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Working Paper

Health, wealth and progeny: explaining the living arrangements of older European women

ISER Working Paper Series, No. 2000-08

Provided in Cooperation with:

Institute for Social and Economic Research (ISER), University of Essex

Suggested Citation: Iacovou, Maria (2000) : Health, wealth and progeny: explaining the living arrangements of older European women, ISER Working Paper Series, No. 2000-08, University of Essex, Institute for Social and Economic Research (ISER), Colchester

This Version is available at:

<https://hdl.handle.net/10419/92070>

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***Health, Wealth and Progeny:
Explaining the living arrangements
of older European women***

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February 2000.

Abstract

The increase in the numbers of older people across industrialised countries, and the increasing proportion of older people who live alone, have enormous implications for social policy in these countries. This paper uses data from the European Community Household Panel (ECHP) to analyse the determinants of living alone for elderly non-married women in Europe; and to examine how these determinants vary between different groups of countries. A number of methodological issues relating to research on living arrangements are also discussed. The main findings of the paper are that higher levels of income are related to a higher probability of living alone, although the relationship is S-shaped, with the main effect found in the second quartile in higher-income countries, and the third quartile in lower-income countries. Women with a limiting health problem are less likely to live alone in countries where social spending is relatively low, while women who have had more children are less likely to live alone in countries where residential mobility is relatively high.

Acknowledgements:

This paper is part of a project funded by the European Union under the Targeted Socio-Economic Research Programme (TSER). The ECHP data on which the paper is based were provided by Eurostat. Thanks to Richard Berthoud, to seminar participants at ISER, and to colleagues on the TSER programme for many helpful comments. All remaining errors and deficiencies are my own.

1. Introduction

This paper is concerned with the living arrangements of older women in Europe, and particularly with the phenomenon of living alone in later life: what factors are associated with living alone, and how do patterns of behaviour vary between countries?

This subject is of interest for several reasons. Firstly, older people as a group are becoming more numerous in all developed countries, both in absolute terms and as a proportion of the total population (OECD 1996; Grundy 1995). Eurostat¹ predicts that over the next 20 years, the population of over-70s in the 15 states of the EU will increase from 42.8 million to 56.5 million, or from 11.4 per cent to 14.8 per cent of the total population. Secondly, the living arrangements of older people appear to be changing, with elderly people increasingly likely to live alone, and less likely to live with other family members or unrelated individuals (Sundström 1994; Keilman 1987).

Both of these have implications for social policy. Older people tend to receive more assistance from the state than younger cohorts, both in cash and in kind (OECD 1996), and therefore the growth in the numbers of older people means that proportionally more resources from the state are set to go to this group.

Additionally, living arrangements matter a great deal. It is known that older people living alone are more likely to enter an institution than those living with at least one other person (Pendry, Barrett and Victor 1999; Breeze, Sloggett and Fletcher 1999). Even where institutionalisation does not take place, older people who live alone are more likely to require inputs of care from the state, in the form of home helps and other social services, than those who live with others. And although many older people may choose to live alone, it may also be the case that living alone is associated with undesirable outcomes, such as a sense of social isolation among older people.

Previous research into the determinants of living arrangements has been conducted in a variety of methodological frameworks. A number of articles use aggregate data to explain changes in household structure over time (Michael, Fuchs and Scott 1980; Macunovich, et al 1995; Glick, Bean and Van Hook, 1997). Another group uses cross-sectional micro-data to explain cross-sectional variations in living arrangements (Wolf and Soldo 1988; Van Solinge 1990; Burr and Mutchler 1992; Carliner 1975); and a third (smaller) group uses panel data to study the dynamics of changes in household structure at a micro level (Mutchler and Burr 1991, Mutchler 1992).

Much of this research displays remarkably consistent findings: higher income is almost always found to be positively related to the probability of living alone in older age, while in micro-studies, poor health or disability is often found to be negatively related to the probability of living alone.

This paper uses a cross-sectional micro-level analysis, and builds on the existing body of research in two ways. Firstly, a different population is analysed. The great majority of existing work in this area relates to the United States (a few exceptions relating to individual European countries do exist, for example Van Solinge 1990 and Wolf and Pinelli 1989). For the first time, this study examines the determinants of living arrangements in a range of countries across the European Union, using the European Community Household Panel, a relatively new data set covering 13 EU countries, and

¹ See Eurostat (1999:202)

having the great advantage that it asks directly comparable questions across all countries in the sample.

This paper also makes use of the fact that customs and living conditions vary widely across the EU, making its second contribution to the literature by commenting on the role played by some of these factors in determining behaviour, and the variations in behaviour across countries.

2. Groups of countries

The ECHP contains data on 13 countries. Rather than focusing on behaviour in individual countries, countries are grouped into three ‘clusters’, and results presented based mainly on this grouping (results for individual countries are presented in Appendices 1 and 2, and referred to from time to time in the text). The main advantages in using this clustering of countries are, firstly, that it makes results much simpler to read and understand, and secondly, that it avoids the problem of small sample sizes in some countries.

TABLE 1: CHARACTERISTICS OF EU COUNTRIES

	(1)	(2)	(3)	(4)	(5)	(6)
	% of people aged 70+ living alone or just with a partner	Mean Annual equivalent income (ECU)	Social expenditure as % of GDP	% of retired people in poverty	% of Catholics in population	Inter-regional Population mobility (ranking)
‘Social democratic’ group						
Denmark	96	14100	33.5	12.2	0	-
Netherlands	94	13100	33.7	10.4	36	2
‘Northern European’ group						
Belgium	86	13600	29.0	13.2	75	5
Luxembourg	74	22100	25.2	13.4	97	-
France	85	13500	31.2	15.1	90	3
UK	86	13100	28.8	31.8	15	1
Germany	85	13900	29.1	15.5	37	4
‘Southern European’ group						
Austria	69	13800	29.0	-	85	-
Ireland	63	11000	20.8	18.3	93	-
Italy	71	10000	26.0	16.5	100	6
Greece	63	8800	22.0	33.4	98	-
Spain	55	10400	24.4	15.2	99	7
Portugal	61	7800	21.0	39.6	97	8

Sources:

- (1) From ECHP 1994 (1995 for Austria), own calculations.
- (2) Annual income (1994 figures) from all household members, net of taxes, divided by no. of adult equivalents according to modified OECD scale. Average over all households. From Eurostat (1998)
- (3) Figures for 1993, from Eurostat (1999b)
- (4) Poverty defined as under 50% of average adjusted disposable income. From Vogel, Table 8.8
- (5) From CIA (1998)
- (6) From Gros (1996)

The grouping of countries used in this paper is shown in Table 1. It is based primarily on living arrangements (column 1). In the first ‘social democratic’ group, consisting of Denmark and the Netherlands, older people are far more likely to live alone, or

with just a partner, than in any other situation, with these situations accounting for well over 90 per cent of individuals. In the second ‘Northern’ group, consisting of Belgium, Luxembourg, France, the UK and Germany, these small households are less prevalent, but still account for about 85 per cent of individuals in all but one country. In the ‘Southern’ group of countries, consisting of the Mediterranean countries, plus Ireland and Austria, the ‘minimal family’ is much less widespread, with many more people living in extended families, with adult children, and so on².

