

LTC determinants of care arrangements for older people in Europe: Evidence from SHARE

Valentina Hlebec, Faculty of Social Sciences, Kardeljeva pl. 5, 1000 Ljubljana

Faculty of Health Sciences, Zdravstvena pot 5, SI-1000 Ljubljana

E-mail: [valentina.hlebec@fdv.uni-lj.si](mailto:valentina.hlebec@fdv.uni-lj.si); corresponding author

Andrej Srakar, Institute for Economic Research, Kardeljeva pl. 17, 1000 Ljubljana

E-mail: [andrej.srakar@ier.si](mailto:andrej.srakar@ier.si)

Boris Majcen, Institute for Economic Research, Kardeljeva pl. 17, 1000 Ljubljana

E-mail: [majcenb@ier.si](mailto:majcenb@ier.si)

## **Abstract**

Apart from the needs and individual characteristics of older people, the social context of care determines the use of different types of care for older people aging in place. European countries differ considerably regarding the societal characteristics of care such as the availability of formal care as well as in the proportions of people receiving various types of care. We, therefore, explore the explanatory potential of the societal characteristics of care using a novel and significantly broader set of societal characteristics than used in the previous literature. We employ data from Wave 5 of the Survey of Health, Ageing and Retirement in Europe, and analyze the data using multinomial logistic models. We present several broad and novel sets of findings. In countries where the LTC system is most comprehensive, with universal access to public services, public services tailored to needs and not to means and services delivered via a single system, formal care or a combination of formal and informal care is more likely than informal care. Less involvement and lower national governance in the integration of home care policy decreases the use of formal care alone, and in combination with informal care. Higher integration and coordination in delivering home-care services increases the use of formal services. In countries with higher shares of reported barriers to using their long-term care systems there is a smaller probability of using formal services. The findings of the article significantly deepen our knowledge regarding the manageable characteristics of care arrangements from a social policy perspective.

**Key words:** aging in place, informal care, formal care, combined care, care context

Acknowledgement: Authors are grateful to Sandra Torres for comments on earlier version of the manuscript.

## 1. Introduction

Organizing care for older people is one of the most important issues in European countries due to the rapidly aging population, and characterized by a rise in the share of the elderly caused by longer life expectancy and declining fertility rates. The share of the population aged 80 years and over, which is the most likely to need care, grew from 1.5% in 1960 to nearly 5% in 2010, and is expected to rise to 11% by 2050 and 12% by 2060 in Europe (Health at a Glance 2013, OECD: 170; The 2015 Ageing Report, European Union: 40). The share of people aged 20–64 will decline substantially from 61% in 2013 to 51% by 2060 (*ibid.*). Thus, we can expect a big increase in the need for care on one hand, and a smaller number of potential informal carers on the other. Both trends are likely to place greater demands on formal care systems across Europe. The purpose of our study is to explore the relationships between the different types and combinations of care old people receive in European countries as well as the social context of care represented by characteristics of long-term systems and organization of home care using Wave 5 SHARE data (Survey of Health Ageing and Retirement in Europe). This will deepen our understanding of how the characteristics of long-term systems, the contextual characteristics of the provision of formal home care, and barriers to using long-term care services influence and shape older people's care arrangements across Europe.

The majority of older people wish to age in place and receive care in their own homes (e.g. Cantor, 1979; Iecovich, 2014). In 2011, in OECD countries 8.7% of people aged 65+ received care in their own homes and only 4.1% in institutions (Health at a Glance 2013:181). For people living at home, care can be provided by different parts of informal social networks like family members, friends or neighbors (e.g. Allen, Goldscheider, & Ciambone 1999; Blomgren, Martikainen, Martelin, & Koskinen 2008; Cantor 1979; Wenger 1994). Care can also be provided by formal care workers such as providers of health and social care or migrant care workers e.g. (e.g. Iecovich 2010; Shutes & Chiatti 2012; Stevens, Hussein, & Manthorpe 2012; Walsh & O'Shea 2010; Williams 2012). Further, formal care given to older people living in their own homes can be delivered by public or private providers (e.g. Colombo, Ana, Jérôme, & Frits 2011; Gennet, Boerma, Kroneman, Hutchinson, & Saltman 2012). Very often older people combine care from different sources, namely private and public care, formal and informal care, informal care by spouses, children and other informal sources (e.g. Gannon & Davin 2010; Litwin & Attias-Donfut 2009).

The type of care older people use depends on their preferences and their individual and social contexts (e.g. Andersen & Newman 2005). More specifically, some people prefer only informal care (e.g. Cantor 1979, 1991) and seek care first from their partners and children, then other family members, friends and neighbors. Only in cases where no informal caregivers are available would they accept formal care, provided they can afford it financially and depending on the range of services provided by the community. From this perspective, formal care may be seen as a substitute for informal care (Greene 1983; Penning 1995; Pezzin, Kemper, & Reschovsky 1996; Penning 2002). Other older people supplement informal care with formal care when their needs exceed the capacity of informal carers to provide care (Denton 1997; Edelman & Hughes 1990; Stoller & Pugliesi 1991). Formal care, therefore, may compensate for a lack of informal care and complement informal care when needs grow (e.g. Chappell & Blandford 1991; Denton 1997). Comparative research also documents the complementary role of formal care in the case of great need and the absence of an informal care network (e.g. Broese Van Groenou, Glaser, Tomassini, & Jacobs 2006; Litwin & Attias-Donfut 2009; Motel-Klingebiel, Tesch-Roemer, & Von Kondratowitz 2005), similarly to single-country studies (e.g. Chappell & Blandford 1991; Denton 1997).

Informal carers provide a vast amount of care to older people in Europe as shown by data from the European Quality of Life Survey (EQLS 2012, own calculations). About 6.4% (Denmark) to 20.1% (Lithuania) of the adult population in Europe provides care to their elderly or disabled relatives at least once or twice a week. On average, these family members deliver 12.5 hours of care to dependent family members. Care is frequently provided by spouses or children, sometimes also by friends and neighbors (e.g. Cantor 1979; Stoller & Pugliesi 1988; Allen et al. 1999; Barrett & Lynch 1999). Most European countries support informal carers with specific policy measures (e.g. Colombo et al. 2011; Mestheneos & Triantafillou 2005; Saraceno & Keck 2010). Support for informal carers encompasses a variety of services in cash and in kind, services specified for working carers and others (e.g. a carer's allowance, an allowance for the person being cared for, tax credits, additional benefits, paid leave, unpaid leave, flexible work arrangements, training/education, respite care, counseling). Elaborate and

abundant support for informal carers increases the likelihood of both informal care and combined informal and formal care, as shown by Suanet et al. (2012).

