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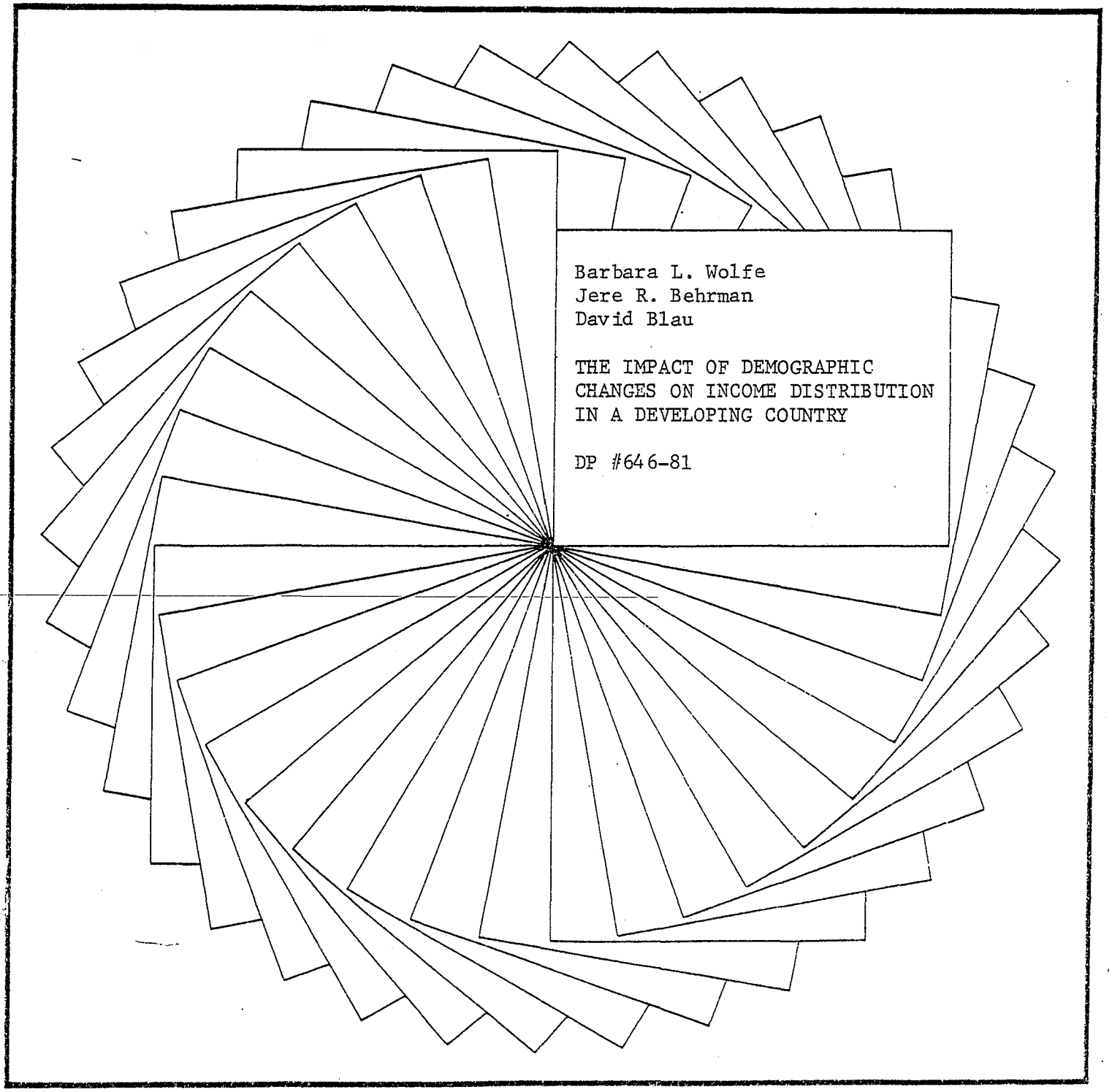

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THE IMPACT OF DEMOGRAPHIC CHANGES ON INCOME DISTRIBUTION IN A DEVELOPING COUNTRY

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The Impact of Demographic Changes on Income Distribution in a Developing Country

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ABSTRACT

A common hypothesis is that the distribution of income tends to become more unequal in the initial and middle stages of economic development, in part because of demographic changes. However, estimates do not exist of the effect on income distribution of demographic changes that are based on the underlying micro determinants of the income components. In this study we undertake such an investigation. We consider four major income components for three regions, differentiated by degree of urbanization. First we estimate the probability that a household receives each type of income and then the magnitude received, conditional on it being positive, all dependent on the household's demographic characteristics and other factors suggested by micro theory. We then use these estimated relations to construct the expected medium-term distributions of income and its components. Finally we simulate what changes would occur in these distributions given hypothetical long-run demographic changes that often accompany development. The simulated effects on some of the regional income component distributions are fairly considerable in regard both to equalizing the distributions and increasing the shares of the poorest, though of course these effects differ across income components and across regions. However, the overall effects are regressive in all three regions. The households whose relatively poor position in the distribution of a particular component are improved tend to be households that are relatively well off in regard to other income components. Thus our simulations

suggest that long-run demographic changes which often accompany development may exert significant regressive effects on total household medium-run income distributions in both urban and rural areas of developing countries.

The Impact of Demographic Changes on Income Distribution in a Developing Country

In recent years a dominant concern in development economics has been the relationship between the average level of economic development and the distribution of income, or other measures of well-being (Adelman, 1975; Chenery et al., 1974; World Bank, 1980). A common hypothesis, first enunciated by Kuznets (1955), is that there is a U-shaped association between equality of income distribution and economic development: when modern development begins, income equality at first declines, and then eventually increases. This association, widely observed empirically, may be due to a variety of factors. One is the pattern of demographic changes often accompanying the process of economic development (Ahluwalia, 1976). To date, however, we lack empirical estimates of the effect on income distribution of demographic changes that are based on the underlying micro determinants of the income components.[1]

In this paper we undertake such an investigation, using a rich, integrated micro data set from a stratified random sample[2] of 3,773 women aged 15 to 45 in Nicaragua. These data, collected in 1977-1978, permit estimation of the micro determinants of household distribution of income and simulation of the impact of long-run demographic changes.[3] Because the income distributions and their determinants differ significantly with the degree of urbanization, in our analysis we distinguish among

three regions: the central metropolis, cities and towns, and rural areas. For similar reasons, within each of these regions we distinguish among four major household income components: women's earnings, men's earnings, transfers, and other income.

Our method is to estimate econometrically the determinants both of the probability that a household receives a given type of income and of the magnitude of income of each type received, conditional on that income being a positive amount--i.e., for households which receive transfers, we model the determinants of the amount of transfers they receive. Included in these relationships as explanatory variables are a variety of demographic and other factors which are suggested by economic theory. We next use the estimated equations to construct the expected medium-run household income distributions, given the observed distributions of demographic characteristics. We then simulate the changes that are induced in these expected income distributions by hypothetical demographic variations.[4]

Through this procedure we gain insight into the answers to several important questions: Do demographic changes associated with economic development change the equality of the distribution of household income? Do they change the relative share of the poorest households? If the answer to either of these questions is positive, additional questions arise: What demographic changes are important? Are the effects similar or different in the various regions? Do they work through particular components of income?

In Section 1 we characterize the actual distributions of income and the four major income components in three regions. In Section 2 we describe the distributions of certain relevant demographic variables in these three regions. In Section 3 we discuss how these demographic factors enter into our estimated determinants of each of the four income components in each of the three regions. In Section 4 we simulate the manner in which various demographic changes that often accompany long-run growth would alter each of the income component-regional distributions and the overall regional distributions. In Section 5 we give our conclusions.

