Kohn [11] recently has offered a critique of an earlier paper by myself published in this journal [1]. I am both flattered and surprised by Professor Kohn's quick attention. The present paper seeks to answer each of Kohn's criticisms.

1. Kohn's first point is that "...a migration model should have been adopted in which the dependent variable was the ratio of the number of migrants from the area of origin to the area of destination to the population of the destination area" [11, p. 603]. Here, it first should be noted that it has been common practice to specify the dependent variable as simply the number of migrants observed and to then use population as an independent (exogenous) variable. This has been done recently, for example, by De Jong and Donnelly [4] and Greenwood [10]. Alternatively, it has become more common in recent years to divide the number of migrants by some population scalar. This procedure has been followed by Cebula and Vedder [2], Gallaway and Cebula [6], Pack [12], and Sommers and Suits [15]. Although the latter approach seems to be more in vogue presently, neither approach has attained the stature of general acceptability.

In any event, it is pertinent to pose the issue as to how in fact we may attempt to scale the dependent variable directly. Let \( P_{ij} \) = the probability that a person in area \( i \) will migrate to area \( j \). Presumably,

\[
P_{ij} = f \text{ (Relative advantages in } i \text{ and } j). \tag{1}
\]

Adopt the following notation:

\[
\begin{align*}
B_i &= \text{ benefits associated with area } i \\
B_j &= \text{ benefits associated with area } j \\
C_i &= \text{ costs associated with area } i \\
C_j &= \text{ costs associated with area } j \\
\alpha &= \text{ costs associated with transferring from } i \text{ to } j
\end{align*}
\]

(1) then becomes

\[
P_{ij} = f \left( C_j - C_i, B_j - B_i, \alpha \right). \tag{2}
\]

There are likely to be more than 2 regions involved and area \( i \) is presumably going to have a plural population. Given this, let \( O_{ij} \) = the number of out-migrants from \( i \) to \( j \). It follows that
\[ O_{ij} = A_i \left[ \sum_{j=1}^{n} P_{ij} \right] \]  

where \( n \) = number of regions (areas) 

\[ A_i = \text{population of region (area) } i \]

Substituting from (2), (3) becomes

\[ O_{ij} - A_i \left[ \sum_{j=1}^{n} f(C_j - C_i, B_j - B_i, \alpha) \right] \]

Dividing through by \( A_i \) yields

\[ \frac{O_{ij}}{A_i} = \sum_{j=1}^{n} f(C_j - C_i, B_j - B_i, \alpha) \]

which is the proper specification of a gross out-migration model for area \( i \). Clearly, this differs from Kohn’s formulation, in which \( O_{ij} \) would have been divided by an incorrect population scalar, namely by destination population (\( A_j \)) rather than origin population (\( A_i \)) as shown in (5).

Alternatively, a study of gross migration may stress in-migration. Let \( I_{ji} \) = the number of in-migrants from \( j \) to \( i \). For the 2 region (\( i \) and \( j \)) case,

\[ I_{ji} = A_j [P_{ji}], \]

which becomes

\[ I_{ji} = A_j [g(C_i - C_j, B_i - B_j, \alpha)]. \]

For the \( n \)-region case, we get

\[ \sum_{j=1}^{n} I_{ji} = \sum_{j=1}^{n} \frac{A_j \cdot g(C_i - C_j, B_i - B_j, \alpha)}{A_i} \]
Once again, Kohn's specific suggestion would seem to be contradicted, since the population divider is not that of the destination area (as Kohn claims).

From the above, a model of net out-migration from area i then may take the form of

\[ N_i = O_{ij} - \sum_{j \neq i} I_{ij} \]

where \( N_i = \) net number of out-migrants from i. (9) may be rewritten as

\[ N_i = A_i \cdot \left[ \sum_{j=1}^{n} f(C_j - C_i, B_j - B_i, \alpha) \right] - \sum_{j \neq i} A_j \cdot g(C_i - C_j, B_i - B_j, \alpha) \]  

(10)

Dividing (10) through by \( A_i \) once again does not produce results which divide by the destination population. Thus, Kohn's prescription \textit{per se} is incorrect here as well.

2. Kohn's next suggestion may well be a good one. Specifically, he argues that my analysis failed "...to disaggregate according to race, age, and/or sex" [11, p. 603] and thus my model "...may hide a multitude of sins..." [11, p. 603]. As De Jong and Donnelly [4], Gallaway [5], Pack [12], Rogers [13], Sahota [14], and Sommers and Suits [15] seem to imply, racial and age traits of migrants may be particularly relevant. The case is less convincing for disaggregation according to sex. Again, however, it is necessary to be cautious in the specification of the dependent variable. Let \( P_{ij}^{ra} \) = the probability that a person of race \( r \) and age \( a \) will migrate from i to j. (2) above then becomes

\[ P_{ij}^{ra} = f(C_j - C_i, B_j - B_i, \alpha) \]  

(11)

Let \( O_{ij}^{ra} \) = the number of out-migrants of race \( r \) and age group \( a \) from i to j.

It is clear that in the n-region case,

\[ O_{ij}^{ra} = A_{ij}^{ra} \cdot \left[ \sum_{j=1}^{n} f(C_j - C_i, B_j - B_i, \alpha) \right], \]  

(12)
where \(A_{ra}^i\) = population of race \(r\) and age \(a\) in area \(i\). Dividing by \(A_{ra}^i\) yields

\[
\frac{O_{ij}^{ra}}{A_{ra}^i} = \sum_{j=1}^{n} f(C_j - C_i, B_j - B_i, a) \tag{13}
\]

Once again, if we are to disaggregate and properly specify the system, we must note that Kohn's suggestion regarding population scaling would lead us far astray, as (13) clearly shows. This is also true if we are measuring in-migration to \(i\) or net (out-) migration from \(i\), as (14) and (15) indicate:

\[
\sum_{j=1}^{n} l_{ji}^{ra} = \sum_{j=1}^{n} A_{ra}^j \cdot g(C_i - C_j, B_i - B_j, a) \tag{14}
\]

\[
N_{ra}^i = A_{ra}^i \left[ \sum_{j=1}^{n} f(C_j - C_i, B_j - B_i, a) \right] - \sum_{j=1}^{n} A_{ra}^j \cdot g(C_i - C_j, B_i - B_j, a) \tag{15}
\]

In addition to all this, given the persistence of contemporary studies of total (not disaggregated) migration (see Gallaway, Gilbert, and Smith [7], Greenwood [9], Gallaway and Cebula [6], Chapin, Vedder, and Gallaway [3], Gallaway, Vedder, and Chapin [8]), it is questionable whether one must necessarily always disaggregate.

3. Kohn's third criticism, that "...it would have been more desirable to analyze migration between high wage and low wage economic areas..." [11, p. 603] also has merit. However, since my original paper stressed changes in demand for labor and thus labor demand growth, my emphasis on slow and fast growth areas seems logically consistent in context.
References