Changes in the living arrangements of elderly people in Greece: 1974-1999

Eleni Karagiannaki

Contents

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Centre for Analysis of Social Exclusion
London School of Economics
Houghton Street
London WC2A 2AE
CASE enquiries – tel: 020 7955 6679

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Abstract

During the period 1974-1999 the percentage of elderly living with their children in Greece reduced from 55 per cent to about 32 per cent. In this paper we examine determinants of the decrease in intergenerational co-residence among Greek elderly people and their adult children and its implications for economic well-being. We find that the main factor that has contributed to the change in the living arrangements has been the increase in the pension incomes. Although income was the most important force driving the increase in the independent living among the elderly Greeks throughout the period under examination its contribution to the change reduced significantly during the 1990s. As the importance of incomes in accounting for changes in co-residence rates among the elderly reduces over time so the contribution of the unobserved year effect rises. This finding points to the role of changing preferences in determining intergenerational co-residence. Despite the substantial decrease in intergenerational co-residence we find that the family in Greece still plays a very significant role in protecting the poor elderly people.

JEL classification: J14, I3
Keywords: elderly, intergenerational living arrangements, Greece, poverty

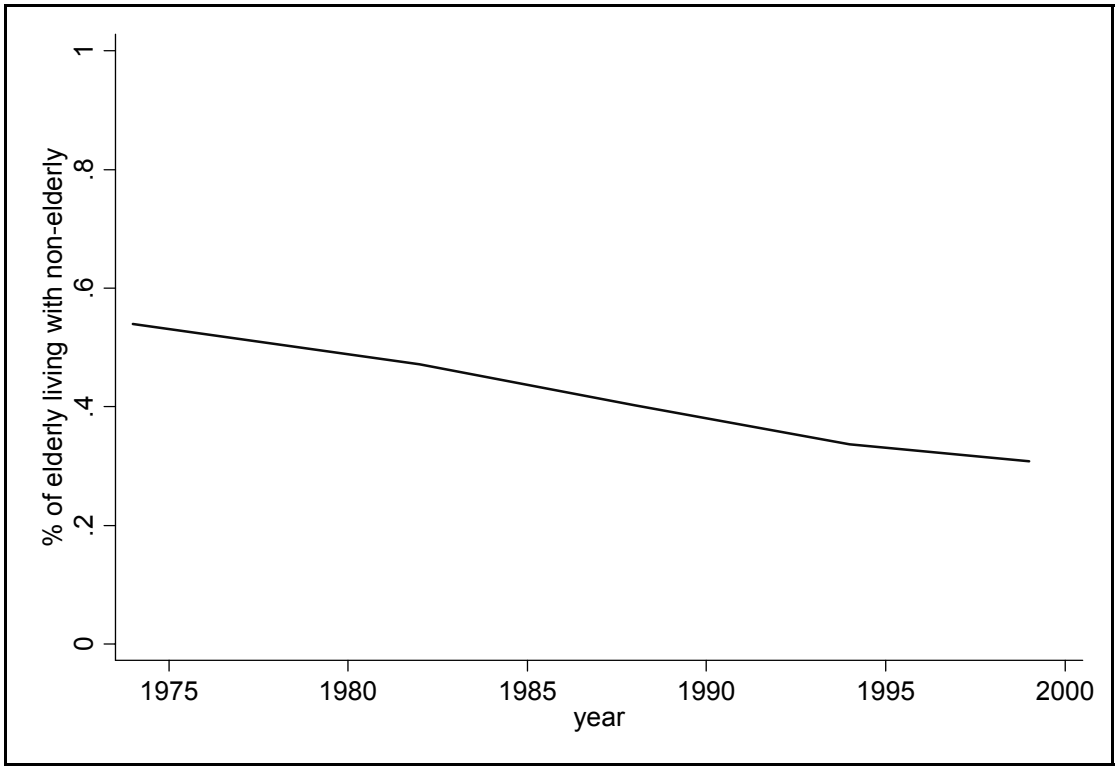
Introduction

Intergenerational co-residence has traditionally been a significant source of familial support for the elderly people. By co-residing with their adult children, the elderly can enjoy financial and social support, companionship and personal care (for a detailed discussion on the cost and benefit of co-residence see Burch and Mathews, 1987). Although being a traditional form of support for elders, co-residence became less prevalent in most industrialised countries during the 20th century. The increase in independent living has raised concerns about the well-being of the elderly population especially in countries with underdeveloped systems of social transfers.

The living arrangements of elderly people in Greece show a similar pattern. The percentage of those living with their children or younger relatives has decreased significantly over time. Using data from the Greek Household Budget Survey we find that during the period 1974-1999 the percentage of Greek elders living with their children fell by 24 percentage points. While in 1974, 56 per cent of people aged 65 years or older lived with their children or younger relatives by 1999 this figure had dropped to about 32 per cent (Figure 1).

There is a considerable research on the living arrangements of the elderly people in USA, Europe and East and South East Asia, however little is known about inter-generational co-residence patterns in Greece. This paper begins to fill this gap. First, we examine how the living arrangements of Greek elders have changed over the period 1974 and 1999 and we consider the relevance of socio-economic changes that took place during the period under examination. Second, we use multivariate analysis to investigate what factors have been associated with the rise in the independent living among elderly people in Greece. We probe further into this issue by studying whether the changes in living arrangements are the result of changes in the characteristics of the elderly population or changes in the way that these characteristics affect the living arrangement choice. Third, we assess the role of the family in protecting the incomes of elderly people and the extent to which the decrease in co-residence has negatively affected the economic well-being of the elderly people. Understanding the determinants of the change in the living arrangements of the elderly people in Greece and its implications for their well being is of great importance given the limited provision of formal care and the increasing concerns regarding the financial sustainability of the Greek pension system. Before addressing these topics we summarise the reasons advanced by the existing literature to account for changes in the living arrangements of the elderly people and we briefly describe the data and methods used for our analyses.

Figure 1: Changes in the share of elderly people living with their adult children



Note: Author's calculation based on data from the Greek Household Budget Survey.

Trends and correlates in the living arrangements of elderly people: A review of the literature

In the last half of the 20th century there was a substantial decline in the percentage of elderly people who lived with their adult children. In the US the shift towards residential independence has been documented extensively in a number of studies (Kobrin, 1976; Kramorow, 1995; Börsch-Supan, 1989; McGarry and Shoenni, 2000; Michael et al., 1980; Mancunovich et al., 1995; Costa, 1999). Similar trends are documented for the living arrangements of elderly Europeans. Pampel (1992), for example, showed that the proportion of elderly unmarried women living alone in Europe had increased substantially during the period 1975-1990 in all the countries in his sample. As a result most elderly people now live alone or with a spouse in most European countries. For Western and Northern European countries the proportion of elders living alone ranges from 75 to 95 percent (with the exception of Ireland and Austria where the percentage of elderly people living alone is about 60-70 percent) (Iacovou 2000a, b; Van Solinge, 1994; Keilman, 1988; Kinsella, 1990). In Southern European countries the percentage of elders living alone is somewhat lower

(ranging from 55 to 70 percent) but recent trends suggest that the situation is changing rapidly.

