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HOUSEHOLD DISSOLUTION AND THE CHOICE OF ALTERNATIVE LIVING ARRANGEMENTS AMONG ELDERLY AMERICANS

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ABSTRACT

For the elderly, housing choices are more complex than merely the choice of housing expenditure, dwelling size, and tenure. They also include the choice among alternative living arrangements such as living in one household with their adult children or sharing accomodations with other related or unrelated elderly.

We first contrast living arrangements of elderly Americans with the population under age 65 and describe the changes from 1974 to 1983. We detect a growing discrepancy in household formation/dissolution patterns between the elderly and the younger population: after a steady decline in the 1970s, we observe a rapid increase in the rate of "doubled-up" young families in the beginning of the 1980s. No such development can be found among elderly Americans. Instead, the proportion of elderly living independently steadily increases from 1974 to 1983.

To explain this discrepancy, we estimate a multinomial choice model among living independently and six categories of alternative living arrangements. The main finding is the predominance of demographic determinants as opposed to economic variables. The difference in income growth between the young and the elderly -- real income declined for the young but increased for the elderly -- can explain only part of the discrepancy in household dissolution decisions. The remaining discrepancy must be attributed to inertia and low mobility rates.

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1. Introduction[1]

A significant segment of the housing market is governed by choices and decisions made by the elderly. The importance of this segment will be even greater in the future because the share of elderly Americans in the total population will be steadily increasing. For elderly, housing choices are more complex than the choice of housing expenditure, dwelling size, tenure, etc. of their own dwelling. In particular for older elderly, a potential alternative to living independently is to live in one household with their adult children or to share accommodations with other elderly. The decision to dissolve the household, and the consequent choice of living arrangements, is the focus of this paper.

The choice of living arrangements is an important aspect of the well-being of the elderly and the economics of aging because of its side-effects in the provision of care and the physical environment that this choice implies. Sharing accommodations, in particular with adult children, will not only provide housing but also some degree of medical care and social support for the elderly. If elderly persons perceive sharing accommodations as an inferior housing alternative and remain living independently as long as their physical and economic means allow, this social support and a larger amount of medical care have to be picked up by society at large rather than the family or close friends.

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[1]Mike Tamada and Winston Lin provided valuable research assistance. I appreciated helpful comments by John Quigley and Angus Deaton. Financial support was received from the National Institutes of Health, Institute on Aging, Grant #1-P01-AG05842-01.

Household dissolution decisions also have obvious consequences for the intergenerational distribution of housing. In particular in times of tight housing market conditions with very high housing prices for newly developed units, the elderly's willingness to move out of the family home is an important parameter in the supply of more affordable existing homes. There is also the subtle question of intergenerational equity when elderly are perceived as being "overhoused," that is, live in houses that are relatively more spacious than those of younger families with children.

This paper studies the economic and demographic determinants of the elderly's decision to stay living independently or to choose some kind of shared accommodations. The main questions being asked are:

- How many elderly live independently? Does this percentage exhibit a similar development as in the non-elderly population?

- Who are the elderly living independently? Are they younger, are they wealthier?

- How many elderly live with their children? If so, do they head the household, or are they "received" by their children?

- How many distantly related and unrelated elderly share accommodations?

- Are economic conditions (income, housing prices) important determinants for the choice between living independently or sharing accommodations? Or is the decision to give up an independent household simply determined by age and health?

- Do only the less wealthy and older elderly "seek refuge" in their childrens' homes?

- Who are the "hosts" for subfamilies? Do they tend to be richer (because they can afford supplying extra shelter) or do they tend to be poorer (because they cannot afford privacy)?

The paper is organized in three parts. We first contrast living arrangements of elderly Americans with the population under the age of 65 years, describe the changes from 1974 to 1983, and compare housing choices in SMSAs with those in non-metropolitan areas and study regional variations. Our main result in this descriptive analysis is the discrepancy of the trends household formation/dissolution between the elderly and the younger population: after a steady decline in the 1970s, we observe a rapid increase in the rate of "doubled-up" young families in the beginning of the 1980s. No such development can be found among elderly Americans. The proportion of elderly living independently steadily increases in our sample period from 1974 to 1983.

In the second part, we estimate a formal choice model among living independently and six categories of alternative living arrangements. The main finding is the predominance of demographic determinants as opposed to economic explanations. This is not too surprising, but some-

what frustrating for an economist. To our relief, the data indicates a growing importance of income in this choice. We also discover a striking difference in the importance of income between the poor elderly and the well-to-do.

Finally, we employ these estimation results to explain the discrepancy in the development of household formation/dissolution between the young and the elderly.

2. Data and Household Decomposition

Our analysis is based on the Linked National Sample 1974 to 1983 of the Annual Housing Survey, now called American Housing Survey (AHS). Our primary reason for employing the AHS is its very large sample size that allows us to make inferences about infrequent choices and to conduct subgroup analyses. The careful recording of household composition makes it possible to detect elderly living as subfamilies or as "secondary individuals" in households headed by their children or other younger persons. Another important advantage of the AHS for the study of housing decisions is its inclusion of structural housing characteristics that allow a precise definition of housing prices. Data sets such as the Panel Study of Income Dynamics (PSID), and the Retirement History Survey (RHS) allow only the construction of simple expenditure measures uncorrected for quality differences.

However, it should be pointed out that the Annual Housing Survey has also several severe shortcomings. Though the dwelling units are

linked over time, the households or individuals living in these units are not. This prevents any dynamic analysis without stringent assumptions on the transition probabilities. The analysis in this paper is strictly cross-sectional and static, a limited dynamic version of the model in the second part of this paper is the subject of a sequel to this paper. The AHS does not contain a systematic record of the functional health status of the elderly.[2] We will depend on age as an indicator also for health, relying on the fact that age-specific medical cost and hospitalization patterns have been relatively stable for the last two decades.[3] Finally, the AHS includes all elderly that live in regular housing units but not the institutionalized population. Hence the choice among alternative living arrangements excludes the choice of the continuum between congregate housing and nursing homes, alternatives that are becoming increasingly popular.[4]

Therefore, most housing data is collected on a household level, with much information about individual household members subsumed in a household total. This is the case in the Census, to some degree in the Panel Study of Income Dynamics, and in the Annual Housing Survey. However, once one realizes that many elderly do not live independently, and that the choice between living independently and sharing accommodations is an important decision, one must view households as an outcome of such decisions rather than an exogenously given sampling unit. If

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[2]The 1978 National Sample contains a supplement on disabilities.

[3]See Poterba and Summers (1985).

[4]The AHS can be augmented with data from the National Nursing Home Survey. This is a subject for further research.

the alternative living arrangements are endogenous, the primary decision unit in housing choice analysis must be smaller than the household, and a fairly narrow definition of a family is more appropriate. A suitable decision unit is the (family-) nucleus, defined as follows:

Definition (Nucleus):

A nucleus consists of a married couple or a single individual with all their own children below age 18.

Households are formed as an outcome of living arrangement decisions made by individual nuclei. In many cases, the household is formed by only one nucleus. Typical examples of multi-nuclei-households are elderly parents in the household of their children, adult children still living in the household of their parents, or roommates. We can distinguish four types of households:

(1) Households consisting of only one nucleus,

(2) Households composed of nuclei with family relations (in this household type, child-parent relationships are of particular interest),

(3) Households composed of nuclei without family relations,

(4) Complex households, that is a combination of the latter two types.

Therefore, our first step in analyzing the data is to create a database in which the appropriate decision unit, the nucleus, is the sampling unit. This is achieved by detecting elderly subfamilies in existing households and splitting up households of type (2) through (4) into several nuclei. This household decomposition is based on the demographic and financial information on individual household members available in the Annual Housing Survey. Variables like income, nucleus size, etc. are apportioned accordingly.[5]

Our analysis will be based on 19,154 elderly nuclei. A nucleus is considered elderly if at least one person in the nucleus is above the age of 65 years. For some comparison, we also use a "control sample" of 19,938 younger nuclei. These samples were drawn as follows. The original Annual Housing Survey database consists of dwellings that are tracked through nine cross-sections from 1974 through 1983 (with the exception of 1982). First, we systematically sampled every fourth dwelling from the original AHS. Of those, every dwelling in which at least one elderly person lived was sampled, and every fourth of the remaining dwellings. We then decomposed each household according to the above rules into nuclei -- cross-section by cross-section.

