Rural-to-Urban Migration and Sexual Debut in Thailand

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Abstract Migration from one's parents' home and sexual debut are common features of the transition to adulthood. Although many studies have described both of these features independently, few have examined the relationship between migration and sexual debut in a systematic manner. In this study, we explore this link for young adults in Thailand. With relatively high rates of internal migration, rapid modernization, a moderate HIV epidemic, and a declining average age of sexual debut, Thailand presents an instructive environment in which to examine migration and sexual debut. We use two waves of a longitudinal data set (2005 and 2007) that includes a subsample of young adults who migrated to urban areas during that period. We identify characteristics and behaviors associated with sexual debut and examine the role of migration on debut. Our approach reduces several common sources of bias that hamper existing work on both migration and sexual debut: (1) the longitudinal nature of the data enables us to examine the effects of characteristics that predate both behaviors of interest; (2) the survey on sexual behavior employed a technique that reduces response bias; and (3) we examine differences in debut by marital status. We find that migrants have a higher likelihood of sexual debut than nonmigrants.

Keywords Migration · Thailand · HIV/AIDS · Sexual debut

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Introduction

Young adulthood is characterized by important life transitions, often including migration from one's parents' home and sexual debut. An extensive research literature has generally treated these "transitions to adulthood" as distinct features of a perilous period that entails a wide range of associated health risks. Far less common is the perspective that these transitions are not necessarily independent—that is, one transition might influence another. Although some observers have noted that migration away from one's home could influence sexual debut, such pathways have seldom been investigated using methodological tools that can reduce the influence of important confounders.

Risks associated with early sexual debut are well documented. Early age at first sex has important negative consequences, including school dropout (Biddlecom et al. 2008), increased risk of unwanted pregnancy (Institute of Medicine 1995), and sexually transmitted infections (Celentano et al. 2008; Kahn et al. 2002; Weinstock et al. 2000). Associations between early sexual debut and HIV infection in particular (Boileau et al. 2009; Bongaarts 2007; Clark 2004; Harrison et al. 2005; Pettifor et al. 2004) result from at least two processes. First, recent societal trends in many countries—including a delay in marriage and steady or decreasing age of sexual debut—are lengthening the period between sexual onset and marriage (Mensch et al. 2005, 2006; Zaba et al. 2004). Taken together, these trends provide opportunities for a greater number of sexual partners—a factor that has consistently been linked to HIV infection (World Bank 1997). Second, earlier sexual debut has also been linked with extramarital partnerships later in life, which further facilitates the spread of HIV (White et al. 2000).

Observed relationships between migration and sexual behavior are common. A recent study using Demographic and Health Survey (DHS) data from Nigeria showed that migration was associated with earlier sexual debut (Mberu and White 2011), and similar results were found for young adults in a recent Kenya-based study (Luke et al. 2012). However, although research has consistently demonstrated increased sexual behavior (including HIV risk behaviors) among migrants compared with their rural counterparts (Anglewicz 2012; Brockerhoff and Biddlecom 1999; Chirwa 1997; Lurie et al. 2003; Pison et al. 1993; Welz et al. 2007), much of this research suffers from important limitations.

Some of these limitations in the study of migration and sexual debut arise from the reliance on cross-sectional data. One notable flaw in cross-sectional data is related to the ordering of events. That is, one can identify factors associated with sexual debut, but confidently ascertaining which happened first is challenging: the sexual debut or the factor associated with sexual debut.[1] Similarly, much migration research has compared nonmigrants with migrants on characteristics measured *after* migration (e.g., Brockerhoff and Biddlecom 1999; Chirwa 1997; Lurie et al. 2003). Although such analysis can demonstrate important differences between migrants and nonmigrants at destination, this style of study design does not allow one to differentiate whether the observed differences in characteristics between migrants and nonmigrants occurred as a

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[1] One approach to overcoming this limitation in cross-sectional data employs the use of life-history calendars to more accurately reconstruct the past, as described in Luke et al. (2011).

result of the migration process or instead whether migrants were different from nonmigrants in certain characteristics prior to migration.

Other limitations in research on sexual debut and migration involve measurement-related issues. The reporting of sexual behavior may be sensitive for some groups (e.g., unmarried Thai women), which can lead to misreporting of these behaviors and thereby cause systematic biases in the data. Such errors resulting from sensitivity may well be compounded by errors following from recall bias in cross-sectional surveys, which typically rely on retrospective self-reports of age of sexual debut. Moreover, like the potential errors resulting from sensitivity, errors of recall are unlikely to be randomly distributed within the population of interest.

Finally, research typically has not considered variation in characteristics of sexual debut by partner type. For some populations, sexual debut occurs before marriage and with a partner whom the individual will not marry. As a result, research on the topic often has either neglected to identify the relationship with the sexual debut partner or focused only on debut outside of marriage. In other populations, substantial proportions may debut within marriage, which is likely to have profoundly different implications with regard to contraceptive use and risk of sexually transmitted infections (STIs) compared with debut with other types of partners.

These limitations in the existing empirical literature notwithstanding, a connection between migration and sexual debut is plausible. Urban environments provide opportunities for formerly rural dwellers to initiate and engage in a wider range of sexual relationships than what was available in rural areas. Such environments also expose recent arrivals to new—and often much more permissive—ideas about appropriate sexual behavior (Anarfi 1993; Grmek 1990; Setel 1999). Indeed, more permissive environments in urban areas may well be one of the attributes that attract some migrants from rural areas in the first place.

Our study addresses some of the key limitations of current research focusing on migration and sexual debut through several features. First, we use a population-based sample of young adults (aged 15–31) living in a rural region of Thailand; we employ a longitudinal approach in which we use two waves of panel data to compare individuals who remain in the rural Thai region of origin with others who moved to an urban area by the second wave. Second, we limit threats to data quality through use of a survey technique that has been demonstrated to yield reliable reports of sensitive behaviors. Third, we compare characteristics associated with sexual debut between individuals who debuted with a spouse and those who debuted with a nonmarital partner.