The demography literature has presented several explanations for this increase in independent living. One explanation offered is a decrease in the availability of family members with whom elderly people may live. One factor explaining the decrease in kin availability is the decline in fertility rates (Kobrin, 1973; Kobrin, 1976; Ruggles, 1994). The literature has consistently found that a decline in fertility rates has been negatively associated with living alone (Wolf, 1994; Mancunovich et al., 1995). This negative association between co-residence and fertility is explained in terms of the fact that the cost of co-residence per available child is higher or alternatively the fact that a smaller number of children narrows the options for elderly people (Palloni, 2000). A second factor explaining the decrease in kin availability is an increase in female labour force participation. The rise in female labour force participation, reduces the availability of members with whom elderly could co-reside since employment outside home may made it more difficult for daughters to take care their frail parents (McGarry and Schoeni, 2000; Grundy, 2000).[1] A third factor affecting kin availability is migration from rural to urban areas since this means that children are living further whereas older people may not wish to move in a city.

In addition to these demographic factors the trend towards independent living may be related to improvements in the health status of older people, given that elderly people with fewer health problems are better able to live on their own (Wolf and Soldo, 1988). Cultural factors and tastes have also been proposed to account for the changes in the inter-generational co-residence patterns. Cultural arguments usually attribute the shift towards independent living to the rise of individualism, changes in the tastes for privacy and the loss of "traditional" family centred values (Kramarow, 1995; Fletscher, 1970; Smith, 1979; Lesthaeghe, 1983). Finally, the shift towards independent living has been linked to the rise in the incomes of elders. According to this explanation income growth enabled the elderly people to purchase more privacy in the form of independent living (Michael et al., 1980; Pampel, 1983; Schwartz et al, 1984). Studies which examine the determinants of the changes in the living arrangement among elderly people have produced mixed results concerning the

[1] Increases in female labour force participation may also have positive effects on the probability of inter-generational co-residence given that the rise in the female labour force participation may have made the presence of a grandparent in the home more valuable as a potential source of childcare. Thus, the magnitude and the direction of the effects of increased female labour force participation depend on which of the two effects dominate.

relative importance of each of the factors in accounting for the trend toward residential independence. Some studies have produced results indicating that the increase in the independent incomes of the elderly people had a strong negative effect on co-residence (Michael, et al., 1980; McGarry and Shoeni, 2000; Burr and Mutcher, 1992; Costa, 1999; Van Solinge, 1994). Others found that either the incomes of the elderly people played no role in the observed trend towards independent living (Schwartz, et al., 1984; Börsch-Supan, et al., 1992) or that demographic or cultural changes are more relevant in explaining the trend in the living arrangements of the elderly. Studies that favour the cultural explanation for the change in co-residence point out that lower fertility and policy changes that increased the incomes of the elderly are not exogenous to the cultural changes. Lesthaeghe (1983) for example argued that a number of demographic changes including low fertility are attributable to individualism. Burch and Matthews (1987) argues that the increase in the incomes of the elderly has been the result of broad institutional changes which reflected societal values that encouraged independent living and transformed individual preferences. These explanations are likely to have different weight in different societies. In this paper we shall examine the contribution of different factors in explaining the change in the living arrangements of the Greek elderly people.

Data and methods

The data used in our analyses are drawn from the five available cross-sections of the Greek Household Budget Surveys (GHBS) covering the period 1974-1999 (the five survey years are 1974, 1981/82, 1987/88, 1993/94 and 1998/99).[2] All surveys exclude persons living full-time in institutions such as old age homes, penal institutions and hospitals. Since one of our primary aims is to examine the living standards of the elderly in Greece the exclusion of elderly living in old age institutions may be a potential source of bias. However, the degree of bias can be considered low since according to the 2001 Population Census only about 3% of all persons above the age of 65 lived in nursing homes in Greece and this number is only slightly lower in earlier years (about 2 percent in according to 1971 census) suggesting that the importance of this type of residential arrangement have not changed much over the period in question.

GHBS collects information on household's income, expenditures and their components as well as information on various household characteristics including educational levels and the labour market status of the household

[2] For abbreviation we refer to these surveys as 1974, 1982, 1988, 1994 and 1999 respectively.

members. In the GHBS, household is defined either as two or more persons who share the same dwelling and have common arrangements for the provision of meals (irrespective of whether they are related or not). A single household is defined as a single person living in his/her own in a dwelling or living with other persons but having no common arrangements for the provisions of either housing needs or sharing meals with them (NSSG, 1999). The person who was identified by all household members to be responsible for major household decisions was defined as the household head. Intra-household relationships in the GHBS are coded by relationship to the household head. Linking individuals to the household head we can identify the relationships among household members. Using this information we separate the nuclear family units which comprise each household.[3] Our definition of multigenerational households includes those households consisting of pairs of elderly and non-elderly family units. We restrict our analysis to those multigenerational households where the head of the elderly family unit is older than 65 years old and the head of the young family unit is less than 65 years old. Although most multigenerational households consist of pairs of elderly parents living with their adult children, there are a few cases representing more complex intergenerational co-residential arrangements.[4] Elderly people who live alone or with a spouse are categorised as living alone.

Although GHBS is a very rich data source which has been widely used for distributional related studies it has certain limitations for analysing the determinants of the living arrangements of elderly people. One of its main limitations is that it does not contain information on the characteristics of non co-residing children. Thus, it can not directly be used to identify how changes in the characteristics of the children affect the co-residence patterns of the elderly people. A second limitation is that it does not contain information on the number of surviving children. Despite these limitations GHBS is still a very a useful data set for examining the trends and the correlates of the living arrangements of the Greek elderly people. No other dataset in Greece offers as relevant information to examine determinants of the change in the living arrangements of the elderly as early as 1974.

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[3] Nuclear family is defined a single person or a couple with dependent members. Dependent members are defined children younger than 18 years old or children older than 18 but being in full time education or serving the military.

[4] These include, for example, households consisting of adult grandchildren who live with their elderly grandparents or three family-three generational households consisting, for example, of parents who live with their adult children and adult grandchildren.

We begin our analysis describing general trends in the living arrangements of elderly Greeks and considering the relevance of various demographic and socio-economic changes that took place over the period under examination. Next we estimate probit models predicting the probability that an elder will live in an intergenerational household. In order to examine whether there have been any changes in the way that socio-economic and demographic characteristics of elderly people affect living arrangements we compare the estimated coefficients which have been derived estimating living arrangements choice models for each year separately. The contribution of changes in the distribution of socio-economic characteristics to living arrangements is quantified using counterfactual simulation techniques. The last section examines trends and differentials in the observed poverty rates among the elderly people by living arrangement status in order to assess the role of the family in protecting the incomes of the Greek elders and how this role has changed over time.

