Helen Garrison[*]

INTERNAL MIGRATION IN MEXICO:
A TEST OF THE TODARO MODEL

Economic growth in Mexico has been accompanied by substantial internal as well as international migration. Migrants are a large proportion of the rapidly growing urban population. For example, in 1970 approximately 34 percent of all persons residing in Mexico City were born outside of the city (Mexico, 1972). Interest has focused on the causes and consequences of migration because of its magnitude and the desire to identify policy tools that affect migration. The body of economic literature on this subject over the past decade has been heavily influenced by the Todaro model of migration dynamics (Todaro, 1976a), in which migration is a function of *expected income* differentials (combining the probability of getting a job with level of wages) instead of simply wage differentials. This model's wide acceptance seems to be based upon its intuitive plausibility and its ability to explain continuing high migration to areas with increasing absolute levels of unemployment. This paper reports the results of an empirical test of the Todaro model using 1969–70 Mexican interstate migration data from the 1970 Mexican Census[1] and compares them with empirical tests using data from other countries. The process of assimilation of migrants into the formal and informal sectors of the labor force is discussed in general terms and in the specific case of Mexico City.

In the Todaro model (1976a) the potential migrant responds rationally to economic considerations and acts to maximize the present value of the net stream of his or her expected income. Expected urban income is determined by both the urban wage rate and the probability of obtaining a job in the urban modern sector. The probability of finding such a job is inversely related to the urban open unemployment rate. Expected rural income is determined by the rural wage rate, and the probability of obtaining rural employment is assumed to be 1. Costs of migration are also considered in evaluating the differential between expected urban and expected rural income. The Todaro model

[*] Doctoral Candidate, Food Research Institute.

assumes that wages in the urban modern sector are inflexible downward. Equilibrium between urban and rural incomes will only be brought about by rural-urban migration. Expected rural and urban incomes are equalized when the probability of getting a job in the urban modern sector falls enough so that $\pi \cdot W_u = W_r : W_u > W_r$, where π equals the probability of getting a job in the urban modern sector, W_u equals the urban wage rate, and W_r equals the rural wage rate. The model ignores the large urban informal or traditional sector, which is distinct in many respects from the urban modern sector, especially in terms of wage levels and ease of entry. Todaro predicts that, "Migration rates in excess of urban job opportunity growth rates are not only possible but rational and likely in the face of continued positive urban-rural expected income differentials" (Todaro, 1976a, p. 47). The model has been much discussed in terms of its implications for the success of urban job-creation programs with the objective of reducing urban poverty and the unemployment rate. Obviously, job creation may induce migration in excess of employment opportunities and therefore lead to higher absolute levels of urban unemployment.

Several econometric studies have tested this basic model. The most important economic variables common to all of the empirical tests of the Todaro model are the average wage in the destination region and the probability of finding a job in the destination region, or "expected income" after the move, and the average wage in the origin region and the probability of finding a job in the origin region, or "expected income" without a move. These variables, which form the expected income differential, are assumed to have independent, but not necessarily equal, significance. Examples of empirical tests of the Todaro model include the Mildred Levy and Walter Wadycki study using Venezuelan interstate data (1972), and H. Barnum and R.H. Sabot's using Tanzanian data (1977). No empirical studies of this sort are available for Mexico, although two related econometric migration studies have been published. Jonathan King has tested the effect of the landholding system on interstate migration (1978), and Michael Greenwood has estimated a simultaneous equations model of interregional migration and regional economic growth (1978).

The Levy and Wadycki study for Venezuela is one of a handful of investigations which, according to Todaro, "now provide the first carefully documented empirical verification of the expected income hypothesis for migration in developing countries" (1976b). The functional form of the Levy and Wadycki model of migration is here adopted with minor modifications for use with the 1970 Mexican Census. The modifications make it possible to test the equation with another body of data, and then to see how the results of the regression change when the equation is estimated in terms of a pure earnings differential instead of an expected income differential, i.e., when the probability-of-employment variables are dropped.

