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***WORKING PAPER***

## **The Determinants of Family and Individual Migration: A Case-Study of Rural Bangladesh**

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\* The author gratefully acknowledges the support of the International Pre-Dissertation Fellowship of the Social Science Research Council (supported by Ford Foundation and American Council of Learned Societies); the J. William Fulbright Scholarship (funded by United States Information Agency, administered by Institute for International Education); the Population Council Dissertation Fellowship in the Social Sciences; the Mellon Fund for Research in Population in Developing Countries; and the University of Colorado Population Aging Center (funded by National Institute on Aging). Many colleagues provided valuable commentaries on earlier versions of the paper, including Jane Menken, Douglas Massey, Leah Vanwey, Robert Retherford, Jeroen van Ginneken, Lynn Karoly, Erin Trapp, Julie DaVanzo, and Richard Rogers. Most of all, the author wishes to thank the research and technical staff of the Matlab Health and Demographic Surveillance Unit at ICDDR,B: International Centre for Health and Population Research, and the patient and thoughtful citizens of Matlab.

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## **Abstract**

This paper investigates the determinants of rural-urban migration by adult males in Matlab *Thana*, Bangladesh, from 1983 to 1991. A three-category model of family migration, individual migration, or no migration identifies important distinctions in the determinants of family and individual migration that would be masked by a simple two-outcome migration model. Family migration, which entails formation of an independent urban household, is more likely among older men and men from landless households, particularly during the year immediately following a devastating flood. The findings demonstrate the potential role of migration in furthering rural socioeconomic stratification: only households with significant resources are better positioned to use individual migration as a powerful outlet for mutual economic development and security.

Keywords: Rural-Urban Migration, Family Migration, Bangladesh, Developing Countries

## **I. Introduction**

In attempting to understand migration, social scientists often ignore the heterogeneity in both migration pattern and motivation that exists in many sending populations. Migration can maximize the welfare of the migrant as well as the members of a larger family unit. Migration can involve individuals moving alone as well as entire families. Motives and practices are both conditioned by life course transitions, as well as characteristics of the migrant and household. Numerous review articles acknowledge these differences, and some papers find empirical evidence of multiple motivations for migration in the same population. Yet few papers have asked how the determinants of migration might differ between different types of migrants within the same population.

This paper addresses the diversity of motivations for rural-urban migration by men in a rural area of Bangladesh in two ways. It looks separately at migration before and after marriage, a life event that both reduces the likelihood of migration and changes the nature of the migration decision. It also separates the migration of married men into migration alone (referred to as “individual migration”) or with conjugal family members (referred to as “family migration”). An iterative cycle of qualitative fieldwork and quantitative analysis has determined that a simple mover-stayer model of rural-urban migration in this context would mask heterogeneity in the determinants of family and individual migration. For instance, a simple negative relationship between land holdings and migration propensity common in many settings could mask a tendency for family migration to be far more likely among men from landless households.

Results from a standard two-outcome, mover-stayer model are thus compared against those of a three-outcome model where married men can choose to stay, to migrate as an individual, or to migrate with a family. Expected differences in the age-, land-, and education profile of family and individual migrants will suggest substantial differences between the two

groups.

The analysis also studies migration patterns in the year immediately following a major flood. The likelihood of family and individual migration should increase following such a major ecological and economic catastrophe, yet the characteristics of those practicing family and individual migration following the flood should diverge considerably.

Each such result should give migration analysts pause to consider whether the purported opportunities and benefits of migration will apply evenly to all sub-groups within a particular community. This is very different from suggesting that some migrants will succeed or fail, and some households will benefit or not. The results of this paper will suggest that family migrants may enter the migration process coming from substantially more disadvantaged backgrounds and having substantially fewer prospects than individual migrants. The systematic promise of negative migration outcomes among certain sub-groups should also give policymakers reason to redouble their efforts to secure rural livelihoods for at-risk households through pathways other than migration.

The following section addresses the diversity versus heterogeneity issue in the literature on the determinants of migration. After discussing the context of rural-urban migration in Bangladesh, I introduce the Matlab Health and Demographic Surveillance System (HDSS) data, which are ideally suited to prospectively identifying individual and family migration behavior and offer a sample size suitable for identifying sub-group differences. Results of a three-outcome model of migration by adult males in Matlab from 1983 to 1991 are then compared to those of a two-outcome model. I address this comparison in the context of the effect of individual age and education, household land holdings, and the migration response to a catastrophic flood in 1988.

## **II. Theoretical Background and Synthesis**

Existing microeconomic theories address migration's role as both an individual labor market and

household livelihood decision. Early migration decision-making models were framed around individual-level labor market decisions. Wage differential models (henceforth referred to as “WD”) conceive migration as a simple response to an unequal spatial distribution in wages or earnings (Ranis & Fei 1961). In a single-society context, migration should induce wage equilibrium between the rural and urban sectors. Decreased rural competition and increased urban competition should lead to a balance in the labor and wage returns to existing capital in each area (Lewis 1954). The micro-level WD model predicts migration if an individual’s expected destination-area income, the expected wage times the probability of employment, is higher than current income (Todaro 1970; Harris & Todaro 1969). Sjaastad (1962) incorporated individual characteristics into the expected wage function, particularly the role of human capital in determining destination-area income.

Acknowledging that migration decisions revolve around issues of family and residence, not just labor, Mincer (1978) extended the WD model to the migrating family. In this model, migration stems from a joint family utility maximization, yet not all family members benefit equally. If only one family member benefits from a move (such as a husband), he must compensate other family members, who become “tied movers.” Family ties such as marriage tend to deter migration. Migration is likely only if one member’s incentives substantially outweigh other members’ disincentives. The model also points to the extreme case in which one spouse draws substantial benefit and another substantial loss, leading to divorce or separation.

Short of marital dissolution, the empirical literature points to *individual migration* as a common result of husband/wife disparities in migration incentives. If migration improves an individual’s labor market position, but not his family’s residential position, he may move to the destination area alone, often for long durations, while other family members remain in the origin

area. Individual migration is particularly common when political restrictions explicitly limit mobility, as in the case of international migration, or when location-specific government transfer programs indirectly limit mobility, as in modern-day China. Individual migration is also common if urban labor markets are dominated by low-wage, low benefit employment in informal and export-oriented production, as in many South and Southeast Asian societies (Gereffi & Korzeniewicz 1994; de Janvry & Garammon 1977). Research on individual migration suggests that migration can lead to positive economic outcomes even for those who do not move (de Haan & Rogaly 2002; de Haan 1999; Kanaiaupuni & Donato 1999). Household consumption may remain fixed in the rural origin area even while a family member lives and works in the urban labor market.

The New Economic Model of Labor Migration (henceforth referred to as “NE”) extended the locus of migration decision-making to include the family. Migration enhances income in the origin area not merely through WD’s reduced competition mechanism, but also through flows of capital from migrants to specific origin households, commonly referred to as remittances. Were remittances to increase the long-term income-earning potential of an origin household, they might encourage migrants to return to their origin households or, indeed, to migrate with the intention of returning after a fixed period of time.

Moreover, an individual’s migration decision might consider not merely one’s own income-earning potential in a different location, but the overall income or welfare of a larger income-pooling unit such as the family or household. Expanding on economic theories of the family, NE shows how remittances act as a partial remedy for risk management and liquidity constraints in developing countries, increasing investment and long-term income (Taylor & Wyatt 1996; Durand et al. 1996; Becker 1991; Stark 1982). Migration may also allow an

income-pooling unit to allocate labor efficiently between sectors to maximize current household earnings, in consideration not just of an individual's own human capital, but of the household's labor and capital demands at a particular point in time (De Haan 1999; Ellis 1998).