The remaining columns of Table 1 show that a number of other social and economic factors also support this clustering. Incorporating these factors, the ‘social democratic’ cluster of countries may be characterised by high levels of income, by the lowest proportions of people in poverty, and by the highest levels of social expenditure, as well as by having the highest proportions of older people living alone or just with a spouse.

The ‘Northern’ group of countries is typified by levels of income similar to those in the ‘social democratic’ group; by social expenditure somewhat lower; and by levels of poverty somewhat higher. Additionally, residential mobility in these countries tends to be high.

Finally, the ‘Southern’ group of (predominantly Catholic) countries may be characterised as having the lowest levels of income and social expenditure, relatively high levels of poverty, and the lowest levels of residential mobility.

It is certainly not true that all countries fit neatly into their clusters by all criteria. For example, although France and Luxembourg fit into the ‘Northern’ group on most criteria, they are predominantly Catholic countries; while the UK fits into the ‘Northern’ group in terms of income and living arrangements, its levels of poverty among retired people are more characteristic of the poorest of the ‘Southern’ countries. Austria, in many respects the most marginal case, is a ‘Southern’ country on the basis of religion and household structure, but belongs with the ‘Northern’ group in terms of income and poverty levels³.

In some respects, these three categories also relate to Esping-Andersen’s (1990) proposal for a threefold categorisation of welfare states, into the ‘liberal’ regime (modest provisions with an emphasis on means-testing, typified by the US, with the UK moving in this direction); the ‘conservative’ regime (with an emphasis on insurance-based benefits providing support for the family rather than the individual, typified by a group of countries including France, Germany, Italy and Belgium); and a ‘social-democratic’ regime (with high levels of state support and an emphasis on the individual rather than the family, typified by the Scandinavian countries).

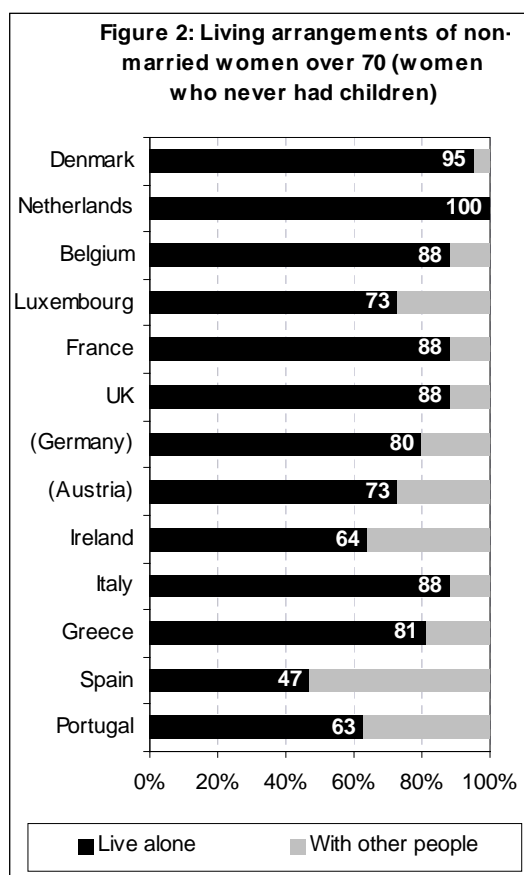
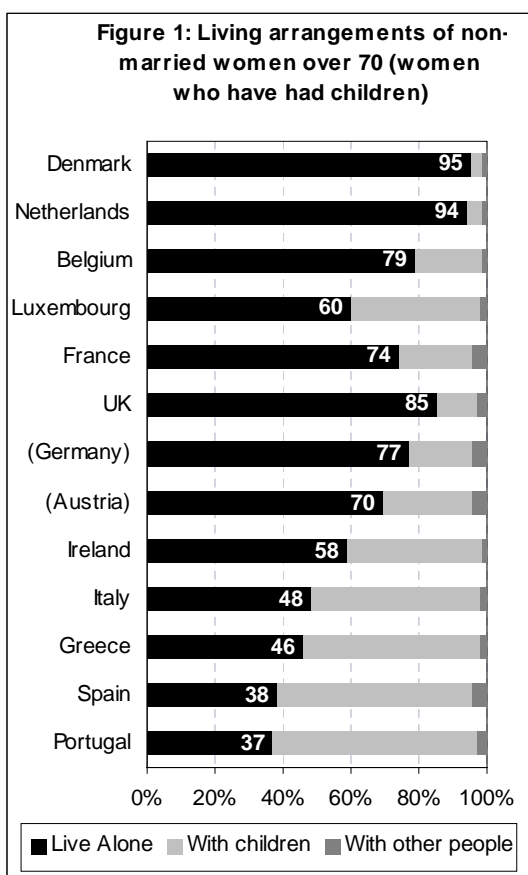
Because Esping-Andersen makes no mention of Mediterranean countries such as Spain, Greece and Portugal, and because his proposals did not deal specifically with older people’s living arrangements, his typology was not directly suitable for use in this paper. However, there are some parallels, notably the use of his ‘social democratic’ terminology for one group of countries, and also the strong relationship between our ‘Northern’ group and his ‘conservative’ group of countries.

² See Iacovou (2000) for a full description of older people’s living arrangements across Europe based on the ECHP.

³ The fact that Austria is assigned to the ‘Southern’ rather than the ‘Northern’ group on this rather marginal evidence does not matter much, since for reasons of data availability (discussed later) Austria is omitted from the pooled regressions and the results presented separately.

Figures 1 and 2 show in more detail how living arrangements vary between countries and groups of countries for the two groups of women which this paper considers⁴. The proportions living alone vary a good deal: for women who have had children, the proportion living alone ranges from 37 per cent in Portugal to 95 per cent in Denmark, while for women who never had children, the proportion ranges from 47 per cent in Spain to 100 per cent in the Netherlands.

As well as highlighting the immense differences between countries, these graphs also illustrate a problem with estimating the determinants of living alone for the ‘social democratic’ group of countries: namely, the tiny proportion of older women who live with their children or other people. Of the entire sample of women who have had children, all but 9 live alone in Denmark, and all but 13 live alone in the Netherlands. And of the sample of women without children, all but 3 live alone in Denmark and *all* live alone in the Netherlands. Because there is so little variation in the data, there is essentially nothing for the regressions to explain⁵. The ‘social democratic’ group of countries is therefore excluded from the pooled regressions which make up the bulk of this paper, which focuses instead on differences between the ‘Northern’ and ‘Southern’ groups. Estimates for Denmark and the Netherlands are presented where possible in the Appendices, but should clearly be treated with caution.



⁴ Graphs are based on ECHP 1994 (1995 for Austria). Germany and Austria, which lack data on fertility history, are included in these graphs by assuming that women who have ever been married have had children and those who have never been married have never had children.

⁵ Van Solinge (1990), who considers a younger age group and has a larger sample at her disposal, does find some variation in living arrangements in the Netherlands.

3. Methods and Conceptual Framework

Marginal Effects Probit

Reduced form probit equations are estimated, of the form

$$\Pr(\text{Live Alone}) = \Phi(\beta'x)$$

where Φ is the cumulative standard normal distribution, x is a vector of variables, and β is a vector of coefficients (see, for example, Greene 1991).

