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AN EMPIRICAL STUDY OF ETHNIC LINKAGES
IN KENYAN RURAL-URBAN MIGRATION

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ABSTRACT

Regression analysis is used to explain rural-urban migration flows in Kenya as a function of economic incentives and the distribution of potential ethnic contacts linking urban and rural areas. These ethnic linkages not only have high explanatory power but also improve the performances of the other economic variables. The results indicate that migration is highly sensitive to the level of urban formal-sector wages but is not directed toward centres experiencing faster growths in formal-sector employment. It appears that when the urban labour markets are expanding very slowly, ethnic contacts rather than urban jobs are a better indicator of the probability of obtaining urban employment.

INTRODUCTION

An empirical estimate of the determinants of rural-urban migration in Kenya should incorporate the vast cultural diversity within the country as well as the regional differences in economic activity. A population speaking different languages and valuing dissimilar customs is likely to generate migration patterns substantially different than those of a culturally homogeneous group. A central feature of the present study is the development of a variable that controls for an ethnic group's penetration of a particular labour market, or the ethnic linkages between a rural area and a specific urban centre. Although they may appear to reflect non-economic considerations, ethnic linkages are emphasised as an economic variable that crucially affects the returns and costs of participating in the urban labour market.¹ They are highly relevant to the economic decision of seeking employment in Kenyan towns because kinsmen are often the primary source of information about employment in both the formal and informal sectors of the urban economy. Perhaps more importantly, one's affiliation with a particular ethnic group may bring economic benefits that would not be forthcoming to those outside the group, particularly if employment discrimination is an important job-allocative mechanism.

The specification of ethnic ties in the regression model improves our understanding of the other economic variables in the equation. If previous migrants were attracted to urban centres with the best economic opportunities and the relative economic environments of the urban areas change slowly over time, there may be an important positive correlation between urban income and urban contacts resulting from previous migration. When ethnic ties are not explicitly specified, some of the attraction of urban contacts is ascribed to the urban income variable. A similar argument can be developed for rural income, although the relationship is complicated by potential reverse causation between out-migration and rural development, as argued by Miracle and Berry (1970) and Walters (1973). In addition, the inclusion of ethnic linkages allows a closer examination of distance, which

1. In viewing ethnicity as an economic variable, I have been greatly influenced by Barth (1969). However, whereas I specify the ethnic factor to be an exogenous variable in the regression model, he has devoted considerable effort towards developing ethnic affiliation as a possible endogenous variable in certain instances, i.e., when people emphasise or even change their ethnicity to reap the gains ascribed to that factor.

has consistently been the most important variable in a number of previous migration studies. (See Beals, Levy and Moses, 1967; Greenwood 1969a and 1969b; Nelson, 1959; Sahota, 1968; Schwartz, 1973; Sjaastad, 1961.) Several explanations have been offered for this phenomenon, including the hypothesis that distance is indirectly measuring the distribution of potential friends and relatives in the destination region. (Nelson, 1969, and Schwartz, 1973.) The results of this study provide support for this interpretation because the addition of ethnic linkages to the regression equation substantially reduces the explanatory power of the distance variable.

In the first section of this paper, the household decision to allocate family members to the urban economy is discussed. If urban contacts are primarily employment-related, it is argued that ethnic ties and the income variables should determine migration propensities multiplicatively, i.e., a potential migrant would seek a centre where both general economic conditions and urban contacts favoured such a move. In the second section, the estimating equation is discussed, including the form of the dependent variable and the development of the ethnic linkages variable. The results of a cross-section estimation of migration from six rural provinces to eight towns for the 1964-68 period are presented in the third section. The migration flows used in this analysis are based upon a sample survey conducted by Rempel, Harris and Todaro (1970). Since migration rates had to be inferred from their study, the reader is encouraged to refer to Appendix A, which discusses the use of this information as well as other data in the present study. A final section discusses some salient policy issues related to rural-urban migration in Kenya and the empirical estimates in this study.

1. THE HOUSEHOLD DECISION

Income

Migration to urban areas is viewed as a rural household decision to allocate family labour between the rural and urban economies. The family will know approximately the economic opportunities in the various regions for a member with certain skills (education) and at certain stages of the life cycle (age). In this manner, the decision can be considered as an investment in the price of human capital embodied in that family member, although there are certainly very important nonmonetary preferences involved as well. Higher anticipated urban incomes and lower anticipated rural incomes both will increase the present value of rural-urban migration,

although changes in the two income streams may influence migration differently.

An important consideration is that substantial portions of rural income are not included in the standard indicators of rural wealth. Even measures of rural income that include food production for subsistence purposes would exclude significant portions of the opportunity costs of leaving the rural economy. Rural households are frequently involved outside the cash economy in a number of nonagricultural activities that include a variety of processing, manufacturing, construction, transportation, and service activities to satisfy the needs for food, clothing, shelter, entertainment, and ceremony.² This uncounted, nonmonetised income is expected to be greatest for those groups with lower rural monetary income. Consequently, a rise in the observed monetary income of a rural group would tend to overstate the increase in opportunity costs. This would suggest that the magnitude of the substitution effect induced by a change in rural monetary income would be somewhat less than its urban counterpart, because cash represents a larger proportion of all income in the towns.

Rural income may also be an indicator of the attitudes and available opportunities of wealthier rural households, i.e., a rise in rural income may produce an income as well as a substitution effect. Greater rural income is likely to provide more cash employment opportunities for rural residents that can be considered job experience in the urban employment-search process. In addition, a greater exposure to a cash economy can increase the taste for market goods and services that are more readily available in an urban centre. And finally, wealthier rural households may value more the monetary returns of migration because they can afford to use a longer time horizon for discounting the future urban income stream. All of these factors tend to encourage migration, resulting in a positive income effect. When this is combined with a substitution effect that includes nonmonetary as well as monetary wealth, the net effect of a rise in measured rural income is likely to be less than a decrease in the expected urban earnings potential. Therefore, it is preferable to treat these two income streams separately rather than to combine them into one determinant of migration.