Another strength of our study is the setting. Much of the recent international literature on sexual debut has been set in sub-Saharan Africa (e.g., Biddlecom et al. 2008; Goldberg 2013; Harrison et al. 2005; Luke et al. 2011; Mberu and White 2011). Yet, with a moderate HIV prevalence, increasing rates of urbanization, and changing sexual norms, Thailand embodies many of the important contextual features that have been highlighted in recent discussions about sexual debut within rapidly changing societies.

Background: Sexual Debut and Migration in Thailand

A well-developed body of research has documented profound changes in sexual behavior among young Thai men and women in recent years. Commercial sex

patronage among young men declined dramatically starting in the late 1980s, which coincided with increased condom use and treatment of STIs (Morrison 2004; Tangmunkongvorakul et al. 2011; VanLandingham and Trujillo 2002; World Bank 2000). According to 2006 estimates from nationally representative data, the once-high rates of commercial sex patronage have remained low since the early 1990s (Chamratrithirong et al. 2007).

These changes in sexual behavior are substantially the result of the HIV/AIDS epidemic. Inspired by fear of the rapidly progressing HIV/AIDS epidemic in the 1980s, the changes in commercial sex patronage and condom use derailed an expanding epidemic: Thailand experienced a remarkable reduction in new HIV infections from 150,000 in the early 1990s to only 26,000 in 2000 (Thai Working Group on HIV/AIDS Projection 2001). Thailand's HIV prevalence rate for 2011 was estimated to be 1.2 % among 15- to 49-year-olds (UNAIDS 2013), about double the rate of the United States but much lower than rates found in the hardest-hit countries of southern Africa.

Despite the success in reducing risky sexual behaviors and decreasing HIV incidence rates, there is concern about the increase in sexual activity among youth in recent years in Thailand and the implications that such increases might have for the future course of the epidemic. Although HIV transmission within commercial sex transactions has declined dramatically, the Thailand national AIDS program has been less successful in preventing HIV transmission resulting from noncommercial encounters (Celentano et al. 1998; Kitsiripornchai et al. 1998; Jenkins et al. 1999). Recent studies suggest that the decline in commercial sex coincided with decreasing age at sexual debut in Thailand and increasing premarital sexual relations among younger generations (Brown et al. 2009; Chamratrithirong et al. 2007). Further cause for concern lies in the apparent lower levels of knowledge of STIs among young adults in Thailand compared with individuals of the same age in the early 1990s (Chamratrithirong et al. 2007).

Another dramatic change in Thailand in recent decades is substantial urban growth. As of 2010, 31 % of the Thai population resides in urban areas (Population Reference Bureau 2010), and the United Nations projects that this figure will reach 60 % by 2050 (UN 2010). Internal migration has played a major role in Thailand's urbanization: the National Migration Survey of Thailand (NMS), conducted in 1992, found that approximately one-fourth of the population had migrated within the five-year period before the survey (Chamratrithirong et al. 1995). Much of Thailand's internal migration is directed toward Bangkok. Since the 1990s, the policy of the Thai government has emphasized reducing migration flows into Bangkok, since the large numbers of migrants are thought to exacerbate longstanding environmental and social problems in the city. Nevertheless, data from a number of sources show that Bangkok remains a major destination for migrants, particularly young adults. Although the economic crisis of the late 1990s dampened the flow of rural residents to urban centers, that was apparently a temporary lull (De Jong et al. 2002).

The rapid transformation of Thailand from a primarily rural traditional society to an urban modern one likely has implications for sexual behavior among young adults. Increased economic and social opportunities and the rapid spread of ideas have permeated even the most remote corners of the country, but few groups have experienced this clash between the modern and traditional worlds as directly as young rural

migrants to the city. Moves by young adults from rural communities to the larger cities are often undertaken with economic or educational goals in mind. However, such moves also present opportunities for migrants to engage in a much wider range of social interactions than are available in the rural communities.

As noted earlier, empirical research has consistently found a relationship between migration and sexual risk behavior, with migrants more likely to engage in sexual risk activity than nonmigrants (Brockerhoff and Biddlecom 1999; Chirwa 1997; Lurie et al. 2003; Pison et al. 1993; Welz et al. 2007). This appears to be the case in Thailand in particular, where rural to urban migration is substantial and opportunities to engage in sexual relationships are greater in urban areas of Thailand than in rural ones (Knodel et al. 1996).

An expanding body of research suggests that rural-to-urban migration broadens opportunities for sexual exploration and long-term relationships through a number of potential mechanisms. First, a move from a village to a city puts the migrant in contact with a larger pool of potential romantic partners than is available in a more sparsely populated area. Second, and related to the preceding, the migrant will be exposed to a much broader set of ideas about what constitutes normative and/or appropriate behavior in the city than was likely the case at home and will be subject to much less parental and community oversight (Anarfi 1993; Grmek 1990; Setel 1999). Third, a move to the city is often accompanied by much more financial independence than what the migrant possessed before the move. Fourth, such moves often result in independent living arrangements, often in stark contrast to what the migrant experienced at home.

The impact of migration on sexual behavior may differ by the type of relationship. For short-term experimental relationships, migration to cities likely provides opportunities that were much less available in the rural origin communities. Some research suggests that migrants are more likely to engage in informal sexual relationships than nonmigrants (Brockerhoff and Biddlecom 1999; Chirwa 1997; Lurie et al. 2003; Pison et al. 1993; Welz et al. 2007). Regarding longer-term relationships, earlier work speculated that rural-to-urban migration might accelerate trends in delayed marriage among young adults in Thailand (Cheung 1984) by providing opportunities for career development and asset accumulation. However, a recent longitudinal analysis of Thai migrants revealed that rural-to-urban migration in Thailand in fact appears to increase the odds of marriage for young female migrants (Jampaklay 2006).

