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## Rural-Urban Migration, Urban Employment and Underemployment, and Job Search Activity in LDC's

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Rural-Urban Migration, Urban Unemployment and Underemployment, and Job  
Search Activity in LDCs

Gary S. Fields

December, 1972

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RURAL-URBAN MIGRATION, URBAN UNEMPLOYMENT AND UNDEREMPLOYMENT, AND JOB  
SEARCH ACTIVITY IN LDCs

Gary S. Fields

December, 1972

In recent years, the urban areas in less developed countries have grown very rapidly. Between 1950 and 1960, urban areas in Africa grew by 69%, in Latin America by 67%, and in Asia by 51%, while rural areas grew by only 20% over the same period.<sup>1</sup> Since biological growth rates rarely exceed 3% per annum, much of the urban growth is due to rural-urban migration.

There is a growing consensus on a number of aspects of the migration question. Both economists<sup>2</sup> and non-economists<sup>3</sup> agree that rural-urban migration can be explained primarily by economic factors: the "push" from agriculture and the "pull" of relatively high urban wages. The "bright lights of the city" and other cultural explanations are given relatively little weight in the literature. There is also agreement that such migration is quite rational despite the existence of urban unemployment. The essence of this relationship is summarized clearly in perhaps the best-known article on the subject, that of Harris and Todaro: "... migration proceeds in response to urban-rural differences in expected earnings (defined below) with the urban employment rate acting as an equilibrating force on such migration."<sup>4</sup> Finally, it is agreed that young persons are most likely to migrate<sup>5</sup> and that they experience much higher rates of urban unemployment than other workers.<sup>6</sup> The reasons for the

greater propensity of the young to move to economically advantageous areas have been discussed by a number of writers<sup>7</sup> and will not be repeated here.

In this paper, we shall present a formal theoretical model with which to analyze the equilibrium allocation of the labor force between labor markets. Our basic premise is that the same kinds of forces that explain the choices of workers between the rural and urban sectors can also explain their choices between one labor market and another within an urban area and are probably made simultaneously. The decision-makers -- be they individuals or family units -- are presumed to consider the various labor market opportunities available to them and to choose the one which maximizes their expected future income.

Our point of departure is the received theory of rural-urban migration in less developed countries, which is the model of Harris and Todaro (1970). We begin by summarizing the basic features of the model. While we accept the basic approach, we show that the particular implication of the model with respect to the equilibrium urban unemployment rate substantially overstates the rates actually observed by Turnham (1970) and others. We then extend the analysis to take into account a number of important factors which have previously been neglected--a more generalized approach to the job search process, the possibility of underemployment in the so-called urban "murky sector," preferential treatment by employers of the better-educated, and consideration of labor turnover--and demonstrate that the resulting framework gives predictions closer to actual experience.

1. The Received Theory of Rural-Urban Migration

The received theory of rural-urban migration, first set forth in Todaro (1968), has been revised and augmented by Todaro (1969), Harris and Todaro (1970), again by Todaro (1971), and by Johnson (1971). The Harris-Todaro version is best known and we shall consider it in that form.

The model treats rural-urban migration primarily as an economic phenomenon. In essence, the theory postulates that workers compare the expected incomes in the urban sector with agricultural wage rates and migrate if the former exceeds the latter. Rural-urban migration is thus the equilibrating force which equates rural and urban expected incomes and as such is a disequilibrium phenomenon.

The three basic characteristics of their model--that migration occurs largely for economic reasons, that the migration decision depends on expected rather than nominal wage differentials, and that migration takes place in disequilibrium--suggest that rural-urban migration be given a new emphasis. Rather than considering it as a key phenomenon in its own right, migration could better be regarded as the adjustment mechanism by which workers allocate themselves between different labor markets, some of which are located in urban areas and some in rural areas.

