MIGRATION: CHICKEN OR EGG?*

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I.

This paper is concerned principally with the relationship between migration and the growth of employment in U.S. cities during the 1950's. The more popular explanation for the strong association between the two, probably, is that differential rates of migration are induced by differential growth in job opportunities or employment. Among the more recent proponents of this first view are Blanco [1], Mazek [4], and Lowry [3]. It is fundamental to the so-called export-base theory of regional growth. An alternative, suggested in particular by Borts and Stein [2], is that differential changes in employment are induced by differential rates of in-migration. In the following section I shall describe these two quite different viewpoints in somewhat greater detail.

In a recent paper [5] I made a preliminary examination of these two theories. My empirical findings tended rather strongly to support the Borts-Stein hypothesis. I found no tendency for manufacturing wages to grow at below-average rates in cities with an above-average total employment growth. The former tended to vary directly with changes in the average national price of a city's manufacturing output, however, as the Borts-Stein hypothesis predicts. More important for the purposes of this paper, when employment growth and migration were treated as simultaneously determined it appeared that in-migrants tended to find jobs in about the same proportion as previous workers. However, I also found that migration tends to be induced by employment growth. The coefficient representing the strength of the latter effect, though, was rather sensitive to variables included in the migration relationship and the cities used for estimating it. For this last reason I decided to examine the relationship between employment growth and migration for a larger number of cities. The cities included and variables used are described in Section III, my empirical results in Section IV.

Briefly to summarize my findings, the more detailed examination pursued here confirms my earlier conclusion that migration and employment growth each affect and are affected by the other. Except, perhaps, for cities under a quarter of a million urbanized area population in 1950 in the northeastern part of the country, in-migration appears to induce an increase in employment almost proportionate to its expected increase in the city's labor force. Just as clearly, employment growth tends to induce in-migration, though the latter effect is quantitatively smaller. Because of the preceding findings, it is difficult to attribute induced in-migration to a decline in the excess supply of labor at exogenously given wage levels which is brought about by growth in the demand for labor. Due to their interaction upon each other, exogenous increases in either migration or employment growth lead to multiple increases in both, the employment multiplier being about three. From my findings it appears that income differentials have effects of substantial practical importance upon differential migration and thus employment growth. The same appears to be true, at least for urbanized areas of a quarter of a million

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population or more in 1950, for differential rates of unemployment.

II.

In this section I shall consider the relationship between migration and employment growth. Special attention will be paid to cases in which either migration or employment growth can be taken to be determined by the other. Migration, like natural population increase, tends to shift a city's labor supply schedule to the right. The extent of the shift, of course, depends upon the demographic composition of the migrants. The greater the fraction of migrants who are males aged, say, twenty-five to fifty-four, the greater the shift because this group's labor force participation rate is higher than those of other demographic groups.

The change in employment which results from the shift in labor supply depends upon the elasticities of the city's labor demand and supply schedules and upon the extent to which wage rates are free to adjust. If these schedules have finite elasticities, the labor supply shift resulting from in-migration lowers the city's equilibrium wage level. So long as the labor supply schedule has a positive slope, any reduction in the wage level, of course, tends to reduce the level of employment. Thus, under the above conditions if wages are free to adjust downward the increase in employment would be smaller than the shift in the labor supply schedule migration brings about.

Downward rigidities in money wage rates need not necessarily change the analysis of the last paragraph. If initially there was no excess supply of labor and if other forces produced increases in wages at least as great as the decrease implied by in-migration, the latter would merely cause money wage rates to rise less rapidly than they otherwise would have. However, if the decline in money wages implied by in-migration were more than to offset increases from other sources, downward rigidities in money wages would cause employment to grow less rapidly than the labor force in the presence of in-migration, even if the labor supply schedule were perfectly inelastic.

In the limiting case where the city's labor demand schedule is infinitely elastic, however, employment increases by the same amount as the shift in the labor supply schedule which migration produces. For, the wage rate being fixed, there is no backward movement along the labor supply schedule. Likewise, downward rigidities in money wage rates do not become operative. At first glance it would seem quite unlikely that a city's labor demand schedule would be perfectly elastic. Borts and Stein [2], though, have provided a convincing rationale for such a demand schedule.