Of course, migration isn't the only or even the principal influence on sexual debut in Thailand and other rapidly modernizing countries. Gender, schooling, and living arrangements have important influences on sexual initiation; and sexual initiation often co-occurs with other new behaviors, such as alcohol and drug (substance) use. Substance use may also be a proxy for personality traits related to permissiveness, which could in turn be related to a higher propensity for sexual experimentation. Complicating these influences further is that these behaviors, traits, and elements of social structure are themselves rapidly evolving within the context of modernization and a more mobile society.

Research in Thailand suggests that differences between men and women in patterns of sexual debut appear to be narrowing. Prior to the recent widespread declines in commercial sex patronage (and the associated drop in HIV), research typically found an earlier age of debut for Thai men than for Thai women (e.g., Chompootaweep et al. 1991; Koetsawang 1987; van Griensven et al. 2001). As the locus of sexual activity

shifted out of commercial sex venues and more men sexually debuted with noncommercial partners, the age of debut for women declined (Taywaditep et al. 2004). Some suggest that the increased anonymity characteristic of large cities has contributed to the decline in age at debut for women and to a larger number of sexual partners (Tangmunkongvorakul et al. 2011).

Further complicating these evolving patterns of sexual debut by gender is the differential effects of the migration experience on male and female migrants. Migrant networks and other forms of social capital play out differently for men and women migrants (Curran et al. 2005), and the effects of migration on mental and physical health appear to differ by sex: moving from a rural to an urban area improves mental health for women but not for men (Nauman 2013). Expectations about urban life also differ significantly between rural men and women who eventually go on to migrate (Nauman and VanLandingham 2013), and these different expectations may lead to different patterns of sexual behavior for rural-to-urban women compared with men.

In addition to differential patterns of sexual debut by gender, such patterns might also differ for individuals with more education compared to those with less. A low level of education was found to be related to sexual initiation at a young age among South African women (Cooper et al. 2007). Another study in eight sub-Saharan African countries found that women with at least some secondary education were significantly less likely to have had sex before age 18 than women with no education (Gupta and Mahy 2003), and a study focusing on Thai men reported a similar pattern (VanLandingham et al. 1993). That many migrants move for educational purposes might serve to strengthen such differences or perhaps introduce new ones related to the different environments in which school-bound and factory-bound migrants live.

Living with parents is associated with less sexual activity or later age at debut in Thailand and elsewhere (Chamratrithirong et al. 2010; Liu et al. 2006; Longmore et al. 2001; Mberu and White 2011). Because many migrants will be living away from their parents for the first time, this relationship between living arrangements and sexual debut is potentially a very important feature of the new urban environment that many migrants experience.

Sexual initiation is associated with substance use and alcohol consumption among male adolescents in many study settings (Mazengia and Worku 2009; Tavares et al. 2009), including Thailand (VanLandingham et al. 1995). Opportunities for premarital sexual experimentation—both heterosexual and homosexual—as well as drug-use experimentation are likely to be substantially greater in urban communities than in rural ones because of increased opportunities to experiment with such behaviors, increased exposure to new ideas about what constitutes appropriate behavior, and decreased supervision and less exposure to negative sanctions by significant others for perceived violations of community norms regarding such behaviors.

Data

The Health Impacts of Rural to Urban Migration in Thailand Study

We use data from the Health Impacts of Rural to Urban Migration (HIRUM) study in Thailand, a longitudinal study based on a repeated census of 84 rural communities in

Kanchanaburi province of Thailand. The HIRUM study extends the Kanchanaburi Demographic Surveillance System (KDSS), which completed five earlier rounds of data collection beginning in 2000.

The first round of HIRUM took place in Kanchanaburi province during the fall in 2005. The target population was individuals aged 15–29. During the fall of 2007, HIRUM reinterviewed all original respondents residing in one of the original study communities, along with those individuals who had migrated to the provincial capital (Amphur Muang, or the "city district"), the other urban area within the province (Amphur Tamaka), or metropolitan Bangkok between the two waves of data collection in 2005 and 2007.

HIRUM interviewed a total of 6,967 respondents in 2005, of whom 4,227 were also interviewed in 2007. Of these 4,227 respondents, 241 (5.7 %) refused to respond to questions on sexual behavior in either 2005 or 2007. This leaves 3,987 individuals who provided information for variables of interest, including 374 migrants (9.4 %) who were reinterviewed at the urban destinations.[2]

There were 2,740 HIRUM respondents who were interviewed in 2005 but not 2007, and are thus not included in the current analysis. These individuals present potential bias to this analysis if they are systematically different from those who were interviewed in both waves. We present an analysis of potential attrition bias in the appendix. Although these individuals differ from respondents who were interviewed in both waves on some characteristics (Table 6 in the appendix), analysis of attrition bias shows no significant differences in 2005 sexual debut between HIRUM respondents who were interviewed in both waves and those who were interviewed only in 2005 (Table 7 in the appendix).[3]

Variables of Interest

We employ two widely used measures of sexual debut. First, individuals were asked whether they have ever had sex (the "current status" measure), and if so, at what age they first had sex (the "age-at-debut" measure). Each of these measures has characteristics that are important to consider in any analysis of sexual debut (Zaba et al. 2004). For example, measures of central tendency for the current status measure will not be available for a population that is mostly sexually inexperienced. Also, age of debut can suffer from recall bias. However, given that the HIRUM respondents encompass the

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[2] Respondents interviewed in 2005 but not reinterviewed in 2007 include 402 migrants to the urban destinations who were not found in the migration follow-up (Table 5 in the appendix). See Nauman (2013) for an analysis of differences in background characteristics between migrants who were found and those who were not found (aged 18+).

