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CENTER DISCUSSION PAPER NO. 307

LIFETIME MIGRATION IN COLOMBIA:

TESTS OF THE EXPECTED INCOME HYPOTHESIS

Gary S. Fields*

January 1979

Notes: Center Discussion Papers are preliminary materials circulated to stimulate discussion and critical comment. References in publications to Discussion Papers should be cleared with the author to protect the tentative character of these papers.

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I. INTRODUCTION

People migrate and areas gain or lose population for a variety of reasons: earnings differentials, job availability, schooling opportunities, differential quality of life, proximity to friends and relatives, and so on. The economic model of migration holds that the central factor determining individuals' migration decisions is the perceived opportunity to attain higher economic status. Areas' populations therefore are expected to change differentially according to the economic opportunities offered. In empirical research in developed countries, economic factors have been shown to underlie most migration decisions (Lansing and Mueller, 1967; Greenwood, 1975). In less developed countries, where the economic situation of the populace is far more perilous, we would expect economic forces to be even more powerful determinants of the spatial allocation of the population. This paper presents evidence on the applicability of the economic model of migration for one less developed country, Colombia.

To model the determinants of migration flows in the Colombian economy from an economic perspective, this paper takes as its starting point the expected income hypothesis. Pioneered by Todaro (1968) and refined and modified in a number of subsequent works,[1] the expected income model of migration holds that a migrant considers not only the income to be earned in an area if he or she is working, but also the probability of obtaining employment in the area in question. The higher the income or the probability of employment, the more in-migration ceteris paribus. Migration is the primary equilibrating force in labor markets in the expected income model, since wages do not play their ordinary equilibrating

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[1] See Todaro (1969), Harris and Todaro (1970), Johnson (1971), and Fields (1975), among others. These extensions are surveyed in Todaro (1976).

function.[1] The expected income model has gained wide acceptance among demographers and other social scientists as well as among economists.[2]

This paper analyzes published data from the 1973 Colombian Census of population. The published information permits one to calculate rates of lifetime migration by department (roughly, a state). Male and female rates are available separately. These rates are in turn related to the department's income level, job opportunities, and employment composition.

My objective in this paper is to say what can be said from the published information about the empirical appropriateness of the economic model of migration in Colombia. Additional research now under way is using the underlying Census questionnaires to build up a new, more disaggregated data base. That will allow us to take account of other factors not considered here -- place-to-place population movements, rural-urban migration, differences in migration rates by education, and differential migration responsivness for various sex/education groups.

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[1]The ordinary competitive model of migration holds that a wage differential between geographic labor markets would be eroded as workers move from the low wage to the high wage market and firms move in the reverse direction. The equilibrium tendency is for wages to equalize. However, if wages in the high wage labor market do not fall, it is the probability of employment that must adjust until expected incomes are equalized. Why wages do not fall in the high wage labor market is a matter of some discussion. Todaro emphasizes institutional factors; others (e.g., Stiglitz, 1974 and 1976) offer market explanations.

[2]Examples are Gugler (1968), Cornelius (1975), and Shaw (1976).

II. DATA, VARIABLES, AND HYPOTHESES

The unit of analysis is the department. Colombia is divided into 23 departments, plus a small number of territories. A department is an administrative unit akin to a province with much less governmental autonomy than characterizes an American state.

Both the migration data and the economic characteristics of the various departments' labor markets are derived from the 1973 Census of Population. The Census enumerated 22 1/2 million people. The basis for social and economic analysis, including the statistical tables used in the present study, is a 4% sample of questionnaires. The Census tabulations of these questionnaires have been subjected to a number of consistency checks and judged reliable in the dimensions examined (Potter, Ordoñez, and Meacham, 1976).

The migration information was published by the National Statistical Office, DANE; see (DANE 1975, Table 5.) This information pertains to geographic mobility over one's lifetime. A lifetime migrant is defined as someone who resided in one department at the time of the Census and was born in another department or outside the country. Twenty-two percent of the population was classified as lifetime migrants between departments.[1]

One economic variable which plays a role in migration decisions is income.[2] Average incomes by department were calculated for each sex by Schultz and myself (forthcoming). These income averages refer to men and women in the labor force (though not necessarily employed in the Census week) who regularly worked for wages and salaries or who were self-employed or employed others; unpaid family workers and domestic servants were thereby excluded from the

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[1]Because of the limitations in the published data, it was not possible to measure movements within departments from farms to towns, towns to towns, or towns to cities.

[2]The Census income question was: "What was your income in pesos last month?" Thus, the data are for gross income; labor earnings can not be distinguished.

income figures.

Migration decisions are also thought to be influenced by job opportunities. Following the expected income hypothesis of migration, several alternative measures of employment probability are included in the analysis below. These are the unemployment rate (as a proportion of the labor force), the employment ratio (ratio of employment to total population), the proportion of full year workers (as a percentage of employment), and the mean months worked by the department's labor force. In addition, following the logic of the expected income hypothesis but extending Harris and Todaro's precise formulation of it, the quality of employment would also be expected to influence migration flows. Accordingly three employment composition variables -- proportion white collar, proportion domestic workers, and proportion unpaid family workers -- are also entered into the analysis. All of these job opportunity variables were taken from special tabulations provided by DANE.[1]

The following hypotheses are tested below:

Hypothesis 1. Women migrate at higher rates than men. A general characterization of migration in less developed countries is that migration propensities are higher for women in Latin America and for men in Africa.[2] These differences are in part determined by social roles. In much of Africa, the women play the leading role in organizing and managing the farm household and doing the actual physical work. This frees the men to go to the cities to look for jobs. A common pattern is for the male to work in the city during the week and return home to the family farm on weekends.[3] In contrast, in Latin American countries, it is more common for teen-age girls and young women to

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[1]The employment probability variables are broken down by sex; the employment composition variables are not.

[2]Todaro (1976).

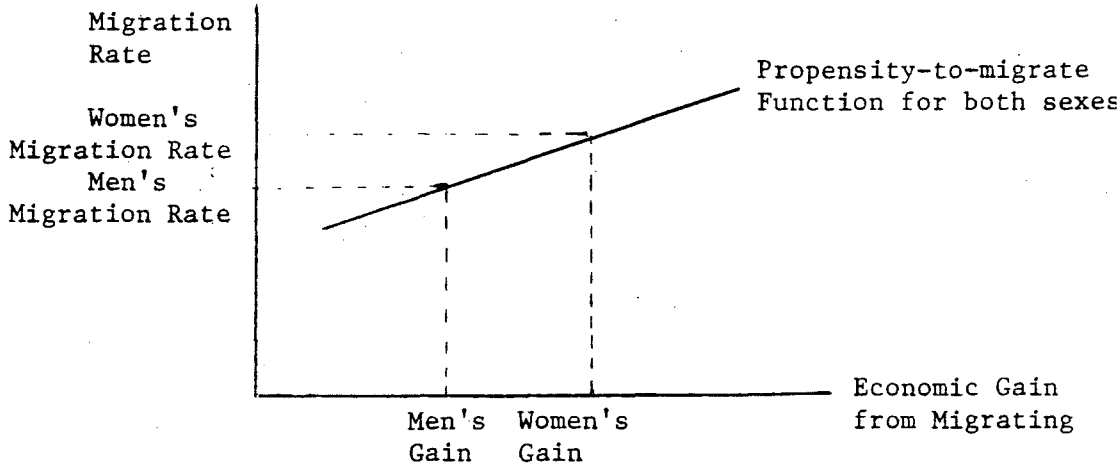
[3]The phenomena of temporary and permanent migration in developing countries are analyzed in depth by Nelson (1976).

migrate, leaving the men behind. Many women in Latin America take jobs as personal service workers, especially in domestic service; few Latin American men would dare do so. Also, the marriage motive is frequently mentioned as a factor stimulating female migration to relatively prosperous towns and cities.

Hypothesis 2. Women in Colombia are more responsive than men to economic opportunities associated with migration for sociological reasons; the economic incentives operate in the other direction. Suppose Hypothesis 1 is true: women migrate at higher rates than men. An economist would be inclined to speculate that women's migration rates are higher because women have more to gain from making a move. On this view, the sexes would have the same propensity-to-migrate function but women would be at a higher point along that function, like so:

FIGURE 1.

