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## The Logic of Letting Go: Family and Individual Migration from Rural Bangladesh

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Family and Individual Migration from Rural Bangladesh  
(Manuscript: Re-submitted to *Demography*)**

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## **Abstract**

This paper studies rural-urban migration by adult males in Matlab *Thana*, Bangladesh from 1983 to 1991, integrating the concerns of an income-maximizing individual and a risk-minimizing household into a three-category model of family migration, individual migration, or no migration. 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 migration's stratifying potential: only households with significant resources are best placed to use individual migration as a powerful outlet for mutual economic development and security.

## **I. Introduction**

In attempting to unify the patterns and determinants of migration under one theoretical umbrella, social scientists often ignore the heterogeneity in migration pattern and motivation that exists in many sending populations. Migration is modeled either as an individual opportunity for self-advancement or as a household opportunity for increased security. Some studies, while acknowledging that both motivations may coexist within the same population, neglect to ask why potential migrants in the same setting might take diverse routes to apparently similar decisions.

This paper examines male rural-urban migration from Matlab, a rural migrant-sending area of Bangladesh, not as a simple choice between migration and no migration, but as a three-choice decision. Migrants may choose between maintaining strong urban-rural ties and letting go of those ties to form independent urban economic units. A grounded theoretical model of the logic underlying this decision emerged from an iterative cycle of quantitative analysis and qualitative fieldwork on the social process of migration from Matlab. A contrast emerged between individual migrants – who are younger, more tied to their villages, and find employment and housing through urban-rural social connections – and family migrants – who often form unique households in settings such as urban slums (Kuhn 2002; Kuhn 1999; Roy et al. 1992). This functional distinction offers compelling evidence as to migration's dual roles of household expansion and household partition, yet it can also be defined theoretically:

Other things being equal, individual migration transfers primary production activities to the destination area while consumption remains in the origin area. Family migration transfers both primary consumption and production activities to the destination area.

This proposed distinction directly relates to the conditions of two prominent micro-level models of migration: one is based on a neo-classical response to urban-rural wage differentials (Harris and Todaro 1969), and one is based on new economic theories of the family (Stark 1991).

The following section integrates the concerns of these existing migration models into a

single, three-category equation that accounts for the expected nature of urban-rural connections as well as the likely site of income production and consumption. After discussing the context of rural-urban migration in Bangladesh, I apply this model to the migration patterns of adult males in Matlab from 1983 to 1991. The empirical results identify the role of household resources such as land and individual traits such as age in determining the choice between family, individual and no migration. These results demonstrate migration's stratifying potential: while households with significant resources are best placed to use individual migration as a powerful outlet for mutual economic development and security, those with limited resources are more likely to part ways.

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

### ***Wage-Differential and New Economic Models of Migration***

Wage-differential models (hence referred to as "WD") conceive migration as a response to an unequal spatial distribution in wages or earnings (Ranis and Fei 1961). In a single-society context, migration generates an expected wage-equilibrium between a rural/traditional sector and a modern/urban sector: competition decreases and expected wages increase in the former, while competition increases and wages decline in the latter (Lewis 1954). A micro-level WD model predicts that migration is more likely if an individual's expected destination-area income, the expected wage times the probability of employment, is higher than current origin-area income (Harris and Todaro 1969; Todaro 1970). Sjaastad (1962) incorporates individual characteristics such as human capital and personal attachments into the expected urban wage function. Mincer (1978) extends the model to incorporate the joint utility of a migrating family unit.

While WD specifications make different assumptions about the likely site of income consumption, all ignore heterogeneity in that regard. Earlier macro-level models focus only on migration's role in generating labor market equilibrium, ignoring the impact of urban-rural remittances and return migration. Todaro acknowledges the rural area as the primary site of

consumption, yet the assumption that all urban income is consumed there emphasizes only migration's market-equilibrium effects. All models ignore heterogeneity in the receipt and long-run economic impact of remittances in the rural area, in spite of extensive evidence that both remittance receipt and remittance investment are enhanced by rural resources such as land and social networks (Faist 2000; Massey et al. 1999; Taylor and Wyatt 1996).

The New Economics of Labor Migration (hence referred to as "NE") takes remittances as the likely goal of the migration process itself. Expanding on theories on the family in economic life (Becker 1974), NE shows how remittances act as a partial remedy for risk management and liquidity constraints in developing countries (Stark 1982; Durand et al. 1996). Stark introduces the notion of a "mutually beneficial contractual agreement" which allows a migrant and origin household to co-insure (Stark and Katz 1986). Empirical work demonstrates how migration provides origin-area households with a source of agricultural capital, and a source of security in cases of crop failure or price fluctuation (Massey and Espinosa 1997; Taylor and Wyatt 1996).

As with WD, the expected returns to migration define the conditions under which migration should occur: while likely migrants may experience an expected wage differential, this does not represent a necessary condition for migration. At the macro-level, NE anticipates migration from areas with limited credit and capital markets (Massey and Parrado 1994). At the micro-level, migration is most likely from households that have a significant level of unsatisfied demand for credit and capital (VanWey 2002; Taylor and Wyatt 1996). Stark argues and demonstrates that households with moderate agricultural asset holdings require such remedies: landless households have no crops to insure or capitalize, while large landowners might be able to self-insure or self-finance (Lucas and Stark 1985; VanWey 2002; Root and De Jong 1991).

### ***Synthesizing the Theories***

A review of the international migration literature by Massey et al. (1999) finds strong support for

both WD and NE in most migration systems, yet it has proven difficult to compare the two directly. Neither model alone delivers the researcher with a sufficient condition for migration; gross out-migration rates rarely rise above two percent per year in any society (Faist 2000). Furthermore, a high proportion of households in rural LDC settings face both high levels of unmanaged risk and negative wage differentials when compared to urban or overseas destinations (Stark 1982). Finally, the two conditions are not mutually exclusive: a household head may decide that a family member should migrate, yet it may still be the household member with the highest expected wage differential who actually migrates (Root and De Jong 1991).