1. THE DISTRIBUTION OF INCOME AND ITS COMPONENTS IN THE CENTRAL METROPOLIS, CITIES AND TOWNS, AND RURAL AREAS

We consider four components of income in our analysis because the demographic determinants vary significantly across these components (see Section 3 below) and because the distributions vary substantially for these components (see Section 2). Our four components are (1) women's earnings; (2) men's earnings, if a male companion is present and earns income; (3) transfers from parents and other relatives, friends, former companions (particularly for child support), and public welfare programs (which are relatively unimportant in comparison with most more developed and many developing countries); and (4) other income (primarily from income-producing assets).

We consider only actual or nominal income (including payments in kind) rather than Becker's (1965) "full" or "social" income, which

imputes values for child quality and quantity and other elements of the household production;[5] and we focus on the household as the recipient unit.[6] Both of these definitional decisions permit relatively clear comparisons with other studies. Because we expect differences in the determinants of income components as related to different levels of urbanization, we disaggregate our analysis by degree of urbanization, considering separately (1) the central metropolis, Managua, whose population of a half million constitutes approximately a quarter of the country's total, and which is the political, economic, and commerical center for the country; (2) towns and cities with from 500 to 76,000 inhabitants, which often are local or regional political and commercial centers; and (3) rural areas, excluding households which are primarily own-farm operators because of the difficulty of defining comparable income concepts for them. Because of extreme skewness in the distribution of land ownership at the time of our survey, however, many rural households depend substantially on income sources other than own-farm production and are eligible for our sample.

Table 1 shows the mean values of various income components for households having such income, and the percentages of households receiving income (if any), by region. Table 2 uses two summary measures, the Gini coefficient[7] and the percentage share of the poorest 40% of the households, to summarize income distributions for each income component in each region, including all households (both recipients and nonrecipients of a particular income component). We employ both measures because a given value

Table 1

Biweekly Values and Distributions of Various Income Components of Nicaraguan Households by Region (Households receiving income)

	Central Metropolis	Cities and Towns	Rural Areas
Mean Magnitude of Income Component[a]			
Women's earnings	276	221	148
Men's earnings	659	626	257
Transfers	227	361	510
Other income	447	340	353
Total income	553	647	363
Percentage of All Households			
Women's earnings	45	44	22
Men's earnings[b]	60	57	62
Transfers	34	35	30
Other income	16	17	11

[a]In cordobas per two-week period. At the time of the survey, 7 cordobas equaled 1 U.S. dollar.

[b]For the subsample of households where women had male companions, the respective percentages are 92, 78, and 85.

Table 2

Two Measures of Inequality of Various Income Components for All Households, by Region

Component	Gini Coefficient			Percentage Share of Lowest 40 Percent of Households		
	Central Metropolis	Cities and Towns	Rural	Central Metropolis	Cities and Towns	Rural Areas
Women's earnings	.76	.75	.87	0	0	0
Men's earnings[a]	.43	.45	.32	15	15	22
Transfers	.89	.92	.96	0	0	0
Other income	.94	.94	.97	0	0	0
Total	.48	.43	.46	12	15	16
Total minus women's earnings	.52	.44	.46	9	15	16
Men and women's earnings	.50	.43	.34	10	15	20
[a]N (except men's), by region:	1,099	479	287			
N men, by region:	962	593	349			

[a]Among only those households with male companions.

of the Gini coefficient is consistent with a wide range of percentage shares for the poorest households, and we are particularly interested in what happens to them. The following is a summary of the information in these two tables.

Women's Earnings

For households in which the woman participates in the paid labor market, mean women's earnings are much larger in the central metropolis and in towns and cities than in rural areas (276, 221, and 148 cordobas biweekly, respectively).[8] Almost half of the households in both urban regions receive such income (45 and 44%), but only 22% do so in the rural region, where many more women are engaged in own-farm activity. In the urban regions, women's earnings are a relatively common source of income, second only to men's earnings. In contrast, in the rural region almost three times as many households receive income from men than from women, and more households receive transfers than receive women's earnings. Even in the urban areas, however, the percentages of households receiving women's earnings are low enough (i.e., below 60%) to mean that the lowest 40% of the households receive no income from this source. Partly for the same reason, not surprisingly, the Gini coefficients for women's earnings are quite high, and are higher for the rural (.87) than for the urban areas (.76 and .75).

A comparison, however, of the Gini coefficients for total earnings versus the total minus women's earnings indicates that women's earnings

equalize slightly the overall distributions in urban areas as compared to the hypothetical case in which all households had zero earnings from women. Comparison of income percentage shares of the poorest households points to a similar effect for the central metropolis. Apparently women from otherwise poorer households are more likely to participate in the paid labor force and to earn relatively more (in comparison with other income sources) than are women from otherwise higher-income households, particularly in more urban areas. (This may suggest little "assortive mating," or that women with higher earning power live with men with relatively low earning power.) Women's earnings therefore tend to exert an equalizing effect in the urban region and to improve the relative share of the poorest households in the central metropolis.[9]

Men's Earnings

The set of households receiving income from men's earnings includes most households in which the women respondents have male companions, since the adult prime-age male labor participation rates are relatively high (see note b to Table 1). Approximately three-fifths of the households in each area (60, 57, and 62%, respectively) receive income from men's earnings, representing the highest proportion for any income source in each region. Mean values of men's earnings are even higher in the urban areas (659 and 626 cordobas biweekly) relative to the rural areas (257 cordobas) than is the case for women's earnings. In all three areas the means for men's earnings are also much higher than are the

means for women, but the absolute and the percentage differences are much larger in urban regions than in the rural region. Ceteris paribus, urbanization seems to be associated with widening sexual disparities in earnings. For those households receiving that form of income, men's earnings constitute the largest source of income on the average in the urban regions--although it is a distant third behind transfers and other income sources in the rural region.

Among households where women have male companions, the distribution of men's earnings is much more equal than are the distributions of the other three income components among all households: the Gini coefficients are .43, .45, and .32 for the three regions. Comparison across regions shows that both equality and the percentage share of men's earnings in the poorest households with male companions are greatest in the rural region; the central metropolis ranks next on both counts. The greater equality in rural areas probably reflects relatively low human capital investments and low returns to such investments there, as we and others have noted elsewhere (Behrman and Wolfe, 1980b; Rosenzweig, 1978; Ryan, 1980). However, the association of greater inequality of men's earnings with urbanization is not monotonic. Even though average investments in schooling and other forms of human capital, and the average returns from those investments, do not vary significantly between the central metropolis and cities and towns, the inequality in men's earnings is greater in cities and towns because the variance in such human capital investments is greater there than in the central metropolis.

Transfers

Among households receiving transfers, the mean value of that income component is inversely associated with the degree of urbanization (227, 361, and 510 cordobas biweekly). For these households, transfers are on average the most important source of income in rural areas, and are second to men's earnings (if any) in cities and towns, but are the least important of all sources in the central metropolis. Given that about one out of every three households in all three areas receives such transfers (34, 35, and 30%), great inequality in their distributions across all households is not surprising.

Other Income

For households receiving other income, the mean values are considerable and are somewhat larger in the central metropolis than elsewhere (447, 340, and 353 cordobas biweekly). But the proportions of households that receive this income are substantially smaller than is true of the other three income components (16, 17, and 11%), and have very high Gini coefficients (.94, .94, .97). The great concentration of other income reflects the great concentration of income-generating assets in all three regions of the country.

