DEMOGRAPHY© Volume 24, Number 2 May 1987

THE IMPACT OF ORIGIN COMMUNITY CHARACTERISTICS ON RURAL–URBAN OUT-MIGRATION IN A DEVELOPING COUNTRY

Richard E. Bilsborrow
Carolina Population Center and Department of Biostatistics, University of North Carolina, Chapel Hill, North Carolina 27514-3997
Thomas M. McDevitt
International Statistical Programs Center, U.S. Bureau of the Census, Suitland, Maryland
Sherrie Kossoudji
Population Studies Center, University of Michigan, Ann Arbor, Michigan 48109
Richard Fuller
Carolina Population Center and Department of Sociology, University of North Carolina, Chapel Hill, North Carolina 27514-3997

INTRODUCTION AND PURPOSE

Considerable evidence has accumulated during the past two decades indicating that in developing countries, migration from rural areas is influenced by high rates of rural natural increase, inequitable land distribution, inadequate rural employment opportunities and incomes, and large differences in income and amenity levels between urban and rural areas (Bilsborrow, Oberai, and Standing, 1984; Firebaugh, 1979; International Development Research Centre, 1977; Peek, 1980; Shaw, 1974). Many households are "pushed" by economic conditions to leave the rural sector. Others are attracted by better conditions in urban areas. Although migration decisions are made in the context of prevailing institutional and structural labor market conditions, local wealth–property relationships, and geographic disparities in economic opportunities and services, the characteristics of the potential migrant and his/her household are also important (Bilsborrow, 1981a,b; Oberai and Bilsborrow, 1984; Wood, 1982).[1]

As a result, the investigation of factors influencing migration decisions is best carried out with a model that incorporates factors at both the micro, or individual/household, and the areal, or structural, levels. Omission of either of the subsets of explanatory variables is thus seen as resulting in misspecified equations and biased estimates of causal relationships.[2] Moreover, since areal variables often closely approximate policy instruments and are important for government planning, their omission, customary in many previous analyses of the determinants of migration decisions, limits the policy implications that can properly be drawn. Most evidence to date on the determinants of patterns of rural–urban migration in Latin America has been derived from macro-level studies based on aggregated census data.[3] Though household surveys have provided the basis for micro-level analyses of the determinants of migration in a few countries (see Balan, Browning, and Jelin, 1973; DaVanzo, 1976; Romero and Flinn, 1976; and others cited in Bilsborrow, Oberai, and Standing, 1984), there has been little systematic analysis of the effects of micro- and areal-level factors based on merged household survey and contextual data.

In this paper we illustrate the use of merged micro and aggregate data to investigate the separate effects of individual, household, and contextual factors on migration. The particular application is to individuals moving from the rural Sierra to

urban destinations in Ecuador. In this and other papers, we have attempted not only to separate and quantify the effects of individual and contextual/structural factors on out-migration in this setting but also to illustrate the value of multi- or cross-level analysis for enhancing our understanding of contemporary patterns of urbanization in developing countries in general.

It is important to clarify at the outset a fundamental characteristic of household surveys vis-à-vis the analysis of the determinants of migration, because the collection and analysis of household survey data appropriate for migration confronts a number of serious methodological difficulties that do not exist for fertility or mortality. Most migration surveys have been carried out only in destination areas (e.g., the capital city); that is, information is collected on (in-) migrants and nonmigrants in areas to which the migrants have moved (see Bilsborrow, Oberai, and Standing, 1984:ch. 4). The focus here, in contrast, is on the effects of origin characteristics on out-migration from rural to urban areas, based on survey data collected in origin areas. In origin areas, one encounters two types of households: those with out-migrants (the head of household and/or other members remaining behind in the origin) and those without out-migrants. This provides data appropriate for investigating why some households have out-migrants and others do not. But when the whole origin household has migrated, there is no one left in the area to report details on the circumstances surrounding their departure. Information from former neighbors, even propinquitous, is rarely reliable. Therefore, an origin area survey can provide reliable information for analyzing the determinants of out-migration only of individuals, not households. In future research we hope to combine information from origin and destination area data to investigate factors influencing rural–urban migration of complete households. Though the present analysis does not deal with the determinants of all rural–urban migration in the Sierra, it does deal with a large component and specifically focuses on those individuals most likely to migrate (sons and daughters aged 12–25 at the time of their migration).

Although the data do not permit an analysis of the determinants of household migration, this does not mean that the conceptual approach is individualistic. Migration of individuals is explicitly viewed here as influenced by household factors and hence to some degree reflects household decisions. The approach draws on the substantial body of sociological, economic, and demographic literature that views migration decisions—together with other demographic, work, and time allocation decisions—as resulting from a complex process of interrelated household decisions (e.g., see Becker, 1976; Bilsborrow, 1981b; Burch, 1979; DaVanzo, 1976; David, 1974; DeJong and Gardner, 1981; Easterlin, 1980; Mincer, 1978; Nerlove and Schultz, 1971; Oberai and Bilsborrow, 1984; and Schultz, 1981). Migration decisions can be viewed as part of a household survival or sustenance strategy (Roberts, 1985; Standing, 1985; Wood, 1982). Relating the migration decision explicitly to other household decisions is beyond the scope of the present paper, whose focus is on the extent to which origin area or contextual factors—reflecting certain aspects of structural conditions in areas of origin—affect out-migration tendencies. A broader, multi-equation model may be particularly important in studying the determinants of female migration, given its more obvious linkages to household size, fertility, and time allocation and earnings of other household members. Specifically, a better understanding of female migration is sorely needed. Recent references indicating empirical research needs more than successes are Thadani and Todaro (1984), *International Migration Review* (1984), and references cited therein.

SETTING

As groundwork for discussing the model that follows, we briefly describe relevant aspects of the rural economy and population movements in the study area. Ecuador comprises three regions: the Costa, or tropical coastal lowlands; the Sierra, or highlands; and the Oriente, largely Amazon jungle. The Sierra region comprises 10 of Ecuador's 19 provinces and is inhabited by roughly half of the country's population. Topographic, climatic, cultural, and even linguistic barriers restrict, but do not eliminate, migration among regions. Population movements within the Sierra include daily commuting to work in both urban and rural locales, seasonal and temporary migration, and more permanent movements, particularly from rural to urban areas (Ecuador, Consejo Nacional de Desarrollo, 1985; Gaude, 1981; Peek and Antolinez, 1980; Preston, 1978).

Patterns of Development; Patterns of Movement

The character, direction, and volume of rural–urban migration in the Sierra during the past two decades has been shaped by patterns of economic growth and decline in the agro-export, oil export, manufacturing, construction, and service sectors and by far-reaching modifications in agrarian structure (Commander and Peek, 1986; Peek, 1981; Peek and Antolinez, 1980; Proaño, 1978). During the 1950s and 1960s economic growth resulted from expanded production of bananas and other export crops and was concentrated in the coastal region, on large plantations, and in the industrial and maritime center of Guayaquil, the largest city in the country. As a result, a substantial number of persons relocated from the Sierra to the Costa during this period (Commander and Peek, 1986; Middleton, 1979). Patterns of movement were significantly altered during the latter 1960s and the 1970s, first by a series of land reforms, beginning with the 1964 Land Reform Law, and then by the oil-led export boom, which began in 1972. Even though the 1964 land reform had only a minor impact on the distribution of land, it contributed to a major shifting of relationships linking the agrarian population to the land. Specifically, abolition of the *huasipungo* (servant labor) system and increased seasonality of labor needs associated with expansion of certain crops led to some substitution of temporary for permanent labor on larger farms (Commander and Peek, 1986; Peek and Antolinez, 1980). At the same time, the growth of the capital, Quito (the main city in the Sierra), and spillover effects associated with the oil boom led to a large increase in labor demand in urban areas, particularly in the construction and service sectors. The urban population of the Sierra has, therefore, continued to grow much faster than the rest of the region since the 1960s. This is seen as a major problem in recent national development plans.