### ***Diversity or Heterogeneity?***

In their review of the global migration literature, Massey et al. (1998) find extensive support for both WD and NE in each region of the world. Migration results from low wages and high levels of unmanaged risk (Stark 1982). Individual decision-makers, whether moving alone or with family members, may move to serve their own needs or those of a larger family grouping. Few studies, however, address whether the extent to which migration's dual purpose reflects diversity or heterogeneity. To what extent do individual members of a community move to maximize both their own income and their origin household's security? To what extent do some maximize their own income while others maximize household security.

This question is difficult to answer for a number of reasons. First, both low wages and unmanaged risk prevail in most rural areas of Less Developed Countries (LDCs), so their effects are difficult to disentangle. Second, although both factors may have a powerful effect on migration, rates of migration in any particular population at any point in time remain quite low (Faist 2001). Third, it is difficult to identify methodological approaches that appropriately address heterogeneity within a single migrant-sending population. Existing studies of migration tend either to establish the presence of a multiplicity of motivations, without addressing questions of diversity or heterogeneity, or they choose to focus on one of many motivations for migration.

Massey and Espinosa's (1997) study on migration from Western Mexico to the United States demonstrates both the achievements and limitations of the first approach. Irrespective of

the presence or absence of migrant family members, an individual's migration likelihood is modeled in terms of individual-level predictors of earnings (age, education) and community- and household-level indicators of unmet need for security or liquidity. In doing so, they find support for each set of factors, yet they do not address how the importance of each set of motivations might differ between specific migrants or households in the same context.

One solution to addressing the complex effect of household variables such as land holdings on migration has been to focus principally on one set of motivations. Several studies focus explicitly on migration's role in household diversification, applying the assumption that household land holdings provide an anchor, a source of long-term economic security that encourages individual, circular or other forms of migration that are aimed at eventually returning home to the land. VanWey (2003) identifies the complex land-migration relationship among temporary migrants, disentangling the income maximizing goals of households with small landholdings from the long-term investment and diversification goals of those with larger landholdings. This work carefully elicits one kind of heterogeneity, amongst motivations for temporary migration, but does not address the substantial portion of moves that are of longer duration or by entire families.

Similarly, a number of studies have focused exclusively on family migration, finding that family migrants come from poorer and landless groups. In Bangladesh and West Bengal (the neighboring Indian state), Roy et al. (1992) identify a weak rural security structure and other "push factors" as reasons for family migration in spite of the predominance of individual migration in the area. Other studies, primarily in India, have also found that migration of entire households is more likely to occur among landless, laboring, and low caste households (Lipton 1980; Connell et al. 1976). Connell et al. (1976) identify a limited segment of small-scale studies

that suggest that family and individual migration are in fact likely to occur in the same villages, with individual migrant-sending households using remittance income to accumulate resources and alter consumption markets, accelerating the process of family migration by landless households.

This paper's three-outcome analysis of family, individual and no migration uncovers those findings that may be missed by two-outcome models. In the case of land holdings, which measures both individual and household productivity, a single-outcome migration model may fail to disentangle two factors simultaneously at play. Individuals choosing to move alone may consider not just the possibility that migration could enhance their own income, but that migration might improve the productivity or size of existing household land. Individuals moving with their nuclear families may instead be driven by the absence of any rural economic opportunity. Before introducing the analytic model, the following section introduces the specific aspects of the rural Bangladeshi context that may encourage individual and family migration.

### **III. Research Context**

Between 1971 and 1996, the proportion of Bangladesh's population living in cities grew from 7.6 to 18.0%, yet even the latter figure was the lowest among the ten largest Asian nations (United Nations 1995; 1996). The most prominent rural-urban migration flows involve movement from areas along the Meghna River Basin in southern Bangladesh, such as Chandpur, Comilla, and Barisal Districts, to large cities such as Dhaka (Nabi 1992). Matlab, a subdistrict of Comilla, is the site of the Health and Demographic Surveillance System (HDSS) of the International Centre for Health and Population Research (known as ICDDR,B). HDSS has registered and computerized vital events -- birth, death, marriage, divorce, and migration -- for every resident of a 149 village study area since 1966, also conducting periodic censuses.

Bangladesh's rapid urbanization reflects a process of rural livelihood diversification and

expansion in which migration addresses persistent risks to agricultural production (Ellis 1996). Located in the flood plain of the Meghna River, a majority of Matlab's households depend on underwater rice cultivation for their livelihoods. Households are exposed to high levels of unmanaged risk due to price fluctuations and severe flooding. The monsoon also results in extreme seasonal fluctuations in cash-flow, nutrition, employment and prices (Chen et al. 1979).

Small landholders finance production and mitigate the worst seasonal effects of flooding by taking loans in terms of high, pre-harvest grain prices. These are then repaid in terms of the lower, post-harvest price, resulting in an effective annualized interest rate of between 30 and 400% (Kuhn 1999; Jensen 1987; Jahangir 1979). In the absence of institutional credit providers, households employ a complex set of social support relationships with close kin, often those living in the *bari*, or residential compound (Jensen 1987; van Schendel 1981; Jahangir 1979). Small plot sizes, a cycle of debt dependence, and high crop failure rates often result in default, and the mortgaging or loss of land.<sup>1</sup> Rising population density, proportional inheritance rules, and the liquidity of land markets have reduced average plot sizes closer to the margins of profitability (Momin 1992; van Schendel & Faraizi 1984).

Migration addresses these risks by introducing a new source of income in the form of migrant remittances. Remittances pay for agricultural production and growing-season consumption, reducing the need to incur debt (Kuhn 1999; Gardner 1995; Afsar 1994; Stark 1991). For economically secure households, they further finance provision of credit to indebted households (Gardner 1995). Among a random sample of older Matlab residents (50+) in 1996,

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<sup>1</sup> Rates of land-ownership are quite high and property rights are entrenched, owing to a history of peasant ownership and a land reform effort in the 1950s (Jensen 1987). Common lands play a significant economic role, yet are typically owned by local patrons, and are rarely unclaimed or contested. Anthropological studies have shown that land markets are highly liquid and prices are transparent, owing to the fierce competition for land through purchase, mortgage and foreclosure.

net transfers from sons living in urban or overseas destinations accounted for 18% of total income for all households and 27% for migrant-sending households (Kuhn 2001).

Individual migration in particular, or the migration of a single member of a larger family, facilitates migration's role as a source of credit and insurance: reductions in rural labor supply are minimal, while solo movers can minimize the extent of consumption at the higher urban cost of living (Meillassoux 1972). In Matlab, relative proximity to major urban destinations (about six to eight hours to Dhaka, versus twenty to twenty five hours for other high out-migration areas) facilitates temporary and individual migration by allowing migrants to simultaneously participate in rural and urban life (Lucas 2000). Matlab's age-sex distribution in 1996 demonstrates the extent to which this process is dominated by male individual migration (Mostafa et al. 1998). Whereas the ratio of males to females stands at 1.08 for the 10-14 and 15-19 age groups, it drops to 0.95 for ages 20-24, 0.78 for 25-29, and 0.79 for 30-34.

Low wages, limited job-related benefits, and housing shortages are among the many factors encouraging the practice of individual migration. In 1998 the rent for a small apartment (30-40 m<sup>2</sup>) in central Dhaka was about \$80 per month, equivalent to the salary of a skilled technical worker or low-ranking civil servant. With few jobs providing financial benefits during retirement or unemployment, migrants typically must purchase housing to remain in the city. While renting a small flat or tin-shed house could bring a migrant's nuclear family to the city in the medium-term, the long-term goal of purchasing land remains unattainable. In a study of an inner-city Dhaka neighborhood in 1996, land prices were considerably higher than in comparably situated neighborhoods in major US cities (Kuhn 1999). Most middle-class rural-urban migrants in Dhaka, as elsewhere in South Asia, purchase suburban plots, but these too have grown expensive over time. In a suburb about 30 kilometers north of the original city center

and 12 kilometers from the new downtown, empty 300 m<sup>2</sup> (3,000 ft<sup>2</sup>) plots that were valued at \$350 in 1987 were worth \$7,500 in 1998, a 40% yearly increase in dollar terms.