As we are looking at older people living in their own homes, the provision of public (or private) home care is another crucial dimension of the context of care. Formal care for older people may be delivered by health or social protection systems, it may be included in public and cost-free services delivered through a generous public Long-Term Care (LTC) system, charged according to the means of users, even entirely paid by the users themselves (Colombo et al. 2011; Gennet et al. 2012; Kraus, Czypionka, Riedel, Mot, & Willemé 2011). Several studies (e.g. Broese Van Groenou et al. 2006; Litwin & Attias-Donfut 2009; Suanet, Van Groenou, et al. 2012) have already revealed differences among European countries regarding the propensity of informal and formal care for people living in their own homes; however, none of these studies has looked closely at how home care is organized in specific countries and whether this significantly influences older people's care arrangements. We suggest that differences in how policymakers balance policy goals and resources in order to provide access and quality formal care in the community across countries and welfare systems (Gennet et al. 2012) may significantly influence the probable nature of older people's care arrangements in these countries. The way in which policymaking evolves and how it is shared between different levels of governance and across different ministries may reflect in cross-country variability in the use of formal services and combining of formal and informal care. In our opinion, better organized formal services, together with a higher degree of integration and coordination, should foster the usage of formal services alone and in combination with informal care in the respective countries.

Apart from support for informal carers, the organization of formal care, the social context of care includes other components. In a broad sense, the social context of older people's care is the welfare system and the social policies with which the state addresses the citizens' needs (Esping-Andersen 1999). When looking at the welfare context of older people's care, one should observe how much is spent by the state via LTC on institutional care and home-based care, how much is spent by individuals, how generous the pension system is, and how comprehensive the LTC system is (e.g. Bettio & Plantenga 2004; Colombo et al. 2011; Kraus et al. 2011; Roostgard 2002; Saraceno & Keck 2010). There are considerable differences in these characteristics across European countries (e.g. Colombo et al. 2011; Gennet et al. 2012; Kraus et al. 2011). At the same time, cross-national studies in Europe (e.g. Bolin, Lindgren, & Lundborg 2008; Broese Van Groenou et al. 2006; Motel-Klingebiel et al. 2005; Srakar, Hrast, Hlebec, & Majcen 2015; Suanet, Van Groenou, et al. 2012) have revealed substantial differences across European countries relative to the proportions of people receiving various types of care (informal only, formal only and mixed care) and the proportions of people with unmet care needs. Taking both into account, we assume that the LTC characteristics of the welfare context must have a significant influence on the ways older people arrange their care. More specifically, we suppose that in countries where the LTC system is most comprehensive, with universal access to public services, public services tailored to needs and not to means and services delivered via a single system, there should be a greater probability of using formal services or a combination of formal and informal services.

The last indication of how good the formal LTC system actually is at delivering services in specific countries is reflections on barriers reported by users themselves. The quality of services as perceived by those using them can also suggest how the formal LTC system is functioning in providing care to older people in need. We follow the concept of access, addressing several components of access such as availability, accessibility, affordability, and quality of services (e.g. Hlebec & Hrast 2015; Iecovich & Carmel 2009; Kuo & Torres-Gil 2001; Penchansky & Thomas 1981). We assume that experienced and reported barriers related to availability, accessibility, affordability, and quality of LTC care would be negatively associated with the likelihood of formal care and combined care in specific countries with more barriers reported. More specifically, in countries where the LTC system is expensive, services less available and difficult to access or of lower quality, there would be a lower likelihood of using formal services either alone or in combination with informal care.

The research questions we wish to address in this paper relate to the societal context of care. We assume that the characteristics of particular welfare systems may influence the care arrangements in different societies. More specifically, we would like to explore whether the care-related characteristics of the welfare state context, such as the organization and financing of a long-term care system, organization and provision of home care, and

subjective evaluations of the quality of long-term care services have a statistically significant effect on the types of care used by older people in European countries. To summarize, it is expected that in countries with more generous LTC systems, that recognize home care at the policy level (as well as via better organization and coordination of formal home care), the use of formal care alone or in combination with informal care would be more likely. Based on the Wave 5 of SHARE data we will estimate the shares of people (over 65 years old and living in their own home) who receive a specific type of care (no care, only informal care, only formal care, a combination of the two), and test the impact of the societal context of care, which has not yet been explored to such an extent.

We, therefore, want to test the following main hypotheses:

H1: In countries where the LTC system is most comprehensive, with universal access to public services, public services tailored to needs and not to means and services delivered via a single system, there should be a greater probability of using formal care or a combination of formal and informal care.

H2: In countries with better organized formal services, together with a higher degree of integration and coordination, formal care alone and in combination with informal care should be more likely than informal care.

H3: In countries where the LTC system is expensive, services less available and difficult to access or of lower quality, there would be a lower likelihood of using formal care either alone or in combination with informal care.

The structure of the article is as follows. In the next section we present the research design, dataset and methods used. In the third section, we present the results of the analysis and we conclude with discussion and limitations of the research.

## **2. Design and Method**

The data for this study are drawn from the final data version of Wave 5 of SHARE (the Survey of Health, Ageing and Retirement in Europe). In our analysis, we limited ourselves to respondents aged 65 or older, which limited the final sample to 34,756 respondents. Our sample included all 15 countries participating in Wave 5 of SHARE: Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Israel, the Czech Republic, Luxembourg, Slovenia and Estonia, but we excluded Switzerland and Israel due to missing comparative (and reliable) data for the societal characteristics variables.