Total Income

Mean total income is highest in cities and towns, next highest in the central metropolis, and significantly lowest in the rural areas. Once again the association between mean household income and degree of urbanization is not a simple monotonic one. On the average, households have higher incomes in cities and towns than in the central metropolis.

The equality in the distribution of total income, as measured by the Gini coefficients, has a U-shaped relation with the degree of urbanization and modernization (.48, .43, .46). This relation contrasts with the inverse association that many expect. The distributions indicate that this result is due to the equalizing effects of transfers and other income in the central metropolitan region in contrast to their unequalizing effects in the rural region. The distributions of total earnings are most equal in the rural region and most unequal in the central metropolis (for the reasons we mention above): .50, .43, .34. But the effect of adding in transfers and other income is to reduce inequality in the central metropolis and to increase it in the rural areas. Despite the resulting association between urbanization and relative equality as measured by the Gini coefficients, however, the proportional share of the lowest 40% of the households is largest in the rural areas (16%, compared with 15% for cities and towns and 12% for the central metropolis).

2. REGIONAL DISTRIBUTIONS OF SELECTED RELEVANT DEMOGRAPHIC VARIABLES

Our interest in this paper is to examine the ways in which the various demographic factors associated with long-run economic growth affect the medium-run Gini coefficients and shares of the poorest households in the distributions of income and of major income components. In the simulations of Section 4 we focus on four particular demographic changes. Here we discuss the summary statistics in Table 3 for the actual distributions of the related demographic variables.

Table 3

Demographic Variables for Households, by Region

Variable	Central Metropolis	Cities and Towns	Rural Areas
Children			
Mean number of live children	2.9 (2.4)	3.0 (2.5)	3.8 (2.6)
Percentage of households with children under 5	60	59	74
Cohabitation (incl. marriage)			
Mean years of cohabitation	10.1 (7.7)	10.5 (8.0)	11.7 (7.9)
Percentage single; never cohabited	9	7	2
Percentage single; previously cohabited	18	20	14
Home Child Care			
Percentage with other adults or children over 14 in household	64	68	58
Percentage with children under 5 and home child care	49	37	38
Father Present in Childhood			
Percentage	60	62	62

Note: For those variables that are not dichotomous, standard deviations are included in parentheses.

Children

Because our respondents are aged 15 to 45, fertility for most of them is not yet complete. The distributions of the current number of live children and the proportion of households with children under five are about the same for the central metropolis and for towns and cities. In both cases, the households average about three children and about three fifths of the households have children under 5 years of age. But the means of both of these variables are higher in rural areas, with a value of 3.8 live children and almost three quarters of the households having children under 5 years old.

Cohabitation

Mean years since first cohabitation is over a decade in each area (10.1, 10.5, and 11.7 years), with a somewhat greater value in the rural area because of the tendency to first cohabit at a younger age in the rural area. A related characteristic is that women are less likely currently to have male companions in the more urbanized areas. This reflects both higher proportions of single (or never accompanied) women, of previously, but not currently, accompanied women (due to divorce, separation, or death) in the urban areas, and lower male/female ratios for the adult population in the central metropolis.

Home Child Care

Well over half of the households (64, 68, and 58%), have extended families (other adults) or children over 14 available as potential

substitutes for the women in caring for younger children. It is interesting to note that the proportion of households with such home-child-care options is higher in the urban than in the rural areas, possibly because in the rural areas older children are more likely to migrate away from their families. However, when both the presence of those home-child-care options and of children under 5 are considered together, the proportions of households which are affected are greater in the central metropolis (49%) than in cities and towns (37%), or rural areas (38%).

3. IMPACT OF DEMOGRAPHIC FACTORS ON FUNCTIONS WHICH DETERMINE COMPONENTS OF INCOME

In order to estimate the effects of these demographic factors on the income distributions, we estimate probit equations to explain the probability that a household receives each type of income and ordinary least square (OLS) regressions to explain the magnitude of each income component received, conditional on it being positive. We use the Heckman (1976) procedure in the OLS regressions to control for selectivity bias.[10] In addition, for reasons discussed below, we estimate an equation to explain years of women's labor force experience. These equations contain the demographic variables described above, along with other relevant variables, such as human capital factors, to lessen possible missing variable biases. Separate equations are estimated for each of the three regions since chi square tests (for the probit

equations) and F tests (for the OLS regressions) reject the null hypothesis of no structural differences across regions. The following discussion focuses on the estimated coefficients of the demographic variables, which are given in Table 4. The appendix gives the rest of the estimated relations. For discussions of the coefficient estimates of the nondemographic variables, see Behrman and Wolfe (1980b, 1981g, 1981h); Behrman, Wolfe, and Tunali (1980); Wolfe, Behrman, and Blau (1980a).

Women's Earnings

Current labor force participation (receipt of earnings). Economic theory suggests that women's labor force participation reflects a comparison between gains from market earnings and the opportunity costs in terms of foregone household production in child care and in other activities for a given level of household income from all other sources (Behrman and Wolfe, 1980b; Behrman, Wolfe, and Tunali, 1980; Heckman, 1976, 1979; Tunali et al., 1980; Wales and Woodland, 1980). Increased income from other sources is likely to reduce the relative gains from market participation.

The estimated coefficients indicate that the demographic variables have a number of significantly nonzero effects on the probability of women's labor force participation. The presence of children under 5 years old reduces the probability of labor force participation in the central metropolis, but the availability of home child care offsets this effect. Women without companions present, particularly those

Table 4

Probits for Probabilities of Positive Values of Four Major Income Components and Regressions for Magnitude of Components if Positive

Demographic Variables	Central Metropolis	Cities and Towns	Rural Areas
Women's Labor Force Participation, Experience, and Earnings			
Labor force participation (probit)			
Children under 5	.25 (1.9)	-.04 (0.3)	.21 (1.1)
Home child care times children under 5	.29 (2.4)	.01 (0.1)	-.20 (1.3)
Single, never cohabited	2.2 (8.5)	2.8 (8.3)	5.7 (0.4)
Single, previously cohabited	.59 (5.7)	.58 (4.9)	.85 (4.6)
Experience	.17 (12.7)	.24 (13.9)	.17 (6.6)
$(\text{Experience})^2$	-.004 (7.2)	-.006 (9.2)	-.004 (4.2)
Labor force experience (OLS)			
Children under 5	-1.4 (3.6)	.26 (0.5)	-.82 (1.1)
Number of living children	-3.7 (3.5)	-.23 (1.6)	-.07 (0.4)
Other household members over 14	-.37 (1.1)	.94 (2.1)	-.18 (0.3)
Single, never cohabited	.60 (0.9)	1.5 (1.5)	2.3 (1.1)
Single, previously cohabited	2.2 (5.3)	1.5 (2.7)	1.5 (1.8)
Years of cohabitation	-.17 (3.2)	-.12 (1.7)	.05 (0.5)

(continued)

Table 4 (cont'd)

Demographic Variables	Central Metropolis	Cities and Towns	Rural Areas
Earnings, if positive (log, OLS)			
Experience	.065 (5.3)	.068 (4.3)	.011 (0.3)
(Experience)^2	-.001 (2.5)	-.0015 (3.0)	.0005 (0.4)
Men's Labor Force Participation and Earnings			
Labor force participation (probit)			
Children under 5	-.06 (0.2)	.24 (0.9)	.18 (0.1)
Home child care times children under 5	.04 (0.1)	.16 (0.6)	.02 (0.1)
Transfers			
Probability of positive transfers (probit)			
Number of living children	.071 (3.3)	.069 (2.9)	.001 (0.0)
Other household members over 14	.51 (6.5)	.25 (2.8)	.62 (4.6)
Single	.29 (0.5)	.61 (1.2)	-.59 (0.3)
Single times age of woman	.013 (0.5)	-.004 (0.2)	.036 (0.5)
Single, previously cohabited	1.2 (12.2)	1.2 (10.6)	.88 (4.7)
Experience of woman in labor force	-.008 (1.2)	-.009 (1.3)	-.028 (1.7)

