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Location of adult children as an attraction for black and white elderly primary migrants in the United States

Kao-Lee Liaw
School of Geography and Geology, McMaster University, Hamilton, Ontario L8S 4K1, Canada; e-mail: rliaw@mcmaster.ca

William H Frey¶
Population Studies Center, University of Michigan, Ann Arbor, MI 48104, USA; e-mail: billf@umich.edu

Ji-Ping Lin
The Institute of Labor Studies, National Chung-cheng University, Ming-hsiung, Chiayi, Taiwan 621; e-mail: labjpl@ccu.edu.tw
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Abstract. By using information on state of birth in the 1990 Census of the United States, the authors create a variable serving as a proxy for the distribution of adult children in 1985. This variable is then used in a two-level nested logit model to explain the 1985 – 90 interstate primary migration of elderly black people and elderly white people within the context of environmental amenities and other factors. The main findings are as follows. First, the location of adult children as well as environmental amenities are among the most important attractions for the primary migration of elderly black and white people. Their effects are stronger on white people than on black people. Because a relatively high proportion of out-migrated black adult children are located in the industrial states of the snowbelt and a relatively high proportion of their white counterparts are located in high-amenity states of the sunbelt, the attractions of adult children and environmental amenities are more prone to counter each other for elderly black people and to reinforce each other for elderly white people. Consequently, the net transfers of elderly primary migrants are small and somewhat oriented toward the snowbelt for black people, but they are voluminous and strongly oriented toward the sunbelt for white people. Second, the attraction of adult children is strong for not only the unmarried but also the married elderly, although it is somewhat stronger for the widowed aged 75 years and over. This finding can be taken as evidence for the viability of the 'modified extended family' system, which not only legitimizes the out-migration of adult children for career advancement but also encourages the migration of elderly parents to be close to their non-coresident children for services that require continual proximity. It also suggests that the elderly do not have a strong tendency to delay their migration toward non-coresident children until the loss of a spouse or becoming very old.

1 Introduction

The idea that the location of adult children can be influential in attracting elderly migrants in an industrialized country such as the United States can be traced back to the seminal paper of Litwak (1960b), which provided part of the basis for the development of the theory of the 'modified extended family' (MEF) (Litwak, 1965; 1985). According to this theory, the MEF is better than the classical extended family and the isolated nuclear family because it not only legitimizes the out-migration of adult children for career advancement but also encourages the relocation of elderly parents to be near their adult children for the services that require continual proximity. Among the various important implications of this theory is the one on the provision of assistance and services to the elderly (Litwak, 1985). Thus, an empirical study on the attraction of elderly migrants to adult children is important both for theoretical and for practical reasons. Unfortunately, it has been difficult to carry out such a study because of the lack

¶ Also at the Milken Institute, Santa Monica, CA.

of empirical data that contain information on the locations of non-coresident children (Clark and Wolf, 1992).

The pattern of the net transfers of elderly black 'primary migrants' (that is, migrants leaving their state of birth) from sunbelt states to snowbelt states with a large working-age black population (Frey et al, 2000) suggests that the location of adult children is essential for explaining the migration behavior of elderly black people. The fact that widowed elderly white people, relative to married elderly white people, are more likely to undertake primary migration from northern industrial states (for example, New York and Illinois) to California (where a high proportion of their out-migrated adult children are concentrated) also suggests that white adult children are more likely to welcome their elderly parents to move closer to them when their parents' need for assistance becomes greater.(1)

Our main purpose in this paper is to assess the importance of the location of adult children in influencing the 1985–90 interstate primary migration of elderly black people and white people in a multivariate context, based on the data of the 1990 Census. As the census questionnaire did not elicit information about the location of non-coresident children, our empirical work will first show that it is possible to use information on the state of birth to create a reasonable proxy for the location of the adult children of elderly 'natives' (that is, the elderly whose 1985 state of residence was identical to their state of birth). This proxy, together with indicators of environmental amenities and other explanatory variables, will then be used in a nested logit model to account for the primary migration of these people. It is the comparison of the effects of the adult children's location, on the one hand, and environmental amenities, on the other, that will help us account for the major differences between black and white elderly migration patterns.

In addition to yielding more insight into the differences between black and white elderly migration, our findings will shed further light on the viability of Litwak's model of the MEF, which he claimed to be the only one that is consistent with modern industrialized society (1985, page 102). Moreover, they will also help us explain an 'unexpected' contrast between return and nonreturn in-migrants of the midwest that was revealed by Longino and Serow (1992) but has to date remained unexplained: relative to return in-migrants, nonreturn in-migrants are older, more likely to be widowed, and less likely to live independently.

Our focus on primary elderly migrants is based on the well-known classification of primary migrants, onward migrants (that is, those who migrate from a nonbirth state to another nonbirth state) and return migrants (that is, those who migrate back to their state of birth) that has been used in previous census-based migration studies (Eldridge, 1965; Long, 1988; Longino, 1979; Miller, 1977; Newbold, 1996; Rogers, 1990; Serow, 1978). This classification is essential for the creation of reasonable proxies for the location of adult children from census data. Owing to space limitations, the results of our assessment on the attraction of onward and return elderly migrants to the location of their adult children, which reinforce the main conclusions of our analysis on elderly primary migration, will be reported in a separate paper. For elderly white people, the 1985–90 net transfers of migrants between major gaining and losing states

(1) Our examination of the 1990 Census data reveals that 1985–90 primary out-migration rates from New York to California are 0.26% for widowed elderly white people and 0.23% for married elderly white people. The corresponding figures for those from Illinois to California are 0.33% and 0.29%, respectively. By 1985, 5.8% (7.0%) of the adult children born in New York (Illinois) had relocated to California—their favorite destination. Their birth-to-1985 stayer rates are 60.4% for New York and 58.8% for Illinois. If the attraction of adult children is ignored it is difficult to explain why the amenity-rich state of California should be more attractive to the widowed elderly than to the married elderly.

were greater for primary migration than for onward and return migration. For elderly black people, these net transfers were greater for return migration than for onward and primary migration (Frey et al, 2000, table 4).

There are in our study methodological and theoretical reasons for making the distinction between black people and white people. The methodological reason is that the patterns of lifetime (that is, birth to 1985) migration of adult children differ markedly between the two. In major northern industrial states, white adult children were much more likely to out-migrate and to select amenity-rich destinations than were black adult children. By contrast, in the southern states with a large black population, black adult children were much more likely to out-migrate and to head for northern industrial states than were white adult children.(2) To the extent that the attraction of the out-migrated adult children is influential, black and white elderly migrants are subject to pulls in opposite directions. Consequently, failure to keep the black – white distinction will cause the opposite pulls to cancel each other out and result in a serious understatement of the importance of the attraction of adult children. The theoretical reason for keeping the black – white distinction is discussed in the next section.

2 Literature review and research context

Our search through the literature revealed that none of the previous multivariate analyses of elderly migration (for example, Clark et al, 1996; Frey et al, 2000; Newbold, 1996) used the location or distribution of adult children to explain elderly migration. The reason for this seems to be that there has not been any national data set that identifies the specific location of non-coresident adult children. Two of the nationally representative longitudinal data sets that have been used in recent years for obtaining valuable insight into US families and for studying the relocation of the elderly in the United States [the Longitudinal Study of Aging (LSOA), and the National Survey of Families and Households (NSFH)] contain information on the proximity between elderly parents and their children (measured in terms of travel time in the LSOA and in terms of travel distance in the NSFH as the only geographical information for non-coresident adult children. Based on these data, some knowledge about the attraction of elderly migrants to their adult children may be only indirectly inferred from changes in proximity or from transitions into and out of coresidence. Because changes in the location of non-coresident adult children were not recorded it is not possible directly to attribute changes in parent – child proximity to the migration of one or the other.

From the LSOA, Silverstein (1995) found that for noninstitutional persons who were aged 70 years and over in 1984 and had at least one surviving child in 1985 ($N = 3468$), the propensity to become temporally closer to their adult children between 1984 and 1988 was enhanced by a recent decline in their physical health. He also found that "the conjunction of declining health and widowhood increased both the *degree* of non-coresident proximity and the *likelihood* of transition to coresidence" (page 29, emphasis in the original). To detect the effects of 'race' and ethnicity, he used a single dummy variable to represent black and Hispanic people in his multivariate models and found that this variable did not have a statistically significant effect either on the propensity to converge (to become closer to a child) or on the degree of convergence, but it did have a significant negative effect on the propensity to diverge.

(2) Among the white adult children born in New York, 40% had out-migrated, among whom 14% ended up in Florida by 1985. The corresponding figures for the black adult children born in New York are 26% and 6%, respectively. Among the black adult children born in Mississippi, as many as 64% had out-migrated among whom 29% ended up in Illinois by 1985. The corresponding figures for the white adult children born in Mississippi are 41% and 3%, respectively.

The negative effect suggests that, relative to elderly white people, elderly black and Hispanic people are less likely to make amenity-oriented interstate migrations that tend to increase the average distance from their children.

