THE INSENSITIVITY OF INTERREGIONAL MIGRATION TO WAGE DIFFERENTIALS

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In a recent issue of <u>Weltwirtschaftliches Archiv</u>, Gallaway, <u>et al</u>., [11], found that regional wage differentials had no apparent impact on the interregional movement of labor in West Germany. The same authors also found that international migration from the United Kingdom and West Germany to the Republic of South Africa was insensitive to variations in international wage differentials over time [1, 4]. These findings appear to cast doubt on the ability of interregional and international factor markets to achieve factor price equalization through interregional and international factor flows. This paper seeks to demonstrate the general proposition that there can be a substantial range of interregional (or international) factor price differentials that will not lead to interregional (international) factor flows. In doing so, this paper also considers the nature of a region's (country's) factor supply curve as interregional (international) factor flows are allowed for. The basic framework for this analysis is one in which (a) factor demand curves are continuous and negatively sloped and (b) intraregional factor supply curves are continuous and positively sloped.

We have divided the paper into two parts. The part which follows consists of a theoretical analysis. First, interregional migration under conditions of perfect factor mobility is analyzed. Second, the costs of interregional migration are considered. Finally, interregional migration under conditions of a "mobility cost constraint" is analyzed. The last part of the paper consists of an empirical exploration of the propositions advanced.

The Theory

Consider a two region economy (regions A and B). The firms in each region are assumed to employ a single variable factor that is homogeneous and purchased under perfectly competitive factor market conditions. We define the "intraregional factor supply" as the number of factor units forthcoming from <u>within</u> a region at various alternative regional factor prices. We assume that the intra-regional supply of the factor is an increasing function of the region's factor price. The "interregional factor supply" to a region is a consequence

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of the flow of factors between regions in response to absolute differentials in regional factor prices. The "total factor supply" to a region is the lateral sum of intra- and interregional factor supplies at alternative factor prices in a region. Regions A and B are assumed to have identical initial factor demand curves and identical initial intra-regional factor supply curves. Also, exogenously introduced factor demand shifts are assumed to have a source outside regions A and B and to be directable at either region alone.

Now, we develop a total factor supply curve in region A under conditions of perfect mobility. By "perfect mobility" we mean that factor units will move between regions in response to any interregional factor price differential. (e.g., factor mobility is assumed to be costless). We assume that regions A and B have the same initial equilibrium factor prices and factor employment levels. Region A's factor market is shown in Figure 1a and region B's in Figure 1b, with an initial equilibrium at points a and g, respectively.

Now postulate exogenous rise in the demand for the factor in region A from D_1D_1 to D_2D_2. Initially, the factor price is driven toward point b. However, as the factor price in region A rises, factor units begin to flow from region B to region A (in response to the interregional factor price differential). This has two consequences: B's intra-regional factor supply curve shifts to the left (B's factor supply decreases), and A's factor supply curve shifts to the right. Factor flows from B to A will continue until there is interregional equality of absolute factor prices. This equality of factor prices is shown in Figure 1 at point c in region A and point h in region B. The movement from equilibrium point a to c in region A is a consequence of the increased volume of the factor supplied intra-regionally at higher factor prices and of interregional flows in response to a factor price differential. Points a and c are two points on region A's total factor supply curve.

Other points on the total factor supply can be derived by varying the factor demand in A, while holding that in B constant. Consider, for example, a decline in demand to D_3D_3, which results in point d and equal factor prices in both regions. The locus of all such points as d, a, b is the total factor supply curve for region A, and is shown by the curve lm in Figure 1a. Note that the curve lm also indicates the equilibrium factor price in region B for every equilibrium factor price in region A.

Costs of Interregional Migration

At the outset, it should be noted that there ordinarily are costs involved in transferring from one region to another. We here classify the costs of interregional migration under two categories: (1) moving costs and (2) non-moving costs. Each of these classifications warrants some discussion.