(continued)

Table 4 (cont'd)

Demographic Variables	Central Metropolis	Cities and Towns	Rural Areas
Magnitude of transfers if positive (log, OLS)			
Number of living children	.07 (1.4)	-.03 (0.6)	.13 (1.6)
Other household members over 14	.40 (1.3)	.01 (0.0)	.79 (1.0)
Single	1.5 (1.6)	-1.6 (1.3)	-2.3 (0.7)
Single times age of woman	-.052 (1.4)	.063 (1.1)	.083 (0.7)
Single, previously cohabited	1.1 (1.8)	-0.9 (1.3)	-.1 (0.1)
Experience of woman in labor force	-.21 (2.1)	-.038 (3.3)	.00 (0.0)
Other Income			
Probability of positive other income probit			
Companion present	-.22 (2.1)	-.13 (1.2)	-.42 (2.4)
Other household members over 14	.23 (2.5)	.11 (1.0)	.10 (0.6)
Experience of woman in labor force	.014 (2.2)	.108 (2.8)	.013 (1.2)
Magnitude of other income if positive (log, OLS)			
Companion present	-.31 (1.5)	.04 (0.2)	-.20 (0.4)
Other household members over 14	.43 (2.3)	.40 (1.8)	-.10 (0.2)
Experience of woman in labor force	.01 (0.7)	-.00 (0.0)	-.01 (0.4)

Note: The appendix tables A.1-A.5 give the rest of the estimated relations. Beneath the point estimates in parentheses are the absolute values of t-statistics (asymptotic for the probit estimates). For the number of observations in our sample a t-value of 2.0 is significantly nonzero in a two-tailed test at the standard significance level of 5% (and a value of 1.7 at 10%).

single in both of the urbanized regions but also those previously accompanied in all three regions, have substantially larger probabilities of participating than do women with companions currently present, ceteris paribus. Past experience in the labor force increases the probability of current participation in all regions, with a peak impact after about 20 years of experience.

Total labor force experience. Women's previous labor force experience reflects the cumulative effects, period by period, of previous labor force participation decisions. The determinants of participation are therefore the cumulative effects over time of variables such as those that are discussed above under current labor force participation.

Currently or previously having had small children once again reduces labor force participation significantly only in the central metropolis. Only for cities and towns, however, in contrast to the estimates for current participation, do we obtain a significant estimated impact of home child care on the woman's work experience.

Being single but previously having had a companion significantly increases labor force experience in all three areas (although only at the 10% level in the rural sample) through increasing the need for the woman to obtain her own income. The estimated effect is somewhat larger in the central metropolis than elsewhere. Also in the central metropolis, but not elsewhere, women who first cohabited when they were younger (given a control for age) have less work experience. This probably reflects self-selection into early cohabitation of women who are more

oriented toward child-raising and other dimensions of household production and less toward paid market activities. Finally, single women do not have significantly greater accumulated work experience in any of the three areas, even though they are significantly more likely to be current participants in the urban areas.

Current earnings. We posit that (log) earnings depend on accumulated human capital in an extended version of the standard model (Behrman and Wolfe, 1980b; Behrman, Wolfe, and Tunali, 1980). The demographic variables of interest enter indirectly through two channels. First, as we noted above, they affect the probability that a woman currently is participating in the labor force and therefore has positive earnings. Second, one important form of human capital is work experience, owing to the skills, habits, and contacts that are acquired through that experience. Our estimates suggest that there are significant positive quadratic returns to experience in the urban areas (with a peak after about three and two decades of experience, respectively, in the central metropolis and in cities and towns), but not in the rural areas. This result is consistent with those found in Behrman and Wolfe (1980b) and Ryan (1980), apparently because not much skill is required in the transitory day work which is predominant in rural areas. In urban areas, the demographic factors that affect accumulated labor market experience alter earnings for women who currently are labor force participants.

Men's earnings. In principle the same considerations underlie the determination of men's current labor force participation, accumulated

work force experience, and earnings. However, most prime-age males work and are not affected by factors that might seem to affect their opportunity costs. We find no evidence of a significant impact of demographic variables on men's labor force participation and experience, though experience does significantly increase earnings in urban areas.

Transfers. Transfers are received primarily from relatives, friends and former companions. They depend upon perceived needs due to factors such as number of children, lack of a companion, and resources available to potential donors (although at times it is difficult to identify "demand" versus "supply" factors). Several of our demographic factors appear to influence the probability of receiving transfers and/or the magnitudes of transfers received.[11]

The number of living children significantly increases the probability of receiving transfers in urban areas, presumably because the number of children increases perceived needs. The negative impact of the woman's accumulated work force experience on the probability of the receipt of transfers in rural areas (significantly nonzero only at the 10% level) and on the magnitude of transfers in urban areas can also be interpreted as relating to perceived needs, which may be seen as less if the woman is capable of earning money income for herself, demonstrated by her past experience. The direction of causality is, however, somewhat ambiguous. Women who received fewer (or smaller) transfers in the past and have lower probability of receiving them currently may have had to work to obtain income and therefore acquired more work experience. In this

case, work experience may reflect the availability of resources to potential donors.

The significant positive effect on transfers (in all three areas) of having an extended family (adults or other household members over 14) may reflect both demand and supply factors. The presence of such individuals, particularly if they are not working, may increase the perception of household need--more mouths to feed. On the other hand, those individuals may provide additional sources for transfers through their own relatives and contacts or their own resources.

The most robust estimates in these relations pertaining to transfers are the positive ones for being single but previously accompanied (reinforced somewhat in the central metropolis by an effect on the magnitude of transfers). Once again, both demand and supply factors probably come into play. Women who are not currently accompanied are perceived to be in greater need of transfers, and those who have had companions have an additional resource, particularly if the previous union led to offspring currently residing with the woman.

Other income. The source of other income is ownership of income-generating assets or earnings of household members other than the nuclear family. Assets generally are acquired from parental families or other relatives or from acquisitions financed by past savings out of the household's own past income. Once again, demographic factors have a role in this process.

The presence of extended family in addition to the respondent and her companion significantly increases the probability of receiving other income and its magnitude in the central metropolis and its magnitude in cities and towns (although only at the 10% level in this case). In urban areas, particularly in the central metropolis, apparently such individuals contribute to the household their earning power and asset ownership. In contrast, in less urbanized and in rural areas those individuals apparently stay in extended households only if they themselves do not have access to the most critical rural income-generating asset--arable land.

The presence of a male companion has a significantly negative estimated effect on the probability of receiving other income in the central metropolis and in rural areas. We find this a puzzling result. We would expect a priori that the presence of a companion would increase asset accumulation through savings out of his earnings and thus have a positive effect.

Finally, the woman's work force experience increases the probability of asset income in the urban areas. Significant savings out of women's earnings and investment in income-generating assets apparently occurs in the urban areas. Thus a number of demographic variables have effects on other income through the experience variables.