By using the longitudinal data of the NSFH, Rogerson et al found that for the respondents who were aged 60 years and over at the initial survey in 1987–88 and had at least one surviving child with a valid distance measure at both the initial survey and the second survey in 1992–93 ($N = 1285$), "an increase in functional limitations is the most consistent predictor of geographical convergence between elderly parents and their adult children" and that "the onset of widowhood during the observation period leads to a greater likelihood of living with an adult child" (1997, page 121). Rogerson et al, by using in their multivariate models a single dummy variable to represent black people and those in all other minorities, also found that this dummy variable does not have any statistically significant effect on (1) the odds of convergence compared with no change, (2) the odds of divergence compared with no change, (3) the odds of living independently compared with no change, and (4) the odds of living jointly compared with no change. It is likely that the complete lack of statistically significant effect of this dummy variable is partly a result of the smallness of the sample size and the grouping of black people with those in other minorities.

By using the cross-sectional data of the 1987–88 NSFH, Clark and Wolf (1992) studied the effect of migration of the elderly (aged 60 years and over, with at least one child aged 19 years or over; $N = 2714$) on the proximity to their children in a multivariate framework. They defined migrants as those who had moved more than 25 miles in the five years before the survey. They also represented proximity by a dummy variable that assumed the value of 1 if the parent in question coresided with a child or if the distance to a child was within 10 miles at the time of the survey. They found that the effects of elderly migration on proximity to children had a curvilinear age pattern:

> "Among the 'young old', migrants are less likely to live near a child than are non-migrants. However, the older migrants are, the more likely it is that they live near at least one child. By age 77, migrants are more likely than non-migrants to be in close proximity to a child" (Clark and Wolf, 1992, page 87).[3]

They also found that widowed respondents were more likely to live near a child than were those of other marital statuses but that functionally limited older parents were no more and no less likely to live near a child than were other parents. Clark and Wolf did not attempt to examine the potential effect of 'race' on parent–child proximity. Another multivariate study of the same data by Lin and Rogerson (1995) showed that elderly black people and white people did not differ significantly in the proximity to their closest and second-closest children.

Although the effects of 'race' and ethnicity on parent–child proximity and on its change appear to be largely nonsignificant, LSOA and NSFH data provided clear evidence that increase in functional disability significantly increases the elderly's proximity to their children and that this effect is reinforced by becoming widowed. Is this increase in proximity achieved mainly by the movement of the elderly or by the movement of their children? Speare and McNalley's (1992) analysis of the data of the Survey of Income and Program Participation indicated that more than two thirds of elderly parents who became geographically closer to their children did not move themselves, suggesting that the increase in proximity was mainly attributable to

[3] The finding that, among the 'young old', migrants are less likely to live near a child than are nonmigrants may or may not mean that the greater parent–child distance of the migrants are a result of the migration of the elderly. It may be mainly a result of the previous out-migration of their adult children. For an interesting discussion and some empirical evidence of this possibility, see Bultena and Marshall (1970).

the movement of their children. However, an analysis of LSOA data by Bradsher et al (1992) showed that the elderly's propensity to change residence was enhanced by increase in instrumental disability and that this enhancing effect was particularly strong for the recently widowed. Together with the above-mentioned finding of Clark and Wolf (1992), this finding suggests that migration of 'weakened' elderly may have contributed significantly to the reduction in distance from their children.

What remains unclear in the empirical studies is the strength of the attraction of healthy and married elderly to their adult children. There are several reasons for expecting that it can be quite strong. First, a non-coresident child may reside in an amenity-rich region and provide information and help to facilitate the migration of her or his healthy and married parents to that region. This type of migration is likely to happen, because migration can enable the elderly to enjoy not only environmental amenities but also visits with their children. Second, some healthy elderly couples may move to the vicinity of their children in order to maintain exchanges of services and affections, including interactions with grandchildren. Third, some elderly may feel safer by moving closer to their children before they experience a decline in health or the loss of spouse. For these reasons, our study will include the elderly of all marital statuses and different ages. We use age as a crude proxy for health status.

It is common for researchers of elderly migration to put their studies in the context of the three-stage developmental framework of Litwak and Longino (1987): (1) amenity-oriented migrations, mostly by relatively young, healthy, and married couples; (2) migrations of the partially disabled or widowed elderly toward their adult children or other kin; and (3) movements of the seriously disabled elderly into institutions. However, we think that it is more meaningful to put our study in the context of the theory of the MEF (Litwak, 1960a; 1960b; 1985). The theory is well grounded in empirical evidence and generates a relatively optimistic prospect for the future of older populations in today's industrialized society.(4)

The MEF consists of "a series of nuclear household units that are semi-independent of each other" (Litwak, 1985, pages 101 – 102). In contrast to the classical extended family (CEF) that discourages differential geographical and occupational mobilities, the MEF legitimizes them (Litwak, 1960a; 1960b). Because such differential mobilities are essential for the advancement of family members in the formal institutions of an industrialized society as well as for enhancing the productivity of the modern economy, the MEF is consistent with the basic nature of modern society whereas the CEF is not. Despite being prone to be separated by geographical location and social status, most members of the MEF are able to maintain substantial exchanges of services and affections among themselves by using modern technology (for example, telephones, cars, airplanes, and money in the banking system).

An important challenge for the MEF occurs when some member (usually an elderly parent) experiences a long-term disability that requires the continual proximity of another non-coresident member who is willing or obliged to provide daily instrumental assistance. As an elderly parent who has retired from the formal institution of employment is free from job-related mobility constraints, it is likely that she or he may

(4) By the 1940s the idea that in industrial societies the classical extended family system is bound to be replaced by the isolated nuclear family system was generally taken for granted by social scientists, including major social theoreticians such as Wirth (1938) and Parsons (1949). However, since the 1950s empirical evidence showing the continuing strength of the connections between elderly parents and their adult children started to accumulate in England (for example, Townsend, 1957; Young and Willmott, 1957) and the United States (for example, Litwak, 1960a; 1960b). For more evidence, see Sussman (1965, page 66), who mounted one of the most forceful attacks on the "isolated nuclear family myth", a 'myth' that can be partly traced back to such great European social thinkers as Durkheim and Weber.

migrate to the vicinity of an adult child soon after or even before the onset of long-term disability. The assessment of this likelihood is essential for judging the viability of the MEF as a humane subsystem in an aged society. A negative result of this assessment would imply a high risk that the family system may degenerate into the isolated nuclear family system whereby the elderly with long-term disability can expect little instrumental assistance from their children. It would then imply the need for the large-scaled proliferation of formal institutions for the elderly as a practical way of dealing with the aging trend.

In a modern society, the main difference between members of the MEF, on the one hand, and friends and neighbors, on the other, as helpers for the elderly is that members of the MEF can maintain long-term commitments whereas the friends and neighbors usually do not. Mainly because of this difference, friends and neighbors usually cannot be a suitable substitute for members of the MEF when the elderly need long-term instrumental assistance (Litwak, 1985). There is empirical evidence that long-term commitments among family members and the willingness to engage in intergenerational transfers are better developed in households with a relatively stable marriage and children living with both parents (Pezzen and Schone, 1999; Silverstein and Bengston, 1997). In an innovative study of black and white families based on the microdata of the 1880, 1910, 1940, 1960, and 1980 Censuses of the United States, Ruggles (1994) identified a fundamental and persistent difference between black and white households: the former, though more likely to be extended, have been more likely to have young children without one or both coresiding parents. This difference is related to greater proportions of nonmarital births, marital instability, and desertion by fathers among black people (Morgan et al, 1993; Smith et al, 1996), which are in turn related to the legacy of slavery and the ongoing marginalization of the majority of black people in the broader socioeconomic context (Biblarz and Raftery, 1999; Frazier, 1939; Jaynes and Williams, 1989;Lichter and Eggebeen, 1993; Moynihan, 1965). Consequently, it is likely that the structure of black families has been less conducive to the development of long-term commitments, which are essential to the proper functioning of an MEF.(5) In a study based on the 1987 – 88 NSFH data, it was found that "African-Americans are consistently less likely than whites to be involved in intergenerational assistance" (Hogan et al, 1993, page 1428). Thus, both the theory of the MEF and some empirical evidence lead us to expect that elderly black people are less likely to be attracted to the location of adult children than are elderly white people.

3 Data and statistical model

This research uses the 8% data from the 1990 Census PUMS (public use microsample) files: the 5% State PUMS files combined with the 3% PUMS-O files. By comparing the state of residence in 1985 and the state of birth, each US-born individual who resided in the United States in 1985 is identified as either a (same-state) 'native' or a 'nonnative'. The sample used in this study of primary migration includes

(5) Ruggles (1994) also found that although extended households have been more common for black people than for white people, elderly black people (aged 65 years and over) were *less* likely to live with their own children than were elderly white people until 1940. To the extent that coresidence reflected long-term commitments by family members before the sharp rise in income and social security allowed many elderly Americans to choose independent living arrangements after World War 2, his finding suggests that for a long time elderly black people probably received less help from their adult children than did elderly white people. As a consequence of the very sharp decline in the rate of coresidence of elderly white people with their children in recent decades, elderly black people have become more prone to coreside with their children than are elderly white people, although their rate of coresidence had also declined (from 44.8% in 1940, to 32.9% in 1960, and 22.8% in 1980).

all black and (non-Hispanic) white natives who were aged 60 years and over in 1990. Among elderly natives, 'primary migrants' are defined as those whose 1985 and 1990 states of residence were different, with the remaining individuals defined as 'stayers'.