Descriptive analysis

In this section we examine the trends in the living arrangements of the Greek elders and we discuss changes in some demographic and socio-economic variables that can be thought that have contributed to the change in the observed co-residential arrangements.

Trends in the living arrangements among the Greek elderly

For our analysis we consider six types of living arrangements: single elderly living alone, elderly couple living alone, single elderly living with their married children, elderly couple living with their married children, single elderly living with their single (unmarried, divorced or widowed) children and single elderly living with their single children. Table 1 shows the percentage of elderly people falling in each of the six alternative living arrangements in each of the five survey years.

The change in the living arrangements of the Greek elders over the 25 years in question was dramatic: the percentage of elderly people (single and couple) living alone has increased by about 24 percentage points rising from about 46 percent in 1974 to 68 percent in 1999. This increase was accompanied by significant changes in the composition of multigenerational households. In 1974 the majority of multigenerational households consisted of elderly people (single or couples) who lived with their married children. This pattern changed significantly over time: although co-residence of elderly people and their single children remained stable over time there has been a significant decrease in the prevalence of households consisting of elderly people living with their married children. As a result of this change by 1999 the majority of multigenerational

households were households which consisted of elderly people who lived with single (predominantly unmarried) children.

Table 1: Living arrangements of elderly people: 1974-1999 (percentages)

	1974	1982	1988	1994	1999
Elderly people who live with their adult children or other relatives					
Single elderly-married children	22.75	19.39	15.52	9.98	8.55
Couple elderly-married children	14.33	12.87	9.41	7.04	4.81
Single elderly-single children	6.21	6.20	5.86	5.12	6.16
Couple elderly- single children	12.36	11.13	10.86	12.98	12.39
Elderly people who live alone					
Single elderly	10.36	12.76	14.52	18.37	19.07
Couple elderly	33.98	37.65	43.83	46.51	49.03

Note: Author's calculation based on data from the Greek Household Budget Survey. Residual categories consisting of more than two families have been assigned to closest household type (based on information on the marital status of the children).

The observed changes in the composition of multigenerational households probably reflect changes in the balance of inter-generational support exchange among elderly parents and their children. Speare and Avery (1993) examining the direction of intergenerational support exchange among different household types found that co-residence with married children (aged 35 or over) was more often associated with support transfers from children to their elderly parents whereas co-residence with non-married children were mainly associated with the needs of the children. Since the majority of inter-generational households are now households who consist of elderly people living with their single (predominantly unmarried) children one can infer that co-residence was to a large extent associated with needs of the younger generation. This in its turn may be associated with factors like the high youth unemployment, the postponement of the age of marriage and the longer period of time spent in full-time education.[5]

[5] Over time there have been some significant delays in the home leaving behaviour of young adults. Indicative of these delays is that the percentage of adult children aged 19-30 years old who lived with their parents has increased by about 10 percentage points during the period under examination from 46 percent in 1974 to 56 percent in 1999 (author's calculation based on data from GHBS). Delays in the home leaving behaviour of adult children in Greece is usually associated with factors such as the high youth unemployment rate, the postponement of marriage and the increase in the period of time spent in full-time education.

Although the prevalence of co-residence is indicative of mutual support between elderly people and their adult children we have to bear in mind the fact that intergenerational transfers may take alternative forms. In place of co-residential arrangements adult children may use time and money transfers to provide support to their elderly parents. In Greece transfers among families are facilitated by the fact that it is very common most members of the extended family to live nearby. The "living nearby" arrangements allows family members to maintain close family ties while at the same time does not require the loss of privacy as is the case in co-residential arrangements. The extent of intergenerational transfers among these families is such, that these families can be described as "functionally extended" families. Given data limitations this research cannot take into account the importance of "living nearby" arrangements. We believe, however it is very important alternative source of support for the elderly Greeks.

Demographic and socio-economic changes

This section examines changes in three demographic and the socio-economic variables that can be thought as being important factors contributing to the change in the living arrangements of elderly people in Greece.

Demographic changes: Greece, in common with most industrialised countries is rapidly ageing. Indicative of the magnitude of the demographic change that occurred over the last 25 years is that during the period 1974-99 the ratio of the population of 65 and over to the population between 15 and 64 – decreased from about 5.2 to about 3.9 (calculations are based on data from the GHBS). This change in the age structure of the Greek population is the outcome of increased longevity and decreasing fertility rates as in many other countries. The declining trend in the fertility rate may have affected the co-residential choice of the elders given that it reduces the number of family members with whom they may live.

Two additional demographic changes that might have affected inter-generational co-residence are urbanisation and emigration. Both may have contributed to the observed change in the living arrangements of the elderly population in Greece given that they have affected the proximity of family members with whom elderly could co-reside. In the large emigration wave that began in the 1950s (1974 is considered by many as the end of the 1950 emigration wave) more than 1,000,000 people emigrated from Greece (mostly to Western Europe, US, Canada and Australia). Equally important changes resulted from the massive urbanisation of the Greek population. The percentage of elderly people who lived in rural areas decreased from 42 percent in 1974 to

31 percent in 1999.[6] The trends affected the co-residence probabilities of parents and their children especially for the cohorts of people that we consider here. Differences in co-residence rates between elderly people who lived in rural and urban areas in 1974 provide support for this hypothesis. In 1974 the prevalence of inter-generational co-residence was higher in urban than in rural areas (in rural areas 53 percent of older persons lived with their adult children compared to 57 percent of their counterparts living in urban areas). By 1999 inter-generational co-residence decreased both in urban and rural areas. In contrast the probability of co-residence in 1999 was just higher in rural than in urban areas (33 percent of elderly people who lived in rural areas lived with their children compared to 32 percent of those who lived in urban areas). The change is not large but it suggests that the preferences for co-residence has decreased faster in urban than in rural areas. However, urban/rural residence may be correlated with other characteristics of the elderly. In our multivariate analysis we examine the contribution of rural residence to the change in the living arrangements of the elderly people controlling for other factors that may be correlated with rural and urban residence.

Female labour force participation: Another important change that occurred during the period under examination is the increase in female labour force participation. Our analysis of GHBS shows that female labour force participation (among women aged 19 to 59 years old) has increased from 33 percent in 1974 to 48 in 1999. This increase may have affected the probability of co-residence in two ways. On the one hand it might have reduced co-residence among elderly people and their adult children by limiting daughters' capacity to providing care for their elderly parents. On the other hand, it might have encouraged co-residence since grandparents are valuable as a potential source of child-care. The magnitude and the direction of the effect of increased female labour force participation depends on which of the two effects dominates.