Harris and Todaro formulate the problem in the following way. Let  $W_a$  and  $W_u$  respectively denote the nominal agricultural and urban wage rates,  $E_u$  be the number of urban jobs, and  $L_u$  be the urban labor force. The expected urban income ( $E(W_u)$ ) is

$$(1) \quad E(W_u) = W_u \frac{E_u}{L_u} .$$

Expected rural income ( $E(W_a)$ ) is simply  $W_a$ . The amount of rural-urban migration ( $\dot{L}_u$ ) is a function of the urban-rural expected wage differential

$$(2) \quad \dot{L}_u = \psi(E(W_u) - E(W_a)).$$

The rural-urban equilibrium condition

$$(3) \quad E(W_u) = E(W_a)$$

becomes

$$(4) \quad W_u \frac{E_u}{L_u} = W_a, \quad 8$$

and the equilibrium employment rate is

$$(5) \quad \frac{E_u}{L_u} = \frac{W_a}{W_u} .$$

How does this prediction square with available empirical evidence? Not well. Per capita incomes in urban areas are anywhere from two to eight times as high as in rural areas.<sup>9</sup> Thus, Harris-Todaro would predict urban employment rates of 1/2 to 1/8. Yet the highest unemployment rate observed in seventeen less developed countries is 20%.<sup>10</sup> While it might be argued that equilibrium has not yet been reached, it seems much more likely in light of the size of the gap between actual and predicted unemployment rates that the theory as stated needs to be amended to conform more closely to the observed facts. This is our task in the remaining sections.

2. A More Generalized Formulation of the Job Search Process

In the Harris-Todaro model, the probability of obtaining an urban job is defined as the number of urban jobs divided by the urban labor force. Implicitly, this specification assumes that persons living in rural areas have no chance whatever of finding urban jobs. In this section, we shall show that the Harris-Todaro specification implies a higher equilibrium unemployment rate than would be predicted by a more generalized formulation of the job search process.

There are several reasons why rural residents would be expected to have a positive chance of obtaining urban jobs. Much urban hiring is done through channels which do not exclude rural residents. Some jobs are "advertised" and filled informally by word of mouth. An urban resident may locate a job for a friend or relative and then send word (and money) for him to come to the city. Other jobs are filled by a central labor exchange with which rural residents are able to register. Finally, those persons in rural areas proximate to cities may on occasion be able to look actively for an urban job.

However, a number of factors make it probable that locating in the cities and searching for a job would still have a positive payoff. These include delays in conveying information to persons in rural areas, the preference of employers for personal contact with prospective employees, the costs of repeated visits to cities in search of work, and the simple fact that many jobs are found by happening to be at the right place at the right time.

All these considerations may be summarized by a single parameter. Should an urban job become available, each urban resident would have some particular chance of being selected for it and each rural resident would have some lesser chance. Let the relative chance of any given rural worker obtaining the job relative to any given urban worker be denoted by  $n$ . We shall call this number  $n$

the relative rural-urban job search-parameter. It is an (inverse) index of the payoff to job search; when job search is profitable,  $n$  is low, and vice versa.

To give an example, suppose  $n = 1/2$  and let the probability that a worker who resides in the urban sector will obtain an urban job in the current period be 0.8. Then, the probability that a comparable worker who lives in the rural sector will obtain an urban job is 0.4. Similarly, if  $n$  were equal to  $1/4$ , the probability of a rural worker securing an urban job would be 0.2.

The value of the rural-urban job-search parameter  $n$  in a given country may be presumed to depend on a number of economic and cultural variables including the length of the work week in agriculture, the extent of favoritism, nepotism, and discrimination in the labor market, and the efficiency of the labor exchange.

We would expect that other things equal, the longer the work week, the smaller the job-search parameter  $n$ . This is because a longer work week leaves fewer hours for other activities including job search. Thus, the longer the work week, the poorer the relative chance of rural workers obtaining urban employment and so the lower the rural-urban job-search parameter.

The greater the degree of nepotism, favoritism, and discrimination in an economy, the greater the expected job-search parameter. When these factors are important, one's contacts, skin color, tribal origin, or other personal characteristics have a greater bearing on his employment status than the extent of his job search. Members of the favored group could remain on the farm and just wait to be called; their prospects would be little improved by migrating to the city and searching full time. Persons not in the favored group would

have almost as poor a chance of obtaining a job from the farm as they would in the city where they are discriminated against; their prospects also would be little improved by full-time job-search in the city. Consequently, a high job-search parameter would be expected where favoritism and discrimination are prevalent.