Several forms of moving costs must be acknowledged [3, 6]. First, of course, there are the direct costs of moving. Second, the act of moving may necessitate the sale of property (especially tangible) and may thus result in certain pecuniary losses (or gains). These must be accounted for appropriately. Next, there may be foregone earnings while in transit and/or while in the
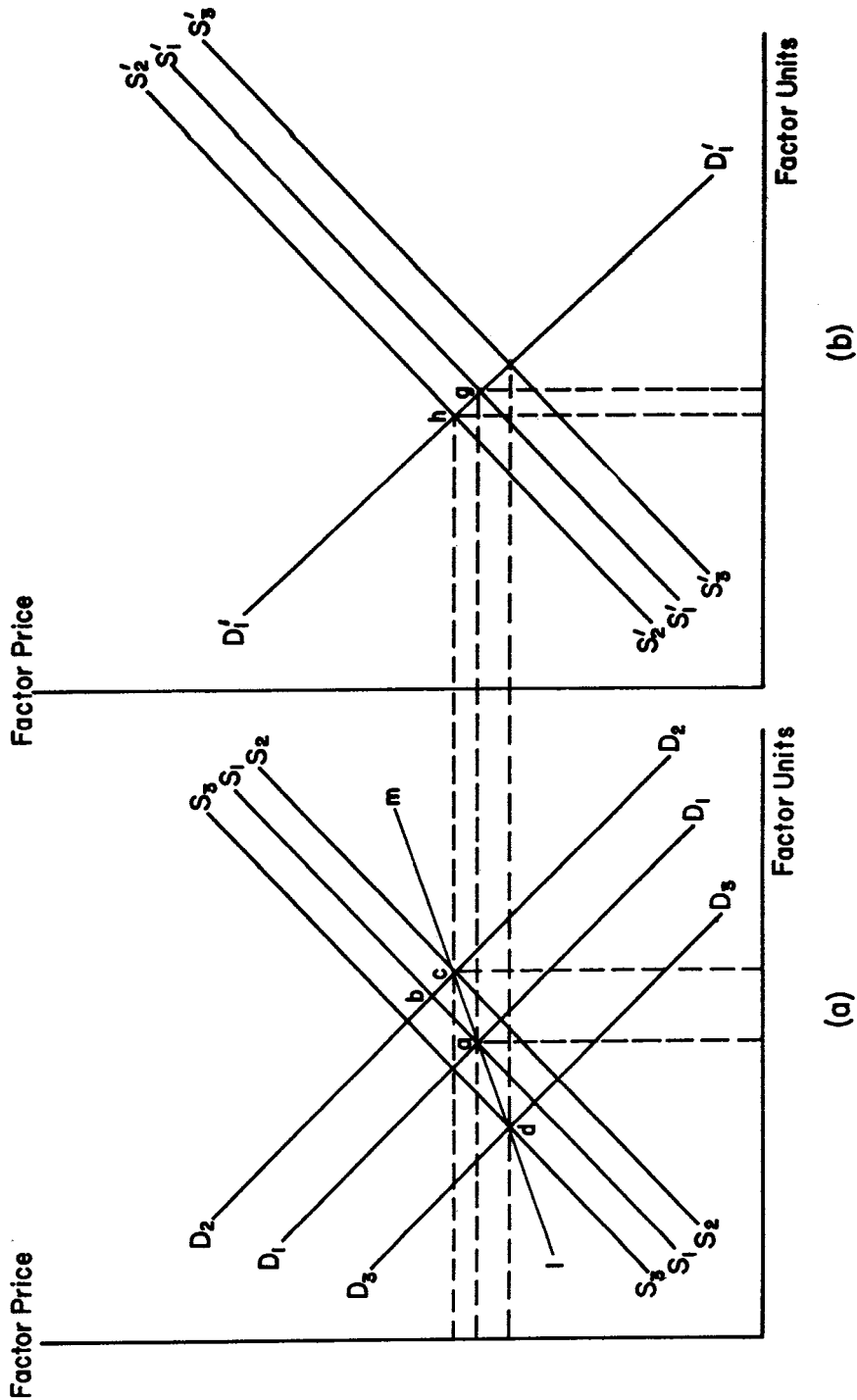
Figure 1

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process of packing and unpacking. Beyond this, of course, there are the psychic costs of leaving familiar surroundings, as well as the psychic costs associated with the experience of moving. There may also be significant psychic costs resulting from the search for a new residence. Finally, there may be costs involved in going out and seeking employment in another region, costs that in themselves may be sufficient to inhibit labor mobility before a job offer is ever made.

There are likely to be costs to migration aside from moving costs per se. To the extent that interregional migration is accompanied by interindustry transfers of labor, there are other costs to be reckoned with. Consider, for example, two common labor market institutions: seniority and pensions. Clearly, seniority provisions, where they pertain, afford an element of job security [2]. This job security presumably has a value. Any interindustry transfer which causes the loss of seniority benefits obviously imposes a real cost on the worker involved. In this same vein, consider the possible effect of pension plans. Should the benefits of a pensions plan be nonvested and should a pension plan's benefits be an increasing function of industry employment, another cost to migration must be recognized. Finally, inter-regional migration which involves interindustry transfers may impose upon the labor unit costs associated with such factors as occupational licensing and/or union membership.