To understand rural–urban migration from farm households, it is first necessary to understand certain aspects of the Sierran economy. Consider first the process referred to in the literature as the "marginalization of the *minifundios*." Commander and Peek (1986) characterized agriculture in the Ecuadorian Sierra in the 1970s as having reached "a stage of involution where little additional agricultural labor can be absorbed."[4] Land scarcity and population growth had led to high levels of labor intensity on the smaller plots. At the extreme, that is, for the many very small holdings, less than one-fourth of total available labor time is absorbed on the farm. Peasant households are often forced to enter into sharecropping, temporary labor hiring-out, and other arrangements to supplement on-farm income. Families holding the smallest amounts of land [less than 1 hectare (ha.)] participate to a greater extent in the off-farm labor market than minifundia households with slightly larger holdings

(2–4 ha.; Commander and Peek, 1986). But many peasant households can survive only by permanent out-migration of family members who often, in turn, send back remittances.

A second characteristic of the rural economy is the role of urban and rural (off-farm) labor markets in the absorption of this agricultural labor surplus. Large (i.e., over 100 ha.) and medium-sized farms continue to represent a source of labor demand, but only about 15 percent of the estimated labor surplus from small farms is actually absorbed on these farms (Commander and Peek, 1986). Some is also absorbed by the growing small-farm (2–4 ha.) labor market. Temporary employment in urban areas (e.g., construction) has, however, increasingly provided an alternative outlet, replacing seasonal or temporary employment on medium and larger farms in importance. The availability of off-farm employment in a given area within and outside agriculture should, therefore, be included in any model of rural out-migration in the Sierra.

A third feature is the special attractiveness of the Quito labor market and consequently the importance of proximity to Quito as a determinant of the volume and permanence of movement in the Sierra. The importance of distance in understanding migration is well established. Statements on the relationship between distance and migration date back at least as far as Ravenstein (1885), and this relationship has been illustrated in Latin America by Thomas and Croner (1975) and others.

This point is related to a fourth characteristic, the enormous disparities in amenities and facilities between rural and urban areas. Despite the benefits of the oil boom, beginning in 1973, relative deterioration occurred in employment and wage conditions in rural areas during the 1970s, adding to the vast structural disparities between urban and rural areas (Commander and Peek, 1986). Increasing recognition of these disparities, as a result of considerable improvements in transportation and communications systems and the expansion of education, is undoubtedly also important in contributing to rural–urban migration. For example, in 1974 (the census prior to the migration movements to be studied) the percentage of dwellings with electricity was 84 in urban areas, 12 in rural; the percentage of population with less than 6 years of education (completed primary) was 30 in Quito and Guayaquil, 40 in other urban areas, and 70 in rural areas; the percentage of births receiving medical attendance was 65 in urban areas, 15 in rural; and reported female labor force participation rates (ages 15–49) were nearly twice as high in urban as in rural areas (Bilsborrow and Foley, in press; IBRD, 1979). In its country assessment the World Bank called sectoral dualism the most serious problem facing Ecuador.

SPECIFICATION OF ESTIMATION MODEL

In the balance of this paper we examine decisions contributing to long-term rural-to-urban migration flows originating in the Sierra, specifying and estimating a model that includes individual, household-level, and contextual variables and focuses on economic motivations for moving. Economically motivated migration is undertaken here, as elsewhere in the developing world, in response to perceived location-specific opportunity differentials. For the majority of Sierra farming households, migration is one of several possible responses to household stress resulting from a low land–labor ratio. The decision to migrate (or not) is influenced by contextual factors, such as local off-farm employment opportunities and proximity to the Quito labor market, and noneconomic considerations, such as the availability of amenities in the area of residence.

Migration decisions thus are based on a process whereby an individual in

household j in community k takes into account information at all three levels. The simplest form of a general multilevel model of individual migration is then of the form

$$M_{ijk} = f(X_{ijk}, X_{jk}, X_k),$$

where M_{ijk} refers to the probability of migration of the ith individual in the jth household in the kth community and X_{ijk}, X_{jk}, and X_k refer to individual-, household-, and areal-level characteristics, respectively.

The dependent variable is a simple binary choice variable: to migrate or not from the rural area.[5] We choose a probit specification, which implies a normal cumulative probability density function for the critical value function. The characteristics and assumptions for a binary probit are well known and need not be reviewed here (Judge et al., 1980; Maddala, 1983).[6]

We specify the (potential) migrant's decision as a function of variables measured at the following three levels:

Individual-level variables

Age: AGE

Education (years completed, operationalized as a set of dummy variables to allow for possible nonlinearities): EDUCATION

Marital status: MSTAT

Household-level variables

Land owned by the farm household[7]: LAND

Adults in the household (aged 12 and over): ADULTS

Areal/contextual variables

Distance to Quito: DIST-Q

Agricultural labor absorptive capacity of the area: LABAB

Size of the local urban labor market: URBEMP

Indicator of level of services or amenities in the area: the proportion of rural houses without electricity[8]: NOELEC

SOURCES OF DATA

In 1977–1978 a survey of internal migration was carried out in the Ecuadorian Sierra by the Instituto Nacional de Estadistica y Censos (INEC, 1978), with financial and technical support from the World Population and Employment Programme of the International Labour Office in Geneva. The survey was designed to produce a data set that would support methodologically innovative work on migration. It used a probability sample covering a major portion of the country, including both origin and destination areas (and both rural and urban areas), collected information about nonmigrants as well as in- and out-migrants, used specialized sampling techniques to select a large number of recent migrants, and collected detailed information from migrants about economic and other conditions before and after the move.

The micro-level data used here are from the rural portion of the INEC–ILO

survey, comprising a sample of 3,427 households representative of the rural Sierra population. Earlier analysis documented some of the correlates of households with out-migrants and the characteristics of out-migrants (Peek and Antolinez, 1980). However, no multilevel analysis has been undertaken previously on these data.

The areal/structural data are from a wide variety of published sources. Principal among these are the 1974 Census of Population, the 1974 Census of Agriculture, and a farm labor survey in the Sierra carried out by the Ministry of Agriculture and the French Office de Recherche Scientifique et Technique Outre-Mer (ORSTROM).[9] All areal/contextual variables are measured at the level of the *canton* (the subprovincial administrative unit in Ecuador).[10]

OPERATIONALIZATION

Selection of Population

The analysis presented here refers to all sons and daughters aged 14–27 in farming households in which the eldest son or daughter was aged 12–25 at the time of the survey.[11] The subset was selected to reduce possible errors in estimating relationships attributable to unmeasured life cycle effects, prior migration experience, and problems of measuring wealth in a comparable way in farming and nonfarming households.

More specifically, we choose to study the odds of being an economically motivated, rural-to-urban migrant relative to being a nonmigrant. The additional restriction of migrants to those moving to an urban destination results in a loss of about 9 percent of total cases in the subsample of sons and daughters.[12] The restriction to those classifiable as "economic migrants" excludes approximately 40 percent of the out-migrants who were declared as moving for other, non–work-related reasons, such as education, marriage, to accompany other family members, and so forth. It is not our purpose to enter into a debate regarding what is an "economic" and a "noneconomic" migrant, specifically how "migrants for education reasons" should be classified. To the extent that education is sought to improve long-run earnings potential, migration for education may be considered as motivated by long-run economic goals. But migration for education may also have other underlying motives—to satisfy a parent, for cultural edification, to enhance one's chances of obtaining a better spouse, and so on. The two categories of economic reasons used here are unabashedly and clearly to "improve one's economic situation as soon as possible." The reader may substitute "work-related" for economic if desired.[13]

In table 1 we present reasons for migration of sons and daughters, as indicated in a response by a remaining household member, usually the household head (father). Overall, the percentge of economic migrants is higher among males than females (69 percent vs. 54 percent). The difference is not so large, however, and the fact that more than half of the daughters are reported as having economic reasons suggests that factors influencing female migration in Latin America are not as different from those influencing male out-migration as is commonly supposed. Moreover, the percentages moving for education reasons are the same. The major difference is the larger percentage of females reported as moving for personal reasons (15 vs. 2). We will see below that in fact, marital status is a far more important determinant of migration for females than males even among those reported as migrating for economic reasons.