[3] We conduct analysis to examine whether those who were interviewed in 2005 but not 2007 are systematically different from those who were interviewed in both waves (see appendix). To do so, we first compare background characteristics between respondents who were interviewed in both waves and those who were lost to follow-up; we then run discrete-time event-history models in which the dependent variable is sexual debut in 2005, and the independent variable is whether the respondent was interviewed in 2005 but not in 2007 (to measure attrition bias in sexual debut). Although there are several significant differences in the bivariate analysis (Table 6), results for this analysis of attrition bias show no significant differences in sexual debut (at the $p < .10$ level) between those who were interviewed in 2005 but not 2007 and respondents who were interviewed in both waves (Table 7).

typical range of ages at which sexual debut typically occurs, the recall problems of the age-at-debut measure should be minimized.

In addition to the measures of sexual debut, the HIRUM data also contain a description of the partner with whom the individual debuted, coded by varying degrees of formality of the relationship.[4] This variable enables us to measure whether individuals debuted with a partner with whom they were engaged or married, compared with others who debuted with less-formal partners.

Because some recent studies have shown that self-completed surveys yield more reliable measures of sexual behavior than does the traditional interviewer-respondent method (Anglewicz et al. 2013; Gregson et al. 2002), we use the more private (self-completed) approach. Upon completion of a standard face-to-face set of modules covering background characteristics, migration activity, and health outcomes, respondents were then asked to answer a separate self-administered module on sexual attitudes and behavior. For these self-completed questionnaires, the interviewer reminded the respondents that they could omit the entire module or any question on it that they did not wish to answer. Those who agreed to continue completed the sexual behavior module themselves in a private place. After completion, this module was placed in a sealed envelope and returned to the interviewer, who was not permitted to open it. The self-completed questionnaires were then taken directly to the field office and stored in a secure place for later data entry. Refusal rates for the self-completed sexual behavior questionnaire were low: of the 4,227 respondents who were interviewed in both waves, 97 % and 96 % of HIRUM respondents agreed to answer the self-administered questionnaire on sexual behavior in 2005 and 2007, respectively, yielding a sample of 3,987 who provided responses to sexual debut in both waves.

Our central independent variable of interest is migration status, which is categorized as "rural-to-urban migrant" (1) for individuals who were interviewed in one of the 84 rural areas in 2005 but in one of the urban destinations in 2007. Individuals who were interviewed in one of the 84 rural areas in both waves are categorized as "nonmigrants."[5] Given the expanded opportunities for sexual exploration in urban areas *vis-à-vis* rural communities, and given the aforementioned empirical links found between migration and sexual experience, we expect that among those sexually inexperienced at the 2005 wave, the rural-to-urban migrants will be more likely than the rural migrants to have initiated sex during the window of observation (2005–2007), after we control for potentially confounding characteristics. Such key control variables include age, level of education, marital status, and an asset-based measure of economic status calculated using principal components analysis (Filmer and Pritchett 2001).[6] In line with factors found to be relevant in previous research, we also include measures of household structure (Chamratrithirong et al. 2010; Liu et al. 2006; Longmore et al. 2001; Mberu and White 2011), indicated by whether the respondent coresides with at

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[4] Categories ranged from the most informal (e.g., casual acquaintance or sex worker) to the most formal (e.g., one's spouse or betrothed).

[5] Some of these "nonmigrants" may have moved prior to 2005, or between 2005 and 2007 before returning to Kanchanaburi by 2007. We control for the former in our models. The latter make up only a small percentage of our sample; controlling for this return migration did not affect our results.

[6] The asset indicator is a principal components analysis measure of 12 household amenities, including air conditioning and a TV, VCR, satellite, stereo, radio, cell phone, telephone, computer, generator, refrigerator, and vehicle.

least one parent; and substance abuse (Liu et al. 2006; Mazengia and Worku 2009; Tavares et al. 2009; VanLandingham et al. 1995), as an indicator of whether the respondent drinks alcohol.

Methods

Timing of Sexual Initiation

Event-history analysis is an appropriate approach for identifying variables associated with the timing of a particular outcome while dealing with censored observations: in this instance, respondents who had not sexually initiated by 2007. In the case of sexual debut, however, timing is measured in years (ranging from age 14 to age 32), which leads to a relatively large number of respondents who share the same coded timing of sexual debut. Multiple observations sharing the same timing of an event often leads to biased coefficients in standard continuous-time specifications, such as Cox regression models (Allison 1995). To address this issue, we instead use a discrete-time event-history model—an approach that yields unbiased estimates of sexual debut when multiple respondents experience an event in the same time interval (Allison 1982; Singer and Willett 2003).

We conduct the analysis in several steps. First, in order to examine the relationship between migration status and other characteristics on the risk of sexual debut between 2005 and 2007, we limit the analysis to men and women who had not sexually debuted by the 2005 HIRUM wave. This sample restriction enables a prospective focus on behaviors yet to occur at baseline (i.e., sexual debut), thus reducing the problems associated with the retrospective reporting of behaviors that occurred before the observation period began. Furthermore, this approach uses baseline values of key covariates from 2005, which facilitates a temporal ordering of events of interest given that these characteristics were measured before sexual debut. As a result, we can identify characteristics and behaviors associated with sexual debut within the next two years for each individual.[7] Limiting the sample to those who had not sexually debuted by 2005 yields a total of 1,377 respondents (828 women and 549 men), or 34.5 % of all respondents (3,987) interviewed in 2005 and 2007.

To construct these discrete-time event-history models (run separately by sex), we convert the data to a person-years format: each observation represents one year per respondent in which they were exposed to the risk of sexual debut, and the censored category is not experiencing sexual debut by the end of the period (2007). In these regressions, the dependent variable is an indicator of whether the individual experienced sexual debut (between 2005 and 2007) within the particular one-year period. Because the youngest individuals in the 2005 sample are age 14, respondents are considered at risk of sexual debut starting at age 14.

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[7] Because we do not have the exact timing of sexual debut (day and month), we do not know whether sexual debut takes place before or after migration. The goal of our analysis is to determine whether the occurrence of migration during the window of observation is associated with sexual debut during the window, *vis-à-vis* individuals who did not migrate during the window.