4. SIMULATIONS OF THE IMPACT OF DEMOGRAPHIC CHANGES ACCOMPANYING DEVELOPMENT ON DISTRIBUTIONS OF INCOME COMPONENTS

In this section we simulate the effects upon medium-term distributions of major income components exerted by hypothetical demographic

changes that often accompany long-run development. We use the estimated determinants by region of the probabilities of receiving different income components and of the magnitudes of these components conditional on their being positive (discussed in Section 3). With these relations we can simulate the "base" income distributions by using the actual distributions of demographic factors, and we can simulate alternative distributions by using the hypothetical long-run changes and noting the differences. In Tables 5 and 6 we summarize our simulated distributions with Gini coefficients and the percentages of the total received by the lowest 40% of households for all the regional-income component distributions. We begin by discussing our base simulations and then turn to the effects of the hypothetical demographic changes.

Base Simulations

Our base (or reference) distributions are "expected distributions" calculated by multiplying for each household the probability of receiving the relevant income component times the magnitude of the relevant income component conditional on the magnitude being positive.[12] For these base distributions we use for each household the actual values of its demographic and other characteristics. In our investigation of the impact of hypothetical demographic changes below, we also use the actual values of all of these variables except for the demographic changes that are indicated explicitly. The statistics for the base or expected distributions are given in the first rows of Tables 5 and 6.

Table 5

Gini Coefficients for Household Income Components in Simulated Base Distributions and under Hypothetical Demographic Changes by Region

	Women's Earnings			Men's Earnings			Transfers			Other Income			Total Income		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Base Expected Distributions															
(predicted amount times predicted probability)	.39	.43	.42	.24	.26	.13	.59	.52	.66	.46	.36	.47	.32	.27	.19
Simulations with Demographic Changes															
1. Fewer children	.35	.42	.42	.26	.28	.15	.58	.52	.65	.46	.36	.46	.33	.28	.21
2. Higher age first cohabitation and probability of being single	.36	.38	.34	.24	.27	.13	.58	.52	.67	.46	.36	.47	.37	.32	.25
3. Lower probability of extended family	.39	.43	.42	.26	.28	.15	.58	.51	.60	.43	.32	.46	.33	.27	.20
4. Higher probability of companion absent	.37	.41	.39	.26	.28	.15	.56	.50	.65	.46	.36	.47	.33	.28	.22
5. All four at once	.32	.38	.31	.24	.26	.13	.53	.49	.59	.43	.32	.46	.37	.31	.24

Note: The samples include observations for which the actual value of the income variable is not missing, and which are in the sample for prediction. The sample sizes are 1,174 for the central metropolis, 705 for cities and towns, and 354 for rural areas. For men the sample sizes are 630 for the central metropolis, 529 for cities and towns, and 278 for rural areas.

Table 6

Percentage Shares of Household Income Components for Lowest 40 Percent of Households in Simulated Base Distributions and under Hypothetical Demographic Changes by Region

	Women's Earnings			Men's Earnings			Transfers			Other Income			Total Income		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Base Expected Distributions	17	14	14	25	24	31	12	10	7	12	18	17	19	23	27
Simulations with Demographic Changes															
1. Fewer children	19	14	14	24	23	30	13	10	8	13	18	17	19	23	26
2. Higher age first cohabitation and increased probability of being single	19	17	19	25	24	31	13	10	7	13	19	17	16	20	23
3. Lower probability of extended family	17	13	14	24	23	30	13	10	12	15	19	17	18	23	27
4. Higher probability of companion present	18	16	15	24	23	30	13	10	7	12	15	17	19	23	26
5. All four at once	21	17	20	25	24	31	15	10	12	15	19	17	16	21	24

Note: The samples include observations for which the actual value of the income variable is not missing, and which are in the sample for prediction. The sample sizes are 1,174 for the central metropolis, 705 for cities and towns, and 354 for rural areas. For men the sample sizes are 630 for the central metropolis, 529 for cities and towns, and 278 for rural.

Before we turn to the simulations of demographic changes, however, it is of interest to ask how the statistics for our base simulation distributions compare with those for the actual distributions which are presented in Table 2. For all 12 income component-regional distributions, the Gini coefficients for the base simulations are lower (indicating more equality) than for the actual distributions. Similarly, for all 12 distributions the base-simulation shares of the poorest households are larger than the actual shares. These results are common in simulation studies for industrialized countries.[13]

How should we interpret these systematic differences? The answer depends upon what factors we believe underlie the disturbance terms in our estimated relations in Table 4 and in the appendix. To the extent that these disturbance terms represent transitory fluctuations in income components or in probabilities of receiving them which are random over time for each household, the base simulations reflect longer-run distributions than do the actual distributions.[14] Under this interpretation, purging the actual distributions of the random transitory components leads to greater equality in the underlying systematic longer-run distributions than in the short-run actual distributions.

Alternatively, the disturbance terms may be representing unobserved characteristics of households which change the probabilities of receiving income components and the magnitudes received, but which are not likely to change much over time for individual households (i.e., "fixed household effects"). To the extent that this is the case, the base simulations

understate inequality in the short run and in the longer run.[15] Nevertheless, as long as these unobserved characteristics are independent of the observed ones on the right-hand sides of our estimated relations (as is assumed in the estimation process), simulations of the effect of changes in the observed variables on the base simulations suggest the impact on the actual distributions.

With panel data we could identify the relative importance of transitory versus household effects in the disturbance terms. Unfortunately we do not have such data and are therefore not able to explore the relative importance of these two possible sources. We believe, however, that transitory factors are significant, although probably not exclusively important. The more important these transitory factors, the more our simulations relate to longer-run distributions than do the actual current distributions.

We now turn to five hypothetical simulations of the impact of demographic changes usually accompanying long-run development on the medium-run regional distributions of income components.

1. Fewer Children

We posit that all households actually having one or more children will have one less child, and that the probability of having children under 5 is lowered from 1.0 to 0.5 for those households with children under 5. These hypothetical changes have the largest impact on the distribution of women's earnings in the central metropolis, exerted

through the effect on the probability of current labor force participation and on accumulated work experience. In this case the effect is equalizing, because of larger relative gains for the poorest households. The Gini coefficient for this distribution declines from .39 to .35, and the share of the lowest 40% of households increases from 17 to 19%. The other noteworthy effects are small disequalizing ones in the distributions of men's earnings in all three regions. These, in fact, negate or outweigh the effect of women's earnings, with the result that the Gini coefficients for total income increase slightly (although the percentage share for the poorest decline perceptively only for the rural areas).

2. Higher Age at First Cohabitation and Higher Probability of Being Single

We hypothesize that women's age at first cohabitation is raised by two years and that the probability of being single (for women currently with a companion) is raised by 0.1. These changes again work primarily to equalize women's earnings because of concomitant gains in the shares for the poorest households, again because of the effect on current probabilities of women's labor force participation and on their accumulated work experience. However, in this case the effects occur in all three regions and are somewhat larger in the less urban and more rural areas. The Gini coefficients drop from .39 to .36, .43 to .39, and .42 to .34 (in order of decreasing urbanization). The percentage shares of the 40% of the poorest households increase from 17 to 19, 14 to 17, and 14 to 19. A striking dimension of these simulations is that the equalizing

effect on the distributions of women's earnings is not equalizing in regard to total income. For total income in all three regions the Gini coefficients increase and the shares of the poorest 40% of the households fall. The additional expected women's earnings which are induced by this change often are gained by otherwise higher income households.