The intent of the INEC–ILO survey was not to measure migration propensities per se but to facilitate analysis of the determinants of differential propensities. There-

Table 1.—Classification of Rural to Urban Migrant Sons and Daughters, by Reason for Moving

Category	Sons			Daughters		
	No.	% unweighted	% weighted*	No.	% unweighted	% weighted
Economic migrants	464	69.2	69.8	271	53.9	52.0
Not enough work	376	56.0	56.5	239	47.5	44.4
Not enough income	88	13.1	13.3	32	6.4	7.6
Noneconomic migrants	207	30.8	30.2	232	46.1	48.0
To attend school	153	22.8	22.9	116	23.1	22.6
To be with friends/relatives	14	2.1	1.9	76	15.1	17.4
Other	40	6.0	5.4	40	8.0	8.0
Reasons missing	3	—	—	6	—	—
Total migrants	674	100.0	100.0	509	100.0	100.0
Nonmigrants	1,276			1,081		
Total	1,950			1,590		

*Weighted by the inverse probability of selection.

fore, households with out-migrants and those with relatively large landholdings were both oversampled to ensure adequate sample sizes for the relevant subgroups, since the number of households with less than 5 ha. was many times that with larger holdings in all Sierra provinces (characterized by minifundia). Thus for the strata with less than 5 ha., all households that had a recent rural–urban out-migrant were selected (oversampled), whereas *all* households with more than 5 ha. were selected, whether or not they had a recent out-migrant (Lasprilla, 1978; Bilsborrow, Oberai, and Standing, 1984:ch. 4; see also note 15). Household selection probabilities were thus determined differently for the two landholding strata. The weighted sample design effectively led to larger proportions of rural households with (a) quite recent rural–urban out-migrants and (b) more than 5 ha. of land, as is evident in table 1. Therefore, our analyses are carried out separately for the two strata to remove the influence of sample design; separate analyses facilitated by the large sample also allow the examination of differences in the effects of landholding size on migration within the large and small farm groups.

Construction of Variables

Migrants are defined as persons aged 12 and above who had left the rural *parroquia* within the previous 5 years. The 5-year cutoff was chosen to focus on recent behavior and to ensure higher quality retrospective data (less memory recall error). Measurement of most of the individual and household-level independent variables and NOELEC is straightforward; however, some explanation may be useful in the case of the education variables, the household-level variables, and the other contextual variables. Recall that the areal variables are measured at the canton level.

ED1 and ED2. These dummy variables were created to capture the effect of educational attainment on migration propensity. ED1 takes a value of 1 if the respondent completed less than 6 years of schooling (less than a primary school

certificate) and is 0 otherwise. ED2 takes a value of 1 if the respondent completed 7 or more years of schooling and is 0 otherwise. The prevailing thought on the subject, particularly that based on empirical tests of human capital migration models, predicts a negative ED1 coefficient and a positive ED2 coefficient.

LAND. Though emphasis in the literature is on the distribution of land, and discussions of the viability of farming units are couched in terms of farm size,[14] it is clear that the farm household's ability to use its labor efficiently and support its members depends on land held in relation to labor. Thus the measure of household resources adopted, LAND, is the amount of land owned by the household (in hectares).[15]

ADULTS. This variable refers to the number of persons aged 12 and above in the household (before the recent out-migration, in the case of households with out-migrants). ADULTS was created by reconstructing the household at a time approximating the migration decision point, adding out-migrants back into the household and subtracting in-migrants (though only about 5 percent of this sample of rural households had in-migrants in the 5 years before the study).

DIST-Q. The relationship between proximity to Quito and propensity to move is captured by inclusion of a simple distance variable. We developed a measure of (road) distance in kilometers from the canton capitals that adjusts for the quality of the road and topography to obtain a measure more akin to time distance.[16]

LABAB. The agricultural labor absorption capacity of an area is measured by (a) the actual off-farm temporary and permanent worker days per hectare for each farm size category at the province level (from Ministry of Agriculture—ORSTROM; see Sources of Data) divided by (b) the number of rural residents over age 15 per hectare in each canton of the province, weighted by the land distribution at the canton level (from 1974 Census of Agriculture). The variable may be interpreted as an answer to the question, "How many days on the average might a person expect to work over the course of a year as an agricultural laborer in the canton?"

URBEMP. The extent of off-farm employment in a given locale indicates availability of opportunities for supplementing farm incomes. The increasing importance of non-farm employment as a source of income for farm families in developing countries in general was documented by Anderson and Leiserson (1980). Off-farm employment includes both agricultural (captured by LABAB) and nonagricultural labor. The less available is off-farm employment relative to the total agricultural labor surplus, the greater is the likelihood of out-migration. Nonagricultural off-farm employment in the Sierra is almost entirely in urban areas. A relevant specification for URBEMP is therefore the ratio of the size of the local urban labor market, measured as urban residents employed in nonagricultural occupations in the canton, to the total economically active canton population aged 15 and above. URBEMP is calculated separately for males and females.

In table 2 we present the means of the model variables for sons and daughters, comparing economic migrants with nonmigrants. Clear differences between sons and daughters emerge across various variables. For example, daughters who out-migrate to urban areas are likely to be slightly younger than sons, are less likely to be married, and have significantly lower education (the difference being even greater than that between non-migrant daughters and sons).[17] We also observe some intriguing differences in household-level variables: economic migrants came from larger households (higher numbers of adults). On farms with less than 5 ha. of owned land, migrants come from relatively larger farms, whereas among farms of more than 5 ha., they came from smaller farms. This may imply a bivariate inverted U-shaped

Table 2.—Means of Independent Variables for Economic Migrants and Nonmigrants, by Landholding Strata

Variable	Land strata (hectares)	Sons		Daughters	
		Non-migrants	Economic migrants	Non-migrants	Economic migrants
AGE	<5	18.6	20.4	18.3	19.7
	5+	18.4	21.1	18.1	20.1
MSTAT	<5	0.058	0.101	0.083	0.080
	5+	0.032	0.053	0.086	0.034
EDUCATION	<5	5.52	5.18	4.92	4.46
(years)	5+	5.67	5.86	5.32	4.95
LAND	<5	1.17	1.21	1.13	1.19
	5+	18.91	16.86	14.54	14.26
ADULTS	<5	5.45	5.48	5.45	5.57
	5+	5.74	6.55	5.90	6.69
DIST-Q	<5	259.2	203.4	243.3	203.0
	5+	308.7	315.7	307.9	245.4
LABAB	<5	48.8	40.9	41.4	48.8
	5+	62.2	57.4	59.4	66.1
URBEMP	<5	0.223	0.212	0.408	0.412
	5+	0.221	0.275	0.487	0.521
NOELEC	<5	0.857	0.870	0.855	0.862
	5+	0.894	0.897	0.901	0.880
TOTAL	<5	689	387	647	213
	5+	589	76	406	58

relationship between size of landholding and migration propensity, which will be further examined below.