2. Hymer and Resnick, 1969, p. 493. Also, see Berg, 1961, on the effects of monetary activities on the supply of rural African labour.

Probability of Employment

The present value of migration depends crucially upon the probability of obtaining employment in the urban centre. On a theoretical level, an important indicator of job opportunities would be the general economic conditions prevailing in the particular labour market, e.g., the relative change in modern sector employment or the percentage of labour market participants who are employed in that sector.³ However, the rate of employment growth in the formal sector of urban Kenya has been quite sluggish in the post-independence era⁴ and would affect the probability of obtaining employment only minimally. Given the very depressed labour market conditions, a much more important determinant of the probability of securing an urban income would be one's access to an ethnic network of urban contacts.

Friends and relatives in the urban economy can provide economic support during job search, information and other employment-related services, and psychological support in an alien community. Economic support for a recently arrived migrant most frequently consists of food and housing during his search for urban employment. This lowers the opportunity cost of leaving the rural area and could induce migration to towns where the earnings potential was lower or from rural areas where incomes were greater. In this respect, urban contacts could be a substitute for high urban earnings or low rural income as an incentive for migration, and the three variables would form an additive function determining migration.

In contrast, if urban contacts are principally a main source of job information or provide other employment-related services, this variable would be expected to interact with the income variables, forming a multiplicative function for the determination of migration rates. Nelson (1959) has suggested that a potential migrant needs both an income incentive and information before he will relocate, and has concluded that this interaction of the two dimensions explains why double-logarithmic regressions are superior to arithmetic regressions for aggregate migration flows. In Kenya, urban

3. See Gugler, 1970, Harris and Todaro, 1970, and Todaro, 1970 on the importance of employment conditions for African rural-urban migration.

4. The International Labour Office (1972, pp. 93-94) estimated a growth of employment of less than $1\frac{1}{2}$ percent within the urban formal sector during the post-independence era.

contacts are likely to provide information on specific jobs available, how to obtain them, etc., and in many cases they may be information-brokers, who can expect to share in the gains from a successful search for employment (I.L.O., 1972, pp. 509-510). These employment-related benefits of urban contacts increase the probability of urban employment for those rural households with access to networks of urban contacts. Since the expected urban income is the product of the probability of obtaining a job and the level of urban income, it should be expected that this variable would interact with the income variables. More urban contacts should increase the response to changes in the relative income levels in the rural and urban economies.

The discussion above emphasises that the economic role of ethnic contacts can be determined by comparing the empirical results of a multiplicative regression model with those of an additive one. No attempt is made to assess the relative merits of the psychological-support argument because it could fit either specification.

2. ESTIMATION OF AGGREGATE MIGRATION FLOWS

Specification

Interregional migration flows are an aggregation of the decisions discussed above. The regression equation used to explain the Kenyan rural-urban flows for the 1964-68 period is:⁵

$$(1) \quad M_{ij}/(P_i P_j) = f [Y_j, Y_i, N_j, T_{ij}, E_j, E_i, D_{ij}, u]$$

where M_{ij} = the migration level between i and j during the 1964-68 period,
 P_i = the 1962 population in rural area, i ,
 P_j = the 1962 population in urban area, j ,
 Y_j = the average formal sector wage for Africans in j , 1964-1968,
 Y_i = the average rural income per adult male in i , 1964-68,
 N_j = urban formal sector employment divided by the estimated urban labour supply for 1963,

5. In the following section, it is shown that the urban education variable, E_j , is insignificant and hence is dropped from the equation.

T_{ij} = the potential urban contacts in j for rural area i based on the ethnic composition of i and j's population in 1962,

E_j = the percentage of the male population in j in 1969 with at least some secondary schooling,

E_i = the percentage of the male population in i in 1969 with at least some secondary schooling,

D_{ij} = the road mileage between j and the district centre of the most densely populated district(s) in i.

and u = the disturbance term.

The 1962 population levels have been used in the dependent variable because the population figures (particularly the urban ones) are likely to reflect the levels of out- and in- migration. (Regressions using 1969 data are reported in Appendix B.)

Aggregate Migration Flows

Migrants from i to j divided by the population of area i is sometimes referred to as the probability that a person in the rural region will relocate to an urban centre. However, the probability of being in this migrant category does not depend solely upon the economic factors as this specification implies. The size of the destination area, which is an arbitrary choice of the researcher, may also influence this measure of probability, because migration from i to j can be expected to increase as the researcher defines the destination area to incorporate a larger unit of analysis. One way to incorporate this statistical point is to normalise each probability by the population of the destination region used for each observation, i.e., $M_{ij}/(P_i P_j)$.⁶ This procedure avoids the problems associated with using as independent variables the populations of the sending and receiving areas, which can be highly correlated with the economic conditions used to explain the behavioural aspects of migration.

Income

Formal sector wages are used for urban income and also comprise most of the rural income measure, although the latter includes available information on small-scale agricultural income as well. From the discussion

6. This form of the dependent variable can be justified on the basis of economic theory as well. Nelson (1959) has argued that the product of the two population densities can be interpreted as a control for the number of potential information flows or interactions between two areas. His empirical tests on U.S. data support this normalisation procedure. Also, see Young (1975) on this point.

of the household migration decision, the urban income coefficient should be positive ($\partial M/\partial Y > 0$), whereas the rural income coefficient is ambiguous. On the basis of previous empirical investigations of migration rates,⁷ however, it is anticipated that the negative substitution effect dominates, i.e., $\partial M/\partial Y_i < 0$.