Assume that a city has firms producing and selling products for a nation or even world-wide market. Also, let the fraction of the output coming into this market which is produced by the firms in the city in question be so small that the demand schedule for their products has an arbitrarily high elasticity. Finally, let the prices paid by these firms for all other productive inputs —call these capital—be fixed for analogous reasons and let the production functions of these firms be homogeneous of degree one. Then the capital/labor ratio for these export firms is uniquely determined by the ratio of the delivered price of capital services to the f.o.b. price of output, both of which are fixed exogenously to the city. The capital/labor ratio, in turn, determines the ratio of the wage paid labor by these export firms to their f.o.b. price of output, and, the latter being given, the wage rate itself. To the extent that other firms, especially those producing goods and services for sale locally, hire labor in the same market as the export firms described above, they must of course pay the same wage rate as the export firms.

Now, a city may also have firms producing for export which face finitely elastic demand schedules in final product markets.

The Boeing Company in Seattle and Eastman Kodak in Rochester, New York, are good examples of such firms selling in world-wide markets. In addition, most cities of any appreciable size have wholesale and other firms who sell their products in surrounding regional markets, while all have firms selling goods at retail and services largely in the city itself. Groups of firms such as these would have a finitely elastic labor demand schedule. But when the latter is added horizontally to the infinitely elastic demand schedule of those export firms selling at given prices, the city's aggregate labor demand schedule is infinitely elastic in the relevant range.

The wage at which the city's aggregate labor demand schedule is infinitely elastic depends upon the f.o.b. prices of export products, the delivered prices of non-labor inputs, and characteristics of their production functions. Differential changes in any of these, especially changes in prices of products sold nationally, lead to differential changes in wage rates. Differential shifts in labor supply, however, have no effect upon wage rates. Indeed, one of the strongest bits of evidence for the Borts-Stein hypothesis is that, despite relatively large differential migration regionally, regional wage differentials have shown remarkably little change over time. The Borts-Stein hypothesis also implies that shifts in the demand for products produced by firms facing finitely elastic demand schedules would have no effects upon a city's employment or wage levels. Rather, such shifts would merely lead to a reallocation of a city's labor force between firms selling at fixed prices nationally and other firms.

Finally, the Borts-Stein hypothesis provides an interesting explanation for underdeveloped and depressed regions. The former are those for which the wage rate at which a national market export sector would develop is below that which workers can earn in other employments—agriculture and production for the local or regional market, for example. Similarly, a depressed region might be characterized as one for which the wage rate set by national conditions has fallen, perhaps below the minimum level at which labor can, in the long-run, be attracted from local employment or from extractive industries. In the short-run, downward rigidities in money wages may produce unemployment. Export firms may continue to produce at greater than long-run equilibrium levels however, so long as existing capital assets earn non-negative quasi-rents.

The Borts-Stein hypothesis thus provides a plausible rationale for the dependence of differential employment growth upon differential migration. The major rationale for the reverse dependence is provided by the model commonly used by labor economists and most explicitly described by Mazek [1]. He assumes that money wages are completely rigid and that an excess supply of labor exists in all local labor markets. Under these conditions employment grows only when the demand for labor increases, so that differential shifts in employment serve as a proxy for differential labor demand shifts. Worker incomes vary inversely with unemployment levels, and workers tend to equalize incomes by migrating from areas with higher to those with lower unemployment rates.

Mazek, following Blanco [4], argues further that it is potential unemployment U_p, upon which migration depends. By potential unemployment is meant that amount which would have existed at the end of the period under consideration had there been no migration, M. Letting, in addition, employment be designated by E, the labor force by L, natural increase of the last by N, and U_0 the initial unemployment level, from the identity

$$\Delta E + \Delta U \equiv \Delta L \equiv M + N,$$

upon substituting $M = 0$, one obtains

$$Up \equiv -\Delta E + N + U_0.$$

Potential unemployment is thus the negative of the change in employment plus natural increase and the initial level of unemployment. To the extent that migration is inversely related to potential unemployment it will thus vary directly with employment growth and inversely with natural increase and initial unemployment.

In my earlier paper [5], as well as in this one, I find that employment tends to grow in about the same proportion as migration. Therefore, I would conclude that the above rationale for the dependence of migration upon employment growth has little support. However, my results do as strongly suggest that migration not only affects but is affected by employment growth. While several *ad hoc* rationalizations for this latter dependence could be given, my major concern here is with measuring the precise degree of the response of migration to employment growth. For in some comparisons presented in my earlier paper, the estimated elasticity of migration with respect to employment growth was implausibly high. This elasticity also appeared to be sensitive to the inclusion of a regional dummy variable and to the cities data for which were used in estimating it. For these reasons, I decided to explore the relationship for a larger number of cities and to investigate the possibility of regional differences. After describing the data I used and procedures I followed in the next section, my findings for this larger group of cities will be presented and discussed in Section IV.