In the first stage of our analysis, we identify the contribution of various factors on sexual debut for men and women. For our first model, we include only age and the measure of migration during our observation window of 2005 and 2007 (Model 1). For Model 2, we add background characteristics (level of education, economic status, the relationship of the respondent to the head of household, and marital status at 2007), health measures (SF-36 measures of physical and mental health), coresidence with a parent, and alcohol use. This approach enables us to examine any significant relationship between migration and sexual debut before controlling for characteristics that may differ between migrants and nonmigrants. We run these regressions separately for three populations: (1) pooled by sex, (2) men only, and (3) women only. This approach enables us to identify differences in sexual debut between men and women for each of the marriage categories described earlier.

We also incorporate the important consideration of marital status in our regression models. For many, sexual debut takes place within first marriage. Among respondents who were interviewed in 2005 and 2007 and had not sexually debuted by 2005, 13.4 % (184) got married for the first time and debuted with the married partner between 2005 and 2007. Because we expect that features of sexual debut will differ by whether debut occurs within or outside marriage, we next model sexual debut separately by marital status in 2007. To account for this pattern, we run three sets of the regressions: (1) for all respondents regardless of marital status in 2007, which we include as a control variable; (2) for respondents who remained never-married in 2007, some of whom debuted; and (3) for individuals who became married and debuted with their spouse between 2005 and 2007.[8]

Results

Background characteristics for these respondents are provided in Table 1. Of the 1,377 men and women who had not sexually debuted by 2005, 41 % of men and 25 % of women debuted by 2007. Of particular interest in our regression models is migration; 15 % (84) and 18 % (146) of men and women, respectively, moved from the rural area to an urban one by 2007. Debut occurred both outside and within marriage; 92 % of men and 83 % of women remained unmarried in 2007.

For our regression results, we begin with the full sample that includes all the men and women in our sample of those who were sexually inexperienced at 2005, regardless of their marital status at 2007 (Table 2). Beginning with the regressions that combine men and women, we can see that when we control for age, there are significant differences by sex and migration status. Women had a significantly lower likelihood of sexual debut than men, and migrants between 2005 and 2007 had a significantly higher likelihood of debut than nonmigrants. Both variables remain significant after we

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[8] Because we consider debut and marriage to occur at approximately the same time for our respondents who marry and debut during our observation window, a discrete-time event-history analysis of marriage would likely mirror our analysis of debut. For these respondents, debut could take place either before or after marriage. All respondents who marry within the interval also debuted with their spouse within this period (but vary in the exact timing of debut), so there is no censoring in this analysis. We could therefore also use a linear regression with time to debut as the dependent variable, but we instead use the same discrete-time event-history approach for comparability with previous results.

Table 1 Background characteristics for HIRUM male and female respondents who had not sexually debuted in 2005

	Men	Women
Sexually Debuted by 2007 (%)	40.9	24.9
2005 Mean Age	17.7	18.4
2005 Highest Level of Education Attained (%)		
No education/primary/religious school	35.9	39.4
Secondary	55.1	50.5
University/postsecondary	9.0	10.1
2005 Mean PCA Assets Index	-0.20	0.13
2007 Marital Status (%)		
Unmarried in 2007	91.9	83.1
Married by 2007	7.7	15.8
Divorced/separated in 2007	0.4	1.1
2005 Mean SF36 Mental Health Score	50.3	49.5
2005 Mean SF36 Physical Health Score	53.0	52.0
2005 Drinks Alcohol (%)	30.0	7.0
2005 Living With One or More Parent (%)	80.6	79.4
Migrated Prior to 2005 (%)	50.0	52.6
Migrated Between 2005 and 2007 (%)	15.3	17.6
N	549	828

Note: Because less than 2 % of HIRUM respondents had no education, we grouped no education with primary education.

include the other variables in Model 2, which shows some surprising results. First, although education has sometimes been associated with lower sexual activity, we find that those with secondary education in 2005 have a significantly higher likelihood of debut, but those with university or postsecondary education have significantly lower odds. Although the significantly higher odds of debut among those married and divorced by 2007 are not surprising, it is interesting to note that individuals with better mental health in 2005 had a significantly lower likelihood of sexual debut. We observe a nonlinear relationship between age and sexual debut for men and women: the likelihood of sexual debut first increases during the early ages within our age range of interest (14–31) and decreases thereafter.[9] Migration between 2005 and 2007 is associated with higher risk of sexual debut, but we do not find that past migration history (before 2005) is significantly related to sexual debut. Another potentially unexpected result is that coresidence with a parent is not significantly associated with sexual debut; however, it is impressive that the effect of the migration status variable remains significant in models including measures of residence, suggesting that the latter does not explain the effect of the former.

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[9] Regression models with dummy variables for each age category 14–31 (with age 14 as the reference category) yielded results that were not substantively different from those presented here (with age as quadratic).

Table 2 Discrete-time event-history regression results for 2005 characteristics and behaviors associated with sexual debut between 2005 and 2007 for HIRUM men and women: Odds ratios, with robust standard errors in parentheses