Employment Opportunities

In the Harris-Todaro (1970) general equilibrium model of rural-urban migration, the proportion of the urban labour force employed in the modern sector was viewed as the probability of an urban income stream. The variable used in the present study is intended to measure this concept, where $\partial M/\partial N_j > 0$. In another paper, Todaro (1969) has also hypothesised that the probability of urban employment is reflected by the number of new jobs relative to the number of jobseekers in the urban centre. This is a particularly difficult and elusive concept to measure for a five-year period and with the available data, although several variables based on the Todaro hypothesis were also entered separately into the regression equation. The relative growth in the urban formal sector's employment was calculated for the 1964-68 (1963-67) period with 1964 (1963) as the base year. Another variable related new jobs to the size of the urban labour force. When used as the N_j variable, both of these measures were inferior to the one relating employment level to labour supply and did not have a coefficient with the hypothesised sign. The measure whose results are reported in this study appears to be more consistent with the standard human capital approach of considering the expected income stream as the wage times the percentage of the labour force that earns the wage. (See Sjaastad, 1964.)

Ethnic Ties

Although it is recognised that ethnic ties may be incorporating other services as well, the measure is constructed on the assumption that information represents a primary service provided by tribal members in the urban area. Information and ethnic linkages will be important when several conditions exist.⁸ First, information should be scarce and distributed unequally across Kenya's regions in order that it be a valued input

7. For example, refer to the origin income elasticities estimated in the studies cited on page 1. Sahota's study (1968) is an exception.

8. This discussion is based upon Nelson's (1959) analysis. The ethnic-linkages variable is similar to his industrial-similarity measure.

into the migration decision. If it were abundant and distributed equally to all regions, it would not contribute to the explanation of variations in migration rates. Secondly, the more information that becomes available to a specific rural area (the unit of observation), the more widely dispersed it will be over the population of the emigration area. If access to information about the urban economy were concentrated in a few rural households, an increase in urban contacts for a rural region would not necessarily raise the probability of migration proportionately. And thirdly, information is channelled within an ethnic group in two different areas but not between ethnic groups. The importance of a group's hold on the urban economy makes this a highly realistic assumption. Its implementation allows the development of an index of the potential contacts between each rural-urban pair of areas on the basis of the ethnic composition of the populations involved.

The number of potential urban contacts for one individual in the rural area would be the number of people from his ethnic group that are now residing in the town. The contacts for an entire group could then be approximated by multiplying the number of group members in the rural area by that in the urban area. The potential contacts for all groups would simply be the summation of these products for each group, or:-

$$(2) \quad C_{ij} = \sum_{t=1}^z (P_{it} P_{jt})$$

where P_{it} = the population of rural area i belonging to ethnic group t ,

P_{jt} = the population of urban area j belonging to ethnic group t ,

and $t = 1, \dots, z$ ethnic groups.

Migration rates would then be a function of these potential contacts divided by the product of the total population in each area.

$$(3) \quad M_{ij}/(P_i P_j) = f \sum_{t=1}^z (P_{it}/P_i) (P_{jt}/P_j)$$

Equation (3) notes that the ethnicity concept can be computed for a rural-urban pair by multiplying the proportion of each area's population (rural and urban) belonging to a particular ethnic group in 1962, the products being summed over z ethnic groups.

Several properties of this index should be briefly discussed. First, if all groups are represented in an urban centre in equal proportions, the index will generate one number regardless of the ethnic composition of the rural area. Under these circumstances all rural areas would have equal access to the same number of urban contacts based on tribal affiliation. Hence, ethnic linkages would cease to be a variable because information is available equally to all rural areas. That ethnic linkages perform so significantly as an independent variable demonstrates that urban (as well as rural) areas vary markedly in their tribal composition. Second, the importance of large groups tends to be magnified by this index. Consider a group that comprises twenty per cent of both a rural and an urban population. If its percentage in each area should double, the contribution of its potential contacts to the index increases more than proportionately (from $.2 \times .2 = .04$ to $.4 \times .4 = .16$, or the group's contribution expands by four rather than two). This implies that there are economies of scale associated with an ethnic group's penetration of urban labour markets.⁹

Education

Rural schooling is included to control for the possibility that those from higher-income rural areas may have more education and hence greater returns from the urban job-search process. It is generally thought that rural schooling tends to provide skills that are more remunerative in the urban rather than in the rural economies. In addition to increasing the differences between urban and rural income streams, education provides important information and contacts about job opportunities as well as general skills that are more adaptable to a changing economy, thereby reducing the risk of migration and thus the discount rate used in the investment. In addition to making the investment more profitable, schooling can also change attitudes. Formal education can increase the desire for the market goods and services that are more readily available in the urban centres and can reduce the importance of being close to rural family and relatives, particularly if the schooling requires the student to leave the family's

9. According to the 1969 Census, the four major tribal groups accounted for over 93 per cent of the African population in the capital city, Nairobi, and 60 per cent of the nation's African population. This concentration in Kenya's principal city is observed for each of the major groups separately, although the neighboring Kikuyu predominate.

farm and board at the institution. All of these factors suggest that rural education and urban migration should be positively related, i.e., $\partial M / \partial E_i > 0$.

The urban education variable is included to control for the possibility that higher urban incomes in a town have resulted from a more educated population. A rural migrant population that is more educated than the rest of the nation should be attracted to those centres with a more educated population, urban income and amenities held constant. This would result not only from the preferences of the educated to be with others with similar schooling backgrounds but also from the greater likelihood that the rural educated would have more frequent communication with more educated urban populations. Thus, it is expected that the urban education coefficient will be positive if the rural education one is also positive, i.e., $\partial M / \partial E_j > 0$ as long as $\partial M / \partial E_i > 0$.