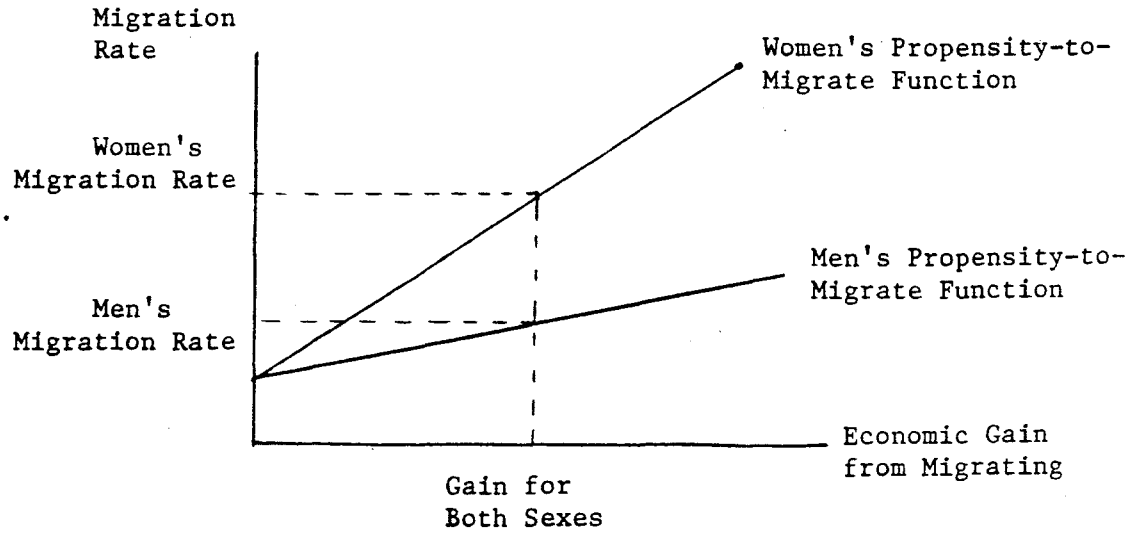
An Economic Model of sex Differences in Migration Rates.



An alternative mechanism, more cultural in nature, is that women's higher migration rates may be due to higher propensity-to-migrate functions:

FIGURE 2.

A Sociological Model of Sex Differences in Migration Rates.



If the actual data are as in Figure 2, the economic model of migration is disproven (or more precisely, fails to receive statistical support). In the tests of Hypothesis 2 given below, I distinguish the effects of the economic and sociological explanations. These hypotheses are not mutually exclusive; both may be operative.

The next three hypotheses offer specific tests of the expected income model of migration:

Hypothesis 3. High income areas have higher in-migration rates than do low income areas. This is the essence of the economic model of migration. It is expected that higher incomes act to hold workers in their current locations while drawing others from elsewhere. I expect this hypothesis to hold both ceteris paribus and mutatis mutandis.

Hypothesis 4. Areas with fuller, more stable employment have higher rates of in-migration than do other areas. By the expected income hypothesis, actual or potential migrants respond positively to the likelihood of securing a job as well as to the income received while working. Thus, in a multivariate relationship, I would expect to find a positive correlation between rate of in-migration and probability of employment after controlling for income. However, the expected sign on the simple bivariate relationship is unclear. If the expected income model is correct, it leads to the conclusion that higher income in an area causes higher unemployment there because of an inflow of migrants trying to get the high-paying jobs. Thus, the areas with high lifetime in-migration rates would be those areas with both high income and high unemployment, and the simple bivariate correlation between lifetime in-migration rates and unemployment rates would be positive. But insofar as equilibrium is

not yet achieved (if ever it will be) and some areas have higher expected incomes than others, the expectation concerning the sign of the bivariate correlation between in-migration rate and unemployment rate is weakened and might even reverse in sign.

Hypothesis 5. Areas where the employment composition is relatively favorable have higher in-migration than areas with poorer job mixes. Workers presumably consider the quality of employment as well as the probability of finding work. The proportion of white collar workers is an index of attractiveness of labor market conditions in an area (proxy for relatively high income, predominantly urban jobs) while the proportion of unpaid family workers is an index of unattractiveness (proxy for relatively low income, predominantly agricultural jobs). No specific hypothesis is advanced for the proportion of domestic servants, since there are two offsetting effects. On the one hand, domestic service is a low-paid, unpleasant job which is inferior to either white-collar or blue-collar work. By this reasoning alone, we would expect a high proportion of the labor force engaged in domestic service to discourage in-migration ceteris paribus. But on the other hand, domestic service may be one of the few options for young adults seeking to establish themselves in urban life. To the extent that domestic service is seen as a means of entry into the modern economy, the availability of such jobs might act to attract migrants.

III. EMPIRICAL RESULTS

A. Migration Rates by Sex

According to Hypothesis 1, we expect to find that women have higher rates of migration in Colombia than do men. The empirical evidence reveals that a differential is present but it is small. 77.6% of the women were born in the same department as the one in which they were living at the time of the Census. This compares with 79.3% for men. The hypothesis that women have higher rates of migration receives support, but only weakly. Sex-selectivity is not as important a feature of Colombian migration, at least at the department level, as it appears to be elsewhere in Latin America. Reasons why these rates are so similar are explored further below.

One interesting feature of the data is the remarkably high correlation between the migration patterns for the two sexes. Table 1 shows these rates by department. The ordinary correlation coefficient between men's and women's migration rates is +0.99. Given the approximate parity of men and women in the population, this means that the departments that gain relatively more migrants of one sex tend also to gain an approximately equal number of migrants of the other sex. This finding tends to contradict the view that is sometimes expressed that male and female migrants choose different kinds of destinations, in particular, that women in Colombia migrate from the farm to large cities while the men migrate from one rural area to another; for if they did, we would observe men migrating disproportionately to rural departments and women tending to choose more urbanized departments and no such pattern emerges.[1]

We will return to male-female migration differences after examining the relationship between migration rates and areas' economic conditions.

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[1] Of course, this still may be taking place within departments, which the available data cannot reveal.

TABLE 1.

LIFETIME MIGRATION RATES BY DEPARTMENT IN COLOMBIA, TOTAL AND BY SEX, 1973.

Both Sexes		Males		Females	
Department	Rate	Department	Rate	Department	Rate
BOGOTÁ	.49	META	.47	BOGOTÁ	.51
META	.47	BOGOTÁ	.45	META	.47
QUINDIO	.35	QUINDIO	.34	QUINDIO	.35
RISARALDA	.34	RISARALDA	.33	RISARALDA	.35
CESAR	.32	CESAR	.32	CESAR	.32
VALLE	.30	VALLE	.29	VALLE	.31
ATLANTICO	.26	ATLANTICO	.23	ATLANTICO	.29
LA GUAJIRA	.19	LA GUAJIRA	.19	LA GUAJIRA	.19
CALDAS	.17	CALDAS	.17	CALDAS	.18
CUNDINAMARCA	.15	CUNDINAMARCA	.15	CUNDINAMARCA	.16
HUILA	.14	HUILA	.15	BOLÍVAR	.14
TOLIMA	.14	TOLIMA	.14	TOLIMA	.14
BOLÍVAR	.13	BOLÍVAR	.13	HUILA	.13
MAGADALENA	.13	MAGADALENA	.13	MAGADALENA	.13
CAUCA	.12	CAUCA	.12	CAUCA	.12
CHOCO	.11	CHOCO	.12	N. DE SANTANDER	.11
N. DE SANTANDER	.11	N. DE SANTANDER	.11	SANTANDER	.11
SANTANDER	.11	SANTANDER	.11	CHOCO	.10
ANTIOQUIA	.08	ANTIOQUIA	.08	ANTIOQUIA	.08
CORDOBA	.08	CORDOBA	.08	SUCRE	.08
SUCRE	.08	BOYACÁ	.07	BOYACÁ	.07
BOYACÁ	.07	SUCRE	.07	CORDOBA	.07
NARIÑO	.03	NARIÑO	.02	NARIÑO	.03

NOTE: Departments are rank-ordered.

B. Migration Rates and Income Level

Hypothesis 3 states that high income areas tend to have higher in-migration rates. Figure 3 depicts the relationship between total lifetime migration rate (TOTALMIG) and average monthly income (TOTINC) for the 23 department of Colombia. The simple correlation between the two is +0.69, i.e., $(.69)^2 = .48$ of the variance in TOTALMIG is explained by variation in TOTINC. The estimated regression relationship is:[1]

(1) TOTALMIG = -.072 + .00020 TOTINC, $R^2 = .48$,
(.00005)

meaning that the lifetime migration rate increases by one percentage point for each increase of 50 (= 1/.0002 x 100) pesos in average monthly income. The hypothesis is strongly confirmed.