In order to retain information on key personal factors and to make the input data files for the statistical model into manageable sizes, the sample weights of all black and white elderly natives are used to create a multidimensional tabulation. The dimensions of the tabulation include: (1) 'race' (black, white); (2) educational attainment (less than high school, high-school graduation, some college education, college graduation); (3) marital status (single, married, widowed, divorced, separated); (4) age in five-year groups (60–64, ..., 80–84, >85 years); (5) gender (female, male); (6) poverty status (poor, nonpoor, unknown); (7) state of residence in 1985; and (8) state of residence in 1990. Poverty status is defined according to the official poverty line. Only about 4% of the elderly natives had an unknown poverty status.

Our multivariate statistical model is a nested logit model that is based on a two-level choice framework: a choice between departing and staying put at the upper level, and the choice of a specific destination at the lower level. For an elderly native with personal attributes s and residing in state i in 1985, we specify that her or his migration behavior in 1985–90 depends on a departure probability $P(s, i)$ at the upper level, and a set of destination choice probabilities, $P(j\,|s, i)$ for all j not equal to i, at the lower level. By assuming that the elderly native makes the migration decision by maximizing her or his quality of life, these probabilities can be derived as functions of observable explanatory variables in the following two submodels (Kanaroglou et al, 1986).

3.1 Destination choice submodel

$$P(j\,|i, s) = \frac{\exp[\boldsymbol{b}^{\mathrm{T}}\boldsymbol{x}(j, i, s)]}{\sum\limits_{k \neq i} \exp[\boldsymbol{b}^{\mathrm{T}}\boldsymbol{x}(k, i, s)]}, \qquad j \neq i, \tag{1}$$

where $\boldsymbol{x}(j, i, s)$ is a column vector of observable explanatory variables, and $\boldsymbol{b}^{\mathrm{T}}$ is a row vector of unknown coefficients.

3.2 Departure submodel

$$P(i, s) = \frac{\exp[d + \boldsymbol{f}^{\mathrm{T}}\boldsymbol{y}(i, s) + uI(i, s)]}{1 + \exp[d + \boldsymbol{f}^{\mathrm{T}}\boldsymbol{y}(i, s) + uI(i, s)]}, \tag{2}$$

where $\boldsymbol{y}(i, s)$ is another column vector of observable explanatory variables; $\boldsymbol{f}^{\mathrm{T}}$ is a row vector of unknown coefficients; d and u are unknown coefficients, with u being bounded between 0 and 1; and $I(i, s)$ is the so-called inclusive variable defined as:

$$I(i, s) = \ln \sum_{k \neq i} \exp[\boldsymbol{b}^{\mathrm{T}}\boldsymbol{x}(k, i, s)]\,. \tag{3}$$

The inclusive variable represents the attractiveness of the rest of the system perceived by the potential migrant in state i.

Assuming that the migration behavior of all persons in the same cell of the multidimensional tabulation depend on the same set of $P(i, s)$ and $P(j\,|i, s)$, we estimate the unknown coefficients in equations (1) and (2) sequentially by the maximum quasi-likelihood method (Liaw and Ledent, 1987; McCullagh, 1983). In constructing a relatively concise specification of a submodel (to be called the *best specification* for simplicity), we only include the explanatory variables that are statistically significant (that is, those whose t-ratios have a magnitude of at least 2.0) and that are substantively sensible.[(6)]

The goodness of fit of a given specification of a submodel is to be measured by the ρ^2-statistic, where

$$\rho^2 = 1 - \frac{L_g}{L_o}, \tag{4}$$

where L_g is the maximum quasi-log-likelihood of the given specification, and L_o is the maximum quasi-log-likelihood of the corresponding null submodel (that is, the destination-choice submodel with $\boldsymbol{b}^T = \mathbf{0}$ or the departure submodel with $\boldsymbol{f}^T = \mathbf{0}$. Note that the ceiling of ρ^2 is much less than 1.0 so that a value of 0.2 may indicate a very good fit (McFadden, 1974).

To help evaluate the relative importance of one subset of explanatory variables (say, the variables representing the attraction of adult children) against another subset (say, the variables representing environmental amenities) we will delete the two subsets of variables in turn from the best specification and then compare the resulting decreases in ρ^2: the greater the decrease, the more important then deleted subset of variables.[(7)] The decrease in ρ^2 arising from the deletion of a subset of explanatory variables is termed the marginal contribution in ρ^2.

4 The specification of explanatory variables

The explanatory variable at the focus of this study is 'adult children', which is defined in the following way. For a given 'race', consider a group of elderly natives (aged 60 years and over in 1990) who in 1985 resided in state i, which is by definition also their state of birth. Where could their adult children be located at the beginning of the 1985–90 migration interval? It is likely that most of their children were born in state i and were aged 30–59 in 1990. The distribution of these children at the beginning of the 1985–90 migration interval can be estimated reasonably well by examining the 'race'-specific birth-to-1985 out-migration pattern of the 30–59 age-group from state i. Let $C(r, i)$ be the number of individuals in the 30–59 age-group who were born in state i and of 'race' group r. Also, let $C(r, i, j)$ be the number of individuals in $C(r, i)$ who made the birth-to-1985 migration from state i to state j, and let $C(r, i, i)$ be the number of individuals in $C(r, i)$ who remained in state i in 1985. The variable 'adult children' is then defined as

$$c(r, i, j) = \frac{C(r, i, j)}{C(r, i)} 100\% \tag{5}$$

(6) The t-ratio associated with the coefficient of an explanatory variable is computed by dividing the estimated coefficient by its asymptotic standard error. For logit models, the maximum quasi-likelihood (MQL) method yields the same estimated coefficient as does the maximum likelihood (ML) method. An advantage of the MQL method over the ML method is that the MQL method does not depend on the unrealistic assumption that migrations are independent events, whereas the ML method does. A consequence of this difference for our data is that the asymptotic standard errors for computing the t-ratios are much larger in magnitude than those generated by the ML method. If we were to use the ML method we would have the difficulty of being unable to remove variables that contribute almost nothing to the model's explanatory power.

(7) Another criterion for comparing the relative importance of two subsets of explanatory variables is the P-value, computed from the corresponding changes in the χ^2-statistic and the associated degrees of freedom. However, in our model, all the changes in χ^2 are so big that the χ^2 distribution function in languages such as SAS and QUATTRO yields either a zero or an error message for the P-values of all deleted subsets of variables, making the comparison impossible. Our experiences in other studies where the P-values are computable show that the ranking by decreases in ρ^2 and the ranking by P-values are very similar.

in the destination-choice submodel, and as

$$c(r, i, i) = \frac{C(r, i, i)}{C(r, i)} 100\% \tag{6}$$

in the departure submodel. It is approximately correct to say that $c(r, i, j)$ is the proportion of adult children born in state i who migrated to state j sometime between birth and 1985 and who remained in state j in 1985 (the beginning of the 1985–90 time interval for studying elderly migration) whereas $c(r, i, i)$ is the proportion of adult children born in state i who remained in state i in 1985. We expect that $c(r, i, j)$ should have a positive coefficient in the destination-choice submodel (implying that elderly migrants are more likely to be attracted to a potential destination where a higher proportion of their adult children are located) whereas $c(r, i, i)$ should have a negative coefficient in the departure submodel (implying that elderly potential migrants are less likely to depart from a native state where a higher proportion of their adult children have remained). As the effects of the variable 'adult children' are expected to vary by 'race', marital status, and age we will also create interaction variables by multiplying this variable by dummy variables representing these personal attributes.

We represent environmental amenities by coldness of winter, cloudiness, and 'Gold Coast', defined in the following way.

Coldness of winter: for each state, this variable is defined as a weighted average of the heating degree-days of cities with records from 1951 to 1980, using city populations as the weights. The unit is 1000 degree(F)-days.[8]

Cloudiness: this is the weighted average of the number of cloudy days in a year of the cities within a state, with the weights being the population sizes of the metropolitan areas where the cities are located. The unit is in 10 days (that is, the value of 90 cloudy days is coded as 9 for this variable).

Gold Coast: this is a dummy variable assuming the value of 1 if the state in question is on the Atlantic coast between Virginia and Florida or one of the three states on the Pacific Coast. In the context of the above two amenity variables, this variable is used to represent the attractions of water, mountains, and scenic beauty (Longino, 1995, page 18).

As it is expected that amenity-oriented migrations are more likely to be made by the elderly who are relatively young (recently retired), well educated, white, and married (Haas and Serow, 1993), some of these place attributes may have some significant interactions with the dummy variables representing the distinctions in personal factors such as age, education, 'race', and marital and poverty status.