Distance

It is generally recognised that the tendency of people to move short distances reflects more than simply transportation costs. Nelson (1959) has argued that the importance of distance is contingent upon two sets of relatives and friends: one group in the decision-maker's home region and another group in the proposed destination centre. The home-region ties discourage long-distance moves because these contacts are difficult and costly to maintain over many miles. On the other hand, the destination contacts provide services, e.g., information about employment opportunities, that are important in the migration decision. These contacts are distributed primarily to the regions that are closest to the decision-maker's area because the relatives and friends in the destination regions were also constrained by distance in their moves during previous years. In this manner, destination contacts encourage short-distance migration while home-region contacts deter long-distance movement.

An alternative explanation is Levy and Wadycki's (1974) reformulation of Stouffer's (1940) intervening-opportunities hypothesis in terms of the opportunity costs of considering longer-distance moves. The potential migrant must consider not only the opportunity costs of leaving one's home region but also those of choosing destination j over all other possibilities. They assume that a greater distance between i and j expands the range of alternative economic opportunities that are no further away than j . Consequently, they argue that the strong deterrent effect of distance on migration may be reflecting the greater opportunity costs of choosing destinations far from the home

region.

Nelson's hypotheses concerning the distance variable appear to be important in the Kenyan case, because there is a close association between rural and urban members of the same household and because informal information and other employment-related services are recognised as being very important in the slowly growing urban economies. In the regression equation, the presence of the ethnic ties variable will directly control for the presence of destination contacts, leaving distance to incorporate the valuation of services provided by home-region friends and relatives. Greater distances will increase the costs of maintaining home-region contacts, resulting in less migration, i.e., $\partial M/\partial D < 0$. It would appear that the migration-distance relationship would be weakened by the lack of competing opportunities spread throughout the country, implying that the Levy-Wadycki hypothesis is less applicable. Kenya's economic activity is highly concentrated in the main urban centres, Nairobi and Mombasa.¹⁰ Thus, rural groups in western Kenya, for example, tend to travel long distances for employment because there are limited economic opportunities in the smaller towns near their home regions.

3. RESULTS

The results are presented in a manner that demonstrates the effect of the inclusion of ethnic ties. In the initial regression without the specification of variables for either urban employment opportunities or ethnic ties, the coefficient for urban education (E_j) is insignificant and negative (with a t-statistic of $-.320$). The correlation between urban income and urban education is not large ($+.341$) and the urban income coefficient is very stable whether or not the urban education variable is included. Thus, the elimination of the urban education variable would not affect the migration response to the income variables. Furthermore, it would appear that educated migrants seek urban centres with formal sector employment opportunities rather than simply a large proportion of educated inhabitants.

The first equation in Table 1 specifies distance without ethnic ties. The urban income and rural education coefficients are significantly positive and the distance one is significantly negative. Surprisingly, the beta

10. Seventy (70) per cent of African employment in the urban modern sector is found in these two towns. See International Labour Office (1972, p. 52).

coefficients that are estimated for equation 1 (Table 1) show that urban income, and not distance, contributes the most to the explanation of migration rates. Equation 2 in Table 1 shows that when ethnic ties is added to the previous regression, distance becomes insignificant—and the explanatory power of the regression equation is increased (R^2 increases from .57 to .64). This indicates that in the absence of ethnic linkages, the importance of distance in the Kenyan case can be attributed to its tendency to incorporate imperfectly the services provided by urban relatives and friends, or tribal contacts. These results would also suggest that the services provided by urban relatives and friends explain migration rates better than do the costs (both psychological and monetary) of being away from rural relatives and friends as measured by distance. This does not imply that rural contacts are unimportant, because ethnic ties indirectly incorporate their influence, as was explained above.

Distance is removed from the regression in equation 3 of Table 1. A comparison of equation 1 with 3 shows that when urban contacts are properly specified, the influence of rural schooling is reduced, because the better educated rural inhabitants also are more urban oriented with the necessary contacts in these employment centres. The pull of better employment opportunities in the modern sector also becomes stronger in equation 3, although its coefficient is not significant. The most important results, however, refer to the income coefficients. The ethnic-linkages specification has no effect on the significance of the urban income elasticity and causes the rural one to become significant. In addition, the urban income coefficient is reduced slightly while the rural income coefficient is increased. It would appear that the migration function without ethnic ties is a misspecified one that credits too much 'pull' to the urban income level and too little 'push' to rural economic conditions.

Other studies have used the migrant stock in a previous period as a proxy for the network of urban contacts. (See Greenwood, 1969a and 1969b, and Levy and Wadycki, 1973.) The results of these studies have usually been marred by the presence of what appears to be severe collinearity: insignificant coefficients for the other variables (including the income parameters) that frequently change from positive to negative and vice versa.¹¹ These problems arose because the migrant stock variable was

11. These criticisms have been noted by Laber (1972).

Table 1. Results of regression analysis for rural-urban mig

| | constant | Y_j | Y_i | N_j |
|------------------------------|----------|--------|---------|--------|
| (1) coefficient | -26.3 | 5.34 | -.958 | .515 |
| t-value | (- 4.44) | (5.56) | (-1.63) | (1.05) |
| β coeff. | | .605 | -.185 | .115 |
| (2) coefficient | -23.5 | 4.96 | -1.30 | .685 |
| t-value | (- 4.23) | (5.55) | (-2.35) | (1.51) |
| β coeff. | | .561 | -.249 | .153 |
| (3) coefficient | -23.6 | 4.91 | -1.29 | .712 |
| t-value | (- 4.32) | (5.64) | (-2.37) | (1.61) |
| β coeff. | | .556 | -.249 | .159 |
| (4) coefficient ^a | -.807 | .0038 | -.0064 | .179 |
| t-value | (-3.08) | (4.16) | (-1.88) | (1.27) |
| β coeff. | | .421 | -.228 | .129 |

a. Denotes arithmetic specification.

ation in Kenya, 1964-68.