C. Migration Rates and Employment Probability

By Hypothesis 4, areas with fuller employment are expected to have higher lifetime in-migration rates ceteris paribus. Four alternative measures of employment probability are calculated. The data for each department are plotted in Figures 4-7. The hypothesized signs and observed correlation coefficients are:

Code Name	Variable Description	Correlation with TOTALMIG, Hypothesized Sign	Ordinary Coefficient of Correlation with TOTALMIG, Observed Value (Significance Level in Parentheses)	
U	Unemployment rate	-	-.19	(.19)
PEMP	Proportion of population employed	+	+.16	(.23)
PFULL	Proportion of workers who had worked in every month of 1973 up to the time of the Census (Oct.)	+	+.27	(.11)
MEANWKYR	Mean work year among those who reported number of months worked in 1973 up to the time of the Census (Oct.) (maximum = 10)	+	+.26	(.12)

[1]All the regressions reported here are in straight linear form. As a check on the appropriateness of this procedure, I re-ran them with a double-log specification. All the results were substantially similar, so are not reported here.

FIGURE 3

TOTAL MIGRATION RATE (TOTALMIG) BY AVERAGE INCOME (TOTINC).

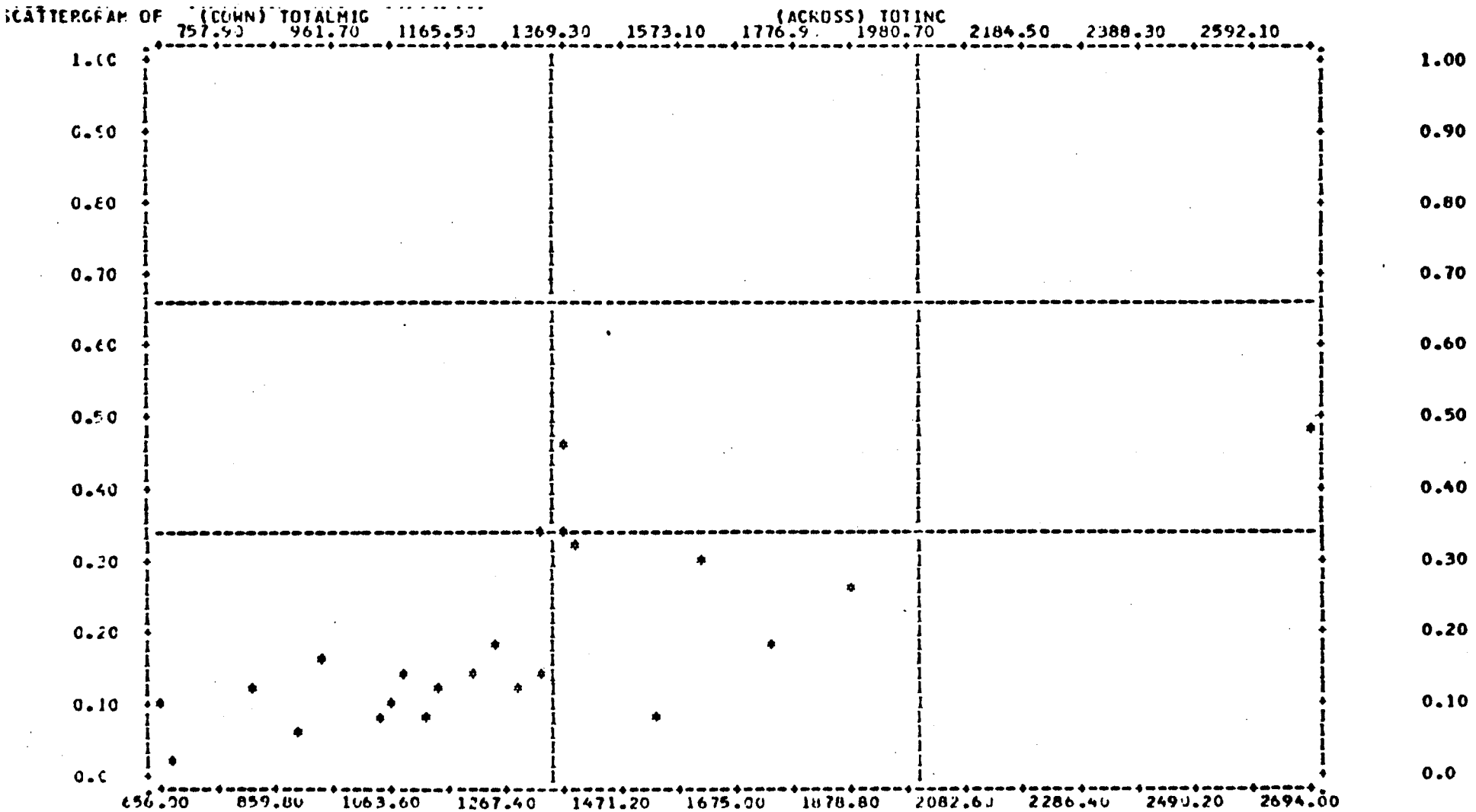


FIGURE 4

TOTAL MIGRATION RATE (TOTALMIG) BY UNEMPLOYMENT RATE (U).

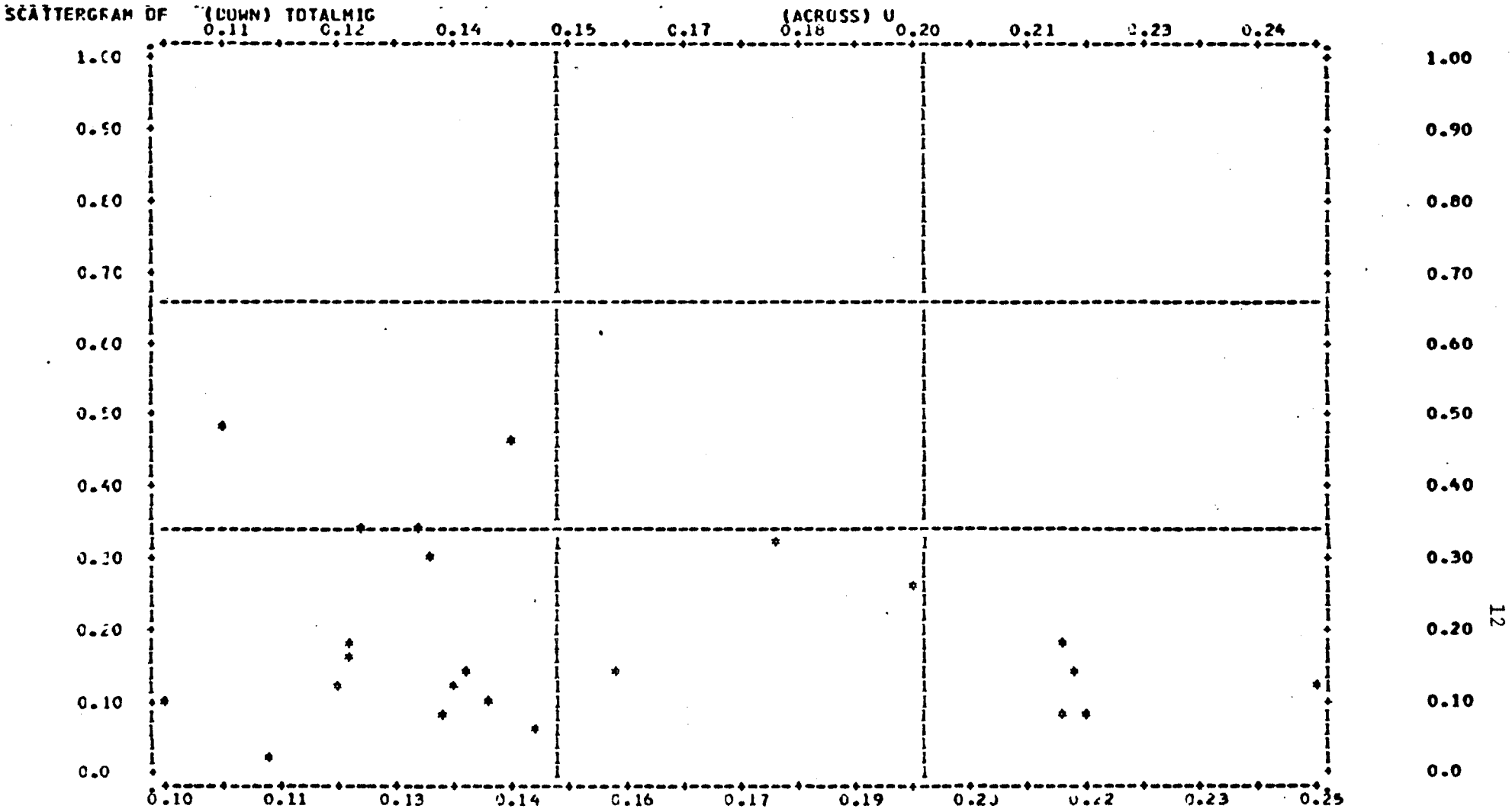


FIGURE 5

TOTAL MIGRATION RATE (TOTALMIG) BY EMPLOYMENT TO POP. RATIO (PEMP).