Other relationships observed in the table may be summarized as follows: migrants are in general older than nonmigrants, suggesting, for this sample of 14- to 27-year-olds, a positive relationship between age and migration; the level of education of migrants is *lower* than that of nonmigrants among daughters and for sons on small farms; and distance to Quito is generally lower for migrants than nonmigrants, as expected. Among the areal variables, the availability of off-farm rural employment is lower for sons who migrate than those who do not, suggesting a negative association with out-migration, as expected; but the opposite is observed for daughters. The size of the local urban (canton) labor market appears positively associated with economic migration out of the canton for both sons and daughters on larger farms. Finally, no pattern is observed between electrification and migration in the table. The bivariate relationship implied by such comparisons may be misleading. For this reason, further discussion will be left to the section on multivariate results below.

EMPIRICAL RESULTS

Table 3 shows the results of the separate probit estimations of the model for sons and daughters for the two landholding size groups. The coefficient for the *n*th explanatory variable may be interpreted as measuring the effect of this variable on the odds of being a(n economic) migrant relative to being a nonmigrant.[18]

Table 3.—Factors Influencing the Probability of Rural–Urban Out-Migration: Probit Parameter Estimates and *t* Values (in parentheses)

Variable	Sons		Daughters	
	Less than 5 hectares	5 or more hectares	Less than 5 hectares	5 or more hectares
AGE	+0.103***	+0.154***	+0.078***	+0.098***
	(8.033)	(6.391)	(5.330)	(4.023)
ED1	−0.234***	−0.741***	+0.186*	+0.109
	(2.625)	(3.859)	(1.811)	(0.623)
ED2	−1.056***	−0.635**	−0.754***	−0.761**
	(6.389)	(2.255)	(3.351)	(2.322)
MSTAT	+0.003	−0.192	−0.378**	−0.998***
	(0.039)	(0.519)	(2.059)	(2.501)
LAND	+0.136**	−0.017***	+0.061	−0.006
	(2.294)	(3.278)	(0.861)	(0.881)
ADULTS	−0.006	+0.137***	+0.026	+0.142***
	(0.269)	(3.323)	(0.961)	(3.113)
DIST-Q	−0.001**	−0.003***	−0.000	−0.000
	(2.563)	(4.867)	(1.025)	(0.709)
LABAB	−0.003***	−0.004*	+0.003**	+0.002
	(3.125)	(1.819)	(2.288)	(1.095)
URBEMP	+0.065	+8.070***	−0.066	+0.394
	(0.263)	(6.148)	(0.262)	(0.588)
NOELEC	+1.480***	+22.883***	+0.638	−1.084
	(2.574)	(5.473)	(1.124)	(0.440)
LAND × DIST-Q	−0.000**	+0.000***	−0.000	+0.000
	(2.478)	(3.518)	(1.544)	(0.964)
−2 × log of likelihood ratio	179.24	126.97	69.98	46.90
Degrees of freedom	11	11	11	11
Sample size	1,076	665	860	464
Nonmigrants	689	589	647	406

Note: Totals may not exactly match those in table 1 because of missing data. Also, the implied proportions of migrants in the two land-size categories are not comparable because of the sampling procedures used (see Sources of Data section).

*Significant at the 0.10 level, two-tailed *t* test.
**Significant at the 0.05 level, two-tailed *t* test.
***Significant at the 0.01 level, two-tailed *t* test.

Let us begin with the individual-level variables (AGE, ED1 and ED2, and the marital status dummy variable, MSTAT). A number of the signs are different from what one would expect on the basis of standard economic theories of migration. First, the effect of AGE is positive and significant for both sons and daughters, in both farm size categories. Normally, one expects the effect to be negative, since younger migrants face greater lifetime returns to movement and often lower costs of relocation. The peculiar result here is simply a consequence of our restriction of the

samples to sons and daughters aged 12–25 at the time of the move. Children in their early teens migrate less often than older teenagers.

The signs for ED1 and ED2 are also not fully consistent with expectations: the coefficients of both are negative and statistically significant for sons. This implies that migration propensity peaks at the primary-certificate level for males, with further education associated with lower out-migration. More surprising is the coefficient pattern for daughters: the least educated daughters were most likely to move, the opposite of what one would expect from the human capital model. A partial explanation may be that urban employment opportunities for women are concentrated at the lower end of the services sector (e.g., domestic service or household servants). This would tend to attract mainly lower socioeconomic status, less educated daughters. A second explanation has to do with the fact that we are investigating factors influencing *economic* migration. The more educated daughters (and sons) may relocate more often for non–work-related reasons (e.g., to further their education), in which case they are excluded from the majority pool of migrants studied here. But the fact that education does not have the simple positive effects on rural–urban out-migration suggests a need for reexamination of the applicability of the human capital model to developing countries, particularly for females.

Quantitative studies of the determinants of migration have rarely had access to or used data on motives for migration, though its use has been suggested before (e.g., Shaw, 1975:107ff). Evidence here suggests that the usual selection argument for education as a factor positively influencing rural–urban migration, deriving from the human capital approach that sees the more educated as having greater employment opportunities in urban areas, is incorrect. It is the less educated who move almost entirely for economic reasons, because they have to. Those with higher education can afford to move for noneconomic reasons. In Ecuador (and other developing countries) among these other reasons is the desire to obtain more schooling, since postprimary schools are concentrated in urban areas. These results for education, however, merit further examination, and the suppositions here will be explored in future research.

The last individual variable, marital status (MSTAT), is found to influence negatively the out-migration of daughters but not sons. The effect for daughters is significant at the 0.05 level for those from small farms and at the 0.01 level for those from large farms. Being married or in a consensual union decreases the likelihood of migrating for daughters, although it has no effect for sons. These results are as expected.

Turning to the household-level variables, we find the effect of LAND on migrant status to be significant for sons from large and small farms but not significant for daughters, although the sign pattern is the same. (The interaction of LAND with DIST-Q is discussed below.) For large farms, the effect of land is negative, supporting the hypothesis that sons tend to remain in the origin household when sufficient land is available to require their labor. For small farms, however, the amount of land owned was found to *positively* influence the odds of a son's being a migrant. There are two possible interpretations of this positive relationship for small farms. Since farms of less than 5 hectares are insufficient to employ the labor of an average household in the Andes (see Setting), variations in land owned by very small farmers may simply indicate whether or not the family has *any* resources. Because there are money and information costs of migration, this positive effect may reflect the relative ability to mobilize the resources necessary for the move of a household member. Such a finding parallels that of Roberts (1985) for Mexico and has theoretical support in David (1974). An alternative explanation is that those with tiny

landholdings are basically not farm families and derive most of their income from off-farm labor earnings. Both explanations probably have some merit. In any case, the findings are quite different from those of Peek and Antolinez (1980), who observed a U-shaped relationship between land and out-migration propensities based on a two-way table. The effect here is more of an inverted U, with low migration propensities for those with 0–1 and 50 or more ha. and highest values at around 3–10 ha. We return to the land–migration relationship at the end of this section.

The number of adults (ADULTS) in the household appears to be a very significant determinant of migration for sons and daughters from large, but not small, farms. Insofar as the amount of land owned is an indicator of household resources and labor absorptive capacity, ADULTS represents the number of individuals taxing those resources and competing for labor opportunities. Other things equal, sons or daughters in large households are more likely to look elsewhere for work. The lack of significance of the ADULTS variable below 5 ha. is not surprising, inasmuch as most LAND-to-ADULTS ratios on farms of this size are uneconomical in any case.

Of special interest in this paper are the effects of the areal-level variables. All four community-level variables are found to influence in some fashion the odds of being an economic migrant. The effect of distance to Quito (DIST-Q) is negative and significant, as anticipated, for sons but not significant for daughters. Since Quito is the main cynosure in the Sierra, we expected that proximity to it would influence migration of both sexes. The results for daughters may imply that its relative power of attraction for daughters is so powerful (far greater female employment opportunities than in the small cities in the Sierra, as well as superior amenities, more personal freedom, etc.) that even being far away is not a determining barrier.