With regard to the care arrangements, we included both formal and informal care and, concerning the latter, both care within as well as outside the household (also see Bolin et al. 2008; Broese Van Groenou et al. 2006; Litwin & Attias-Donfut 2009; Motel-Klingebiel et al. 2005; Suanet, Van Groenou, et al. 2012). Formal care is measured as a dichotomous variable which specifies whether a respondent has received either professional or paid nursing for personal care, domestic tasks, meals-on-wheels or help with other activities, in which case the variable has the value of “1”, and “0” if a respondent has received none of the above. Informal care is measured as a dichotomous variable, taking a value of “1” if a respondent has received either help within (responses to a question asking if there was someone living in the household who had helped him/her regularly during the last 12 months with personal care, such as washing, getting out of bed, or dressing) or outside (responses to a question asking if in the last 12 months any family member from outside the household, any friend or neighbor had provided him/her personal care or practical household help) the household; and “0” if a respondent has received neither. For the final variable on care arrangements, the two dichotomous variables for use of informal care and formal care were combined in a measure specifying the type of care arrangement. The four patterns are: 0 “no care use”, 1 “only informal care use”, 2 “only formal care use”, and 3 “a combination of formal and informal care use”.

Three types of individual determinants of care arrangements were included in our study, predisposing and enabling factors and need (e.g. Andersen & Newman 2005; Bookwala et al. 2004; Broese Van Groenou et al. 2006; Geerlings, Margriet Pot, Twisk, & Deeg 2005; Geerts & Bosch 2012; Suanet, Van Groenou, et al. 2012). Among the predisposing factors, we included age, gender, and years of education. Living alone and the

availability of a child within 25 km were used as proxy variables for the availability of informal care as an enabling factor. Among the enabling factors, we also included winsorized household income and settlement. Need was measured as functional limitations on a scale from 0–10 with regard to the number of the following limitations in daily life: walking 100 meters; sitting for about two hours; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing one flight of stairs without resting; stooping, kneeling, or crouching; reaching or extending your arms above shoulder level; pulling or pushing large objects like a living room chair; lifting or carrying weights over 10 pounds/5 kilos, like a heavy bag of groceries; picking up a small coin from a table. We measured depression as a dichotomous variable, with a value of “0” if the score on the EURO-Depression scale (Copeland et al., 1986); was less than 4 and “1” if the score was 4 or more. We measured chronic illnesses as a dichotomous variable, with a value of “0” if a respondent had less than two diseases; and “1” if he/she had two or more chronic diseases.

The welfare state context tackles four broad dimensions: financing and public spending on LTC, characteristics of the provision of home care, subjective barriers to use of the LTC system, and support for informal carers (e.g. Colombo et al. 2011; Gennet et al. 2012; Kraus et al. 2011). The data on LTC public expenditure as a share of GDP (OECD Health Statistics 2013) and private household out-of-pocket spending (OECD Health System Accounts Database, 2010) come from different years.

The scope of entitlement for LTC public support can be arranged on a universal vs. means-tested dimension, and whether the coverage is through a single system or multiple services and programs (Colombo et al. 2011, pp. 215, 216–220) (data gathered between 2009 and 2010). Three groups can be identified: 1 – universal coverage within a single program; 2 – mixed systems; and 3 – means-tested safety-net schemes. The third element of comprehensiveness (Colombo et al., 2011, pp. 235–238) evaluates how extensive public LTC protection compared to individual LTC costs is and varies from: 1 – means-tested, defined public contributions, 2 – cost sharing as residual, 3 – flat-rate cost sharing, and 4 – income and/or assets-related benefits. The degree of the overall level of national governance in regulating HC policy was measured in the following way: 1 – municipal, 2 – mixed regional/municipal, 3 – regional or mixed national/municipal, 4 – mixed national/regional, 5 – national. The overall level of national governance in the integration of HC policy was measured in the following way: 1 – two ministries, several schemes, 2 – two ministries, two schemes, 3 – one ministry, more schemes, 4 – one ministry. The strength of organizational integration was measured as (Gennet et al., 2012, pp. 36, 78): 1 – segregated, 2 – partly integrated, 3 – integrated; and the strength of formal coordination (ibid.: 78): 1 – hardly anywhere, 2 – in some areas, 3 – usually. Barriers to the use of formal services from the user’s perspective (availability, accessibility, affordability, quality) were evaluated with EQLS (2012, own calculations), asking four questions on either who used the LTC system or would like to have used it in the last 12 months, or who knew about it from someone else in their household or from someone close to them outside the household. The eligible respondents evaluated whether the costs, availability, access, or quality of care made it very difficult to use LTC services.

The dependent variable is categorical and encompasses different types of long-term care. Our categories for the dependent variable are therefore the following:

- Category 0 (reference category) – respondents with no help received;
- Category 1 (informal care only) – respondents receiving any type of informal, but not receiving formal care;
- Category 2 (formal care only) – respondents receiving any type of formal care, but not receiving informal care;
- Category 3 (formal and informal care) – respondents receiving a combination of both types of care, formal and informal.

Independent variables - predisposing, enabling, need and societal variables:

Age

Gender (0-male, 1-female)

Years of education

Living alone (0-does not live alone, 1-lives alone)

Child living in proximity (0-does not have a child within a range of 25 km, 1-has a child within a range of 25 km)

Household income (EUR, winsorized)

Settlement (0-rural, 1-urban)

Number of functional limitations

Depression (0-scoring less than 4 on Euro-Depression scale; 1-scoring 4 or more)

Chronic diseases (0-less than 2 diseases, 1-2 or more chronic diseases)

Societal characteristics

A multinomial logistic model was used in a model with four categories, where the reference category was Category 0 (respondents with no long-term care received). Multinomial logistic models (for more detailed elaboration see e.g. Long and Freese 2006; Hosmer and Lemeshow 2000; Agresti 1996) broadly fall into regression models for the analysis of categorical dependent variables with more than two response categories and can be considered as generalizations of logistic regression analysis to polychotomous data (see e.g. Rodríguez 2015). Simplest and most commonly used approach to multinomial data is to nominate one of the response categories as a baseline or reference cell, calculate log-odds for all other categories relative to the baseline, and then let the log-odds be a linear function of the predictors. Such analysis will be used in our article as well, completed with robustness checks using simple binary limited dependent variable models (logit, probit) for robustness check of the findings of the analysis.