Our assessment of the importance of the attraction of adult children and environmental amenities are performed in the context of a set of other place attributes that are considered as covariates. These covariates represent cost of living, generosity of Medicare and Medicaid programs, proportion of homeownership, rate of violent crime, racial similarity, relative location between origin and potential destination, economic conditions, and the size of ecumene (that is, population size). To maintain

[8] The data source for heating degree-days and cloudy days is the US National Oceanic and Atmospheric Administration. The reference value for computing the coldness measure is 65°(F). The measure is the sum of the deviations of daily mean temperatures below this reference value. The summation is over all 365 days of a year. If the mean temperature on a given day is 50°, then the contribution of this day to the sum is 15°. If the mean temperature on another day is 80°, then the contribution of that day is zero. Because most days with positive values are in winter, the coldness measure is called 'coldness of winter' for ease of communicating the main idea. Because we use 1000 degree-days as the unit, the sum of 3500 is coded as 3.5 for this variable.

the flow of the paper, their operational definitions are relegated to the appendix. To achieve a high level of explanation and to be consistent with theory, these place attributes are also used to form interaction terms with personal factors. For example, we use the interaction between the log of distance and the dummy variable representing postsecondary education in the destination choice submodel to allow the weaker distance-decay effect on those with higher educational attainment.

5 Empirical findings

5.1 Destination choices

The sharp difference in destination-choice pattern between black and white elderly primary migrants can be vividly depicted by the migration flows from the southern states. Table 1 shows the three most attractive destinations, together with their percentage shares, of the 'race'-specific elderly primary migrants from each of the southern states in 1985 – 90. For black people, many of these destinations are the industrial states

Table 1. The three most preferred destinations of (a) black and (b) white elderly primary migrants from the southern states in the period 1985 – 90 [source: 1990 Census public use microsample (PUMS)].

Origin state	Best		Second best		Third best		No. of migrants
	destination	share (%)	destination	share (%)	destination	share (%)	
(a)							
Virginia	Maryland	29.2	New York	17.7	New Jersey	13.6	1 312
West Virginia	Virginia	19.1	California	12.5	Kentucky	12.5	168
North Carolina	Virginia	19.3	New York	17.0	Maryland	11.7	1 434
South Carolina	New York	16.4	Pennsylvania	13.6	North Carolina	12.9	1 639
Georgia	Florida	31.2	Ohio	12.2	New York	7.9	1 422
Florida	Georgia	17.6	New York	12.1	Maryland	8.5	637
Kentucky	Indiana	48.1	California	13.1	Illinois	11.4	511
Tennessee	Michigan	26.9	Illinois	17.2	Indiana	9.1	618
Alabama	Florida	16.3	Georgia	12.3	Ohio	12.2	1 881
Mississippi	Illinois	22.8	Tennessee	14.5	Louisiana	9.2	2 180
Arkansas	California	20.3	Illinois	14.9	Michigan	14.3	847
Louisiana	Texas	27.7	California	27.0	Ohio	5.5	1 536
Oklahoma	California	42.0	Texas	25.2	Michigan	7.4	421
Texas	California	49.5	Colorado	9.4	Oklahoma	8.1	1 308
(b)							
Virginia	Florida	29.3	North Carolina	21.4	Maryland	8.1	7 272
West Virginia	Florida	28.3	Ohio	21.5	Virginia	9.7	6 736
North Carolina	South Carolina	25.5	Florida	22.1	Virginia	13.9	5 988
South Carolina	North Carolina	31.2	Florida	21.6	Georgia	19.1	2 183
Georgia	Florida	39.0	Alabama	12.3	South Carolina	10.3	6 098
Florida	Georgia	30.0	North Carolina	16.2	Alabama	9.1	3 005
Kentucky	Florida	25.5	Ohio	19.9	Indiana	17.6	9 838
Tennessee	Florida	18.7	Georgia	11.6	Mississippi	11.1	6 955
Alabama	Florida	33.3	Georgia	21.4	Tennessee	11.6	6 450
Mississippi	Tennessee	20.8	Louisiana	14.3	Alabama	12.4	3 184
Arkansas	Texas	22.0	California	10.6	Oklahoma	10.6	4 577
Louisiana	Texas	30.3	Mississippi	23.0	Florida	7.9	4 622
Oklahoma	Texas	28.9	California	13.6	Arkansas	8.1	6 505
Texas	California	14.4	Arkansas	12.0	Oklahoma	11.1	11 702

Note: Delaware, Maryland, and Washington, DC, are included in the northern industrial region in this study.

in the snowbelt (for example, Illinois, New York, Michigan, Pennsylvania, Ohio, and Indiana). For white people, few of these destinations are in the snowbelt.

Although black migrants' preference for northern industrial states have been frequently attributed to the relatively generous welfare and social programs of these states,(9) it is more plausible to expect that the elderly black migrants were attracted mainly by their adult children, many of whom happened to be located in the industrial north. To illustrate (but not to prove) the plausibility of this expectation, we have plotted the destination choice patterns of the widowed and married elderly primary black migrants from Alabama against the distribution of their adult children (figure 1). Figure 1(a) shows that the northern industrial states that attracted large proportions of widowed black migrants indeed tended to have large shares of their adult children. The relationship between the distribution of adult children and the destination choice pattern of the widowed elderly appears to be rather strong ($R^2 = 0.729$). Figure 1(b) shows that the corresponding relationship is much weaker for married elderly black people ($R^2 = 0.341$). The difference for widowed and married elderly black people is consistent with Litwak's characterization of the MEF in the sense that the elderly who are less capable of living independently are more likely to move toward their adult children.

Regarding the attraction of elderly white people to their adult children, figures 1(c) and 1(d) show the relevant information for widowed and married white primary migrants from Alabama. The data suggest that the attraction to adult children was very strong and hardly differed for the widowed and the married ($R^2 = 0.912$ and 0.910, respectively). Widowed and married elderly white people were strongly attracted

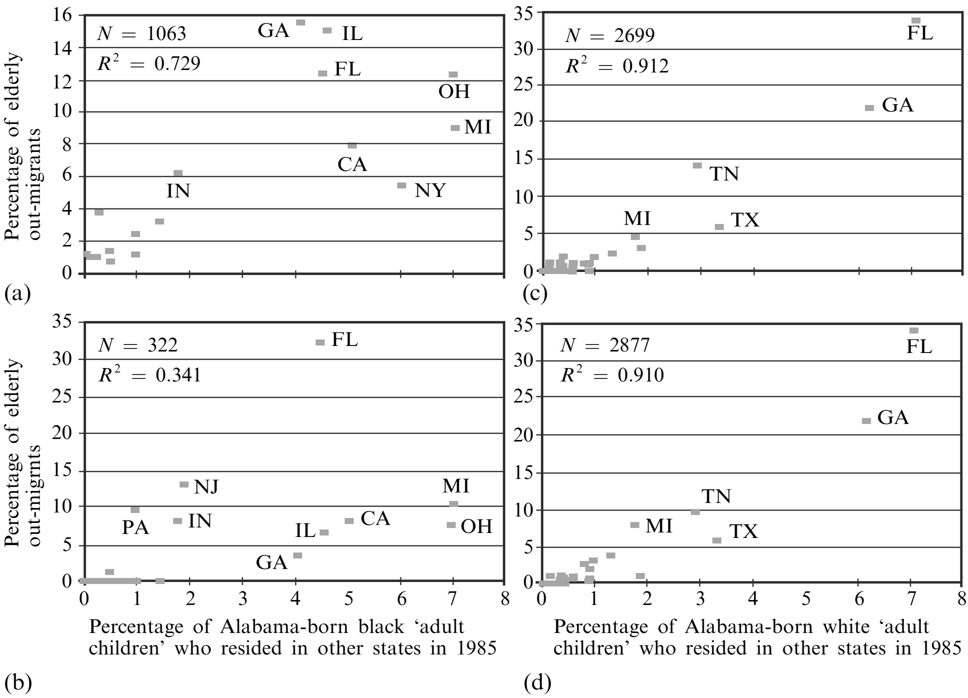

Figure 1. Attraction of Alabama's 1985–90 black and white elderly primary out-migrants to their adult children who resided in other states in 1985, by the elderly's marital status: (a) black widowed, (b) black married, (c) white widowed, (d) white married.

(9) For a list of references about the potential effects of the spatial variation in welfare and social benefits on black migrants (see Long, 1988, page 149).

to Florida and Georgia, which had not only a large concentration of their adult children but also an attractive environment. Without multivariate analysis it is difficult to know the differential attractions of these two factors. The main message from these figures is that the attraction to adult children should not be forgotten when attempting to explain the flows of elderly migrants into amenity-rich states.(10)

We now turn to the estimation results of the destination choice submodel. In the best specification we find that the elderly primary migrants of both 'races' and for all marital statuses were attracted to their adult children,(11) that this attraction was somewhat stronger for the relatively old (aged 75 years and over) widowed, and that it was substantially stronger for white people than for black people (table 2). To be more specific, we can compute the estimated odds ratios for four separate groups of elderly migrants:

(1) For white people younger than 75 years and not widowed, the odds ratio is $\exp(0.291) = 1.34$, which means that if the share of adult children by a potential destination is increased by one percentage point, the odds that this potential destination is selected will be increased by a factor of 1.34.

(2) For widowed white people aged 75 years and over, the odds ratio is $\exp(0.291 + 0.020) = 1.36$.