| E_i | D_{ij} | T_{ij} | \bar{R}^2 | F | n | /X'X/ |
|------------------------|---------------------------|------------------------|-------------|------|----|-------|
| 1.99 (3.39) .368 | -.850 (-3.18) -.357 | | .573 | 11.2 | 39 | .815 |
| 1.08 (1.69) .199 | -.127 (-.348) -.053 | .817 (2.68) .470 | .640 | 12.3 | 39 | .252 |
| .998 (1.70) .184 | | .896 (4.43) .516 | .650 | 15.1 | 39 | .623 |
| .014 (.631) .078 | | 1.69 (5.54) .763 | .629 | 13.9 | 39 | .409 |

essentially the dependent variable lagged and because migration patterns tend to change slowly over time. They do not exist in the present study as evidenced by the stability of the income parameters, the easily explained changes in the coefficients for rural schooling and urban employment opportunities, and the small decline in the determinant of the correlation matrix ($X'X$) when ethnic linkages replace the distance variable. This can also be shown by regressing ethnic ties as a function of the other independent variables in equation 3. If ethnic linkages were simply a proxy for a previous migration pattern that has not changed much over time, the results should produce a significantly positive urban income coefficient and a significantly negative rural income coefficient. This step yields:-

$$(4) \quad T_{ij} = \begin{matrix} -9.731 & + & .3203 & Y_j & + & .9878 & Y_i & + & 1.239 & E_i \\ (-2.251) & & (.4343) & & & (2.296) & & & (2.753) & \end{matrix}$$

$$\begin{matrix} -.0423 & N_j \\ (-.1130) & \end{matrix} \quad \bar{R}^2 = .2381; \quad F = 3.969$$

As expected, rural education is a significant determinant of the rural-urban network of ethnic contacts. In addition, the rural income coefficient is significantly positive rather than negative, thus suggesting that an urban orientation is associated with both more schooling and greater rural incomes.¹² The other variables are insignificant and the explanatory power of the equation is relatively low.¹³

The employment-opportunity variable (N_j) is statistically insignificant in all equations in Table 1. In contrast to the other employment-opportunity measures that were discussed previously, the percentage of the labour force absorbed by the formal sector affects migration positively. The relative success of this form of the job-probability concept may be reflecting a

12. The correlation between the logs of rural education and rural income is only .18, which indicates that ethnic ties and rural income are associated independently of the schooling variable. Walters (1973) has argued that urban contacts are an important source of rural capital. This potential simultaneity between migration and rural income was not investigated here because good estimates of a rural income function were not possible.

13. Collinearity is even less a problem with the other variables. When each variable is regressed against the remaining independent variables, the resulting \bar{R}^2 and F-statistics are relatively low: rural education, .1247 (with an F-statistic of 2.353); rural income, .0669 (1.682); urban income, -.0578 (.4805); and urban job opportunities, -.0645 (.4244).

greater amount of formal information about employment that would be valued by a more educated migrant population. The International Labour Office (1972, pp. 509-510) noted that formal-sector employers often contact the secondary schools directly for potential employees. In general, the measures based on formal-sector employment do not perform as well as the other variables in the equation. This could reflect the fact that the general labour market conditions in a town represent only part of the probability of obtaining employment, which also depends upon the specific contacts available to the potential migrant. It is also recognised that these results may be due to data limitations that inhibit a proper specification of the employment opportunities or to the insufficient attention to the role of small-scale employment in creating urban opportunities that will either attract migrants or at least reduce the opportunity costs of the urban job-search process.

In equation 4 of Table 1, the results are reported for an arithmetic specification using the variables in equation 3. A comparison of the \bar{R}^2 for each equation is inappropriate because the dependent variables other than ethnic ties are not as important in the arithmetic specification as they are in the double-log transformation. It has been hypothesised that both income incentives and ethnic contacts are needed for migration and not simply the latter alone. Therefore, the double-log equation is preferred because both urban and rural incomes are significant. This supports the hypothesis that urban contacts interact with the economic conditions to stimulate migration rather than being simply a food-and-lodging subsidy to job-seekers.

The survey also separated migrants who had been in school prior to entering the urban labour market from those who had not. This is an important distinction because school leavers, who have been comprising an increasing share of the rural-urban migration flow, have had access to more formal channels of information, e.g., school counselors or knowledge of English, that were closed to the less educated. To capture this potential difference in the migration flow, the observations of the school-leaver migrants are used to estimate migration flows for this group, as was done with the total migration observations. The difference between the total and school-leaver migration flows is defined as non-school-leaver migration. Migration rates for those who had been in school are calculated as migration divided by the urban population and the rural male school enrollment in

1966 (the closest year to 1962 for which this information was available). Migration rates for the nonschool group are calculated as migration divided by the urban population and the remaining adult male population in the rural province.

The regression results are compared in Table 2, where those for the school leavers are reported in equation 1, those for the nonschool population in equation 2, and those for both groups pooled together in equation 3. There should not be too much emphasis given to the result that the school-leaver group responds slightly more to the urban income variable and slightly less to the rural income variable. This may simply reflect that the average urban income is measuring the income stream for educated people and the average rural income is measuring the opportunity costs of the unskilled and uneducated. Although the effect of the employment opportunities in the modern sector (N_j) appears reasonably similar for both groups, the informal information and other services provided by ethnic ties is more important for those not in school than for the school leavers.

It does not appear that the regression coefficients for the school leavers are significantly different from those for the nonschool population. This has been tested by pooling the observations for both groups and including a dummy variable to denote an observation from the school-leaver group. This regression has a very high explanatory power compared to the other results appearing in Tables 1 and 2. All coefficients, including the employment-opportunity one, are significant at the 95 per cent level. A Chow test has been performed by comparing the sum of the squared residuals of the pooled regression with those of the two separate groups added together. The null hypothesis that the two sets of regression coefficients are similar cannot be rejected.