III.

The data used in the comparisons described in Section IV and the motivations for the various variables included are quite similar to those of my earlier paper [5, 319-21 and 324-29]. There are several major differences, however. First, I used urbanized area rather than SMSA data. The latter in my judgment is an inferior empirical counterpart of the notion of city and was used in my earlier paper only for comparability with manufacturing and business census data. Where necessary, urbanized areas were combined for comparability as between 1950 and 1960. Second, rather than using estimates of manufacturing wage rates and their changes, which were not as readily estimable for the larger group of cities, I included measures of median income of families, designated INCM49, and its change during the fifties, DINCM, in the analysis.[1] The third major difference is in the measurement of the 1950 unemployment rate, UNEMPT. Rather than the proportion of males in the experienced civilian labor force who worked twenty-six weeks or less in 1949, which I would have preferred but which is not available for SMSA's of less than 250,000 population, I used the fraction of the civilian labor force which was unemployed during the census week.[2] Other differences are noted in the description of variables below. Brief descriptions of all the variables used are given in the Appendix. Finally, all variables except regional dummies are in the natural log form after suitable modification.

The major variables which I have to describe are my estimates of migration, MIGRTN, and natural increase, NATINC. Both are based upon the well-known forward-survival technique applied to census population data.[3] Survival ratios for the total U.S. urban population, e.g., U. S. urban white males 35 to 39 in 1960 divided by white males 25 to 29 in 1950, were multiplied by 1950 city population for each cohort defined by age (14–19, 20–24, . . . , 70–74), sex and color (white vs. non-white) to obtain expected 1960 population. The difference between actual and expected 1960

[1] Unless otherwise noted explicitly, all the data used are from U. S. Bureau of the Census, *1950 Census of Population*, Vol. II, State Parts, hereafter designated 1950 Census, and *1960 Census of Population*, Vol. I, State Parts. The data on median income of families for 1950 and 1960 are from Tables 37 and 76 in their respective volumes.

[2] From 1950 Census, Table 35.

[3] The city data used for 1950 and 1960 are from Tables 33 and 20, respectively.

cohort population was attributed to migration, that between expected 1960 and actual 1950 population in the same age-sex-color group to natural increase.

I think it preferable, however, to convert population increases to corresponding increases in the labor force. The coefficient showing the effect of expected labor force increase produced by migration on employment is more readily interpreted. An elasticity of unity, for example, signifies that migrants enter the labor force and find employment to the same extent as previous workers. Converting to labor force increase also allows one to correct for differences in the extent to which persons in different age-color-sex groups enter the labor force. Therefore, the population increases attributed to migration and to natural increase were multiplied by labor force participation rates for the particular demographic group to obtain the corresponding expected labor force increases.[4] The labor force increases so estimated were then aggregated over all age-color-sex groups to obtain the total city labor force increase attributable to migration and to natural increase, respectively. The resulting totals were divided by the 1950 labor force estimate obtained by applying U.S. urban labor force particpation rates to the city's 1950 population by age-sex-color, and one was added before taking logs. NATINC, then is the log of what the labor force would have been in 1960 relative to 1950 at given U.S. labor force participation rates in the absence of migration, and similarly for MIGRTN.

Besides MIGRTN, the other dependent variables analyzed are total civilian employment, TLEMPT, and, in two comparisons, total civilian labor force, LBRFRC, both logs of 1960 relative to 1950 values. Both refer to values reported by the Census Bureau for the Census week (the data are from Tables 35 and 73 for 1950 and 1960, respectively). Included as an additional explanatory variable was a measure of the effects of changes in armed forces personnel, DARMFC, taken from the same source. This was necessary because the population data upon which the migration estimates are based include military personnel but the employment data refer only to civilian employment. DARMFC is the net change in military personnel divided by 1950 civilian labor force, to which one was added before taking logs. The coefficient of DARMFC in the equation explaining TLEMPT should be the negative of the average labor force participation rate for persons of the same demographic characteristics as military personnel multiplied by the coefficient of MIGRTN.