3. Lower Probability of Extended Family

For each household that is in fact an extended family we posit that the probability of being an extended family is halved. This change reduces inequality in transfers in rural areas (the Gini coefficient drops from .66 to .60) and in other income in the central metropolis (.46 to .43) and in cities and towns (.36 to .32). It increases the share of transfers for the poorest 40% of households in the central metropolis (12 to 13%) and in rural areas (7 to 12%) and their share of other income in the central metropolis (12 to 15%) and in other urban areas (18 to 19%), but reduces slightly their share of women's earnings in towns and cities (14 to 13%). On the other hand, men's earnings become somewhat more unequal in all three regions, with increases in the Gini coefficients from .24 to .26, .26 to .28 and .13 to .15, and a one percentage point drop in the shares of the poorest in each area. The regressive effects dominate slightly: the Gini coefficient for total income increases from .32 to .33 for the central metropolis and from .19 to .20 for the rural areas, and for the central

metropolis the share of total income for the poorest drops one percentage point.

4. Higher Probability of No Male Companion

We posit that women who are currently accompanied hypothetically have a 0.2 probability of not being accompanied in the future (but, instead, will have previously cohabited). This change reduces inequality and regressiveness in the distributions of women's earnings in all three areas due to the induced increased labor force participation of women (the Gini coefficients fall by .02 to .03, and the percentage shares of the poorest 40% of households increase by 1 or 2%). It also induces more transfers, equalizing somewhat their distributions in all three areas (.59 to .56, .52 to .50, and .66 to .65) and increases the share of the poorest in the central metropolis (12 to 13%). The impact on the distributions of overall income, nevertheless, is to increase slightly the Gini coefficients for the central metropolis and for cities and towns by shifting relative income from middle to upper income households, having no perceptible impact on the shares of the poorest. In rural areas the effect is larger: the share of the poorest 40% of households drops one percentage point.

5. All Demographic Changes Combined

In the distributions of women's earnings, the overall effects are fairly substantial, are both equalizing and progressive, and are somewhat

stronger in rural areas. The Gini coefficients fall from .39 to .32, .43 to .38, and .42 to .31. The percentage shares of the poorest rise from 17 to 21%, 14 to 17%, and 14 to 20%.

In contrast, in the distributions of men's earnings the effects are too small to be perceptible. This very limited impact is hardly surprising given the underlying estimates that were discussed in Section 3.

For the distributions of transfers, the overall effects are again substantial, equalizing, and progressive, and also somewhat stronger in rural areas. The Gini coefficients drop from .59 to .53, .52 to .49, and .66 to .59. The percentage shares of the poorest rise from 12 to 15% in the central metropolis and from 7 to 12% in rural areas.

For the distributions of other income the overall effects are also equalizing and progressive, but in this case only for the two urban regions. There the Gini coefficients drop from .46 to .43 and from .36 to .32. The percentage shares of the poorest households rise from 12 to 15% and from 18 to 19%, respectively.

For the distributions of total income, finally, the regressive tendencies dominate in all three regions. The three Gini coefficients increase from .32 to .37, .27 to .31, and .19 to .24. The percentage shares of the poorest households fall from 19 to 16, 23 to 21, and 27 to 24. What appear to be progressive changes for three of the four income components (and neutral changes for the other) turn out to be regressive in regard to the effects on the total income distributions.

5. CONCLUSIONS

We have examined the distributions of four major components of income across three areas of urbanization in a developing country and have found considerable differences among regional-income component subsamples in the proportions of recipient households and in the magnitudes for those households for which the components are positive.

We also have noted significant differences in the distributions of relevant demographic characteristics across the three regions, as well as in the estimated impact of these demographic characteristics on both the probabilities of receiving different types of incomes and on the magnitudes of different types of income conditional on their being positive. The demographic factors which we consider tend to have much less impact on relations pertaining to prime-age male earnings than on the other three income components which we consider, with perhaps the greatest effects on relations pertaining to women's earnings. They also tend to have more pervasive effects the more urban the area.

Finally, we have simulated the effects of hypothetical demographic changes that usually accompany long-run development on the medium-run regional distributions of components of income. The effects on some of the regional income component distributions are fairly considerable in regard both to equalizing the distributions and increasing the shares of the poorest. Of course these effects differ across types of income (and generally are small for men's earnings) and regions. The results suggest that such demographic changes may have some important, although

hardly overwhelming, progressive effects on the distributions of income components other than men's earnings.

The more relevant finding concerns the effect of these demographic changes on total household income. Here our results are quite striking. Despite the apparently progressive effects on the income components, the overall effects on total income are regressive in the three regions. In all three areas, inequality increases and the poorest become relatively worse off. The households whose relatively poor position in the distribution of a particular income component are improved tend to be households which already rank relatively high in regard to other income components. Therefore, to look at changes in distributions of the components of income may be quite misleading. Thus, when the distribution of total income is considered, our simulations suggest that the long-run demographic changes which often accompany development may exert significant regressive effects on total household medium-run income distributions in both urban and rural areas of developing countries.

Table A.1

Probit Estimates for Labor Force Participation of Women and Men by Region
(Nondemographic coefficients)

Right-Hand Variables	Women			Men		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Human Capital						
Education	.058	.048	.034	-.021	-.043	.051
	(4.5)	(3.4)	(1.0)	(0.6)	(2.0)	(0.6)
Experience	.171	.238	.165	.103	.061	-.073
	(12.7)	(13.9)	(6.6)	(4.1)	(2.6)	(1.2)
(Experience)^2	-.004	-.006	-.004	-.002	-.001	-.001
	(7.2)	(9.2)	(4.2)	(3.9)	(3.3)	(1.1)
Protein	.372	.350	.342	.327	.685	.089
	(3.7)	(2.6)	(1.7)	(1.0)	(2.5)	(0.2)
Parasites	.029	-.043	-.036			
	(0.4)	(0.4)	(0.3)			
Family Situation						
Other Income + 1000	-.196	-.041	.068	-.148	-.186	.248
	(3.6)	(0.8)	(1.0)	(0.8)	(1.4)	(0.2)
National Region						
North		.026	-.333		-.467	.346
		(0.1)	(1.6)		(1.1)	(1.0)
Madriz		.321	.435		-1.36	2.99
		(0.7)	(1.1)		(2.0)	(0.2)
Nueva Segovia		-.405	-.046		2.91	-.177
		(1.1)	(0.1)		(0.1)	(0.4)
Pacific		.158	-.186		-.024	.635
		(0.8)	(1.0)		(0.1)	(1.7)
Atlantic Coast		-.561			2.75	
		(1.4)			(0.1)	
Constant	-1.69	-2.12	-1.92	1.01	0.69	2.13
	(9.3)	(7.3)	(5.7)	(1.8)	(1.1)	(2.4)
-2 x ln likelihood ratio	604	505	152	21	41	9
Sample size	1,535	1,041	557	998	762	406
Number of participants	787	504	134	984	737	394

Note: Asymptotic absolute values of t-statistics are given in parentheses beneath the coefficient estimates. See Table 4, labor force participation sections, for the estimated coefficients of the demographic variables.