	Men and Women		Men Only		Women Only	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Female	0.43**	0.34**	—	—	—	—
	(0.05)	(0.05)	—	—	—	—
Age	1.89**	1.99**	1.95**	2.01**	1.86**	2.05**
	(0.17)	(0.18)	(0.27)	(0.27)	(0.22)	(0.26)
Age, Squared	0.97**	0.97**	0.97**	0.97**	0.97**	0.97**
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Migrated Between 2005 and 2007	1.76**	1.86**	1.92**	1.80**	1.61**	2.22**
	(0.23)	(0.29)	(0.36)	(0.38)	(0.30)	(0.42)
Migrated Prior to 2005		1.10		1.18		1.15
		(0.14)		(0.20)		(0.20)
Level of Education						
No education/primary/religious school (ref.)		—		—		—
Secondary		2.52**		2.62**		2.16**
		(0.42)		(0.57)		(0.55)
University/postsecondary		0.80		0.88		0.57†
		(0.17)		(0.32)		(0.17)
Assets Index		0.92*		0.95		0.89
		(0.04)		(0.05)		(0.07)
2007 Marital Status						
Unmarried in 2007 (ref.)		—		—		—
Married by 2007		7.61**		2.71**		15.57**
		(1.12)		(0.63)		(2.83)
Divorced/separated in 2007		3.77*		0.66†		11.15**
		(2.40)		(0.14)		(5.90)
Lives With at Least One Parent		1.00		0.97		0.94
		(0.17)		(0.21)		(0.19)
Mental Health		0.98**		0.99		0.97**
		(0.01)		(0.01)		(0.01)
Physical Health		1.01		1.00		1.02
		(0.01)		(0.01)		(0.02)
Drinks Alcohol		1.02		1.36†		0.63
		(0.16)		(0.23)		(0.18)
Pseudo-R^2	.077	.172	.072	.108	.057	.248
N	13,264 (1,377 clusters)		4,958 (549 clusters)		8,323 (828 clusters)	

Notes: We also tested other variables in the regressions, including employment status and job type, more-detailed household structure (e.g., living with one or both parents, number of siblings), and other lifestyle measures (e.g., cigarette smoking, dietary measures, free-time activities). None of these variables were significant, and their inclusion does not substantially alter the results presented in the table; they were therefore left out of the final models.

†$p \leq .10$; *$p \leq .05$; **$p \leq .01$

Next, we focus on similarities and differences between men and women for the full population (regardless of marriage status by 2007), again from Table 2. These results show some similar patterns of sexual debut by sex: the importance of migration and higher likelihood among the married remain significant in these regressions for men and women. There are several differences in characteristics associated with debut by sex, however. Although the odds for both men and women are significantly higher for those with secondary school education (compared with less than secondary schooling), the significantly lower likelihood for those with education higher than secondary school is found only for women. In addition, we find that mental health is associated with sexual debut only for women.

Moving to the next set of regressions, in which we limit the population to only those who remained unmarried by 2007 (Table 3), we find consistent results for migration: among those who remained never-married in 2007, those who migrated between 2005 and 2007 have a significantly higher likelihood of debut than do nonmigrants. For unmarried men and women, several results remain consistent with the previous set: we still see significant differences by sex, with women having a significantly lower likelihood of debut than men. Among the unmarried, the nonlinear pattern with regard to age is consistent for both sexes combined and for men and women separately.

Several results are different among unmarried men and women, compared with all individuals. For example, the relationship between alcohol use and debut differs between men and women: men who drink alcohol have a significantly higher likelihood of sexual debut, but the opposite is found among women who drink. We do see a significant relationship between physical health and debut for women: those with better physical health have a higher likelihood of debut. Finally, we see a different relationship with education among the unmarried: whereas men with secondary or higher level of education have a higher likelihood of debut (consistent with the preceding), there is no significant relationship for women, or for men or women with university or postsecondary education.

Turning to the respondents who debuted within marriage between 2005 and 2007 (Table 4), we again find a relationship between migration and sexual debut, but this time only for women: Thai young adult women who migrated between 2005 and 2007 had a higher likelihood of sexual debut than their nonmigrant counterparts, which could reflect moving to the spouse's home upon marriage. Men who married by 2007 do not have a significantly higher likelihood of debut than women, perhaps reflecting the fact that Thai men and women marry at about the same age. Compared with the results for unmarried women, we see a stronger relationship between debut and education for these women who married during the interval: married women with secondary school education have significantly higher odds of debut and those with university or postsecondary education have a significantly lower likelihood of debut than women with primary or lower education. Finally, it is only among women (not men) who married by 2007 that household structure is important: women who married by 2007 and lived with a parent have a significantly lower likelihood of debut than their counterparts not living with a parent.

Discussion

That a move from the village to the city might accelerate sexual debut among rural-to-urban migrants *vis-à-vis* those who remain behind is intuitively appealing. The city

Table 3 Discrete-time event-history regression results for 2005 characteristics and behaviors associated with sexual debut between 2005 and 2007 for HIRUM men and women who remained unmarried in 2007: Odds ratios, with robust standard errors in parentheses

	Men and Women		Men Only		Women Only	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Female	0.19**	0.21**	—	—	—	—
	(0.03)	(0.03)	—	—	—	—
Age	2.11**	2.19**	1.94**	2.03**	2.66**	2.75**
	(0.33)	(0.33)	(0.32)	(0.31)	(1.17)	(1.15)
Age, Squared	0.96**	0.96**	0.97**	0.97**	0.94**	0.94**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Migrated Between 2005 and 2007	2.37**	2.12**	2.07**	1.86**	2.96**	2.59**
	(0.39)	(0.36)	(0.43)	(0.41)	(0.78)	(0.71)
Migrated Prior to 2005		1.15		1.36		0.79
		(0.17)		(0.25)		(0.19)
Level of Education						
No education/primary/religious school (ref.)		—		—		—
Secondary		2.52**		2.65**		1.70
		(0.54)		(0.66)		(0.74)
University/postsecondary		0.94		0.79		0.99
		(0.31)		(0.33)		(0.51)
Assets Index		0.95		0.98		0.89
		(0.04)		(0.05)		(0.07)
Lives With at Least One Parent		0.91		0.83		1.09
		(0.17)		(0.19)		(0.34)
Mental Health		0.97**		0.99		0.93
		(0.01)		(0.01)		(0.01)
Physical Health		1.02		1.01		1.06**
		(0.01)		(0.02)		(0.02)
Drinks Alcohol		1.41*		1.62**		0.69**
		(0.23)		(0.30)		(0.38)
Pseudo-R^2	.120	.146	.067	.097	.084	.136
N	11,454 (1193 clusters)		4,507 (504 clusters)		6,947 (689 clusters)	

Notes: We also tested other variables in the regressions, including employment status and job type, more-detailed household structure (e.g., living with one or both parents, number of siblings), and other lifestyle measures (e.g., cigarette smoking, dietary measures, free-time activities). None of these variables were significant, and their inclusion does not substantially alter the results presented in the table; they were therefore left out of the final models.