4. POLICY ISSUES

Although problems of aggregation and data limitations require that these results be interpreted with caution, it appears that rural-urban migration in Kenya has generally been away from areas with lower opportunity costs and toward those centres with better economic conditions, as measured by income and employment opportunities. These results become even more pronounced when ethnic ties are included to incorporate the

Table 2. Comparison of school-leaver and nonleaver migration in Kenya, 1964-68.

| | <u>constant</u> | <u>Y_j</u> | <u>Y_i</u> | <u>N_j</u> | <u>T_{ij}</u> | <u>SL^a</u> | <u>R²</u> | <u>F</u> | <u>n</u> | <u>SSR^b</u> |
|----------------|-------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|----------------------|----------|----------|------------------------|
| School Leavers | -24.2 (- 4.33) | 5.19 (5.58) | -.649 (-1.10) | .789 (1.60) | .641 (3.07) | | .574 | 12.9 | 36 | 41.5 |
| Nonleavers | -18.0 (- 3.27) | 4.37 (4.76) | -1.59 (-2.76) | .695 (1.41) | 1.05 (5.32) | | .588 | 14.2 | 38 | 43.2 |
| Pooled | -22.3 (- 5.74) | 4.79 (7.38) | -1.13 (-2.75) | .721 (2.09) | .855 (6.04) | 2.46 (9.23) | .719 | 38.3 | 74 | 88.4 |

a. Dummy variable equal to one for school-leaver flows and to zero for nonleaver flows.

b. The sum of the squared residuals.

informal information and related employment services provided by urban tribal contacts.

Before the regression results are discussed with respect to some important policy issues concerning rural-urban migration in Kenya, it is essential to recognise that the structural relationships during the period analysed may be changing over time. Although income inequalities have been an important incentive, the migration of the 1960s was also a response to the increased opportunities for social and political participation in the urban areas that emerged from the independence movement. (See Gutkind, 1968 and 1974.) These other opportunities are likely to have been concentrated in those centres with the better economic conditions. This complicates the interpretation of the estimated income coefficients for policy or planning purposes, because a tighter incomes policy that reduces the monetary incentives alone may not lower migration rates as rapidly as the improved economic, social and political opportunities of the 1960s have increased them. Another structural change has been the rapid expansion in secondary schooling that is presently occurring in Kenya.¹⁴ As the population becomes more educated, formal channels of information should reduce the traditional importance of less formal linkages such as ethnic networks of rural-urban contacts. And finally, the estimated migration function should be sensitive to changes in the monetary returns to education in the urban and rural economies. Although urban and rural education variables have been included to incorporate the relative returns to education in the various regions, these coefficients could change if the returns to education in the urban areas should decline as schooling enrollments expand throughout the country.

The first policy issue concerns the role of income differences in the rural-urban migration process.¹⁵ The Kenya government has been particularly concerned with the social costs of rapid urban migration - a pool of the urban underemployed or overburdened urban public services. The government could influence the magnitude of this rural-urban flow through changes in the income differential, particularly since the public

14. During the 1963-70 period, primary school enrollment increased from about 0.9 to 1.5 million, while secondary school enrollment increased from 30,000 to 130,000. See International Labour Office (1972, p. 233).

15. See Frank (1968) for a fuller discussion of this issue.

sector is a principal determinant of the level of urban incomes as well as the initiator of many rural development projects. The regressions indicate that if rural incomes are allowed to grow as rapidly as urban incomes on a relative basis migration rates would still increase. This occurs because the absolute magnitude of the urban income elasticity (the coefficient in a double-log regression) is significantly greater than that for the rural income elasticity. Similar conclusions have been derived from another regression, in which the urban incomes adjusted for the presence of non-Africans were replaced by the unadjusted income levels and the rural incomes incorporated some unpublished data on income from nonagricultural small-scale activity. These coefficients - 3.636 for the urban income and -1.409 for the rural income - are significantly different from each other at the 95 per cent level. Thus, it appears that the migration flow will continue at a substantial pace even if the relative growth of rural income is raised to that of urban income. This does not mean that rural income-generating efforts are ineffective in limiting rural-urban migration, but simply that their influence on population movement appears to be easily muted by a small growth in urban incomes.¹⁶ Moreover, the government would be ill-advised to neglect the opportunity to encourage better economic conditions for those who remain in the rural area. It should also be recognised that a rural development strategy that differs substantially from the one prevailing during the 1960s may alter the effect of rural income on outmigration from rural areas.

The supply of urban migrants appears to be very sensitive to the levels of destination income when compared to other studies of migration in less developed countries. For example, Greenwood (1971, 1969b) estimated destination income elasticities of .932 for migration into Indian urban areas and .651 for interregional migration in Egypt. In studies of sub-Saharan African countries, however, Beals, Levy and Moses (1967) estimated a destination income elasticity of 2.683 for interregional migration in Ghana, and Rempel (1974) reported estimates of 3.6 for life-time migration

16. For example, according to the elasticities calculated in the previous section, a 10 per cent increase in rural incomes could be offset by a 2.6 per cent increase in urban incomes, leaving migration rates unchanged. The alternative income elasticities reported suggest that a 10 per cent increase in rural incomes could be countered with a 3.9 per cent increase in urban incomes. Note that this refers to relative rather than absolute income growth.

into Kenyan towns.¹⁷ Although the elasticities of 4.9 for adjusted urban income and 3.6 for unadjusted income in the present study are at the high end of the range, they are not inconsistent with the observation that there have been large monetary returns to post-independence migration in Kenya. These results suggest that an urban incomes policy of pricing labour closer to its marginal product would appear to be quite effective in limiting migration, although the political ramifications of such a policy may rule against this strategy.

