The Quality of Life and Migration of the Elderly

Richard Cebula

Jacksonville University

29. January 1973

The Quality of Life and Migration of the Elderly

RICHARD J. CEBULA*

I. INTRODUCTION

In recent years, the increased concern with environmental matters and the "quality of life" has led to a propogation of scholarly studies relating to the economic impact of man's social and cultural milieu.[1] Although most of these studies have been abstract in nature, there have been a few relating to the impact of the quality of life on human migration. The latter have been concerned with migration for the population as a whole[2] or the population by race[3] rather than with the migration patterns of the population according to age group.

The present paper seeks to contribute to the above literature by investigating the impact of quality of life variables on the migration of the elderly. The uniqueness of this paper rests primarily on its concern with a particular age group of migrants, the "elderly," defined here as "all persons 65 years of age or older."

The conventional analysis of the determinants of migration in principle treats the migration decision as an investment decision in which the individual chooses to migrate to that area which maximizes his "differential economic advantage" over time.[4] The standard migration study then examines the impact of variables such as income differentials, unemployment rates, distance, and education on the migration decision. The present paper, however since it is concerned with the migration of the elderly, emphasizes the role of a different set of variables. In particular, this paper argues that for the elderly the main determinants of migration are those concerned with the quality of life and that purely economic variables such as income differentials have little or no influence over elderly migration.

There are of course numerous possible measures of the quality of life. For this paper, we have singled out five such measures: availability of medical care, amount of sunshine, temperature levels, air pollution levels, and the availability of recreation facilities. The argument as to the impact of each of these variables is quite straight-forward. For example, the more abundant medical care in an area, other things held constant, the more attractive that area should be to elderly migrants. Next, the elderly presumably will be more attracted to areas which offer better climatic conditions, i.e., more sunshine and/or warmer temperatures. As for pollution, it is argued that the lower the level of air pollution in an area, the more attractive the area should be to elderly migrants. Finally, since the elderly are for the most part retired or semi-retired, the availability of recreation facilities should be of concern in a migration decision. It is argued here that the greater the availability of such facilities in an area, the more attractive the area will be to the elderly migrant.

*Emory University

Section II below presents the basic migration model to be developed in this paper. In addition to the five quality of life variables mentioned above, two purely economic variables (per capita income and state-local per capita tax levels) are introduced in order to make the system more complete. Section II presents and discusses the empirical results of the paper.

II. THE MODEL

To investigate the impact of the quality of life on the migration of the elderly, the following model of net interstate migration is postulated:

$$(1)\quad M_i = M_i(D_i, S_i, T_i, P_i, R_i, G_i, Y_i),$$

where M_i is net migration (in-migration less out-migration) to state i of the elderly between 1965 and 1970, D_i is a measure of the availability of medical care in state i, S_i is a measure of the amount of sunshine in state i, T_i is a measure of cold weather in state i, P_i is a measure of the amount of air pollution in state i, R_i is a measure of the availability of recreation in state i in the form of state, municipal, and county parks, G_i measures the per capita level of all state and local taxes in state i, and Y_i is per capita income in state i.

The data on net migration of the elderly were obtained from the 1970 Census of the Population.[5] To control for variations in the population among the states, the variable M_i takes the form of the ratio of net migration to state i between 1965 and 1970 to the 1965 population of state i. The migration data were assembled for all of the states except Alaska and Hawaii.

The variable D_i is the number of physicians per 100,000 population in state i in the year 1966.[6] The elderly presumably should prefer to locate in communities where health (medical) services are more abundant, *ceteris paribus*. Accordingly, we would expect a direct relationship between D_i and M_i:

$$(2)\quad \frac{\partial M_i}{\partial D_i} > 0.$$

The variable S_i is the average of daylight periods when there is sunshine in state i.[7] Clearly, the larger the value of S_i, the greater the average amount of sunshine in the ith state. Since the elderly presumably are interested in climatic conditions, they are likely to be attracted to states where there are, other things held constant, greater amounts of sunshine. Thus, the relationship between M_i and S_i is argued to be:

$$(3)\quad \frac{\partial M_i}{\partial S_i} > 0.$$

things held the same, the elderly on average prefer mild or warm climates to colder climates. Thus, the relationship between M_i and T_i is inverse:

$$(4)\quad \frac{\partial M_i}{\partial T_i} < 0.$$

No analysis of the relationship between migration and the quality of the environment would be complete without explicitly considering pollution. As our measure of air pollution, P_i, we use the amount of suspended particulate matter per cubic meter of air. Suspended particulate matter consists of the more "visible" forms of pollution: smoke, soot, dust, and "fumes and droplets of viscous liquid remaining in the air for varying periods of time."[9] We use the mean amount of suspended particulate matter observed in the 48 states in the year 1966.[10] Given that greater amounts of air pollution in an area lower the quality of the environment and therefore its attractiveness, we would expect an inverse relationship between M_i and P_i :