While individual migration allows households to diversify their rural livelihoods, family migration often results from the total loss of livelihood. Many rural households may offer migrants little income or security from rurally based physical assets, kin-based financial support or patronage (Das Gupta 1987). For members of these households, the dwindling benefits of low rural consumption prices and informal rural exchange are overwhelmed by the costs, both personal and financial, of trying to move between rural and urban areas. Rather than making a gradual transition to urban economic activity as temporary laborers in support of a rural household, family migrants make an immediate transition to the city as economic producers, consumers and permanent residents (Unnithan-Kumar 2003; Roy et al. 1992). In contrast to the high likelihood of return migration for male individual migrants after four years of urban residence (42%, see above), only 16% of family migration episodes from the same study resulted in return migration.

Given the multitude of sending- and receiving-area factors reinforcing the normative practice of individual migration by adult males, this paper addresses factors that might instead encourage family migration. In doing so, it addresses an expectation, shared by both researchers and many respondents in the study area, that migration is a relatively singular process whereby men move alone, and are joined by family only if their economic fortunes enable them to enter the middle classes. Family migration may be the best course of action if limitations to current and future rural opportunities encourage migration but do not facilitate urban-rural cooperation.

#### **IV. Data and Sample Characteristics**

The 1982 DSS census provided baseline data on household land holdings, as well as age and

schooling of each household member.<sup>2</sup> The analysis followed all men who were age 15 to 64 and residing in a DSS household during the 1982 census (30,795 were married and 17,177 were unmarried at the start of the analysis). Yearly observations were included from 1983 through 1991, or until censoring. Censoring occurred if a man died or migrated outside the household during the observation year. While returned out-migrants were typically tracked upon re-entry into the DSS area, these observations were excluded to focus on individual characteristics acquired prior to 1982. Men moved from the unmarried to the married sample upon first marriage, and were censored upon divorce. The resulting file included 264,184 married and 90,579 unmarried person-years.

The analysis focuses on migration out of the DSS area from 1983 to 1991. Migration surveillance files include the date, destination, and cause of migration. Migration was recorded after a six-month absence from the household, excluding most seasonal or circular migration episodes, business trips, or vacations. These data demonstrate migration's extraordinary impact on demographic change (Kuhn 1999). While the area's population grew from 186,232 in mid-1982 to 209,843 in mid-1996, the 1996 population would have been 40,327 higher in the absence of net out-migration. Although rural-urban moves accounted for only 31% of all migration episodes, they accounted for 63% of net out-migration.

The analysis focused on rural-urban migration by adult males, excluding all women. During this period, women's moves largely consisted of rural-rural moves associated with marriage, or "tied moves" with husbands.<sup>3</sup> Rural-urban migration opportunities for unmarried

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<sup>2</sup> Household rosters are updated to reflect yearly changes in size and structure due to migration, marriage, divorce, birth, and death. These changes are reflected in adjusted controls for household size and structure (not presented). Roster adjustments also capture the movement of women and children who might be involved in family migration episodes.

<sup>3</sup> As a result of the practice of women's exogamy, it is also difficult to compare women's moves prior to marriage, which may depend on natal household resources, and after marriage, which may depend on marital household resources. While research has shown that daughter's marriage decisions may reflect parental risk minimization goals (Rosenzweig and Stark 1989), addressing these concerns would require a separate analytic model for women.

women emerged only with the expansion of the ready-made garment industry in the mid-1990s (Amin et al. 1998). From 1983 to 1991, 75% of women's gross migration involved movement between rural households and 71% involved women under age 25, compared to only 46 and 41% for men. Women migrated three times more often than men prior to age 25, yet men accounted for substantially more net out-migration. After marriage, women's migration grew less common, although many moved with or joined their husbands.

Only rural-urban moves were modeled; rural-rural and international migrants were censored, but no event was recorded.<sup>4</sup> Family migration was recorded if the migrant's wife moved on the same day to the same destination.<sup>5</sup> Individual migration was coded if the man moved alone or with a group that did not include his wife. At the person-year level, 0.59% of married observations experienced individual migration and 0.70% experienced family migration, while 3.87% of unmarried observations experienced individual migration. The cumulative effect of these small probabilities was substantial, as 4.9% of married men who appeared in the sample experienced family migration prior to censoring and 4.1% experienced individual migration; 20.5% of unmarried men experienced individual migration.

Figure 1 presents distributions of the primary predictors by respondent's marital status for each of the married and unmarried person-years in the analysis, starting with the respondent's individual resources (education and age). Panel A shows that about half of married and one-third of unmarried respondents had completed no schooling. Only 8% of each group had completed secondary school (10<sup>th</sup>), which is typically the minimum requirement for tenured government or corporate employment. The higher proportion of unmarried men with any schooling reflects

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<sup>4</sup> Rural-rural moves, which typically involve individual seasonal migration episodes or nuclear family resettlement, require a separate analytic model that includes destination-specific resources that are relevant in the rural context (land purchase opportunities, local labor opportunities). International moves are difficult to model because income expectations depend more on labor relations and social connections than on education, and because international family migration is a rare event.

<sup>5</sup> All models were also tested using a definition of family migration as a husband, wife, and children (if any were alive). Cases in which a husband and wife moved without their children were rare, and the models produced statistically similar results.

rapid growth in schooling that occurred during the period. Unmarried men were no more likely to have completed 10<sup>th</sup> grade, however, because 30% of them were under age 20 in 1982 and possibly still working toward secondary degrees. To determine the impact of underestimation of young men's education, separate analytic models excluded men under age 20 in 1982 (not shown). Results of these models were statistically similar to the presented models.

[Insert Figure 1 about here]

Panel B shows that age distributions were quite different for the two groups, as most men made the transition from unmarried to married between ages 20 and 30. Yet there was considerable age overlap in the sample, particularly in the 20 to 30 range. The declining proportion of married men at ages 30 and above reflects attrition out of the sample due to migration, divorce, and mortality. The peak of unmarried men in the 20-24 age group reflects the aging of the sample; a majority of unmarried men were age 15-19 (56% compared to 36% for 20-24) at the start of observation in 1983, but they also accumulated person years in the 20-24 range.

Panel C shows that a large proportion of households held some land (measured in decimals = 1/100 acres), yet average land holdings were extremely low compared to most agrarian societies. Forty-five percent of married male and 38% of unmarried male observations came from households that held less than ½ acre, the threshold for functional landlessness below which an average-sized household cannot produce sufficient rice for a year's consumption. This distribution reflected a gradual process of land liquidation and consolidation resulting from high population growth, a system of equal inheritance by all sons, and intense competition for credit and land (Jensen 1987). Married and unmarried men had similar land distributions, with the

exception of the higher proportion of married observations with no land holdings.<sup>6</sup>

The observation year distribution, shown in Panel D, was weighted toward earlier years due to sample censoring. The unmarried sample was weighted toward early years as men shifted into the married sample. Whereas the married sample gained observations in later years, this growth did not make up for sample losses due to out-migration, divorce and mortality. The sample showed no unexpected changes during the flood years of 1988 and 1989

### ***The Great Flood of 1988***

Extreme floods are the most devastating ecological crisis affecting inland areas such as Matlab, destroying crops, altering the course of rivers, and permanently submerging land. The October 1988 flood in Bangladesh occurred at the end of the annual growing season, resulting not from heavy rains, but from unusual flows of water from rivers draining the Himalayas. A majority of permanent property loss was sustained by households living on river banks, where buildings and land were inundated. Yet a broader segment of households suffered a more lasting set of indirect effects, including disruptions in subsequent planting seasons, broken communications and transport links, and commodity price distortions. A household's ability to sustain the short-term effects of a flood may be determined not merely by ecological factors, but also by a household's ability to manage risk and cope with crises.