Model:

$$\log \frac{\Pr(Y_i = j)}{\Pr(Y_i = 0)} = a_j + b_{1,j}X_1 + b_{2,j}X_2 + b_{3,j}X_3 + b_{4,j}X_4 + b_{5,j}X_5 + b_{6,j}X_6 + b_{7,j}X_7 + b_{8,j}X_8 + b_{9,j}X_9 \\ + b_{10,j}X_{10} + b_{11,j}X_{11} + b_{12,j}X_{12} + b_{13,j}X_{13} + e_{i,j} \\ j = 1,2,3,4$$

$Y_i$  – Category of the dependent variable (type of care)

$a$  – Constant

$b_i$  – Regression coefficients

$X_i$  – Independent variables

$e$  – Error

### 3. Results

We will first observe how countries differ with respect to the composition of individual and enabling characteristics of care arrangements on a descriptive level. This should give us an insight into the cross-national differences that may influence the occurrence of care arrangements for individuals living in these countries.

Table 1 about here

Table 2 about here

Table 3 about here



There are obviously large cross-country variations (Table 3) in proportions of “no care”, informal care only, formal care only, and combined informal and formal care. There are countries where nearly one-third of the population aged 65+ receives only informal care (Czech Republic) and others where only 8%–10% receives informal care (the Netherlands, France, Belgium, Luxembourg, and Sweden). In some countries, exclusively formal care is quite rare (less than 3.3%), such as Slovenia, Estonia, and the Czech Republic – all Eastern European countries. The percentage of combining informal and formal care is the lowest in Slovenia (2.8%) and the highest in Belgium (12%).

Table 4 about here

The coefficients of an individual’s characteristics and variance intercept refer to those estimated for the model incorporating the “co-reside” societal characteristic. “No care” is the reference category. We used multinomial logistic multi-level analyses to evaluate how much the differences in societal characteristics explain cross-national patterns of informal and formal care use. Given the small number of countries included in the analyses, we modeled each societal characteristic in separate models. There are significant variations across countries with respect to the four patterns of care (no care, informal care only, formal care only, combination of informal and formal care), namely, PseudoR-squared = 0.178, WaldChi2 = 8432.536 ( $p=0.000$ ), LogLikelihood = -19437.42,  $N = 25929$ . We tested the models for the independence of irrelevance alternatives (IIA) assumption using the Hausman and Small-Hsiao tests, as well as against combining and collapsing alternatives using the Wald and LR tests. No problems in any of the models were detected in the testing. We performed the analysis also on binary-variable probit and logistic models, where presence of each of the three alternatives against the reference Category 0 (respondents with no help received) was used as a dependent variable: Category 1 (informal care only); Category 2 (formal care only); Category 3 (formal and informal care). The results confirmed the sign and significance on all coefficients in the multinomial logistic models with only negligible discrepancies in the size of the coefficients on both societal as well as control variables.

As in other studies, the care patterns are determined by individual characteristics (Andersen & Newman, 2005; Bookwala et al., 2004; Geerlings et al., 2005; Geerts & Bosch, 2012; Suanet, van Groenou, & Van Tilburg, 2012).

In countries with higher public LTC spending and higher private LTC spending the likelihood of receiving only informal care is significantly lower. Having mixed public financial arrangements, as opposed to universal public funding, significantly increases informal care only, while having means-tested public financial arrangements decreases the likelihood of having informal care only. It seems that generous LTC financing reduces informal care, but so does higher private spending. In countries with more generous LTC public spending as a share of GDP and more generous pensions, there is a significantly higher likelihood of having formal care only, and combined care. As expected, in countries with higher out-of-pocket expenditure on LTC, there is a significantly lower likelihood of formal care only, and combined care. Both mixed and means-tested public LTC financing arrangements, as opposed to universal public LTC financial arrangements, significantly reduce the likelihood of using formal care only, and combined care. The effect is much stronger for means-tested arrangements than for mixed arrangements.

In countries with a higher level of policy regulation and integration of formal care as well as with a higher level of formally organized CH home care, informal care only is significantly less likely. On the other hand, a higher level of organizational integration is positively related to informal care only. The strength of involvement of policymaking in the area of HC, the overall level of national governance in integration of HC policy, the level of organizational integration and formal coordination within the HC system all seem to increase the likelihood of formal only and combined care across countries.

As expected, in countries with a bigger share of people experiencing barriers when using the formal LTC system, the likelihood of informal care only is higher. As expected, in countries where there is a higher percentage of people reporting barriers to the use of formal services (availability, accessibility, affordability, quality) there is a lower probability of formal care only, and combined care.

#### 4. Discussion

Several methodological issues should be outlined and specified. The time lag between the year of collecting the micro data (2013) and the other data, especially for the societal determinants of care arrangements, is considerable for some indicators, regardless of our efforts to provide the most recent data possible. As stated by Colombo et al. (2011), the majority of European countries have made significant changes in policy measures regarding their LTC systems, and this may reflect in contradictory effects for some societal characteristics. Further, the three indicators of societal characteristics (private household out-of-pocket expenditure, public LTC financing arrangements, and services for carers indices) have missing data, despite the goal of making the data sources as comprehensive as possible. We nevertheless included them in the regression models as we consider them very important for understanding the societal context of care arrangements.

Regardless of the methodological limitations, our findings corroborate a number of previous studies (e.g. Bookwala et al. 2004; Broese Van Groenou et al. 2006; Geerlings et al. 2005; Geerts & Bosch 2012; Litwin & Attias-Donfut 2009; Suanet, van Groenou et al. 2012). The individual components of the care usage, need, and availability of informal carers as an enabling factor strongly influence the use of any kind of care. In countries with more generously arranged LTC systems (where little payment is expected by users), the use of formal care alone or in combination with informal care is more likely.

This study has shown that specific characteristics of LTC systems (Colombo et al. 2011), contextual characteristics of home care (Gennet et al. 2012), and subjective evaluations of the quality of long term care services (EQLS 2012) determine care arrangements of individuals across European countries. The effect of these components is stronger on the usage of formal care and combined care than on the usage of informal care. The findings of this study contribute to existing knowledge on how characteristics of LTC influence care arrangements of older people by focusing on fragmentation of LTC systems in provision of services in community. In countries with fragmented long-term systems, awareness of the variety of services available to older people or their informal carers may cause the smaller use of formal services. On the other hand, the delivery of services via one integrated system may improve the efficiency of service delivery, prevent a cross-section of services within separate health and social services, and reduce the costs of care.