For ease of interpretation, coefficients are reported in the form of marginal effects at the mean⁶. Thus, a coefficient of 0.077 on a (continuous) income variable means that (at the mean), a one-unit increase in income is associated with an increase of 7.7 percentage points in the probability of living alone. Likewise, a coefficient of -0.066 on the ‘health hampers activity’ dummy variable means that at the mean, an individual with a limiting health problem is 6.6 percentage points less likely to live alone than someone in the base category (in this case, a person without a limiting health problem).

Older non-married women

The paper concentrates on women over the age of 70. Although several studies of living arrangements among the elderly include individuals as young as 55, restricting the sample to those aged 70 and older leads to analysis of a more homogenous group of women who may truly be considered as ‘elderly’, and for whom the policy questions raised earlier are most relevant. Additionally, restricting the age of the sample to 70-plus means that most of the individuals in the sample who live with others are doing this to some degree out of choice. A lower age limit would include in the analysis many women who live with their children not because of any decision they have made, but simply because their children have not yet left home. This is particularly important in the context of very late home-leaving in several Southern European countries⁷, where it is quite common for women in their sixties to have adult children still living at home.

The focus is restricted to *non-married* women for two main reasons. First, policy considerations, such as the risk of institutionalisation, the need for social services, and the risk of social isolation and exclusion, are less pressing for older people who live with a partner than they are for single people. Second, restricting the sample to non-married women means that living arrangements *after* widowhood become the focus of interest, rather than living arrangements *before* widowhood (which may change shortly after widowhood).

Finally, this paper concentrates on women rather than men. Although older non-married men are an important group for policy purposes, they are much less numerous than their female counterparts, accounting for only about one in six of the older non-married population in our sample.

Regressions are estimated separately for women who have had one or more children and those who have never had children. It is not uncommon to see these groups

⁶ In other words, a coefficient indicates the increase in the probability of living alone arising from a one-unit increase in the variable in question, evaluated for a hypothetical person for whom all variables are equal to the sample mean. See Stata Corporation (1999) for further details.

⁷ See Iacovou (1998)

pooled in regressions, but there are several reasons why it may be better to treat them separately. Firstly, although the decision under analysis for both groups is whether to live alone, the *alternative* to living alone is clearly different for the two groups. As Table 2 shows, those who have ever had children are far more likely to live with their children in later life (36 per cent) than with other people (3 per cent), while those who never had children only have the choice of living with other relatives or unrelated people. A second, related, problem with aggregating those with and without children, is that this restricts the estimated coefficients to be equal for the two groups, when the underlying processes may in fact be very different. For example, a significant coefficient on the number of children might have indicated only that those with any children are less likely to live alone than those with no children, and tell us nothing about the effect of the *number* of children for those who have had one or more children⁸.

TABLE 2: LIVING ARRANGEMENTS OF NON-MARRIED WOMEN OVER 70

	Living alone	Living with children	Living with other relatives or unrelated people	Sample Size
Had children	60%	36%	4%	3494
Never had children	81%	-	19%	1211

Source: ECHP 1994. All countries, except Germany and Austria where fertility data are not available.

Right hand side variables: Income

Most of the literature on older people's living arrangements views privacy as a 'good', which is purchased by those with sufficiently high incomes – in other words, other things being equal, higher incomes will be associated with a tendency to live alone (Michael et al 1980). Although different empirical studies in this field have used very different measures of income (personal income; household income; mean national or state income, and so on), virtually all studies, whether using aggregate time-series data or cross-sectional micro data, have found income to be associated with living alone. Carliner (1975) found income growth to be the most important factor in the post-war increase in living alone.

Some investigators (Burr and Mutchler 1993) have used a linear term in income; others (Carliner 1975; Macunovich et al 1995) have used a term in log income. However, thinking about the choices actually facing the older women in question, it is not clear that either of these specifications will be particularly good. Below some threshold where income becomes adequate to support independent living, living arrangements may vary very little with income; likewise, above a much higher upper threshold where income is sufficient to support independent living under virtually all conceivable circumstances, the effect of income may again be small. The effect of income on living arrangements might therefore tend to be concentrated in some

⁸ In fact it would be reasonably easy to overcome this problem by including the number of children as a series of dummies rather than a continuous variable, but this is not often done.

intermediate part of the income distribution. Michael et al (1980) report such an S-shaped effect for a sample of young unmarried males, while Wolf and Soldo (1988) find non-linearities in the effects of income on the living arrangements of older unmarried women, with a stronger effect at the lower end of the distribution, and little if any effect at the upper end.

This paper allows for non-linearities by using a spline function in income, with knots at the 25th, 50th and 75th percentiles of income in each country. This specification is reasonably parsimonious, while at the same time adequate to capture the essential shape of the income effect and its variations between countries. Rather than using personal income as reported in its original form to generate the spline function, the income percentile in which the older person is located *within the group of people over 70 in the same country* is used. As well as reducing the influence of outlying values for income, this controls to some degree for cost-of-living differences between groups of countries⁹.

The response of living arrangements to income may be different in different countries, depending on the average level of income in each country and on factors such as housing costs. In general, one might expect that in countries where average incomes are sufficient to allow for independent living, the main effect of income will be seen lower down the income distribution, while in countries where average incomes are lower, the main effect of income will be seen higher up the distribution.

The measure of income used to generate the income variables in this paper is total personal income. However, this measure of income may not be independent of living arrangements. In most countries in the 'Northern' group, an elderly person living with adult children is treated by the social security system as a separate unit for benefit assessment purposes. However, in some countries (Italy, for example)¹⁰ the assessment unit is the (extended) family rather than the individual. In this case, an older person living with her children may receive lower levels of means-tested social assistance than an older person in similar financial circumstances but living alone. This may bias estimated coefficients on income upwards at low levels of income. Without a more thorough investigation of social security systems in the EU, the extent of this difficulty cannot be assessed, but this possible source of bias should be borne in mind.

Health

Most studies using micro-data include some measure of health or disability as an explanatory variable, on the grounds that those with some functional impairment will need assistance with daily activities, which may best be provided by someone else in the same household. Such inputs of care may also be purchased in the marketplace, but in this case, for any given income level, a disabled individual will have fewer resources at her disposal for independent living.

Other things being equal, one would expect those in poor health, or with a disability, to be more likely to live with other people than those in better health; however, not all studies have found health or disability status to be negatively related to living alone.

⁹ The author also experimented with income splines based on personal income adjusted for purchasing power parity, and on income expressed as a proportion of mean income of over-70s in the country of residence; these results are discussed later in the paper.

¹⁰ See Commission of the European Communities (1991)

Mutchler and Burr (1991) find that poor health is significantly related to the probability of dying or being institutionalised but not to the probability of living with others; Wolf and Soldo (1988) find that disability is related to the probability of living with a child but not to the probability of living in another form of extended household. The somewhat ambiguous effects of health and disability may arise because of the difficulty of measuring these variables, and also because the effects of health may be confounded with those of age (discussed) below.

The effect of health status on living arrangements is likely to vary by country according to the availability of state assistance for older people living in their own homes. In some countries, home helps provide comprehensive services for elderly disabled people, free of charge or at very low cost. In these countries health or disability may have little relationship with living arrangements, while in countries with less comprehensive systems of home helps, they may be much more intimately related.