The 1970 Mexican Census provides information which allows the calculation of interstate migration rates only. At this level of aggregation, much movement is obscured. Rural-urban migration cannot be identified as such, and intrastate migration is excluded.[2] The model is estimated using a log-

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[2] Many migration studies have been in an interstate form, despite these problems, simply due to data availability from censuses.

linear ordinary least squares (OLS) regression in the following form:

$$\frac{M_{ij}}{Pop_i} = f\ (Dist_{ij},\ Pop_i,\ Pop_j,\ Educ_i,\ Educ_j,\ U_i,\ U_j,\ Earn_i,\ Earn_j,$$
$$Urban_i,\ Urban_j),$$

where i = state of origin;

         j = state of destination;

$\dfrac{M_{ij}}{Pop_i}$ = number of migrants living in state j for less than 1 year in 1970 who had previously lived in state i, as a proportion of the population in state i;

    $Dist_{ij}$ = road mileage in kilometers between the capitals of state i and state j;

     Pop_i = total population, 1970, state i;

   $Educ_i$ = percentage of population, age 7–15, enrolled in school in 1970, state i;

  $Urban_i$ = percentage of population of state i residing in urban areas (cities of 15,000 or more);

      U_i = open unemployment rate, males 15–65 in state i; and

   $Earn_i$ = average monthly earnings of employed males 15–65 in state i, 1969.

All values are for January 1970 except for the earnings variable and are taken from either the 1970 Mexican Census volumes (Mexico, 1972), or, when not available there, calculated from a 1 percent sample tape from the 1970 Mexican Census.

Distance between state of origin (i) and state of destination (j) is included as a proxy for the actual monetary costs of migration, for the flow of information between the areas about earnings and job opportunities, and for cultural differences between areas. Where included in the econometric studies of migration reviewed, it is always significant and negative and is expected to be significant and negative for Mexico also.

Total populations of state of origin and state of destination are included to control for population size. More densely populated destination states may exert more of a pull on migrants since they have larger and more diversified job markets. A positive sign is expected for destination state, but the sign for origin state is not predicted.

The education variable is expected to be positive for the destination state (representing non-wage amenities of an area). For the origin state the sign is not predicted. It could be positive reflecting a higher propensity to migrate with increasing education, or negative, representing the pull of the origin state in terms of non-wage amenities.

The urbanization variables are expected to be positive for the state of destination due to the attraction of urban opportunities and services. Along similar lines, they are expected to be negative for the state of origin.

The Todaro model expected income variables consist of the average earnings and the unemployment rates in origin and destination states. Current expected income differentials are assumed to be an adequate proxy for the discounted lifetime earnings differential. (Earnings are used instead of wages because of data availability.) The coefficient should be positive for earnings

and negative for unemployment rates in destination states under the Todaro hypothesis. Origin variables should be negative for earnings and positive for unemployment rates.

There are 32 states in Mexico, producing therefore 992 observations of interstate migration. Migration between the Federal District and the State of Mexico is excluded from the analysis, however, because the metropolitan area has spread widely into the State of Mexico, leaving 990 observations. The independent variables of earnings and the open unemployment rate are calculated for males age 15–65. Ideally, the dependent variable of migration rate from state i to state j should also be calculated for males age 15–65 instead of for the total population. However, the census volumes do not include migration flows disaggregated by age and sex and, when age-sex specific migration rates were calculated from the 1 percent sample, too many cells had zero observations. The dependent variable of migration rate therefore includes both males and females of all ages.

Migration models like this one have often been criticized for simultaneous equation bias resulting from the fact that the independent variables are typically calculated at time t, while the migration rate is calculated for time (t − 1) to t. Obviously, the migration rate could influence the independent variables. To correct for this, the migration rates should be calculated from time t to (t + 1). This problem is severe in studies that use lifetime migration rates as the dependent variable, and independent variables calculated at a much later point in time. The problem is probably insignificant in the present estimation, because the migration flows are calculated for only one year immediately preceding the census. All of the independent variables were measured as of January 1970 except for earnings, which are average monthly earnings for 1969. The time lag is therefore short, or, in most cases, nonexistent.

THE REGRESSION

Table 1 provides the coefficients from the estimation under the column Regression I. Regression II is identical to Regression I, but excludes the unemployment variables. The Levy and Wadycki results for Venezuela are shown in Table 2 to provide a point of comparison. The overall R^2 is .50 for the Mexican data against .61 in the Venezuela study. This may be due to many reasons such as differences in the quality of the data, differences in age groups covered, basic differences in the migration experience between the two countries, or differences between how well the state-level aggregate variables serve to represent variation among the states.

The Mexican regression shows, as predicted, that distance has a negative and statistically significant effect on the migration flows between two states. The coefficient for the variable of total population of the destination state is positive and significant for both studies, while total population of state of origin is significant only in the Mexico study and negative. In both studies the education variables are positive for both origin and destination. In the Mexico study they are both significant. The urbanization variables are positive and significant for both studies for the destination state, but not significant for the origin state.