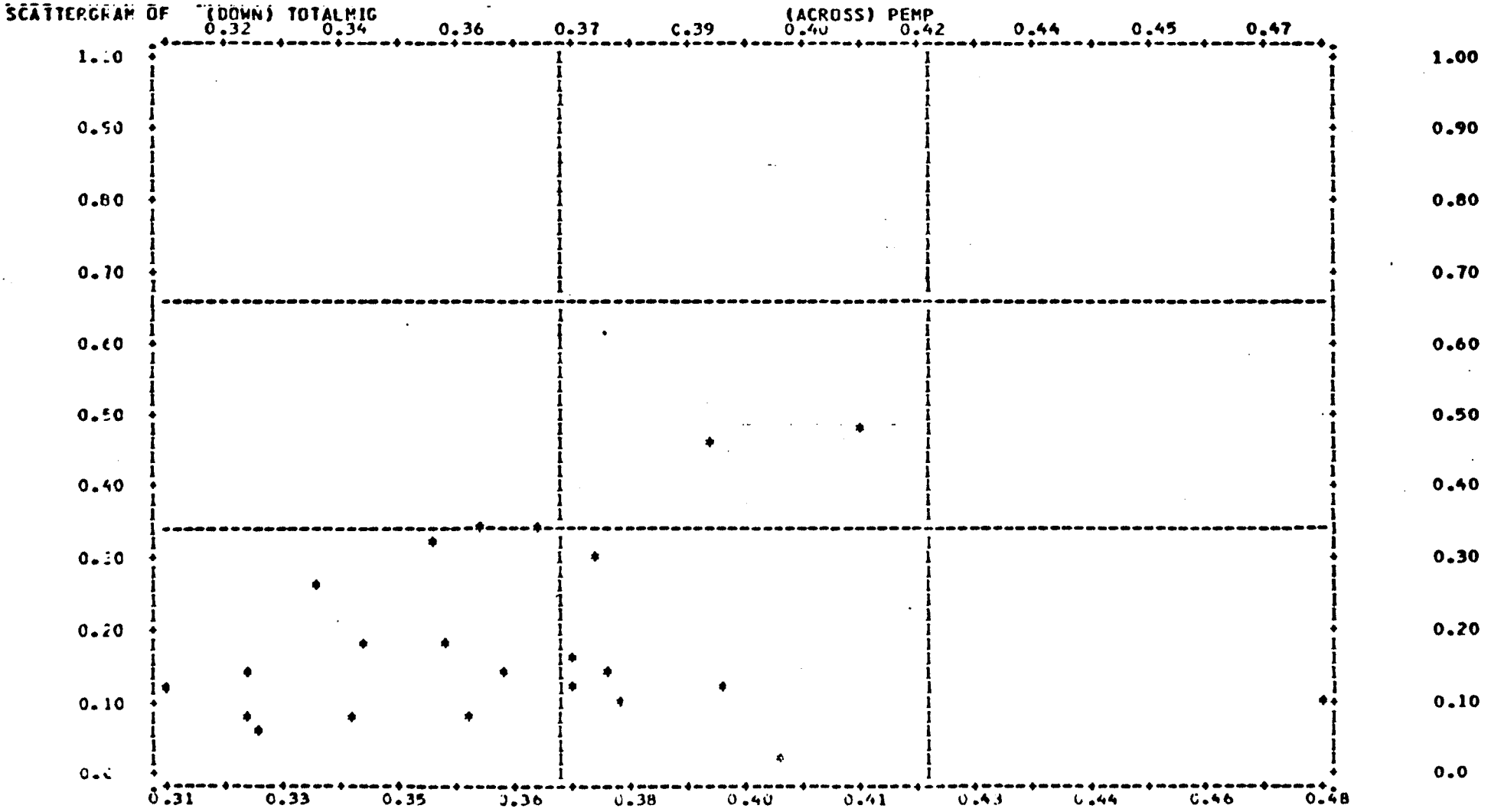


FIGURE 6

TOTAL MIGRATION RATE (TOTALMIG) BY PERCENTAGE FULL YEAR WORKERS (PFULL).

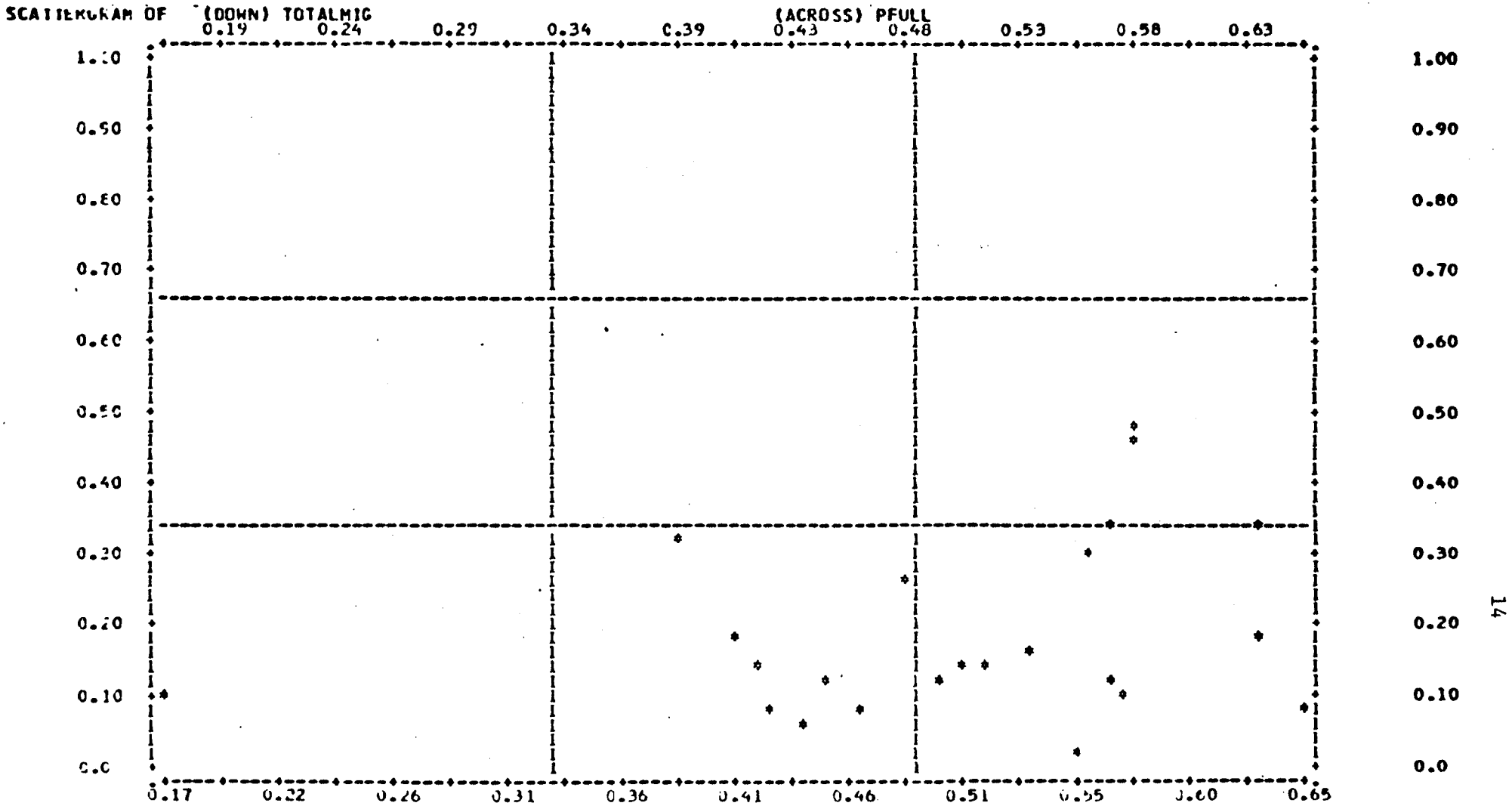
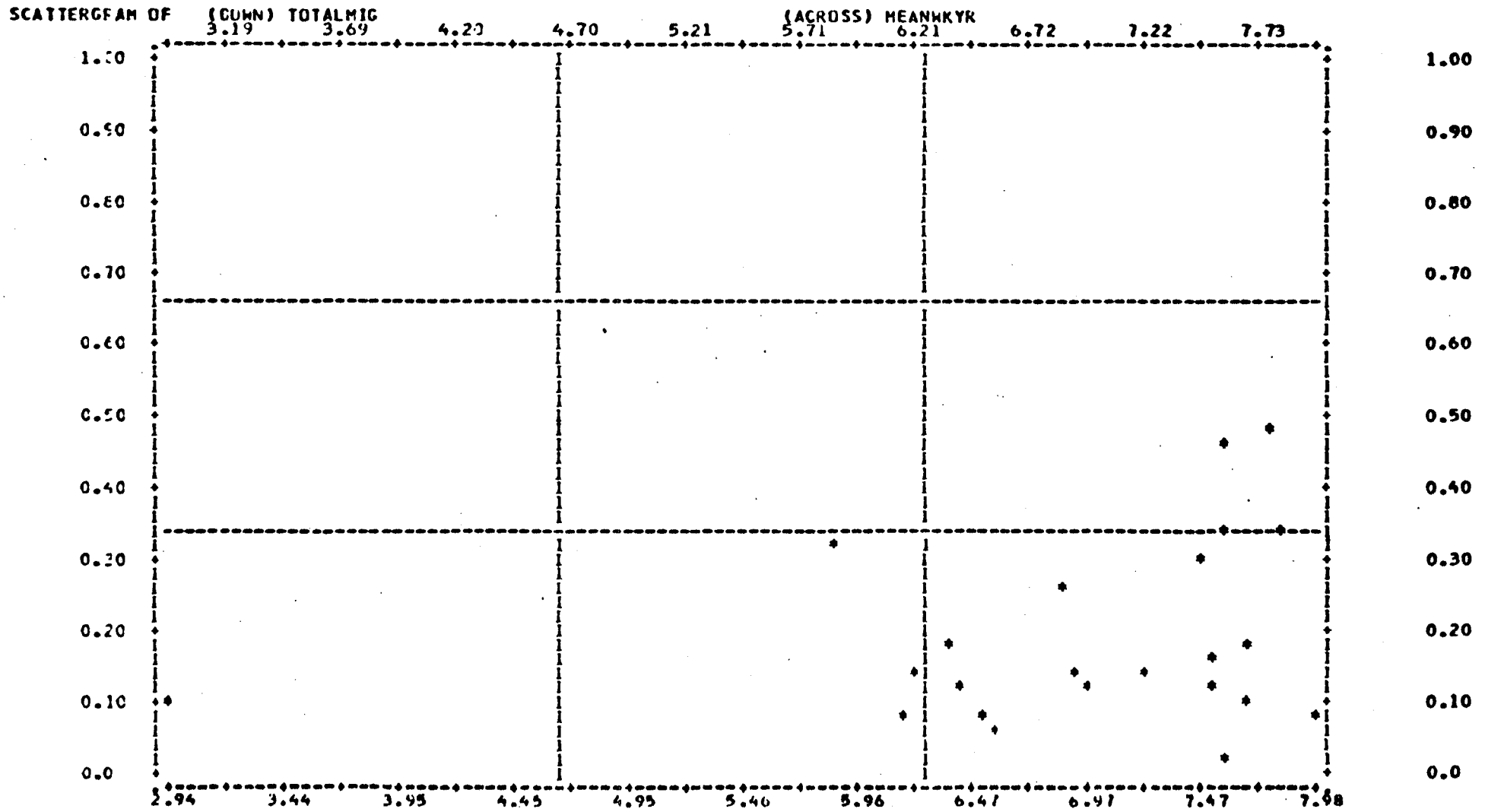