Kin availability

Clearly, whether an older woman lives with other people depends not only on her resources and preferences, but also on whether other people are available as co-residents. The more children an individual has had over her lifetime, the more likely it is that at least one of them will be suitable and willing to co-reside with the older person, and the number of children¹¹ may therefore be positively related to the probability of living with a child. This is borne out by several studies which include fertility variables (Burr and Mutchler 1992, 1993; Mutchler and Burr 1991). A number of authors suggest that the *characteristics*, as well as the *numbers*, of children, as well as economic factors such as the rate of unemployment among adult children, will also be important in determining living arrangements (Wolf & Soldo 1988; Aquilino 1990; Macunovich et al 1995). However, the ECHP does not have data on adult children which could be used in this way.

The effect of the number of children on living arrangements may vary from country to country, according to residential mobility. In places where people commonly move considerable distances for professional and other reasons, older people will be less likely to live near to any given child than in places where people tend to stay near to their place of birth. In these countries, older people with larger numbers of children will be more likely to have *at least one* child living close by, and one may therefore expect that the number of children will be more important as a predictor of living arrangements in countries with a high degree of residential mobility.

Kin availability will also be an issue for older people who have never had children, since their living arrangements will be affected by factors such as the number of living brothers or sisters they have, and whether they have a living parent. However, this data is not available in the ECHP, so kin availability is not included as a control for this group.

Other variables

Most studies in this area control for the age of the older person, and most find that 'older old' non-married people are significantly more likely to live alone than their

¹¹ Strictly, the variable of interest is the number of *surviving* children which people have, rather than the number of children which they have *ever* had. However, in the absence of information on surviving children, the latter variable is a reasonably good approximation of the former.

‘younger old’ counterparts (Van Solinge 1990; Mutchler 1992). However, in many studies only a linear term in age is included. Without allowing the effect of age to vary over the age range, it is possible that the age effect will be dominated by the greater numbers of people at the younger end of the age range, and if there is an opposite effect at the older end, with parents moving back in with children at very old ages *simply because they are old*, this may not show up as an effect of age, but be wrongly picked up as an effect of another variable related to advanced old age, for example, poor health. In order not to confound the effects of age and health, a quadratic rather than a linear term in age is used.

Marital history variables are included on the right hand side, and are assumed to be exogenous. Decisions on marital status (whether to divorce or re-marry, for example) do affect an older person’s presence in this sample, and in theory they may be taken simultaneously with decisions on living arrangements. However, as Table 3 shows, a large majority of women in this age group either made the decision to remain single many years ago, or remain married to a long-standing partner, or were widowed in what may be considered an exogenous event; it is therefore reasonable to assume that for this group marital history is fixed and marital and fertility variables are exogenous.

TABLE 3: PROPORTION OF WOMEN AGED 70 AND OVER WHO HAVE CHANGED THEIR MARITAL STATUS WITHIN THE LAST 5 YEARS

Marital status	Proportion of age group	Proportion changing status in last 5 years
Married	33%	<1%
Widowed	57%	21%
Divorced or Separated	2%	4%
Never married	7%	-

Source: ECHP 1994, all countries. Sample size: 15932 individuals.

Education is also included as a control variable (though several studies, such as Wolf & Soldo (1980), find no effect from education). Pooled regressions also include a set of dummies to control for country of residence. A variable indicating the degree of urbanisation of the individual’s community of residence was also included in the original specification, but there was no significant effect from this variable and it was dropped.

4. Data and descriptive statistics

The analysis in this paper is based on the European Community Household Panel (ECHP), a large-scale longitudinal survey set up by the European Union. The ECHP contains data on individual characteristics, incomes and expenditure, education, employment and unemployment, and various measures of life satisfaction.

In Wave 1, collected in 1994, the following countries took part in the survey: Denmark, the Netherlands, Belgium, Luxembourg, France, Germany, the UK, Ireland, Italy, Spain, Greece and Portugal. In Wave 2, collected the following year, Austria also took part in the ECHP.

This data set has several advantages. Because it is a household survey, it collects information on *all* members of respondents' households, which is particularly useful in the analysis of living arrangements. Because the same questions are asked in each country, results are directly comparable across countries. In addition, the ECHP is relatively large compared to some other data sets; Wave 1 contains information on over 9,000 males and over 12,000 females aged 65 and over.

One potential feature of the data which it is not possible to exploit at this stage, is its longitudinal nature. Although two waves of data are available for 12 countries, there are insufficient transitions in the data to make longitudinal analysis feasible (Iacovou 2000). Therefore, only data from Wave 1 of the survey is used, supplemented with data from Wave 2 for Austria, and with observations from Wave 2 for individuals in other countries for whom a complete interview was not obtained the previous year.

Table 4 gives Wave 1 sample sizes for each country¹², for men and women aged 65-74, and for men and women aged 75 and over.

TABLE 4: ECHP POPULATION AND SAMPLE SIZES

	Total Population (millions, 1994 LFS)	Women aged 70+	Men aged 70+
Denmark	5.1	446	329
Netherlands	25.1	530	423
Belgium	10.1	586	403
Luxembourg	0.4	101	59
France	56.1	945	667
UK	57.3	847	598
Germany	80.4	468	324
Austria	7.9	534	322
Ireland	3.5	512	464
Italy	56.3	997	724
Greece	10.2	917	675
Spain	38.8	1374	898
Portugal	9.8	924	686
Total	361.0	9181	6572

The first column in Table 4 gives the total populations of all the sample countries. These figures are given for information, and also because these are used to re-weight observations when analysis is performed using groups of countries rather than individual countries. It should be noted that because of this weighting procedure,

¹² Wave 2 sample sizes are given for Austria.

these multi-country analyses will reflect behaviour in large countries to a greater extent than small countries.

Although the sampling procedure in all countries was designed to be representative of the population as a whole, and the sample has been weighted in accordance with Census results for each country, one important issue arises which relates specifically to the older population as a topic of study. In many countries, a significant proportion of older people live not in private homes but in residential institutions. However, people living in residential institutions are not sampled at all in the ECHP. Thus, it should be borne in mind that strictly, the sample represents *those elderly people not in residential care*¹³, rather than the total population of elderly people.

Another point relating to the data is that complete data are not available for every country. For Germany and Austria, no data at all is available on fertility history, while in the Netherlands the data records whether respondents have had any children, but not how many they have had. Germany and Austria have therefore been dropped from the pooled regressions. However, modified regressions¹⁴ are estimated separately for the three countries in question, and presented along with the other single-country analyses in Appendices 1 and 2.

In addition to problems with fertility variables, there is no data in the German sample on age for individuals over age 70, and so for Germany the age variable has been dropped from regressions. Finally, the sample size for Luxembourg is so small that although this country has been included in the pooled regressions, single-country estimates are not presented.

Descriptions and means of variables used in regressions are described in Table 5.

¹³ OECD (1996) puts the average OECD figure for over-65s in residential care at less than 4.5 per cent for Italy, Portugal, Spain and Greece; 4.5-5.4 per cent for Austria, Belgium, France, Germany, Ireland and the UK; 5.5-6.4 per cent for Denmark; and 9 per cent for the Netherlands.

¹⁴ These modified regressions are carried out by dropping variables which are not available for any given country. In addition, in the absence of fertility history data, a different procedure is used for assigning women into the two groups. Anyone who is currently unmarried but previously married is assumed to have had children, while anyone who has never been married is assumed never to have had children. Using data from other countries to check the accuracy of this algorithm estimates that over 80 per cent of people are correctly assigned to the two groups in this way.