In the absence of a single micro-level equation differentiating the two motivations, researchers have quantified the impact of each model's concerns indirectly by entering community- or society-level indicators of supply of and demand for capital markets into a standard WD model. Massey and Espinosa (1997) found the concerns of both models important in the context of migration from Mexico to the United States. While wage differentials explained initial trips to the US, they were less powerful in explaining later trips. NE garnered support through strong effects of local interest rates and credit constraints. This work takes an important step in showing that each model's concerns can be substantiated in the presence of controls for the other, yet it cannot distinguish between two divergent conclusions:

- 1) Individual members of a community migrate so as to maximize both their own income and their origin household's security, as predicted by both models;
- 2) Certain members of a community migrate to maximize their own income, as predicted by NE, while others do so to maximize household security, as in WD.

This distinction lies at a level of analysis that cannot be captured by either model alone, yet it is essential for understanding the potential impact of migration on both origin household and migrant well-being. A WD model can show that an individual is better off producing income in

the urban area, but cannot discern the conditions under which this income would be consumed in the rural or urban area. An NE model can show that some households are better off having earners in both areas while others are better off in one sector alone, but it cannot say whether all members of the second group will be willing to remain in the rural area, or whether some would move to the urban area, consuming and producing all income there.

Triangulation between the two models introduces an individual model in which a potential migrant maximizes one of three possible income consumption and production scenarios:

- 1) Individual continues to produce and consume all income in the rural area (hence referred to as *strictly-rural income*)
- 2) Urban income is pooled with rural household income, almost all income is consumed in the rural area (*urban-rural income*)
- 3) Urban income is produced and consumed in the urban area (*strictly-urban income*)

The current analysis predicts a man's choice of no migration ( $n$ ), individual migration ( $i$ ), or family migration ( $f$ ) in terms of the following income-maximization equation:<sup>1</sup>

$$P(M_j = k) = \text{Max}(E_k), \quad k = i, f, m, \text{ and}$$

$E_i = E(\text{Urban/Rural})$  is the expected utility a man draws from urban-rural income,  $E_f = E(\text{Urban})$  is the expected utility a man draws from strictly urban income, and  $E_n = E(\text{Rural})$  is the expected utility that a man draws from strictly rural income.

The value of strictly-urban income is determined largely by individual characteristics that are applicable in the urban sector (referred to here as *individual resources*), while strictly-rural income is determined by household and community resources that affect rural production (referred to here as *rural resources*).<sup>2</sup> Specific predictions must also account for *urban-rural income*, determined jointly by both types of resources through a negotiation of the needs of the potential migrant and origin household members.

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<sup>1</sup> In a general model,  $M_j=i$  can indicate any form of temporary, circular or targeted migration that moves the individual's production only.  $M_j=f$  can indicate any form of permanent migration that moves both production and consumption.

<sup>2</sup> Rural resources include both physical resources and social exchange relationships. Couples living in nuclear households may place primary value on land, whereas those in extended households may emphasize exchange relationships.

This individual-level (or couple-level) migration decision model introduces a more sharply defined set of hypothetical predictions. The model identifies the dual role of land and other fixed household or community resources in both providing a direct source of rural income and in enhancing the value urban migrant income. As land holdings approach zero, and the long-term benefits of urban-rural cooperation also approach zero, an individual's migration decision should approach a direct comparison between expectations of strictly-urban and strictly-rural income: family migration and non-migration become the only viable options.

The complex role of land in determining strictly-rural and urban-rural income becomes particularly important during periods of intense economic shock. Households with no out-migrants prior to a crisis (meaning strictly-rural income was previously the best outcome) would find strictly-rural income temporarily approaching zero, creating a situation in which some form of migration is preferable for all affected households. Yet the likely mode of migration would differ for landed and landless households: landed households would likely send one or more individual migrants to take advantage of urban-rural income opportunities, while landless households would undertake family migration since all rural options would hold little value.

### **III. Data and Research Context**

#### ***Migration and Agriculture in Rural Bangladesh***

A highly developed migration process connects the rural southern districts of Bangladesh to Bangladeshi cities. Comilla District had a larger net migrant out-flow than any other district between 1974 and 1981, primarily due to male migration, and trailed only neighboring Faridpur and Noakhali in net out-migration rate (Nabi 1992).<sup>3</sup> One of Comilla's subdistricts, Matlab, is the site of the Demographic Surveillance System of the International Centre for Health and Population Research (known as ICDDR,B). DSS has collected monthly information on birth,

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<sup>3</sup> Lying near the industrial belt along the Dhaka-Chittagong Highway, Matlab is a primary source of labor for Dhaka as well as for Chittagong, the major port city; smaller cities along the delta; and labor-deficit countries in the Middle East and Pacific Rim.

death, marriage, divorce, and migration for every resident of the 149 village Matlab study area since 1966, and has conducted periodic censuses that acquire additional information.

Matlab is located at the junction of the Dhonnogoda and Gumti Rivers, in the flood plain of the Meghna River system. Most households depend on underwater cultivation of rice during the flood season (June-September) as a primary staple crop. Almost all land outside of densely settled homestead plots is submerged throughout the flood season, inducing extreme yearly cycles in transportation, nutrition, labor and prices (Chen et al. 1979). Small landholders cover flood-season deficits by taking loans in terms of high, pre-harvest grain prices and repaying them in terms of the lower, post-harvest price (Jensen 1987; Jahangir 1979). This yearly cycle of debt dependence often leads small landholders to default, land mortgage, and foreclosure.<sup>4</sup>

Migrant remittances provide an advantage in this competitive agricultural context. Remittances pay for agricultural production and growing-season consumption, reducing the need to incur debt. They also finance provision of credit and purchase of land from indebted households (Gardner 1995). Among a random sample of older Matlab residents (50+) in 1996, 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 2000). Research on the same sample showed that total inter-generational transfer receipts increased only in response to the addition of migrant sons; additional daughters and non-migrant sons had no effect on total parental receipts, while their own contributions decreased with each additional male migrant sibling (Frankenberg and Kuhn 2001). Sons who lived in the city with their own conjugal families also contributed less than their siblings who lived alone in the city.

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<sup>4</sup> Rates of any land-ownership are quite high and titles are well-established, owing to a history of peasant ownership and a land reform effort in the 1950's (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 land prices are highly transparent, owing to the fierce competition for land through purchase, mortgage and foreclosure.