FIGURE 7

TOTAL MIGRATION RATE (TOTALMIG) BY MEAN WORK YEAR (MEANWKYR).



The corresponding regression results are:

(2) TOTALMIG = .278 - .574 U, R^2 = .04;
(.650)

(3) TOTALMIG = -.028 + .596 PEMP, R^2 = .03;
(.788)

(4) TOTALMIG = .024 + .328 PFULL, R^2 = .07;
(.256)

(5) TOTALMIG = -.025 + .031 MEANWKYR, R^2 = .07.
(.025)

Each correlation and regression coefficient has the expected sign. Thus, the evidence is broadly consistent with the expected income hypothesis. However, the lack of an apparent pattern in the data, the low levels of statistical significance, and the low estimated regression coefficients[1] appear to cast doubt on the relevance of employment probability as a determinant of migration. But before coming to this conclusion, we should remember the ceteris paribus nature of the hypothesis that a high rate of unemployment discourages in-migration. What are the ceteris that must be held paribus? One obvious one is income. Calculating partial correlation coefficients controlling for the effect of income on migration rate, the partial correlations between income and the various employment probability measures are:[2]

Variable Name	Coefficient of Partial Correlation with TOTALMIG	(Significance Level in Parentheses)
U	-.36	(.05)
PEMP	+.34	(.06)
PFULL	+.09	(.34)
MEANWKYR	+.05	(.41)

Thus, the deterrent effect of a high unemployment rate on in-migration appears to be confirmed at a statistically significant level by this evidence obtained

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[1]For example, regression (2) implies that an increase in an area's unemployment rate from 10% to 15% would reduce the predicted in-migration rate from an estimated 22.1% to an estimated 19.2%.

[2]The available computer program calculated significance levels for a two-tail test. A one-tail test is more appropriate. The one-tail significance levels are higher, i.e., more significant.

from the partial correlation coefficients.[1]

To reach a judgment on the empirical applicability of the expected income model of migration in the Colombian context, we must decide whether to give more weight to the simple correlations (where the employment probability effects were insignificant) or to the partial correlations (where these variables exhibit statistically significant effects in the hypothesized direction). As stated in the hypothesis section, I regard the multivariate relationship as a better test of the expected income hypothesis, because the logic of the expected income model leads us to expect that higher income in an area causes higher unemployment there ceteris paribus. Indeed, unemployment rates are higher in higher income areas (ordinary correlation coefficient = +.10). The expected income hypothesis asks whether higher unemployment discourages in-migration, all other things held equal. It is more appropriate to use partial correlation coefficients to test the hypothesis under investigation than it is to use ordinary correlation coefficients, as is more typical. Because the partial correlation coefficients exhibit the anticipated signs and are statistically significant, we have strong support for the central proposition of the expected income hypothesis -- that potential migrants are attracted to an area by good opportunities of obtaining employment as well as by the average incomes in an area.

An examination of the multiple regression results is also revealing. Including both income and employment probability as potential independent variables explaining in-migration rates, the results are:

$$(6)\quad \underset{}{\text{TOTALMIG}} = .041 + \underset{(.00004)}{.00021\ \text{TOTINC}} - \underset{(.460)}{.786\ \text{U}},\ R^2 = .54$$

$$(7)\quad \underset{}{\text{TOTALMIG}} = -.410 + \underset{(.00005)}{.00021\ \text{TOTINC}} + \underset{(.561)}{.897\ \text{PEMP}},\ R^2 = .54.$$

[1]This statement holds for the two most commonly-used measures: the unemployment rate and the employment-to-population ratio. The continued insignificance of the other two variables -- mean work year and proportion who worked a full year -- is open to a variety of interpretations. My suspicion is that it is largely due to measurement error. People were asked in October: "How many months were you employed in a paid job or in a family business during this year?" I would guess that full year workers would not know whether the right answer is nine, ten, or twelve. And so too for census enumerators. Uncertainty on how to respond may well have rendered the reported values largely useless.

In contrast with the simple regressions (2) and (3), a higher employment probability is found to be a statistically significant attraction for migrants (at the 95 percent confidence level, one-tail test).[1] Two other comparisons bear mention. One is the pattern of regression coefficients. The estimated deterrent effects of unemployment on in-migration are higher in the multivariate regressions (-.786 and +.897 in equations (6) and (7) respectively) than in the simple regressions (-.574 and +.596 in equations (2) and (3) respectively), suggesting that the estimated coefficients in the simple regressions are too small (in absolute value) due to omitted variables bias. The other comparison is the relationship between the coefficients of determination. The marginal contribution of employment probability to explaining an area's migration rate (subtracting the R^2 in (1) from the R^2s in (6) and (7)) is <u>greater</u> than the gross contribution to explanatory power (the R^2s in (2) and (3)). This can arise only because the simple correlations and regressions mingle two offsetting influences: the effect of higher income in inducing in-migration, which raises unemployment, and the effect of higher unemployment, which retards in-migration.