*$p \leq .05$; **$p \leq .01$

provides contacts with a larger number of potential romantic partners, exposure to a broader range of perspectives about appropriate behavior, more financial independence, and less supervision and scrutiny than a rural environment. Empirically, several studies

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Table 4 Discrete-time event-history regression results for 2005 characteristics and behaviors associated with sexual debut between 2005 and 2007 for HIRUM men and women who became married by 2007: Odds ratios, with robust standard errors in parentheses

	Men and Women		Men Only		Women Only	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Female	0.98	1.11	—	—	—	—
	(0.23)	(0.38)	—	—	—	—
Age	1.75**	1.93**	2.08**	2.17**	1.69**	1.94**
	(0.21)	(0.25)	(0.66)	(0.80)	(0.22)	(0.28)
Age, Squared	0.98**	0.97**	0.97*	0.96*	0.98**	0.98**
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Migrated Between 2005 and 2007	1.14	1.67*	1.00	0.98	1.19	1.76**
	(0.27)	(0.43)	(0.46)	(0.75)	(0.33)	(0.37)
Migrated Prior to 2005		1.39		0.85		1.68[†]
		(0.32)		(0.35)		(0.47)
Level of Education						
No education/primary/religious school (ref.)		—		—		—
Secondary		1.87*		1.03		2.26[†]
		(0.60)		(0.58)		(0.95)
University/postsecondary		0.45*		0.36		0.44*
		(0.15)		(0.24)		(0.18)
Assets Index		0.87		0.97		0.88
		(0.09)		(0.30)		(0.10)
Lives With at Least One Parent		0.88		1.31		0.64[†]
		(0.23)		(1.10)		(0.15)
Mental Health		0.99		0.98		1.00
		(0.01)		(0.03)		(0.02)
Physical Health		0.99		0.98		1.00
		(0.02)		(0.04)		(0.02)
Drinks Alcohol		0.81		0.63		0.93
		(0.25)		(0.28)		(0.33)
Pseudo-R^2	.097	.140	.109	.126	.095	.157
N	1,827 (184 clusters)		451 (45 clusters)		1,376 (139 clusters)	

Notes: We also tested other variables in the regressions, including employment status and job type, more-detailed household structure (e.g., living with one or both parents, number of siblings), and other lifestyle measures (e.g., cigarette smoking, dietary measures, free-time activities). None of these variables were significant, and their inclusion does not substantially alter the results presented in the table; they were therefore left out of the final models.

[†]$p \leq .10$; *$p \leq .05$; **$p \leq .01$

have found links between such moves to the city and sexual behavior. A major limitation of much of this work is the reliance on cross-sectional data, which suffer from substantial threats to validity resulting from the potential confounding influences of selection: migrants differ from nonmigrants even before they migrate and such differences cannot be accounted for after the fact—that is, after migration has already occurred. A more robust test of the hypothesis that migration influences sexual

behavior requires premigration measures for both future migrants and nonmigrants, and a longitudinal approach that follows both groups as they transition to sexually active adults.

We employ such a longitudinal approach in this analysis of sexual debut among young Thai men and women, exploiting data from a demographic field station in Kanchanaburi Province, on Thailand's western border. Following sexually inexperienced young adults originating from rural sites through two rounds of data collection, we find that those who migrated to urban areas during the two-year observation window were indeed more likely to debut than their counterparts who remained behind in the rural area. This influence of migration on debut remains statistically significant in the presence of a number of potentially confounding factors, such as age, education, health status, previous migration, coresidence with a parent, and alcohol use; it also holds for both male and female migrants. Some of this debut occurred within the context of marriage, but much of it occurs outside it. Among those who remained unmarried at the end of the observation period, rural-to-urban migration significantly increased the odds of sexual debut for both male and female migrants with respect to their counterparts who did not migrate. Although men were more likely to debut during the two-year window than women, the effect of migration on debut was stronger for women than for men.

Although our research is an improvement over the commonly used cross-sectional approach, several notable limitations remain. First, although we can discern the causal ordering of sexual debut with most independent variables of interest, we cannot do so with migration; thus, we do not know whether migration causes sexual debut or if those who sexually debut are more likely to migrate. In addition, we have a relatively small sample size of men who became married between 2005 and 2007, which limits our ability to detect characteristics associated with sexual debut. Third, it is possible that some of those who debuted outside marriage will eventually marry the partner with whom they debuted. However, given that these individuals reported their sexual debut partner as less formal than those who debuted within marriage, it seems reasonable to assume that they are systematically different groups. Finally, although we do not find evidence of systematic differences in 2005 sexual debut between those we successfully reinterviewed and those who were lost to follow-up, it is still possible that sexual debut differed after 2005 for these respondents. In other words, characteristics associated with sexual debut between 2005 and 2007 could differ between respondents who were and those who were not reinterviewed.

Nonetheless, our longitudinal approach helps us to minimize potentially confounding effects of selection and enables us to minimize bias that often confronts cross-sectional designs. A second contribution is a focus on sexual debut in Southeast Asia, a region that has not received as much attention on this topic as have other regions. Our separate analyses for those who debuted within and those who debuted outside marriage is a third contribution of our analysis.

Although our results say much less about how migration might influence sexual debut, the pattern of results provides some clues. That the influence of migration on sexual debut is stronger for unmarried women than for unmarried men implicates rural constraints on sexuality that are especially restrictive for women. Such constraints likely include a much greater degree of behavioral and relationship scrutiny in rural areas than in urban ones, as well as greater scrutiny of the activities of unmarried

women than of unmarried men. Conversely, the urban environment is likely to provide greater anonymity and more freedom to pursue relationships of interest without drawing the attention of family and community members. Such contrasts between the urban and rural environments would presumably have a greater impact on the behavior of women than of men; indeed, precisely such an effect is indicated by the stronger influence of a move to the city on the sexual behavior of women than of men. Also, the fact that women's risks—or opportunities—for debut diminish with the highest levels of educational attainment is likely explained by longstanding patterns of Thai husbands having at least equal levels of educational attainment of their wives (Jones 2007). Given that highly educated men are in especially short supply in rural areas, our empirical results suggest that a highly educated woman's chances for love are going to be much greater in the city than in the village.