## **V. Estimating the Model**

### ***Constructing a Static Model of Individual and Family Migration***

Figure 2 depicts life-course migration and marriage decisions for men who reach adulthood while living in the rural area. All men begin unmarried, after which, in any year, they can either

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<sup>6</sup> This may reflect a tendency toward earlier marriage among the landless (Barkat-e-Khuda 1987), but it also reflects differences in within-household land ownership. For unmarried men who live in their father's households, household land holdings report fathers' land. Married men are more likely to live in their own households, and may have yet to inherit parental land. One implication of this difference is that land estimates are a less perfect estimate of married men's rural income. To test the impact of this effect, however, the models in Tables 1 and 2 were estimated separately for married men whose fathers had died; they were not statistically significant different from the general model.

move to the city alone or get married. Married men can be in one of the following recurring states, according to their current expected maximum of the three income consumption/production scenarios discussed in Section II: (1) living in the village, (2) living alone in the city, or (3) living with their wives in the city. A man enters state (1) through marriage or return migration, and remains there if strictly-rural income is highest. He enters state (2) through individual migration, marriage after migration to a wife who does not live in the city, or wife's return migration, as long as urban-rural income is highest. State (3) can be reached through family migration, marriage in the city, or wife's migration to the city, as long as strictly-urban income is highest.

[Insert Figure 2 about here]

The models employed in this paper ignored three of the processes in Figure 2: marriage, marital dissolution, and return migration.<sup>7</sup> The model for men living in the village and married at the start of the year had three possible outcomes: individual (i), family (f), or no (n) migration. The unmarried model had two outcomes: individual or no migration. While the three income production/consumption scenarios discussed in Section II can predict any of the migration events depicted in Figure 1, testing such a model would have required complete tracking of the men after they had left Matlab, as well as information on transitory changes in the resources and relationship dynamics that determine the renegotiation process (i.e. human capital accumulation, marriage, urban land ownership). By focusing on men living in the rural area, the analysis looked at the one point in the life-course in which the transitions to family migrant or individual migrant status were governed by the same knowledge, resources and family relationships.

### ***Testing the Models***

Multinomial logistic hazard models predicted the probability of migration for married men, whereas binomial logistic hazard models looked at unmarried men. For each year  $t$  until an event

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<sup>7</sup> To test the need for a marriage transition model, models for married men were tested with the inclusion of an interaction between age and recency of marriage. The interactions were not statistically significant, and had no effect on other coefficients.

occurred or a respondent was censored, the outcome for man  $k$  was,  $M_{kt} = j, j = i$  (individual),  $f$  (family) or  $n$  (no) migration for married men and  $i$  (individual) or  $n$  (no) migration for unmarried men.<sup>8</sup> The general equation for both married and unmarried men fit a vector of predictive coefficients  $X$  and a measure of time ( $t$ ) according to the following equation:

$$\Pr(M_{kt} = j, j = i, f, n) = \frac{e^{\sum_{s=i}^n \beta_{js} X_{ks}}}{\sum_{j=i, f, n} e^{\sum_{s=i}^n \beta_{js} X_{ks}}}$$

Because estimation could result in any number of solutions, no migration was chosen as a reference event for which all values of  $\beta_n = 0$ . If there were no time dependencies (i.e.,  $\beta_{jt} = 0$ ) or time dependencies were the same for all outcomes, the coefficient  $\beta_{ij}$  could be interpreted by

$$\ln \left[ \frac{\Pr(M_j)}{\Pr(M_n)} \right] = \beta_{ij} x_i,$$

the change in the log-odds of outcome  $j$  (relative to the reference event) due to a one-unit change in the value of  $x_i$ .

Models included village-level fixed-effects specified through controls for village of origin.<sup>9</sup> Fixed-effects were included to eliminate the impact of community-level factors such as ecology and market development, and community-level variation in migration rates. Fixed-effects models were statistically similar to those without fixed effects in terms of the joint significance of any group of variables. This suggests that the individual- or household-level heterogeneity of interest in the model was not simply the result of between-village differences.

<sup>8</sup> Multinomial models must account for the “Independence of Irrelevant Alternatives” (IIA) assumption that the relative choice between outcomes 1 and 2 would not be affected by elimination of outcome 3. Hausmann specification tests compare coefficients and standard errors of possible two-outcome models with those of the chosen model. All tests show no significant differences between the two-outcome models and the chosen model (at the  $p \leq 0.01$  level).

<sup>9</sup> While estimating a fixed-effects multinomial logistic regression is problematic due to the categorical nature of the dependent variable, the inclusion of village-level controls in a standard model results in no bias as long as the number of observations per cell (village) approaches infinity. An average cell contains 1,800 married male person-years, and 600 unmarried ones.

Results are presented and interpreted through the use of Multiple Classification Analysis (MCA) to account for the role of competing risks in multinomial models. Multinomial coefficients and risk ratios do not bear a straightforward relationship to predicted probabilities, as they do in binary models. For example, if a variable has a positive association with both family and individual migration, then its true impact on the probability, say, of family migration depends not only on the effect itself, but also on the reduced number of cases at risk because the risk of individual migration has also increased. MCA calculates the predicted probability of each outcome (family, individual or no migration) allowing the variable (or variables) of interest to vary, while holding all other variables at their means (Retherford & Choe 1993):

$$\Pr(M_r = j, j = i, f, n) = \frac{e^{\sum_{s \neq r} \beta_{js} \bar{X}_s + \beta_{jr} X_r}}{1 + \sum_{j=i, f, n} e^{\sum_{s \neq r} \beta_{js} \bar{X}_s + \beta_{jr} X_r}}$$

Results are primarily presented through two sets of graphical comparisons constructed from MCA tables. The first compared predicted probabilities of any migration between unmarried and married men. The probability of any migration for married men was calculated from the sum of the probability of individual and family migration, which provided similar results to predictions based on a binomial model of any migration for married men. The second broke predicted probabilities of any migration for married men into their component parts: the predicted probabilities of family and individual migration.

## VI. Results

Table 1 presents Model 1, which includes main effects for age, education, observation year and household land holdings. All models include controls for village fixed effects, respondent's household headship status, household size and composition, religion, and whether the man's primary occupation is fisherman.

### *Main Effects for Schooling*

Results for educational attainment, presented in Table 1 and summarized in Figure 3, address two important concerns about education and migration modeling. First, marriage reduces the likelihood of migration. Second, marriage also conditions the effect of education on migration hazard and probability. Before marriage, men who completed secondary school were twice as likely to migrate as those completing primary (8.7 versus 4.3%). After marriage, they were only 1.5 times as likely (2.7 versus 1.8%).

[Insert Table 1 and Figure 3 about here]

Panel B illustrates one missed finding that would result from using only a two-outcome model of migration versus no migration for married men. Each increased level of schooling resulted in an incremental rise in the likelihood of individual migration. Only completion of secondary school resulted in a significant rise in the likelihood of family migration. Men who had completed secondary school had a 1.6% probability of family migration, compared to only 0.77% for those who had some secondary schooling. Each of these findings individually fits well with existing models of migration. For men to move alone, the wage differential model would predict incremental returns to schooling if such returns also prevailed in urban labor markets. For men to move with their wives however, the Mincer model suggests that only those men with high levels of schooling would be able to finance the high long-term costs of permanent urban residence and compensate their non-working wives for their disincentives to moving.

In the case of education, a two-outcome model of migration versus no migration, whether run separately for married and unmarried men or pooled across marital status, would generate the statistically correct finding that men migrate more at higher levels of schooling. Yet in terms of understanding the likely impact of migration, such a model would miss crucial differences between the migration of married and unmarried men, as well as between men who migrate

alone and with their families.