Income: A third important change that took place during the period under examination is the increase in incomes of elderly people. Of the five sources of income for the elders, social security was the one that showed the largest increase. According to the figures presented in Table 2 during the period under examination social security income increased by more than 187 per cent.

This increase was the outcome of several policies which resulted in large increases in the level of social security income. One of the most important policies was the introduction, in 1978, of the Automatic Price Indexation

[6] Rural residence is coded as living in an area with a population less than 3,000.

Mechanism, which aimed at the stabilisation of the purchasing power of pensions (Tinios, 2001; Mylonas and Maissoneuve, 1999). During the period 1978-85 the minimum pension was linked to a larger share of the minimum blue-collar wage (initially 60 and subsequently 80 per cent) (Mylonas and Maissoneuve, 1999). These two policies, along with the fact that the minimum blue-collar wage increased by 50 per cent, resulted in big increases in the level of minimum pensions. In addition to the increase in the pension benefits in the early 1980s there has been a significant expansion of the social security system covering a significant part of the uninsured population (such as farmers' spouses, non-contributors).[7] Most of the changes outlined above took place in the late 1970s and the early 1980s. A significant change that took place in the mid-1990s was the introduction, in 1996 of a means-tested benefit for poor pensioners.[8]

Table 2: The evolution of incomes of elderly people

Year	Earnings	Social Security	Investment	Financial Assistance	Other	Total Income
1974	13489	34192	7800	4607	104	60191
1981	14419	52558	5190	1893	0	74060
1988	13306	71918	10756	1952	54	97987
1993	11632	73898	10808	2283	98	98719
1999	14536	97546	12835	2936	101	127955

Note: All figures are expressed at mid 1994 prices.

It can be argued that the rising levels of incomes enhanced the economic security and made independent living more and more affordable. In the multivariate analysis which follows we examine the role of the rising levels of income to the change of the living arrangements of the elderly population in Greece.

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7 The three measures which expanded the coverage of the social security system are: 1) the introduction of a pension for farmers' spouses 2) the introduction of a special old age pension for non-contributors, which was equivalent to the agricultural pension, and 3) the allowance made for individuals above the statutory retirement age to purchase pension rights to qualify for a minimum pension (Mylonas and Maissoneuve, 1999).

8 The means-tested benefit (EKAS) was based on information contained in income tax declaration, giving emphasis on total pension income. EKAS relied on three income tests: 1) a test on the individuals' total pension income, 2) a test on the individuals' total income, including property income and earnings and 3) a test on family income.

Multivariate analyses

In this section, we investigate the factors that are associated with the increase in independent living among older people in Greece. We consider two types of changes that might have contributed: changes in the structure of the co-residence decision, reflected in the change in the coefficients of the models estimated for each year independently, and changes attributed in the composition of the older population.

Econometric model

To examine the choice of living arrangements we specify a reduced form probit model, of the form:

$$\text{Prob}(\textit{Live with children}) = \Phi(X\beta') \qquad (1)$$

where Φ is the cumulative normal distribution, X is the vector of variables and β is a vector of coefficients. Although research on the living arrangements of the elderly people has shown that both the characteristics of the elderly parents and their children are important determinants of the living arrangements of the elderly people our data does not have information on non-co-resident children; therefore all variables included in X control for the socio-economic characteristics of elderly people but not for their children's characteristics. These include controls for socio-economic characteristics such as age, marital status, gender, urban/rural residence, home ownership and income.

Parental age is included in equation 1 with a quadratic specification in order to allow for its effect to vary over the age range. Previous research (Wolf and Soldo, 1988; Börsch-Supan, 1989; Kinsella, 1990; Ruggles, 1994; Macunovich et al, 1995) indicates pronounced non-linearities in the relationship between age and the probability of co-residence: the prevalence of elderly people living with their children decreases from about the age of 50 to about age 75 or 80 and then increases again. In addition to age the specification of equation 1 includes two dummies variables which control for the effect of marital status: one of which indicates elders who have never married and one of which indicates elders who are divorced or widowed (the base category for marital status is married). Similarly with other studies we control for the effect of marital status under the critical assumption that this is exogenous to the decision concerning the living arrangements. Given that remarriage and divorce rates for the cohorts that we examine here were rare this is not a too restrictive assumption. Gender differences in our models are accounted by a dummy variable indicating sex: this variable takes the value of 0 for elderly men and 1 for elderly women. In the specification of equation 1 we also include a dummy variable indicating

urban residence in order to account for the effect of urbanisation on the living arrangements of the Greek elders. As discussed earlier since the early 1950s there has been a large migration of the population from rural to urban areas. To a large extent migration of children from rural to urban areas have reduced the potential for support of elderly people who were left behind at the rural areas – therefore we expect to find that elderly people who live in rural areas to be less likely to co-reside with their children. There are additional reasons for which co-residence may differ between rural and urban areas. As Kramarow (1995, p. 341) points "urban residence can also signify being exposed to "modern ideas" and having different mortality, fertility and migration patterns that would affect the availability of kin and consequently influence co-residence and the likelihood of living alone".

In addition to these demographic variables we use two socio-economic controls: family income and homeownership status. The family income variable is derived by summing up the incomes of each member in the family units – therefore reflects solely the independent resources of the elderly families.[9] Under the view that privacy is a normal good which allows elderly people to purchase privacy in the form of independent living we expect to find a negative relationship between income and the probability of living with children. Although the negative relationship between income and co-residence has been confirmed by most studies it has also been pointed out that its effect is not linear. Michael et al. (1980) report an S-shaped pattern to the effect of income: as income rises from very low level its impact on living alone is small and insignificant but after a certain threshold income increases again the probability of living alone. Wolf and Soldo (1988) also find non-linearities in the effect of income on the living arrangements of older unmarried women with stronger effect at the lower end of the distribution and little if any effect at the upper end. In order to capture possible non-linearities of the effect of income we choose a spline function specification with knots at the 25th, 50th and 75th percentiles of the family income distribution. Our second socio-economic control is homeownership status. As a proxy of the overall wealth we expect homeownership to be negatively associated with co-residence probabilities. A problem with the homeownership status however is that is not completely exogenous to the living arrangements: whom one lives with is not completely independent of the type of dwelling in which they live (Kramarow, 1995).

Comparison of models of co-residence status over time

We first present results from models estimated independently for each of the survey years. Results for these models are presented in Table 3.

[9] Income is adjusted to mid 1994 levels using the CPI for the period 1974-1999.