(3) For black people younger than 75 years and not widowed, it is $\exp(0.291 - 0.151) = 1.15$.

(4) For widowed black people aged 75 years and over, it is $\exp(0.291 + 0.020 - 0.151) = 1.17$.

The finding that elderly black people were substantially less attracted to their outmigrated adult children than were elderly white people is consistent with the black–white difference demonstrated by figure 1. It is also consistent with the finding of Hogan et al (1993) that black families tend to have weaker intergenerational connections than do white families. It suggests that black families tend to differ more from the model of the MEF than do white families. The finding that the widowed were more likely to be attracted to adult children than were those of other marital status is consistent with the greater attraction of California for widowed compared with married elderly migrants, as mentioned earlier.

The estimated coefficients of the amenity variables show that the elderly migrants in general tended to be attracted to potential destinations with a warmer winter, clearer days, and a location on the Gold Coast. The group that was most subject to the attraction of a warm winter was that of nonpoor married white people in the 65–69 year age interval.(12) Compared with their white counterparts, all cohorts of black

(10) In two small-scale surveys of the post-retirement migrants from north central states to the amenity-rich states of Arizona ($N = 199$) and ($N = 150$), it was found that 54% "had at least one child located closer now than before their retirement", and that "the desire to be nearer children was, in fact, indicated by 31 percent of the Arizona migrants, and by 13 percent of those in Florida, as a primary consideration in their decision to retire outside their home communities" (Bultena and Marshall, 1970, page 91).

(11) The never-married elderly in general did not have a child and represented a very small proportion of the elderly population, having little effect on the estimated results. Our interpretations of the statistical results about the attraction of children do not apply to this group.

(12) The age pattern of the odds ratio of the coldness variable for unmarried and nonpoor white migrants is: $\exp(-0.28) = 0.76$ for the 60–64 age-group, $\exp(-0.28 - 0.11) = 0.68$ for the 65–69 age-group, $\exp(-0.28 - 0.08) = 0.70$ for the 70–74 age-group, $\exp(-0.28) = 0.76$ for the 75–79 age-group, and $\exp(-0.28 + 0.07) = 0.81$ for the 80 plus age-group. These odds ratios, together with other odds ratios that can be computed in a similar way, indicate that white migrants of *every* age-group tended to avoid destinations with a relatively cold winter, and that white migrants of the 65–69 age-group had the strongest aversion to a cold winter (or, equivalently the strongest attraction to a warm winter). For black migrants who were married, aged 65–69 years,

Table 2. Estimation results of the destination choice submodel for the 1985–90 interstate black and white elderly (aged 60 years or more in 1990) primary migrants in the United States.

Explanatory variable	Best specification[a]		MCR
	coefficient	t-ratio	
Attraction to adult children			0.0264
(adult children)	0.291	62.7	
(adult children) × (widowed) × (aged 75 or more years)	0.020	2.8	
(adult children) × black	−0.151	−15.3	
Environmental amenity:			0.0563
climate			0.0298
(coldness of winter)	−0.280	−22.0	
(coldness of winter) × married	−0.186	−21.1	
(coldness of winter) × (aged 65–69 years)	−0.113	−12.8	
(coldness of winter) × (aged 70–74 years)	−0.078	−7.9	
(coldness of winter) × (aged 80 or more years)	0.066	6.4	
(coldness of winter) × poor	0.040	3.2	
(coldness of winter) × black	0.449	15.8	
cloudiness	−0.103	−24.8	
scenic beauty and recreational opportunity			0.0070
Gold Coast	0.989	35.3	
(Gold Coast) × black	−0.561	−5.4	
Relative location			0.0305
ln(distance)	−0.566	−27.6	
ln(distance) × married	−0.117	−5.8	
ln(distance) × (post-secondary education)	0.043	2.6	
ln(distance) × Alaska	0.349	12.4	
ln(distance) × Hawaii	0.075	4.3	
contiguity	0.710	22.7	
contiguity × black	−0.244	−2.9	
Cost of living			0.0058
(cost-of-living index)	−0.074	−31.8	
(cost-of-living index) × black	0.072	10.6	
Generosity of medical programs			0.0042
Medicare	0.334	9.4	
Medicaid	0.153	27.1	
Medicaid × black	−0.179	−8.7	
Racial attraction			0.0057
(racial similarity)	0.532	31.4	
(racial similarity) × black	−0.191	−4.0	
Labor-market variables			0.0015
income × (aged 60–64 years)	0.666	5.2	
(employment growth) × (aged 60–64 years)	4.188	11.6	
Size of ecumene			0.0015
ln(population size)	0.174	11.1	
ln(population size) × black	0.420	8.2	
ρ^2-statistic	0.3507		

Note: MCR, marginal contribution to the ρ^2-statistic; for more details on the explanatory variables, see text, sections 3 and 4 and the appendix.
[a] See text, section 3.2.

(12) continued
and nonpoor, the odds ratio of coldness is $\exp(-0.28 - 0.19 - 0.11 + 0.45) = 0.88$, compared with the very low value of $\exp(-0.28 - 0.19 - 0.11) = 0.56$ for their white counterparts. In other words, the black migrants had a much weaker aversion to destinations with a cold winter than did their white counterparts.

people were much less attracted by destinations with a warm winter. Although both black and white elderly migrants were subject to the attraction of the states on the Gold Coast, the attractions were much weaker for black people than for white people.

From the marginal contributions in the ρ^2-statistic (table 2), we see that, although the explanatory power of the adult children variable was much less than the combined explanatory power of the variables climate and Gold Coast, it was stronger than that of Gold Coast. Compared with the covariates that are not the focus of this paper, adult children was less powerful than the combination of distance[(13)] and contiguity but much more influential than cost of living, generosity of medical programs,[(14)] racial similarity, labor-market variables (in the 60–64 age-group), and population size at destination. Overall, we find that the adult children variable was one of the most important explanatory factors in the destination-choice submodel.

Table 3. Observed and predicted shares of elderly primary migrants (aged 60 or more years in 1990) in 1985–90 by the major receiving states: (a) black people and (b) white people.

Rank	Destination	In-migrants[a]		Share (%)		Native pop. in 1985[a]	In-migration rate (%)	
		observed	predicted	observed	predicted		observed	predicted
(a)								
1	California	2 578	2 860	11.2	12.5	15 328	16.8	18.7
2	Maryland	1 749	1 593	7.6	6.9	48 468	3.6	3.3
3	Florida	1 713	1 448	7.5	6.3	72 816	2.4	2.0
4	New York	1 394	1 881	6.1	8.2	59 925	2.3	3.1
5	Illinois	1 215	1 711	5.3	7.4	34 291	3.5	5.0
6	Georgia	1 120	1 187	4.9	5.2	151 891	0.7	0.8
7	Michigan	1 104	751	4.8	3.3	19 907	5.5	3.8
8	New Jersey	1 054	845	4.6	3.7	24 778	4.3	3.4
9	Virginia	1 001	745	4.4	3.2	108 049	0.9	0.7
10	Texas	958	871	4.2	3.8	172 117	0.6	0.5
Top-10 destinations		13 886	13 892	60.5	60.5	707 570	2.0	2.0
All destinations		22 967	22 967	100.0	100.0	1 663 973	1.4	1.4
(b)								
1	Florida	211 481	190 024	37.7	33.8	190 933	110.8	99.5
2	Arizona	31 871	28 654	5.7	5.1	24 475	130.2	117.1
3	California	31 605	41 458	5.6	7.4	711 631	4.4	5.8
4	Texas	20 589	21 371	3.7	3.8	1 090 723	1.9	2.0
5	New Jersey	19 687	11 769	3.5	2.1	614 173	3.2	1.9
6	North Carolina	16 322	14 870	2.9	2.6	634 209	2.6	2.3
7	Pennsylvania	12 591	12 932	2.2	2.3	1 888 668	0.7	0.7
8	Virginia	11 508	14 006	2.0	2.5	418 173	2.8	3.3
9	Georgia	10 496	22 507	1.9	4.0	463 153	2.3	4.9
10	South Carolina	10 471	15 311	1.9	2.7	257 339	4.1	5.9
Top-10 destinations		376 621	372 902	67.1	66.4	6 293 477	6.0	5.9
All destinations		561 435	561 435	100.0	100.0	20 170 529	2.8	2.8

[a] Number of persons.
Note: pop., population.

(13) The distance-decay effect is flatter for the far-away states of Alaska and Hawaii.

(14) Although both black and white migrants were attracted by the destinations with a more generous Medicare program, only white migrants were significantly attracted by destinations with a more generous Medicaid program. In other words, our result does not support the idea that elderly black people were more prone to be attracted by states with more generous government programs than were elderly white people.