All of the coefficients presented and discussed in Section IV were estimated by the method of two-stage least-squares in which MIGRTN and TLEMPT (in two cases LBRFRC) were treated as simultaneously determined. In each of the two equations it was assumed that NATINC and DARMFC had non-zero coefficients. Also included as determinants of TLEMPT (and LBRFRC) were: the median income of families in 1960 relative to 1950, DINCM; the proportion of the city's employment which was in manufacturing in 1950, PRPMFG; and 1950 urbanized area population, SIZE. In my earlier paper both these latter variables had coefficients which exceeded their standard errors rather substantially in most of the comparisons made there, that of PRPMFG being negative.[5] In equations not shown

[4] The labor force participation rates used are the average rates for the whole U.S. urban labor force in 1950 for each specific age-color-sex group. This differs from my earlier paper, in which different 1950 rates for each city were used. My earlier procedure did not allow separate calculations for whites and nonwhites. In retrospect I thought it more important to allow for differences associated with color than for differences among cities in labor force participation rates.

[5] For most cities the proportion employed in manufacturing was based on data for the experienced civilian labor force 14 years old or over for the SMSA, 1950 Census, Table 79. For several, however, the former was not available, so data from Table 35 relating to all workers was used. In a few of the latter no SMSA was defined in 1950 or

here I also included the regional dummy variables noted below in the TLEMPT equation. The coefficients of these dummy variables were generally negligible and statistically insignificant in the TLEMPT equation, and the coefficients of the other variables were not very different from those shown in Table IV. Since there is no very strong *a priori* reason for including the regional dummies as determinants of employment change, I preferred to exclude them in the results shown here.

In addition to TLEMPT, NATINC, and DARMFC, already noted, UNEMPT, INCM49 and regional dummies DSOUTH and DWEST were included as determinants of MIGRTN. The dummy for cities in the South was included in anticipation that, because of the surrounding underdeveloped agricultural areas, in-migration would be heavier into cities in this region. The dummy for cities in the West was included partly because of its physical features, found desirable by some. More importantly the latter dummy was included partly out of the suspicion that some other important variable, in part responsible for the heavy in-migration into Western cities, might have been omitted. In some equations not shown here, DINCM was included as a determinant of migration as well. In most instances the coefficients of the other variables were very similar to those shown in Table V and DINCM's coefficient was insignificant. In a few, however, nonsense coefficients were obtained. The latter occurred, I believe, because the other variables included as determinants of employment change—but not migration—were not powerful enough to identify well the migration equation. On *a priori* grounds it would seem that differences in that rate of income growth are small enough relative to differentials at any point of time so that they have little effect upon the incentive to migrate. For this reason, I omitted DINCM from the determinants of MIGRTN in the estimates presented here.

the SMSA contained two or more urbanized areas; in such instances urbanized area data were used. Total 1950 population is from 1950 Census, Table 10.

As noted earlier, the results obtained in my earlier paper led me to suspect regional differences in the determinants of migration. For this reason I initially gathered data for all twenty-nine of the cities in the South and twenty-eight in the West which I ultimately used and for a random sample of thirty of the Northeastern cities.[6] When separate regressions were run for these three regions, some of the coefficients did differ considerably among the regions. I was also somewhat suspicious of possible differences in the coefficients among different city size classes. My earlier results were obtained mostly for cities of 250,000 or more in 1950, and it seemed possible that the Borts-Stein hypothesis might not work as well for smaller cities. This last is the case because there is presumably some size below which most cities do not contain firms selling on national markets in significant numbers. Indeed, I suspected that the regional differences found in the comparisons just described might be due in part to differences in the mix of cities by size regionally.

Now there are too few cities in the South and in the West to run separate regressions by city size and region. Thus, after gathering data for the forty-eight Northeastern cities which were not included in the original sample of thirty, I ran separate regressions for Northeastern cities in three size classes, large (1950 urbanized area population greater than 250,000), medium (125,000 to 250,000), and small (under 125,000). Since the coefficients did differ considerably in at least one important respect, as described later in Section IV, I

[6] Since there are relatively few urbanized areas in the West North Central and Mountain States, these were omitted. I would be happy to mail any interested reader the list of cities data for which were used in my comparisons and the names of the cities data for which were omitted from the comparisons shown in the third and fourth columns of Table II.

added successively cities in the South and then the West to the regressions for the three city size classes as a check for regional differences. The separate regressions shown in Section IV for the different regional combinations of cities are not statistically independent, of course.