Table A.2

Regression Estimates for Women's Labor Force Experience by Region
(Nondemographic coefficients)

Right-Hand Variables	Central Metropolis	Cities and Towns	Rural Areas
Human Capital			
Education	-.350 (1.7)	-.259 (1.08)	-1.134 (2.1)
Education x age	.005 (0.7)	.006 (0.7)	.043 (2.3)
Had generally preventable disease	.935 (2.9)	.133 (0.3)	.504 (0.9)
Had medically preventable disease	-.190 (0.6)	.512 (1.2)	.248 (0.4)
Had therapeutically treatable disease	.578 (1.7)	.631 (1.5)	-.010 (0.0)
Background			
Both raisers present in childhood	-.331 (0.3)	.209 (0.1)	-.281 (1.6)
Father present	.099 (0.1)	-1.89 (1.4)	-.321 (0.2)
Mother present	.783 (1.5)	.210 (0.2)	2.04 (1.5)
Mother worked	1.11 (3.5)	1.45 (2.8)	.065 (0.1)
Father's occupational prestige	-.002 (0.2)	.018 (0.9)	.047 (1.5)
Never migrated	-.640 (2.0)	.338 (0.8)	-.561 (0.9)
Age	.611 (10.6)	.577 (8.6)	.208 (2.3)
National Region			
North		1.38 (1.5)	-1.68 (2.0)
Madriz		.68 (0.3)	-2.21 (1.4)
Nueva Segovia		-.05 (0.0)	.01 (0.0)
Pacific		1.03 (1.2)	.53 (0.6)
Atlantic Coast		.13 (0.1)	
Constant	-7.46 (5.1)	-10.6 (5.0)	-1.69 (0.6)
R^2	.30	.26	.19
Sample size	1,535	1,041	557

Note: Asymptotic absolute values of t-statistics are in parentheses. See Table 4, Women's Labor Force Experience, for the estimated coefficients of the demographic variables.

Table A.3

Regression Estimates for Women's and Men's Log Earnings by Region
(Nondemographic coefficients)

Right-Hand Variables	Women			Men		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Human Capital						
Education	.130	.121	.052	.097	.075	.037
	(15.6)	(12.6)	(1.4)	(16.5)	(9.9)	(2.4)
Experience	.065	.068	.011	.050	.033	.020
	(5.3)	(4.3)	(0.3)	(4.9)	(3.3)	(2.1)
$(\text{Experience})^2$	-.001	-.0015	.00045	-.0008	-.0006	-.000
	(2.5)	(3.0)	(0.4)	(4.1)	(2.8)	(2.2)
Nutrition	.162	.335	.499	.396	.526	.138
	(2.2)	(3.2)	(2.2)	(6.9)	(2.8)	(1.7)
Health (days ill)	-.003	-.001	-.004	-.002	.002	-.001
	(1.6)	(0.7)	(1.0)	(1.8)	(1.3)	(0.4)
Never migrated	.181	-.088	-.114			
	(3.0)	(1.2)	(0.6)			
National Region						
North		-.020	-.434		.164	-.411
		(0.1)	(1.9)		(1.4)	(4.4)
Madriz		-1.09	.094		-.859	-.494
		(3.5)	(0.3)		(2.4)	(2.3)
Nueva Segovia		-.175	-.449		.200	.142
		(0.2)	(1.3)		(1.0)	(1.0)
Pacific		.028	-.215		.130	-.188
		(0.2)	(1.0)		(1.3)	(1.0)
Atlantic Coast		.007			.110	
		(0.0)			(0.6)	
Labor force participation						
Heckman selectivity term	.340	.129	.151	1.36	1.28	-2.79
	(3.9)	(1.2)	(0.7)	(1.9)	(1.7)	(2.4)
Constant	3.95	3.77	4.29	4.65	4.55	5.56
	(21.9)	(13.6)	(8.0)	(28.6)	(21.0)	(34.2)
R^2	.30	.35	.08	.32	.34	.14
Sample size	697	455	121	917	593	346

Note: Asymptotic absolute values of t-statistics in parentheses. See Table 4, Women's Earnings, for the estimated coefficients of the demographic variables.

Table A.4

Probit Estimates for Receiving Transfers and Regression Estimates of Log of Amount of Transfers by Region
(Nondemographic coefficients)

Right-Hand Variables	Probit Estimates for Receiving Transfers			Regression Estimates of Log of Amount of Transfers		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Family Background						
Father present in childhood	.210	.178	-.212	-.307	-.380	-.390
	(1.6)	(1.4)	(1.0)	(1.4)	(1.7)	(0.8)
Mother present	-.110	-.317	-.227	-.043	.240	-1.32
	(1.1)	(2.2)	(1.2)	(0.3)	(0.8)	(2.0)
Father's occupational prestige	-.005	-.001	.014	.008	.021	.006
	(1.4)	(0.3)	(1.8)	(1.5)	(3.1)	(0.3)
Mother's occupational prestige	-.004	-.005	.010	.008	.021	.044
	(1.0)	(1.2)	(1.4)	(1.2)	(3.0)	(2.4)
Number of siblings	-.008	.003	.055	.003	-.017	-.071
	(2.0)	(0.9)	(1.1)	(0.2)	(0.7)	(0.9)
Urban origin	-.238	.144	.169			
	(2.0)	(0.9)	(1.1)			
Personal Characteristics						
Education	.027	.018	-.011	.096	.037	-.089
	(2.3)	(1.4)	(0.3)	(4.4)	(1.3)	(0.8)
Experience	-.008	-.009	-.018	-0.21	-.038	.000
	(1.2)	(1.3)	(1.7)	(2.1)	(3.3)	(0.0)
Age	-.015	-.011	.024	.019	.051	-.017
	(2.1)	(1.4)	(2.1)	(1.4)	(3.9)	(0.4)
Never migrated	.088	.007	.170	.150	-.138	.544
	(1.2)	(0.1)	(1.1)	(1.4)	(0.9)	(1.4)
Had generally preventable disease	.018	.076	.204			
	(0.2)	(0.9)	(1.6)			
Had medically preventable disease	.075	-.132	.003			
	(1.0)	(1.5)	(0.0)			

(continued)

Table A.4 (con'd)

Right-Hand Variables	Probit Estimates for Receiving Transfers			Regression Estimates of Log of Amount of Transfers		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Had therapeutically treatable disease	-.023 (0.3)	.092 (1.1)	-.201 (1.4)			
Days ill	.001 (0.6)	.002 (0.7)	-.003 (0.9)			
Church attendance	.000 (0.0)	.022 (1.3)	.027 (0.9)			
National Region						
North		.037 (0.2)	.259 (1.3)		-.098 (0.3)	-.267 (0.4)
Madriz		.302 (0.8)	.265 (0.5)		-1.10 (2.2)	-.052 (0.0)
Nueva Segovia		.497 (1.7)	.218 (0.7)		-1.08 (2.1)	.642 (0.6)
Pacific		.339 (2.0)	.491 (2.5)		-.124 (0.4)	.639 (0.8)
Atlantic Coast		.307 (2.0)			-.172 (0.3)	
Selection for positive transfers				1.063 (1.3)	-1.52 (1.8)	.158 (0.1)
Constant	-.533 (2.2)	-.923 (2.7)	-2.69 (6.0)	1.731 (1.6)	4.49 (3.5)	4.37 (1.1)
-2 x log likelihood ratio	262	206	105			
R^2				.14	.24	.18
Sample size	1,567	1,159	541	314	231	88
Number receiving transfers	530	406	162			

Note: Asymptotic absolute values of t-statistics in parentheses. See Table 4, Transfers, for the estimated coefficients of demographic variables.