Although the ρ^2-statistic (0.3507) of the best specification in table 2 may appear small to a reader who is familiar with the R^2-statistic as a measure of goodness of fit, we see in table 3 that the destination-choice submodel actually predicts quite well the observed patterns for black people and white people. It is interesting to note that two of the top three destinations of white elderly primary migrants, namely Florida and California, had the largest shares of nonnative white adult children among all the states in 1985: 8.7% in Florida, and 13.7% in California, compared with only 3.1% in New York. An important black – white contrast in destination-choice pattern is that Florida attracted by far the largest number of elderly white primary migrants (211 481), but it attracted significantly fewer elderly black primary migrants (1713) than did California (2578), even though it is much closer to the major concentration of elderly native black people than is California. This difference is consistent with the fact that Florida had only 5.3% of the nonnative black adult children in 1985, compared with 14.0% for California. As New York had as many as 10.4% of nonnative black adult children in 1985, it is not surprising that it was among the top five destinations of elderly black primary migrants.

5.2 Departure choices

As expected, the estimated coefficients of the 'adult children' variable and its interaction term in the departure submodel show that the concentration of adult children in their state of birth had a significant retention effect on both native elderly black people and white people and that this effect was stronger for the widowed than for those of other marital statuses (table 4, see over). The coefficients of environmental factors also turn out to be consistent with our expectations: the states on the Gold Coast were in general more capable of retaining their elderly natives, whereas states with a colder winter were more prone to 'push out' those elderly natives who were married couples or males at retirement age. The marginal contributions in the ρ^2-statistic show that, among the factors representing place attributes, adult children and environmental amenities, together with cost of living, were most important: they were more important than generosity in medical programs, proportion of homeownership, rate of violent crime, population size at origin, and location in the industrial heartland.[15]

The marginal contributions in the ρ^2-statistic also show the typical finding that personal attributes were in general more important than place attributes in determining departure propensities. The large negative coefficient of the variable black (−0.946) indicates that native elderly black people were much less likely to migrate than were native elderly white people. This difference is also reflected by the observed departure rates: 1.4% for black people compared with 2.8% for white people. By contrast, the small positive coefficient of the variable male (0.036) indicates that the migration propensities did not differ much by gender. This is reflected by the small gender difference in the observed departure rates: 2.6% for females compared with 2.8% for males. The estimated coefficients also show that the retirement peak of the departure (out-migration) schedule was quite clear for white people but hardly existed for black people. The observed age-specific departure rates also display a retirement peak for white people: 3.2% for the 60 – 64 age-group, 3.3% for the 65 – 69 age-group, and 2.6%

[15] In the multivariate context, we found that the industrial heartlands variable had a significant retention effect on native elderly black people and a significant push effect on native elderly white people. This finding suggests that most of the native elderly black people were much less affluent than the corresponding white people in the industrial heartland so that they were less prone to participate in amenity-oriented migration. The changes in the coefficients of other variables arising from the deletion of this dummy variable (not shown in this paper) suggest that the black – white difference in the propensity to leave the industrial heartland was partly a result of a high proportion of black adult children born in this region remaining within the region.

Table 4. Estimation result of the departure submodel for the interstate migrations by the black and white elderly (aged 60 years or more in 1990) native-born Americans in 1985 – 90.

Explanatory variable	Best specification[a]		MCR
	coefficient	t-ratio	
Constant term	−4.859	−18.9	
Race			0.0014
black	−0.946	−9.5	
Gender			0.0013
male	0.036	2.1	
Age			0.0025
[retirement age (65 years)]	0.159	6.8	
[retirement age (65 years)] × black	−0.135	−1.7	
Marital status			0.0057
single	−0.167	−3.1	
single × black	1.311	9.8	
(divorced or separated)	0.747	16.6	
(divorced or separated) × black	0.604	5.9	
widowed	1.306	9.5	
widowed × black	0.620	6.9	
widowed × female × (aged 75 – 79 years)	0.294	6.7	
widowed × female × (aged 80 or more years)	0.564	15.1	
widowed × male × (aged 75 – 79 years)	0.345	4.4	
widowed × male × (aged 80 or more years)	0.479	7.7	
Educational attainment			0.0054
(secondary education)	0.258	15.5	
(post-secondary education)	0.600	34.8	
(post-secondary education) × blacks	−0.307	−3.4	
Poverty status			0.0007
poor	−0.211	−7.6	
poor × black	−0.515	−6.0	
Retention effect of adult children			0.0014
(adult children)	−0.016	−10.5	
(adult children) × widowed	−0.016	−7.9	
Environmental amenity:			0.0015
climate			0.0011
coldness × married	0.106	14.8	
coldness × (retirement-aged male)	0.017	3.3	
scenic beauty and recreational opportunity			0.0003
(Gold Coast)	−0.227	−8.1	
Cost of living			0.0017
(cost-of-living index)	0.030	20.1	
Generosity in Medical Programs			0.0008
Medicare × (aged 75 or more years)	−0.025	−2.1	
Medicaid × (aged 75 or more years)	−0.035	−6.4	
Homeownership			0.0005
(homeownership proportion)	−0.020	−11.0	
Social environment			0.0003
(violent crime rate)	3.253	7.7	
Size of ecumene			0.0000
ln(population size)	0.039	2.3	
Regional effect			0.0007
(industrial heartland)	0.249	11.9	
(industrial heartland) × black	−0.471	−5.4	
Attraction of rest of system			0.0003
inclusive variable	0.076	7.9	
ρ^2-statistic	0.0424		

[a] See text, section 3.2.

Note: MCR, marginal contribution to the ρ^2-statistic; for more details on the explanatory variables, see sections 3 and 4 and the appendix.

for the 70 – 74 age-group. The corresponding rates for black people are 1.3%, 1.2%, and 1.3%, respectively.

To the extent that educational attainment and poverty status serve well as proxies for socioeconomic status, the estimation result confirms that the higher the socioeconomic status, the greater the migration propensity. The estimated coefficients indicate that educational attainment had highly significant positive effects, which were stronger for white people than for black people. The observed departure rates are consistent with this multivariate finding: the rates for white people were 2.0% (less than high school), 2.9% (high school), and 4.0% (college), whereas the corresponding rates for black people were 1.2%, 1.6%, and 1.9%, respectively. With respect to the effects of poverty status, the estimated coefficients and the observed departure rates show that those under the poverty line were less likely to migrate. However, without controlling for other factors, the observed departure rates were unable to substantiate the multivariate finding that the negative effect of poverty was stronger for black people than for white people.[16]

The estimated coefficients of the dummy variables representing marital status and their interactions with race, age, and gender suggest that the effects of marital status were relatively complex. With the minor exception of never-married white people, the unmarried were more migratory than the married. Among the unmarried, the widowed were most migratory. The contrast between the widowed and the married was much greater for black people than for white people. For each gender, the propensities of the widowed to undertake primary migration increased monotonically with age beyond the early seventies. It is important to realize that these findings are obtained from a multivariate framework whereby other explanatory variables have already represented (1) the greater tendency of the widowed to be retained by states containing many of their adult children, and (2) the greater tendency of the married to be pushed out of states with a relatively cold winter. Mainly because of these two tendencies, the observed departure rates turned out to be somewhat lower for the widowed (2.4%) than for the married (2.8%).

To follow the main theme of this paper, we end this section by focusing on the marked difference between the overall departure rates of black people and white people (1.4% compared with 2.8%), which are perfectly predicted by the departure submodel. This difference can be partly accounted for by the fact that elderly black people had a lower educational attainment, were more likely to be in poverty, and were less prone to migrate at retirement age. It can also be related to the fact that a high proportion of black adult children had made a lifetime migration from the sunbelt to the snowbelt, whereas the opposite was true for white adult children. In other words, the difference in departure rates was also attributable to the fact that the attraction to adult children and environmental amenities countered each other for elderly black people but reinforced each other for elderly white people.

5.3 Interstate net transfers of elderly primary migrants

Although the elderly are much less migratory than are young adults, the elderly migration process tends to operate "like a giant parabolic mirror, collecting distinctive types of individuals from everywhere and concentrating them into certain places" (Morrison, 1990, page 401). It can thus result in fairly large net gains for a few states. Realizing the possibility of attracting a sizable number of elderly migrants to their territories, some southern states and municipalities have developed strategies and

[16] The observed departure rates for white people are 1.8% (poverty) and 2.9% (nonpoverty). The corresponding rates for black people are 0.9% (poverty) and 1.5% (nonpoverty).

Table 5. (a) The top-ten net gainers and (b) top-ten net losers of black and white elderly primary migrants in 1985–90: observed and predicted patterns.