As was already mentioned, this analysis does not attempt to track individual nuclei over time. Because the AHS cross-sections are linked across time by dwelling only, households will appear and vanish in the

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[5]The creation of this data base is a large, mostly mechanical task that is not particularly glamorous but devoured most of the work for this paper.

sample whenever they move. Hence, only a panel of stayer households could be constructed. Tracking nuclei over time introduces additional difficulties because nuclei must be identified in each cross-section and then be matched over time. This matching is non-trivial because of demographic changes (death or institutionalization) that are confounded by the frequent occurrence of unreliable demographic data. Because we treat observations of the same nucleus in separate years as independent observations, the above 19,154 nuclei should more precisely be termed "nucleus-years." We estimate that the elderly sample contains approximately 5,000 different nuclei.

3. Living Arrangements

We will describe the choice of an elderly nucleus among the following seven types of living arrangements:

- Living independently (denoted by INDEP),

- Parents living in one household with their adult children either as head of this joint household (denoted by PARE-H) or as subfamily in the household headed by the adult child (denoted by PARE-S),

- Living with relatives other than adult children either as head of this joint household (denoted by DREL-H) or as subfamily in the household headed by the distant relative (denoted by DREL-S),

- Living with unrelated persons either as head of this joint household (denoted by NREL-H) or as subfamily in the household headed by the non-relative (denoted by NREL-S).[6]

These seven types of living arrangements for the elderly are depicted in Figure 1. Note that for elderly who do not live independently we distinguish not only among three different relations to the other household members (PARE, DREL, NREL), but also between two headship categories (HEAD and SUBF). This is important because elderly who dissolve their own household in order to live in their adult childrens' household are living in an entirely different situation than elderly who stay in their family home but provide shelter for some of their adult children. In the first case, an explicit decision to move and to dissolve the elderly's household has to be made, and the elderly person gives up the economically important function as a homeowner (or, more rarely, as a renter) to become a sublettee. In the second case, the elderly person avoids the important psychic and physical moving costs and keeps the status as homeowner.

For the younger nuclei, two additional living arrangements become relevant:

- Adult children living in one household with their parents either as head of this joint household (denoted by CHIL_H) or as subfamily in the household headed by the parent (denoted by CHIL-S).

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[6]Complex households are assigned to the above categories in the stated order.

Table 1 presents the proportions in which these living arrangements are chosen by the elderly. The data is once stratified by year of cross-section (1974 through 1983, with the exception of 1982), by the four census regions (Northeast, Midwest, South, and West), and by whether the dwelling is located in an SMSA or a non-metropolitan area. For comparison, Table 2 presents the same proportions for younger nuclei. Based on more than 19,000 observations, the entries have a standard deviation of less than .36 percent points.

More than two-third of all elderly nuclei live independently, that is either as a married couple or as a single person forming a household. This proportion increases steadily from 1974 to 1983. More detailed tabulations show that about 32.5 percent of all elderly nuclei are elderly living together with their spouses, and about 38.5 percent elderly living alone. Almost all of the increase in independent elderly nuclei is generated by an increase in the single-person nuclei. A continuation of this trend will have serious consequences in the delivery of health care and social support because elderly seem to become increasingly isolated and detached from their traditional source of medical and social support.

The percentage of elderly living independently is highest in the western and midwestern region of the United States, lowest in the Northeast, and is much higher in rural areas as compared to metropolitan areas. The latter result is surprising and in contrast to common beliefs about rural and non-rural living arrangements.

The growing number of independent nuclei is particularly significant because it is not typical for the population at large. Comparing the trend among elderly nuclei with the development among younger nuclei (first column in Tables 1 and 2) yields a striking result: there is a large discrepancy in the development of household formation and dissolution between the elderly and the young. Whereas the percentage of all elderly nuclei living independently rises from 69.3 percent in 1974 to 73.0 percent in 1983, the percentage of nuclei in the younger part of the population that lives independently fluctuates around 55 percent throughout the second half of the seventies, and then markedly declines to 52.4 percent in 1983.

How does this discrepancy come about? In particular, why is there no increase in alternative living arrangements in the early eighties? This question will be the focus of the balance of this paper. Before discussing potential explanations, we will analyse the importance of the six dependent living arrangements.

Living together with one's own adult children is the most important alternative living arrangement. Of the 28.9 percent of those elderly nuclei who share accommodations with other nuclei, about 60 percent live in the same households as their adult children do. In most of theses cases, the elderly nucleus is household head, not the adult child. Corresponding to the increasing proportion of elderly living independently (in particular alone), parent-child households decline as alternative living arrangements. However, the relative importance of being head or subfamily in an elderly parent-adult child household shifts dramatically (columns PARE-H and PARE-S): in 1974, about 64 percent of all elderly

parent-adult child were headed by the elderly, in 1983, more than 73 percent. The percentage of parent-child nuclei is lower in the Middle-West and the West of the United States, and markedly lower in non-metropolitan areas as compared to SMSAs.

The third and fourth column in Table 2 (labelled CHIL-H and CHIL-S) represent the mirror image of elderly parent-adult child households, now relative to the living arrangements chosen by younger nuclei. Column three displays again the decline in headship-rates of adult children in parent-children households. Note that the proportion of both elderly parent-adult child living arrangements among all living arrangements chosen by younger nuclei households stays approximately constant as opposed to the relative decline of this choice among elderly nuclei -- reflecting the changing age distribution in the United States towards a higher proportion of elder Americans and a relatively declining "supply" for joint households.

About 8.7 percent of all elderly nuclei live doubled-up with relatives other than their own children (categories DREL-H and DREL-S). This percentage exhibits a similar declining trend as parent-child households, from 9.8 percent in 1974 to 7.4 percent in 1983. Again, this trend is in striking contrast to the younger population in which the relative share of this kind of living arrangement increases from 7.0 percent in 1974 to 9.6 percent in 1983.

Only a very small percentage of elderly nuclei (3.0 percent) share the household with non-related household members (living arrangements NREL-H and NREL-S in Tables 1 and 2). This percentage is more or less

stable in 1974-83 and is slightly lower than the corresponding percentage in younger households (3.4 percent) where we observe a distinct increase from about 2.5 percent in 1974-76 to about 4.5 percent in the early eighties.

4. Determinants of Living Arrangements

Who are the nuclei who live alone and who are the nuclei who share accommodations? In this section, we will collect descriptive statistics of the most important financial and demographic characteristics by living arrangement: income, age, marital status, sex, and size of the nucleus. These variables, among others, will influence the demand for housing of each nucleus where housing choices are understood to also include the way in which accommodations are shared with other nuclei. In the case of shared accommodations, these variable will also influence the "supply" of living arrangements by the head nuclei. Short of formulating some kind of demand-supply relationship of household formulation,[7] we will display some of these variables not only by nucleus (as a determinant of demand), but also by each nucleus' respective head nucleus (as a determinant of supply).

We will first concentrate on demand. Tables 3 and 4 tabulates the income of each nucleus. Average nucleus income for elderly is $11,150 compared to $15,450 for non-elderly nuclei. (These dollar amounts correspond to 1980 figures, and are deflated with the consumer price

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[7]See Becker's (1981) treatise or the paper by Ermisch (1981).

index.) The respective household incomes are $14,100 for the elderly population and $22,450 for the non-elderly. 87 percent of the income of the non-elderly is transfer income; in turn, 80.1 percent of non-elderly nuclei earn salary or wages as their predominant income source.

The row averages in the last columns of tables 3 and 4 indicate the income development from 1974 to 1983. Real income of elderly nuclei went almost steadily up from $10,470 to $12,340, essentially due to doubly-indexed transfer income. This is in stark contrast to the general real income development. Real income of non-elderly nuclei essentially stayed constant in our sample period -- it increased from 1974 to 1979, then decreased rapidly back to the 1974 level. If household formation is income elastic, the diverging income distribution is a formidable explanation for the discrepancy in household formation trends between the young and the elderly. The choice model in Section 5 will try to estimate this elasticity.

The intergenerational income distribution exhibits also some interesting regional variation: for both elderly and non-elderly, income is highest in the West and higher in urban than in non-metropolitan areas. In the North East where income of young nuclei is below the national average, elderly nuclei receive an above average real income.

Not surprisingly, there is a large income gap between nuclei living as head, and nuclei living as subfamilies. Head nuclei earn generally about more than twice as much as subfamilies. However, this difference in income between subfamilies and head nuclei is less pronounced than among younger nuclei (Table 4). Headship clearly has a strongly posi-

tive income elasticity. Among younger nuclei, nuclei living in any kind of shared accommodations have lower incomes than nuclei living independently. Not only headship, but also living independently has a positive income elasticity for younger nuclei. This is not necessarily the case with elderly nuclei. Elderly parents who head a joint household with their adult children exhibit larger average incomes than those living independently, and their income rose dramatically from 1974 to 1983. Hence, we observe not only an increasing share of elderly who live as heads of two-generation households (Table 1), but also that these elderly are very different from the nuclei we would expect are most likely to "double-up."