IV.

The coefficients of MIGRTN and NATINC obtained for the TLEMPT equation using the different regional groupings of cities are shown in the first three columns of Table I. For the large cities the coefficients of MIGRTN are all essentially unity, and there is little difference among those obtained for the three regional groupings. For the medium and small cities in the Northeast, however, the coefficient of MIGRTN, while not significantly different from unity in a purely statistical sense, is certainly enough smaller to be of considerable practical importance. For these cities, however, MIGRTN's coefficient increases considerably as cities in the South and then the West are added, so that for all three regions in the third column of Table I there is little difference among the migration coefficients estimated for the three size classes of cities.

TABLE I

COEFFICIENTS OF MIGRTN AND NATINC IN TLEMPT STRUCTURAL EQUATION

Coefficient	Dependent Variable (Cities Included)			
	TLEMPT			LBRFRC
	(N.E.)	(N.E. & S.)	(N.E., S., & W.)	(N.E., S., & W.)
Large Cities				
MIGRTN	1.05	.931	.926	.909
	(.20)	(.142)	(.080)	(.076)
NATINC	.346	.536	.340	.504
	(.866)	(.527)	(.333)	(.316)
Std. Error of Est.	.0631	.0593	.0518	.0493
Medium Cities				
MIGRTN	.637	.819	.974	.942
	(.304)	(.271)	(.125)	(.124)
NATINC	.29	.577	.340	.432
	(1.27)	(.862)	(.581)	(.574)
Std. Error of Est.	.131	.124	.110	.109
Small Cities				
MIGRTN	.428	.799	.859	.867
	(.678)	(.246)	(.211)	(.210)
NATINC	.96	1.28	1.04	1.01
	(1.52)	(.65)	(.46)	(.46)
Std. Error of Est.	.166	.120	.111	.110

Another interesting and rather puzzling feature of Table I is the small coefficients of the NATINC variable for the large and medium cities. Since NATINC was estimated by weighting population increases in the various demographic groups by labor force participation rates, one cannot ascribe the size of these coefficients to the likely concentration of natural population increase in the younger age groups. And, since migrants apparently find employment in the same proportion as previous workers (with the exceptions noted above), it is difficult to attribute the size of the NATINC coefficients to the fact that new entrants to the labor force cannot obtain employment. For this reason, I ran regressions of LBRFRC on the same explanatory variables, with the results shown in the last column of Table I. Here the coefficients of NATINC are only negligibly higher, as compared with their standard errors. Thus, I would conclude that, whatever the reason, new workers tended to join the labor force in much smaller numbers than previous workers or in-migrants in the large and medium cities.

Now, one might be tempted to attribute the low values of the coefficients of NATINC to gross out-migration, O, from the city. Framing the TLEMPT equation in terms of gross in-migration, I, and natural increase remaining in the city, R, however, shows that such is not likely to be the case. In the same notation as was used earlier in Section II, since $M = I - O$ and $N = O + R$,

$$\Delta E = aI + bR = aM + bN + (a - b)\ O.$$

TABLE II

COEFFICIENTS OF MIGRTN AND NATINC IN TLEMPT STRUCTURAL EQUATION, MEDIUM AND SMALL N. E. CITIES

Coefficient	Dependent Variable (Cities Excluded)			
	TLEMPT	LBRFRC	TLEMPT	
	(none)	(none)	(1950 Unempt more than 6.5%)	(Substantial and Persistent Unempt, 1955–66)
Medium Cities				
MIGRTN	.637	.648	.925	.848
	(.304)	(3.04)	(.436)	(.478)
NATINC	.29	.50	.068	−.50
	(1.27)	(1.27)	(1.42)	(1.46)
Std. Error of Est.	.131	.131	.141	.127
Small Cities				
MIGRTN	.428	.610	.872	.620
	(.678)	(.651)	(.508)	(.443)
NATINC	.96	1.11	1.70	1.45
	(1.52)	(1.46)	(1.92)	(1.61)
Std. Error of Est.	.166	.160	.190	.189

If $a = b$, using net migration and natural increase would yield the same results as would the use of I and R as explanatory variables. If $a \neq B$, since O is negatively correlated with M and positively with N, the omission of O would bias the estimates of a and b toward equality.