Independent variables	Regression coefficients	
	I	II[a]
Constant	− 30.43	− 28.39
Distance between capital of state i and capital of state j	− 1.05***	− 1.03***
Average monthly earnings of employed males, age 15–65, 1970		
State i	.24***	.27***
State j	.32***	.33***
Percent of economically active males, age 15–65, who are unemployed, 1970		
State i	− .14***	—
State j	− .03	—
Total population, 1970		
State i	− .34***	− .34***
State j	.64***	.64***
Percentage of population residing in urban areas (15,000 or more), 1970		
State i	.14	.08
State j	.72***	.71***
Percentage of population age 7–15, enrolled in school, 1970		
State i	1.11***	.65
State j	2.94***	2.84***
R^2	.50	.49
Number of observations[b]	990	990

Source: See text. Dependent variable is all migrants living in state j for less than one year in January 1970 who had previously lived in state i, as a proportion of the population in state i. The functional form of the regression estimation is log linear.
***Significant at .001 level.
[a]Excludes unemployment variables.
[b]Flows from Mexico state to the Distrito Federal and vice versa omitted.

TABLE 2. — DETERMINANTS OF INTERSTATE MIGRATION IN VENEZUELA,
1961, FROM LEVY AND WADYCKI

Independent variables		Regression coefficients[a]	
		Men, age 15–24	Men, age 25–54
Constant		− 62.51	− 19.52
		(8.61)	(3.34)
Average wage of economically active males, age 10 or over, 1961	State i	− 0.08	− 0.85
		(0.19)	(2.32)
	State j	1.89	0.94
		(4.69)	(2.59)
Percent of economically active males who are unemployed, 1961	State i	− 0.21	0.73
		(0.74)	(3.28)
	State j	− 2.45	− 0.78
		(8.75)	(3.47)
Total population, 1961	State i	0.14	0.29
		(1.18)	(2.69)
	State j	0.98	0.73
		(8.12)	(6.72)
Percent of population residing in urban areas (2,500 or more), 1961	State i	− 0.72	− 0.75
		(2.16)	(2.49)
	State j	1.10	0.81
		(3.29)	(2.69)
Percent of population, age 7–14, enrolled in school, 1961	State i	3.07	1.14
		(2.93)	(1.29)
	State j	4.10	0.16
		(3.91)	(0.18)
Road mileage between capital cities of states j and i (kilometers)		− 1.06	− 1.17
		(13.01)	(15.92)
R^2		0.61	0.60
Number of observations		380	380

Source: See text and M. Levy and W. Wadycki (1972), "A Comparison of Young and Middle-Aged Migration in Venezuela," *The Annals of Regional Science,* Vol. 6, pp. 73–85. Dependent variable is all male migrants living in state j for less than a year in 1961 who had previously lived in state i, as a proportion of the population in state i. The functional form of the regression estimation is log linear.

[a]t-statistics in parentheses.

More interesting are coefficients of the Todaro expected income variables. To reiterate, the Todaro model should predict positive and significant signs for the earnings of destination area and negative signs for the earnings of origin area. The unemployment variable, which is inversely related to the probability of getting a job, should be negative for the destination area and positive for the origin area.

The Mexican data do not provide a robust support of the Todaro model, given this functional representation. Coefficients for the destination state are positive and significant for both Mexico and Venezuela. But the Mexican data also produce a positive and significant coefficient for the earnings of the origin state, which is contradictory to what was expected; the origin of unemployment coefficient for Venezuela is negative but not significant for young males. In Mexico the unemployment rate variable is not significant for the destination state, but is significant and negative for the origin state. The Venezuelan data make somewhat more sense in the Todaro framework, as the unemployment rate in the destination state has a negative and significant impact on migration, but is not significant in the origin state.

THE NATURE OF UNEMPLOYMENT

Why do the unemployment variables in the Mexican estimation produce results contrary to the Todaro hypothesis? Perhaps the concept of open unemployment is not a satisfactory proxy for the probability of (not) getting a job. In Mexico, open unemployment rates for males age 15–65 were low in 1970, ranging on a statewide basis from less than 0.5 percent to 4.9 percent (Mexico, 1972). Such low open unemployment rates reflect a situation where personal savings are small, and people must take any work they can get in order to survive. Berry (1975) finds that the openly unemployed in Colombia are mostly people who are in a financial position to refuse unattractive jobs; unemployment is largely frictional rather than involuntary, occurring disproportionately among the young and relatively well educated. However, most people must work while waiting for a better job to open up, and therefore do not appear in the open unemployment figures. Data from Mexico City (all references to Mexico City refer to the Federal District) were used to test the hypothesis that open unemployment occurs disproportionately among the young and well educated, whose occupational aspirations are not readily met, and who can rely on family support in the interim (Table 3). In the age 15–20 group, for example, the unemployment rate is 11.6 percent, but only 4.2 percent in the 21–30 group. The unemployed are presumably in a better position to be supported by their families than the employed. Only 2.2 percent of heads of households in the sample are ·unemployed whereas other household members have unemployment rates that are three to four times higher. Of single respondents 7.9 percent are unemployed, while only 2.2 percent of married respondents are unemployed.