The organization of formal home care (Gennet et al. 2012) has an effect on use of formal care alone and in combination with informal care. The effect of the organizational contextual characteristics of home care on the usage of formal home care has been shown in a few national studies (e.g. Demaerschalk, Boer, Bronselaer, Molenberghs, & Declercq 2013; Hlebec 2014), but has not yet been verified in cross-national comparison. The contribution of this study has been to confirm the influence organizational characteristics of formal home care on usage of formal care and combined care across European countries. As hypothesized, a higher degree of integration and coordination promotes the use of formal services alone and in combination with informal care. We have shown that the fragmentation of this part of the long-term system is related to the low usage of formal services. Combining formal and informal care may be more important in the future as retirement ages across Europe increase. These findings suggest that with increasing demand for services owing to the aging population, the service delivery system should become more efficient and coordinated. This study supports the idea that the accessibility of formal services (Hlebec & Hrast 2015; e.g. Iecovich & Carmel 2009; Kuo & Torres-Gil 2001; Penchansky & Thomas 1981) has a significant effect on the use of these services across countries. In fact, user perceptions of barriers to access to the formal long-term system are indicative of the lower use of formal services, either alone or in combination with informal care. A lower quality formal care system in terms of higher costs, lower availability, limited access, and a lower quality of services negatively influences the use of such services across countries. These findings suggest that a key policy priority should therefore be aiming at reducing the barriers to access to long-term care system and facilitating combined care.

It is very difficult to determine whether the cultural norms or the absence of integrated, universally accessible, and a generous long-term system entailing the coordinated delivery of formal services to older people in their homes reduces the use of formal services alone or in combination with informal care in countries with a poorly developed LTC system. Decisions about different types of care are usually made in complex individual, family, community, and country contexts and may be better understood via in-depth qualitative inquiries taking everything into account at the same time. Further, the SHARE data will enable longitudinal observations to be

made concerning changes in the care arrangements of individuals, at least for a limited number of countries. This should give us further insights into how decisions about care are shaped by different LTC systems.

## References

- Agresti A (1996) *An Introduction to Categorical Data Analysis*. New York: John Wiley & Sons, Inc.
- Allen SM, Goldscheider F, Ciambrone DA (1999) Gender Roles, Marital Intimacy, and Nomination of Spouse as Primary Caregiver. *The Gerontologist*, 39(2), 150–158. <http://doi.org/10.1093/geront/39.2.150>
- Andersen R, Newman, JF (2005) Societal and Individual Determinants of Medical Care Utilization in the United States. *The Milbank Quarterly*, 83(4). <http://doi.org/10.1111/j.1468-0009.2005.00428.x>
- Barrett AE, Lynch SM (1999) Caregiving Networks of Elderly Persons: Variation by Marital Status. *The Gerontologist*, 39(6), 695–704. <http://doi.org/10.1093/geront/39.6.695>
- Bettio F Plantenga J (2004) Comparing Care Regimes in Europe. *Feminist Economics*, 10(1), 85–113. <http://doi.org/10.1080/1354570042000198245>
- Blomgren J Martikainen P, Martelin T, Koskinen S (2008) Determinants of home-based formal help in community-dwelling older people in Finland. *European Journal of Ageing*, 5(4), 335–347. <http://doi.org/10.1007/s10433-008-0094-4>
- Bolin K, Lindgren B, Lundborg P (2008) Informal and formal care among single-living elderly in Europe. *Health Economics*, 17(3), 393–409. <http://doi.org/10.1002/hec.1275>
- Bookwala J, Zdaniuk B, Burton L, Lind B, Jackson S, Schulz R (2004) Concurrent and Long-Term Predictors of Older Adults' Use of Community-Based Long-Term Care Services: The Caregiver Health Effects Study. *Journal of Aging and Health*, 16(1), 88–115. <http://doi.org/10.1177/0898264303260448>
- Broese Van Groenou M, Glaser K, Tomassini C, Jacobs T (2006) Socio-economic status differences in older people's use of informal and formal help: a comparison of four European countries. *Ageing & Society*, 26(5), 745–766. <http://doi.org/10.1017/S0144686X06005241>
- Cantor MH (1979) Neighbors and friends An overlooked resource in the informal support system. *Research on Aging*, 1(4), 434–463.
- Cantor MH (1991) Family and community: Changing roles in an aging society. *The Gerontologist*, 31(3), 337–346.
- Chappell N, Blandford . (1991) Informal and formal care: exploring the complementarity. *Ageing and Society*, 11(3), 299–317.
- Colombo F, Ana L-N, Jérôme M, Frits T (2011) *OECD Health Policy Studies Help Wanted? Providing and Paying for Long-Term Care: Providing and Paying for Long-Term Care*. OECD Publishing.