The above observation may be attributable to the demand for or the supply of shared housing opportunities. The stratification by region and urbanization in Table 3 may yield some clues to separate demand from supply: in Metropolitan areas, in the North East, and in the West -- where housing prices rose most during the late seventies and early eighties -- this income gap is largest; in non-metropolitan areas and in the South -- areas less affected by housing market pressures -- it is reversed. Elderly parents with an existing family home owned free and clear seem to provide an increasing amount of housing for the younger generation. Hence, this development may be a supply effect on the part of the elderly and a demand effect on the part of the younger generation.

This finding would also indicate that the supply elasticity for shared accommodations is positive because those parent who are "host" for the younger generation appear to be wealthier than average. In

general, we may distinguish two contradictory hypotheses about the supply elasticity for shared housing. In addition to the hypothesis that only a wealthy nucleus can afford being a "host" for another nucleus (positive income elasticity of supply), it may also be reasoned that only poor nuclei will offer to share accommodations with other nuclei, since in this way they can save on housing costs by splitting them with the "guest" nucleus (negative income elasticity of supply).

Table 5 sheds some light on this question. It tabulates the income of the head nucleus by living arrangement of each nucleus. Hence, columns referring to head nuclei (labelled INDEP or ending in -H) are identical to Table 3, whereas columns referring to subfamilies (labels ending with -S) now indicate the income of the respective head nucleus.

For distant relatives and non-relatives living with each other, incomes are roughly comparable (the yearly averages for these living arrange-ments are based on cells with 25 to 150 observations and carry large standard deviations). Income of both host and guest nucleus are markedly lower than average. In these cases, the distinction between supply and demand for shared living arrangements may be as artificial as the distinction between head nuclei and subfamilies, and we observe the in general declining tendency to double up when income is increasing.

The situation is quite different among elderly parent-adult children households. If elderly parents live in the same household as their children, and the children are head of the household, then the children have a markedly higher income ($20,140, third row of Table 5, roughly corresponding to the income in the second column in Table 4, its

mirror-image) than the average income of young nuclei ($15,450). Conversely, if elderly parents head a two-generation household, they earn more than the average elderly nucleus ($13,020 versus $11,150). This pattern is true in all of the four census regions and in metropolitan and non-metropolitan areas alike. This finding rejects the hypothesis of a negative income elasticity of supply of living arrangements when two-generation households are concerned.

Stated differently, economic considerations such as saving housing costs may well play a role when distantly related or unrelated nuclei double-up. Not only the demand, but also the supply elasticity declines with income. Among two-generation households, the mechanisms that create two-generation households seem more complicated. Income clearly indicates which nucleus plays the headship role and its ability to host another nucleus. The data includes elderly parents who provide housing for adult children constrained by the housing affordability crisis in the late seventies and early eighties, and we observe adult children with above average income who receive their elderly parents. To study the economic incentives in these two-generation households more carefully, we would need to know the elderly parents' health status.

Tables 6 through 9 present the main demographic determinants of the choice among living arrangements: age, nucleus size, and sex of nucleus head, relevant mostly for single-elderly nuclei.[8]

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[8]If the nucleus consists of a married couple, age refers to the average age of husband and spouse. Sex of nucleus head is a somewhat ambiguous concept because the head of a nucleus is only well defined in the trivial case of one-person nuclei or self-reported in one-nuclei households. Otherwise, we assigned the head status to the male.

The right margin of Table 6 reflects the aging of the American population. Average age increased from 69.2 years to 69.8 years in the decade considered. It is important to realize that this change is more pronounced in the category of elderly who live independently. Once again, this points out the increasing burden of social support and health care that has to be born by society at large rather than the immediate family. Table 7 displays the corresponding age profile: only after age 75 does the proportion of elderly Americans living independently decline and is picked by living arrangements within the immediate or more distant family.

The columns in Table 6 represent the relation between multi-nuclei living arrangements and age. Subfamilies tend to be older than head nuclei, a finding, that may be explained by the health status of older, therefore more dependent nuclei. In the case of elderly parents living in the home of their adult children, the age of the parent nucleus is particularly high (76.8 years).[9] This relates back to the discussion of the role of income in forming two-generation households and the importance of the elderly parent's health status in that decision.

Surprising, however, is the fact that elderly parents who head a joint household with their adult children are not only younger than average nuclei, but also became even more so in the time from 1974 to 1983. It is interesting to relate this finding to the ownership rates

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[9]A table similar to Table 5 indicates that the corresponding age of the receiving child nucleus is quite young (52.8 years).

in Table 10. These ownership rates represent the percentage of nuclei who live in a dwelling that is owned by the head nucleus rather than rented. Columns 2 and 3 in Table 10 show that the ownership rates of a two-generation family home are virtually unchanged in our sample period. However, the proportion of family homes owned by the elderly parent increases, whereas the proportion of homes owned by the younger generation declines.

Furthermore, the age profiles in column 2 and 3 of Table 7 show the reversal of roles with increasing age, the crucial age being 75 years after which more elderly become subfamilies rather than heads and at which the rate of independently living elderly nuclei peaks. Except for the small category of NREL-S, the attractiveness of all other living arrangements also strongly declines after the age of 75. In passing, note the low ownership rates of living arrangements among non-relatives. All age patterns exhibit little variation across regions and degree of urbanization, see Table 6.

Tables 8 and 9 shed more light on the demographic characteristics of living arrangements, in particular two-generation households. Elderly living in the household headed by their adult children are almost always single and mostly female, whereas elderly parents who are heads in a two-generation household are more often but by no means exclusively couples. Living arrangements with non-relatives are most frequently chosen by single male elderly persons, particularly in the midwestern region of the United States.

5. A Multinomial Logit Model of the Choice Among Living Arrangements

The descriptive analysis in the previous Section pointed out some important changes in the way elderly Americans live. In addition to the intergenerational shift in ownership patterns among two-generation households, the most striking change is the unexpectedly large increase in the proportion of elderly Americans living independently as opposed to the reversal of headship rates in the younger population.

What factors are generating the difference in household formation/dissolution patterns between the elderly and the young? There are primarily two hypotheses. The first hypothesis could be termed the "inertia hypothesis." Low mobility, caused by relatively higher monetary and non-monetary moving costs for the elderly, creates a slow adaptation of housing patterns to a changing economic environment among the elderly. Market forces that may induce trends in the general market will only very slowly shift consumption patterns of the elderly. With an increasing share of the population becoming elderly, the proportion of elderly living independently among all households will rise. A relatively decreasing "supply" of younger households because of the change in the age distribution will also increase the proportion of elderly living independently among all elderly nuclei.

The second hypothesis -- we will term it "income distribution hypothesis" -- rests on the observation that the economic environment has actually changed much less for the elderly than for the younger

population. Whereas real income rose in in the seventies and then sharply declined in the beginning of the eighties for younger families, this was not the case for the elderly. The same holds for housing prices. Housing prices were rising drastically in the beginning of the eighties, but most elderly were already sitting in houses owned free and clear that have appreciated during that period but without a proportional increase in cash-costs.

In order to distinguish between both hypotheses, we need to estimate the price and income elasticities of the proportions in which living arrangements are chosen, as well as contrast these elasticities with the influence of demographic variables. We will estimate a variant of the multinomial logit model describing the choice among the seven alternative living arrangements introduced in Section 3 and depicted below in Figure 1.

We consider the most frequent choice of living independently as the base category and measure the attractiveness of the remaining six choices relative to this category. We postulate that the attractiveness or (dis-) utility of each alternative relative to living independently can be decomposed into three additive components. The first component describes the (dis-)utility of sharing accommodations either as head of the joint household (denoted by HEAD) or as subfamily (denoted by SUBF). The second component describes the attractiveness of the partners, that is the (dis-)utility an elderly nucleus receives from living with distant relatives (denoted by DREL) or with unrelated persons (denoted by NREL). Living as elderly parents with its own adult children (denoted by PARE) serves as the base category for shared living arrangements.