Finally, an efficient labor exchange, in which most urban job openings are filled by lotteries conducted by the labor exchange, would cause there to be little payoff to job search and raise the job search coefficient to near unity. For instance, this was the case in Kenya during the Tripartite Agreement of 1970, at which time all employers were required to increase employment by ten percent, workers were required to register with the labor exchange, and the lottery results were published in the daily press.

Let us now incorporate the generalized job-search formulation into the Harris-Todaro model and determine the resulting effect on the equilibrium unemployment rate. We shall denote the probability of a given urban resident becoming employed in an urban job by  $P_u$ . Assuming that all jobs are available to all persons equally,<sup>11</sup>

$$(6) \quad P_u = \frac{E_u}{J_u},$$

where  $E_u$  is urban employment and  $J_u$  is the number of job-seeker equivalents, defined as follows.  $J_u$  is a weighted sum of the urban and rural labor forces, the weights reflecting the relative chances of being hired. Since each rural resident has only an  $n$ 'th as great a chance of being hired, a weight of one is assigned to each urban resident and a weight of  $n$  to each rural resident.

Letting  $L_u$  and  $L_a$  be the number of residents in the urban and rural areas respectively, we therefore have, by definition,

$$(7) \quad J_u = L_u + nL_a.$$

$J_u$  is called the number of job-seeker equivalents because the same number of urban residents as  $J_u$  and no rural residents would leave each with an equivalent probability of finding urban employment.

The labor market just described may be thought of as functioning like a lottery in which each urban resident ( $L_u$ ) has one ticket, each rural resident ( $L_a$ ) has an  $n$ 'th of a ticket, each ticket is identical, each prize is equally valuable, and the total number of prizes is  $E_u$ .

The expected wage of a member of the urban labor force ( $E(W_u)$ ) is simply the urban wage  $W_u$  times the probability of employment  $P_u$ :

$$(8) \quad E(W_u) = W_u P_u = W_u \frac{E_u}{J_u}.$$

The expected income of a rural resident is slightly more involved, since it depends on whether or not he is hired for an urban job. If he does obtain an urban job, he will earn the urban wage  $W_u$ ; otherwise he earns the rural wage  $W_a$ . The respective probabilities are  $n \frac{E_u}{J_u}$  and  $1 - n \frac{E_u}{J_u}$ . Therefore, the expected income of a member of the rural labor force is

$$(9) \quad E(W_a) = W_u n \frac{E_u}{J_u} + W_a \left(1 - n \frac{E_u}{J_u}\right).$$

The rural-urban migration equilibrium condition  $E(W_u) = E(W_a)$  becomes

$$(10) \quad W_u \frac{E_u}{J_u} = W_u n \frac{E_u}{J_u} + W_a (1 - n \frac{E_u}{J_u}).$$

The situation described by the Harris-Todaro model is easily seen to be the case where  $n = 0$ .

In order to determine the equilibrium employment rate, we solve the equilibrium condition (10) for  $\frac{E_u}{L_u}$ . Substituting (7) for  $J_u$  and  $(L - L_u)$  for  $L_a$ , where  $L$  is the total labor force, we find

$$(11) \quad \frac{E_u}{L_u} = \frac{1 + n \left( \frac{L}{L_u} - 1 \right)}{\frac{W_u}{W_a} - n \left( \frac{W_u}{W_a} - 1 \right)}.$$

In the Harris-Todaro case where  $n = 0$ ,  $\frac{E_u}{L_u} = \frac{1}{\frac{W_u}{W_a}}$ . However, when agricultural workers have some chance of obtaining urban employment and  $n > 0$ ,  $\frac{E_u}{L_u} > \frac{1}{\frac{W_u}{W_a}}$ .

Furthermore, by differentiating (11) with respect to  $n$ , one can easily see that the larger is  $n$ , the larger is the urban employment rate  $\frac{E_u}{L_u}$ . Thus we find that there is a lower equilibrium unemployment rate in general than would be predicted by the Harris-Todaro model and the greater the relative chance of rural workers finding urban jobs, the greater the discrepancy between the general result and the Harris-Todaro result.