### ***Main Effects for Age***

Results for respondent's age reveal the complex interaction between age's effect on both strictly-urban and urban-rural income. Most studies find age-specific decline in migration propensity due to declining urban income expectations (Lipton 1980). Yet uniquely separable factors result in age-specific decline in urban income expectations: declining lifetime returns to existing human capital (as individuals grow older), and declining opportunities for accumulation of further human capital (as individuals take on new responsibilities such as marriage or management of a family farm). Whereas lifetime returns to current human capital may suffer a gradual, linear decline with age, the possibility of accumulating further human capital (through apprenticeships, seniority, and training) is likely to decline rapidly during the initial years of marriage, as obligations of child-rearing, parental support and land maintenance take on greater importance.

The age pattern of migration for married and unmarried men, shown in Panel C, depicts the strong effect of marriage on out-migration at any particular age. Throughout the peak years of male marriage initiation, out-migration rates were higher for unmarried men than for married ones, with unmarried men 2.5 times as likely to migrate at the median age of marriage, 26. An unmarried man's migration probability rose and reached a peak during the years immediately prior to the median age of marriage, and remained above average (3.9%) through age 31. For married men, the likelihood of any migration showed a linear decline with age. These results reflect the impact of marriage on human capital accumulation as men acquire further familial responsibilities.

Panel D shows that the linear age-specific decline in married men's migration in fact conceals two trends that can each be explained by existing migration models. Individual migration declined monotonically and rapidly with age, while the steepest declines occurred

prior to age 30. This result may reflect not merely the process of declining returns to human capital outlined by the WD model, but also a rapid reduction in the long-term benefits of short-term circular migration episodes suggested by the NE model.

In contrast, family migration initially rose with age, resulting in a peak at age 31; it remained the more likely of the two migration outcomes at each age after 27. A number of life course changes may explain this pattern, which can be split into two questions: 1) why does the likelihood of family migration not decrease as rapidly as individual migration, and 2) why does the likelihood of family migration increase?

Likely explanations lay in the typical age pattern of rural income expectations in Bangladesh. First, rural income expectations may decline if households tend to liquidate land following the initial 1982 baseline (Jahangir 1979). Second, expected urban-rural income opportunities may decline over the life courses as a man's own individual migration opportunities diminish, as between-sibling cooperation declines, and as elderly parents provide less labor and require greater support and assistance (Jensen 1987). Research on household economic life cycles has shown that the period of greatest economic vulnerability occurs when adults are in early middle age, after their own economic opportunities have diminished, yet before children are old enough to enter the labor market themselves. After looking at the impact of rural resources on migration, we revisit this issue by looking at the age-pattern of migration in 1989, the year immediately following a major flood.

### ***Main Effects for Household Land Holdings***

Household land holdings have been found to be a key determinant of rural-urban migration in most settings, and typically individuals are more likely to move if their households own less land. Yet WD and NE models offer different explanations for this effect, and slightly different expectations. As the principal determinant of income in most rural settings, WD expects a

monotonic negative relationship; more land holdings lead to less income, and thus, other things being equal, a greater likelihood of migration. NE explains the role of land not just in terms of income, but in terms of a need for investment capital and insurance against the risks of agricultural production. Households with large land holdings are better placed to self-insure, either through crop diversification or other non-agricultural assets, and their members should be less likely to migrate. Households with no land holdings should be less directly exposed to the risks of agricultural production, and able to diversify their labor activities into agricultural and non-agricultural activities; while they may be poorer than households with small land holdings, their members may also have less reason to migrate.

Two land measures are therefore estimated: an indicator of whether any land was held by the household and the log of total household land holdings (set to zero for no land). This model further offered the best fit of all categorical, linear or logged land specifications. Logged land holdings had a negative association with all forms of migration (Table 1), but a stronger association with family migration (-0.318 coefficient) than with individual migration by married (-0.135) or unmarried men (-0.146). For married men, any household land ownership had a further negative association with family moves, but no significant association with individual ones. No land ownership effect was found for unmarried men.

The relationship between land holdings and migration assuming a two-outcome model are depicted for married and unmarried men in Figure 4, Panel A. Under the two-outcome model, the likelihood of migration would experience a monotonic, asymptotic decline with increasing land holdings, with the steepest part of the curve affecting households with 100 decimals of land or less. Unmarried men would have a 4.6% likelihood of moving out of a landless household, compared to 3.3% from a household with 100 decimals, while married men's migration

likelihood would decline from 2.0% to 1.0%.

[Insert Figure 4 about here]

Yet Figure 4, Panel B shows that land's effect on migration depends greatly on the choice of family or individual migration. Family migration was considerably more likely among men from landless households (1.2% versus 0.8%). The likelihood of both forms of migration drops with greater land holdings, yet family migration experiences a much steeper decline (four times more likely among the landless compared to the top land holding decile, whereas individual moves were only twice as likely). What results is a crossover: family migration was more likely among men from households holding less than 100 decimals of land, while individual moves were preferred among those with more. The individual migration effect offers some support for both WD and NE models of migration; individuals are encouraged to migrate alone if their households have small land holdings, indicating a low income, yet perhaps some prospect of investing migrant earnings into increased production. The family migration effect suggests that when a man is considering whether to move with his nuclear family, income is of paramount concern.

#### ***Variation Over Time – Main Effects and Interactions***

Figure 4, Panel C addresses the predicted pattern of any migration by observation year, focusing on 1989, the year immediately following the major flood. Unmarried men's predicted migration probabilities rose gradually during the initial years of the sample, before leveling off and declining in later years. The predictions show there was no increase in unmarried male migration in 1989 relative to either surrounding year. The yearly pattern of married male migration was remarkably stable for most years, yet it deviated significantly from the overall mean (1.29%) in the post-flood year of 1989, when it was 1.82%. The significant village fixed effect results (not shown) indicate that increases in migration in 1989 did not stem from between-village

differences such as proximity to a river or flood-control facilities.

WD and NE models both offer insight into the mechanisms linking a major flood to increasing migration, and each explanation relates further to the role of household land resources. According to WD, a decline in income, perhaps permanent, might raise the attractiveness of urban areas relative to the affected rural area. For households already lacking in land holdings, these effects might be particularly important. According to NE, short-term migration opportunities might allow households to mitigate the short-term effects of the flood with an infusion of remittance income. Yet again, factors that allow households to use migration as a means of mitigating future risks might also be better placed to use migration to alleviate an ongoing crisis.

To address this issue, Model 2 (Table 2) contains observation-year interactions with household landlessness. Log-likelihood statistics in Table 2 show the statistical importance of the included interactions, which reduced the predicted underestimate of migration (family migration in particular) in 1989 (not shown). Interactions between logged land holdings and observation year did not significantly improve model fit.

[Insert Table 2 about here]

Figure 5 depicts the effects of post-flood hardship on migration, comparing the predicted land-migration relationship for 1989 to all other years, based on Model 2.<sup>10</sup> Panels A and B depict the likelihood of any migration for married and unmarried men, both of which were higher in 1989 compared to other years. Unmarried men's migration probabilities increased by about 20% in 1989 for landed households, but showed a much more dramatic increase among the landless, from 4.5% in all other years to 6.4% in 1989 (Panel B). Married men, shown in Panel

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<sup>10</sup> As expected, the October flood had little impact on migration in 1988. The level and age/land pattern of migration for 1988 are quite similar to those of other years.

B, were 40% more likely to migrate in 1989 than in other years. Using only the two-outcome approach, the difference between 1989 and other years was only slightly higher for men from landless households, who were 50% more likely to move in 1989.

[Insert Figure 5 about here]

Based solely on Panel B, it would appear that migration grows more likely to an equal extent among households across the land distribution, and thus that household land holdings do not mediate the use of migration to respond to an economic crisis. Yet Panels C and D reveal that, as with the likelihood of migration in a typical year, household land holdings determine whether the increased likelihood of migration is reflected in individual or family moves. For men from landed households, the probability of individual migration (shown in Panel C) rose by 30% in 1989 relative to other years combined, compared to only 16% among men from landless households. Controlling for other factors, the likelihood of family migration (shown in Panel D) sustained a much sharper increase in 1989, 55%, compared to 27% increase in the likelihood of individual migration. Furthermore, this increase occurred disproportionately among men from landless households, who were 80% more likely to move with their families in 1989 (2.0% compared to 1.1%), than among men from landed households (47% more likely).