The rural labor absorptive capacity (LABAB) in the canton appears to act as a factor retaining sons, especially those from small farms: the parameter is significant at the 0.01 and 0.10 levels, respectively, for small and large farms. This is exactly what one would expect. Local agricultural labor opportunities should be more important for individuals residing on farms where land is inadequate to use their labor. The peculiar positive relationship between LABAB and migrant status for daughters may reflect that off-farm agricultural labor is not considered socially appropriate for daughters, or that the demand is for male workers. In those areas completely dominated by agriculture, with perhaps few local urban nonagricultural employment opportunities, daughters on small farms may have no choice but to look elsewhere for work.

The ratio of urban nonagricultural jobs (URBEMP) to canton population carries mixed signs for the four sex–landholding classes. This is not altogether surprising, as the variable plays a dual role in the model: the availability of local urban employment may deter movement from the canton to larger urban centers. At the same time, it may encourage intracanton movement—included in rural–urban movement in this study—and commuting and thus provide employment experience and tastes that lead to future stagewise migration: Experience working in local urban areas may provide both skills and contacts necessary for moving to larger urban areas. Migrants from wealthier households (i.e., from larger farms) are more likely to be able to afford and participate in such a stagewise migration process.

The proportion of rural households without electricity (NOELEC) in the canton is positively related to migration decisions. This is true for sons on both large and small farms and, to a lesser extent, daughters on small farms. As an indicator of lack of amenities or lack of development, NOELEC complements the employment variables by illustrating another important dimension of the "push–pull" mechanism involved

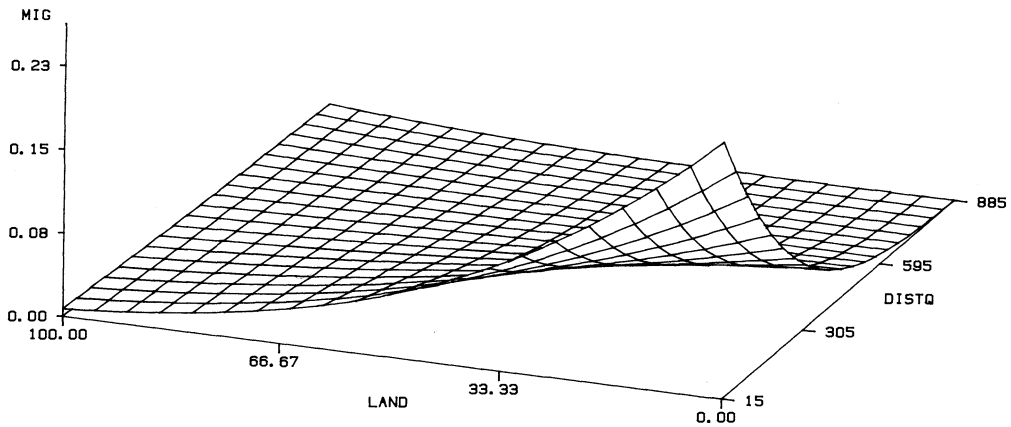

Figure 1.—LAND × DIST-Q Interaction for Sons From Large Farms. MIG is estimated migrant propensity.

in migration in developing countries, the importance of amenities. No ready explanation suggests itself for the lack of significant effects for daughters.

Although the relationships between the dependent and independent variables in our model are not uniform across the four groups, the results clearly indicate that community-level factors play a role in migration decisions of rural households in Ecuador. To determine the exact form of these relationships, we examined a wide range of theoretically plausible cross-level effects involving model variables. Only one interaction term, indicating the interaction of land owned and distance to Quito (LAND × DIST-Q), appeared consistently enough to be included in the final model presented in table 3. The presence of this effect requires that the main effects for LAND and DIST-Q be reexamined.

The composite relationship between LAND, DIST-Q, and migrant status may be visualized by substituting mean values for all independent variables in the estimated regression equations and allowing LAND and DIST-Q to vary (figs. 1 and 2, for sons from large and small farms, respectively). This generates a grid of expected migration propensities for all LAND and DIST-Q combinations. In each figure the estimated propensity to migrate is shown along the vertical axis with the composite relationship between LAND, DIST-Q, and migration measured by the height of the propensity surface above the LAND × DIST-Q plane. The relationship of each independent variable to the dependent variable is shown to depend on the value of the other independent variable.

Thus figure 1 for the large farms shows a strongly negative relationship between distance and propensity to migrate for the relatively smaller farms of 5–30 ha. (the implied migration propensity–distance plane at the right side of the graph) but a small, positive association for the largest farms (a slight upward slope at land = 100). With reference to the LAND baseline (i.e., the migration–land plane), the composite relationship between land and migration is strongly negative for households close to Quito (indicating a dominant land–labor effect for households proximate to the capital) but weakly positive for farms farthest from Quito (implying some ability-to-finance-a-move effect). The weakness of the latter relationship may also be attributable to the preferences of migrants in these provinces farthest from Quito (Loja, Azuay, and Cañar) to migrate to the Costa region: Roughly half of the migrants from the sample households in these provinces chose the Costa rather than Quito as a

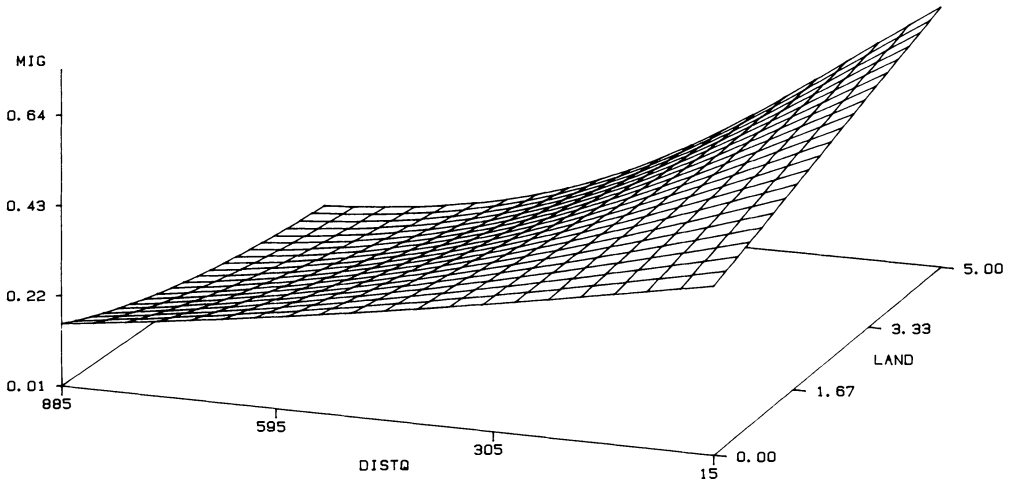

Figure 2.—LAND × DIST-Q Interaction for Sons From Small Farms. MIG is estimated migrant propensity.

destination (see also Ecuador, Consejo Nacional de Desarrollo, 1985). The composite picture shows sons from farms nearest to Quito and with little land to be by far the most likely to move. Conversely, sons on farms farther from Quito or with the least resources are either unable or unwilling to move. Others (sons from larger landholding families at varying distances from Quito) exhibit an intermediate but relatively low likelihood of movement.