Appendix

Here, we examine potential bias presented by respondents interviewed in 2005 but not in 2007. First, we present a table of reasons for noninterview among the 2,740 respondents not interviewed in 2007. Next, we test bivariate differences in background characteristics (used in the regression models above) between respondents who were reinterviewed and those who were lost to follow-up. Finally, we examine whether individuals who were lost to follow-up are systematically different in sexual debut from reinterviewed respondents.

Table 5 shows the reason for noninterview among respondents who were interviewed in 2005 but not 2007. The most common reason was migration out of the KDSS sample area. Also shown in Table 5 are the 402 migrants who were not found (i.e., migrants who moved to the urban locations listed earlier but were not found in the migration follow-up).

For an analysis of attrition bias, we examine whether those who were interviewed in 2005 but not 2007 are systematically different from those who were interviewed in both waves. To do so, we first compare background characteristics between respondents who were interviewed in both waves and those who were lost to follow-up (Table 6). Then, we run discrete-time event-history models in which the dependent variable is age at sexual debut in 2005 (Table 7). For these regressions, we include the same independent variables as other models in the main article, with one important exception: a binary measure of whether the respondent was interviewed in 2005 but not in 2007 (an indicator of attrition bias). Thus, if those who were interviewed in 2005 but not 2007 were systematically different in sexual debut from those who were interviewed in 2005 and 2007, this variable would be significant in the models. We run these regressions for both sexes combined and then separately for men and women.

Table 5 Reason for noninterview in 2007 among respondents interviewed in 2005

	N	%
1. Moved Within Village	78	2.8
2. Move to Another KDSS Village	15	0.5
3. Moved Out of KDSS to Rural or Other Urban Location	659	24.1
4. Moved Out of KDSS to Urban Location (migrant target group), Not Found	402	14.7
5. Moved Out of KDSS to Unknown Destination	687	25.1
6. Refused	47	1.7
7. No One Found at Household	815	29.7
8. Sick/Disabled	21	0.8
9. Died	10	0.4
10 Other	6	0.2
Total	2,740	100.0

Results for this analysis of attrition bias show several significant differences in the bivariate comparison (Table 6). Those who were lost to follow up are more likely to be male, to have no previous migration history, to have less secondary education only, to be unmarried, not to live with a parent, and to consume alcohol; they are also younger.

Table 6 Analysis of attrition; bivariate comparison of 2005 background characteristics between respondents who were interviewed in 2005 and 2007 with those who were lost to follow-up

2005 Characteristics	2005–2007	2005 only (attrition)
Female (%)	58.8	48.7**
Age	21.9	21.5**
Migrated Prior to 2005 (%)	30.9	21.9**
Level of Education (%)		
No education/primary/religious school	38.0	40.7*
Secondary	52.4	48.3**
University/postsecondary	9.6	11.0
Assets Index	0.013	−0.011
Marital Status (%)		
Never-married	47.3	51.4**
Married	50.5	45.3**
Divorced/separated	2.2	3.3**
Lives With at Least One Parent (%)	53.3	49.6**
Mental Health	51.9	52.0
Physical Health	49.6	49.5
Drinks Alcohol (%)	31.0	39.1**
N	4,227	2,740

*$p \le .05$; **$p \le .01$

Table 7 Discrete-time event-history regression results for assessment of attrition: 2005 characteristics and behaviors associated with sexual debut for HIRUM men and women: Odds ratios, with robust standard errors in parentheses

	Men and Women	Men Only	Women Only
Female	0.93	—	—
	(0.04)	—	—
Age	2.91**	2.86**	2.96**
	(0.08)	(0.12)	(0.10)
Age, Squared	0.96**	0.96**	0.96**
	(0.00)	(0.00)	(0.00)
Attrition (interviewed in 2005 but not in 2007)	**1.03**	**1.07**	**1.08**
	(0.04)	(0.06)	(0.06)
Migrated Prior to 2005	0.95	0.87†	1.05
	(0.05)	(0.07)	(0.08)
Level of Education			
No education/primary/religious school (ref.)	—	—	—
Secondary	0.97	1.29*	0.79**
	(0.04)	(0.09)	(0.05)
University/postsecondary	0.52**	1.01	0.35**
	(0.03)	(0.11)	(0.03)
Assets Index	1.00	1.06*	0.96**
	(0.01)	(0.02)	(0.02)
2005 Marital Status			
Unmarried (ref.)	—	—	—
Married	4.58**	2.35**	20.26**
	(0.25)	(0.17)	(2.77)
Divorced/separated	5.01**	2.45**	23.01**
	(0.56)	(0.52)	(4.36)
Lives With at Least One Parent	0.94	1.11	0.80
	(0.04)	(0.08)	(0.05)
Mental Health	0.99**	0.99*	0.99**
	(0.00)	(0.00)	(0.00)
Physical Health	1.00	1.01*	1.00
	(0.00)	(0.01)	(0.00)
Drinks Alcohol	1.35**	1.76**	1.16†
	(0.07)	(0.11)	(0.09)
Pseudo-R^2	.244	.213	.308
N	50,165 (6,965 clusters)	20,494 (3,145 clusters)	29,671 (3,820 clusters)

$^\dagger p \leq .10$; $*p \leq .05$; $**p \leq .01$

Despite these bivariate differences, there is no significant difference in sexual debut (at the $p < .10$ level) between those who were interviewed in 2005 but not 2007 and

respondents who were interviewed in both waves (in bold, Table 7), for men or women alone, or pooled by sex.

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