## **VII. Conclusion: A Note on Migration Theory and Policy**

The results of this paper offer further evidence that the concerns of the two prevailing microeconomic models of migration, the Wage Differential and New Economic Models, may both be relevant in the same setting. Yet by incorporating a three-outcome model of migration, they also suggest not so much a diversity of motivations as heterogeneity in terms of the practice of migration and the individuals practicing it. Determinants of individual migration are suggestive both of the income deficits hypothesized by the Wage Differential Model and the household economic diversification hypothesis of the New Economic Model. Family migration

responds more strictly to the concerns of the Wage Differential Model.

A number of specific differences in the determinants of family and individual migration would be missed were a simple two-outcome model employed. Individual migration is more likely among those with small land holdings, while family migration is more likely among those with no land holdings. Following marriage, the likelihood of individual migration declines rapidly, while the likelihood of family migration rises for several years following the mean age of marriage. Most importantly, in the aftermath of the major 1988 flood, increasing family migration accounted for most the substantial increase in the likelihood of migration in 1989. Furthermore, a two-outcome model would suggest that the 1989 migration increase occurred across the land distribution, when in fact the increase in family migration occurred disproportionately among men from landless households.

These results carry both direct and indirect implications for our understanding of the effects of rural-urban migration on future demographic and sociological trends in a rapidly urbanizing society such as Bangladesh. For urban migrant-receiving areas, compositional differences between family and individual migrants are of paramount importance. Past research has shown that migrant families are more likely than individual movers to settle in slums or squatter settlements, while asserting that migrating families are likely to be less suited to the urban economy and less able to fall back on rural family or resources for support or return migration. This work confirms the latter assertion, showing that family migrants may be older and come from rural households with fewer land holdings than individual migrants. As a result, it is likely in particular that those women and children who move to the city are selected from the lowest rural socioeconomic strata. While LDC cities anticipate massive migrant inflows following major rural catastrophes such as floods, these results suggest that they should also

expect those migrants to move with families, and to be even more strongly selected from the lowest rural socioeconomic strata.

From the standpoint of rural migrant-sending areas, these results extend research on the role of resource deprivation in hastening the fission of households and limiting subsequent interhousehold cooperation to the sphere of interregional social networks. For rural elders in particular, family migration may reduce the likelihood and value of migrant remittances and deprive them of the benefits of joint coresidence with daughters-in-law and grandchildren (e.g. jointly consuming migrant remittances, receiving labor and care). The results suggest that such an outcome is most likely to affect those with limited land resources, particularly in the year following a major ecological and economic crisis. Households with sufficient land resources, on the other hand, appear well-placed to take advantage of the opportunities afforded by individual migration.

From a stratification and development perspective, the divergence in age- and land-specific migration patterns would not be a problem were the expected outcomes of family and individual migration reasonably similar. Yet research in this context and others has shown that this is not the case (Root & De Jong 1992; Perlman 1976). Family migration is a process that is not taken lightly: it is costly, typically involves residence in slums, and is often irreversible (Kuhn 1999). Family migration not only separates the movers from their traditional base of security, but it also separates stayers from their most dynamic source of economic support. In the case of the elderly, family migration often removes a primary source of financial support and labor (a son) as well as a primary source of personal care (a daughter-in-law). From a parent's perspective, family migration is akin to losing a son; individual migration is akin to gaining an income source. In the long run, the results raise further concerns about a disincentive to invest in

children; if landless households can expect more limited support from their out-migrant children, they may find less incentive to invest in children's education.

This research raises a call for the development of a more synthetic migration theory, and more innovative tests of the meaning, context, and likely impact of migration. While the specific causes and uses of migration from rural Bangladesh are unique to its ecosystem and economic structure, the patterns have general applicability to almost any migrant-sending region, to internal and international migration, to men's and women's migration, and to forced and voluntary migration. In all cases, migrant outcomes that are considered unique to the context may *in part* be explained by a migrant's desire and ability to maintain strong social and economic linkages with members of the origin community. There is now a mountain of evidence explaining why migrants leave home and even more evidence explaining why they never really leave home, yet we have only begun to ask what allows them to do both.

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Table 1: Results of Fixed Effects Logistic Models of Migration, Adult Males in Matlab (1983-1991)  
Model 1: Main Effects Only

	Married Men				Unmarried Men	
	Individual		Family		Individual	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Education (1-4)	0.452***	0.072	0.198***	0.066	0.300***	0.053
Education (5-9)	0.816***	0.070	0.420***	0.066	0.662***	0.049
Education (10+)	1.127***	0.093	1.181***	0.079	1.372***	0.073
Year = 1984	-0.117	0.110	-0.316***	0.102	0.053	0.070
Year = 1985	-0.051	0.110	-0.280***	0.102	0.412***	0.068
Year = 1986	0.204*	0.105	-0.155	0.099	0.682***	0.069
Year = 1987	0.230**	0.106	-0.012	0.097	0.746***	0.073
Year = 1988	0.090	0.112	-0.001	0.098	0.687***	0.079
Year = 1989	0.453***	0.106	0.309***	0.093	0.701***	0.085
Year = 1990	0.112	0.116	-0.159	0.105	0.707***	0.092
Year = 1991	-0.087	0.126	-0.134	0.107	0.355***	0.110
Age	-0.099***	0.018	0.078***	0.019	0.222***	0.039
Age-Squared	0.001***	0.000	-0.001***	0.000	-0.004***	0.001
Household Has Any Land	-0.069	0.085	-0.117*	0.061	0.091	0.069
Log Household Land	-0.135***	0.030	-0.318***	0.029	-0.146***	0.020
Constant	-1.792***	0.399	-5.545***	0.436	-6.118***	0.490
Dependent Variable Mean	0.0059		0.0070		0.0387	
Observations	264,184				90,579	
Log Likelihood R <sup>2</sup> (DF)	2988.3 (342)				1589.5 (171)	

Notes: \* p<=0.05; \*\* p<=0.01; \*\*\* p <= .001. Model includes controls for village fixed effects, respondent's household headship status, household size and composition, religion, and whether occupation is fisherman.

Table 2: Results of Fixed Effects Logistic Models of Migration, Adult Males in Matlab (1983-1991)  
 Model 2: Main Effects and Observation Year Interactions with Age, Land