In sum, as hypothesized, areas with fuller employment do have higher lifetime in-migration rates ceteris paribus. The expected income hypothesis is confirmed.

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[1]This result parallels, but is not independent of, the finding that the ordinary correlation coefficients are not statistically significant though the partial correlation coefficients are.

D. Migration Rates and Composition of Employment

We expect from Hypothesis 5 that migration rates are determined in part by the quality of available jobs. Three measures of employment mix are available. They are:

Code Name	Variable Description	Correlation with TOTALMIG, Hypothesized Sign	Correlation with TOTALMIG, Observed Value (Significance Level in Parentheses)
PWTCLR	Proportion of workers employed in white collar jobs	+	+.77 (.00001)
PFAMWKR	Proportion of workers employed as unpaid family workers	-	-.56 (.003)
PDOMWKR	Proportion of workers employed as domestic workers	?	+.42 (.02)

The evidence suggests that people are attracted to an area by the availability of white collar and domestic jobs and are pushed from areas or choose not to go to areas with high proportions of family workers. These findings are in accordance with Hypothesis 5.

Figures 8-10 depict the scatter of points. The correlations are rather pronounced, more like the relationship between migration rate and income (Figure 3) than the relationship between migration rate and the employment probability variables (Figures 4-7). In each case, the responsiveness of migration to employment composition is large, as can be seen from the following simple regressions:

$$\text{(8)}\quad \underset{(.20)}{\text{TOTALMIG} = -.043 + 1.11\ \text{PWTCLR}},\ R^2 = .59;$$

$$\text{(9)}\quad \underset{(.60)}{\text{TOTALMIG} = .296 - 1.84\ \text{PFAMWKR}},\ R^2 = .31;$$

$$\text{(10)}\quad \underset{(1.53)}{\text{TOTALMIG} = .015 + 3.28\ \text{PDOMWKR}},\ R^2 = .18.$$

Taken together in a multiple regression, the multivariate analysis shows considerable strength for these variables, particularly for the percentage of white collar workers (PWTCLR). With just the three composition variables, the results are:

$$(11)\quad \underset{}{\text{TOTALMIG}} = .057 + \underset{(.32)}{1.25}\ \text{PWTCLR} - \underset{(.65)}{.40}\ \text{PFAMWKR} - \underset{(1.56)}{1.99}\ \text{PDOMWKR},\ R^2 = .63.$$

Noteworthy are the strong statistical significance of the PWTCLR variable and the superior explanatory power of this regression relative to any previous one. Clearly, occupational mix plays an important role in determining migration patterns in Colombia. The employment composition version of the expected income hypothesis is strongly confirmed.

Measures of average income and employment composition have been found to exhibit high explanatory power. These effects are probably not independent of one another. There is reason to suspect that TOTINC and PWTCLR are highly collinear, since the attractiveness of a white collar occupation is determined in large part by the higher salaries which such jobs pay. Two pieces of evidence suggest that the multicollinearity is indeed extreme. One is the simple correlation between the two: $r_{\text{TOTINC, PWTCLR}} = +.92$. The other is that a multiple regression run on both sets of variables produces an insignificant income effect:

$$(12)\quad \text{TOTALMIG} = .048 + \underset{(.00014)}{.00002}\ \text{TOTINC} + \underset{(.54)}{1.19}\ \text{PWTCLR} - \underset{(.72)}{.36}\ \text{PFAMWKR}$$

$$- \underset{(1.88)}{2.4}\ \text{PDOMWKR},\ R^2 = .63.$$

What this suggests is that the effects of average income and percent white collar on migration are <u>not</u> independent of one another. Rather, good predictions of population movements can be gotten from data on <u>either</u> the average incomes in various locations <u>or</u> the occupational mix of an area's labor force.

FIGURE 8

TOTAL MIGRATION RATE (TOTALMIG) BY PERCENTAGE WHILE COLLAR (PWTCLR).

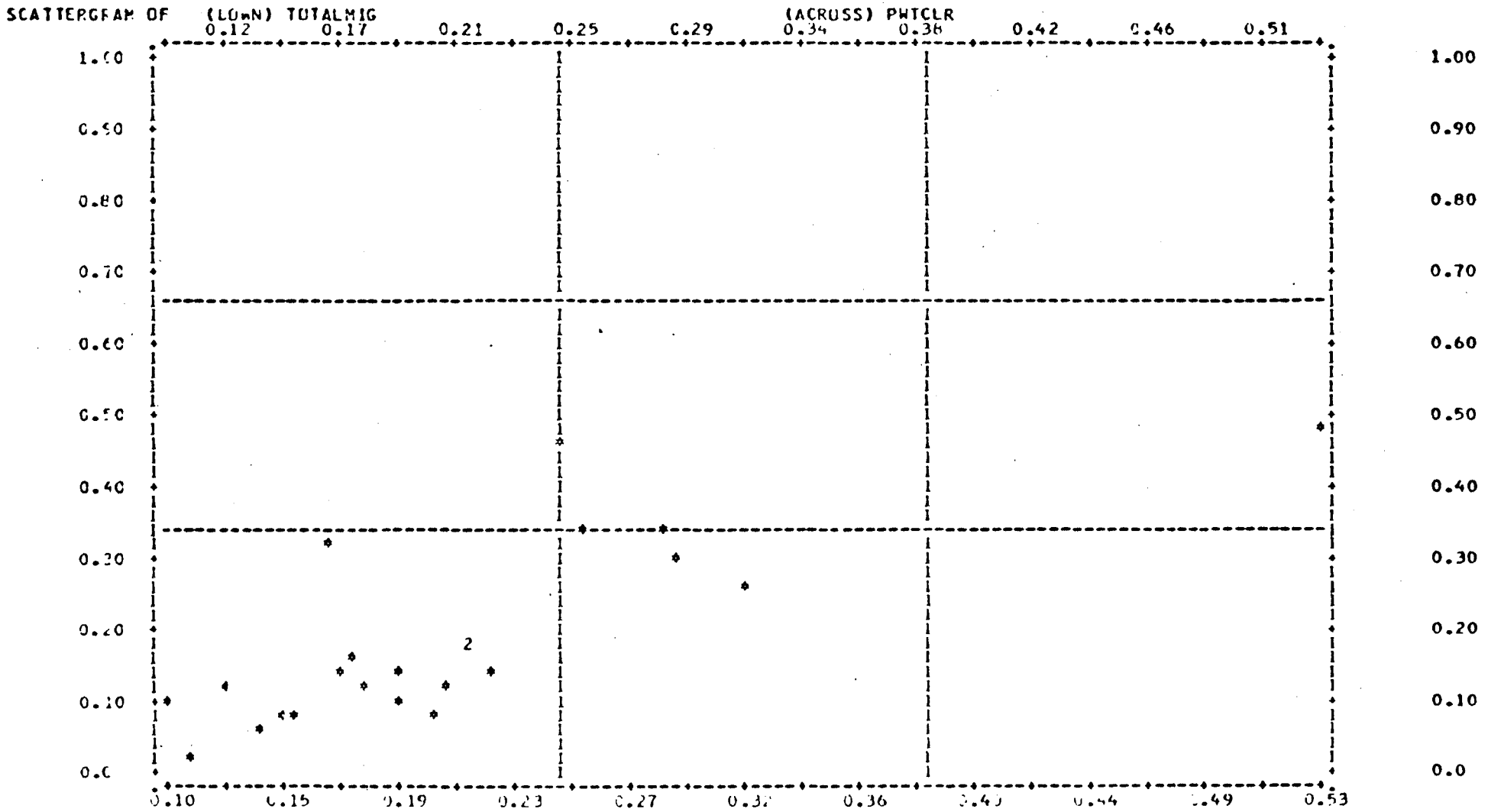


FIGURE 9

TOTAL MIGRATION RATE (TOTALMIG) BY PERCENTAGE FAMILY WORKERS (PFAMWKR).