In contrast to Berry's work in Colombia, the data from Mexico City did not show higher unemployment rates among the young and well educated than the young, relatively less educated (Table 4).

TABLE 3. — EMPLOYMENT STATUS OF 10,065 MEN IN FEDERAL DISTRICT LABOR FORCE, 1970, BY AGE, MARITAL STATUS, AND POSITION IN THE HOUSEHOLD

| | Number | | Percent |
	Employed	Unemployed	unemployed
Age *(years)*			
15–20	1,268	166	11.6
21–30	3,263	142	4.2
31–45	3,123	64	2.0
46–65	1,994	45	2.2
Marital status			
Single	3,080	266	7.9
Married or free union	6,330	140	2.2
Widowed, separated, or divorced	238	11	4.4
Position in household			
Head of household	6,673	150	2.2
Child of head	2,138	202	8.6
Other[a]	837	65	7.2

Source: Calculated from 1 percent sample of 1970 Mexican Census.
[a]Other relatives of head, not related to head, or not reported.

TABLE 4. — EMPLOYMENT STATUS OF 10,065 MEN IN FEDERAL DISTRICT LABOR FORCE, 1970, BY AGE, EDUCATION, AND PERIOD OF URBAN RESIDENCE
(Percent unemployed)

Level *(years)*	Age 15–20	Age 21–30	Age 31–45	Age 46–65
Education				
Less than 6	10.3	5.2	3.4	[a]
6 (only primary school)	9.7	3.4	1.7	[a]
7 to 11	15.4	4.0	1.1	[a]
11 to 13	12.2	4.0	0.9	[a]
14 to 16	6.7	5.6	0	[a]
More than 16	—	2.1	0.4	[a]
Residence[b]				
Less than 1	9.6	5.5	3.8	5.9
1 to 5	10.1	4.2	3.9	6.1
6 to 10	17.7	5.8	1.3	1.6
11 or more (including natives)	11.7	3.9	1.9	2.1
Total number	1,434	3,405	3,187	2,309

Source: Calculated from 1 percent sample of 1970 Mexican Census.
[a]Not calculated.
[b]Analysis of variance was used to test if unemployment rates varied significantly by length of residence after controlling for age. The only significant difference in rates was at the .05 level for the age group 46–65.

The open unemployment rates of recent migrants do not appear to differ from that of natives. Migrants tend to be younger than the native population in Mexico City, and unemployment rates are higher among the 15–20 age group. But after age is controlled, the unemployment rates of recent male migrants (residents of less than one year), males living in Mexico City for 1–5 years, for 6–10 years, and for natives are not significantly different, except for the age group 46–65 years, where the difference is significant at the .05 level.

One qualification must be made, however, to the above observation. Many migrants who were unsuccessful at finding work in Mexico City may have returned to their previous home before the enumeration of the 1970 Mexican Census and are therefore excluded. Unfortunately, there is no way of estimating the size of this return flow. Therefore, the fact that unemployment rates are no higher for recent migrants than for natives, after controlling for age, is only tentative evidence supporting the hypothesis that migrants enter the labor force with relative ease.

The Todaro model states that both the wage rate and unemployment rate in the destination area along with the rates in the origin area are very significant in the decision to migrate, because together they form the expected income differential. The regression results for Mexico do not yield clear results for these parameters, either in terms of sign of the coefficient or statistical significance. Dropping the unemployment variables should reduce the explanatory power of the regression, because it then becomes, instead of an "expected income differential," a "pure average earnings-differential" model. Column II of Table 1 shows the results of the estimation when the unemployment variables are exluded. The overall results change very little. A stepwise analysis of variance of the contribution of the variable of unemployment rate for origin state and destination state to the total explained variation shows that the contribution is not statistically significant at the .10 level. The significance of the unemployment rate variable for the origin state within the first regression is therefore probably due to mild multicollinearity.

The fact that the unemployment variables do not function as the Todaro hypothesis predicts does not of course provide sufficient basis for rejecting the Todaro model because an interstate migration model may be too aggregate and may blur important intrastate differences in unemployment rates. On the other hand, Mexican unemployment rates are low and do not appear higher for migrants than for residents (after controlling for age). The concept of "probability of obtaining a job" must be considered in light of the fact that ease of entry into the labor market, albeit not necessarily that of the modern sector, seems to be high. Todaro only considers the "probability of successfully obtaining employment in the urban modern sector" in his model (1976b, p. 47).