Table 3: Probit models predicting the probability of co-residence: Marginal effects

	1974	1982	1988	1994	1999
Age	-0.06	-0.07	-0.13	-0.15	-0.13
	(-1.94)	(-1.67)	(-3.17)	(-3.84)	(-4.48)
Age squared*10^{-2}	0.04	0.05	0.08	0.10	0.08
	(2.12)	(1.81)	(3.22)	(3.78)	(4.35)
Female	-0.03	-0.02	-0.05	-0.05	-0.04
	(-1.23)	(-1.04)	(-2.28)	(-2.32)	(-1.87)
Marital status					
Never married	-0.12	-0.16	-0.11	-0.26	-0.23
	(-2.06)	(-2.50)	(-1.64)	(-4.47)	(-3.75)
Widowed-divorced	0.23	0.24	0.26	0.13	0.19
	(9.29)	(9.43)	(10.37)	(5.34)	(7.97)
Homeowners	-0.08	-0.03	-0.07	-0.01	0.02
	(-3.05)	(-1.83)	(-2.27)	(-0.33)	(0.46)
Rural residence	-0.09	-0.03	-0.00	-0.07	-0.04
	(-4.10)	(-1.03)	(-0.15)	(-3.09)	(-1.63)
Quartile of income					
1st quartile	-1.41	-0.67	-1.87	-2.18	-1.54
	(-9.96)	(-3.95)	(-5.70)	(-6.72)	(-3.30)
2nd quartile	-0.26	-0.47	-0.48	-0.37	-0.66
	(-2.28)	(-4.19)	(-4.32)	(-3.45)	(-5.53)
3rd quartile	0.10	-0.00	0.00	-0.05	-0.06
	(1.20)	(-0.09)	(0.07)	(-0.73)	(-0.95)
4th quartile	0.00	0.00	0.02	-0.01	-0.01
	(0.06)	(0.52)	(1.33)	(-0.44)	(-0.70)
Observations	3014	2584	2907	3034	2898
Pseudo R-squared	0.145	0.102	0.115	0.082	0.075
Log-likelihood	-1766.6	-1609.5	-1749.8	-1808.4	-1681.5

Note: Figures in parentheses report z-statistics. The reference category for marital status is married. Marginal effects on income variables are multiplied by 10^5.

For ease of interpretation in this table we present marginal effects (instead of the estimated coefficients) reporting the change in the probability of co-residence that is associated with a change in each of the independent variables when all other variables are held constant at their mean values. In order for the

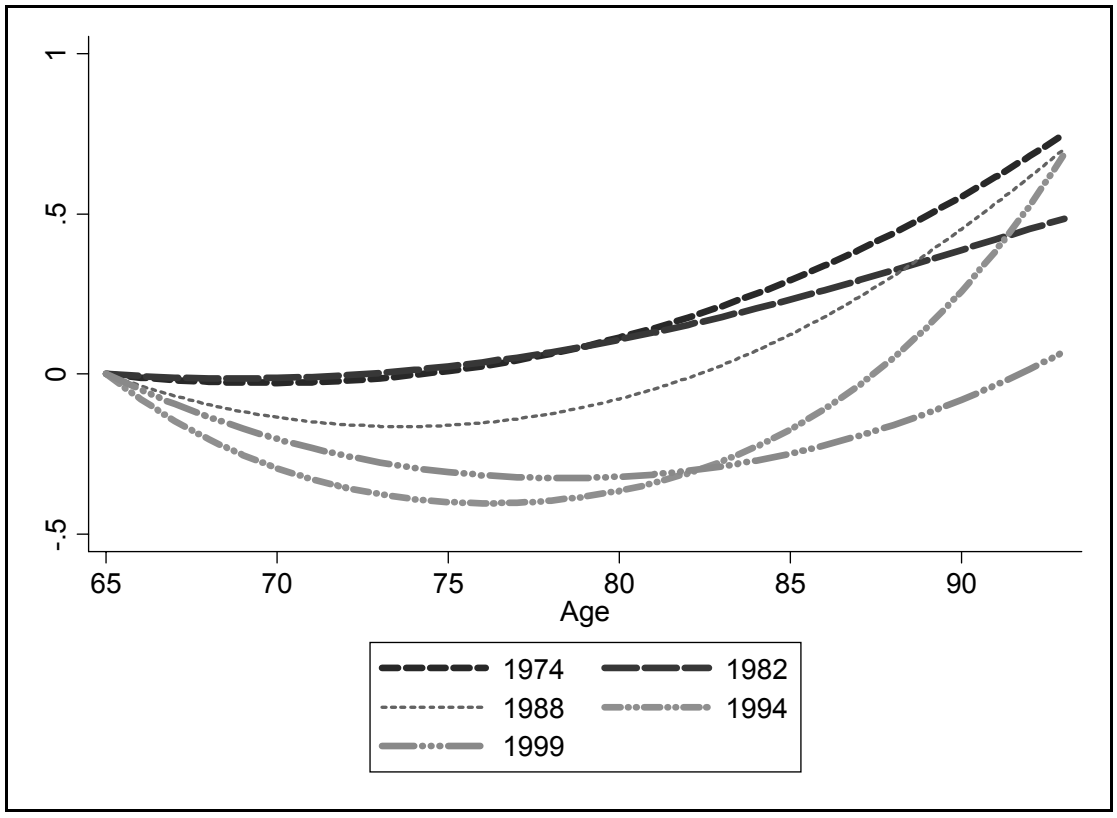
results to be comparable over time, the marginal effects are evaluated at the pooled sample means.

We begin our analysis examining the results of the model estimating the probability of co-residence in 1974 using the independent variables described in the previous section. The coefficients on age variables from this model suggest that the probability of living with others increases almost linearly with age. In the absence of controls for health status and given that health problems requiring care increase with age the increase in the probability of co-residence may capture the effect of deteriorating health status. Turning to the effect of gender we find that being woman is negatively associated with co-residence but its effect is insignificant. The effects of the variables controlling for marital status suggest that unmarried elderly people are significantly less likely than their married counterparts to live with their children (12 per cent less likely) while widowed or divorced elderly people are significantly more likely compared to elderly couples to co-reside with children or other younger relatives (about 23 per cent more likely). In the absence of data controlling for the number of children the negative effect of the variable indicating elderly people who have never been married probably reflects differences in kin availability (given that elderly people who have never married are less likely to have children). On the other hand, the higher prevalence of co-residence among widowed elderly people can be explained in terms of the support given to vulnerable persons that have no spouse to take care of them (Elman and Uhlenberg, 1995). The coefficient on the variable indicating rural residence suggests that elderly people living in rural areas are about 9 per cent less likely to live with their children compared to their counterparts living in urban areas. The negative effect of rural residence reconciles with the hypothesis which suggests that migration of children from rural to urban areas have reduced the potential for support of elderly people who are left behind at the rural areas (Kramarow, 1995). Both homeownership and income had a significant negative effect on co-residence suggesting that more affluent elderly people were more likely to live alone. However, the effect of income is highly non-linear: at the lowest two quartiles increasing incomes decrease the probability of co-residence whereas in the higher two quartiles income has no significant effect on the probability of co-residence. The relationship implied by the estimated coefficients of income variables on co-residence probability is in line with findings from other studies which suggest that income has “threshold” effects on probability of co-residence (Michael et al., 1980; Wolf and Soldo, 1988; Börsch-Supan, 1989).