### 3. The Introduction of a Murky Sector

The nature of the migration process and the resulting urban growth are perhaps best described impressionistically by a typical scenario. New arrivals in the cities ordinarily stay with friends or relatives who help house and feed them while they look for work. A dozen or more people crowded into one room is not uncommon. They need not live in housing which is rented or provided as part of job compensation. Squatter settlements and shanty towns house a substantial portion of urban populations, particularly in Africa.

Unemployment (by standard definitions) is not very common. Additional household members are expected to contribute to their support. Frequently, they assist with the household chores by preparing meals, washing clothes, or caring for children. Simultaneously, they search for work (albeit on an irregular basis) and are classified as unemployed.

The most fortunate new migrants obtain a permanent modern sector job as a clerk, messenger, or whatever. However, these are the best jobs and the typical migrant is forced to find some lesser means of earning a cash income. He may secure one or more typically a succession of wage jobs (e.g., house-servant, cook in a small lunch kiosk, assistant in a family shop) or engage in self-employment (e.g., selling produce, newspapers, curios, or shoe shines on the street corner). These activities have been given several names including petty capitalism, the traditional sector, the service sector, and the grey area. A particularly graphic term, and the one we shall use to denote this whole range of activities, is the "murky sector."

Entry into the murky sector is typically open. For instance, a person can get started by buying some peas in the market, removing the pods at the side of the road, and selling podded peas to passers-by at a higher price. Prostitution is another occupation which has notoriously easy entry.

Workers in the murky sector are ordinarily classified as employed<sup>12</sup> although they themselves and the statisticians who measure those things would be inclined to consider them underemployed. An examination of available time series evidence suggests that unemployment rates have not in general worsened substantially over time. Of ten countries which permit analysis, unemployment rates have risen<sup>13</sup> in three (Korea, Colombia, and Panama), fallen in five (UAR, Taiwan, Argentina, Chile, and Puerto Rico), and remained unchanged in two (Philippines and Trinidad-Tobago).<sup>14</sup> The tentative conclusion to be drawn is that most migrants have encountered limited success and are engaged in some sort of murky sector employment.

The existence of opportunities for paid employment in the murky sector gives each member of the labor force a new option. Not only can he choose between staying in (or returning to) agriculture or being either employed or unemployed in the cities, but he can also voluntarily choose to be underemployed in the urban murky sector while looking for a better job.

Why don't all workers enter the murky sector? While underemployment in the murky sector yields a positive wage and unemployment pays no wage, the murky sector income is earned at the cost of reduced job search opportunities. This may be simply because murky sector workers have less time to look for

modern sector jobs or for some other reason. In the remainder of this section, we shall examine these effects and show that introduction of the murky sector leads to a lower equilibrium unemployment rate than the Harris-Todaro result.

The murky sector may be introduced in a manner similar to the development of the agricultural sector in the last section. In order to keep the effects of recognizing the murky sector separate, we return to the original model (equations (1) - (5)) and assume that agricultural workers have no chance of obtaining modern sector jobs.

We now have two kinds of urban jobs, modern sector and murky sector, with wage rates  $W_u$  and  $W_m$  respectively. While we will hold  $W_u$  constant as before, we will regard  $W_m$  as an endogenous variable to be determined by the model.

Let the relative job search parameter between murky and modern sector jobs be denoted by  $h$ . The parameter  $h$  is the probability that any given person in the murky sector labor force would be hired for a modern sector job relative to the probability of any given member of the modern sector labor force being hired.

Since we are now assuming that rural residents have no chance of obtaining urban jobs, the number of job-seeker equivalents for modern sector urban jobs is

$$(12) \quad J_u = L_u + hL_m,$$

where  $L_u$  and  $L_m$  are the modern sector and murky sector labor forces respectively.