MIGRANT ASSIMILATION INTO THE URBAN LABOR FORCE

Given a high probability of getting a job, it then becomes important to look at what kind of jobs migrants obtain and what level of earnings they receive in order to construct a more accurate expected income-differential between origin and destination. Fortunately, the 1 percent sample of the 1970 Mexican Census provides information on earnings and occupation, and on length of residence in the state for approximately 500,000 people. Earnings and occupa-

tions of men age 15–65 residing in Mexico City in 1970 were examined in order to compare the experience of migrants with that of natives. If the migrants' experience in urban areas is significantly different from the labor force as a whole, and if the potential migrant has accurate information about what type of job he or she is likely to obtain, then it becomes desirable to modify the Todaro model to reflect this.

The Informal Sector

Urban labor markets can be characterized as dual markets, consisting of the formal (modern) sector and the informal sector. Various colorful names have been used to identify the informal sector such as marginal, traditional, murky, or grey. The formal sector provides work that is contractual, full-time, and more remunerative than the informal sector. Institutional downward rigidities of wages in the formal sector prevent labor competition from reducing the wage differential, and so workers queue for jobs in the formal sector.

Informal employment is characterized by easy entry, variable hours or days of work, and low rewards. Workers are often self-employed or casual labor. The size of the informal sector depends in part on the size of the labor surplus in the "organized sector" of the labor market and on the possibilities for selling or making anything that will provide some income. Domestic servants, street vendors, scavengers, shoe shiners, street sweepers, and prostitutes may be thought of as being engaged in informal employment.

Informal employment is of particular importance to low-skilled or unskilled migrants because of the ease of entry. Hours and days of work are often flexible, and migrants who cannot afford a long job search can engage in an informal activity and continue to look for more desirable employment. It will pay the worker in the informal sector to continue looking for another job if the marginal expected gain is greater than the marginal search costs.

Several theoretical approaches to migration dynamics have critically examined the assimilation of migrants into the labor force in a formal and informal sector framework. Alvaro López Toro (1970) incorporates the probability of attaining a job in the modern sector, the probability of finding marginal or informal sector work, and the residual probability of remaining unemployed. He departs from the Todaro hypothesis on its assumption that expected income in the city depends exclusively on job opportunities in the modern sector. Todaro regards the marginal sector as only a temporary stage in the migrant's assimilation, without advantages of its own with respect either to urban unemployment or to job opportunities in rural areas.

López Toro points out that the marginal sector does provide many advantages to the migrant. First, it makes possible some earnings. Second, these earnings are supplemented by urban non-wage amenities like education and health-care services that may not exist in rural areas. López Toro ignores the possibility of unemployment and defines expected income in an urban area as $\pi^* \text{Earn}_{mod} + (1 - \pi)^* \text{Earn}_{marg}$ where π is the probability of attaining a modern job, $(1 - \pi)$ is the probability of attaining a marginal, informal sector job, and Earn_{mod} and Earn_{marg} are the associated average earnings in those sectors. The secondary probability of marginal employment produces much higher equilibrium migration rates than the Todaro model predicts. The

difference between rural earnings and marginal sector earnings is sufficient to explain a growing informal sector in many LDC urban areas like Rio de Janeiro and Lima. The model illuminates the attraction of the marginal sector alone in rural-urban migration and suggests that equilibrium will not be reached until expected marginal earnings decline below actual rural earnings.

Dipak Mazumdar (1965) has also stressed the importance of the informal sector in his approach to an expected income differential model of migration. He points out that as long as migrants have some chance of breaking into the higher-wage modern sector, they may be willing to take a reduction in their supply price of labor for a period of time. Thus, it is important to include the probability of entering the modern sector in a specified period of time.

Fields (1975), in an approach similar to Mazumdar and López Toro, also finds that when the informal sector is taken into account, the long-run equilibrium requires that marginal sector earnings become less than the agricultural wage. This is because the migrant has a chance of attaining a modern sector job while employed in the marginal sector, although job-search activity is reduced. He also finds that the "introduction of the murky sector leads to a lower equilibrium unemployment rate than predicted by the Harris-Todaro model" (1975, p. 175).

Lorene Yap and Deepak Lal have also discussed migration in the context of a dual urban labor market (Yap, 1976; Lal, 1973). These modifications add more realism to the expected income differential framework and help to explain the much lower levels of open unemployment than are predicted by the Todaro model that have been observed in developing countries.