In contrast, urban migrants do not appear as responsive to the relative growth of employment in the formal sector. When employment opportunities are measured as the percentage of the urban labour supply absorbed by the modern sector, there is a positive but insignificant relationship, except when school leavers and others are differentiated and the two samples pooled into one regression. The better performance of this variable, however, could reflect the reliance by educated migrants on more formal information sources that would be available in urban economies with a large modern sector. If it is interpreted strictly as an indicator of employment opportunities, its estimated elasticity implies that an increase in formal sector jobs will lead to a less than proportional increase in migration. However, the supply of migrants could expand more rapidly than employment growth if urban income is allowed to rise at the same time or if job-creation is promoted in high-income urban areas.¹⁸ These empirical conclusions are consistent with those derived theoretically by Todaro (1969) from his model of migration and urban unemployment. However, it should be emphasised again that they are based on a statistically insignificant coefficient of a variable that could have another interpretation, as explained above.

17. These elasticities are not strictly comparable to each other and are reported only to provide an indication of their general magnitude. The regression models used by these authors differed from the present one. None used migration rates as defined here, although all but the Rempel study controlled for the populations of both areas. Rempel also specified migration as a function of both the level of and the change in incomes.

18. The double-log specification of the regression equation means that the marginal effect of employment growth on migration will be greater at higher levels of urban income.

The predominance of ethnic ties would appear to be a primary reason why the employment opportunities in the modern sector failed to be a dominant influence on migration rates between specific rural and urban areas. In depressed labour markets, migrants can and will substitute specific contacts for the general employment conditions in a particular urban centre. Thus, a major conclusion of this study is that a basic understanding of the nature of these specific contacts is essential for the development of reliable migration estimates when employment growth is slow. There is some evidence that migrants in Kenya are depending less on family and ethnic networks and more on the educational system and schoolmates for the procurement of formal-sector employment (I.L.O., 1972, p. 510). It would appear, therefore, that future estimates of the determinants of Kenyan migration should incorporate the changing nature of employment-related contacts.

APPENDIX A: THE DATA

This study uses cross-section migration flows based upon a survey of 1,100 urban migrants conducted by Rempel, Harris and Todaro (1970). That study provides the only observations on migrants who have entered eight major towns in Kenya during the post-independence era. Census data do enumerate residence by place of birth in 1969, but these figures cover all migration prior to the time of census. There are several reasons that make these life-time migration figures less desirable. First, current policy considerations require the analysis of the movement of the African population in response to the post-colonial opportunities that emerged with Kenya's independence in 1963, as separate from all other migration flows. And secondly, the key variable in this study is the distribution of ethnic ties prior to the migration period under analysis. If lifetime migration were to be used, it would be difficult to specify an ethnic ties variable that was truly independent of the dependent variable, because lifetime migration would itself be a major determinant of the distribution of the country's ethnic groups. Another important advantage of the Rempel et. al. sample is that it separates the movement of people who were in school prior to migration and those who were not. This is an important distinction because school leavers are expected to have very different sources of employment information than the rest of the population. This is a particularly important concern in this study, which tries to assess the role of a more traditional source of information - urban relatives and friends.

The major disadvantage of the Rempel et. al. survey for my purposes is that only migrants were sampled and that each of the eight towns was sampled as an independent unit. A comparison of the 1962 and 1969 Kenya Population Census yielded an estimate of the magnitude of the in-migration into each urban centre. The growth in Nairobi's and Mombasa's African adult male population was calculated as the difference between the two populations as enumerated in 1969 and 1962. For the other six towns, there was no reporting of an African adult male population for 1969. Consequently, this was approximated by assuming that adults composed the same percentage of the African male population as they did of the total male population in 1969. This approach yielded negative growth rates for two towns, Eldoret and Nanyuki. When this procedure was applied to the Nairobi and Mombasa populations, it was found to underestimate the growth rates between 1962 and 1969 by about 12 per cent, or 1.7 per cent per annum. Accordingly, the growth rates for the other six towns were adjusted upwards by this 12 per cent factor. Finally, the Nairobi, Mombasa and Kisumu figures were all scaled down by the same adjustment that the International Labour Office's study used to account for the annexation occurring in these towns during the period between the two censuses.

The total in-migration into a town during the five years (1964-1968) covered by the survey was estimated as five times the absolute annual growth in the respective centre's population. This volume was then allocated to the rural home provinces according to the observations in the survey on urban residence by rural district of birth. This method provides estimates of the migration flows from the six rural provinces into eight major towns for the African male population.

These migration flows have several important limitations. They do not account for the change in the African adult male population of a particular city as the population grows older. It is difficult to assess the bias in this omission because the likelihood of a male child remaining in a particular urban centre or of an adult male in his forties returning to his rural home is not known. If it is assumed that all males aged 10 to 14 remain in the urban centre and all males aged 45 to 49 return to their rural homes, the 1962 statistics of Nairobi's African male population would indicate that 5.0 per cent of the city's male population entered the male adult classification whereas another 4.6 per cent were no longer included in this group. A more serious problem appears to be the neglect of return migration by those in all age groups, which would tend to cause

the migration estimates to understate the actual volume of in-migration to each city. Similarly, the neglect of chain migration (where urban residents in smaller towns leave for larger urban employment centres) would also understate migration into the smaller towns because all 1962 residents are counted as inhabiting the same town in 1969. Despite these limitations, the migration flows represent an unusually rich data source for analysing a problem for which suitable data are frequently unobtainable.

Rural Population

Adult male populations for 1962 were based upon the Kenya Population Census 1962 and upon some unpublished estimates of the area boundary changes in the intercensus period from the Statistics Division, Ministry of Finance and Economic Planning. These area changes were translated into the reallocation of population by assuming that population density within a rural district was uniform, i.e., if ten per cent of a district's area was moved to another province, ten per cent of its population was also assumed to be reallocated.

Income

The income estimates are based primarily upon reported income from employment in the modern sector, and hence must be interpreted cautiously because earnings from small-scale enterprises in both the rural and urban economies are omitted. The unadjusted urban income measure was calculated simply as the average earnings per employee in the modern sector. It was calculated as a five-year average (1964-1968) because the income level for any one year may fluctuate greatly and thus not be representative of the income flow expected from the migration investment.