Figure 2 represents the LAND × DIST-Q interaction for sons from small farms (less than 5 ha.). The overriding relationship depicted is again the negative one between DIST-Q and propensity to migrate: for all land ownership values, sons living farther from Quito are less likely to migrate than those from households nearer the capital. There is a strong, positive relationship between land owned and propensity to migrate for those close to Quito (the ability-to-finance-a-move effect), but the relationship quickly becomes less pronounced with distance from Quito. For households located far from Quito, the surface slopes gently downward as land owned increases from 0 to 5 hectares, indicating a weak negative relationship between land and migration propensity. In other words, for farms far from Quito, those with no land are marginally *more* likely to leave the farm, perhaps for the more attainable Costa, than those with small amounts of land.

The overall relationships observed in figures 1 and 2 indicate not only the generally negative relationship between distance and migration propensity, as pervasively found in the literature, but also that this relationship depends on and is attenuated by (increasing) land size. In fact, it disappears above some medium size (30–50 ha.). And the relationship between landholdings and migration propensity is roughly that of an inverted U, with households having land in the range of 2–20 ha. most likely to have individual out-migrants. But this relationship also depends on distance. In sum, both relationships, between landholdings and (out-)migration and between distance and out-migration, are more complex than is usually supposed and warrant more careful attention than has been customary.

It is useful to extend the interpretation of the findings for other coefficients as well to see what they represent in terms of changing the propensity to migrate. The

Table 4.—Effects of Simulated Changes in Selected Explanatory Variables on the Probability of Recent Out-Migration of Sons and Daughters, Sierra Region of Ecuador (changes in probability)*

Effect of	Sons		Daughters	
	Less than 5 hectares	5 or more hectares	Less than 5 hectares	5 or more hectares
Increasing age by one year	+0.039	+0.016	+0.024	+0.018
Increasing education from less than primary to primary complete	+0.090	+0.064	+0.060	(+0.022)
Increasing education from primary complete to more than primary	−0.310	−0.054	−0.157	−0.086
Changing marital status from unmarried to married	(+0.001)	(−0.014)	−0.100	−0.094
Increasing adults in household by one	(−0.002)	+0.014	(+0.008)	+0.026
Increasing demand for off-farm agricultural labor by 5 days	−0.005	−0.002	+0.004	(+0.002)
Reducing percentage of rural dwellings without electricity from 85 to 80	−0.026	−0.040	(−0.009)	(+0.009)

*Numbers in parentheses are derived from nonstatistically significant coefficients and should therefore be ignored.

procedure is first to compute the overall probability of recent migration (i.e., of having a son or daughter migrate from the rural household to an urban area within the previous 5 years) for each of the four land–sex samples by inserting the mean values for all of the explanatory variables in the four predicted regression equations in table 3 and using the cumulative normal density function table to derive the overall probabilities. Then the effect of a change in each of the significant explanatory variables may be estimated by substituting the new, hypothetical value in the predicted regression equation, keeping all other values at their mean values, and computing the new simulated values. This amounts to simulating the effect of a change in the probability (i.e., the marginal probability) of a change in each of the explanatory variables.

The results are shown in table 4. Evidently, they correspond very closely to those of table 3. Again, we observe significant increases in the probability of out-migration for economic migrants of increasing education from less than primary (with a mean education of about 2 years) to a primary school certificate (6 years) but a decrease for those with more than 6 years. As the proportion in the latter category is small in rural

areas of Ecuador, the overall effect of raising rural education is actually to increase slightly out-migration for economic reasons. (Less than 8 percent of the rural population had 7 or more years of education in 1977.) The results for marital status indicate that getting married has a large effect on reducing the probability of out-migrating for females, by 10 percentage points (the marginal probability being −0.1). Having one more adult in the household has a small effect, increasing out-migration by about 2 percentage points on large farms. Finally, with respect to the two significant policy-relevant community variables, an increase of 5 days in the demand for off-farm labor (from a mean of about 50 days per household per year to 55) reduces out-migration of sons, but by a considerably smaller amount than achieved by increasing the percentage of dwellings with electricity. Despite the possibility of drawing such specific inferences regarding the effects of simulating changes in explanatory variables on probabilities of rural–urban out-migration, we believe it is stretching the empirical results, for reasons indicated at the end of the conclusions.

SUMMARY AND IMPLICATIONS

Although past quantitative research on the determinants of migration decisions has largely been limited to investigating the effects of factors captured by variables at the individual and household levels, a number of theoretical and descriptive studies suggest that the environment or context of the person also has a profound effect on migration (and other household) decisions.

A standard model of the individual/household determinants is therefore expanded here to include the effects of several key areal/contextual factors. A sample household survey of internal migration in the Sierra region of Ecuador was carried out in 1977–1978. Data from the rural portion are used in combination with areal-level data to investigate factors influencing recent rural–urban out-migration of sons and daughters.

Among the results are the following: First, for the individual and household variables, older children (above age 20) are more likely to migrate than younger ones, as expected for the young age groups considered. But the effects of education appear to differ from those of previous studies, perhaps because of failure to take into account the motives for migration in previous studies. Thus the effects on economic migration (migration for work reasons) are generally positive for education up to the completed primary level, then negative beyond that. (Reasons for these unorthodox education findings have been suggested in the foregoing sections.) On the other hand, results for marital status were as expected: Marriage has no effect on out-migration of sons but a significant negative effect on out-migration of daughters. In addition, the more adults in the household, the greater the out-migration of sons and daughters, but only on larger farms. This is consistent with the hypothesis that their labor is less needed when there are more adults (potential farm workers) available. Finally, the results for land owned are more complex, having no effect on daughters (consistent with their lower participation in farm work) but significant, complex effects on sons. Specifically, among very small farms, more land is associated with higher out-migration, perhaps implying that such families are sufficiently above the poverty level to afford sending a son off to the city or town. The negative relation between land size and out-migration of sons on larger farms is consistent with the greater labor needs on these farms.

The findings for the community variables—of special interest in this paper—show that distance to Quito has the expected strong negative effect on out-migration only for sons. The extent of availability of electricity in the community (used as a measure

of amenities) appears to have a significant effect on deterring out-migration, particularly of sons, as does the availability of off-farm rural employment. Both of these findings have potentially significant policy implications. For example, they suggest that increased (seasonal or permanent) off-farm rural employment—from increased agricultural production, rural road construction, and so forth, or from land redistribution or other policies to increase the utilization of land—and reductions in disparities in the provision of amenities and government services between urban and rural areas could reduce rural–urban migration flows. These results contrast with those for the availability of local urban employment, which does not appear to deter rural–urban out-migration from the canton (area). Indeed, it appears to have a positive effect for sons on larger farms, suggesting it provides them with a taste for urban life and/or skills that leads them to out-migrate to other areas (presumably larger cities). This hypothesis will be explored further with the partial occupational history data in the survey on out-migrants.

Despite a number of intriguing findings, the results of this paper should not be considered as definitive. First, the analysis covers the determinants of out-migration of individual household members from rural households. It does not cover the determinants of (out-)migration of entire households from rural to urban areas, for reasons indicated in the Introduction and Purpose. Moreover, although it does cover the bulk of individual migration, it excludes those moving for noneconomic reasons, covers only the Sierra, and does not simultaneously consider short-term or seasonal migration (because data are not available).[19] Therefore, it does not and cannot purport to be a comprehensive study of the factors influencing all rural–urban migration movements in Ecuador. Any policy inferences must be carefully tempered. Moreover, and especially important in this context, many additional areal- and household-level variables remain to be investigated, and more complex models will also be formulated and tested in the future. The findings clearly indicate, however, that areal/structural factors have significant effects on rural–urban migration flows in Ecuador and, presumably, other developing countries as well.

NOTES

[1] The standard economic (human capital) model of migration focuses on the individual's own characteristics (see Sjaastad, 1962; and Todaro, 1976).