Measurement of the Informal Sector

Several attempts to define and estimate the size of the informal sector and analyze who predominates in this sector have been made (Yap, 1976, 1977; PREALC, 1978; Souza and Tokman, 1976). The size of the informal sector seems to vary from about 20 percent to upwards of 50 percent in urban areas in less developed countries depending in part upon how it is defined. There is consensus empirically that women, the young, and the old disproportionately make up the informal sector.

Definitions of "marginal work" in each study depend principally on data availability. Occupational codes, firm size, mode of remuneration, self-employment, and level of earnings have all been used alone or in combination as indicators to distinguish employment in the informal sector from employment in the modern sector. The 1970 Mexican Census provides information on average monthly earnings, occupation, position in employment (classified as self-employed, employer, employee, worker in family business without pay, farm or day laborer, or ejidatario), and class of activity. The 3-digit occupation code and the 2-digit class of activity code are broken down fairly extensively. After experimentation with several possible definitions, a criterion combining occupation code and level of earnings was selected as the basis for distinguishing the formal, modern sector from the informal sector, for use in a 1 percent sample of males, age 15–65, and of females, age 20–65, in Mexico City (Federal District). (Age differences in the two samples reflect data availability.) Informal sector work is defined as work that provides a monthly

CHART I. — PROPORTION OF 9,644 EMPLOYED MEN WITH SPECIFIED YEARS OF
SCHOOLING WERE IN THE INFORMAL SECTOR: MEXICO CITY, 1970
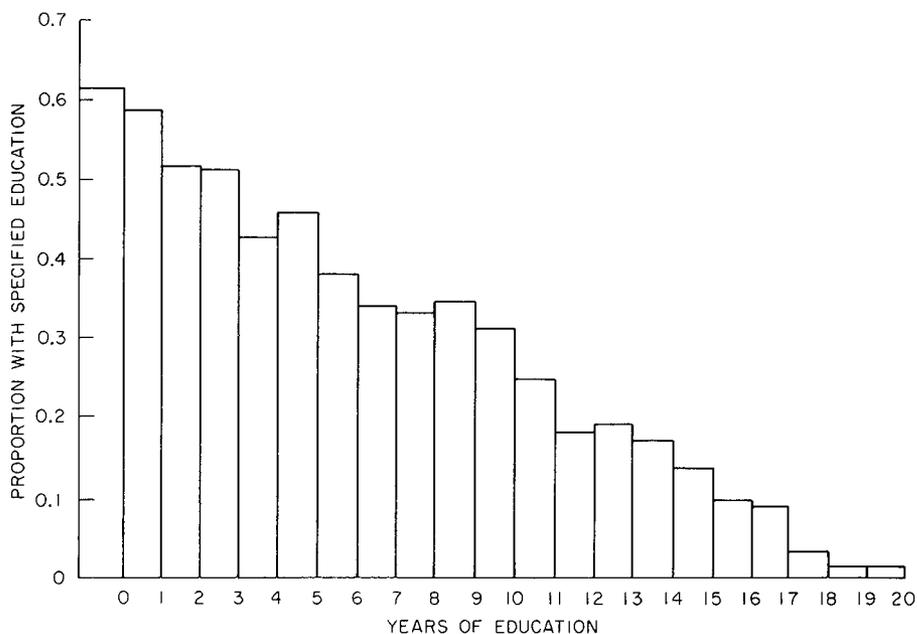
income of less than 669 pesos (US$58 in 1970), or as employment in trade,
personal services, and construction. The earnings component in this definition
was used by the Programa Regional del Empleo para América Latina y el
Caribe (PREALC) in its study of the informal sector in Latin America (1978).
This definition is very rough, but it captures a large portion of the informal
sector.

With this definition, 36.8 percent of all employed men in Mexico City age
15–65 and 62.5 percent of all employed women age 20–65 in the 1970 Mex-
ican Census sample were in the informal sector. Of men 15–65 with a primary
education or less, 45 percent were employed in the informal sector. Average
monthly earnings in 1970 of the 9,643 employed men age 15 to 65, by sector,
were as follows:

	Pesos per month
Primary education or less	
Informal sector (2,723)	953
Formal sector (3,380)	1,658
More than primary education	
Informal sector (826)	1,937
Formal sector (2,714)	2,583
All employed males	
Informal sector (3,549)	1,182
Formal sector (6,094)	2,070

Earnings in the informal sector of 1,182 pesos are roughly 57 percent of earnings in the formal sector. Earnings in both are lower for men who have only a primary education or less. Chart 1 shows that the likelihood of employment in the marginal, informal sector clearly declines with increased education, from a high of 60 percent for those men with no education to 38 percent for those with a primary education and to 3 percent for those with 18 years of education.