This unadjusted measure included non-African income as well, resulting in a bias that overstated the expected income streams in the larger centres where non-Africans represented a larger proportion of the modern-sector labour force. An adjusted urban income measure was developed by making a rather imperfect correction for the presence of non-Africans in a centre's labour force. The only available information on the racial composition of the labour force in the different towns was for 1971, when the non-African labour force was likely to have been a smaller group than during previous years. It was assumed that the absolute number of non-African employees was the same during the 1964-68 period as in 1971. African

employment was calculated as the difference between total employment in year t and non-African employment in 1971. The non-African contribution to earnings in year t was estimated as the 1971 non-African employment times the national average earnings for that race (for private industry and commerce and public service employees) in year t. These non-African earnings were subtracted from total earnings in year t. Adjusted earnings divided by adjusted workers resulted in the second (adjusted) measure of urban income, which is the earnings variable in the regressions reported in the text. All urban incomes were expressed in Kenyan pounds per annum for an average employee in the modern sector over the 1964-68 period. Rural income was calculated as the sum of: (1) average annual modern sector income outside the major towns used in the study during the 1964-68 period, (2) the small-scale farm income in 1965, and (3) the market value of livestock in 1964. The first component was by far the most important source of rural income in this measure. A second income measure also included some unpublished data on nonagricultural small-scale rural income. Annual rural income was expressed as Kenyan pounds per rural adult male, as the adult males are the primary recipients of cash income in the rural economy. The results in the paper do not change greatly if rural income is expressed on a per-household rather than adult-male basis.

Probability of Employment

The change in modern-sector employment in each town during the 1964-68 period was divided by the 1964 level of employment to form the rate of change in employment. The more successful indicator of employment opportunities - the proportion of the urban labour force absorbed in the modern sector - was calculated as the 1963 employment level divided by an estimate of the 1962 urban supply of labour. The latter was approximated as 95 per cent of the adult males and 45 per cent of the adult females for all races (non-Africans as well as Africans) in each town. It was not possible to find estimates for modern-sector employment and the urban supply of labour that corresponded to the same period.

Distance

The distance between a rural province and an urban centre was calculated as the road miles between the town and the district centre(s) of the most densely populated district(s) in that province. The mileages were those given by British Petroleum, Road Map of East Africa (London, George Philip & Sons, Ltd., 1971).

Ethnic Linkages

This index was discussed in the text. The ten groups used were the four main tribes (Kikuyu, Luo, Abaluhya and Kamba) in addition to six aggregated groups (Coastal Bantu, Central Bantu minus the Kikuyu and Kamba, Western Bantu minus the Abaluhya, the Kalenjin groups, the other Nilo-Hamitic and the Hamitic groups). It is recognised that each group is large and does not necessarily operate as one ethnic group, e.g., the Kikuyu do have significant intra-tribal differences. However, the more one subdivides the population, the smaller will be the ethnic-linkage index. It is believed that the index as constructed does capture the main differences in ethnic compositions in a country that has a highly diverse culture.

APPENDIX B: USE OF THE 1969 POPULATION FOR THE DEPENDENT VARIABLE

The dependent variable is migration divided by the product of rural and urban population. Although 1969 population figures are available, 1962 figures were used to construct the dependent variable. The later population statistics would reflect the migration flows under investigation, which in some cases caused towns to double in size during the 1962-69 period. The 1962 figures are also consistent with the use of the 1962 ethnic composition of each town and province to develop the linkages variable. Basing the ethnic ties variable on 1969 data would clearly bias the results in favour of the hypothesis because interregional migration and ethnic composition are interrelated. (The use of 1969 data on ethnic composition did increase the importance of ethnic linkages in the regression equation.)

Alternate regressions are reported in Table 3 to show the effect of using 1969 data for the dependent variable, migration rates. This variable reduces the measured rate of migration for the more rapidly growing towns, because in this case migration increases the denominator through the urban population term while it is increasing the numerator. The results are basically unchanged, particularly the effects of introducing ethnic ties into equation (1). The elasticity for urban income is reduced somewhat but its absolute magnitude remains significantly greater than that for rural income. The measure of urban employment opportunities also performs less well.

Table 3. Results of regression analysis for rural-urban migration in Kenya, 1964-68: migration rates defined in terms of 1969 population.

| | constant | Y_j | Y_i | N_j | E_i | D_{ij} | T_{ij} | \bar{R}^2 | F | n | /X'X/ |
|---|------------------|-------------------------|----------------------------|------------------------|-------------------------|---------------------------|------------------------|-------------|------|----|-------|
| (1) coefficient t-value β coeff. | -21.9 (-3.77) | 4.26 (4.54) .532 | -.785 (-1.37) -.167 | .264 (.551) .065 | 1.94 (3.39) .396 | -.849 (-3.25) -.393 | | .505 | 8.76 | 39 | .815 |
| (2) coefficient t-value β coeff. | -18.9 (-3.54) | 3.87 (4.49) .482 | -1.14 (-2.13) -.241 | .440 (1.00) .108 | .999 (1.62) .203 | -.102 (-.290) -.047 | .844 (2.87) .535 | .594 | 10.3 | 39 | .252 |
| (3) coefficient t-value β coeff. | -19.0 (-3.61) | 3.83 (4.56) .477 | -1.13 (-2.15) -.236 | .461 (1.08) .113 | .934 (1.65) .190 | | .907 (4.66) .574 | .606 | 12.7 | 39 | .623 |
| (4) coefficient ^a t-value β coeff. | -.230 (-2.03) | .0012 (2.96) .302 | -.0026 (-1.75) -.210 | .058 (.950) .095 | .0017 (.181) .022 | | .846 (6.43) .868 | .643 | 14.7 | 39 | .409 |

a. Denotes arithmetic specification.

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