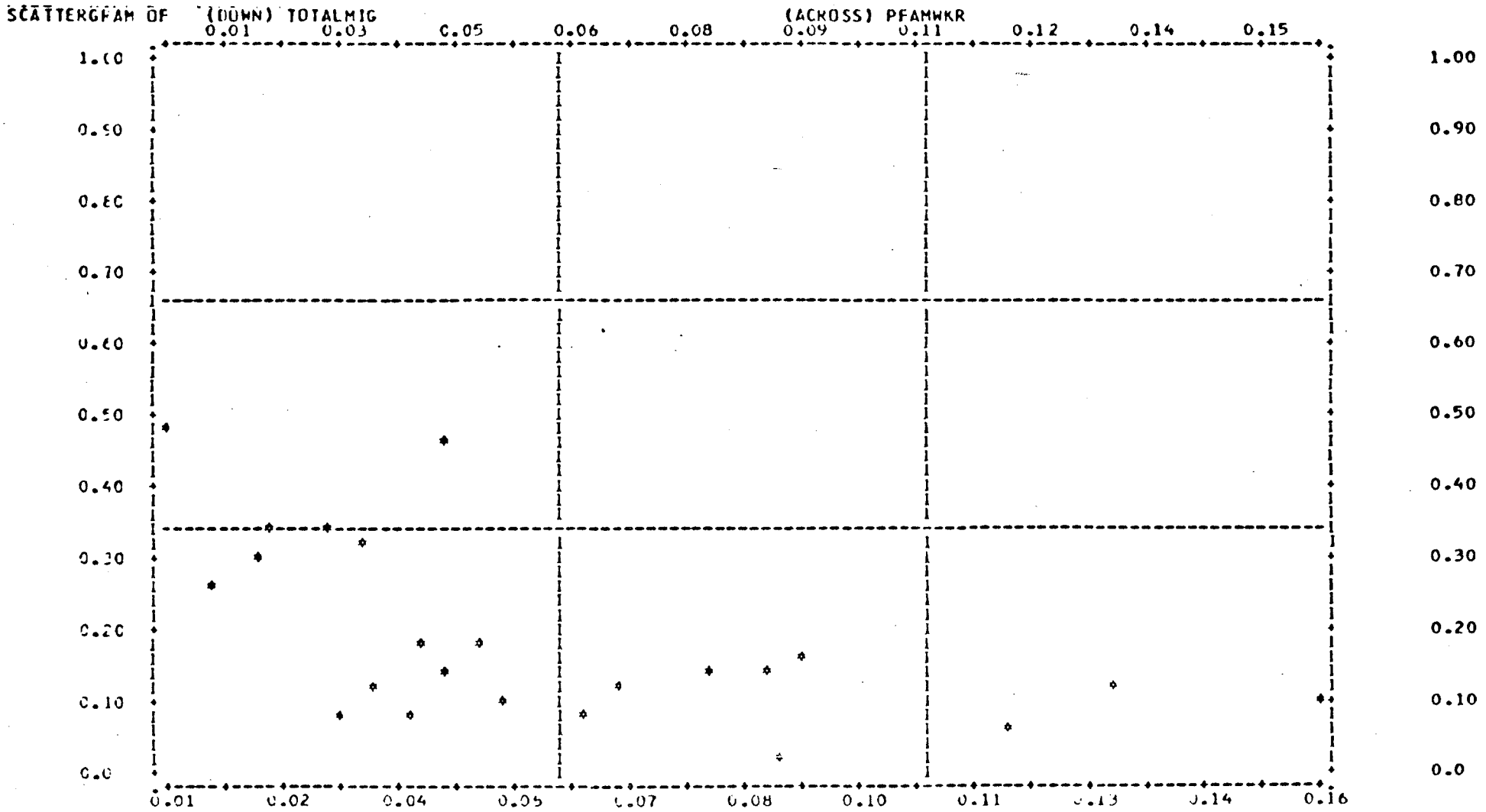
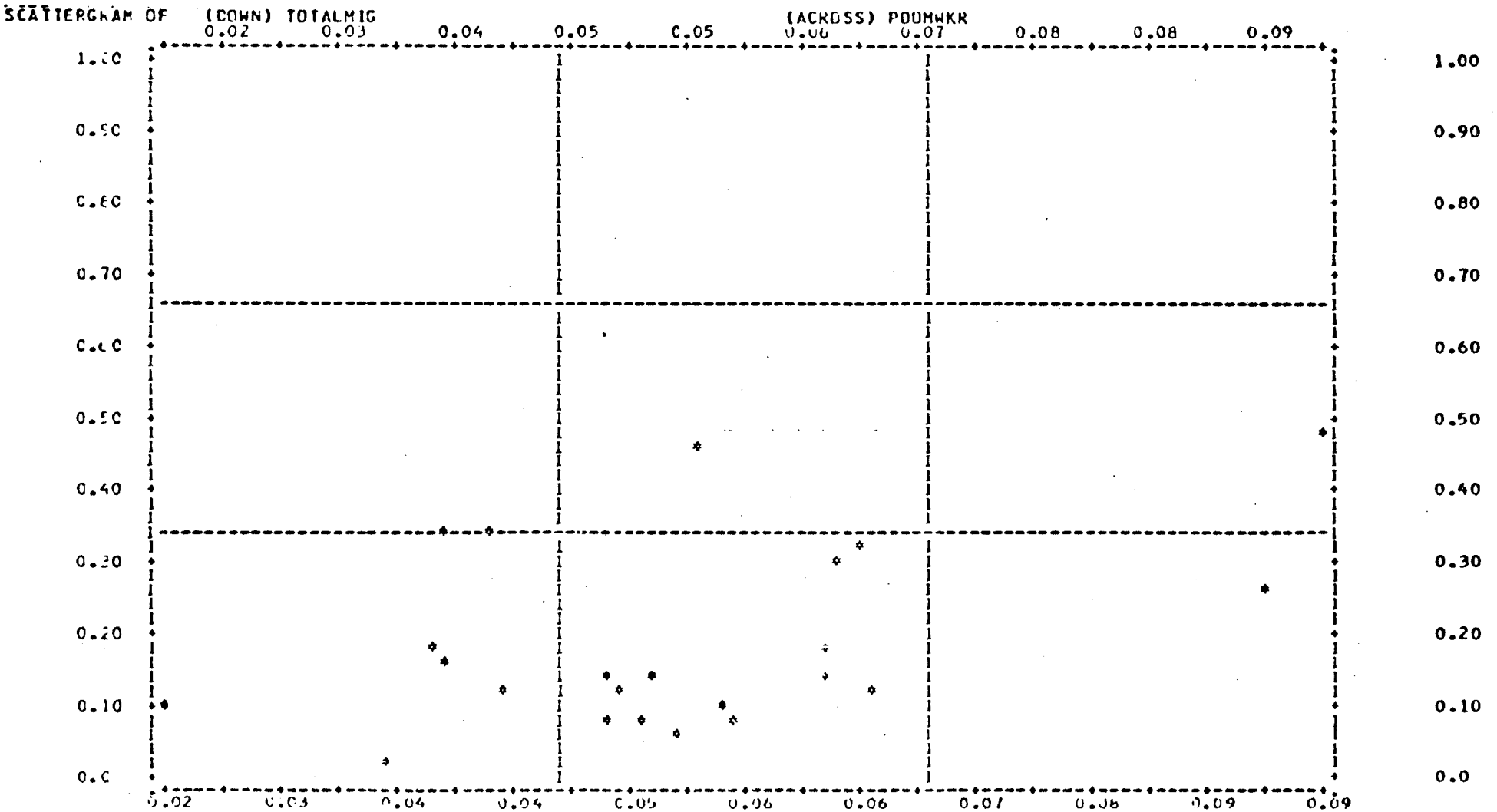


FIGURE 10

TOTAL MIGRATION RATE (TOTALMIG) BY PERCENTAGE DOMESTIC WORKERS (PDOMWKR).



E. Determinants of Migration Rates: Male/Female Differentials

The available data permit estimation of migration functions for men and women separately using a more limited set of variables. We have sex-specific data on migration rates, average incomes, unemployment rates, and employment-to-population ratios.