Table A.5

Probit Estimates for Receiving Other Income and Regression Estimates of Log of Amount of Other Income, by Region
(Nondemographic coefficients)

Right-Hand Variables	Probit Estimates for Receiving Transfers			Regression Estimates of Log of Amount of Transfers		
	Central Metropolis	Cities and Towns	Rural Areas	Central Metropolis	Cities and Towns	Rural Areas
Family Background						
Father present in childhood	.031	-.131	.171	-.302	-.137	-.405
	(0.2)	(0.9)	(0.7)	(1.1)	(0.4)	(0.5)
Mother present	.132	.056	-.339	-.072	-.059	-.034
	(1.0)	(0.3)	(1.6)	(0.3)	(0.2)	(0.0)
Father's occupational prestige	.003	.004	.015	.009	-.010	-.007
	(0.7)	(0.9)	(1.7)	(1.3)	(1.1)	(0.3)
Mother's occupational prestige	.002	-.002	.003	.002	.012	-.002
	(0.4)	(0.5)	(0.3)	(0.2)	(1.3)	(0.0)
Human Capital						
Women's education	.061	.025	.001	.070	.096	.240
	(4.6)	(1.7)	(0.0)	(3.0)	(3.4)	(1.8)
Woman's experience	.014	.018	.013	.009	-.000	-.012
	(2.2)	(2.8)	(1.2)	(0.7)	(0.0)	(0.4)
Woman's age	.013	.009	.003	-.016	.024	.005
	(2.1)	(1.3)	(0.3)	(1.2)	(1.6)	(0.2)
Companion's education	.017	-.008	.037	.037	.007	-.003
	(1.5)	(0.7)	(1.1)	(1.8)	(0.3)	(0.0)
National Region						
North		-.305	-.258		-.190	-1.34
		(1.5)	(1.2)		(0.5)	(1.5)
Madriz		-3.51	-.255			-1.76
		(0.4)	(0.6)			(1.0)
Nueva Segovia		.013	.170		-.833	-1.64
		(0.0)	(0.5)		(1.5)	(1.6)
Pacific		-.204	.042		-.537	-1.05
		(1.2)	(0.2)		(1.6)	(1.6)
Atlantic Coast		.017			-1.28	
		(0.0)			(2.1)	
Constant	-2.19	-1.28	-1.42	50.9	4.26	6.27
	(8.7)	(3.9)	(2.8)	(9.3)	(6.4)	(4.0)
-2 x log likelihood ratio	76	37	26			
R^2				.11	.17	.05
Sample size	1,534	1,188	590	210	140	46
Number receiving other income	240	197	66			

Note: Asymptotic absolute values of t-statistics in parentheses. See Table 4, Other Income, for estimated coefficients of demographic variables.

Notes

[1]Ahluwalia (1976) and Boulier (1975) explore the effect of demographic changes on the distribution of income in developing countries using aggregate cross-country data. Such data do not, however, permit the estimation of the effects of demographic variables while controlling for other theoretically relevant variables on a micro level, nor disaggregation of income components, nor disaggregation by degree of urbanization.

[2]The sample is not strictly speaking a random one of all households because not all households include at least one woman in the required age range. It is nevertheless much closer to a random sample of all households than would be the case for a similarly defined sample for more industrialized countries. Extended families are fairly common and a high proportion of the women in the country are 45 or under in age due to the relatively low expected life and the high population growth of recent decades (World Bank, 1980). It is quite rare in Nicaragua that families with children do not have at least one woman in the eligible age range. Thus, it is almost a random sample of that very important set of households in which the next generation is being raised. For the purpose of the present study, the advantage of having integrated data on socioeconomic, health and nutrition, and demographic factors outweighs the disadvantage of possible nonrandomness. For more details concerning these data and our other analyses of them, see Behrman and Wolfe (1979, 1980a-b, 1981a-h); Behrman, Wolfe, and Gustafson (1980); Behrman, Wolfe, and Tunali (1980);

Blau (1977, 1980); Wolfe (1977); Wolfe and Behrman (1980a-c, 1981); Wolfe et al. (1979a-b); Wolfe, Behrman, and Blau (1980a-b); Wolfe, Behrman, and Flesher (1979); Ybarra Rojas (1978).

[3]We assume that the demographic changes are exogenous for the time horizon of interest because of the long lags with which they respond to the income distribution changes of interest. Boulier (1975), on both theoretical and empirical grounds, criticizes studies (Kochner, 1973; Repetto, 1973; Rich, 1973) that make the alternative assumption that medium-term income distributions simultaneously alter longer-run demographic phenomena.

[4]We note that our simulations are partial in that we do not consider possible macroeconomic effects, nor the point that simulations may imply creation or destruction of households elsewhere in society. Despite such limitations, we think that our study gives some important insight about the extent to which demographic changes are likely to affect medium-run household distributions of income and its components.

[5]We do not use "full" income because of the difficulties in making these imputations and because the use of actual income assures greater comparability with other studies. Of course, to the extent that households in a certain part of the distribution forego relatively certain types of income (e.g., from paid labor force participation) in order to engage in household production, the distribution of actual income may differ from the distribution of "full" income. For example, Butz (1979) and his collaborators report that in Malaysia the distribution of full income

is more equal than is that of nominal income because many households which are low in the latter distribution have relatively low labor force participation and high household production.

[6]See Lazear and Michael (1980) and Pollak and Wales (1978) for discussions of the alternative of constructing equivalency scales.

[7]This measure of inequality is widely used despite its lack of consistency with a social welfare function (see Atkinson, 1975).

[8]The numbers in parentheses are from Table 1. Throughout, we give such numbers in order of decreasing urbanization (i.e., central metropolis, cities and towns, rural areas). Mean values of income components are in 1977-1978 cordobas per biweekly period (7 cordobas = 1 U.S. dollar).

[9]This result suggests that Becker's (1965) full income definition might indicate greater inequality than does the actual income distribution, since richer households are more likely to have more of women's time devoted to household production. This contrasts with the result referred to in note 5.

[10]Selectivity bias may occur if the disturbance term in the relation that determines whether or not a household receives an income component is correlated with the disturbance term in the relation that determines the magnitude of the income component. Selectivity bias is most emphasized in the literature on women's earnings (Behrman and Wolfe, 1980b; Behrman, Wolfe, and Tunali, 1980; Heckman, 1976, 1979; Tunali, Behrman, and Wolfe, 1980; Wales and Woodland, 1980), but we also have found evidence of it

in other contexts, such as whether or not certain information is provided (Behrman and Wolfe, 1980a-b; Tunali, Behrman, and Wolfe, 1980). We control for selectivity bias in our estimates for the first three income components, but not for other income. In the last case the Heckman term from the probit estimate is merely a nonlinear transformation of the variables included in the OLS regression for the magnitude of other income. Therefore we cannot identify whether it is actually representing some selectivity phenomenon, or only nonlinearities in the true relation.

[11]Since we are considering gross income, not the use of income, we do not concern ourselves with transfers from a household in our sample to other households. For this reason we work with gross transfers received (not net transfers), which are non-negative by definition.

[12]If the probabilities of receiving a particular income component are ignored, the distributions are less skewed--in some cases substantially so. A striking illustration is the case of women's earnings in rural areas in which most of the inequality arises from differential probabilities of labor force participation and not from differential predicted magnitudes of earnings for workers. In this case the incorporation of the effect of the probabilities of participating in the labor force increases the Gini coefficient from .18 to .42 and reduces the share of the poorest 40% of households from 23 to 13%. Thus it is important to incorporate into the simulations the probabilities of receiving various income components in addition to the magnitudes that are received conditional on their being positive.

[13]See Schwartz (1980) for a discussion of this result.

[14]A similar interpretation is made in a different context, at least for earnings, in a number of other studies. See for example Willis (1973).

[15]For evidence that unobserved family or household effects may be quite important in male earnings functions in the United States, see Behrman et al. (1980), Taubman (1977). We are attempting a similar investigation (Behrman and Wolfe, 1981g) for the sample used in this study, but results are not yet available.

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