	Married Men				Unmarried Men	
	Individual		Family		Individual	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Education (1-4)	0.447***	0.072	0.197***	0.066	0.297***	0.053
Education (5-9)	0.818***	0.070	0.423***	0.066	0.669***	0.050
Education (10+)	1.172***	0.093	1.208***	0.080	1.363***	0.074
Year = 1984	0.129	0.344	-0.109	0.376	-0.404	0.409
Year = 1985	0.208	0.340	-0.067	0.373	0.547	0.409
Year = 1986	0.431	0.326	0.373	0.363	1.038**	0.420
Year = 1987	0.770**	0.334	0.181	0.353	1.170**	0.457
Year = 1988	1.183***	0.366	1.057***	0.361	2.090***	0.534
Year = 1989	1.724***	0.344	0.392	0.341	1.496**	0.592
Year = 1990	1.215***	0.385	1.335***	0.398	1.281*	0.667
Year = 1991	1.360***	0.440	1.197***	0.405	2.802***	0.951
Age	-0.089***	0.020	0.082***	0.019	0.175***	0.039
Age-Squared	0.001***	0.000	-0.001***	0.000	-0.004***	0.001
Household Has Any Land	-0.300*	0.178	-0.505***	0.143	-0.176	0.139
Log Household Land	0.095	0.069	-0.161**	0.074	-0.283***	0.095
Age * Log Household Land	-0.007***	0.002	-0.004**	0.002	0.006	0.004
Age * Year = 1984	-0.007	0.010	-0.003	0.010	0.022	0.019
Age * Year = 1985	-0.005	0.010	-0.002	0.010	-0.004	0.019
Age * Year = 1986	-0.004	0.009	-0.007	0.010	-0.014	0.019
Age * Year = 1987	-0.015	0.009	0.001	0.009	-0.016	0.020
Age * Year = 1988	-0.030***	0.011	-0.023**	0.010	-0.059**	0.023
Age * Year = 1989	-0.036***	0.010	0.000	0.009	-0.032	0.025
Age * Year = 1990	-0.031***	0.011	-0.037***	0.011	-0.022	0.027
Age * Year = 1991	-0.042***	0.013	-0.033***	0.011	-0.094**	0.038
Any Land * Year = 1984	0.058	0.248	0.208	0.208	0.062	0.190
Any Land * Year = 1985	0.378	0.258	0.371*	0.210	0.454**	0.194
Any Land * Year = 1986	0.373	0.243	0.760***	0.212	0.365*	0.188
Any Land * Year = 1987	0.196	0.238	0.612***	0.201	0.474**	0.201
Any Land * Year = 1988	0.357	0.257	0.710***	0.204	0.221	0.207
Any Land * Year = 1989	0.322	0.236	0.197	0.182	0.203	0.225
Any Land * Year = 1990	0.229	0.258	0.494**	0.212	0.564**	0.268
Any Land * Year = 1991	0.099	0.275	0.294	0.207	0.456	0.320
Constant	-2.467***	0.456	-6.039***	0.485	-5.605***	0.522
Dependent Variable Mean	0.0059		0.0070		0.0387	
Observations	264,184				90,579	
Log Likelihood R <sup>2</sup>	3099.5 (376)				1624.6 (188)	
Joint Log-Likelihood Tests:						
Landless/Year Interactions	32.1 (16)***				11.8 (8)	
Age/Year Interactions	62.9 (16)***				15.9 (8)**	

Note: Coefficients followed by 3, 2, and 1 stars are significantly different from zero at the 1, 5, and 10 percent level, respectively. Model includes controls for village fixed effects, respondent's household headship status, household size and composition, religion, and whether occupation is fisherman.

Figure 1: Distributions of Predictor Variables According to Marital Status: Males Aged 15-65

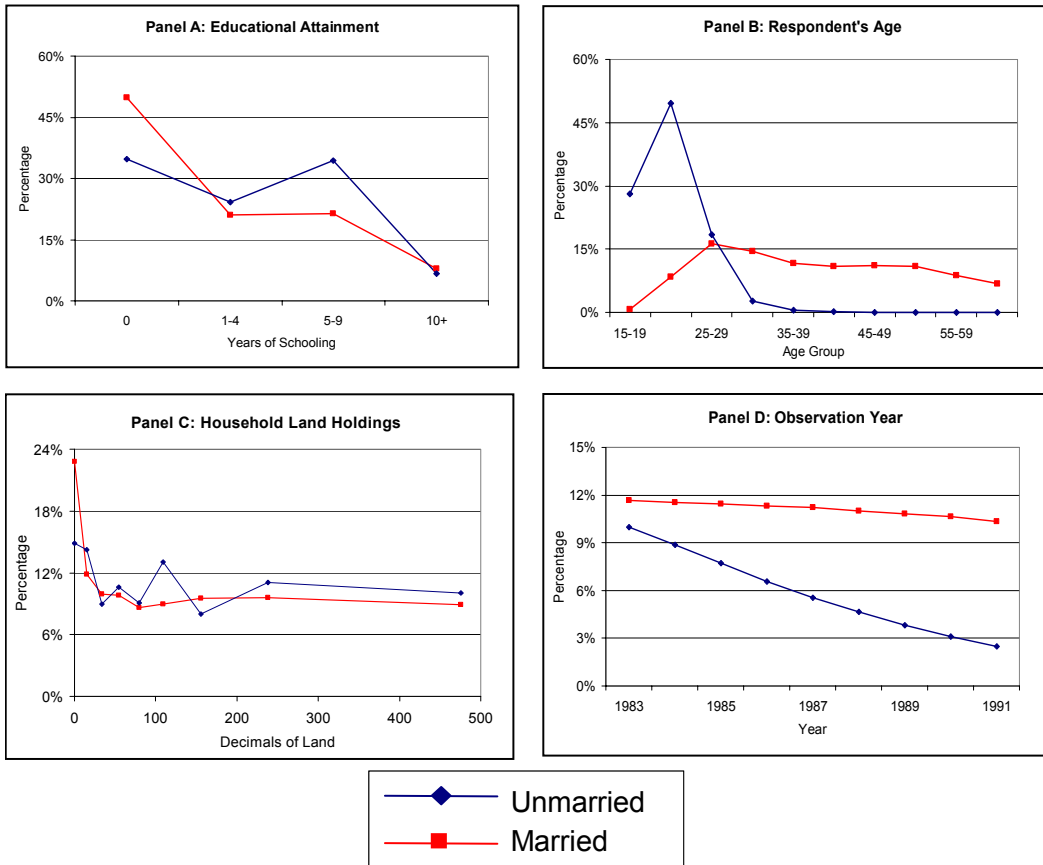


Figure 2: Schema of Dynamic Model of Family and Individual Migration

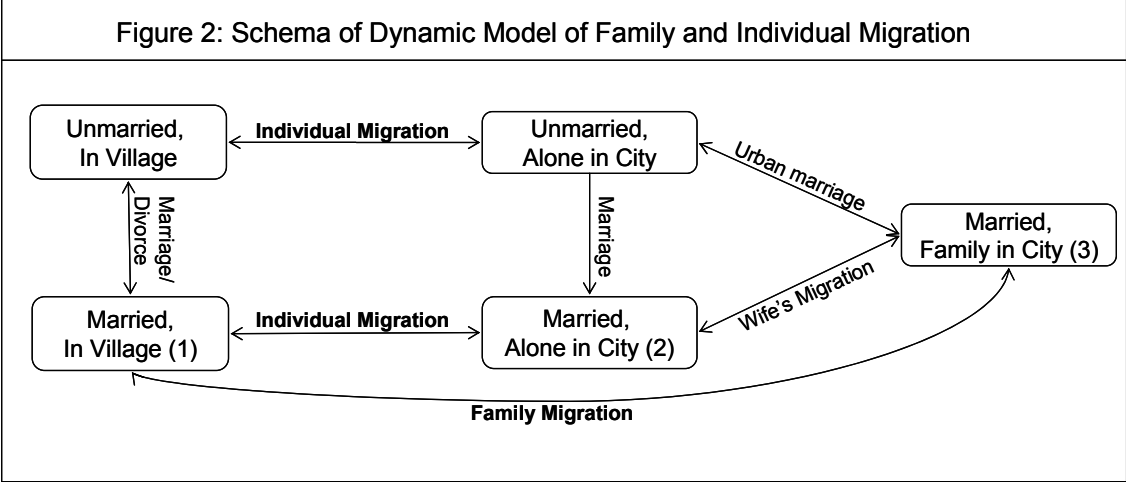


Figure 3: Predicted Migration Probabilities by Schooling/Age and Marital Status: Other Variables held at Mean