These utility components are a deterministic function v of regional housing prices (denoted by PRI), nucleus income (INC), age of nucleus members (AGE), the size of the nucleus (PER), and the sex of the nucleus head (SEX), comprised in the vector X. In addition, a random utility component ϵ_i represents all unmeasurable factors that characterize each alternative. Using the symbols in Figure 1, total (dis-)utility u_i becomes

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\begin{aligned}
u_{\text{PARE-H}} - u_{\text{INDEP}} &= v_{\text{HEAD}}(X) + \epsilon_1, \\
u_{\text{DREL-H}} - u_{\text{INDEP}} &= v_{\text{HEAD}}(X) + v_{\text{DREL}}(X) + \epsilon_2, \\
u_{\text{NREL-H}} - u_{\text{INDEP}} &= v_{\text{HEAD}}(X) + v_{\text{NREL}}(X) + \epsilon_3, \\
u_{\text{PARE-S}} - u_{\text{INDEP}} &= v_{\text{SUBF}}(X) + \epsilon_4, \\
u_{\text{DREL-S}} - u_{\text{INDEP}} &= v_{\text{SUBF}}(X) + v_{\text{DREL}}(X) + \epsilon_5, \\
u_{\text{NREL-S}} - u_{\text{INDEP}} &= v_{\text{SUBF}}(X) + v_{\text{NREL}}(X) + \epsilon_6,
\end{aligned}
\tag{1}
$$

We assume that the ϵ_i are mutually independent and logistically distributed and specify functions v linear in the explanatory variables. Hence, the probability of choosing the alternative with the highest attractiveness is of the familiar multinomial logit form.[10]

Several comments are appropriate concerning the choice of this model. First, all explanatory variables are nucleus-, but not alternative-specific. An alternative model commonly used in this situation is the logit model with alternative-specific coefficients where for each relative utility component

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[10] McFadden (1973).

(2) $u_i - u_{INDEP} = X'\beta_i + \epsilon_i, \quad i=1,..,6 \text{ or PARE-H,..,NREL-S.}$

Our specification simply economizes on the number of parameters by imposing a set of linear restrictions on the β_i:

(3) $\beta_1 - \beta_2 = \beta_4 - \beta_5$ and $\beta_1 - \beta_3 = \beta_4 - \beta_6$.

In addition, these restrictions reflect a non-hierarchical pattern of similarities among the alternatives.

This leads to the second comment. It would be desirable to allow for a more flexible specification of the distribution of the unobserved utility components ϵ_i. Excluding a general multivariate normal distribution because of its computational intractability, an obvious choice is the generalized extreme value distribution leading to the nested multinomial logit (NMNL) model. However, the NMNL model is not identified in the context of explanatory variables that do not vary across alternatives.[11]

A final comment regards the nature of the data. The data includes repeated observations of the same nucleus, but treats each observation independently. This assumption requires that all nucleus-specific time-invariant utility components are included in the explanatory variables. We are well aware that if in fact the unobserved characteristics ϵ_i

[11]There is no variation in the inclusive values to identify the dissimilarity parameters.

correlate over time, the logit model will produce inconsistent estimates. It is possible to correct for this potential inconsistency by conditioning on the time-invariant unobserved nucleus characteristics (Chamberlain, 1980). However, with 9 cross-sections, this approach is prohibitively costly. Little is known about the magnitude of this bias in the coefficients.[12] The longitudinal nature of the data will also the deflate the standard errors. Assuming essentially unbiased estimates, the correct standard errors should be approximately twice as large as reported.[13]

Table 11 presents parameter estimates of the choice model. The estimates are based on a choice-based subsample of all 19,154 nuclei. The subsample includes all nuclei that live with non-relatives, a .05 percent random sample of independent nuclei, and intermediate sized random samples of nuclei in other living arrangements. The subsample includes 3,081 nuclei and substantially economizes the estimation, at the same time including a sufficiently large number of observations for each living arrangement to guarantee reliable estimation results. To correct for the case-controlled or choice-based subsampling, the estimation procedure re-weights each observation. The weights (the ratio of the percentage of each alternative in the original sample over the percentage in the subsample) vary by income class and cross-section.

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[12]See Börsch-Supan and Pollakowski (1985) for an application and sensitivity analysis using a panel of 3 cross-sections.

[13]The 3081 observations in the estimation sample represent between 700 and 800 different nuclei.

The estimation approach is a slight generalization of the WESML estimator proposed by Manski and Lerman (1977)[14].

A striking result in Table 11 is the predominance of demographic variables relative to economic determinants. The coefficients measuring housing prices are insignificant, the income elasticities surprisingly small. In contrast, age, nucleus size, and sex of single person nuclei determine most of the observed variation in choices among living arrangements. The overall fit, measured as ratio of optimal over diffuse likelihood value, is quite satisfactory.

We will first discuss the age variables. Nucleus age refers to the average age of nucleus head and spouse, its sample mean is about 70 years. To be able to capture the important differences in housing choices before and after age 75 discovered in Table 7, we include age linearly (measured in years) as well as quadratically (measured in squared years divided by 100). The probability of living as a subfamily increases with old age, correspondingly, headship rates decline. However, at ages below 75 years, becoming one year older still decreases the log-odds of being a subfamily rather than living independently. The probabilities of the HEAD alternatives decline uniformly in the relevant age range, whereas the tendency to move as elderly parent in the home

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[14]See McFadden, Winston, and Börsch-Supan (1985) for details, including a derivation of the appropriate asymptotic covariance matrix. The WESML estimation approach is not necessary to consistently estimate the coefficients in the MNL model. Inclusion of alternative specific constants would serve the same purpose. However, these constants are highly collinear with PER and FEM which makes the WESML approach more attractive.

headed by the adult child increases steadily. All these patterns correspond to simple intuition and the tabulations in Section 4. We will compute these predicted age profiles in more detail further below.

The variable PER or PERSONS represents the number of persons in the nucleus, therefore also the marital status of its head (PER=1, if the elderly person is widowed, divorced or never married, in general PER=2 otherwise[15]). Not surprisingly, elderly couples strongly prefer to live independently. If they share housing, they prefer to head the joint household, other things being equal. They regard doubling-up with non-relatives as a strongly inferior alternative. The odds of preferring such a living arrangement are about twelve times lower than for single elderly.

The variable FEM or FEMALE indicates that the head of the nucleus is female which is relevant for one-person nuclei. After correcting for differences in income and age between single male and single female elderly, male are much more likely to live together with non-related persons in one household, their odds of choosing this alternative being 3.6 times higher than among female persons.

Of the economic variables, PRI or PRICE denotes a housing price index of owner-occupied housing computed by Brown and Yinger (1986). The index represents after-tax user-cost of a typical single-family home and includes historical appreciation as well as the federal income tax

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[15]There are some cases of elderly nuclei with own children under age 18.

advantages of homeownership for the relevant income range. Because of the very large ownership rates, an owner-oriented price index seems to be the most appropriate index of housing costs for the elderly. The index is computed from Annual Housing Survey tabulations. The index is not SMSA-specific and varies only by the four Census regions Northeast, Midwest, South, and West. However, regional and intertemporal price variation is very large because the second half of our the sample period encompasses the rapid rise in housing costs, starting in the West, then picking up in the remainder of the United States. In spite of this dramatic change in housing prices, virtually no price effect can be found in our estimation.

The variable INC or INCOME represents the nucleus' current income, measured in $1000 per year deflated by the Consumer Price Index with base year 1980. Its sample mean is about 10.0. The estimated coefficients indicate a precisely measured, but surprisingly small income effect in favor of living independently. The log-odds ratio of choosing to live as a subfamily rather than independently decreases by .1061 for an income increase of $1000. At first sight, these results seem to reject the "income distribution hypothesis" in favor of the notion that housing consumption of the elderly is very inert. Even if the income of the elderly had declined as much as in the general population, the lack of responsiveness of household dissolution decisions to income changes would have predicted an essentially unchanged housing consumption pattern.

Because the author of the paper is an economist, not a demographer, the paper would have ended at this point. However, believing in

economics after all, we re-estimated the model in two different ways. First, the sample was stratified into three income classes and each income class estimated separately. Second, the pooled cross-sections are decomposed into an early sample period (1974-76), a middle period (1977-79), and a late period (1980-83).

Table 12 presents the results stratified by income class. The lower income class extends to $5,000 per year, and the upper income class begins with a yearly income in excess of $10,000.

Quite clearly, there are very strong differences between the income classes. The statistical hypothesis that the estimated relationships are homogenous with respect to income class can easily be rejected.[16] Whereas the coefficients for housing prices and demographic variables are essentially stable, most of this difference can be found in the income variable. Low income nuclei are highly income responsive, about five times as much as was estimated in the pooled regression in Table 11. Income responses among the other two income groups are essentially insignificant, while a perverse sign characterizes the middle income group.[17] Low income elderly comprise almost half of the sample (1404 out of 3081). Hence, the aggregation error in Table 11 is considerable, and we will use this disaggregate model for the applications in Section 6 below.