Having examined the effect of the independent variables on the probability of co-residence in 1974 we will now examine how the effects of these independent variables have changed over time. Examining first the effect of age we find that

although age has a significant effect on the probability of co-residence in all years, the relationship has changed significantly in 1988, 1994 and 1999. A graphical representation of the relationship between the co-residence probability and age is depicted in Figure 2. As can be seen from this figure in earlier years the probability of living with others increases almost linearly with age. In contrast to earlier years, in 1988, 1994 and 1999 the effect of age is non-linear: the probability of living with children falls quite steeply with age up to a certain age (the age threshold is 74 in 1988, 76 in 1994 and 79 for 1999) and increases thereafter.[10]

Figure 2: The effect of age on the probability of living with children

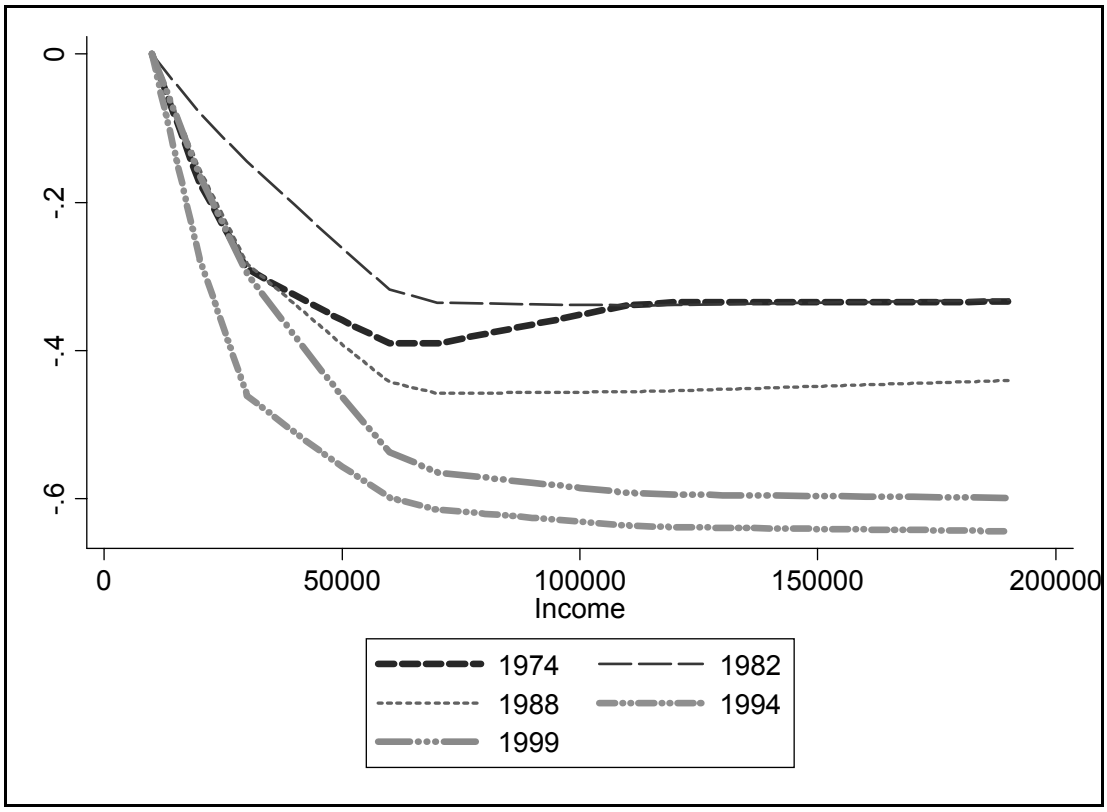


Similar changes especially for 1994 and 1999 are found for most of the other independent variables. The gender variable shows the effect of being women as negative in all years but statistically significant in 1994 and 1999 only. Unmarried elderly people in all years under examination were significantly less likely to co-reside with younger relatives compared to elderly couples but its effect increased significantly in magnitude in the 1994 and 1999 (from -12 in

[10] This pattern is very similar to the age pattern reported for other countries (Wolf and Soldo, 1988; Börsch-Supan, 1989; Kinsella, 1990; Ruggles, 1994; Macunovich et al, 1995).

1974 to -26 and -23 percent in 1994 and 1999 respectively). The change in the effect of the variable indicating widowed or divorced elderly are modest and do not reveal a clear pattern. According the results presented in Table 3 the probability of co-residence among widowed and divorced elderly people increased slightly in 1982 and 1988 whereas it fell in both 1994 and 1999 (the change however is only significant in 1994). Turning to the effect of variable indicating rural residence we find that although the negative effect of rural residence reduces in magnitude over time, this decrease was not statistically significant (with the exception of 1988 for which the effect is small and insignificant).

Figure 3: The effect of income on the probability of living with children



Similarly to 1974 the effect of income on the probability of co-residence is highly non-linear in all years: at the lowest two quartiles increasing incomes decrease the probability of co-residence whereas in the higher two quartiles income has no significant effect on the probability of co-residence. Although the pattern of the relationship between income and the probability of co-residence is similar, the magnitude of the estimated effects has changed over time. As with most of other variables the change is statistically significant only in the later two years (1994 and 1999). As can be seen from Figure 3 differences in the estimated effect of income are concentrated at the lowest quartile in 1994

and the second lowest quartile in 1999. The estimated coefficients for these quartiles imply that the probability of co-residence is falling more steeply with increasing income levels in later years as compared to earlier years.

Significant changes over time are also found for the effect of homeownership status. On the one hand, in the three earlier years homeownership had a significant negative effect on co-residence suggesting that more affluent elderly people were more likely to live alone while in both 1994 and 1999 the effect of homeownership status was both smaller in magnitude and insignificant. However, comparison of the effects of homeownership status over time is confounded by the potential endogeneity of homeownership status to the co-residence decision. To the extent that homeownership status is endogenous to the decision of co-residence the estimated changes in the effect of homeownership status over time may reflect changes in the degree to which homeownership status is endogenous to the decision of co-residence. A further ambiguity in explaining the effect of homeownership status and its changes over time arises because homeownership among elderly living with their relatives may represent resources of the elderly person's relatives.

Summing up the comparison of the models predicting the probability of co-residence over time suggests some significant changes in the structure of co-residence decision. These changes occurred mostly in 1994 and 1999. Below we will try to quantify the effect of the change in the structure co-residence decision on the observed changes in the living arrangements.