**TABLE 5: DESCRIPTION AND MEANS OF VARIABLES
FOR NON-MARRIED WOMEN OVER AGE 70**

	(1) Had children	(2) Never had children
Dependent variable		
Lives alone	60%	81%
Lives with children	36%	-
Lives with other people	4%	19%
Total number of children	2.62	-
Total children ever born to the person (co-resident children, plus those living elsewhere)		
Age in years	78.2	78.0
Education: Secondary school or better	11%	17%
Dummy taking the value 1 if the individual has finished secondary school or further education.		
Disabled	26%	25%
Answered “Yes, severely” to the question “Are you hampered in your daily activities by any chronic physical or mental health problem, illness or disability?”		
Marital Status Dummies:		
Widowed	95%	57%
Divorced / Separated	4%	2%
Never married	1%	41%
Income \clubsuit		
Total annual personal income, PPP equivalent, Euros $\clubsuit\clubsuit$	€7400	€8060
Also included:		
Country Dummies		
Sample size	3249	1127

Source: ECHP 1994, excluding Germany, Austria and Netherlands from column (1) and Germany and Austria from column (2)

\clubsuit The small number of women with any labour earnings have been excluded.

$\clubsuit\clubsuit$ These figures for income are given for information only. In the regressions, a 4-part piecewise linear function based on income percentiles is used.

5. Estimates: Women who have ever had children

Results from probit regressions using pooled samples for the ‘Northern’ and ‘Southern’ groups of countries are shown in Table 6.

TABLE 6: WOMEN WHO HAVE HAD CHILDREN
MARGINAL EFFECTS ESTIMATES FROM PROBIT REGRESSIONS
DEPENDENT VARIABLE: LIVING ALONE

	North	South	Difference
Total number of children	-0.030 ***	0.010	***
Age	0.280 ***	0.166 **	*
Age Squared	-0.002 ***	-0.001 **	*
Secondary school or better	0.028	0.103 *	
Health hampers activity	-0.032	-0.071 ***	
Divorced/ Separated	-0.140 ***	0.287 **	***
Never married	0.072	-0.205 **	*
Income: percentile			
x Lowest quartile	-0.054 **	0.002	*
x 2 nd quartile	0.101 ***	0.003	***
x 3 rd quartile	-0.019	0.037 **	**
x Highest quartile	-0.007	-0.026	
UK (base country for N)			
Belgium	-0.084		
Luxembourg	-0.319		
France	-0.079 ***		
Italy (base country for S)			
Ireland		0.009	
Greece		-0.020	
Spain		-0.092 ***	
Portugal		-0.119 **	
Observations	1218	2031	
P-value: joint significance	0.000	0.000	
Pseudo R-squared	0.085	0.039	
Log likelihood	-576.0	-1334.0	

Notes:

Sample of childless non-married women aged 70 or over, with no employment income.

‘Northern’ group = UK, Belgium, Luxembourg and France

‘Southern’ group = Italy, Ireland, Greece, Spain and Portugal.

Individual country regressions are presented in Appendix 1.

Coefficients on income variables are multiplied by 10.

Significance is shown by stars: * = significant at 10% level, ** = 5%, *** = 1%.

Number of Children

The prediction that people who had had more children in earlier years might be more likely to live with their children in later years is borne out for women in Northern Europe (for whom each extra child decreases the probability of living alone by 3 per cent). However, the same is not true for women in Southern Europe, for whom past fertility has no significant effect on the probability of living alone.

This appears to support the hypothesis that the number of children may be more important as a predictor of co-residence in countries with relatively high residential mobility (in this case, the Northern group), although more research would be needed before this could be asserted with any certainty.

It is possible that the significant effect of fertility in Northern Europe is a transitory phenomenon arising because people with large numbers of children tend to have had at least some of their children later in life, and therefore are more likely to have children who have still not left home but will leave home in the future. In the case of Northern European women, this would need significant numbers of women to have had children in their mid-thirties or later, and for those children to be still at home in their mid-thirties or later. This seems unlikely, and testing for this possibility by restricting the sample to older age groups does not affect the size of the coefficient.

Do individual countries follow the North/South pattern? In Northern Europe, the coefficient on fertility is positive for all countries, though significant only in Belgium and the UK. In Southern Europe, the individual countries are less homogeneous. There is a significant *positive* relationship between fertility and living alone in Italy and Portugal¹⁵ for women, but a significant negative relationship in Spain.

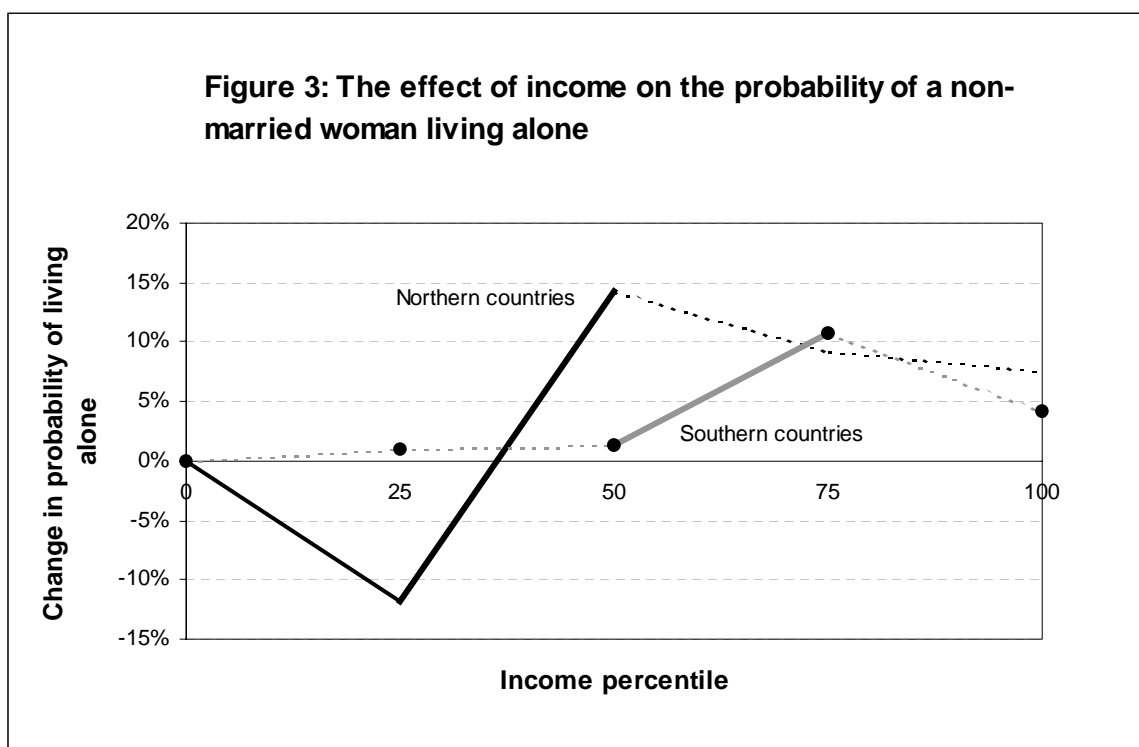
Income

For both groups of countries, there is a significant positive relationship between higher income and the probability of living alone over some, but not all, parts of the income distribution. The main effect is observed in the second quartile for women in Northern countries, and in the third quartile for women in the Southern countries. This is consistent with expectations, since incomes on average are higher (and therefore more adequate to support independent living) in Northern countries. The knots in the spline function at the 25th and 50th percentiles are significant at the 1 per cent level in Northern Europe, but in Southern Europe, none of the knots are significant at the 5 per cent level, and only the knot at the 75th percentile is significant even at the 10 per cent level.