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[16]The likelihood ratio test statistic is 188.2 (the loglikelihood of the constrained estimation is 3159.5 (Table 11), the likelihood of the unconstrained model (Table 12) is 3065.4). The chi-squared value for 50 degrees of freedom at .99 confidence is 76.2.

[17]Note that the reported standard errors ignore intertemporal correlations. Correct standard errors are approximately twice as large.

The result of high income elasticities among the poor elderly corresponds to earlier findings that predicted very elastic household formation rates for single elderly women participating in a general housing allowances program.[18] It also revives the hypothesis that without double-indexation of Social Security income the United States may have experienced a much larger incidence of doubling-up among the elderly than was actually the case. For more affluent elderly, economic considerations appear to be irrelevant in the decision among living arrangements.

We performed a second sample stratification in order to investigate whether tastes have changed from 1974 to 1983 and re-estimated the model separately for the periods 1974-76, 1977-79, and 1980-83. This decomposition also alleviates the econometric problems of pooling cross-sections in the presence of unobserved nucleus-specific but time-invariant utility components. Estimated coefficients are presented in Table 13. The results are qualitatively unchanged from Table 11, and the likelihood ratio test version of the Chow-test is insignificant. If at all, the income elasticities show a rising tendency, both in terms of magnitude and significance. The stability of the results is a fair indication that the potential inconsistency of the logit results may not be a severe problem in this data set.

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[18] Börsch-Supan (1986).

6. Simulations and Applications of the Model

What do the magnitudes of the estimated coefficients imply? How do living arrangement decisions vary by age and income? Are the estimated income effects sufficiently large to explain the discrepancy between declining headship rates among young nuclei and a rising proportion of elderly living independently in the early eighties? We will try to answer these questions by evaluating predicted choice probabilities generated by the multinomial logit models in Table 12 in various scenarios.

Table 14 presents predicted age profiles for the three income classes. Clearly, poorer elderly not only have a lower tendency to live independently but also give up this status earlier than elderly with higher incomes. The reversal in the choice probability of living independently occurs at 70.5 years for elderly nuclei with yearly incomes below $5,000, at 75.5 years for the middle income group, and at 78.5 years for those elderly nuclei who receive more than $10,000 yearly.

Once they dissolve their households, the upper income classes are more likely to be received by their adult children or by more distant relatives. The pattern is different for poorer elderly among whom a large proportion stays head of a two-generation household. As opposed to the low income strata, elderly nuclei with incomes above $5,000 become increasingly likely to also be received by distant or unrelated persons. However, this trend is statistically insignificant.

Which living arrangements would elderly Americans have chosen in the absence of the rise in real income generated by Social Security indexation? Table 15 presents estimated changes that would have occurred if the income of elderly nuclei had exhibited a similar development as the income of younger nuclei. Using the observed income at 1974, we computed the hypothetical elderly's income by using an income index calculated from the sample of young nuclei. Columns 1 and 3 display the changes between this and the baseline prediction, once for nuclei with income below $5,000 and once for all nuclei. The differences are substantial for poor nuclei, but there not large enough to explain a similar decrease in headship rates among all elderly as was observed among young nuclei. This is indicated in columns 2, 4, and 5, which compare the yearly changes in the proportion of elderly living independently with the actual changes in this category among the young nuclei.

We conclude that the divergence in the income development substantially contributed to the steady increase in the proportion of elderly living independently, but that this explanation in itself is not sufficient to account for the entire discrepancy in choosing living arrangements between young and elderly Americans.

7. Summary of Conclusions

1. About a third of all nuclei with at least one elderly person do not live independently. As opposed to an increase in the proportion of

doubled-up households in the general population in the early eighties, this percentage has fallen among elderly Americans.

2. The emerging discrepancy in living arrangement choices between young and elderly can only partially be explained by the discrepancy in the income development 1974 to 1983. The residual may be attributed to inertia due to low mobility and slow adaptation to economic changes.

3. More than 17 percent of all elderly nuclei live with their adult children. In most of these cases, the parents head the common household. If the children are household heads, the parent is mostly single, old, and has only a small income.

4. Within these two-generation households, important intergenerational changes occurred from 1974 to 1983. An increasing percentage of these households are headed by the parent generation rather than the adult child. We speculate that this development can be attributed to the housing affordability crisis among young first time home buyers.

5. Few elderly live with distant relatives (the proportion is less than 9 percent), and very few elderly share the household with non-relatives (about 3 percent).

6. The choice probabilities among living arrangements are predominantly determined by demographic variables. There is no evidence, that they respond to an aggregate price index of owner-occupied housing.

7. The "demand elasticity for shared accommodations" with respect to income is strongly negative for elderly with low incomes. However, for elderly nuclei with yearly incomes in excess of $5,000, the income elasticity is insignificant after correcting for demographic variables.

8. In elderly parents-adult children household, there is some evidence that the corresponding "supply elasticity for shared accommodations" with respect to income is positive: children who "receive" their parents have about twice than average nucleus income.

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Figure 1: ALTERNATIVE LIVING ARRANGEMENTS

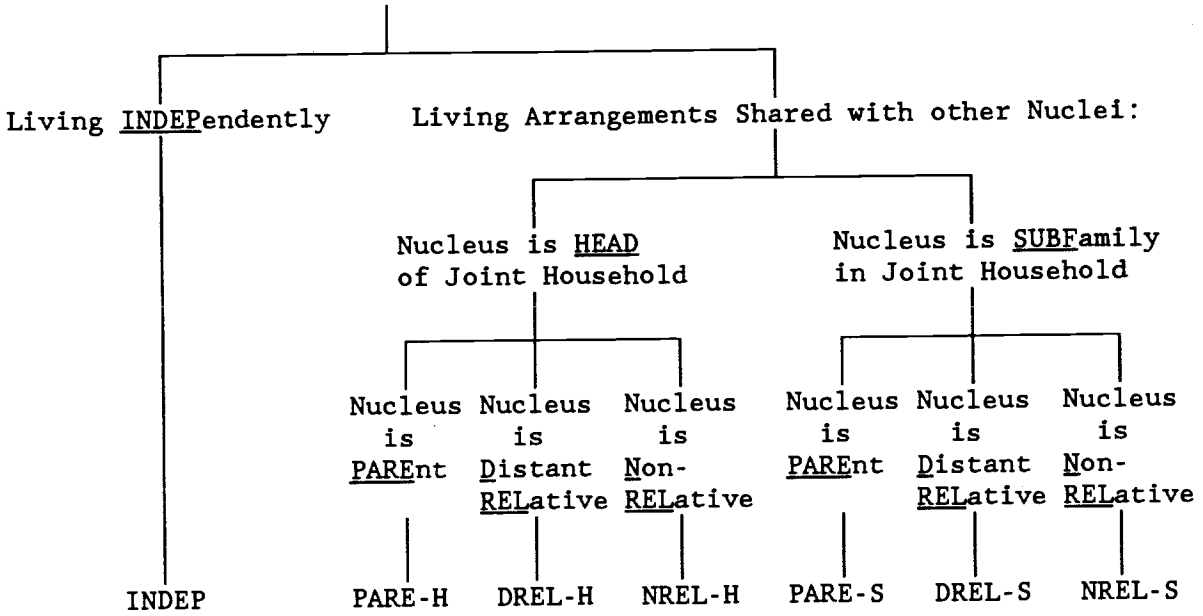

Table 1: OBSERVED FREQUENCIES OF LIVING ARRANGEMENTS
(Percentages of Elderly Nuclei)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	69.3	11.4	6.4	5.0	4.8	1.9	1.2	100.0
1975	70.4	11.8	5.9	4.6	4.4	1.8	1.2	100.0
1976	70.5	11.8	6.1	4.8	3.9	1.6	1.2	100.0
1977	70.5	12.4	5.7	4.9	3.9	1.5	1.1	100.0
1978	71.5	11.7	5.4	5.0	3.5	1.4	1.4	100.0
1979	71.5	11.2	5.3	4.9	3.9	1.5	1.6	100.0
1980	71.3	11.8	4.8	5.0	3.9	1.7	1.5	100.0
1981	71.5	12.5	4.1	4.4	4.3	1.9	1.4	100.0
1983	73.0	12.3	4.5	4.4	3.0	1.8	1.1	100.0
	71.1	11.9	5.4	4.8	3.9	1.7	1.3	100.0