In addition, to the extent that interregional migration is accompanied by occupational changes, there are retraining costs which may have to be reckoned with. These retraining costs may assume a number of forms. First, there are the direct costs of retraining, which may assume the form of tuition expenses and/or materials expenses. Second, to the extent that income is foregone during retraining per se, occupational changes involve an obvious cost to the labor units affected. Additionally, to the extent that retraining is both (a) on-the-job in nature and (b) undertaken at a below-normal wage rate, retraining involves other forms of income loss.

In light of this brief discussion, it seems reasonable to assume that there exist cost barriers to the interregional flow of labor. For simplicity (and relevance), we assume that all such costs can be translated into pecuniary terms and consequently into an absolute interregional wage rate differential which must be overcome for any interregional labor flows to take place. We refer to this differential as the "mobility cost constraint."

The Constraint and Migration

We now analyze interregional migration under conditions of a "mobility cost constraint." Consider Figure 2, where curve D_1D_1, S_1S_1 and $D_1'D_1'$, $S_1'S_1'$ from Figure 1 are reproduced. Using points $\underline{a}$ and $\underline{g}$ as the initial equilibrium positions, we assume that the mobility cost constraint is given in Figure 2 by the distance $\underline{st}$. No factor movement from A to B will take place until the factor price in A falls at least $\underline{su}$ ($=st$). The reason is simple. The suppliers of the factor in region B choose between selling in region B and exporting the factor to region A. The factor price in A is viewed from B as
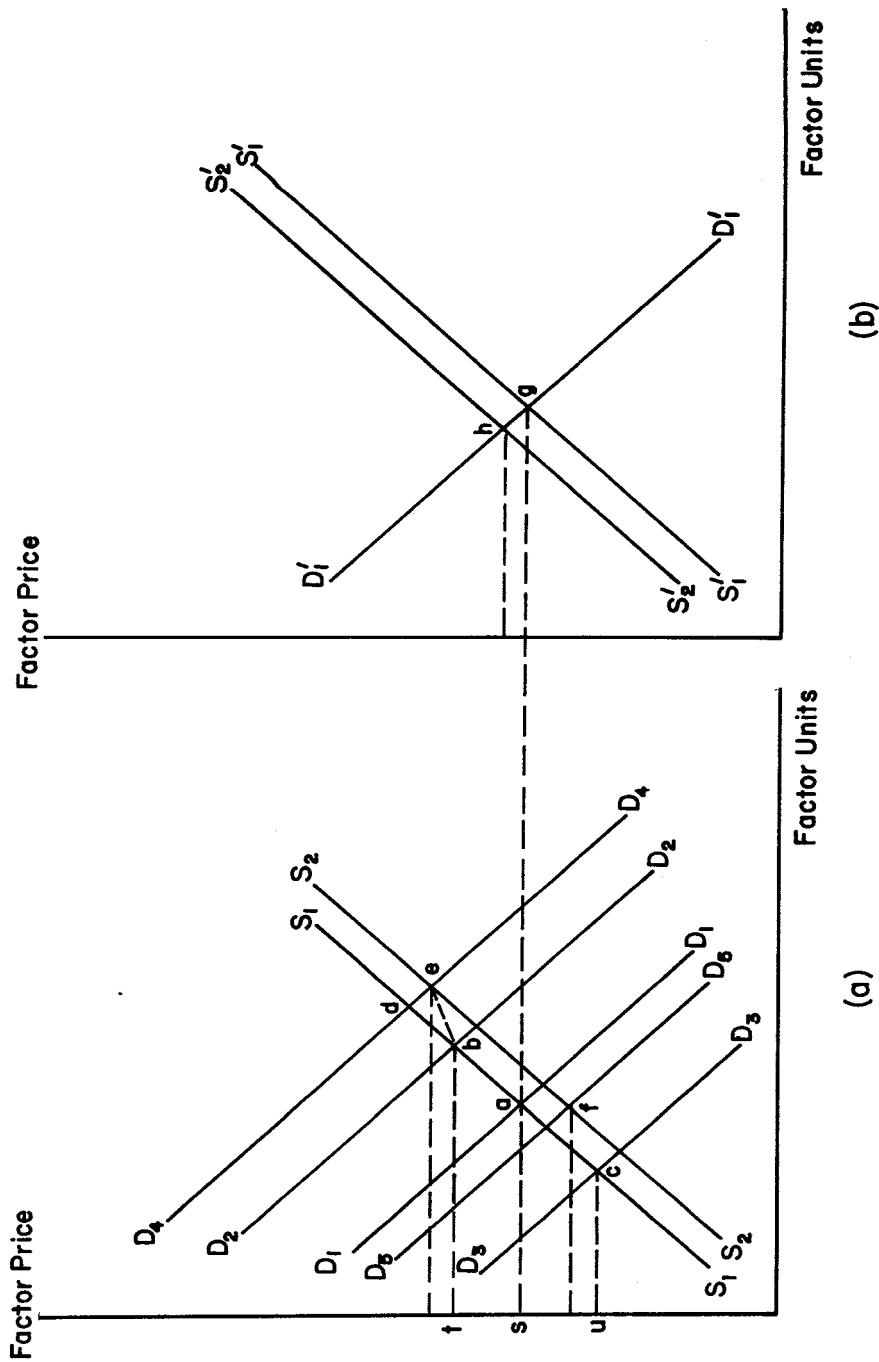
Figure 2