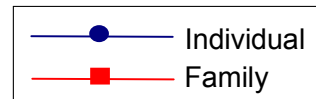
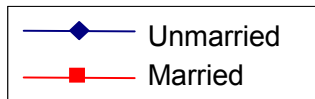
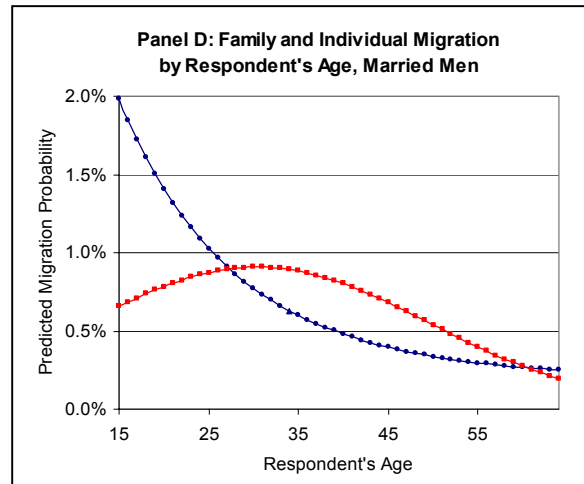
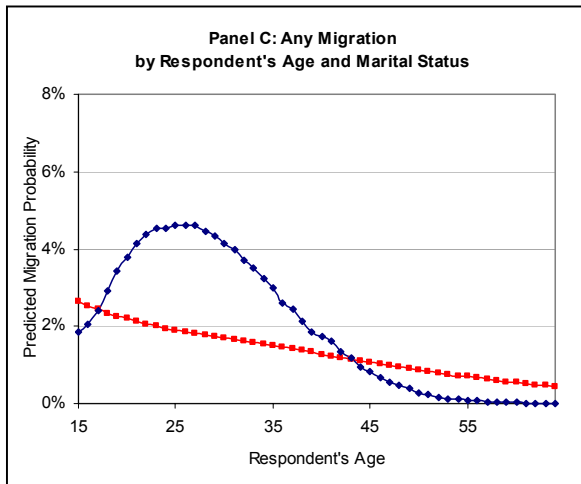
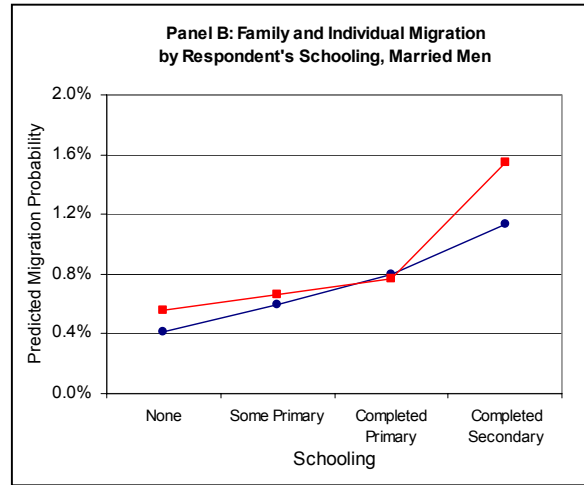
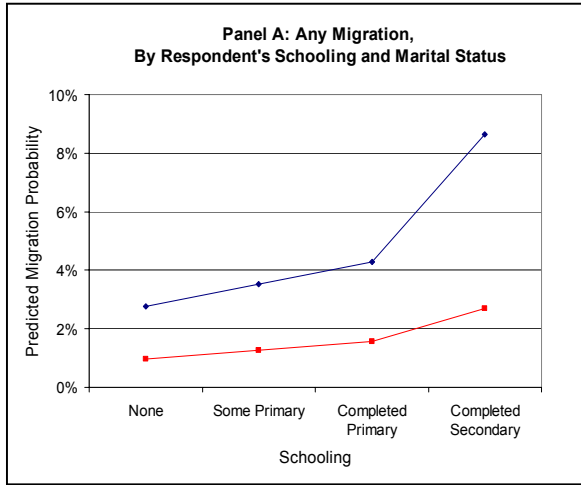


Figure 4: Predicted Migration Probabilities  
by Land Holdings / Observation Year and Marital Status

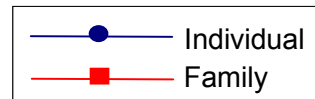
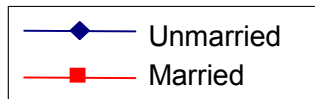
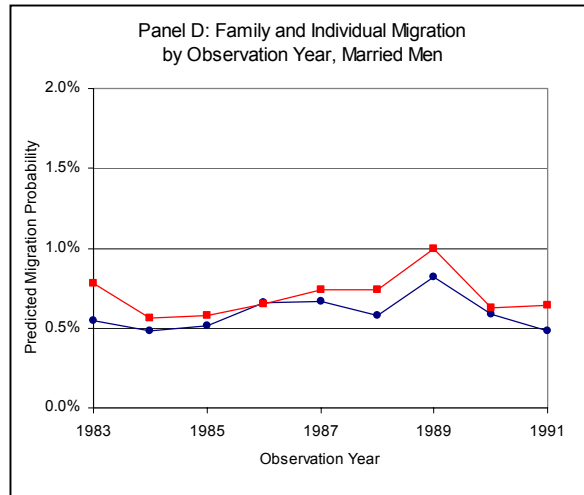
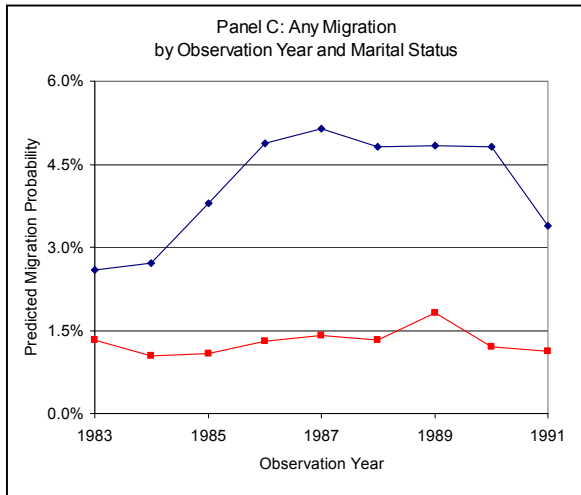
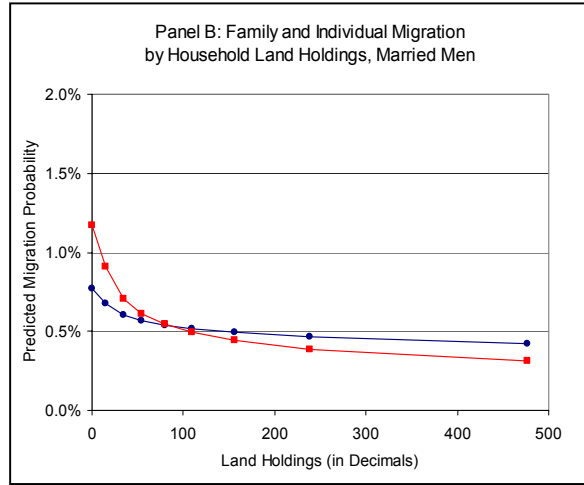
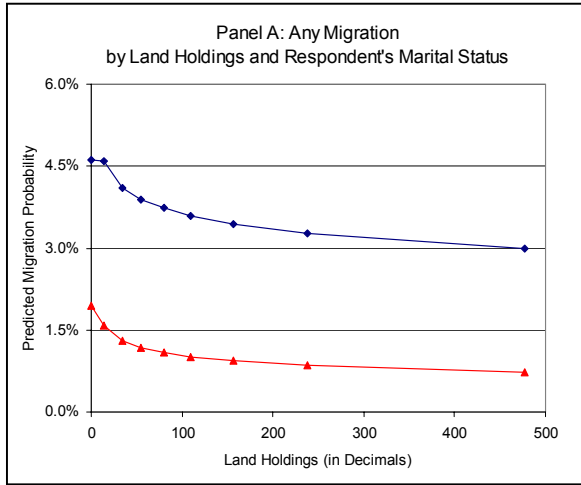


Figure 5: Predicted Migration Probabilities  
by Household Land Holdings, 1989 vs. All Other Years Combined