Equilibrium between the murky and modern sectors requires that the expected wage in the modern sector ( $E(W_u)$ ) equal the expected wage in the murky

sector ( $E(W_m)$ ). By analogy with the expected agricultural wage under general job search conditions,

$$(13) \quad E(W_m) = W_u h \frac{E_u}{J_u} + (1 - h \frac{E_u}{J_u}) W_m.$$

As before,

$$(14) \quad E(W_u) = W_u \frac{E_u}{J_u}.$$

Equilibrium between the rural and urban sectors requires that these in turn equal the expected agricultural wage ( $E(W_a)$ ), which is

$$(15) \quad E(W_a) = W_a,$$

since we are once again assuming that agricultural workers have no opportunity of obtaining an urban job. Therefore, the rural-urban and intra-urban equilibrium conditions may be combined as

$$(16) \quad W_a = W_u h \frac{E_u}{J_u} + (1 - h \frac{E_u}{J_u}) W_m = W_u \frac{E_u}{J_u}.$$

We now wish to solve for the equilibrium labor force allocation, urban unemployment rate, and murky sector wage rate. From the equality between the first and third members of (16), in equilibrium,

$$(17) \quad J_u = \frac{W_u}{W_a} E_u.$$

Substituting this into the equality between the second and third members and solving for  $W_m$ , we obtain for the equilibrium murky sector wage

$$(18) \quad W_m = \frac{W_a (1-h)}{1 - h \frac{W_a}{W_u}}$$

which is constant for particular values of  $W_a$ ,  $W_u$ , and  $h$ .

For the determination of the murky sector labor force, we assume that the demand for murky sector output ( $Q_m$ ) is the sum of the demand by employed modern sector workers  $f(E_u)$  plus the demand by murky sector workers  $g(L_m)$ :

$$(19) \quad Q_m = f(E_u) + g(L_m), \quad f' > 0, \quad g' > 0.$$

We further assume that since murky sector workers are underemployed, the demand is supplied and the resultant income is shared equally among murky sector workers, i.e.,

$$(20) \quad W_m = \frac{Q_m}{L_m}$$

Substituting (18) and (19) into (20), we obtain an implicit expression for the murky sector labor force as

$$(21) \quad \frac{[f(E_u) + g(L_m)]}{L_m} = \frac{W_a(1-h)}{1-h \frac{W_a}{W_u}}$$

In this general form, we cannot solve explicitly for  $L_m$ . However, if we adopt the simplifying assumption that the amount of murky sector output demanded by murky sector workers is fixed, this along with the assumed constancy of  $E_u$  implies that the total murky sector output is fixed at some level  $\bar{Q}_m$ . Substituting  $\bar{Q}_m$  for  $[f(E_u) + g(L_m)]$  in (21) and rearranging, we derive the murky sector labor force as

$$(22) \quad L_m = \frac{\bar{Q}_m (1-h \frac{W_a}{W_u})}{W_a (1-h)}$$

Substituting (22) and (17) into (12) and rearranging, we find that the total urban labor force ( $L_{urb}$ ) is

$$(23) \quad L_{urb} = \frac{W_u E_u + \bar{Q}_m \left(1 - h \frac{W_a}{W_u}\right)}{W_a}$$

The urban employment rate is modern sector employment plus murky sector employment divided by the total urban population:

$$(24) \quad \frac{E_u + L_m}{L_{urb}}$$

Substituting (22) and (23) into (24), we find that the urban employment rate is

$$(25) \quad \frac{E_u + \frac{\Omega}{W_a(1-h)}}{\frac{W_u E_u + \Omega}{W_a}}$$

where  $\Omega = \bar{Q}_m \left(1 - h \frac{W_a}{W_u}\right)$ . This may readily be shown to be greater than Harris-Todaro equilibrium unemployment rate  $\left(\frac{W_a}{W_u}\right)$  by subtracting (5) from (25) and observing that the result is unambiguously positive. We have therefore demonstrated the validity of the proposition that introduction of the murky sector leads to a lower equilibrium unemployment rate than predicted by the Harris-Todaro model.

What is the effect of the size of the murky-modern relative job search parameter on the equilibrium urban employment rate and other labor market variables? Our model suggests that the greater the chance of a worker employed

in the murky sector of obtaining a modern sector job relative to an unemployed worker who searches full-time, (i.e., the larger is h):

- a) the smaller the equilibrium murky sector wage rate,
  - b) the larger the equilibrium murky sector labor force,
  - c) the smaller the modern sector labor force in equilibrium,
  - d) the smaller the total urban labor force in equilibrium,
- and e) the larger the equilibrium urban employment rate.