Results from the pooled model

In this section we estimate a model predicting the probability of living with a child using the pooled data from all years. In this model in addition to the variables used in the previous section we control for year effects including four year dummies (with 1974 being the reference year). Imposing the effects of the covariates on the living arrangements choice to be the same in all years and including the year dummies we want to examine the contribution of unobserved year effects to the increase in independent living. Table 4 presents the results of this model.

Table 4: Probit model predicting the probability of co-residence-Pooled model: Marginal effects

Age	-0.10
	(-6.36)
Age squared*10^{-2}	0.06
	(6.40)
Female	-0.04
	(-4.16)
Marital status	
Never married	-0.27
	(-10.03)
Widowed-divorced	0.22
	(19.79)
Homeowners	-0.05
	(-3.68)
Rural residence	-0.04
	(-4.24)
Quartile of income	
1st quartile	-1.09
	(-12.59)
2nd quartile	-0.49
	(-10.19)
3rd quartile	-0.01
	(-0.43)
4th quartile	0.00
	(0.29)
Year	
1982	0.02
	(1.03)
1988	-0.02
	(-1.18)
1994	-0.07
	(-5.15)
1999	-0.07
	(-5.04)
Observations	14437
Pseudo R-squared	0.12
Log-likelihood	-8700.8

Note: Figures in parentheses report z-statistics. The reference category for year is year 1974 while the reference category for marital status is couple. Marginal effects on income variables are multiplied by 105.

The pooled model produces results concerning the effects of socio-economic variables very similar to those estimated using the 1994 and 1999 data. Turning to year effects which the main interest of this section we find that the probability of co-residence did not change significantly in 1982 and 1988 but it did decrease significantly in 1994 and 1999. According to the model's predictions elderly people in 1994 and 1999 are about 7 per cent less likely to live with their children compared to their counterpart in 1974. To a large extent the significant negative time effects captured by the 1994 and 1999 year dummies may reflect changes in the residential preferences among the elderly people and their children (Kramarow, 1995; McGarry and Schoeni, 2000). The year effects however may also reflect the importance of all year specific factors that are not captured in the model (such as increases in the incomes of the children of the elderly). Although the year effects cannot be interpreted as representing solely changes in preferences or culture they give an overall guide to their importance.

Counterfactual simulation

In this section we use counterfactual simulation techniques to examine the contribution of changes in the distribution of elderly people's characteristics to the increase in independent living. To perform our simulations we use the estimated coefficients from the model estimated with the pooled data from all years (Table 4). Using these estimated coefficients we first predict the probability of co-residence setting the value of all independent variables to their 1974 mean values. Then we change the value of one variable at a time to their mean values in each year. The differences in the two estimated probabilities provide a measure of the size of the increase that is caused by each independent variable.

The first row of Table 5 shows the actual mean probability of co-residence for each of the survey years. The second row shows the estimated probability of co-residence calculated using the estimates from the pooled model combined with the mean values of the independent variables from each year. Subsequent rows present the counterfactual simulated probabilities calculated by changing the level of one variable at a time at its mean value in each year while keeping all other variables at their 1974 mean level.

Table 5: Predicted probabilities

	1974	1981	1988	1994	1999
Actual probability	0.556	0.495	0.417	0.351	0.318
Mean predicted probability[1]	0.559	0.495	0.417	0.352	0.318
Simulated predicted probability[2]					
Age	0.556	0.559	0.561	0.561	0.563
Never married	0.556	0.565	0.566	0.565	0.564
Widowed-divorced	0.556	0.562	0.558	0.552	0.553
Homeowners	0.556	0.563	0.560	0.559	0.565
Rural residence	0.556	0.565	0.566	0.567	0.568
Income	0.556	0.490	0.441	0.434	0.398
Year	0.556	0.578	0.549	0.497	0.495

Note:
1) Calculated setting all independent variables at their mean value in each year.
2) Calculated setting all variables at their mean 1974 values and changing the value of one variable at a time at their mean value in each respective year.

What we can first note from this table is that the model predicts very closely the proportion of elderly living with their children in each year. Comparing the counterfactual simulated probabilities with the mean predicted probability of co-residence in 1974 we find that the variable that contributed the most to the change in the living arrangements of the Greek elders is income. The change in income accounted for 100 percent of the decrease in the co-residence rate between 1974 and 1982. Its contribution however to the change in the living arrangements has decreased significantly over time. As we can see from Table 5 the change in the co-residence rates between 1974 and 1999 only due to changes in the incomes of the elderly (from 55.6 to 39.8) accounts for about 66 percent of the overall change (from 55.6 to 31.8). As the importance of incomes in accounting for changes in co-residence rates among the elderly reduces over time so the contribution of the unobserved year effect rises. The change between 1974 and 1999 due to unobserved year effects accounts for about 26 percent of the overall change. As we discussed earlier the increase in the share of the change explained by year indicators may reflect changes in the tastes for co-residence and all other factors that are not controlled for in our models (such the incomes of the children, daughters labour force participation etc). All the other variables in all years can explain only a very small percentage of the change in the probability of living alone.

The effect of the change in the prevalence of co-residence on the economic well-being of elderly people

It is often thought that the dissolution of the traditional living arrangements where most elderly people live with their children or younger relatives will reduce the overall levels of well-being of the elderly people as there may be less pooling of income and less contact with children and grandchildren. In this section assuming that income is a satisfactory indicator of well-being (albeit a partial one) we examine trends and differentials in the observed poverty rates among the elderly people by living arrangement status in order to assess the role of the family in protecting the incomes of the Greek elders and how this role has changed over time.

Results on the overall and subgroup poverty rates for elderly people who live alone and for those who live with their children are presented in the first three rows of Table 6.[11] Further to these statistics in the lower half of the table we present estimates of the overall probability of living alone as well as the probability of living alone for the subgroups of poor and non-poor elderly people. Poverty rate estimates and the estimates of the probability of living alone are derived using two measures of income: household income and family income. Household income is derived by summing up the incomes of all household members, while family income is derived by summing up the income of the members of the nuclear family unit only.[12] Household income thus reflects the total resources of household in which the elderly people are living whereas family income reflects the independent incomes of the elderly family units. Household income is used as an indicator of the actual levels of the economic well-being whereas family income is used as an indicator of the economic well-being that elderly people can attain if they were to rely solely on their independent incomes.[13] Differences in the poverty rate estimates derived

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11 Poverty rate shows the percentage of people in each group whose income is lower than the poverty line. Here we set the poverty line at 50 percent of the median income in each year.

12 Each of these two measures of income is adjusted using equivalence scales in order to account for differences in needs of households/families of different size and composition. In this paper we use the "modified OECD" equivalence scales which assigns the first adult in the household (family) a value of 1, each subsequent adult 0.5 and each child 0.3.