Rank	Top-10	Net migrants[a]		Native population in 1985[a]	Net migration rate (%)	
		observed	predicted		observed	predicted
(a)						
Black people						
1	California	2 363	2 645	15 328	15.4	17.3
2	Maryland	1 411	1 017	48 468	2.9	2.1
3	Florida	1 076	844	72 816	1.5	1.2
4	Michigan	817	525	19 907	4.1	2.6
5	New Jersey	593	397	24 778	2.4	1.6
6	Indiana	564	171	12 426	4.5	1.4
7	Ohio	538	300	36 275	1.5	0.8
8	Illinois	466	1 214	34 291	1.4	3.5
9	Wisconsin	423	226	878	48.2	25.7
10	Nevada	289	117	41	704.9	285.4
	Total	8 540	7 456	265 208	3.2	2.8
White people						
1	Florida	208 476	187 470	190 933	109.2	98.2
2	Arizona	31 281	28 016	24 475	127.8	114.5
3	California	14 609	24 645	711 631	2.1	3.5
4	North Carolina	10 334	7 820	634 209	1.6	1.2
5	Nevada	9 587	6 792	7 351	130.4	92.4
6	Texas	8 887	7 848	1 090 723	0.8	0.7
7	South Carolina	8 288	12 721	257 339	3.2	4.9
8	Oregon	5 487	2 731	131 205	4.2	2.1
9	Georgia	4 398	16 681	463 153	0.9	3.6
10	Arkansas	4 309	1 408	249 111	1.7	0.6
	Total	305 656	296 132	3 760 130	8.1	7.9
(b)						
Black people						
1	Mississippi	−2 011	−1 440	107 775	−1.9	−1.3
2	Alabama	−1 603	−1 627	130 151	−1.2	−1.3
3	South Carolina	−1 280	−708	114 759	−1.1	−0.6
4	Louisiana	−1 232	−1 098	131 543	−0.9	−0.8
5	Arkansas	−698	−635	42 507	−1.6	−1.5
6	North Carolina	−680	−897	148 201	−0.5	−0.6
7	New York	−474	449	59 925	−0.8	0.7
8	Kentucky	−393	−143	27 002	−1.5	−0.5
9	Texas	−350	−601	172 117	−0.2	−0.3
10	Virginia	−311	−605	108 049	−0.3	−0.6
	Total	−9 032	−7 305	1 042 029	−0.9	−0.7
White people						
1	New York	−112 337	−96 340	1 930 530	−5.8	−5.0
2	Illinois	−38 724	−44 639	1 189 369	−3.3	−3.8
3	Pennsylvania	−32 200	−36 517	1 888 668	−1.7	−1.9
4	Massachusetts	−24 595	−24 588	754 614	−3.3	−3.3
5	Michigan	−23 101	−23 156	859 853	−2.7	−2.7
6	Ohio	−20 921	−25 627	1 155 149	−1.8	−2.2
7	New Jersey	−12 055	−15 007	614 173	−2.0	−2.4
8	Indiana	−8 597	−4 152	578 840	−1.5	−0.7
9	Iowa	−8 547	−6 718	428 723	−2.0	−1.6
10	Wisconsin	−7 955	−13 438	633 555	−1.3	−2.1
	Total	−289 032	−290 182	10 033 474	−2.9	−2.9

[a] Number of persons.

programs to attract relatively well-off elderly migrants as a way to boost "population, incomes, and employment" (Glasgow and Reeder, 1990, page 434).

Table 5 shows that the major net gains and net losses in elderly primary migration are fairly well predicted by the explanatory factors used in the nested logit model. More importantly, they also show that the interstate net transfers of elderly primary migrants were voluminous for white people and rather small for black people, and that the net transfers of white people were strongly oriented from amenity-poor states to amenity-rich states, whereas the net transfers of black people were mainly from southern states to a mixture of northern industrial states and a few amenity-rich states. These differences reflect the important fact that the adult children who had made the birth-to-1985 interstate migration were distributed quite differently in 1985 for these two cohorts: 67% of white people and 52% of black people settled down in South and West regions where amenity-rich states are concentrated. The white adult children's greater concentration in amenity-rich states helped to pull a greater proportion of their parents to the sunbelt, whereas the relatively high concentration of black adult children in northern industrial states generated a northward pull that largely canceled out the southward pull by environmental amenities. This finding suggests that the amenity-rich states with a higher concentration of nonnative adult children are more likely to succeed in their attempt at attracting relatively well-off elderly primary migrants for boosting their economic base.

6 Explanation for the unexpected finding of Longino and Serow

In a paper on the characteristics of elderly return migrants, Longino and Serow formulated the hypothesis that "although there will be regional variation, return migrants are more likely to be older and more widowed and residentially dependent than nonreturn migrants for the nation and for all regional streams" (1992, page S39). They tested this hypothesis with the census data on the 1975–80 interstate elderly (aged 60 or more years in 1980) in-migrants of the four census regions of the United States. The hypothesis was well supported at the national level but was significantly contradicted by the data of the Midwest. At the national level, among the return migrants 24.5% were aged 75 or more years, 33.0% were widowed, and 75.6% lived independently, whereas among the nonreturn migrants, the corresponding figures were 21.5%, 27.0%, and 79.5%, respectively. However, in the Midwest, these figures were 28.6%, 34.9%, and 76.7%, respectively, for the return in-migrants, compared with 32.2%, 41.4%, and 65.8%, respectively, for the nonreturn in-migrants.

Why was the hypothesis contradicted so sharply by the elderly in-migrants of the Midwest? Longino and Serow did not attempt to explain this contradiction specifically but speculated in the concluding section that, for the elderly, "one's informal support system, composed of close friends and children, may more often be located at one's adult state of residence than at one's state of birth" (1992, page S42). We think that the answer lies partly in this speculation in the sense that the attraction to adult children was recognized as a potentially important factor. But a plausible answer also requires the recognition that many adult children may have migrated to a state that is neither their state of birth nor the state of previous long-term residence of the elderly. As the results of our multivariate analysis indicate that the location of adult children and environmental amenity are among the most important place attributes for accounting for elderly primary migration, and as the Midwest is in general perceived to be lacking in environmental amenity, it is likely that many elderly in-migrants to the Midwest are attracted mainly by their previously out-migrated adult children, because of their (the elderly's) need for assistance, and are hence more likely to be older and widowed and to coreside with their adult children. We now use 1990 Census data to see if some

Table 6. Different characteristics of nonreturn (primary plus onward) and return interstate elderly in-migrants to the US Midwest: 1985–90.

Characteristic	Nonreturn migrants			Return migrants
	primary	onward	total	
(a) Black people and white people				
Number of in-migrants	62 775	91 556	154 331	96 286
Share[a]	25	37	62	38
Number aged 75 or more years[b]	40	33	36	32
Number widowed[c]	41	34	37	34
(b) Black people				
Number of in-migrants	5 237	8 616	13 853	1 842
Share[a]	33	55	88	12
Number aged 75 or more years[b]	43	34	37	21
Number widowed[c]	52	46	48	39
(c) White people				
Number of in-migrants	57 538	82 940	140 478	94 444
Share[a]	24	35	60	40
Number aged 75 or more years[b]	40	33	36	33
Number widowed[c]	40	33	36	34

[a] As a percentage of the number of US-born elderly in-migrants of the US Midwest.
[b] As a percentage of all people aged 60 or more years in the given cohort.
[c] As a percentage of people of all marital statuses in the given cohort.

Table 7. Different characteristics of black and white elderly primary interstate in-migrants of the Midwest from different regions: 1985–90.

Characteristic	Region of origin				
	Northeast	Midwest	South	West	total
(a) Black people					
Number of in-migrants	212	750	4 251	24	5 237
Share[a]	4.0	14.3	81.2	0.5	100
Number aged 75 or more years[b]	46	20	46	–	43
Number widowed[c]	37	34	56	–	52
Midwest share[d]	6	34	25	8	23
(b) White people					
Number of in-migrants	7 451	36 189	12 008	1 890	57 538
Share[a]	12.9	62.9	20.9	3.3	100
Number aged 75 or more years[b]	46	38	43	35	40
Number widowed[c]	47	36	47	33	40
Midwest share[d]	3	20	13	5	10

Note: as the actual sample size of black migrants from the states in the West region is only about 2 persons (24×0.08), the values of their characteristics are not shown.
[a] As a percentage of the total.
[b] As a percentage of all aged 60 or more years in the given cohort.
[c] As a percentage of people of all marital statuses in the given cohort.
[d] Of elderly primary migrants from the states of each region, for the given cohort.

suggestive evidence for this explanation can be found (tables 6 and 7). For simplicity, we now refer to the older and more likely to be widowed elderly as the 'needy' elderly.

In table 6 we divide the 1985 – 90 US-born black and white elderly interstate in-migrants of the Midwest into return and nonreturn cohorts, the latter being further divided into primary and onward cohorts. In table 6(a) we can see that nonreturn migrants are indeed needier than are return migrants and that the primary component is the 'neediest'. In tables 6(b) and 6(c) we can see that these statements are true for black people and white people. Thus, our focus is on elderly primary migrants.

In table 7, we divide the black and white primary in-migrants of the Midwest into those from the states of each of the four census regions. In table 7(a) we can see that a large majority of the black primary in-migrants (81.2%) came from southern states and that the black primary migrants from southern states are the neediest. Because as many as 82.2% of the nonnative black adult children in the Midwest in 1985 were born in the South, it is highly plausible to claim that the black needy elderly primary (and hence nonreturn) in-migrants of the Midwest were attracted mainly to their adult children. In table 7(b) we can see that the neediness of the white elderly in-migrants of the Midwest is attributable to the neediness of the migrants coming from the South and Northeast, who represented only a small fraction (13% and 3%, respectively) of the white elderly primary out-migrants from the states of these two regions. Instead of joining the dominant streams towards the amenity-rich states in the South, these needy primary migrants came to the Midwest where the winter is cold. Although the Midwest does not have a high proportion of white adult children born in the South and Northeast, our multivariate results suggest that the needy elderly white people in the small tributaries flowing from the South and Northeast into the Midwest were attracted mainly by their adult children. These small tributaries undoubtedly included the elderly primary migrants from the economically depressed areas of West Virginia and western Pennsylvania who went to join the households of their adult children in the industrial cities of the Midwest (Rowles, 1983). In sum, our evidence suggests that the unexpected finding of Longino and Serow (1992) is the consequence of the attraction of elderly primary migrants to their adult children.