If as the previous discussion has indicated the informal sector is the "gateway" to the urban labor market, migrants should disproportionately enter the informal sector for two reasons. They do not have the financial resources to look actively for a modern sector job without working elsewhere, and entry to the modern sector is a function of time in the labor queue. The typical migrant did not remain long in the urban job queue (Table 5). Even after just one year of residence, the proportion of men employed in the informal sector falls by 18 percent, from 54 to 45 percent. A higher proportion of employed women migrants start out in the informal sector. Of employed women who had lived in Mexico City less than one year, 85 percent worked in the informal sector. After 10 years of residence, this proportion falls to 56 percent. The preponderance of informal employment is even more marked for men and women with no more than a primary education (Table 5). Of males who had resided in Mexico City for less than one year, 62 percent were in the informal sector and of females, 89 percent. This is evidence that the informal sector is very important to recent migrants entering the labor force, especially to women and less well educated men. Other studies have found that migrants are fully assimilated within the labor force in three to five years and cannot be distinguished from their urban native counterparts at that point. Yap concludes in a general survey of the migration literature that, "the informal sector is an important source of employment for migrants. However, there is little evidence to suggest that migrants are disproportionately concentrated in that sector" (1977, p. 255). However, in the Mexico City sample, migrants of up to 10 years length of residence are disproportionately concentrated in the informal sector when compared to residents of 11 years or more (Table 5). This is, of course, due in large part to the fact that migrants tend to be young, and the informal sector tends to employ younger workers.

Table 5 also shows the monthly earnings experience in the two sectors by length of time in Mexico City. Earnings for men within the marginal sector increase with length of residence from 577 pesos for residents of less than one year to 1,281 pesos for residents of 11 years or more. This trend is the same for men with a primary education or less in the informal sector, although overall earnings are lower.

Table 6 shows the results of an analysis comparing earnings of recent migrants and longer-term residents, after controlling for personal characteristics like age, education, and certain aspects of employment. The earnings function is estimated from the 1 percent sample of males, age 15–64, in the labor force in the Federal District, excluding those in agricultural occupations. Dummy variables are employed to represent migrant status. In the first two regression equations, three migrants categories are included: resident for less than 1 year in Mexico City, resident for 1–5 years in Mexico City, and resident for 6–10

TABLE 5. — MEXICO CITY, 1970: DISTRIBUTION AND EARNINGS
OF EMPLOYED MEN AND WOMEN BY SECTOR AND LENGTH OF RESIDENCE
IN FEDERAL DISTRICT

	Length of residence (years)				
	Less than 1	1–3	4–6	7–10	11 or more

Percentage by occupational status

All men (9,643)					
Informal sector	54	45	37	40	35
Formal sector	46	55	63	60	65
Men with only primary education or less (6,107)					
Informal sector	62	54	46	50	42
Formal sector	38	46	54	50	58
All women (2,080)					
Informal sector	85	68	64	64	56
Formal sector	15	32	36	36	44
Women with only primary education or less (1,678)					
Informal sector	89	76	75	74	66
Formal sector	11	24	25	26	34

Mean earnings by occupational status (pesos per month)

All men (9,643)					
Informal sector	577	923	915	1,074	1,281
Formal sector	2,525	2,368	2,340	2,493	2,733
Men with only primary education or less (6,107)					
Informal sector	537	812	806	913	1,021
Formal sector	1,601	1,288	1,437	1,634	1,704

Source: Based on Sample of 1970 Mexican Population Census. Numbers in parentheses are numbers of individuals in each class in the sample of 9,643 men and 2,080 women.

TABLE 6. — EARNINGS DIFFERENCES IN THE MALE LABOR FORCE,
BY LENGTH OF RESIDENCE, FEDERAL DISTRICT, 1970

Independent variables	Regression coefficients			
	I[a]	II[a]	III[b]	IV[b]
Years of residence				
Migrants of less than 1	− .324***	− .328***	− .398***	− .388***
Migrants of 1–5	.149***	.151***	.072	.088*
Migrants of 6–10	− .005	− .006	− .079	− .067
Natives (born in Federal District)	—	—	− .111***	− .091***
Age	.211***	.197***	.207***	.194***
(Age)²	− .002***	− .002***	− .002***	− .002***
Years of education	.100***	.095***	.101***	.096***
Self-employed	—	.136***	—	.137***
Employer	—	.484***	—	.484***
Work in family business without pay	—	− 2.354***	—	− 2.347***
Constant	2.080	2.389	2.221	2.504
R²	.17	.20	.17	.20

See text. Based on 1 percent sample of Mexican 1970 Population Census, 9,851 observations. The years of residence (migrant status) dummy variable coefficients indicate relationship with earnings of individuals in omitted category who have same age, education, and employment characteristics. Dependent variable is log of average monthly earnings.