The strong tendency to remit stems in part from high rates of return migration, particularly among individual migrants. Other work in this context has shown that migrants who are more likely to return home have a greater incentive to remit (Shaw 1988; Stark 1982). Among a sample of male migrants leaving Matlab between 1982 and 1984, married migrants had a 65% return migration probability in the ensuing 13-year follow-up if they had moved alone, and 46% if they had moved with family (43% for unmarried migrants returned) (Kuhn 1999). Among those who had already lived in the city four years, subsequent risk of return was 42% for individual migrants, but only 16% for family migrants (and 27% for unmarried migrants).

### *Data and Sample Characteristics*

The analysis focused on migration out of the DSS area from 1983 to 1991. Migration surveillance files included 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 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>5</sup> Rural-urban migration opportunities for unmarried women emerged only with the expansion of the ready-made garments industry in the mid-1990's (Amin et al. 1998). From 1983 to 1991, 75% of women's gross migration involved movement

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<sup>5</sup> The practice of women's exogamy also makes it difficult to compare pre-marital moves, which respond to natal household resources, and post-marital ones, which respond to marital household resources. While others have shown that women's marriage decisions may reflect parental risk minimization goals (Rosenzweig and Stark 1989), these concerns should be addressed in a separate analytic model.

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 their husbands or to join their husbands. These tied moves were indirectly captured through analysis of men's family migration decisions, which can also be constructed as a couple-level choice between urban co-residence and spousal separation.

The 1982 DSS census provided baseline data on household land holdings, as well as age and schooling of each household member.<sup>6</sup> The analysis followed all men who were age 15 to 64 and residing in a DSS household during the 1982 census (47,972, of whom 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. Married men were censored upon divorce. Men moved out of the unmarried sample and into the married sample upon first marriage. The resulting file included 264,184 married and 90,579 unmarried observations.

Only rural-urban moves were modeled; rural or international migrants were censored, but no event was recorded.<sup>7</sup> Family migration was recorded if the migrant's wife moved on the same day, to the same destination.<sup>8</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

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<sup>6</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>7</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 an extremely rare event.

<sup>8</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.

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). 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> Grade), which is typically the minimum requirement for tenured government or corporate employment. The higher proportion of unmarried men with any schooling reflects 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 towards 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]

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 (Panel b). The declining proportion of married men at ages above 30 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 in comparison to most agrarian societies. 45% 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>9</sup>

The observation year distribution, shown in panel d, was weighted towards earlier years due to sample censoring. The unmarried sample was weighted towards early years as men shifted into the married sample. While 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

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<sup>9</sup> This may reflect a tendency towards earlier marriage among the landless (Barkat-e-Khuda 1987), but also differences in land reporting. 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, models were estimated separately for married men whose fathers had died, and were not significantly different.

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.

#### **IV. 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 move to the city alone or get married. Married men can be in one of the following recurring states, according to his 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>10</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

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<sup>10</sup> To test the need for a marriage transition model, I included an interaction between age and recency of marriage in the married men's model (not shown). The interactions was not statistically significant, and had no effect on other coefficients.

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, while binomial logistic hazard models looked at unmarried men. For each year  $t$  until an event 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>11</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:

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

Since 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  $x_i$ .

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11 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  $p < 0.01$  level).

Models included village-level fixed-effects specified through controls for village of origin.<sup>12</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.

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 and 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

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<sup>12</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.

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.

## **V. 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.

### ***Individual Resources – Main Effects***

Results for educational attainment, presented in Table 1 and summarized in Figure 3, show that each additional level of schooling (some primary, some secondary, completed secondary) was associated with a significant increase in the likelihood of any migration for both married and unmarried men (Panel a). For unmarried men, most of the schooling effect was concentrated in the impact of completing secondary school (8.7% migration probability, versus 4.3% for those with some secondary school).

[Insert Table 1, Figure 3 about Here]

Schooling had a less pronounced effect on any migration by married men, particularly at higher levels (10+ years) of schooling, but these effects differed between family and individual migration (panel b). While each level of schooling had an incremental impact on the likelihood of individual migration, changes in family migration resulted primarily from the completion of secondary school. 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. While schooling resulted in a higher probability of any migration, presumably due to increased urban income expectations, the highest levels of schooling also had a more pronounced impact on migration by unmarried men, who can better invest in long-term human capital investments, and

on family migration by married men, who are better placed to find quality jobs that reduce dependence on rural resources.

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). Urban income expectations decline with age due to declining opportunities for human capital accumulation and declining lifetime returns to existing human capital, yet these two factors may have differential effects on the relative decline of strictly-urban and urban-rural income. 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 any-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 the average unmarried migration probability (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.

While the post-marital decline in any migration appears to reflect a linear decline in returns to existing human capital, these results mask the divergent effects of age on individual

and family migration, shown in panel d. Individual migration declined monotonically and rapidly with age, while the steepest declines occurred prior to age 30. 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.

While the declining probability of individual migration replicated a typical age-pattern of decreases in both human capital accumulation and returns, the rising age-specific probability of family migration reflected other sources of age variation. 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.

### ***Rural Resources – Main Effects***

Household land is the primary determinant of rural income in Bangladesh, but specification of its impact must take into account both its effect on strictly-rural income, and its effect on urban-rural income through enhanced urban-rural investment opportunities. I capture this complex relationship with two rural land variables: an indicator of whether any land was held by the household and the log of total household land holdings (set to zero if no land was held). This model fit the best of all simple 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, household land ownership had a further negative association with family moves, but no significant association with individual ones; there was also no association for unmarried men.

The impact of land holdings on any migration is depicted in Figure 4, panel a. Unmarried men from households with very small land holdings were no more likely to migrate than those who held no land. Migration probabilities decreased as land holdings (and strictly-rural income) increased because the small landholdings were those most enhanced by a migrant's urban income contribution. Yet in spite of having the lowest possible strictly-rural income expectations, some unmarried men from landless households chose to migrate, presumably because the incentives for urban-rural cooperation were low.

[Insert Figure 4 about Here]

Married men experienced a monotonic decrease in the likelihood of any migration with increased land holdings, yet this pattern conceals a crossover in land's relationship with family and individual migration, as seen in Figure 4, panel b. Family migration was the more likely migration outcome among men from landless households (1.2% versus 0.8%), reflecting their particularly low expectations of urban-rural income. While the likelihood of both forms of migration declined at higher levels of land ownership, the decline in family migration was stronger. The probability of family migration was almost four times higher among men from landless households than among men in the top land decile, while the probability of individual migration was just less than two times higher. This resulted in a crossover, in which family migration was more likely among men from households with less than one acre of land, and individual moves were more likely if land holdings were greater than one acre.