In Table II some additional comparisons are presented which attempt to account for the small MIGRTN coefficients in the Northeastern medium and small cities. In the second column, using LBRFRC rather than TLEMPT as dependent, the coefficient of MIGRTN for medium cities is almost identical with that in the first column, which repeats the first column of Table I, and for small cities the coefficient is only slightly larger. Thus, the small coefficient previously noted in the Northeast would not seem to be associated with lower labor force participation rates for migrants. I also suspected that the small MIGRTN coefficients in Table I might be the result of an excess supply of labor in some cities whose elimination was not permitted by downward wage rigidities. If such were the case, the elasticity of TLEMPT with respect to MIGRTN would be essentially zero in the affected cities and the observed coefficient in Table I a weighted average of zero for these cities and a much larger one for others.

To test this latter suspicion I eliminated two different, though not disjoint, groups of cities. In the last column, results are shown which were obtained when cities with unemployment rates in excess of 6 percent in nine or more years in the period 1955 through 1966[7] were eliminated. For medium cities the coefficient of MIGRTN increases markedly, but for the small cities the MIGRTN coefficient in the fourth column is still considerably below unity. When cities with 1950 unemployment rates of 6.6 percent or more are eliminated, as in the third column, MIGRTN's coefficients increase much more and, in fact, are not much different than the MIGRTN coefficient for all regions in Table I. It therefore appears that the small coefficients in Table I are the result of unusually small employment effects of migration in Northeastern cities with especially high initial unemployment rates. The result is still rather puzzling, though, since quite a few cities in the South and West had 1950 unemployment rates as large or larger than those Northeastern cities omitted in the third column of Table II.

There is little variability of the estimated partial regression coefficients of MIGRTN on TLEMPT shown in Table III. With but two exceptions, regardless of the regional groupings of cities used or the size class of city, all the coefficients range from about

[7] As reported by the U. S. Department of Labor in its list of labor market areas with substantial and persistent unemployment. The list for years prior to 1955 was not available to me. Many of the excluded cities, in fact, had unemployment rates in excess of 9 percent in six or more years during the period.

0.6 to 0.7 and all are highly significant statistically. I would conclude, therefore, that although migration is clearly affected by employment growth, the elasticity of the former with respect to the latter is markedly smaller than unity.

The coefficients of NATINC in Table III, however, vary considerably as among city size classes. For the large cities, these coefficients are roughly equal numerically but of opposite sign to the TLEMPT coefficients. For the medium cities the coefficients of NATINC, though small relative to their standard errors, are actually positive, while for the small cities they are negative and markedly larger numerically than the TLEMPT coefficients. It is interesting to note that the effect of NATINC on TLEMPT as well appears markedly greater in the small cities. On the whole, though, it is difficult to make any precise judgment about the effects of NATINC because of the large standard errors of its coefficients. These probably result from the fact that NATINC varied but little from city to city. As shown by Table VII, while the standard deviation of MIGRTN ranged from about 13 per cent for large cities over all three regions to 27 percent for medium cities, the standard deviation of NATINC was only 3 to 4 per cent among cities in all regions.

One final point on differences in coefficients is worth noting. While by and large there do not appear to be marked changes in the standard errors of estimate when cities of a given size class in additional regions are added, rather consistently the standard errors of estimate shown in Tables I and III are about twice as large for medium and small cities as for large ones. The standard deviations of TLEMPT and MIGRTN, however, were also about twice as large for the medium as for the large cities, though about the same for small ones, as Table VII indicates. Thus, while the model does less well absolutely in explaining employment growth and migration in the medium city size class, it does less well both absolutely and relatively for the small cities.

TABLE III
COEFFICIENTS OF TLEMPT AND NATINC IN MIGRTN STRUCTURAL EQUATION

Coefficient	Dependent Variable (Cities Included)		
	MIGRTN		
	(N.E.)	(N.E. & S.)	(N.E., S., & W.)
Large Cities			
TLEMPT	.590	.580	.699
	(.156)	(.142)	(.114)
NATINC	−.239	−.483	−.583
	(.672)	(.472)	(.367)
Std. Error of Est.	.0504	.0467	.0452
Medium Cities			
TLEMPT	.448	.671	.820
	(.162)	(.178)	(.107)
NATINC	.065	.465	.207
	(.797)	(.700)	(.516)
Std. Error of Est.	.0857	.0896	.0923
Small Cities			
TLEMPT	.590	.664	.687
	(.370)	(.217)	(.233)
NATINC	−1.14	−1.23	−1.02
	(.94)	(.63)	(.50)
Std. Error of Est.	.117	.0983	.0954