REGION	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
NO-EAST	64.6	13.8	6.7	6.1	5.2	1.8	1.7	100.0
MIDWEST	74.5	9.3	5.0	4.3	3.5	2.0	1.4	100.0
SOUTH	71.0	13.2	4.9	5.1	4.0	1.0	.7	100.0
WEST	74.8	10.5	5.0	2.9	2.7	2.4	1.7	100.0
	71.1	11.9	5.4	4.8	3.9	1.7	1.3	100.0

URBAN	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	68.5	12.7	6.3	5.1	3.9	2.0	1.4	100.0
NON-SMSA	75.0	10.5	3.8	4.3	3.9	1.2	1.1	100.0
	71.1	11.9	5.4	4.8	3.9	1.7	1.3	100.0

Table 2: OBSERVED FREQUENCIES OF LIVING ARRANGEMENTS
(Percentages of Young Nuclei)

YEAR	INDEP	PARE-H[a]	CHIL-H	CHIL-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	55.7	13.5	1.7	20.0	3.3	3.7	1.0	1.7	100.0
1975	55.2	13.3	1.5	19.9	3.9	4.3	.9	1.5	100.0
1976	55.5	12.6	1.9	19.4	4.2	4.5	.9	1.5	100.0
1977	55.3	12.5	1.4	19.5	4.0	5.1	1.2	1.7	100.0
1978	54.5	12.4	.9	20.0	4.0	4.9	1.7	2.6	100.0
1979	55.3	12.1	.8	20.1	4.4	5.0	1.2	1.7	100.0
1980	54.1	12.0	.9	19.2	4.7	5.5	1.7	2.8	100.0
1981	53.4	11.4	1.0	19.9	4.9	5.9	1.8	2.8	100.0
1983	52.4	12.9	1.0	20.8	4.4	5.1	1.8	2.5	100.0
	53.9	12.6	1.2	19.8	4.2	4.9	1.3	2.1	100.0

REGION	INDEP	PARE-H[a]	CHIL-H	CHIL-S	DREL-H	DREL-S	NREL-H	NREL-S	
NO-EAST	50.2	14.2	1.9	23.8	3.4	3.8	1.4	1.9	100.0
MIDWEST	53.5	12.4	1.3	20.8	4.7	5.3	1.0	1.5	100.0
SOUTH	57.4	12.3	.9	19.2	3.6	4.4	1.3	1.9	100.0
WEST	56.5	11.3	1.1	15.2	5.3	6.4	1.8	3.3	100.0
	53.5	12.6	1.2	19.8	4.2	4.9	1.3	2.1	100.0

URBAN	INDEP	PARE-H[a]	CHIL-H	CHIL-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	52.0	12.8	1.4	20.8	4.5	5.4	1.5	2.4	100.0
NON-SMSA	59.8	12.1	.9	17.9	3.5	3.8	1.1	1.5	100.0
	53.5	12.6	1.2	19.8	4.2	4.9	1.3	2.1	100.0

Note: [a]. About .4 percent nuclei in PARE-S are included in PARE-H.

Table 3: INCOME OF NUCLEI BY LIVING ARRANGEMENTS
(Elderly Nuclei; Hundred 1980 Dollars)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	113.6	115.4	52.6	95.5	54.7	105.8	1.3	104.7
1975	114.5	111.4	52.3	102.2	44.9	119.7	.0	105.6
1976	116.6	119.7	55.3	82.1	52.6	110.6	1.4	107.6
1977	118.2	115.7	54.0	96.1	59.4	104.2	35.2	109.8
1978	120.2	131.1	46.2	91.5	53.2	96.6	48.7	112.3
1979	116.9	128.7	49.3	71.8	52.6	82.7	65.9	108.6
1980	116.2	141.9	45.8	89.1	50.5	121.9	48.6	111.0
1981	128.1	155.0	48.0	88.4	44.9	89.7	51.5	121.1
1983	128.3	152.7	54.2	102.4	52.8	91.3	78.3	123.4
	119.1	130.2	51.1	90.9	51.7	102.9	38.3	111.5

REGION	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
NO-EAST	123.2	148.7	41.8	104.5	59.0	103.6	56.8	115.3
MIDWEST	111.8	119.3	57.1	91.7	45.6	91.5	25.8	105.0
SOUTH	110.6	109.6	50.0	72.9	48.9	99.2	32.6	102.4
WEST	141.3	161.8	61.7	111.2	52.4	120.1	31.8	133.9
	119.1	130.2	51.1	90.9	51.7	102.9	38.3	111.5

URBAN	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	129.3	148.9	50.7	98.6	50.7	115.0	34.5	120.5
NON-SMSA	104.7	95.0	52.1	76.9	53.2	72.6	46.2	97.4
	119.1	130.2	51.1	90.9	51.7	102.9	38.3	111.5

Table 4: INCOME OF NUCLEI BY LIVING ARRANGEMENTS
(Young Nuclei; Hundred 1980 Dollars)

YEAR	INDEP[a]	CHIL-H	CHIL-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	191.1	184.6	35.9	136.0	23.4	124.4	11.9	148.3
1975	198.0	214.1	40.0	142.7	25.1	120.9	7.6	153.6
1976	200.2	237.0	38.7	132.9	31.0	104.7	10.2	155.2
1977	198.2	209.1	37.1	158.5	80.5	109.1	53.2	155.9
1978	201.2	238.1	43.4	158.3	76.9	139.7	59.1	157.5
1979	204.7	155.4	45.5	141.6	76.2	141.5	75.0	160.1
1980	202.7	148.0	41.8	140.4	78.9	139.8	59.3	156.5
1981	205.7	186.9	37.5	122.2	67.9	147.4	67.0	155.0
1983	197.1	174.6	31.8	136.1	70.9	123.4	56.3	148.5
	199.7	199.1	39.1	140.9	61.1	130.1	48.1	154.5

REGION	INDEP[a]	CHIL-H	CHIL-S	DREθ-H	DREL-S	NREL-H	NREL-S	
NO-EAST	192.8	215.4	42.6	158.6	69.6	133.7	53.0	148.2
MIDWEST	204.7	187.8	41.5	139.6	58.9	132.5	47.9	156.6
SOUTH	186.6	182.9	36.9	134.2	56.9	121.4	55.8	147.1
WEST	221.5	210.9	32.8	137.8	63.5	135.4	38.1	170.5
	199.7	199.1	39.1	140.9	61.1	130.1	48.1	154.5

URBAN	INDEP[a]	CHIL-H	CHIL-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	209.4	212.2	38.6	149.2	65.3	138.1	47.8	158.5
NON-SMSA	182.3	159.8	40.4	119.1	49.3	108.1	49.0	146.6
	199.7	199.1	39.1	140.9	61.1	130.1	48.1	154.5

Note: [a]. INDEP category includes PARE-H category.

Table 5: INCOME OF HEAD BY LIVING ARRANGEMENT OF NUCLEUS
(Head Nuclei of Elderly Nuclei; Thousand 1980 Dollars)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	113.6	115.4	179.7	95.5	102.8	105.8	151.9	116.9
1975	114.5	111.4	210.4	102.2	106.4	119.7	84.2	118.5
1976	116.6	119.7	220.0	82.1	95.8	110.6	64.8	120.1
1977	118.2	115.7	226.5	96.1	106.1	104.2	66.4	121.7
1978	120.2	131.1	217.8	91.5	97.7	96.6	62.4	123.4
1979	116.9	128.7	189.5	71.8	90.1	82.7	80.6	117.7
1980	116.2	141.9	202.9	89.1	100.1	121.9	94.5	121.2
1981	128.1	155.0	198.6	88.4	97.3	89.7	92.3	130.1
1983	128.3	152.7	162.2	102.4	113.0	91.3	85.3	130.1
	119.1	130.2	201.4	90.9	100.9	102.9	86.5	122.1

REGION	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
NO-EAST	123.2	148.7	207.4	104.5	85.7	103.6	109.6	128.7
MIDWEST	111.8	119.3	197.6	91.7	107.4	91.5	63.5	114.7
SOUTH	110.6	109.6	188.1	72.9	96.3	99.2	69.5	111.4
WEST	141.3	161.8	221.5	111.2	142.9	120.1	96.7	145.4
	119.1	130.2	201.4	90.9	100.9	102.9	86.5	122.1

URBAN	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	129.3	148.9	215.2	98.6	108.7	115.0	92.1	134.0
NON-SMSA	104.7	95.0	166.1	76.9	88.7	72.6	74.9	103.5
	119.1	130.2	201.4	90.9	100.9	102.9	86.5	122.1