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

Figure 4, panel c portrays the predicted pattern of any migration by observation year. 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. The predicted migration probability deviated significantly from the overall mean (1.29%) only 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.

While the results in Table 1 suggest that yearly change, including the effects of the 1989 flood, had relatively homogenous effects on the choice between family and individual migration, these results may be misleading if resources mediated the migration impact of the flood. The theoretical model suggests that men from landless households, with urban-rural income expectations approaching zero, would have chosen family migration only in a situation in which strictly-rural income expectations had also fallen to zero. To address this issue, Model 2 (Table 2) contains observation-year interactions with respondent's age and household landlessness, as well as an interaction between age and logged household land. 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 the post-flood hardships by showing comparisons of the predicted land-migration relationship for 1989 with all other years, based on Model 2. 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 (panel b). While unmarried men from landless households were less likely to migrate than those with very small land holdings in other years, they were the group most likely to migrate in 1989. The resulting predicted probability of migration by unmarried men in landless households was 6.4% in 1989, compared to 4.5% in other years. For married men (panel a), the probability of any migration was about 40% higher in 1989 than in other years. The effect was only slightly larger for men from landless households, who had a 50% higher probability of migration in 1989.

[Insert Figure 5 about Here]

The probabilities of family and individual migration, shown in panels c and d, reveal the divergence of post-flood migration outcomes between landed and landless households. The 1989 effect on individual migration (panel c) was stronger for men from landed households, with a 30% higher probability of migration compared to all other years combined, than for men from landless households, who had only a 16% increase (0.81% compared to 0.68%). In contrast, family migration probabilities (panel d) underwent a far greater increase for all men, with a stronger increase for men from landless households. The probability of family migration in 1989 was 47% higher for men from landed households than in all other years, and 80% higher for men from landless households. As strictly-rural income expectations approached zero in households affected by the economic aftermath of a flood, migration of some form became more likely, but family migration became particularly likely among men from landless households.

The final set of results, depicting age-year interactions, further demonstrates the role of family migration as an option for men who were unable to practice individual migration. Figure

6 compares the age-pattern of migration in 1989 to all other years. For unmarried men (panel a), the likelihood of migration increased at all ages prior to the median age of marriage (26), with particularly large increases occurring in the early 20's, immediately prior to that age. For married men, the likelihood of any migration (panel b) increased for men of all ages, but most of the increase occurred at younger ages. Migration probabilities showed an even sharper negative association with age in the post-flood year than in other years, suggesting that households responded to the flood by mobilizing young men, both married and unmarried. In particular, young *married* men's migration probabilities, which were typically well below those of similar-aged unmarried men, approached similarly high levels.

[Insert Figure 6 about Here]

Yet as in the other results, individual (panel c) and family migration (panel d) differed. The aforementioned story of increased migration by young men did well in explaining changes in the pattern of individual migration in 1989. Much of the increase in the likelihood of individual migration was concentrated among young married men, with a 70% increase in the probability of migration among 25 year olds (1.7% in 1989 versus 1.0% in other years) compared to a 40% increase among 35 year olds (0.78% versus 0.56%) and a 15% increase among 45 year olds (0.42% versus 0.37%). Regarding family migration, probabilities in 1989 were higher for married men of all ages, yet the greatest increases occurred amongst men in their thirties and early forties. As a result, the peak of family migration in 1989 occurred at ages 30 to 34, compared to a peak in the 26 to 30 age range in all other years. The relative post-flood increase in family migration was greater for older men, with a 35% increase for 30 years olds, a 55% increase for 40 year olds, and a 72% increase for 50 year olds.

The pervasive practice of family migration in 1989 even at advanced ages suggests one of the unobserved factors that may explain the parabolic age-pattern of family migration in all years

pooled, shown in Figure 3, panel d. By merely excluding 1989, a year in which men at older ages were practicing family migration, we see a much earlier and much less pronounced peak in the parabolic age-pattern of family migration. This again suggests that the slower age-specific decline in the probability of family migration relative to individual migration stemmed not from better urban opportunities, but from the loss of rural ones.

Taken together, the age-pattern of migration for married and unmarried men in 1989 suggests a life-course process of migration opportunity. Even in 1989, migration was less likely among married men than unmarried ones, and older men were always less likely to migrate than younger ones. Yet the results also suggest crisis periods in the life-course in which individual moves are replaced by family ones. Given a median male age at marriage of 26 and a brief time to first pregnancy, a married male in this analysis was unlikely to have a son old enough to be included in this analysis (15+) until he was 41 at the earliest. Younger married men could have moved alone to the city since their children were young, their parents were not yet infirm, and their siblings were able to substitute for their household activities. Older married men could ask young, preferably unmarried, sons to move alone to the city. But men in early middle age, unable to count on either opportunity, often had no alternative other than family migration.

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

This paper introduces a three-outcome migration model that accounts for the role of individual and household resources not only on rural and urban income expectations, but also on the expected nature of urban-rural cooperation. It integrates existing models of migration to identify the theoretically important conditions under which a migrant can choose either to maintain or let go of urban-rural economic ties. An empirical analysis of individual, family or no migration by adult males in Matlab demonstrates this model's importance in identifying the causes and likely implications of rural-urban migration.

The importance of the three-choice model is best demonstrated by the migration response to the 1988 flood. As strictly-rural income approached zero for all households, migration grew more likely among all individuals. Yet the nature of the migration response to this short-term decline in strictly-rural income depended primarily on the comparison between strictly-urban and urban-rural income. The likelihood of individual migration increased among men from landed households, where better risk management mechanisms and smaller debt loads indicated a more rapid return to productivity. The likelihood of family migration increased among men from landless households, where expected urban-rural incomes approached zero both before and after the crisis. Similarly, the likelihood of individual migration increased among younger men, both married and unmarried. Married men between ages 30 and 40, who were too old to practice individual migration and too young to have children who could do so, experienced increased likelihood of family migration.