Point a) may be demonstrated by partially differentiating (18) with respect to h

$$(26) \quad \frac{\partial W_m}{\partial h} = \frac{W_a \left( \frac{W_a}{W_u} - 1 \right)}{\left( 1 - h \frac{W_a}{W_u} \right)^2}$$

and noting that the result is negative since  $W_u > W_a$ . To show b), differentiate (22)

$$(27) \quad \frac{W_a \bar{Q}_m \left( 1 - \frac{W_a}{W_u} \right)}{\left[ W_a (1-h) \right]^2}$$

and observe that the result is positive for  $W_u > W_a$ . For c), (12) and (17) give

$$(28) \quad L_u = \frac{W_u E_u}{W_a} - h L_m$$

which clearly varies inversely with h. Part d) is easily seen from the expression for the equilibrium urban labor force in (23).

Finally, differentiation of (16) with respect to  $h$  gives a constant  $J_u$  and

$$(30) \quad \frac{\partial W_m}{\partial h} = - \frac{(W_u - W_m) \frac{E_u}{J_u}}{1 - h \frac{E_u}{J_u}} < 0.$$

(20) and (30) imply  $\frac{\partial L_m}{\partial h} > 0$ , which along with the constancy of  $J_u$  implies that  $\frac{\partial L_u}{\partial h} < 0$ . We now have more urban residents employed in the murky sector and fewer unemployed seeking modern sector unskilled jobs and therefore an unambiguously higher urban employment rate for a larger value of  $h$ .

A priori considerations suggest that the murky sector relative job search parameter  $h$  would be fairly large, i.e., worker' job search activity would not be seriously impeded by taking a murky sector job rather than remaining unemployed in search of work in the modern sector. This would seem so for two reasons. First, the nature of the murky sector is such that self-employment, flexible hours, and part-time work are common. Thus, it is often possible to adapt one's work week and the specific work hours so as to be relatively free to search for modern sector jobs. Second, many modern sector jobs are obtained by contacts from employed friends or relatives. Consequently, workers would have relatively little to gain by searching full time and they would be more likely to take up employment in the murky sector in order to earn a cash income. To the extent that these two considerations hold, urban unemployment rates are likely to be fairly low in absolute terms as well as relative to the prediction of the Harris-Todaro model. However, it should not be forgotten that these low unemployment rates conceal a considerable volume of underemployment in the murky sector.

As long as the murky sector labor force has some positive chance of becoming employed in the modern sector, the equilibrium murky sector wage would be less than the agricultural wage.<sup>15</sup> This would be expected because the lower wage is the price workers must pay in equilibrium in order to have a better chance of obtaining a relatively high-paying modern sector job.

This gives an additional reason for the existence of an impoverished urban class. Not only are some people willing to be unemployed much of the time in order to earn high wages when they are employed in the modern sector, but others are willing to be underemployed by working for very low wages (less even than they could earn in agriculture) in order to have a better chance of being hired for those same modern sector jobs.

#### 4. Preferential Treatment by Employers of the Better Educated

A number of observers of less developed countries report employers using educational attainment as a criterion for hiring and selecting the better educated in preference to those with less education.<sup>16</sup> What effect does this have on the equilibrium employment rate?

Let us once again return to the original model and neglect the possibility of employment in the murky sector. Now suppose there are two categories of workers: the educated ( $L_e$ ) and uneducated ( $L_u$ ), of whom  $L_{uu}$  live in urban areas and  $L_{ua}$  in agriculture. Suppose further that because of this systematic preference by employers the available supply of educated workers are hired immediately without unemployment and uneducated workers must divide the remaining jobs.