I would now like to comment upon the coefficients of some of the other variables used to explain employment growth and migration. By and large, the coefficients of these other variables changed very little relative to their standard errors as among different regional groupings of the same size class. Therefore, I show only those coefficients obtained from the regressions fitted to data for cities in all regions. The coefficients of the determinants of employment change are shown in Table IV, those of migration in Table V. In the former, the most significant statistically are those of DINCM, which are about twice as large as their standard errors for the large and medium cities, still positive but decidedly smaller for the small cities. For the former two groups, at least, the coefficients are rather too large to attribute to the effects of increased earnings on the supply of labor, since earnings elasticities of labor force participation for most groups, I suspect, are quite low. Thus, it appears that DINCM may be serving partly as a surrogate for exogenous increases in the labor force.[8] The coefficient of PRPMFG is consistently negative and about the same as found in my earlier paper, though here its "t"-ratio is never greater than −1.5. Finally, unlike my earlier paper, the coefficient of size is never larger than its standard error, and it differs in sign as between the large and the other two size classes.

TABLE IV
TLEMPT STRUCTURAL EQUATION, BY CITY SIZE CLASS, ALL REGIONS

Coefficient	Dependent Variable (City Size Class) TLEMPT			
	(Large)	(Medium)	(Small)	(Combined)
MIGRTN	.926	.974	.859	.998
	(.080)	(.125)	(.211)	(.073)
NATINC	.340	.340	1.04	.674
	(.333)	(.581)	(.46)	(.267)
DINCM	.424	.541	.192	.370
	(.207)	(.282)	(.284)	(.152)
DARMFC	.165	−.350	−.519	−.349
	(.246)	(.698)	(.538)	(.259)
PRPMFG	−.0296	−.0361	−.0517	−.0329
	(.0214)	(.0440)	(.0344)	(.0194)
SIZE	−.00495	.0041	.0514	.0093
	(.00919)	(.0902)	(.0854)	(.0084)
Std. Error of Est.	.0518	.110	.111	.0933

TABLE V
MIGRTN STRUCTURAL EQUATION, BY CITY SIZE CLASS, ALL REGIONS

Coefficient	Dependent Variable (City Size Class) MIGRTN			
	(Large)	(Medium)	(Small)	(Combined)
TLEMPT	.699	.820	.687	.819
	(.114)	(.107)	(.233)	(.070)
NATINC	−.583	.207	−1.02	−.457
	(.367)	(.516)	(.50)	(.265)
DARMFC	.395	1.01	.609	.466
	(.276)	(.57)	(.431)	(.223)
UNEMPT	−.0879	.0143	−.0858	−.0532
	(.0302)	(.0469)	(.0490)	(.0227)
INCM49	.108	.370	.052	.0981
	(.110)	(.168)	(.182)	(.0831)
DSOUTH	.0432	.0099	.0244	.0089
	(.0302)	(.0550)	(.0650)	(.0279)
DWEST	.0575	−.0174	.0577	.0247
	(.0294)	(.0590)	(.0600)	(.0289)
Std. Error of Est.	.0452	.0923	.0954	.0831

TABLE VI
COEFFICIENTS OF UNEMPT AND INCM49 IN MIGRTN REDUCED-FORM EQUATION

Coefficient	Dependent Variable (Cities Included) MIGRTN		
	(N.E.)	(N.E. & S.)	(N.E., S., & W.)
Large Cities			
UNEMPT	−.111	−.131	−.169
	(.056)	(.052)	(.040)
INCM49	.662	.690	.661
	(.166)	(.154)	(.148)
Std. Error of Est.	.0556	.0602	.0654
Medium Cities			
UNEMPT	.006	−.0293	.0404
	(.118)	(.0729)	(.0838)
INCM49	.994	.832	1.07
	(.383)	(.229)	(.28)
Std. Error of Est.	.0991	.0891	.157
Small Cities			
UNEMPT	−.160	−.0619	−.0716
	(.132)	(.0795)	(.0649)
INCM49	.034	.643	.538
	(.541)	(.299)	(.247)
Std. Error of Est.	.133	.117	.121