While these results stem from a static decision model, they suggest a dynamic interplay between migration and resource accumulation. Figure 7 portrays likely pathways to family and individual migration for a recently-married man living in a household with moderate land-holdings: land holdings remain constant in the first scenario, but fall in the second. Individual migration occurs when rising and invariant expectations of urban-rural income surpass constant but highly variable expectations of strictly-rural income. Family migration occurs when falling and highly variable strictly-rural income expectations fall below strictly-urban expectations.<sup>13</sup> While the scenarios share the same pattern of strictly-urban income expectation, family migration would be the likely outcome of the second scenario even if strictly-urban income expectations had been considerably lower.

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<sup>13</sup> The wave pattern of strictly-urban income expresses the role of yearly shocks to urban labor markets; in the scenarios, they are negatively correlated to strictly-rural shocks, with a lower magnitude (relative to long-term income).

[Insert Figure 7 about Here]

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 and De Jong 1992; Perlman 1976). Family migration is a process that is not taken lightly: it is costly, it typically involves residence in slums, and it 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 yet more evidence explaining why they never really leave home, yet we have only begun to ask what allows them to do both.

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)	

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.

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

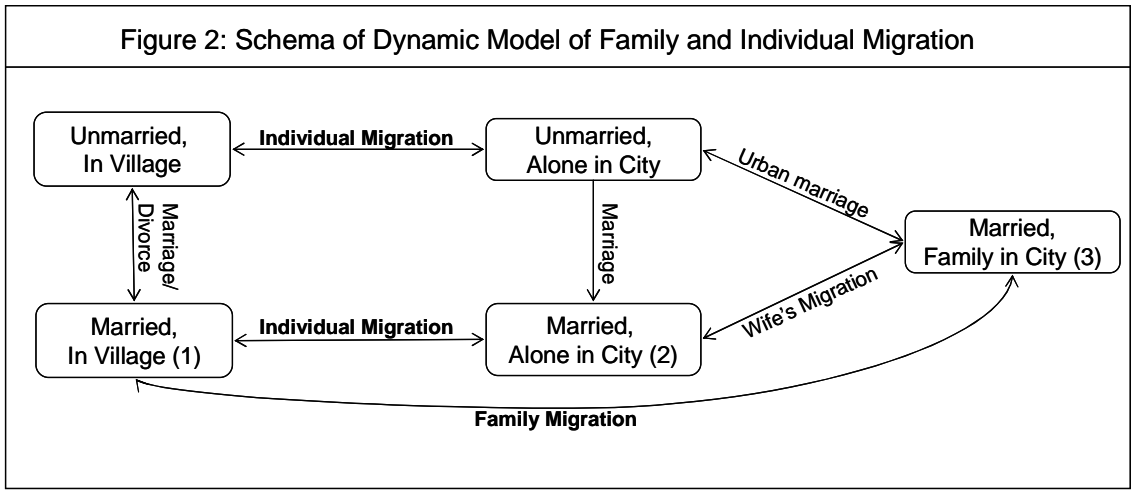
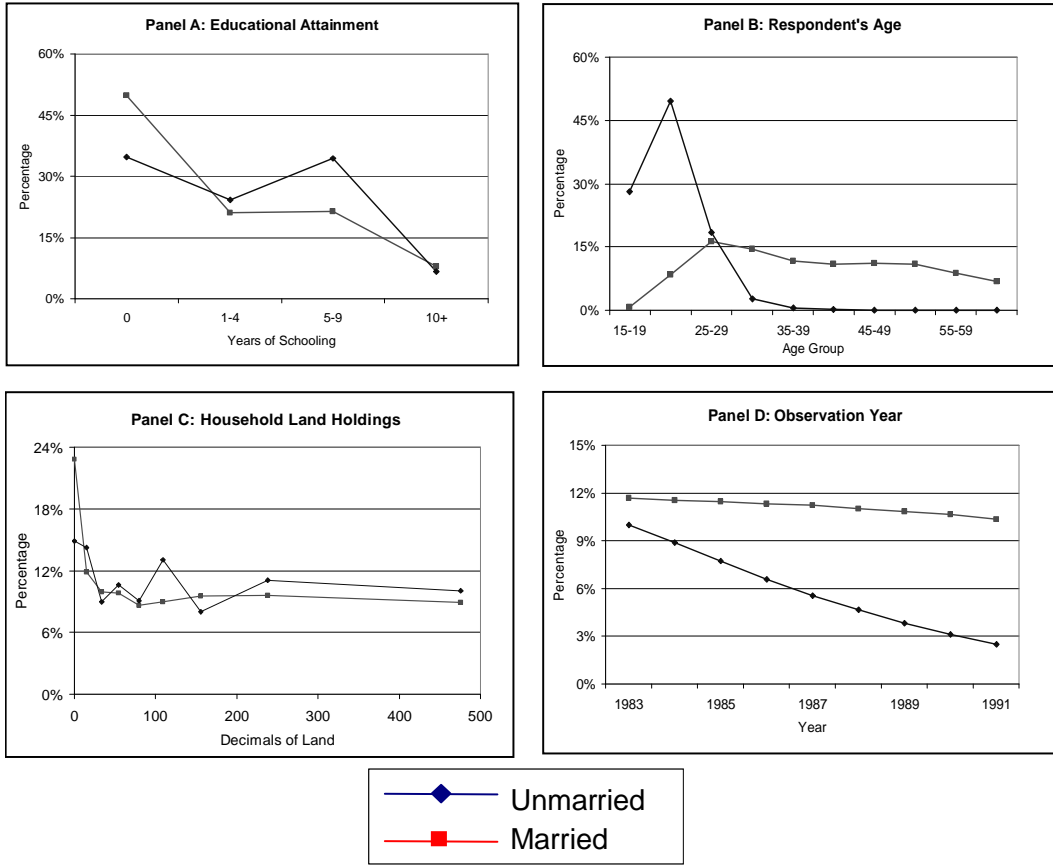


Figure 3: Predicted Migration Probabilities  
by Schooling/Age and Marital Status: Other Variables held at Mean