net of the mobility cost constraint. Therefore, the factor price in A must rise above t before suppliers in B will find it profitable to export the factor. Similarly, the price in A must fall below u before suppliers in A will find it advantageous to export the factor to region B.[1]

Now let demand in A rise from D_1D_1 to D_2D_2, holding B's factor demand curve constant. Equilibrium in A will move from point a to point b. Since the factor price differential does not overcome the mobility cost constraint, A's intra-regional factor supply remains at S_1S_1. Thus, points a and b lie on A's total factor supply curve. Similarly, if A's factor demand curve had shifted from D_1D_1 to D_3D_3 (point c) another point on A's total factor supply curve is derived, which does not bring about any interregional factor flows. Consequently the factor supply curve in B remains at $S_1'S_1'$.

Now, let factor demand in A rise from D_1D_1 to D_4D_4. Initially, the factor price in A will rise toward point d, and since the interregional factor price differential exceeds the amount of the mobility cost constraint, factor units will flow from region B to region A. This shifts A's factor supply curve to the right (and B's to the left). Factor units will continue to flow from B to A until an interregional factor price differential equal in amount to st is established at some points such as e in region A and h in region B. Point e is another point on the total factor supply curve in region A.

With equilibrium at point e, once again a mobility cost constraint is identified. Now consider a decline in demand in region A, after the establishment of equilibrium point e. The factor price in A will have to decline below the factor price in B by an amount equal in magnitude to st before factor units will flow from A to B. This point is reached at point f. In short, factor demand in region A must decline below D_5D_5 before factor units will flow from A to B. Below D_5D_5, the total factor supply will differ from the intra-regional factor supply.

Summary

Several important implications arise out of this analysis. First, there is likely to be a substantial range of interregional factor price differentials that will not be associated with interregional factor flows. Second, once interregional factor flows have occurred, the range of variation which does not elicit factor flows will shift (e.g., in Figure 2, the range shifted from cb to ef). In particular, this suggests that the sensitivity of interregional factor flows to factor price differentials will depend upon the presence or absence of systematic demand shifts in one direction in one region. That is, in Figure 2, if factor demand continues to shift rightward in region A, factor

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[1]These points are logically analogous to the gold import points. See, for example, Leighton [5, pp. 136-137].

movement will take place <u>pari passu</u>. Should the factor demand shift reverse direction, reverse factor flows from A to B may not occur and the apparent sensitivity of interregional factor flows to variations in interregional factor price differentials may thus disappear. This suggests that where there is not a systematic growth in demand in one region <u>vis-a-vis</u> another, factor movement between the two regions may display an apparent insensitivity to factor price differentials.

<u>Empirical Evidence</u>

In order to explore empirically the propositions advanced in the theoretical portion of the paper, data have been assembled from the 1960 decennial census describing the 1955-1960 migration patterns among Standard Metropolitan Statistical Areas (SMSA's) [9, 10]. Since the theoretical argument emphasizes the existence (or non-existence) of systematic differences in growth in the demand for labor among areas, the twenty fastest growing and the twenty slowest growing SMSA's were selected for study, where growth is measured in terms of percentage increases in retail sales.[2] The following basic mobility model is postulated:

(1) $M_{ji} = f(W_i, U_i, D_{ij}, P_j)$,

where M_{ji} denotes the number of individuals resident in area j in 1955 living in area i in 1960, W_i is a measure of wage levels in area i (1960 median income levels are used for this purpose).[3] U_i is the 1955 unemployment rate for area i,[4] D_{ij} is the distance in statute miles between areas i and j, and P_j is the 1955 population of area j. All data other than that for distance are from the 1960 decennial census. <u>A priori</u>, we would expect

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[2] The sales data were obtained from [7] and [8]. The change in the total value of retail sales between 1954 and 1958 for each SMSA with a 1960 population over 250,000 was computed first. This change in retail sales was then divided by the value of total retail sales at the beginning of the period to find the percentage growth in retail sales over the period.