However, there is some evidence for an S-shaped relationship between income and living alone for both groups of countries. This is illustrated in Figure 3, with the bold sections of each line representing the part(s) of the income distribution for which the relationship is significant at the 5 per cent level or more.

¹⁵ Interestingly, these are the two countries where there may be under-reporting of fertility in the ECHP: see Iacovou (2000).

Figure 3: The effect of income on the probability of a non-married woman living alone



This S-shape is also apparent under other specifications (a piecewise linear function in income as a proportion of average income of over-70s in the country of residence, and a piecewise linear function in income adjusted for purchasing power parity). Under these two alternative specifications, the results remain essentially unchanged, with the main effect of income observed in the second quartile in Northern Europe and in the third quartile in Southern Europe. However, because older people's incomes are so much higher in Northern Europe, the main effect of income is observed at a lower *level* of income in Southern than in Northern Europe. In Southern Europe, the main effect is seen in the range €4900 - €6600 per year, while in Northern Europe the main effect comes in the range €6000-€8100 per year.

These results make it clear that it is important to allow for non-linear income effects in this type of work, and the shape of the relationship suggests that using the log of income as a right hand side variable may not be appropriate. Additionally, attempts to re-estimate the regressions using a linear term in income also revealed problems. Not only did the linear specification miss the S-shaped relationship for both groups of countries, but more importantly, it missed any relationship at all between income and living arrangements for women in Northern Europe.

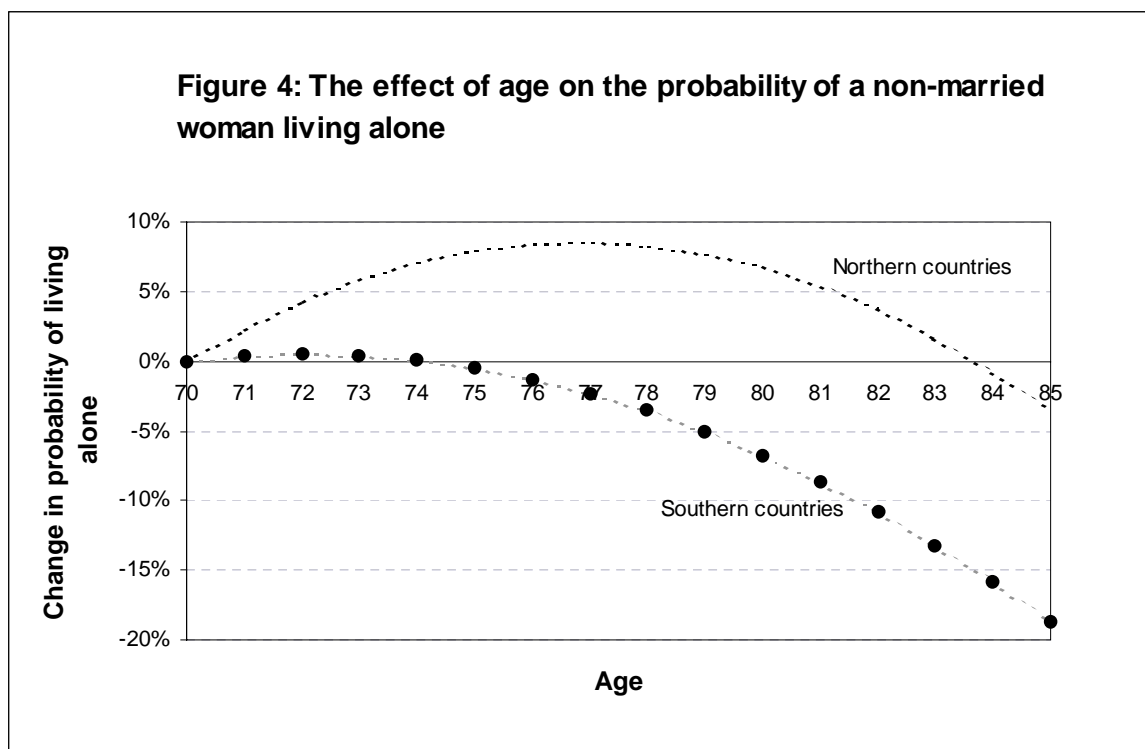
Health

We predicted that people who are hampered in their activities would be less likely to live alone, and that this effect would be stronger in those countries where there is less provision of support services for disabled older people living at home. For Northern countries, the relationship is in the 'right' direction, but is not statistically significant; for Southern countries, however, being hampered in daily activities is associated with a significant decrease in the probability of living alone, of around 7 percentage points. It is interesting to note that in line with our previous discussion, the group of

(Southern) countries where a strong relationship is observed between disability and living arrangements is the same group of countries where social spending (see Table 1) is lower.

Other variables

For both groups of countries, the probability of living alone increases with age until a certain point and falls again thereafter. The relationship between age and living alone is shown in Figure 4. In Southern Europe, the probability of living alone falls quite steeply after the age of 72, so that an 85-year-old is 20 per cent less likely than a 70 year old to live alone. In Northern Europe, by contrast, the probability of living alone only begins to fall after age 77, so that an 85-year-old is only slightly more likely than a 70-year-old to live alone.



Because the sample is made up mainly of widows with children, and most of those who do not live alone live just with their children, this decrease in living alone with age among the ‘older old’ is most likely due to older women rejoining their adult children at a faster rate than adult children are leaving their mothers’ homes¹⁶.

In the regressions where countries are grouped together, there is no evidence that the level of education is related to the likelihood of living alone. In general, this is also the case when countries are considered separately. In Austria and Germany, there is a positive and significant coefficient on the “secondary or better” variable, but in these countries the effect may arise because of a relationship between education and the (omitted) fertility variable, rather than a relationship between education and the propensity to live alone.

¹⁶ However, a selection effect may be involved, with those already living alone more likely to enter an institution than those living with other people, and thus being removed from the sample.

The coefficients on marital status are rather surprising. In Northern Europe, women who have divorced or separated are significantly less likely to live alone than women who are widowed, while in Southern Europe, being divorced is associated with a significantly *higher* probability of living alone. This result may be caused by the small proportions of women in this category (1 per cent in Southern Europe and 6 per cent in Northern Europe); or it may be that divorced women in Northern Europe are less likely to have lost contact with their families than those in Southern Europe. It may also be that a proportion of divorcees in Northern Europe are cohabiting with a partner, but reporting their partner as a 'non-relative' rather than a partner, though the coefficient is not changed by restricting the sample to those living alone or just with children.

There is no relationship between never having been married and living alone for women who have had children in Northern Europe, but in Southern Europe, never-married women with children are significantly less likely than widows with children to live alone. The numbers of never-married women who have had children are small (1-2 per cent in both groups), so this result may not be particularly important, but the more detailed discussion of never-married childless women in the next section may help with interpretation of the result.

Finally, there are differences between countries, even after controlling for a range of variables. In Northern Europe, older women in France are less likely to live alone than those in the UK, while in Southern Europe, older women in Spain and Portugal are less likely to live alone than those in Italy, Ireland and Greece.