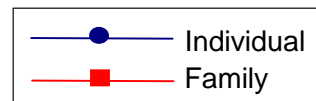
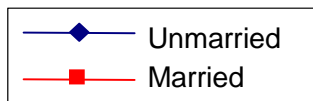
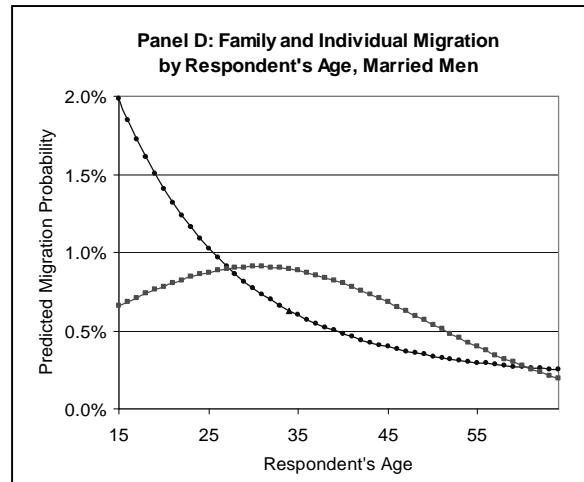
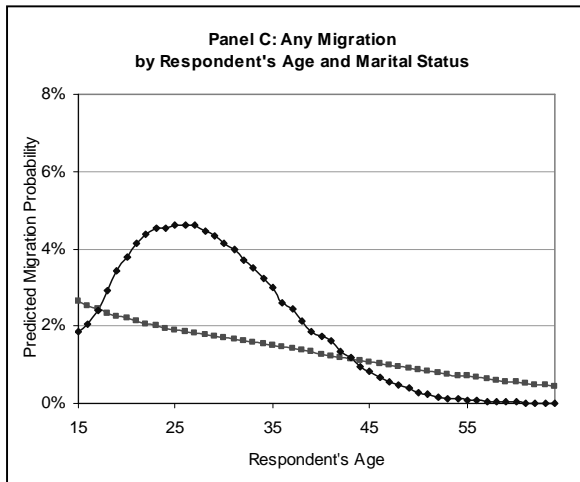
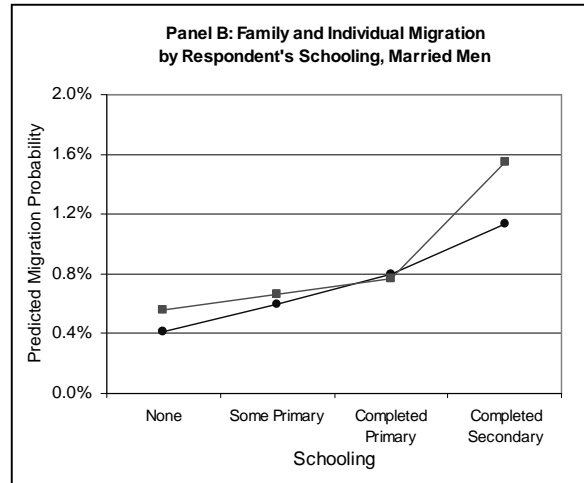
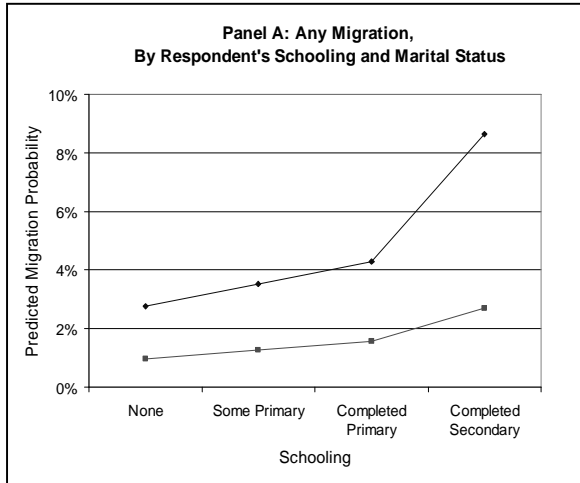


Figure 4: Predicted Migration Probabilities  
by Land Holdings / Observation Year and Marital Status

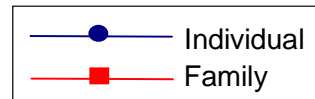
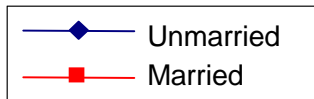
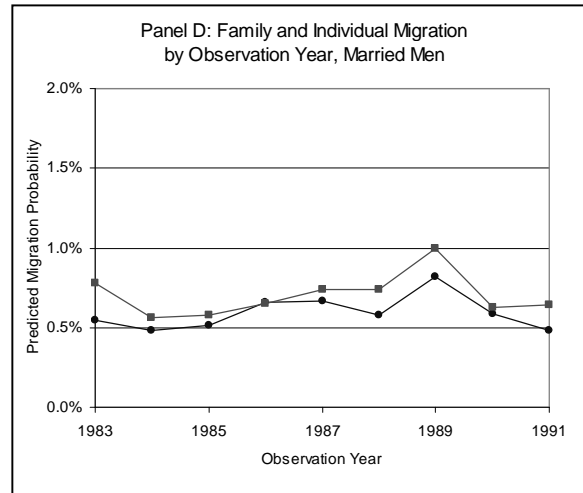
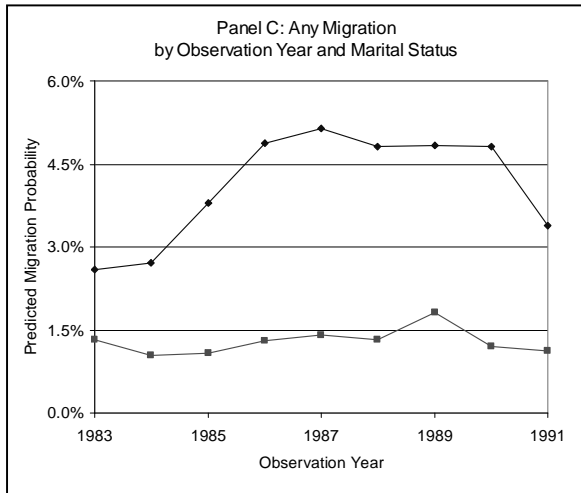
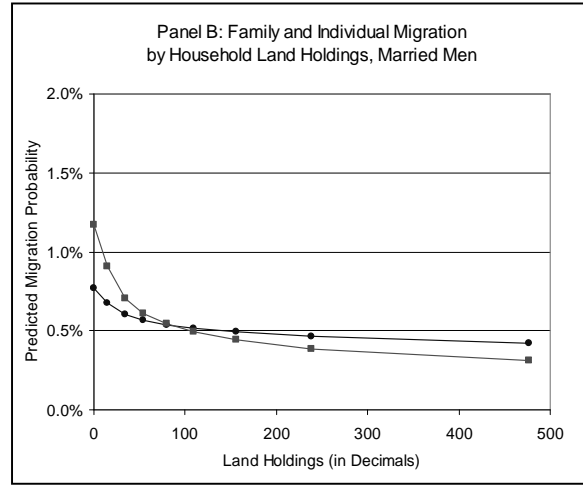
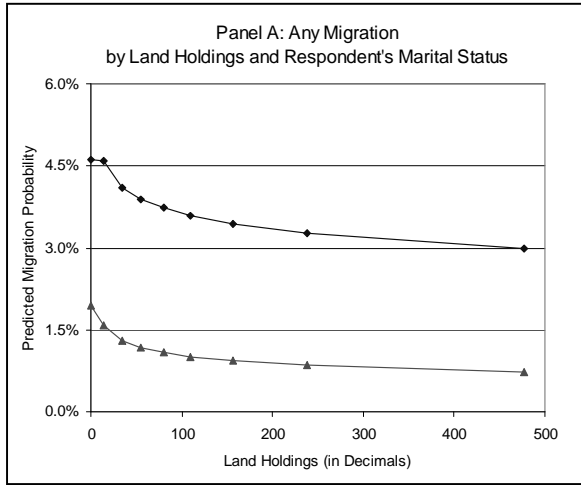