[2] For discussions of the importance of incorporating the X_k into estimated equations, see Bilsborrow (1981a), Bilsborrow, Oberai, and Standing (1984), and Findley (1981). For an empirical example, based on a small sample in a single village in the Philippines, with the dependent variable being intentions to migrate, mainly to the U.S. (international migration), see Lee et al. (1985).

[3] The hazards of relying on conclusions based on analyses of aggregate data for an understanding of individual behavior are, of course, well known. The classic statement is that of Robinson (1950).

[4] The historical background is set out in Barraclough and Domike (1966), Commander and Peek (1986), Peek and Antolinez (1980), and Peek (1980, 1981).

[5] Rural–rural migrants, constituting 9 percent of sample migrants aged 12 and over, have been combined with nonmigrants for the purpose of this analysis. Rural–rural migrants usually do not undergo changes in life style such as those confronted by rural–urban migrants. A sensitivity analysis based on the effects of excluding them from the estimation found no difference in the basic results reported below.

[6] The general statistical model underlying the single-equation estimation model here is of the form

$$Y_{ij} = \alpha + \beta X_{ij} + \gamma Z_i + \varepsilon_{ij},$$

where Y_{ij} is the migration decision (dichotomous variable) of individual i in origin community j, X_{ij} are the values of the independent individual/household variables, Z_i is the value of the community variable for community i, α and β are the unknown coefficients associated with the individual level variables, and γ is the coefficient associated with the community variable. If the ε_{ij} disturbance terms are independently, identically normally distributed random variables with zero mean and constant variance, then the

estimation procedure will yield unbiased, consistent estimates of α, β, and γ. In practice, this means that the community and individual/household variables represent different independent concepts. For example, we cannot include in the same single equation whether the household has electricity and whether it exists in the community, or wage levels of household members and community wage levels, because the latter influence the former in each pair. A simultaneous (recursive) model would then be required. These issues are discussed in detail in Bilsborrow and Guilkey (1986).

[7] Alternatively, land to which the household has access through either ownership, rental, or a sharecropping arrangement might have been used. The percentage of households renting land, however, was less than 3 percent, and the use of a more general land resources variable would introduce additional measurement error.

[8] Some literature exists on the effects of electrification on rural development, access to consumer goods, fertility, and so on (e.g., see Fluitman, 1983; Herrin, 1979; and Bilsborrow and DeLargy, 1985).

[9] See Ecuador, Ministerio de Agricultura y Ganaderia (MAG) and Office de Recherche Scientifique et Technique Outre-Mer (ORSTOM) (1978a,b), based on a detailed survey of rural households in 1976.

[10] There were 120 cantons in the country (52 in the 10 Sierran provinces) at the time of the survey. The mean population of the Sierra cantons excluding Quito was about 50,000, roughly similar to the population of United States counties. Each canton is composed of a number of smaller administrative districts known as *parroquias*. There are usually four to eight parroquias per canton.

[11] Because the mean length of time since the move for out-migrants is about 2 years, this corresponds to an expected age range of 12–25 years for the at-risk population at the time of the move.

[12] This does not mean 91 percent of rural out-migrants move to urban areas; rather, it reflects the particular sampling scheme used (see Operationalization, and Bilsborrow, Oberai, and Standing, 1984).

[13] Education is thought to have such wide-ranging effects that virtually all of the social sciences want to claim it as their special domain. For example, sociologists generally consider it a social variable under their purview, economists have tried to co-opt it with human capital theory, and pyschologists see it as crucial in attitude/taste formation.

[14] See Basile (1974), Comite Interamericano de Desarrollo Agricola (1965), and Commander and Peek (1986).

[15] This variable was obtained by using a phase I screening questionnaire administered to all households in the selected rural census sector one week before the survey. Information on land *available*, along with migrant status, was obtained in this screening in order to oversample households with out-migrants to urban areas or with more than 5 hectares of land. LAND, representing land owned in hectares, differs from the land strata variable in that the latter refers to total land available for use.

[16] Though not all rural–urban migration in the Sierra is to Quito, nearly half is. We tested alternative measures, including the minimum of the distance to the province capital or Quito and mean distance, but none performed as well. It may be that Quito is such a dominant city in the Sierra that people are more likely to consider migrating (anywhere) the closer they are to Quito.

[17] The statistic presented at the bottom of each column, $-2 \times$ log of the likelihood ratio, has a chi-squared distribution and provides a joint test of significance of all coefficients together (except the constant term). Since the critical value of the chi-squared statistic for these regressions is 23.21 at the 1 percent significance level, it is evident that each regression is highly significant.

[18] Note that the value of URBEMP differs substantially between the sexes. This is because the denominator for females, all women aged 15 and above reported as economically active, does not include most rural women, who are reported as not working even though they may be helping on family farms. Female economic activity is notoriously underreported in surveys and censuses, in Latin America as well as elsewhere (see Anker, 1983; Wainerman and Recchini de Lattes, 1981). Sons engaged in the same activities are generally reported as unpaid family workers and therefore as economically active.

[19] On the importance of short-term and seasonal migration and circulation, see Standing (1985) and articles and references therein.

ACKNOWLEDGMENTS

This is a considerably revised version of a paper presented at the Annual Meetings of the Population Association of America, March 27–30, 1985, in Boston, Massachusetts. We are grateful to audience participants in the PAA session, anonymous reviewers, and Peter Peek for helpful suggestions and to the Instituto Nacional de Estadistica y Censos (Ecuador) and the International Labour Office for permission to use the data. We are also grateful for support from National Institute for Child Health and Human Development (NICHD) Grant HD17276-02, NICHD/NRSA Grant 2 T32 HD07168-06, and the Carolina Population Center. At the time the

research was carried out, all authors were associated with the Carolina Population Center.

REFERENCES

Anderson, D., and M. Leiserson. 1980. Rural nonfarm employment in developing countries. *Economic Development and Cultural Change* 28(2):227–248.

Anker, R. 1983. Female labour force participation in developing countries: A critique of current definitions and data collection methods. *International Labour Review* 122:709–723.

Balan, J., H. L. Browning, and E. Jelin. 1973. *Men in a Developing Society: Geographic and Social Mobility in Monterrey, Mexico.* Austin: University of Texas Press.

Barraclough, S. L., and A. L. Domike. 1966. Agrarian structure in seven Latin American countries. *Land Economics* 42:391–424.

Basile, D. G. 1974. *Tillers of the Andes: Farmers and Farming in the Quito Basin*, Studies in Geography No. 8. Chapel Hill: University of North Carolina, Dept. of Geography.

Becker, G. 1976. *The Economic Approach to Human Behavior.* Chicago: University of Chicago Press.

Bilsborrow, R. 1981a. *Surveys of Internal Migration in Low-Income Countries: The Need for and Content of Community-Level Variables.* Geneva: International Labour Office.

———. 1981b. Priority areas for future research on demographic–economic interrelationships. Pp. 74–87 in *Population and Development Modelling, Proceedings of UN/UNFPP Expert Group Meeting*, Population Studies No. 73. New York: United Nations.

Bilsborrow, R., and P. DeLargy (eds.). 1985. *Impact of Rural Development Projects on Demographic Behavior*, Policy Studies No. 9. New York: United Nations Fund for Population Activities.

Bilsborrow, R., and M. Foley. In press. *La Planificacion de la Educacion: Un Modelo Nuevo, con un Estudio del Caso del Ecuador* (Education Planning: A New Model, with a Case Study of Ecuador). Quito.

Bilsborrow, R., and D. K. Guilkey. 1986. *Community and Institutional Influences on Fertility: Analytical Issues*, World Population and Employment Program Working Paper. Geneva: International Labour Office.

Bilsborrow, R., A. Oberai, and G. Standing. 1984. *Migration Surveys in Low-Income Countries: Guidelines for Survey and Questionnaire Design.* London: Croom Helm.