- Demaerschalk MF, Boer LEV, Bronselaer JL, Molenberghs G, Declercq AG (2013) The influence of municipal characteristics on the use of informal home care and home care services by the elderly Flemish. *The European Journal of Public Health*, 23(2), 241–246. Retrieved from <http://eurpub.oxfordjournals.org/content/23/2/241.short>
- Denton M (1997) The linkages between informal and formal care of the elderly. *Canadian Journal on Aging*, 16(1), 30–50.
- Edelman P, Hughes S (1990) The impact of community care on provision of informal care to homebound elderly persons. *Journal of Gerontology*, 45(2), S74–S84.
- Esping-Andersen G (1999) *Social foundations of postindustrial economies*. OUP Oxford. Retrieved from [https://www.google.com/books?hl=s1&lr=&id=1SVMSAbknpMC&oi=fnd&pg=PR8&dq=Espin+Anderson+1999&ots=5Rcf\\_RVqk7&sig=XaSFWNG3d0WRVeWbbI6bn8XVXLI](https://www.google.com/books?hl=s1&lr=&id=1SVMSAbknpMC&oi=fnd&pg=PR8&dq=Espin+Anderson+1999&ots=5Rcf_RVqk7&sig=XaSFWNG3d0WRVeWbbI6bn8XVXLI)
- Gannon B, Davin B (2010) Use of formal and informal care services among older people in Ireland and France. *The European Journal of Health Economics*, 11(5), 499–511. <http://doi.org/10.1007/s10198-010-0247-1>
- Geerlings SW, Margriet Pot A, Twisk JWR, Deeg DJH (2005) Predicting transitions in the use of informal and professional care by older adults. *Ageing and Society*, 25(1), 111–130. <http://doi.org/10.1017/S0144686X04002740>
- Geerts J, & van den Bosch K(2012) Transitions in formal and informal care utilisation amongst older Europeans: the impact of national contexts. *European Journal of Ageing*, 9(1), 27–37. <http://doi.org/10.1007/s10433-011-0199-z>
- Gennet N, Boerma W, Kroneman M, Hutchinson A, Saltman R (2012) *Home Care across Europe: Current structure and future challenges*. The European Observatory on Health Systems and Policies supports. Retrieved from [https://www.google.si/webhp?sourceid=chrome-instant&rlz=1C1CAFA\\_sISI667SI667&ion=1&espv=2&ie=UTF-8#q=Gennet+et+al+2012+home+care](https://www.google.si/webhp?sourceid=chrome-instant&rlz=1C1CAFA_sISI667SI667&ion=1&espv=2&ie=UTF-8#q=Gennet+et+al+2012+home+care)
- Greene VL (1983) Substitution between formally and informally provided care for the impaired elderly in the community. *Medical Care*, 21(6), 609–619.
- Hlebec V (2014) Individual and Contextual Determinants of Social Homecare Usage in Slovenia/Dispozicijski In Kontekstualni Dejavniki Uporabe Socialne Oskrbe Na Domu. *Slovenian Journal of Public Health*, 53(4), 311–317. Retrieved from <http://www.degruyter.com/view/j/sjph.2014.53.issue-4/sjph-2014-0034/sjph-2014-0034.xml>

- Hlebec V, Hrast MF (2015) Ovrednotenje dostopa do socialne oskrbe na domu z vidika uporabnikov. Evaluation of access to social home care: users perspective. *Teorija in Praksa*, 52(1/2), 48. Retrieved from <http://search.proquest.com/openview/7895a965f18dfa06b8e753e188ac36d0/1?pq-origsite=gscholar>
- Hosmer D, Lemeshow S (2000) *Applied Logistic Regression (Second Edition)*. New York: John Wiley & Sons, Inc.
- Iecovich E (2010) Tasks performed by primary caregivers and migrant live-in homecare workers in Israel. *International Journal of Ageing & Later Life*, 5(2), 53–75.
- Iecovich E (2014) Aging in place: From theory to practice. *Anthropological Notebooks*, 20(1), 21–33. Retrieved from [http://www.drustvo-antropologov.si/AN/PDF/2014\\_1/Anthropological\\_Notebooks\\_XX\\_1\\_Iecovich.pdf](http://www.drustvo-antropologov.si/AN/PDF/2014_1/Anthropological_Notebooks_XX_1_Iecovich.pdf)
- Iecovich E, Carmel S (2009) Differences in accessibility, affordability, and availability (AAA) of medical specialists among three age-groups of elderly people in Israel. *Journal of Aging and Health*, 21(5), 776–797. Retrieved from <http://jah.sagepub.com/content/21/5/776.short>
- Kraus M, Cypionka T, Riedel M, Mot E, Willemé P (2011) *How European Nations Care for Their Elderly: A New Typology of Long-Term Care Systems* (SSRN Scholarly Paper No. ID 2005018). Rochester, NY: Social Science Research Network. Retrieved from <http://papers.ssrn.com/abstract=2005018>
- Kuo T, Torres-Gil FM (2001) Factors affecting utilization of health services and home-and community-based care programs by older Taiwanese in the United States. *Research on Aging*, 23(1), 14–36. Retrieved from <http://roa.sagepub.com/content/23/1/14.short>
- Litwin H, Attias-Donfut C (2009) The inter-relationship between formal and informal care: a study in France and Israel. *Ageing & Society*, 29(1), 71–91. <http://doi.org/10.1017/S0144686X08007666>
- Long JS and Freese J (2006) *Regression Models for Categorical and Limited Dependent Variables Using Stata*. Second Edition. College Station, Texas: Stata Press.
- Mestheneos E, Triantafillou J (2005) *Supporting Family Carers of Older People in Europe-The Pan-European Background Report* (Vol. 1). Siglo del Hombre Editores.
- Motel-Klingebiel A, Tesch-Roemer C, Von Kondratowitz H-J (2005) Welfare states do not crowd out the family: evidence for mixed responsibility from comparative analyses. *Ageing & Society*, 25(6), 863–882. <http://doi.org/10.1017/S0144686X05003971>