Figure 5: Predicted Migration Probabilities  
by Household Land Holdings, 1989 vs. All Other Years Combined

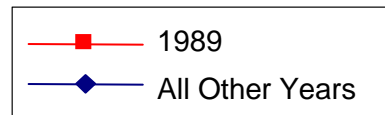
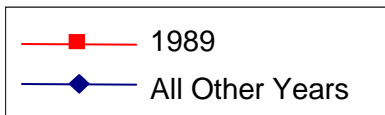
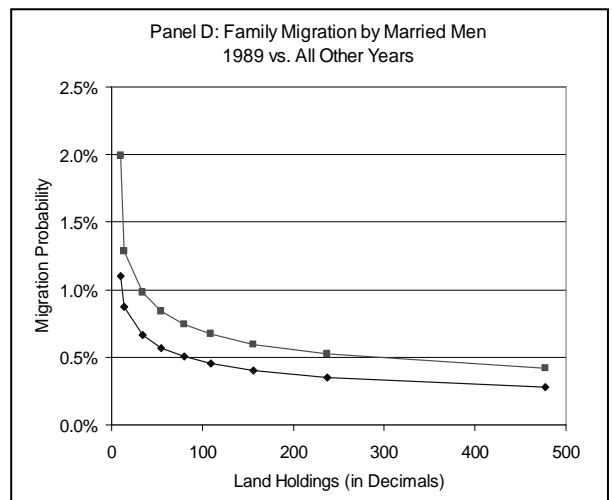
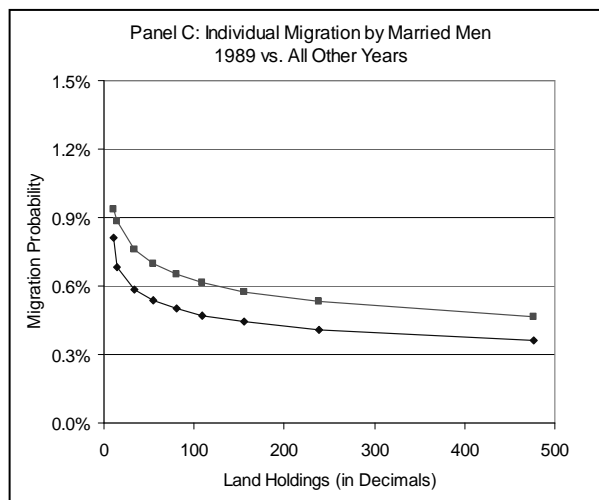
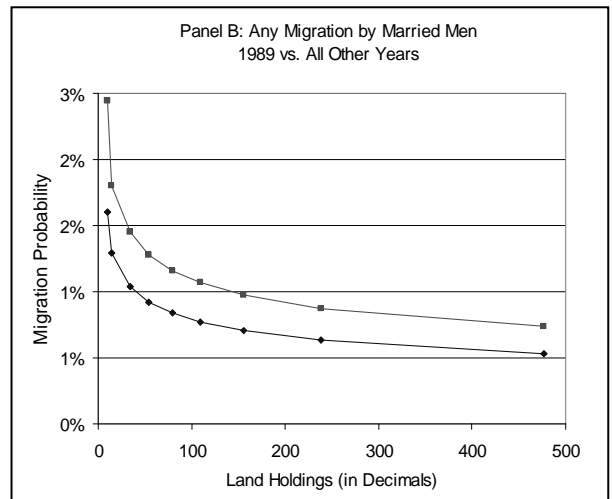
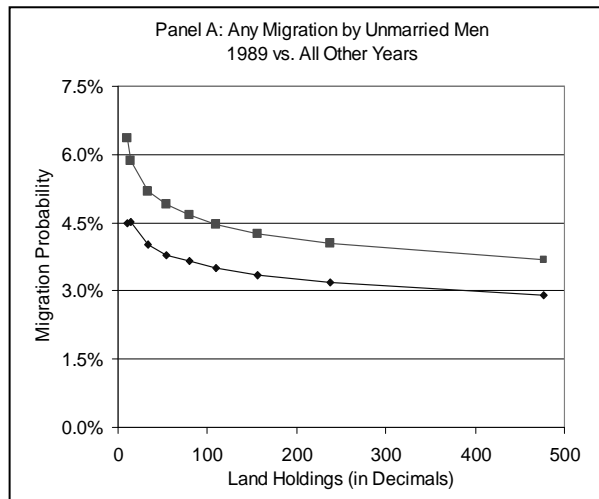
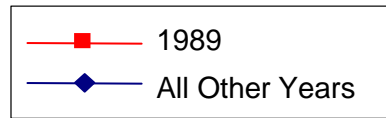
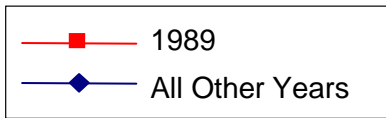