The expected income of an uneducated worker who enters the urban labor force ( $E(W_u | u)$ ) is

$$(31) \quad E(W_u | u) = W_u \frac{E_u - L_e}{L_{uu}}$$

and the expected income of an uneducated worker who enters the agricultural labor force ( $E(W_u | a)$ ) is

$$(32) \quad E(W_u | a) = W_a.$$

Equilibrium between the two labor markets for uneducated workers requires that  $E(W_u | u) = E(W_u | a)$  or

$$(33) \quad W_u \frac{E_u - L_e}{L_{uu}} = W_a.$$

The equilibrium employment rate for uneducated workers is

$$(34) \quad \frac{E_u - L_e}{L_{uu}} = \frac{W_a}{W_u}$$

and the equilibrium employment rate for educated workers is one. The total employment rate is a weighted average of these two rates, the weights given by the percentage of uneducated and educated workers respectively. Therefore, the total urban employment rate in equilibrium is

$$(35) \quad \frac{L_{uu}}{L_{urb}} \frac{W_a}{W_u} + \frac{L_e}{L_{urb}}$$

which is clearly greater than the Harris-Todaro result  $\left(\frac{W_a}{W_u}\right)$  except when  $L_e = 0$ .

The reason for this greater employment rate is inherent in the job search mechanism itself. When an educated worker is hired, he fills a position which some greater number of uneducated workers had been seeking. For example, if  $W_a = \frac{1}{3} W_u$ , the equilibrium employment rate for uneducated workers is  $\frac{1}{3}$ , as given by (34). For each educated worker who is hired preferentially, there is one less urban job available to uneducated workers and in equilibrium there would be three fewer job seekers.

### 5. Consideration of Labor Turnover

The basic Harris-Todaro model has been extended by Johnson (1971) to give explicit attention to a time dimension and rate of labor turnover.<sup>17</sup> As before in choosing between the urban and rural sectors workers are assumed to consider the expected incomes in each. Now, however, the present value of the expected lifetime income streams are relevant. For a person in the urban labor force, this is

$$(36) \quad V_u = \int_0^T E(W_u) e^{-rt} dt,$$

where  $T$  is his relevant time horizon,  $E(W_u)$  is the expected urban wage which varies over time, and  $r$  is a discount rate. While  $T$  and  $r$  have clear interpretations, it is not at all obvious what the appropriate value of  $E(W_u)$  is. Even if we grant that the expected urban wage  $E(W_u)$  at any time  $t$  is the "objective" mathematically expected wage, i.e.,

$$(37) \quad E(W_u) = W_u \phi_u,$$

where  $W_u$  is the urban wage at time  $t$  and  $\phi_u$  the probability of being employed

at that time, the appropriate future values of  $W_u$  and  $\phi_u$  are nonetheless subjective. In this sense there are as many different expected urban incomes as there are workers with different notions about future wages and employment probabilities. If workers' behavior is standardized and we assume that all workers behave as if today's wage and probability of finding employment will prevail forever, Johnson shows that the expected probability of being employed at any future time  $t$  is

$$(38) \quad \phi_u = \frac{P_u}{P_u + \psi_u} (1 - e^{-(P_u + \psi_u)t})$$

where  $\psi_u$  is the rate of involuntary labor turnover in urban jobs. Substituting (37) and (38) into (36) and integrating, for a sufficiently young worker with a long time horizon (i.e., large value of  $T$ ), the present value of expected urban income is

$$(39) \quad V_u = \frac{W_u}{r} \frac{P_u}{r + P_u + \psi_u}$$

Similarly, if agricultural workers are excluded from consideration for urban jobs but always have the opportunity of earning the agricultural wage  $W_a$ , the present value of expected lifetime income in agriculture would be

$$(40) \quad V_a = \int_0^T W_a e^{-rt} dt = \frac{W_a}{r}$$

Rural-urban migration equilibrium requires that the expected present values in each labor force ( $V_u$  and  $V_a$ ) be equal. All terms except  $P_u$  are parameters of the model. Assuming randomness of hiring,  $P_u$  (the probability

of finding an urban job) is the ratio of hires to job-seekers. Johnson shows that the urban unemployment rate varies directly with the rate of labor turnover, provided the individual's discount rate exceeds the rate of growth of urban employment. The Harris-Todaro model has no job fixity, i.e., infinite labor turnover, and therefore predicts a higher unemployment rate in equilibrium than would be expected for any finite rate of labor turnover.