[3] The mean wage ($\bar{W}$) and standard deviation for wages (σ) for each SMSA group is given for 1959 by: $\bar{W}$ slow growing = $81.99, σ slow growing = $4.80; $\bar{W}$ fast growing = $88.04, σ fast growing = $5.28.

[4] The mean unemployment rate ($\bar{U}$) and standard deviation for employment rates (σ^*) for each SMSA group for 1955 is given by: $\bar{U}$ slow growing = 6.2%, σ^* slow growing = 1.0%; $\bar{U}$ fast growing = 4.3%, σ^* fast growing = 1.0%.

$\partial M_{ji}/\partial W_i$ and $\partial M_{ji}/\partial P_j$ to be positive and $\partial M_{ji}/\partial U_i$ and $\partial M_{ji}/\partial D_{ij}$ to be negative. A positive relationship between migration from $\underline{i}$ to $\underline{j}$ and wages in $\underline{i}$ follows from orthodox theory while P_j is a simple population scalar. On the other hand, higher values for U_i — and D_{ij} have the effect of imposing greater costs on migrants, either in the form of — greater uncertainty about employment possibilities or the larger costs implicit in moving greater geographic distances.

Conceptually, what we propose to do is estimate log-linear regression equations of the following form:

(2) $\log M_{ji} = \log a + b \log W_i + c \log U_i + d \log D_{ij} + e \log P_j + v$

(where $\underline{v}$ is an error term with zero mean and variance greater than zero) for two sets of migration data. The first will involve only movement between the relatively slow growing SMSA's and the second will deal with migration from slow growing to fast growing areas. On the basis of our theoretical dis-cussion we would expect the same set of values for the independent variable in the regressions to produce less movement between slow growing areas than between slow growing and fast growing areas. This might be reflected in the regressions by a greater value for the coefficient associated with the wage variable in the slow to fast growing regression or by values for the other regression coefficients that suggest a greater sensitivity of migrants between slow growing areas to the factors that impose costs on them.

The basic data for each set of SMSA's were pooled to provide 380 observations of movement between slow growing areas and 400 observations of movement from slow to fast growing SMSA's. The regression results are summarized in Table 1.

Clearly, there is no difference between the coefficients in the two regressions associated with the wage variable. However, marked differences appear in the other coefficients and they are all consistent with the pre-dictions of the theory. When contemplating movement from one slow growing area to another, vis-a-vis movement to a fast growing area, individuals view the costs as being more substantial (witness the larger absolute values for the unemployment and distance coefficients). In addition, above and beyond this, the lower value for the coefficient of the P_j variable in the slow-to-slow regression reinforces this tendency. In general, this suggests that residents of slow growing areas view the costs of movement to another slow growing area in an entirely different light than they view movement costs to a fast growing area. This is quite consistent with our theoretical discussion.

Conclusions

In this paper we have explored in both a theoretical and empirical fashion the possibility that the pattern of movement of people between geographic areas is sensitive to the presence of systematic positive shifts in the demand for

TABLE 1: Regression Analysis of Migration Between Selected Groups of SMSA's, United States, 1955-1960

| SMSA Group | Regression Coefficients* | | | | |
	Wage Levels	Unemployment Rate	Distance	Population of SMSA of Origin	R^2
Slow Growing to Slow Growing	0.61269 (0.50617)	-1.20297[a] (0.18621)	-0.81888[a] (0.08406)	0.76430[a] (0.05844)	.4637
Slow Growing to Fast Growing	0.61889 (0.56248)	-0.52567[b] (0.22193)	-0.18086[b] (0.08061)	0.95113[b] (0.05516)	.4403

*Values in parentheses beneath coefficients are standard errors.

[a]Significant at the one per cent level.

[b]Significant at the two per cent level.

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labor in one area relative to another. We have argued on theoretical grounds that it is and, in general, our empirical analysis supports this view. Apparently, movement from slow growing to fast growing areas is less inhibited by the presence of movement costs than is movement between slow growing areas. Consequently, less of a wage differential is required to produce a given amount of movement between slow and fast growing areas than is needed in the case of movement between slow growing areas. This creates the appearance of a relative insensitivity of movement between slow growing areas to wage differentials. However, as our analysis indicates, this is not the appropriate interpretation to place on the data.

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