Table 6: AVERAGE AGE OF NUCLEI BY LIVING ARRANGEMENT
(Elderly Nuclei; Years)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	68.7	66.2	77.8	67.9	72.2	68.8	70.7	69.2
1975	68.8	66.2	75.8	68.6	72.2	69.1	71.2	69.1
1976	69.1	66.4	75.8	67.9	72.3	71.0	71.3	69.3
1977	69.3	66.2	76.8	68.6	71.8	70.2	70.6	69.4
1978	69.3	66.8	77.0	68.4	72.1	70.0	71.5	69.5
1979	69.5	66.5	76.8	69.2	72.5	70.7	72.9	69.7
1980	69.6	66.2	77.2	68.6	72.8	68.4	71.2	69.6
1981	69.6	66.8	77.6	68.4	71.9	68.3	71.2	69.6
1983	70.0	65.5	77.4	69.3	72.0	69.8	71.0	69.8
	69.3	66.3	76.8	68.5	72.2	69.5	71.3	69.5

REGION	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
NO-EAST	69.6	66.1	75.4	69.2	72.2	67.8	71.1	69.6
MIDWEST	70.0	67.7	77.6	68.7	74.4	70.5	72.1	70.3
SOUTH	68.7	66.2	76.9	68.6	71.2	68.5	71.7	68.9
WEST	69.1	64.9	78.3	66.0	70.8	71.0	70.3	69.2
	69.3	66.3	76.8	68.5	72.2	69.5	71.3	69.5

URBAN	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	69.2	66.0	77.0	68.0	72.1	70.3	71.1	69.4
NON-SMSA	69.4	66.9	76.5	69.6	72.4	67.5	71.9	69.5
	69.3	66.3	76.8	68.5	72.2	69.5	71.3	69.5

Table 7: FREQUENCY OF LIVING ARRANGEMENTS BY AGE
(Percentage of Elderly Nuclei)

AGE	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
< 65	68.3	21.9	1.1	5.1	1.9	1.0	.7	100.0
66-70	72.8	12.2	2.8	5.1	3.7	2.2	1.2	100.0
71-75	77.9	6.5	3.2	5.1	3.6	2.4	1.2	100.0
76-80	74.1	5.5	8.2	4.7	4.1	1.4	1.9	100.0
> 80	58.9	8.8	18.1	3.1	8.0	1.1	2.0	100.0

Table 8: SIZE OF NUCLEUS BY LIVING ARRANGEMENT
(Elderly Nuclei; Number of Persons)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	1.6	1.7	1.0	1.6	1.1	1.2	1.0	1.5
1975	1.6	1.7	1.1	1.5	1.0	1.3	1.0	1.5
1976	1.5	1.7	1.1	1.4	1.1	1.3	1.0	1.5
1977	1.5	1.7	1.1	1.5	1.1	1.2	1.0	1.5
1978	1.5	1.7	1.0	1.5	1.1	1.3	1.0	1.5
1979	1.5	1.7	1.1	1.5	1.1	1.2	1.0	1.5
1980	1.5	1.7	1.0	1.5	1.0	1.3	1.0	1.5
1981	1.5	1.7	1.0	1.4	1.1	1.2	1.0	1.5
1983	1.5	1.7	1.1	1.4	1.1	1.1	1.0	1.5
	1.5	1.7	1.0	1.5	1.1	1.2	1.0	1.5

Table 9: SEX OF NUCLEUS-HEAD BY LIVING ARRANGEMENT
(Elderly Nuclei; Percent Female)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	38.6	37.1	79.7	38.9	66.7	47.6	52.0	42.7
1975	38.4	36.3	77.6	42.8	73.1	55.2	38.5	42.5
1976	39.3	37.0	76.5	50.5	64.4	50.0	44.4	43.1
1977	39.8	35.0	79.5	42.6	61.2	54.8	47.8	42.7
1978	39.5	36.2	82.5	37.1	67.6	63.3	48.3	42.8
1979	39.7	35.1	79.7	45.2	66.7	66.7	48.6	43.2
1980	41.5	35.2	84.0	43.6	68.6	63.1	42.4	44.4
1981	43.6	39.9	85.3	52.5	73.1	60.0	38.5	46.7
1983	41.5	34.5	80.6	53.5	66.2	53.7	46.2	44.0
	40.2	36.2	80.2	45.0	67.5	56.8	45.2	43.5

REGION	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
NO-EAST	43.0	30.3	85.0	47.0	70.3	50.0	55.0	46.1
MIDWEST	43.1	43.1	83.7	46.1	77.4	63.6	20.0	46.5
SOUTH	39.1	39.8	70.8	46.8	62.3	69.7	45.7	42.5
WEST	34.1	28.7	83.9	30.1	55.2	44.2	63.0	37.2
	40.2	36.2	80.2	45.0	67.5	56.8	45.2	43.5

URBAN	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
SMSA	40.1	35.7	82.5	45.6	68.0	62.1	47.9	44.2
NON-SMSA	40.3	37.1	74.3	43.8	66.8	43.5	39.5	42.5
	40.2	36.2	80.2	45.0	67.5	56.8	45.2	43.5

Table 10: OWNERSHIP RATES OF HEAD NUCLEI BY LIVING ARRANGEMENT
(Elderly Nuclei; Percent Homeowners)

YEAR	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S	
1974	70.3	79.0	89.1	75.9	67.6	61.9	68.0	72.5
1975	70.2	78.5	83.2	78.6	69.9	65.8	69.2	72.2
1976	70.1	75.9	83.8	78.5	72.4	66.7	55.6	71.9
1977	71.4	75.9	82.9	84.2	80.0	67.7	60.9	73.4
1978	71.0	79.3	83.3	86.7	74.3	70.0	62.1	73.4
1979	70.8	78.3	84.1	83.7	77.4	54.6	54.3	72.7
1980	71.5	79.7	84.9	80.0	72.1	57.9	57.6	73.1
1981	70.7	83.3	86.7	76.2	74.4	62.9	61.5	73.0
1983	73.6	84.7	83.5	74.3	76.5	61.0	65.4	75.2
	71.1	79.4	84.6	79.9	73.5	63.0	61.2	73.0

Table 11: MULTINOMIAL LOGIT ESTIMATES OF LIVING ARRANGEMENT CHOICES

VARIABLE	UTILITY COMPONENT	ESTIMATE	STD.ERROR	T-STATISTIC
PRICE	SUBFAMILY	-.0185	.0266	-.69
PRICE	HEAD	-.0043	.0233	-.18
PRICE	DISTANT RELATIVE	.0274	.0212	1.29
PRICE	NON-RELATIVE	.0197	.0262	.75
INCOME	SUBFAMILY	-.1061	.0177	-5.97
INCOME	HEAD	-.0013	.0044	-.31
INCOME	DISTANT RELATIVE	-.0421	.0079	-5.27
INCOME	NON-RELATIVE	-.0208	.0095	-2.17
AGE	SUBFAMILY	-.0300	.0125	-2.39
AGE SQ.	SUBFAMILY	.0521	.0126	4.11
AGE	HEAD	-.0691	.0124	-5.53
AGE SQ.	HEAD	.0374	.0138	2.70
AGE	DISTANT RELATIVE	.0616	.0121	5.07
AGE SQ.	DISTANT RELATIVE	-.0671	.0124	-5.40
AGE	NON-RELATIVE	.1136	.0137	8.24
AGE SQ.	NON-RELATIVE	-.1144	.0145	-7.89
PERSONS	SUBFAMILY	-1.8548	.2159	-8.58
PERSONS	HEAD	.6145	.1433	4.28
PERSONS	DISTANT RELATIVE	-.7961	.1826	-4.35
PERSONS	NON-RELATIVE	-2.5076	.2248	-11.15
FEMALE	SUBFAMILY	-.0075	.1607	-.04
FEMALE	HEAD	.4760	.1732	2.74
FEMALE	DISTANT RELATIVE	-.4730	.1543	-3.06
FEMALE	NON-RELATIVE	-1.2829	.1497	-8.56
LOGLIKELIHOOD AT OPTIMUM:				-3159.5
LOGLIKELIHOOD AT ZERO:				-5995.3
NUMBER OF OBSERVATIONS:				3081

Notes: Estimates are obtained by weighted exogenous sampling maximum likelihood. Standard errors are not corrected for intertemporal correlation.