Longino and Serow (1992) have highlighted that the general characteristics of a given type of migrant observed in different regions may be quite different from those observed at the national level and that this difference can help to yield greater insight into the major determinants of elderly migration. For example, the fact that the return in-migrants of the West and South tend to be significantly younger and less likely to be widowed than return in-migrants of the Northeast and Midwest was used by them to infer the importance of what Cribier (1980) described as 'provincial return migration'. In other words, an important motivation for an older person's return migration after his or her retirement from a modestly successful working career is the lower cost of living and the higher social status that he or she can enjoy in the region of his or her family roots. Similarly, the fact that the elderly primary in-migrants of the Midwest are unusually old and often widowed can be used, in our opinion, to suggest the importance of the attraction to adult children who are willing to assist their weakened elderly parents.

7 Concluding discussion

We have presented our study of black and white elderly primary migration in the context of Litwak's theory that the only family system that is consistent with an industrialized and bureaucratized society is the system of a modified extended family, which legitimizes the out-migration (as well as social mobility) of adult children for career advancement and encourages the migration of elderly parents to be close to their adult children for the assistance that requires proximity. In our opinion, this family system is much better than the alternative system of the isolated nuclear family or the highly individualized mass society, especially as aging of the population has become the dominant demographic trend of the new century.

By using a reasonable proxy for the location of adult children we have shown that married and unmarried elderly natives were strongly attracted to their adult children, although the attraction was stronger for the widowed. In the departure process we found that the elderly (especially those who were widowed) were more likely to remain in the states where a higher proportion of their adult children had remained. In the destination choice process, we found that elderly migrants were more likely to move to states where a higher proportion of their migrated adult children were located and that this tendency was somewhat stronger for those who were widowed and aged 75 years and over. These findings can be taken as hopeful signs of the viability of the MEF system. They also suggest that the elderly natives did not have a strong tendency to delay their migration towards their adult children until the loss of a spouse or becoming very old.

We have also shown that the attraction of adult children and environmental amenities were weaker for elderly black people than for elderly white people. This finding is related to the fact that a relatively high proportion of black adult children had made lifetime migration from the sunbelt to the industrial states of the snowbelt, whereas a relatively high proportion of white adult children had made life-time migration in the opposite direction. Thus, the two types of attractions were more likely to counter each other for native elderly black people and to reinforce each other for native elderly white people.(17) As a consequence, the migration of native elderly black people was very small in volume and was somewhat oriented towards the snowbelt, whereas the migration of native elderly white people was rather large in volume and was strongly oriented towards the sunbelt.

In light of the highly controversial literature on black families in the United States (for a review, see Franklin, 1997) we hesitate to make a strong connection between our finding about the weaker attraction of the black elderly to their adult children and the finding of Hogan et al (1993) that black people are consistently less likely than are white people to be involved in intergenerational assistance.(18) This connection would

(17) Note that the countervailing and reinforcing effects of the location of adult children and environmental amenities appeared in an additive form in our model. One of the referees mentioned a scenario: a school teacher in midcareer might select a promotion in, and move to, an amenity-rich region (and away from her parents) knowing that 5 – 15 years later her parent(s) will retire and that they are keen to move to an amenity-rich area *and* to live near her. The question about this scenario is: can the amenity – family motivations be easily distinguished in either generation? The answer is no. But, if there were many cases like this, there would be significant interaction (multiplicative) terms between the proxies of these two factors in the nested logit model.

(18) Based on a three-level nested logit model, our multivariate analysis of black and white elderly *return* and *onward* migration behavior has revealed the following main points. First, elderly non-natives were strongly attracted to the location of their adult children when they made their migration decisions, at all levels of the choice framework (to depart or to stay put; to return or to move onward; and to select one of the many potential destinations for onward migration). Second, at all three levels, the attraction to the location of adult children was stronger for the widowed than for those of other marital statuses. Third, in the return/onward-choice and destination-choice submodels the attraction to adult children was much weaker for black people than for white people. This finding suggests that intergenerational connections were weaker for black people than for white people, despite the fact that since the 1960s elderly black people have been more likely to coreside with their kin (including their adult children) than have elderly white people (Ruggles, 1994). In short, the main findings from our analysis of primary migration are reinforced by the findings from our analysis of return and onward migration. The results of our analysis of return and onward migration are available to the reader on request.

suggest that the structure of many black families has been less conducive to the development of long-term commitments to family members. One would suggest that perhaps the emphasis on commitments by the Million Man March is not as pointless as some cynics may suggest.[19]

Owing to the lack of data on the specific locations of noncoresident adult children, the importance of the attraction to adult children has not been assessed by other researchers in the context of environmental amenities and other relevant factors. Thus, the empirical implications of this attraction have remained largely unexplored. In this paper we have demonstrated that it can help to explain the 'unexpected' contrast between return and nonreturn elderly in-migrants of the Midwest: the latter are older, more likely to be widowed, and less likely to live independently. We hope that our findings will provide a basis for encouraging collection of information on the specific locations of non-coresident adult children in censuses and surveys.[20]

In light of the trend of the extremely rapid growth of the oldest old in the United States (Taeuber and Rosenwaike, 1992), an important implication of our findings relates to the long-term care for the disabled elderly, who in 1990 represented more than half of the nation's elderly population (Torres-Gil, 1996). As friends and neighbors are not suitable substitutes for adult children as the major providers of long-term care (Litwak, 1985), our findings suggest it is viable that adult children will remain the main providers of long-term care for the elderly. However, policymakers should realize that long-term care tends to be extremely burdensome (Brody, 1985). If formal institutions are not set up to relieve part of this burden, the attraction of the elderly to their adult children may be weakened (Anderson, 1977), leading to the degeneration of the MEF system and the need for further expansion of long-term care facilities for the elderly.

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[19] The Million Man March, spearheaded by Minister Louis Farrakhan, a black Muslim, took place on 16 October 1995 in Washington, DC. It was attended by numerous black men who were urged to pledge to be, among other things, good fathers and good husbands (Madhubuti and Karenga, 1996). It reflected a clear recognition by major black leaders of the need for strengthening the black family system in the United States.

[20] It is encouraging that we learned recently (September 2000) via an e-mail (nsfhhelp@ssc.wisc.edu) from the NSFH Office at the University of Wisconsin (www.ssc.wisc.edu/nsfh/) that geographical codes will be merged to the individual records of the NSFH. We plan to continue this line of research as soon as the merged data become available.

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APPENDIX

Definitions of the place attributes used as covariates in the nested logit model

In assessing the effects of adult children and environmental amenities on the interstate migration behavior of native elderly black people and white people, we control for the effects of other place attributes by including them as covariates in the nested logit model. These covariates are defined as follows. The data sources that are not specifically identified below are indicated in Frey et al (1996).

Cost-of-living index: the cost of living in a given state in 1985, with the national average set at 100. Data source: MacMahon and Chang (1991).

Medicare: the 1987 Medicare payment per elderly recipient. The unit is US $1000 per person. Data source: USDC (1991, page 220).

Medicaid: the 1986 Medicaid payment per elderly recipient. The unit is US $1000 per person. The missing value of Arizona is replaced by the average of the other states. Data source: HCFA (1990).

Income: the income per capita of a state computed in the following way: first, adjust the state-specific 1985 and 1989 nominal per capita incomes by the corresponding state-specific cost of living indices of the same years; second, the 1985-adjusted and 1989-adjusted values are then averaged. The unit is US $10 000 per person.

Employment growth: for each state, this variable is the state-specific 1985–89 growth of total civilian employment divided by the 1985 total civilian employment. The unit is 'proportion per four years'.

ln(distance): the natural logarithm of the population gravity centers of origin and destination states. It is calculated as ln(distance/miles).

Contiguity: for each potential destination, this is a dummy variable assuming the value of 1 if the destination shares a common border with the state of origin.

'Racial' similarity: for the migrants of a specific 'race' in the destination choice submodel, this is the logit of the specific 'race's' proportional share of the population of the potential destination in 1985, computed indirectly from the data of the 1990 Census. For the potential migrants of a specific 'race' in the departure submodel, this is the logit of the specific 'race's' proportional share of the population in the origin in 1985, computed indirectly from the data of the 1990 Census.

Proportion homeowners: this variable is the proportion (percentage) of the elderly (aged 65 or more years) owning homes in 1990. Data source 1990 Census 5% PUMS.

ln(population size): the natural logarithm of the population size of the state in 1985, computed indirectly from the data of the 1990 Census. It is calculated as ln(population/1000 000 persons).

Industrial heartland: a dummy variable assuming the value of 1 if the 1985 state of residence is Delaware, Maryland, or Washington, DC, or is in the Middle Atlantic Division or the East North Central Division.