Correlation coefficients among these variables are shown in Table 2. Variable code names are as before with the addition of a suffix for male (M) or female (F). As previously observed, the lifetime migration rate for the two sexes are remarkably similar ($r_{TOTMIGM, TOTMIGF} = +.992$). On the other hand, the data indicate that economic conditions across department differ appreciably for men and women. We find an imperfect correlation between males' and females' incomes ($r_{INCTOTM, INCTOTF} = +.782$) and unemployment rates ($r_{UM, UF} = +.818$) and an even weaker correlation between the two sexes' employment ratios ($r_{PEMPM, PEMPF} = +.228$). This raises the possibility that male and female migration may be responsive to somewhat different stimuli.[1]

Our hypothesis (number 2) is that women are more responsive than men to economic opportunities associated with migration. If the sociological version of this hypothesis is correct, men and women would be found to have different propensity-to-migrate functions. Thus, we would expect to find that the coefficients on the explanatory variables (TOTINC and U or PEMP) are larger (in absolute value) for women than for men, if indeed the expected income hypothesis holds at all. The respective regression results when the employment probability measure is U are:

$$\text{(13)} \quad \underset{}{TOTMIGF} = \underset{}{.118} + \underset{(.00009)}{.00036\ TOTINCF} - \underset{(.28)}{.76\ UF}, \quad R^2 = .50$$

and

$$\text{(14)} \quad \underset{}{TOTMIGM} = \underset{}{.053} + \underset{(.00006)}{.00019\ TOTINCM} - \underset{(.64)}{1.03\ UM}, \quad R^2 = .49;$$

and

$$\text{(15)} \quad \underset{}{TOTMIGF} = \underset{}{-.342} + \underset{(.00010)}{.00035\ TOTINCF} + \underset{(.60)}{1.49\ PEMPF}, \quad R^2 = .47$$

and

$$\text{(16)} \quad \underset{}{TOTMIGM} = \underset{}{-.506} + \underset{(.00004)}{.00018\ TOTINCM} + \underset{(.62)}{1.11\ PEMPM}, \quad R^2 = .51$$

(See next page for footnote

TABLE 2

MATRIX OF CORRELATION COEFFICIENTS AMONG SEX-SPECIFIC MIGRATION RATES AND SEX-SPECIFIC ECONOMIC VARIABLES, 23 DEPARTMENTS IN COLOMBIA, 1973

	TOTMIGM	TOTMIGF	INCTOTM	INCTOTF	UM	UF	PEMPM	PEMPF
TOTMIGM	1.000	.992	.655	.513	-.117	-.337	.228	.316
TOTMIGF		1.000	.710	.554	-.091	-.341	.213	.335
INCTOTM			1.000	.782	.204	-.153	-.083	.410
INCTOTF				1.000	.311	.166	-.134	-.115
UM					1.000	.818	-.916	-.294
UF						1.000	-.738	-.671
PEMPM							1.000	.228
PEMPF								1.000
Mean	.186	.193	1316	1073	.118	.273	.402	.108
Standard Deviation	.121	.131	444	226	.031	.076	.031	.035

when the employment probability measure is PEMP. These results show that the expected income model of migration applies to both sexes. In addition, the women's coefficients are in fact found to be higher than men's.[2] Thus, the sociological explanation underlying Hypothesis 2 receives support: men's and women's migration rates differ in Colombia in part because women have a higher propensity to migrate in response to a given spatial difference in economic opportunity than do men.

What about the economic hypothesis? Regressions (13)-(16) show that women's migration functions start above those for men and are substantially steeper. Why then are women's migration rates only slightly higher than men's? The answer lies in the interdepartmental income structure. The mean income (unweighted) in the 23 departments is 1316 pesos per month for men and 1073 pesos for women. The standard deviation and coefficient of variation are also larger for men (444 and .34 respectively) than for women (226 and .21). That is, both in an absolute and in a relative sense, men in Colombia have more to gain from interdepartmental migration than do women.[3] This acts to offset women's higher migration propensities to migrate in response to any given dollar gain. The net effect is to produce quite similar migration rates for the two sexes.

These relationships are illustrated in Figure 11. These findings provide a clearer insight into the behavior underlying sex differences in Colombian migration. Both sociological and economic factors are at work.

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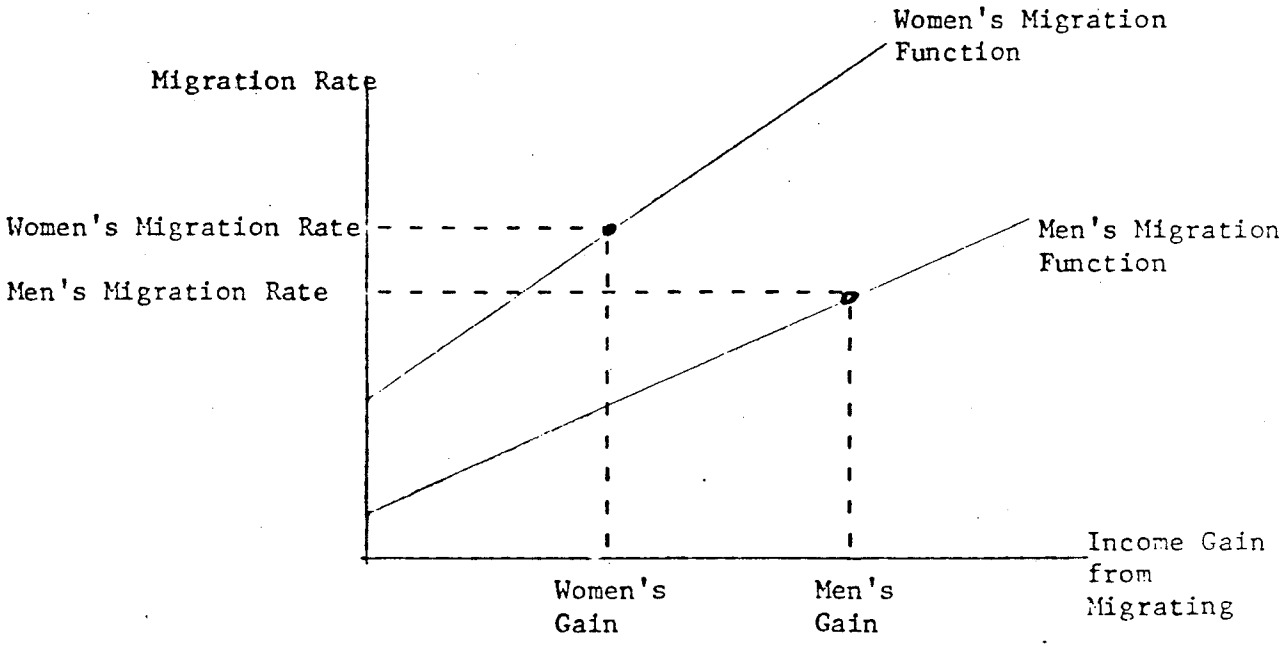
[1]This is not the place to go into the reason for different sex-specific employment conditions. The results are sufficiently tantalizing to warrant thorough analysis in a separate paper.

[2]The estimated income elasticities of migration are also somewhat higher for women than for men. From the double-log regressions, the estimated elasticities were 1.78 and 1.72 for women (equations (13) and (15) respectively) and 1.63 and 1.57 for men (equations (14) and (16) respectively).

[3]I have no reason to believe that the losses are appreciably different for men and women.

FIGURE 11

SEX DIFFERENCES IN MIGRATION BEHAVIOR IN COLOMBIA, 1973



IV. CONCLUSIONS

This paper has explored the determinants of population migration in Colombia. The basic hypothesis was that areas' economic opportunities play a central role in determining the spatial allocation of the population. Recently published data from the 1973 Population Census were used to test whether the rates of lifetime migration into Colombia's 23 departments are associated with those areas' labor market conditions. Male and female population movements were considered, both separately and together. For both sexes, the results sustain the empirical validity of the economic model of migration in the Colombian context.

Five specific hypotheses were confirmed by the available statistical evidence. They are:

1. Women in Colombia migrate at higher rates than men.
2. Women in Colombia are more responsive than men to economic opportunities associated with migration for sociological reasons; the economic incentives operate in the other direction.
3. High income areas have higher in-migration rates than low income areas.
4. Areas with fuller, more stable employment have higher rates of in-migration than do other areas.
5. Areas where the employment composition is relatively favorable have higher in-migration than areas with poorer job mixes.

Confirmation of the economic model of migration and the expected income hypothesis are important in any country. But in Colombia, evidence on the importance of economic factors as determinants of migration is particularly useful since some past work, particularly that of Schultz, has been interpreted

incorrectly to the contrary.[1] The rapid urbanization of Bogota and other major Colombian cities did not occur in a vacuum. It would be foolhardy at this juncture to even hazard a guess as to the excessiveness or insufficiency of migration and the consequent urbanization from a social point of view. However, it is warranted to conclude that this is but one more instance of the Colombian people shifting their economic energies to activities with higher private returns. (A skeptic need only look at the flow of financial and human resources into the drug trade to be convinced.) What development analysts and policy-makers sometimes forget is that the population consists of human beings who repeatedly evaluate the optimality of their current situations and may decide to shift course if they believe the gains are large enough. Migration in Colombia is yet another area of human conduct that economic principles help elucidate.

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[1]Schultz (1971) and Nelson, Schultz, and Slighton (1971) reported that the violencia which plagued Colombia in the 1950s had a substantial impact on migration flows. This does not deny the importance of economic factors on migration decisions since (i) social instability in the countryside greatly reduced economic activity there, and (ii) many who left, whether for economic or non-economic reasons, chose a particular destination on the basis of available economic opportunities.

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