- Penchansky R, Thomas JW (1981) The concept of access: definition and relationship to consumer satisfaction. *Medical Care*, 19(2), 127–140. Retrieved from [http://journals.lww.com/lww-medicalcare/Abstract/1981/02000/The\\_Concept\\_of\\_Access\\_\\_Definition\\_and\\_Relationship.1.aspx](http://journals.lww.com/lww-medicalcare/Abstract/1981/02000/The_Concept_of_Access__Definition_and_Relationship.1.aspx)
- Penning MJ (1995) Health, Social Support, and the Utilization of Health Services among Older Adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 50B(5), S330–S339. <http://doi.org/10.1093/geronb/50B.5.S330>
- Penning MJ (2002) Hydra Revisited Substituting Formal for Self-and Informal In-Home Care Among Older Adults With Disabilities. *The Gerontologist*, 42(1), 4–16.
- Pezzin LE, Kemper P, Reschovsky J (1996) Does Publicly Provided Home Care Substitute for Family Care? Experimental Evidence with Endogenous Living Arrangements. *The Journal of Human Resources*, 31(3), 650–676. <http://doi.org/10.2307/146270>
- Rodríguez G (2015) Generalized Linear Statistical Models. Course Materials. Princeton University, Fall 2015–2016. Retrieved from <http://data.princeton.edu/wws509/>
- Roostgard T (2002) Caring for children and older people in Europe—a comparison of European policies and practice. *Policy Studies*, 23, 51–68.
- Saraceno C, Keck W (2010) Can We Identify Intergenerational Policy Regimes in Europe? *European Societies*, 12(5), 675–696. <http://doi.org/10.1080/14616696.2010.483006>
- Shutes I, Chiatti C (2012) Migrant labour and the marketisation of care for older people: The employment of migrant care workers by families and service providers. *Journal of European Social Policy*, 22(4), 392–405. <http://doi.org/10.1177/0958928712449773>
- Srakar A, Hrast MF, Hlebec V, Majcen B (2015) 17 Social exclusion, welfare regime and unmet long-term care need: evidence from SHARE. *Ageing in Europe-Supporting Policies for an Inclusive Society*, 189. Retrieved from [http://www.degruyter.com/dg/viewbooktoc.chapterlist.resultlinks.fullcontentlink:pdfeventlink/\\$002fbooks\\$002f9783110444414\\$002f9783110444414-019\\$002f9783110444414-019.pdf?t:ac=product/462442](http://www.degruyter.com/dg/viewbooktoc.chapterlist.resultlinks.fullcontentlink:pdfeventlink/$002fbooks$002f9783110444414$002f9783110444414-019$002f9783110444414-019.pdf?t:ac=product/462442)
- Stevens M, Hussein S, Manthorpe J (2012) Experiences of racism and discrimination among migrant care workers in England: Findings from a mixed-methods research project. *Ethnic and Racial Studies*, 35(2), 259–280. <http://doi.org/10.1080/01419870.2011.574714>
- Stoller EP, Pugliesi KL (1988) Informal Networks of Community-Based Elderly Changes in Composition over Time. *Research on Aging*, 10(4), 499–516.

- Stoller EP, Pugliesi KL (1991) Size and effectiveness of informal helping networks: A panel study of older people in the community. *Journal of Health and Social Behavior*, 32(2), 180–191.
- Suanet B, Van Groenou MB, Van Tilburg T (2012) Informal and formal home-care use among older adults in Europe: can cross-national differences be explained by societal context and composition? *Ageing & Society*, 32(3), 491–515. <http://doi.org/10.1017/S0144686X11000390>
- Suanet B, van Groenou MB, Van Tilburg T (2012) Informal and formal home-care use among older adults in Europe: can cross-national differences be explained by societal context and composition? *Ageing and Society*, 32(3), 491–515. Retrieved from [http://journals.cambridge.org/abstract\\_S0144686X11000390](http://journals.cambridge.org/abstract_S0144686X11000390)
- Walsh K, O’Shea E (2010). *The role of migrant care workers in ageing societies: report on research findings in the United Kingdom, Ireland, Canada and the United States* (Report). International Organization for Migration - IOM Migration Research Series - No. 41. Retrieved from <https://aran.library.nuigalway.ie/handle/10379/3217>
- Wenger GC (1994) *Support Networks of Older People: A Guide for Practitioners*. Bangor: Centre for Social Policy Research & Development, University of Wales.
- Williams F (2012) Converging variations in migrant care work in Europe. *Journal of European Social Policy*, 22(4), 363–376. <http://doi.org/10.1177/0958928712449771>



Table 1: Individual determinants of care arrangements

Only 65+	Austria (n=2,361)	Germany (n=2,606)	Netherlands (n=2,152)	France (n=2,388)	Belgium (n=2,720)	Luxembourg (n=656)	Sweden (n=2,800)	Denmark (n=1,908)	Spain (n=3,650)	Italy (n=2,618)	Czech Republic (n=3,120)	Slovenia (n=1,516)	Estonia (n=3,381)	Total (n=33,500)
Gender (% female) <sup>a</sup>	57.1	49.7	52.4	58.3	55.3	50.2	52.1	52.4	53.5	52.4	58.6	58.0	61.9	55,0
Age (years, average) <sup>a</sup>	73.9	73.8	73.5	75.3	74.9	73.8	73.6	73.7	75.8	73.9	73.1	74.7	74.7	74,3
Education (years, average) <sup>a</sup>	6.8	11.8	10.8	9.7	11.8	11.0	10.7	11.7	8.6	7.7	11.8	9.7	10.6	10,5
Income (EUR, average, winsorized) <sup>b</sup>	3.801.0	3.340.8	2.812.2	3.274.7	3.249.3	7.367.7	3.361.2	3.056.8	2.331.8	2.732.3	1.067.2	1.672.8	868.2	2.799,6
Settlement (% urban) <sup>b</sup>	56.4	60.2	78.0	53.9	73.4	61.7	83.6	78.0	93.1	61.4	70.9	47.8	68.9	69,0
Lives alone (%) <sup>b</sup>	35.6	23.4	27.4	35.8	32.4	28.4	26.1	31.1	18.3	20.6	31.9	24.7	31.4	27,9
Has a child within 25 km (%) <sup>b</sup>	21.1	67.1	66.9	16.3	53.0	74.0	64.5	63.1	71.6	63.1	73.1	72.1	17.1	61,0
Functional limitations (average) <sup>c</sup>	2.2	1.9	1.4	2.2	2.2	2.1	1.3	1.4	2.8	2.5	2.3	2.7	2.9	2,1
Chronic diseases (% 2 or more) <sup>c</sup>	52.8	63.5	47.9	58.0	60.4	72.2	55.1	58.0	65.5	56.0	67.4	56.4	60.7	58,6
Depression (% 4 or more on EURO-D scale) <sup>c</sup>	22.1	23.7	17.0	37.7	29.6	29.2	18.8	16.4	34.6	40.0	27.8	29.3	41.4	28,5