Of the predetermined variables in the MIGRTN equation shown in Table V, most of the regional dummy variable coefficients are positive as anticipated. Except for the medium size class, they indicate that MIGRTN was about 6 percent greater in the West than in the Northeast and 2 to 4 percent greater in the South for given employment growth. Two of the three size

[8] In my earlier paper [5, 325, Table 1], the estimated elasticity of TLEMPT with respect to the increase in an index of the change in wages of manufacturing workers was about −0.1.

classes yielded negative elasticities for the 1950 unemployment rate, also about comparable or even larger numerically than I found previously [5, 328, Table 2]; both of these are about twice their standard errors. While all three coefficients of INCM49 are positive, only one exceeds its standard error.[9]

The coefficients of the structural equations, though, are misleading as to the overall impact of UNEMPT and INCM49 on migration. Because the latter and employment growth interact upon each other, a variable such as INCM49 which shifts the migration equation produces a multiple increase. To illustrate, let

$$\Delta E = \alpha M + \beta \text{ and } M = \gamma \Delta E + \delta,$$

where ΔE is employment change, M is migration, and β and δ represent shifts in the relationships. Solving,

$$\Delta E = \frac{\beta + \alpha\delta}{1 - \alpha\gamma} \text{ and}$$

$$M = \frac{\gamma\beta + \delta}{1 - \alpha\gamma}$$

Here, the equilibrium will be a stable if and only if $\alpha\delta < 1$. Substituting the values $\alpha = 1$, $\gamma = 2/3$, approximately those found here, one finds employment and migration multipliers of income differences which are about three. Thus, the overall impact of, say, INCM49 on MIGRTN is about three times the elasticities shown in Table V.

Indeed, one finds still larger elasticities for INCM49 from the reduced-form equations for MIGRTN. These as well as similar UNEMPT elasticities are summarized in Table VI. With the exception of small cities in the Northeast only, all the income coefficients are several times their standard errors and 0.5 or greater. The elasticities of about 2/3 for large cities indicates that, for a city whose median income of families was about one standard deviation or 11 per cent above-average in 1949, in-migration during the period 1950 to 1960 was about 7 percent above-average. Since the mean value of MIGRTN, shown in Table VII, was about 10 percent relative to the city's 1950 labor force, the effect of income differences was of substantial practical importance. For UNEMPT, only the large cities have elasticities which are consistently negative and numerically large relative to their standard errors. For the large cities, though, UNEMPT too is of substantial practical importance. The coefficient of −0.17 for cities in all regions together with the standard deviation of UNEMPT for large cities shown in Table VII implies that in-migration would have been 5 percent less relative to its labor force for a large city where the 1950 unemployment rate was one standard deviation above-average, that is 6.6 percent instead of 4.9 percent.

TABLE VII

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES, BY CITY SIZE CLASS, ALL REGIONS

Variable	Mean (Standard Deviation)			
	(Large)	(Medium)	(Small)	(Combined)
TLEMPT	.212 (.145)	.236 (.307)	.138 (.169)	.194 (.220)
MIGRTN	.105 (.133)	.142 (.269)	.051 (.152)	.099 (.195)
NATINC	.0456 (.0293)	.0619 (.0340)	.0632 (.0391)	.0569 (.0351)
UNEMPT	−3.01 (.30)	−3.04 (.39)	−3.00 (.37)	−3.02 (.35)
INCM49	8.16 (.11)	8.13 (.13)	8.06 (.13)	8.11 (.13)

[9] This finding is more in accord with *a priori* expectation than that of my earlier paper. There, using an index of manufacturing wage rates rather than family income, the coefficient was slightly negative [5, 328, Table 2].

APPENDIX

Glossary of Variable Names

(See Section III for an exact description)

Variable Code Name	Description
TLEMPT	Increase in total civilian employment, 1950 to 1960
LBRFRC	Increase in total civilian labor force, 1950 to 1960
MIGRTN	Net increase in labor force due to in-migration, 1950–60
NATINC	Net increase in labor force due to aging of the 1950 population, 1950–60
DINCM	Increase in median income of families, 1950 to 1960
DARMFC	Net increase in armed forces personnel residing in the city relative to 1950 civilian labor force, 1950–60
PRPMFG	Proportion of city employment in manufacturing, 1950
SIZE	City population, 1950
UNEMPT	Civilian unemployment rate, 1950
INCM49	Median income of families, 1949
DSOUTH	1 if city located in the South, 0 otherwise
DWEST	1 if city located in the West, 0 otherwise

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