$$(5)\quad \frac{\partial M_i}{\partial P_i} < 0.$$

Since most elderly migrants are either retired or semi-retired, it is likely that they would be attracted to those areas which provide the better recreation facilities. The variable R_i is used as a measure of the availability of such facilities. R_i was computed by dividing the number of state, municipal, and county parks in 1965 in state *i* by the 1965 population in state *i*, thus yielding the number of such parks per capita.[11] Since a higher value for R_i implies a greater abundance of recreation facilities in the *i*th state, we would expect a direct relationship between M_i and R_i:

$$(6)\quad \frac{\partial M_i}{\partial R_i} > 0.$$

The variable G_i represents the per capita level of all state and local taxes in the *i*th state for the year 1967.[12] In a very real sense, G_i can be interpreted as one of the costs associated with living in state *i*. Presumably, then the higher the per capita tax level in a state, the less attractive the state will be to migrants, *ceteris paribus*. Thus, we argue the following:

$$(7)\quad \frac{\partial M_i}{\partial G_i} < 0.$$

The variable Y_i is per capita income in the *i*th state in the year 1965.[13] The use of some variable to measure per capita income or wage rates is a standard procedure in most migration studies. The conventional argument in these studies is that migrants are attracted, other things held constant, to areas which offer higher wages. In this paper, however, it is argued that income (wage rate) differentials among states are likely to exercise little or no impact over the migration of the elderly since the latter are, by and large, not full time participants in the labor market. Therefore, it is urged that the relationship between M_i and Y_i, whatever its sign (+,—), will be statistically insignificant.

III. EMPIRICAL RESULTS

To examine the determinants of elderly migration, we propose to estimate the following log-linear regression equation:

$$
\begin{aligned}
(8)\quad \log M_i &= \log a + b \log D_i \\
&+ c \log S_i + d \log T_i \\
&+ e \log P_i + f \log R_i \\
&+ g \log C_i + h \log Y_i \\
&+ u,
\end{aligned}
$$

where a is a constant and u is a stochastic error term.

The estimated regression equation is given by

$$
\begin{aligned}
(9)\quad \log M_i = &-13.83572 \\
&+ 13.98196 \log D_i \\
&\quad (1.67) \\
&+ 26.15024 \log S_i \\
&\quad (2.30) \\
&- 7.96655 \log T_i \\
&\quad (4.54) \\
&- 4.23520 \log P_i \\
&\quad (1.08) \\
&+ 6.74419 \log R_i \\
&\quad (2.29) \\
&- 10.56099 \log G_i \\
&\quad (0.90) \\
&- 7.69334 \log Y_i, \\
&\quad (0.59) \\
&DF=40,\ R^2=59,\ F\text{-Ratio}=7.719,
\end{aligned}
$$

where the terms in parentheses are t-values.

The results overall are very encouraging. To begin with, the model explains nearly 60 percent of the variation in the rate of net migration for the 48 states was statistically significant at the five percent level. Although both the pollution (P_i) and tax (G_i) variables had the correct sign, neither was statistically significant at an acceptable level. The coefficient for the income variable had a negative sign and was, as we hypothesized, not statistically significant at any acceptable level.

The basic argument of this paper has been that the main type of determinant of elderly migration is the quality of life and that purely economic variables have a comparatively small impact on elderly migration. As evidence of the validity of our argument, we observe that the quality of life variables accounted for an R^2 in equation (9) of 0.58 while the purely economic variables accounted for an R^2 in equation (9) of merely 0.01. That is, over 98 percent of the explanatory power of our model was attributed to the quality of life variables, while less than two percent was associated with the purely economic variables. This is in contrast to the results which might be expected in an analysis of *total* as opposed to *elderly* migration.[14]

We may now refer to specific components of the quality of life. Clearly, the elderly migrant tends to be quite sensitive to the availability of medical care. This same basic result has been obtained elsewhere in analyses of total migration.[15] Elderly migrants are also quite sensitive to climatic conditions, as evidenced by their apparent aversion to cold weather and attraction to sunshine. This is also consistent with other studies.[16] Elderly migrants apparently are quite sensitive to the availability of recreation facilities. On the other hand, there was little to indicate that they were particularly concerned about pollution levels in making their migration decisions. This relative insensitivity to the pollution variable has been found elsewhere in the analysis of total migration.[17]

We now turn to the purely economic variables, per capita state and local taxes (G_i) and per capita income (Y_i). Clearly, elderly migrants were not particularly sensitive to either of these variables. Especially interesting is the coefficient for the income variable: it is both statistically insignificant and negative. This is consistent with our argument above that, since the elderly are by-and-large retired or semi-retired, they are not expressly concerned with wage (income) levels when making migration decisions. The negative value for the income coefficient could well be expected given the fact that climatic conditions tend to be "superior" in states where per capita income levels are on average below the national average and climatic conditions tend to be "inferior" in states which on average have per capita income levels which are above the national average. For example, the states of Florida, Arizona, Texas, and New Mexico combined to attract a preponderant majority (over 75 percent) of all elderly net migration during 1965-1970 period; yet, the per capita income level in each of these states was perceptibly below the national level. On the other hand, the states of New York and Illinois combined to experience a net loss of nearly 50 percent of all elderly net migration; however, both of these states had per capita income levels well above the national average.