a – predisposing factors, b – enabling factors, c – need



Table 2: Societal determinants of care arrangements

	Austria	Germany	Netherlands	France	Belgium	Luxembourg	Sweden	Denmark	Spain	Italy	Czech Republic	Slovenia	Estonia
<b>LTC public expenditure as share of GDP</b>	<b>1.2</b>	<b>1.0</b>	<b>3.7</b>	<b>1.8</b>	<b>2.0</b>	<b>1.2</b>	<b>3.6</b>	<b>2.4</b>	<b>0.7</b>	<b>1.9</b>	<b>0.3</b>	<b>1.0</b>	<b>0.2</b>
<b>Private household out of pocket expenditure</b>	<b>17.1</b>	<b>30.4</b>	<b>0.0</b>	<b>0.4</b>	<b>0.2</b>	<b>-</b>	<b>0.8</b>	<b>10.4</b>	<b>28.1</b>	<b>-</b>	<b>0.0</b>	<b>24.0</b>	<b>12.4</b>
<b>Public LTC Financing Arrangements</b>	<b>uni</b>	<b>uni</b>	<b>uni</b>	<b>mix</b>	<b>uni</b>	<b>uni</b>	<b>uni</b>	<b>uni</b>	<b>mix</b>	<b>mix</b>	<b>mix</b>	<b>mt</b>	<b>-</b>
<b>Regulation of policy</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>Integration of policy</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>Organizational integration</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>
<b>Formal coordination</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Difficult to use LTC / Cost</b>	<b>20.5%</b>	<b>26.1%</b>	<b>12.5%</b>	<b>27.3%</b>	<b>13.7%</b>	<b>25.0%</b>	<b>7.2%</b>	<b>4.7%</b>	<b>19.9%</b>	<b>28.1%</b>	<b>28.2%</b>	<b>43.6%</b>	<b>56.5%</b>
<b>Difficult to use LTC / Availability</b>	<b>22.1%</b>	<b>13.2%</b>	<b>17.0%</b>	<b>26.1%</b>	<b>15.7%</b>	<b>21.9%</b>	<b>15.9%</b>	<b>16.6%</b>	<b>27.6%</b>	<b>29.4%</b>	<b>30.8%</b>	<b>40.4%</b>	<b>40.3%</b>
<b>Difficult to use LTC / Access</b>	<b>10.0%</b>	<b>5.6%</b>	<b>12.1%</b>	<b>14.6%</b>	<b>4.5%</b>	<b>5.3%</b>	<b>7.8%</b>	<b>7.3%</b>	<b>13.5%</b>	<b>14.3%</b>	<b>15.0%</b>	<b>17.0%</b>	<b>31.1%</b>
<b>Difficult to use LTC / Quality of care</b>	<b>6.8%</b>	<b>11.2%</b>	<b>8.8%</b>	<b>8.6%</b>	<b>4.0%</b>	<b>3.7%</b>	<b>19.2%</b>	<b>8.6%</b>	<b>9.0%</b>	<b>13.6%</b>	<b>11.2%</b>	<b>11.9%</b>	<b>14.8%</b>

Regardless of the fact that three indicators (Private household out-of-pocket expenditure, Public LTC financing arrangements, Services for carers index) have missing data, we still included them in the regression models as we consider them crucial for understanding the societal context of care arrangements.

Table 3: Cross-country differences in the distribution of care arrangements

	<b>no care</b>	<b>only informal care</b>	<b>only formal care</b>	<b>combination</b>
<b>Austria</b>	69.08% (1631)	13.85% (327)	6.90% (163)	10.17% (240)
<b>Germany</b>	73.87% (1925)	12.24% (319)	5.22% (136)	8.67% (226)
<b>Netherlands</b>	72.63% (1563)	8.27% (178)	12.31% (265)	6.78% (146)
<b>France</b>	68.97% (1647)	9.42% (225)	11.64% (278)	9.97% (238)
<b>Belgium</b>	62.06% (1688)	10.18% (277)	15.81% (430)	11.95% (325)
<b>Luxembourg</b>	69.51% (456)	10.52% (69)	10.37% (68)	9.60% (63)
<b>Sweden</b>	79.50% (2226)	10.14% (284)	5.61% (157)	4.75% (133)
<b>Denmark</b>	68.82% (1313)	15.04% (287)	7.18% (137)	8.96% (171)
<b>Spain</b>	71.26% (2601)	14.33% (523)	7.26% (265)	7.15% (261)
<b>Italy</b>	74.56% (1952)	15.81% (414)	5.12% (134)	4.51% (118)
<b>Czech Republic</b>	60.93% (1901)	27.92% (871)	3.33% (104)	7.82% (244)
<b>Slovenia</b>	81.60% (1237)	13.92% (211)	1.65% (25)	2.84% (43)
<b>Estonia</b>	66.84% (2260)	19.28% (652)	3.05% (103)	10.83% (366)
<b>Total</b>	70.46% (24490)	14.24% (4948)	7.17% (2491)	8.13% (2827)

Table 4: Individual and societal determinants of care arrangements in 13 European countries (main effects model, multinomial logit)

	only informal	only formal	combination
	B	B	B
Constant	-5.374***	-11,046***	-11,830***
Gender	0.064	0,257***	0,103*
Age	0.031***	0,104***	0,099***
Years of education	0.028***	0,039***	0,040***
Income	-0.000***	0,000**	0,000
Settlement	-0.181***	0,055	-0,074
Living alone	0.882***	0,759***	1,078***
Child living in proximity	0.176***	-0,172***	0,005
Functional limitations	0.245***	0,267***	0,459***
Number of chronic diseases	0.188***	0,208***	0,561***
Depression	0.367***	0,369***	0,474***
LTC public expenditure as share of GDP	-0.166***	0,383***	0,150***
Private household out-of-pocket expenditure	-0.010***	-0,032***	-0,021***
Public LTC Financing Arrangements in OECD countries - MT/UNI	-0.625***	-3,093***	-2,116***
Public LTC Financing Arrangements in OECD countries - MIX/UNI	0.100**	-0,541***	-0,723***
Regulation of policy	-0.055***	0,226***	0,170***
Integration of policy	-0.063***	0,063**	0,149***
Organizational integration	0.249***	0,206***	0,289***
Formal coordination	-0.086***	0,413***	0,315***
Difficult to use LTC / Cost	0.001	-0,038***	-0,015***
Difficult to use LTC / Availability	0.008***	-0,061***	-0,037***
Difficult to use LTC / Access	0.005*	-0,066***	-0,029***
Difficult to use LTC / Quality of care	0.014***	-0,133***	-0,073***
PseudoR-squared	0.178		
WaldChi2	8.432.536		
LogLikelihood	-19.437.42		
N	25.929		

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01