6. Non-married women who never had children

Non-married (ie not currently partnered) childless women are very different from the women with children discussed in the previous section. For one thing, the group of non-married childless women is a good deal smaller (just over a third as large) than the group of non-married women with children. As Table 5 shows, non-married women without children are much more likely to be never married (41 per cent against around 1 per cent) and correspondingly less likely to be widowed (57 per cent against 95 per cent). The proportion divorced or separated is small in both groups. Women without children in this age group also tend to be better educated than women with children, and to have rather higher incomes.

TABLE 7: CHILDLESS WOMEN
MARGINAL EFFECTS ESTIMATES FROM PROBIT REGRESSIONS
DEPENDENT VARIABLE: LIVING ALONE

	North	South	Difference
Age	0.231 *	0.153	
Age Squared	-0.001 *	-0.001	
Secondary school or better	0.024	0.093 *	
Health hampers activity	0.016	-0.099 **	*
Divorced/ Separated	-0.089	-0.236	
Never married	-0.078 **	-0.219 ***	*
Income: percentile			
x Lowest quartile	-0.004	0.053	
x 2 nd quartile	0.054 *	0.008	
x 3 rd quartile	-0.016	0.013	
x Highest quartile	-0.002	-0.028	
UK (base country for N)			
Belgium	-0.001		
Luxembourg	-0.100		
France	-0.005		
Italy (base country for S)			
Ireland		-0.258 **	
Greece		-0.105	
Spain		-0.320 ***	
Portugal		-0.262 **	
Observations	378	756	
P-value: joint significance	0.000	0.000	
Pseudo R-squared	0.068	0.192	
Log likelihood	-129.0	-360.4	

Notes:

‘Northern’ group = UK, Belgium, Luxembourg and France

‘Southern’ group = Italy, Ireland, Greece, Spain and Portugal.

Individual country regressions are presented in Appendix 2.

Coefficients on income variables are multiplied by 10.

Sample of childless non-married women aged 70 or over, with no employment income.

Significance is shown by stars: * = significant at 10% level, ** = 5%, *** = 1%.

The decision faced by non-married women without children in older age is whether to live with other people or whether to live alone. Around 18 per cent of this group do in fact live with other people, and the data shows that this is mainly with siblings and other relatives, rather than with unrelated adults.

Regression results for this group of women are given in Table 7¹⁷. Many of the variables which were useful in explaining the behaviour of women with children do not have a significant effect for women without children. The coefficients on income are not significant, and neither are the coefficients on age (although in both Northern and Southern countries, the coefficients suggest that the probability of living alone increases until age 77 and decreases thereafter). Educational levels also appear to have no significant relationship with living arrangements for this group of women.

However, there is an observable effect from health, with women in Southern Europe 10 per cent less likely to live alone if they have a limiting health problem. In Northern Europe, the coefficient is insignificant (and oppositely signed), giving further support to the hypothesis that health is more of a factor in determining living arrangements in places where the provision of social services is more limited.

The variable with most explanatory power for this group of women is the 'never married' dummy: it is significant at the 1 per cent level in Southern Europe and at the 5 per cent level in Northern Europe (moreover, in the individual countries, the coefficient is significant in four out of five Southern European countries, despite the small sample sizes). A never-married woman without children in Northern Europe is 8 per cent less likely to live alone than a widowed woman, while a never-married woman in Southern Europe is 22 per cent less likely than a widowed woman to live alone. There is no corresponding effect from being divorced, although this may be because there are very few divorced women in this sample.

The fact that never having married is so strongly associated with living in a household with other people suggests that the decision to live with other people may be taken relatively early on in life among people not destined to marry, and that among this group, this is a relatively long-standing arrangement (unfortunately at this stage, data are not available with which to test this hypothesis). It also suggests that not many people move in with others *after* becoming single through divorce or widowhood.

If living with others tends to be a long-standing arrangement, this may also help to explain the lack of effect from other variables in this regression. If for the majority of women in this group, the decision to live with others was made many years ago, then current factors, such as the individual's present economic situation, will not be important in explaining living arrangements.

¹⁷ In Appendix 2, we also report regressions for individual countries, although in many cases the sample sizes are so small that the results are less than fully meaningful.

7. Combining two groups of women

Earlier in the paper, we argued on theoretical grounds that it may be important to separate the sample of non-married women into those who had children and those who were childless: combining the groups would (perhaps wrongly) restrict all the estimated coefficients to be the same for the two groups.

To test whether this matters in practice, the regressions in the previous sections were run on a sample combining both groups. Table 8, which presents selected coefficients from regressions using the separate and combined samples, demonstrates that problems do indeed arise by combining the groups.

**TABLE 8: COMBINED SAMPLE OF WOMEN WITH AND WITHOUT CHILDREN
MARGINAL EFFECTS ESTIMATES FROM PROBIT REGRESSIONS
DEPENDENT VARIABLE: LIVING ALONE**

	North			South		
	Combined Sample	Had children	Never had children	Combined Sample	Had children	Never had children
Number of Children	-0.033 ***	-0.030 ***		-0.036 ***	0.010	
Divorced/ Separated	-0.128 ***	-0.140 ***	-0.089	0.127	0.287 **	-0.236
Never married	-0.049	0.072	-0.078 **	-0.061 **	-0.205 **	-0.219 ***
Observations	1596			2787		
P-value: joint significance	0.000			0.000		
Pseudo R-squared	0.086			0.069		
Log likelihood	-710.8			-1797.3		

Notes:

‘Northern’ group = UK, Belgium, Luxembourg and France

‘Southern’ group = Italy, Ireland, Greece, Spain and Portugal.

Sample of childless non-married women aged 70 or over, with no employment income.

Significance is shown by stars: * = significant at 10% level, ** = 5%, *** = 1%.

In the ‘Northern’ group of countries, the negative and significant effect from being never-married (which is the most important determinant of living arrangements for childless women) is missed if the whole sample is considered together.

In the ‘Southern’ group of countries, where being never-married has a negative effect of around 20 percentage points on the probability of living alone for both women with and without children, this effect is substantially reduced (to around 6 percentage points) when the two groups are combined. Additionally, an insignificant coefficient on the number of children (for those who have children) becomes a significant negative coefficient when the groups are combined. It is clear that the effects of marital history and fertility history are confused when these two groups of women are analysed together, and this again supports the argument that they should be analysed separately, or at least that interaction terms should be used in regressions in order to obtain meaningful results.

7. Summary and Conclusions

This paper has analysed the determinants of living arrangements for elderly non-married women in Europe, and examined how these vary between three groups of countries: a 'social democratic' group, consisting of Denmark and the Netherlands; a 'Northern European' group, consisting of the UK, France, Belgium, Luxembourg and Germany; and a 'Southern European' group, consisting of Austria, Ireland, Italy, Greece, Spain and Portugal.

In the 'social democratic' group, there is very little variation in living arrangements, with all but a handful of women living alone. Because there is so little variation to analyse, none of the variables which are useful in explaining living arrangements for the other groups of countries are useful in explaining behaviour in Denmark and the Netherlands. Therefore, the paper focuses on the 'Northern' and 'Southern' groups of countries.

Health, or more accurately having a health problem which limits activity, is associated with a significantly lower probability of living alone in 'Southern' countries, but not in 'Northern' countries. This may be attributable to better provision of home-help services for disabled elderly people by the state in 'Northern' countries.