[a]Omitted years of residence category is natives and migrants of more than 10 years residence. Omitted job category is employee and day laborer.

[b]Omitted years of residence category is migrants of more than 10 years residence. Omitted job category is employee and day laborer.

*Significant at .05 level.
***Significant at .001 level.

years in Mexico City. Natives and migrants of longer than 10 years residence are the omitted category in the first two regressions. The migrant status dummy variables compare the earnings of those groups against the earnings of the omitted category. In Regressions III and IV, dummy variables are included for residents of less than 1 year in Mexico City, residents of 1–5 years in Mexico City, and residents of 6–10 years in Mexico City, and natives. The omitted category only includes migrants of longer than 10 years residence. Years of education, age, and age squared are included in all four regressions to control

for those personal characteristics.[3] Regressions II and IV also include variables representing job characteristics.

As would be expected, very recent migrants (of less than one year residence) have significantly lower earnings than the combined group of long-term migrants and natives (Regressions I and II) and long-term migrants only (Regressions III and IV). In Regressions I and II, their earnings are about 28 percent lower than long-term migrants and natives.[4] The drop in earnings is slightly higher, about 33 percent when compared with long-term migrants alone. There is little difference in the migration coefficients when age and education are controlled for alone (Regressions I and III) and when job characteristics are included, along with age and education.

Migrants of 1 to 5 years duration have significantly higher incomes (by about 16 percent) when compared with long-term migrants and natives. This earnings·difference is greatly weakened, however, when compared with long-term migrants alone (Regressions III and IV). However, migrants of 6–10 years residence do not show significant differences in earnings in all the regressions.

Natives have significantly lower incomes than long-term migrants in Regressions III and IV, even after controlling again for age and education and job characteristics. The drop in aggregate earnings is about 9 percent.

Self-employment is associated with significantly higher earnings than the omitted category of employee and day laborer. Several studies concerning the informal sector have used self-employment as a criterion for placement in the informal sector. The data here, however, indicate that in Mexico City self-employment is associated with about 15 percent higher earnings than work as an employee or day laborer, after controlling for age and education.

The explained portion of the variance in earnings in these regressions is not very high, suggesting that other characteristics not included here are important in explaining earnings differences in Mexico City.

The picture that emerges is that migrants who stay in Mexico City for at least six months but less than a year have lower earnings than long-term migrants and natives of similar age and educational levels during the first year of residence.[5] This may be due to a period of frictional unemployment or because they immediately accept a low-paying job while looking for a better one. The fact that migrants of 1 to 5 years residence have higher earnings than natives and long-term migrants of similar age and educational levels, and that long-term migrants have significantly higher earnings than natives of similar age and educational levels may indicate that migration entails some sort of self-selection process. Migrants may have a competitive advantage over natives of the same age and education levels due to other personal characteristics. The

[3] Both age and squared terms are included to capture the nonlinear life-cycle earnings effect of age.

[4] The problem of income that a migrant category has relative to the omitted category is calculated by taking the exponential of the estimated regression coefficient, since the dependent variable is the natural log of average monthly income.

[5] The 1970 Mexican Census was a de jure census, recording respondents by place of habitual residence. If the respondents' length of residence was less than six months, they were in theory enumerated at their place of usual residence.

variation could also arise if migrants had similar wages, but worked longer hours.

This type of analysis has been made elsewhere by Yap (1976b) with 1960 Brazilian census data with similar results. She found that, "Within four years after moving, rural-urban migrants are earning as much as—in some cases, more than—their urban-born, nonmigrant counterparts with similar personal characteristics" (Yap, 1976b, p. 236).

CONCLUSION

Migration is an important labor market adjustment mechanism, whereby workers move in order to maximize expected income. The Todaro migration framework of expected income differentials that employs the probability of getting a job in the modern sector and modern sector earnings levels is important in explaining the causes of migration, but can be vastly improved by introducing the probability of obtaining work in the informal sector and earnings levels in that sector.

The analysis of the 1 percent sample from Mexico City supports the idea that the informal sector is important in assimilating workers into the urban labor force and may provide long-term or permanent employment for many migrants, in addition to many natives.

Migrants are disproportionately numerous in the informal sector even after several years of residence in Mexico City. This is primarily because of their age and educational characteristics. But interestingly, the sample of Mexico City showed that earnings of migrants after the first year of residence are no lower than those of natives and long-term migrants, controlling for education and age. The informal sector cannot be ignored if a migration model is to have any bearing on reality, since it is an important source of short-run and long-run employment for many migrants.

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