Table 12: MULTINOMIAL LOGIT ESTIMATES AFTER INCOME STRATIFICATION

	INCOME ≤ $5,000:		$5,000 - $10,000:		INCOME > $10,000:	
VARIABLE	ESTIMATE	T-STAT.	ESTIMATE	T-STAT.	ESTIMATE	T-STAT.
PRI*SUBF	-.0074	-.18	-.0299	-.60	-.0107	-.23
PRI*HEAD	-.0230	-.55	-.1036	-2.08	.0717	2.02
PRI*DREL	.0286	.92	.0797	1.67	.0037	.10
PRI*NREL	.0409	1.03	.0284	.54	-.0086	-.19
INC*SUBF	-.5191	-7.26	.1701	2.15	-.0162	-1.18
INC*HEAD	-.1186	-1.56	.1765	2.26	-.0115	-1.84
INC*DREL	-.0799	-1.69	-.0755	-1.05	-.0173	-1.93
INC*NREL	-.2780	-4.80	-.1123	-1.42	.0112	1.13
AGE*SUBF	.0168	.86	-.1489	-5.47	-.1068	-3.76
AG^2*SUBF	.0204	1.12	.1534	6.04	.1370	4.45
AGE*HEAD	-.0812	-4.06	-.0911	-2.88	.0005	.02
AG^2*HEAD	.0617	3.06	.0475	1.50	-.0600	-2.09
AGE*DREL	.0550	3.47	.0682	2.33	.0761	2.69
AG^2*DREL	-.0645	-4.12	-.0721	-2.58	-.0669	-2.22
AGE*NREL	.1381	6.70	.0871	2.80	.0537	1.89
AG^2*NREL	-.1380	-6.88	-.0853	-2.87	-.0223	-.73
PER*SUBF	-2.1678	-5.70	-1.2889	-3.39	-1.9998	-5.10
PER*HEAD	.7366	2.61	.5017	1.90	.4561	1.88
PER*DREL	-.4670	-1.71	-.8342	-2.99	-1.6117	-4.58
PER*NREL	-2.4771	-5.49	-1.6769	-4.54	-3.0806	-7.81
FEM*SUBF	-.2018	-.87	.6367	2.01	.1913	.54
FEM*HEAD	.4550	1.64	.7059	2.16	.1121	.32
FEM*DREL	-.3232	-1.61	-.8141	-2.77	-.7886	-2.13
FEM*NREL	-1.2613	-6.45	-1.1145	-3.40	-1.2541	-3.63
LLF AT OPT.:	-1702.4		-729.6		-633.4	
LLF AT ZERO:	-2732.1		-1562.6		-1700.7	
OBSERVATIONS:	1404		803		874	

Notes: See Table 11.

Table 13: MULTINOMIAL LOGIT ESTIMATES FOR THREE TIME PERIODS

	1974 - 1976:		1977 - 1979:		1980 - 1983:	
VARIABLE	ESTIMATE	T-STAT.	ESTIMATE	T-STAT.	ESTIMATE	T-STAT.
PRI*SUBF	.0193	.31	.0273	.54	-.0134	-.17
PRI*HEAD	.0335	.57	.0094	.22	-.1055	-1.54
PRI*DREL	.0863	1.68	-.0214	-.56	.1085	1.78
PRI*NREL	.0108	.17	-.0532	-1.15	.1306	1.68
INC*SUBF	-.0923	-2.87	-.0988	-3.41	-.1275	-4.43
INC*HEAD	-.0065	-.91	-.0088	-1.05	.0095	1.23
INC*DREL	-.0204	-1.66	-.0440	-2.96	-.0714	-4.37
INC*NREL	-.0415	-1.42	-.0047	-.32	-.0238	-1.69
AGE*SUBF	-.0472	-2.04	-.0143	-.66	-.0365	-1.52
AG^2*SUBF	.0737	3.22	.0399	1.81	.0464	2.03
AGE*HEAD	-.0865	-3.82	-.0779	-3.46	-.0401	-1.77
AG^2*HEAD	.0539	2.22	.0509	1.99	.0073	.31
AGE*DREL	.0682	2.61	.0520	2.74	.0585	2.80
AG^2*DREL	-.0771	-3.19	-.0577	-2.72	-.0612	-2.91
AGE*NREL	.1207	5.19	.0868	3.38	.1216	4.81
AG^2*NREL	-.1255	-5.18	-.0858	-3.17	-.1225	-4.78
PER*SUBF	-1.8601	-4.42	-2.3011	-6.20	-1.3585	-3.98
PER*HEAD	.8139	2.85	.6307	2.60	.5294	2.27
PER*DREL	-1.0270	-2.13	-.5433	-2.50	-.9856	-3.60
PER*NREL	-2.2964	-6.23	2.2766	-5.16	-2.9720	-7.61
FEM*SUBF	.0257	.09	-.1337	-.46	.2011	.73
FEM*HEAD	.6700	2.12	.3791	1.23	.4587	1.56
FEM*DREL	-.4467	-1.45	-.4575	-1.84	-.6428	-2.41
FEM*NREL	-1.4096	-5.38	-.9965	-3.86	-1.4841	-5.41
LLF AT OPT.:	-1101.0		-1045.4		-998.5	
LLF AT ZERO:	-2027.6		-2006.2		-1961.5	
OBSERVATIONS:	1042		1031		1008	

Notes: See Table 11.

Table 14: HOUSEHOLD DISSOLUTION OF ELDERLY AMERICANS BY AGE AND INCOME

Nuclei with Income ≤ $5,000:

AGE	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S
60:	69.0	11.0	3.1	10.9	3.0	2.3	.6
65:	69.8	10.9	3.8	9.5	3.3	1.9	.7
70:	70.1	11.1	4.8	8.2	3.6	1.5	.7
75:	69.9	11.5	6.0	7.1	3.7	1.2	.6
80:	69.1	12.2	7.6	6.0	3.7	.8	.5
85:	67.6	13.2	9.5	5.0	3.6	.6	.4
90:	65.2	14.6	12.0	4.1	3.4	.4	.3
95:	61.9	16.3	14.9	3.4	3.1	.2	.2

Nuclei with Income $5,000 - $10,000:

AGE	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S
60:	73.2	12.3	1.6	8.6	1.1	2.8	.4
65:	76.2	10.9	2.1	6.8	1.3	2.3	.4
70:	78.3	9.8	2.8	5.3	1.5	1.8	.5
75:	79.2	8.9	4.2	4.0	1.9	1.3	.6
80:	78.5	8.1	6.4	2.9	2.3	1.0	.8
85:	75.7	7.3	10.4	2.0	2.9	.7	1.0
90:	69.5	6.4	17.4	1.4	3.7	.4	1.2
95:	58.9	5.4	28.9	.8	4.4	.3	1.4

Nuclei with Income > $10,000:

AGE	INDEP	PARE-H	PARE-S	DREL-H	DREL-S	NREL-H	NREL-S
60:	73.6	16.9	.7	6.8	.3	1.6	.1
65:	79.6	12.6	1.1	4.9	.4	1.4	.1
70:	84.3	8.9	1.7	3.2	.6	1.1	.2
75:	87.3	6.0	2.7	1.9	.9	.8	.4
80:	87.9	3.8	4.7	1.1	1.3	.6	.7
85:	85.3	2.2	8.2	.5	2.0	.4	1.4
90:	78.2	1.2	14.7	.2	2.8	.2	2.6
95:	65.1	.6	25.4	.1	3.9	.1	4.8

Note: All predictions are based on the disaggregate model in Table 12.

Table 15: PREDICTED PROPORTIONS OF NUCLEI LIVING INDEPENDENTLY IF INCOME OF ELDERLY HAD DEVELOPED AS GENERAL INCOME
(Changes; Percentage Points)

	LOW INCOME ELDERLY:		ALL ELDERLY NUCLEI:		YOUNG NUCLEI:
	predicted change versus baseline	predicted change versus prev.year	predicted change versus baseline	predicted change versus prev.year	actual change versus prev.year
1974	.0	.0	.0	.0	.0
1975	-1.1	-.9	-.4	-.3	-.5
1976	-1.2	.3	-.4	.1	.3
1977	-1.3	.2	-.4	.1	-.2
1978	-.8	1.0	-.2	.3	-.8
1979	-.6	-.5	-.2	-.2	.8
1980	-2.2	-1.2	-.7	-.4	-1.2
1981	-3.6	.3	-1.1	.1	-.7
1983	-4.8	-.7	-1.4	-.2	-1.0

Notes: The entries in columns 1 and 3 represent the difference between baseline prediction (using the elderly's actual income) and alternative prediction (deflating the elderly's income at the rate of the general income development). The entries in columns 2 and 4 represent the yearly changes of the alternative prediction. Column 5 represents the yearly changes of the actual proportions among young nuclei (Table 2). All predictions are based on the disaggregate model in Table 12.