Income is significantly associated with living arrangements in both Northern and Southern countries for women who have had children, but not for childless women. In line with previous research, this study finds a positive relationship between income and living alone, although this effect is not evident throughout the income distribution. There is evidence for an S-shaped relationship between income and living alone, with the main effect coming in the second income quartile for women in Northern Europe, and in the third quartile for women in Southern Europe (where incomes tend to be lower).

The *number of children* that a woman has had over her lifetime is an important determinant of living arrangements for women in Northern Europe: in this group of countries, women who have had more children are significantly less likely to live alone in later life. However, in Southern Europe, there is no relationship between past fertility and living arrangements. I hypothesise that this may be related to greater levels of residential mobility in Northern Europe: in countries where any given child is less likely to live near an elderly parent and thus be available as a co-resident, the number of children becomes more of an issue in determining whether at least one child will be available to co-reside with an elderly parent.

There are also important effects from marital status, particularly for the group of women who never had children. For this group of women, marital history is the most important determinant of living arrangements, with those who never married much less likely to live alone than those who were previously married. This suggests that women who did not marry made their decisions about whether to live with other people relatively early on in life, while women who married but did not have children are unlikely to move in with other people after being widowed.

As well as examining the determinants of living arrangements, this paper highlights a number of methodological points. The issue of which specification to use for income in this type of work is discussed in some detail, and the implications of a number of different specifications are examined. The case is made for using a piecewise linear specification rather than a linear or logarithmic function, on the grounds that the

income function should be able to capture the S-shaped relationship between income and living arrangements which is theoretically likely (and for which, in this sample, there is empirical evidence).

Additionally, this paper argues that it is important to treat women who have had children as a separate group from childless women when examining living arrangements. On theoretical grounds, the choices facing the two groups of women are different; additionally, it is shown that analysing the two groups together may lead to estimated coefficients which are misleading at worst, or difficult to interpret at best.

This paper raises at least as many questions as it answers. A number of hypotheses have been advanced in the paper concerning the relationship between individual characteristics, social conditions and older women's behaviour in terms of living arrangements; several of these remain as open questions, awaiting further research.

Additionally, this paper has examined behaviour in a cross-sectional rather than in a dynamic context. At present, data is not available to study the dynamics of living arrangements in a cross-European framework. However, in the not too distant future, sufficient waves of data will be available in the ECHP to make longitudinal research of this kind a real and exciting possibility.

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APPENDIX 1: SINGLE-COUNTRY REGRESSIONS FOR NON-MARRIED WOMEN WHO HAVE HAD CHILDREN
MARGINAL EFFECTS ESTIMATES FROM PROBIT REGRESSIONS
DEPENDENT VARIABLE: LIVING ALONE

	Denmark	Netherlands	Belgium	France	UK	Austria	Germany	Ireland	Italy	Greece	Spain	Portugal
Total no. of children	0.004	-	-0.041 **	-0.016	-0.048 ***	-	-	0.013	0.047 **	0.020	-0.021 *	0.030 **
Age	-0.008	-0.006	0.316 *	0.389 ***	0.115	0.116	-	0.031	-0.097	0.211	0.350 ***	0.421 **
Age Squared	0.000	0.000	-0.002 *	-0.003 ***	-0.007	-0.001	-	-0.000	0.001	-0.001	-0.002 ***	-0.003 **
Secondary or better	-0.017	-0.000	0.065	0.022	0.015	0.190 ***	0.111 **	-0.064	0.022	0.139	0.392 ***	
Health hampers activity	-0.005	-0.000	-0.129 **	-0.054	0.008	-0.079	-0.169 ***	-0.332 ***	-0.072	-0.026	-0.084 *	-0.178
Divorced/ Separated	-	-	-0.227	-0.147 *	-0.121	0.233 **	0.167 **	0.042	-	0.039	-	-0.010
Never married	-	-	-	0.109	-	-	-	-0.319	-0.414	0.408	-0.192 *	-0.007
Income: percentile												
x Lowest quartile	-0.007	0.000	-0.213	-0.006	-0.119 ***	-0.037	-0.090	0.038	-0.113	0.112 ***	0.004	0.044
x 2 nd quartile	0.025	-0.000	0.040	0.108 ***	0.098 ***	0.109 **	0.166 ***	0.201 ***	0.049	0.031	-0.041	-0.084
x 3 rd quartile	-0.000	0.000	-0.034	-0.037	-0.003	-0.011	-0.093 **	0.034	0.083	-0.008	0.027	0.058
x Highest quartile	0.009	-0.000	0.043	0.029	-0.044	-0.038	0.099 *	-0.057	-0.061	-0.047	-0.011	0.109 *
Observations	220	205	258	495	411	300	272	232	236	484	695	376
Joint sig of coefficients	0.808	0.666	0.069	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.000	0.012
R-squared	0.060	0.215	0.064	0.080	0.120	0.099	0.159	0.203	0.062	0.053	0.054	0.046
Log Likelihood	-40.9	-10.6	-125.4	-258.1	-156.8	-165.5	-119.6	-127.4	-153.3	-316.6	-437.5	-238.0

Note: See Table 6 and discussion in Section 5 for details of specification, etc.

APPENDIX 2: SINGLE-COUNTRY REGRESSIONS FOR NON-MARRIED WOMEN WHO NEVER HAD CHILDREN
MARGINAL EFFECTS ESTIMATES FROM PROBIT REGRESSIONS
DEPENDENT VARIABLE: LIVING ALONE

6A: Women	Belgium	France	UK	Germany	Austria	Ireland	Italy	Greece	Spain	Portugal
Age	0.363	-0.019	0.442 **	-	0.780	-0.065	0.376 *	0.264	-0.343	0.361
Age Squared	-0.002	0.000	-0.003 **	-	-0.005	0.001	-0.002 *	-0.002	0.002	-0.002
Secondary or better	-0.126	0.082	0.007	0.056	0.418 **	0.103	0.095	0.054	-0.049	-0.015
Health hampers activity	0.025	0.085	-0.088	-0.323	-0.263	-0.236	-0.049	-0.029	-0.153 *	-0.277 **
Divorced / Separated	-	-0.313 *	-	-	-	-0.002	-0.267	-0.081	-0.237	-0.504 **
Never married	0.067	-0.151 **	-0.063	-	-	-0.308 **	-0.078	-0.283 ***	-0.349 ***	-0.532 ***
Income: percentile										
x Lowest quartile	-0.126	-0.033	0.004	-0.223	0.366 **	-0.084	0.122	0.033	0.035	0.027
x 2 nd quartile	0.064	0.054	0.065	0.088	-0.176	0.170	-0.026	-0.029	-0.015	0.221 ***
x 3 rd quartile	-0.024	-0.056	0.005	-0.020	-0.008	-0.030	0.001	0.079	0.036	-0.046
x Highest quartile	0.098	0.087	-0.059	0.052	0.167	-0.128	-0.004	-0.081	-0.036	0.028
Observations	84	131	133	27	42	92	156	137	193	178
Joint sig of coefficients	0.407	0.253	0.030	0.219	0.026	0.086	0.403	0.026	0.001	0.000
R-squared	0.143	0.128	0.192	0.339	0.327	0.135	0.085	0.140	0.110	0.371
Log Likelihood	-28.0	-42.7	-38.9	-8.1	-18.0	-53.0	-56.2	-62.6	-118.9	-73.5

Note: See Table 7 and discussion in Section 6 for details of specification, etc.