Burch, T. 1979. Households and family demography: A bibliographic essay. *Population Index* 45(2):173–195.

Comite Interamericano de Desarrollo Agricola (CIDA). 1965. *Tenencia de la Tierra y Desarrollo Socio-Economico del Sector Agricola-Ecuador.* Washington, D.C.: Union Panamericana.

Commander, S., and P. Peek. 1986. Oil exports, agrarian change and the rural labour process: The Ecuadorian Sierra in the 1970s. *World Development* 14(1):79–96.

DaVanzo, J. 1976. *Why Families Move: A Model of the Geographic Mobility of Married Couples*, Technical Report R-1972-DOL. Santa Monica, Calif.: Rand Corp.

David, P. A. 1974. Fortune, risk, and the microeconomics of migration. Pp. 21–88 in D. and M. Reder (eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramoritz.* New York: Academic Press.

DeJong, G., and R. Gardner (eds.). 1981. *Migration Decision Making: Multidisciplinary Approaches to Microlevel Studies in Developed and Developing Countries.* New York: Pergamon Press.

Easterlin, R. A. (ed.). 1980. *Population and Economic Change in Developing Countries.* Chicago: University of Chicago Press.

Ecuador, Consejo Nacional de Desarrollo (CONADE). 1985. Diagnostico Socio-demografico de la Poblacion del Ecuador, 1950–1982. Unpublished manuscript. CONADE, Quito.

Ecuador, Ministerio de Agricultura y Ganaderia (MAG) and Office de Recherche Scientifique et Technique Outre-Mer (ORSTOM). 1978a. *Diagnostico Socio-economico del Medio Rural Ecuatoriano. No. 2: Tierra.* Quito: MAG.

———. 1978b. *Diagnostico Socioeconomico del Medio Rural Ecuatoriano. No. 3: Poblacion y Empleo.* Quito: MAG.

Findley, S. 1981. Methods of Linking Community-Level Variables With Migration Survey Data. Paper presented to the United National Economic and Social Commission for Asia and the Pacific, Technical Working Group on Migration and Urbanization, December 1–5, Bangkok.

Firebaugh, G. 1979. Structural determinants of urbanization in Asia and Latin America, 1950–1970. *American Sociological Review* 44:199–215.

Fluitman, F. 1983. *The Socio-Economic Impact of Rural Electrification in Developing Countries: A Review of Evidence.* World Employment Programme Research Working Papers, WEP 2-22/WP126. Geneva: International Labour Office.

Gaude, J. 1981. *The Temporary Migration Phenomenon in the Sierra of Ecuador: A Formalised*

Approach, Project Report. Rotterdam: Erasmus University, Centre for Development Planning.
Herrin, A. N. 1979. Rural electrification and fertility change in the southern Philippines. *Population and Development Review* 5:61–86.
IBRD. 1979. *Ecuador: Development Problems and Prospects*. Washington, D.C.: World Bank.
Instituto Nacional de Estadistica y Censos (INEC). 1978. *II Censo Agropecuario, 1974. Resultados Definitivos: Resumen Nacional*. Quito: INEC.
International Development Research Centre (IDRC). 1977. *Social Change and Internal Migration: A Review of Research Findings From Africa, Asia and Latin America*. Ottawa: IDRC.
International Migration Review. 1984. Women in migration: Special issue. 18:882–1382.
Judge, G. G., W. E. Griffiths, R. C. Hill, and T.-C. Lee. 1980. *The Theory and Practice of Econometrics*. New York: Wiley.
Lasprilla, E. 1978. Diseno de la Muestra para la Encuesta de Migracion Rural-Urbana en la Region de la Sierra del Ecuador. Paper presented at the Conference of Latin American Sampling Statisticians, Mexico City, November.
Lee, S.-H., J. T. Fawcett, R. W. Gardner, and R. G. Abad. 1985. *Community, Household, and Individual Influences on Migration: A Test of a Contextual Model in the Philippines*. Working Paper No. 37. Honolulu: East–West Population Institute.
Maddala, G. S. 1983. *Limited-Dependent and Quantitative Variables in Econometrics*. Cambridge, U.K.: Cambridge University Press.
Middleton, A. 1979. Distribucion del Gasto Publico y Migraciones Internas en el Ecuador (mimeo). Quito: FLASCO.
Mincer, J. 1978. Family migration decisions. *Journal of Political Economy* 86:749–773.
Nerlove, M., and T. P. Schultz. 1971. *Love and Life Between the Censuses: A Model of Family Decision-Making in Puerto Rico, 1950–1960*. Santa Monica, Calif.: Rand Corp.
Oberai, A. S., and R. E. Bilsborrow. 1984. Theoretical perspectives on migration. Pp. 14–30 in R. E. Bilsborrow, A. S. Oberai, and G. Standing (eds.), *Migration Surveys in Low-Income Countries*. London: Croom Helm.
Peek, P. 1980. *Urban Poverty, Migration and Land Reform in Ecuador*, Occasional Papers No. 79. The Hague: Institute of Social Studies.
———. 1981. Agrarian change and rural emigration in Latin America. In J. Balan (ed.), *Why People Move*. Paris: UNESCO.
Peek, P., and P. Antolinez. 1980. *Labour Migration in the Sierra of Ecuador: Causes and Incidence*, World Employment Programme Research Working Paper WEP 10-6/WP36. Geneva: International Labour Office.
Preston, D. A. 1978. *Rural Emigration and the Destination of Migrants in Highland Ecuador*, Working Paper No. 224. University of Leeds, School of Geography.
Proaño, F. 1978. *Ecuador: Dinamica del Sector Agrario*. Quito: Junta Nacional de Planificacion y Coordinacion Economica.
Ravenstein, E. G. 1885. The laws of migration. *Journal of the Royal Statistical Society* 48:167–277.
Roberts, K. 1985. Household labour mobility in a modern agrarian economy: Mexico. Pp. 358–381 in G. Standing (ed.), *Labour Circulation and the Labour Process*. London: Croom Helm.
Robinson, W. S. 1950. Ecological correlations and the behavior of individuals. *American Sociological Review* 15:351–357.
Romero, L. K., and W. L. Flinn. 1976. The effects of structural and change variables on the selectivity of migration: The case of a Colombian peasant community. *International Economic Affairs* 29:35–58.
Schultz, T. P. 1981. *Economics of Population*. Reading, Mass.: Addison-Wesley.
Shaw, R. P. 1974. Land tenure and the rural exodus in Latin America. *Economic Development and Cultural Change* 23:123–132.
———. 1975. *Migration Theory and Fact*, Bibliography Series No. 5. Philadelphia, Pa.: Regional Science Research Institute.
Sjaastad, L. A. 1962. The costs and returns of human migration. *Journal of Political Economy* 70:80–93.
Standing, G. (ed.). 1985. *Labour Circulation and the Labour Process*. London: Croom Helm.
Thadani, V. N., and M. P. Todaro. 1984. Female migration: A conceptual framework. In J. Fawcett, S. Khoo, and P. Smith (eds.), *Women in the Cities of Asia: Migration and Urban Adaptation*. Boulder, Colo.: Westview Press.
Thomas, R. N., and C. M. Croner. 1975. Migrant paths to Tegucigalpa and San Pedro Sula, Honduras: The role of accessibility. *Social and Economic Studies* 24:445–457.
Todaro, M. P. 1976. *Internal Migration in Developing Countries*. Geneva: ILO.
Wainerman, C. H., and Z. Recchini de Lattes. 1981. *El Trabajo Femenino en el Banquillo de los Acusados: La Medicion Censal en America Latina*. Mexico City: Population Council and Terra Nova.
Wood, C. H. 1982. Equilibrium and historical-structural perspectives on migration. *International Migration Review* 16(2):298–319.