## 6. Conclusion

In this paper, we have sought to understand the determination of the equilibrium level of unemployment in less developed countries. Following the precedent established by Harris and Todaro, we have focussed on the voluntary movement of workers between labor markets as the equilibrating force instead of the more conventional mechanism of wage adjustment. Within this framework of quantity rather than price adjustment, we have taken into consideration four additional factors: a more generalized account of the process of search for urban jobs, the possibility of underemployment in the so-called murky sector, the chance that educated workers might be favored by employers in job hiring, and recognition of labor turnover in a multiperiod framework. We have shown that each of these extensions implies a lower equilibrium unemployment rate than is predicted by Harris and Todaro. Since urban unemployment rates are observed to be much lower than the Harris-Todaro model predicts, these extensions permit us to retain the quite plausible notion of quantity adjustment as the equilibrating mechanism in labor markets and yet also have a theory which is not contradicted by the facts.

In interpreting these results, one should not jump to the conclusion that things are not (or will not become) as bad as the Harris-Todaro model might have led us to believe. It is important that we remember that these unemployment rates fail to take into account employment at very low wages or the plight of the working poor. Poverty is no less real when people eke out subsistence in agriculture or earn less than a living wage while underemployed in the murky sectors of the cities. In fact, the social consequences of a low unemployment rate may be severe, for if planners and policy-makers mistakenly regard unemployment rates of 10-20% as indicating that 80-90% of the urban population are fully and gainfully employed, they may fail to act to increase earnings opportunities.

FOOTNOTES

1. See Turnham (1970, p. 107).

2. See Harris and Todaro (1970), Stiglitz (1969), and Frank (1971).

3. Especially Gugler (1968).

4. Harris and Todaro (1970, p. 128).

5. Todaro (1971).

6. On the basis of evidence from urban areas in 22 countries, Turnham (1970, p. 47) concludes that "in most cases the rate of unemployment among young workers is double or more than double that applying to the labor force as a whole."

7. See Sjaastad (1962) and Bowles (1970).

8. In our discussion we shall employ a somewhat different wage determination process from that of Harris and Todaro. The Harris-Todaro model fixes the urban wage rate in real terms. The rural wage is specified as the marginal product of labor in agriculture, which depends on the number of agricultural workers and the terms of trade between agricultural products and manufactures. Harris and Todaro specified the agricultural wage in this way in order to be able to consider the welfare implications of various government policies with regard to rural-urban migration in a general equilibrium framework. Since our present concern is with employment and underemployment and other labor market conditions, we shall subsequently treat the rural-urban terms of trade as contained in the rural and urban wages and ignore changes in relative price levels. Furthermore, we will treat the agricultural wage rate as fixed. While this is primarily for expositional purposes, it is also likely that given the small size of the modern urban sector compared to the agricultural sector, the wage a potential migrant could earn in agriculture would vary to a relatively small extent over the relevant range and can be treated as constant.

9. Evidence for eight less developed countries (East Pakistan, Egypt, Ivory Coast, Ceylon, Brazil, India, Philippines, and Venezuela) is given in Turnham (1970, p. 77).

10. Turnham (1970, p. 57)

11. In subsequent sections we will distinguish between the total number of jobs and the jobs for which hiring is taking place and between skilled and unskilled jobs and educated and uneducated workers.

12. Except for those engaged in illegal activities which they do not report to census enumerators.

13. From the first year the series is available until the last.

14. Turnham (1970, p. 46)

15. Under more general conditions whereby agricultural workers also have some positive chance of obtaining modern sector employment, any value of  $h$  (the murky-modern relative job search parameter), greater than  $n$  (the rural-urban relative job search parameter) would give the same result.

16. For evidence on this point, see Blaug, Layard, and Woodhall (1969), Krueger (1971), Skorov (1968), and unpublished data from the 1971 Nairobi Household Survey.

17. This extension is described in some detail in my doctoral dissertation. Johnson also extended the model to allow for the possibility that the urban employed might be expected to share part of their incomes with the unemployed, but this is outside the scope of the present discussion.

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