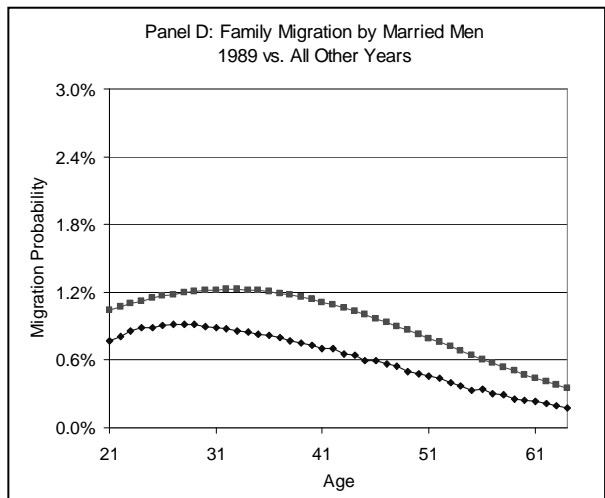
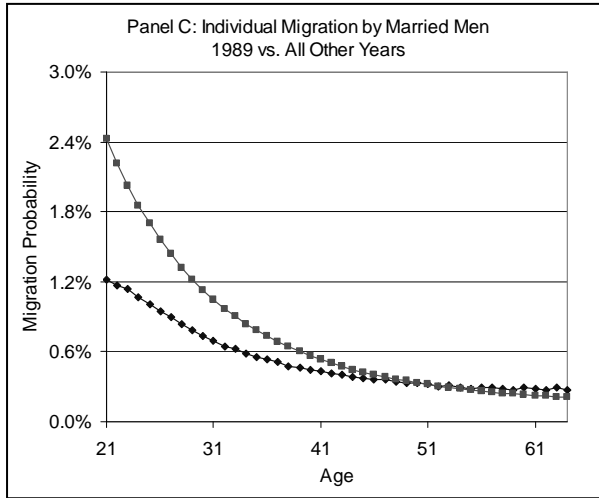
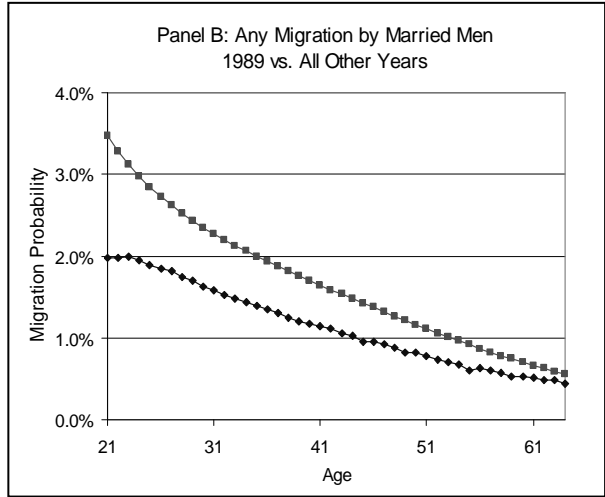
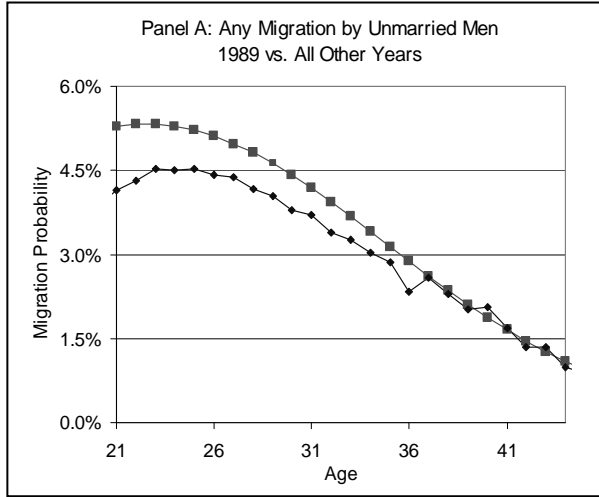
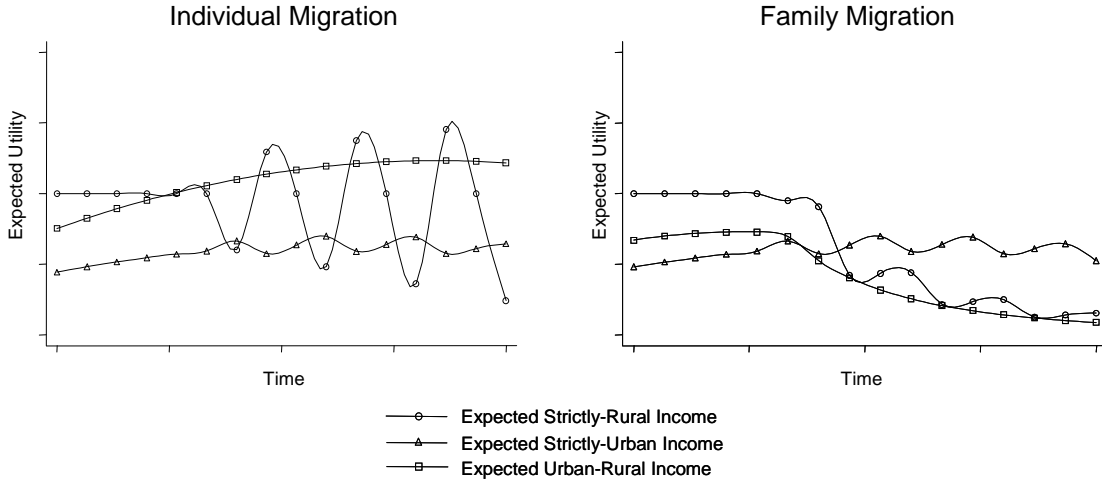


Figure 6: Predicted Migration Probabilities by Age, 1989 vs. All Other Years Combined



# Figure 7: Hypothetical Paths to Individual and Family Migration



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