In closing, it should be noted that there was no significant co-linearity among any of the independent variables in this study. In addition, results similar to those above were obtained from a straight (non-log) linear regression equation using the same data. In particular, using the following regression equation:

$$(10)\quad M_i = a + bD_i + cS_i + dT_i + eP_i + fR_i + gG_i + hY_i + u,$$

where a is a constant and u a stochastic error term, we obtained the following results:

$$(11)\quad M_i = -13.63262 \underset{(2.08)}{+ 0.06158D_i} \underset{(3.51)}{+ 0.29954S_i} \underset{(2.65)}{+ 0.03663T_i} \underset{(0.51)}{- 0.00922P_i} \underset{(3.05)}{+ 0.02899R_i} \underset{(1.18)}{- 0.02071G_i} \underset{(0.75)}{- 0.00215Y_i},$$

$$D=40,\ R^2=0.49,\ \text{F-Ratio}=5.548,$$

where the terms in parentheses are t-values. Clearly, these results are entirely consistent with our earlier findings.

FOOTNOTES

[1]See, for example, J. M. Culbertson, "The Quality of Life, Population, and Environment: The Role of Science," *Review of Social Economy*, Vol. 30 (1972), pp. 46-53; R. C. D'Arge and K. C. Kogiku, "Economics Growth and the Environment," *Review of Economic Studies*, Vol. 40 (1973), pp. 61-77; H. Demsetz, "Theoretical Efficiency in Pollution Control: Comment on Comments," *Western Economic Journal*, Vol. 9 (1971), pp. 444-446; L. E. Gallaway, "The Quality of Life, Population, and Environment: The Importance of the Historical Perspective," *Review of Social Economy*, Vol. 30 (1972), pp. 37-45; M. I. Goldman, "Externalities and the Race for Economic Growth in the U.S.S.R.: Will the Environment Ever Win?," *Journal of Political Economy*, Vol. 80 (1972), pp. 314-327; R. L. Heilbroner and J. Allentuck, "Ecological Balance and the Stationary State," *Land Economics*, Vol. 48 (1972), pp. 205-211; R. Jackson, "Zero Population: A Tradeoff Analysis," *Southern Economic Journal*, Vol. 38 (1971), pp. 97-100; L. Legey, M. Ripper, and P. Varaiya, "Effects of Congestion on the Shape of a City," *Journal of Economic Theory*, Vol. 6 (1973), pp. 162-179; E. Miller, "Implications of Process Change for Industrial Pollution Abatement," *Land Economics*, Vol. 48 (1972), pp. 396-398; A. H. Pascal, "Where Will All the People Go? How Much Will They Dump When They Get There?—Population Distribution, Environmental Change, and the Quality of Life," *Annals of Regional Science*, Vol. 5 (1971), pp. 1-5; R. F. Ruffin, "Pollution in a Crusoe Economy," *Canadian Journal of Economics*, Vol. 5 (1972), pp. 110-118; D. C. Shoup, "Theoretical Efficiency in Pollution Control: Comment," *Western Ecoonmic Journal*, Vol. 9 (1971), pp. 310-313; R. O. Zerbe, "Theoretical Efficiency in Pollution Control," *Western Economic Journal*, Vol. 8 (1970), pp. 364-376 and "Theoretical Efficiency in Pollution Control: Reply," *Western Economic Journal*, Vol. 9 (1971), pp. 314-317.

[2]See, for example, R. J. Cebula and R. K. Vedder, "A Note on Migration, Economic Opportunity, and the Quality of Life," *Journal of Regional Science*, forthcoming; L. E. Gallaway and R. J. Cebula, "Differ-

[4]This approach is developed in L. A. Sjaastad, "The Costs and Returns of Human Migration," *Journal of Political Economy*, Vol. 70 (1972), October Supplement, pp. 80-93 and P. K. Gatons and R. J. Cebula, "Wage Rate Analysis: Differentials and Indeterminacy," *Industrial and Labor Relations Review*, Vol. 25 (1972), pp. 207-212.

[5]These data were obtained from U.S. Bureau of the Census, *Census of the Population: 1970, Migration Between State Economic Areas*, Final Report PC(2)-E (Washington, D.C., 1972), Tables 2 and 3.

[6]U.S. Bureau of the Census, *Statistical Abstract of the United States: 1968* (Washington, D.C., 1968), Table 88.

[7]*Ibid.*, Table 273.

[8]*Ibid.*, Table 263.

[9]*Ibid.*, p. 174.

[10]*Ibid.*, Table 262.

[11]*Ibid.*, Tables 291-292.

[12]U.S. Bureau of the Census, *Statistical Abstract of the United States: 1969* (Washington, D.C., 1969), Table 594.

[13]*Ibid.*, Table 469.

[14] See, example, Cebula and Vedder, *op. cit.*

[15]See R. J. Cebula, "Labor Migration and the Cost of Living," *Review of Regional Studies*, forthcoming and Cebula and Vedder, *op. cit.*

[16]See, for example, Cebula and Vedder, *op. cit.*, Gallaway and Cebula, *op. cit.*, or Kohn, Vedder, and Cebula, *op. cit.*

[17]Cebula and Vedder, *op. cit.*