13 Whether household or family level income is more accurate indicators of economic well-being of the elderly people depends on how resources are shared among household members. The analysis here assumes that there is an equal sharing of resources among household members and thus household income represent better the true economic well-being of elderly people.

using household and family incomes are used to account for the role of the family in protecting the incomes of the elders.

Table 6: Poverty rate and probabilities of living alone by living arrangement status

	Family income		Household income	
	1974	**1999**	**1974**	**1999**
Poverty rate				
Overall	58.1	29.6	32.2	22.0
Living alone	43.1	23.9	44.8	26.8
Co-residing	69.9	41.5	22.4	11.7
Probability living alone				
Overall	44.4	68.2	44.0	68.2
Poor	32.6	55.3	61.1	83.0
Non-poor	59.8	73.6	35.8	64.4

Note: Poverty line is set at 50 per cent of equivalised household/family income distribution. Both household and family incomes are equivalised using modified OECD equivalence scales.

Comparison of poverty rate estimates in terms of household and family income reveal that the family in Greece plays a significant role in protecting the poor elders. In particular, we find that the estimate of the overall poverty rate in terms of family income in 1974 was about 26 percentage points higher than in terms of household level income. Although this difference has significantly reduced over time, poverty rate in terms of household incomes in 1999 was still about 8 percentage points lower than in terms of family income. As expected, subgroup comparisons suggest that differences in the estimates of overall poverty rate between household and family income mainly arise from differences in poverty rate estimates for the group of co-residing elderly people. The evidence concerning the role of the family in protecting the incomes of poor elderly people is re-enforced when we examine differences in the probability of living alone between poor and non-poor elderly: the probability of living alone among elderly people who are classified as poor in terms of their family income is significantly lower than among their non-poor counterparts.

The above analysis highlighted the importance of the Greek family in protecting the incomes of poor elderly people. But what does the evidence presented in Table 6 reveal concerning the effect of the changes in the living arrangements on the economic well-being of the elderly people? To provide an answer this question we examine the estimates of the poverty rate in terms of household income – the indicator that we assume that reflects more accurately the actual

levels of economic well-being. Examination of the poverty rate in terms of household income suggests that poverty has substantially decreased among both elderly people who live alone and among elderly people who live with their children. This decrease was mainly caused by the increase in the independent incomes of elderly people.[14]

Due to the substantial decrease in the poverty rate among the elderly people who lived alone, the differential in the economic well-being between the elderly people living alone and those living with their children has substantially decreased: while in 1974 the poverty rate among elderly people who lived alone was 22.4 percentage points higher than for elderly people living with their children in 1999 the difference in the estimates of poverty rate between the two groups decreased to 15.1 percentage points. This finding suggests that the increase in the independent living over time has not translated into a deterioration of the levels of the economic well-being. However, the fact that poverty has decreased much faster for elderly people who lived with their children (for elderly people living alone the change was of the magnitude of 65 per cent compared to almost 95 per cent for elderly people living with their children) suggest that the elderly people could have enjoyed higher levels of economic well-being if the level of co-residence was at its 1974 levels.

From the above analysis one can conclude that the family in Greece plays a significant role in protecting the incomes of the poor elderly people. Despite the fact that the increase in the independent living was not found to affect negatively the living standards of the elderly people the fact that the economic well-being has increased much faster for elderly people who live with their children suggests that the elderly people who live alone may have enjoyed higher levels of income if the incidence of co-residence was at its 1974 level. However, the fact that they chose independent living despite this may suggest that they put high value on independence or other factors may be at work which we cannot quantify with our data.

Conclusion

This paper provides baseline evidence about the intergenerational living arrangements in Greece. Similarly with the trend documented for most industrialised countries we found that the intergenerational co-residence has

[14] As discussed earlier, the driving forces behind the substantial increase in the independent incomes of the elderly was the expansion of the Greek old-age pension system which covered substantial segments of the uninsured population and several other measures that resulted to substantial increases in the pension benefits.

changed significantly over time. During the period 1974-1999 the percentage of elderly people living alone increased from about 45 to about 68 per cent while the percentage of those living with adult married children fell by the same magnitude. However, little change was observed during the period in question in the percentage of elderly people living with single (predominantly unmarried) adult children. The latter may be consistent with a stable role of the inter-generational co-residence as a type of support *from* elderly parents *to* their adult children.

The increase in the independent living among the elderly Greeks coincides with social policy changes which resulted in important increases in social security coverage and benefit levels. As a result of these policy changes the independent incomes of the elderly increased substantially during the period under examination. Our analysis suggested that although rising income levels associated with most of the change in the living arrangements of the elderly people over the whole period in question its contribution reduced significantly over time. As the importance of incomes in accounting for changes in co-residence rates among the elderly reduces over time so the contribution of the unobserved year effect rises. During the 1990s a substantial part of the changes were accounted by unobserved year effects. These unobserved year effects may reflect changes in preferences or may suggest the importance of other unobserved factors that we could not account for with the data at hand (such as changes in the incomes of the elders' children).

Our analysis also showed that throughout the period in question the Greek family played an important role in protecting the incomes of the old. We did not find support for the conjecture that the increase in the independent living had negatively affected the living standards of elderly people. However, we found that the economic well-being increased much faster for elderly people living with their children compared to their counterparts living alone which may suggest that those living alone would have enjoyed higher levels of economic well-being if they continued to live with their children.

Our study makes a systematic use of the only source of survey data in Greece that offers relevant information over a significant period of time. However, there are some limitations that are inherent in the cross sectional nature of the analysis. Static reduced form models of the type used in this paper represent the living arrangement choice as a response to a set of covariates. If the included covariates are endogenous to the living arrangement decision or if the living arrangement choice is a lifelong decision then the estimates of these reduced forms models would be inconsistent.

Another potential limitation imposed by our data is that we abstract from the possible contribution of the children's characteristics to the change in the living arrangements of the elderly people. The demography literature offers some evidence that suggests that both the elderly people's and their children's characteristics are important determinants of the living arrangements of elderly people. Hence this remains an open question for future research.

Furthermore, the importance of alternative forms of inter-generational support transfers is another fruitful avenue for future research. In Greece inter-generational transfers between nuclear families are very common to such an extent that nuclear families can be viewed as functioning as extended families. Functionally extended families in Greece are a common arrangement which is facilitated by the fact that members of the extended family are living nearby. The "living nearby" arrangement allows family members to maintain close family ties, to exchange help and support while at the same time they do not sacrifice their privacy. Given that this type of arrangement does not require loss of privacy families may use this as a substitute for co-residence. Examining the role of the alternative forms of intergeneration support exchange and in particular that of the living nearby arrangements can further contribute to our understanding on the role of the contemporary Greek family.

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