

Mozhaeva, Irina

Article

Who cares? Evidence on informal and formal home care use in Estonia

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Who cares? Evidence on informal and formal home care use in Estonia

Irina Mozhaeva

Faculty of Business, Management and Economics, University of Latvia, Riga, Latvia

ABSTRACT

Despite increasing attention to long-term care (LTC) and related challenges in the Estonian social policy agenda, the distributional fairness of LTC services in the country has received very limited attention. Using SHARE data, we address informal and formal home care services and identify the socio-economic factors that drive or hinder their use among the Estonian elderly. The relationship between informal and formal home care utilization is estimated applying the new approach to instrumental variable method proposed by Lewbel [2012]. Using heteroscedasticity to identify and estimate mis-measured and endogenous regressor models. *Journal of Business and Economic Statistics*, 30(1), 67–80]. We find that it is important to distinguish among informal care provided by household members, other relatives and non-relatives because the same socio-economic factors might differentially affect the propensity to use these kinds of care. The estimation results indicate that informal care provided by non-relatives complements formal home care. LTC policy in Estonia ensures the absence of tangible financial, ethnic and urban/rural barriers to the use of formal home care.

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1. Introduction

Rapid population ageing is expected to pose various challenges for long-term care (LTC) systems all over Europe in the near future. The social and economic consequences will vary across countries depending on a number of factors, starting with old-age and care-dependency ratios and ending with the priorities defined by policy makers and the ability of responsible authorities to create sustainable LTC systems. Countries with generous LTC policies, such as Denmark, Netherlands and Norway, are predicted to experience substantial increases in public expenditures (EC, 2018), withholding the pressure on informal carers, while systems with high reliance on familial care, e.g. Estonia, Latvia, and Bulgaria, are expected to rein in public expenditure growth by paying the price of greater withdrawal of working-age informal carers from their labour markets, which will have non-negligible negative effects on these economies, especially in the face of diminishing numbers of younger entrants into labour markets and shrinking working-age populations.

CONTACT Irina Mozhaeva  irina.mozajeva@gmail.com  Faculty of Business, Management and Economics, University of Latvia, Aspazijas Boulv. 5, Riga LV-1050, Latvia

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Forecasts for Estonian demographics show that in the year 2030, the share of the population aged 65 and over will increase from the current value of 19% to a quarter of the population, implying a tangible increase in care-dependency ratios in the near future. These demographic trends in line with gradually growing disability rates already pose increasing burden on both informal and formal LTC in Estonia. Public (and private) expenditures on inpatient care have expanded significantly in recent years (World Bank, 2017), highlighting the need for more efficient integration of the health and social LTC sectors and increasing the role of less expensive home-based services that are found to reduce the utilization of institutional care (Kehusmaa, Autti-Rämö, Helenius, & Rissanen, 2013; Van Houtven & Norton, 2008). While the LTC system in Estonia is characterized by an unusually strong family responsibility, and familial care is expected to remain the backbone of the LTC system, the anticipated demographic changes will put enormous pressure on informal carers, implying substantial negative economic and social consequences if no political action is taken.

Although LTC and related challenges are high on the political agenda in Estonia, insufficient political and scientific attention is being paid to a related and important social issue – ensuring adequate, equitable access to LTC for all individuals based on their needs and independent of their socio-economic status. Examining the inequality aspect in Estonia is extremely important given very low public spending on LTC and one of the lowest coverage indicators in the EU, which is estimated at approximately only 1/3 of the care-dependent population (EC, 2015).

In this paper, based on the Survey of Health, Ageing and Retirement in Europe (SHARE) wave 6 data, we examine the association between socio-economic and need factors and utilization of informal and formal home care among the Estonian elderly aged 60 and over. We conduct our analysis in two stages. First, we examine the socio-economic and physical and mental health factors that drive or hinder the use of various kinds of informal care. Second, we analyse inequities in access to formal home care controlling for the use of informal care.

There is no united approach to analysing the causal relationship between formal and informal care. Many past studies were concerned with the effect of publicly provided LTC on informal care (e.g. Arnault & Goltz, 2013; Christianson, 1988; Langa, Chernew, Kabeto, & Katz, 2001; Motel-Klingebiel, Tesch-Roemer, & Kondratowitz, 2005; Stabile, Laporte, & Coyte, 2006; Viitanen, 2007). Another angle, i.e. the effect of informal care on the utilization of formal LTC services, was considered by Bolin, Lindgren, and Lundborg (2008), Bonsang (2009), Lo Sasso and Johnson (2002), Pezzin, Kemper, and Reschovsky (1996), and Van Houtven and Norton (2004), among others. Other authors have aimed at generalizing two-way substitution between informal and formal LTC (e.g. Chen, Yamada, Nakashima, & Chiu, 2017). Holly, Lufkin, Norton, and Van Houtven (2010) argue that differences in institutional settings across countries must be taken into account when defining the direction of causality in an analysis of informal care provision and formal home care.

Given the legislative framework of the LTC system in Estonia described further in this paper, we analyse the effect of informal care on the utilization of formal home care services, not the reverse. We follow previous research that has highlighted the importance of taking into account the endogeneity inherent to formal and informal care: while the decision to provide/seek informal care and the decision to use formal home care are simultaneously determined, failure to control for endogeneity may result in misleading

conclusions (Bolin et al., 2008; Van Houtven & Norton, 2004). In this research, exogeneity of the informal care variable was rejected (Rivers & Vuong, 1988); therefore, in our paper, the relationship between formal home care and informal care is estimated by applying an instrumental variable approach.

Research on the distributional fairness of LTC provision in Estonia, especially of the social components, is scarce. We have identified only one study by Bremer et al. (2017) that examines the utilization of informal and formal home care and their determinants and includes Estonia as one of the eight countries analysed; however, this study focuses on a narrow target group of persons with dementia. At the same time, high variability in population and LTC system characteristics across the European landscape implies substantial differences in the effects of socio-economic determinants on the utilization of LTC (e.g. Ilinca, Rodrigues, & Schmidt, 2017; Marcinkowska & Sowa, 2011); therefore, country-specific analysis is essential to disentangling the factors that hinder the use of LTC services and contribute to the existing inequalities within a country.

This paper extends the literature in two main ways. First, it fills a gap in country-specific information on the socio-economic determinants of informal and formal home care utilization in Estonia. Second, we propose analysing informal care by splitting it into three kinds based on the nature of the relationship between the caregiver and the recipient – informal care provided by (1) household members, (2) relatives not living in the same household and (3) non-relatives. Most authors analyse informal care using a single variable (e.g. Bakx, 2010; Balia & Brau, 2014; Bolin et al., 2008; Bonsang, 2009; Holly et al., 2010; Van Houtven & Norton, 2004), mostly reflecting care provided by descendants only. Others, including Litwin and Attias-Donfut (2009) as well as Marcinkowska and Sowa (2011), distinguish between care received within and outside the household; however, the latter encompasses assistance provided by relatives and non-relatives and is therefore not homogeneous in the sense that the two components are obviously driven and hindered by different underlying factors. Distinguishing between care provided by relatives within and outside the household is also important given that the content and intensity of these kinds of care usually differs considerably.

The approach adopted in this paper sheds light on some peculiarities of the determinants of informal LTC use, proposing that the same factors may affect the propensity to use various kinds of informal care in different directions. This approach also raises some important points on the association between informal and formal home care use in Estonia: our results suggest that informal care provided by non-relatives complements formal home care, while the effect of informal care provided by relatives, living either with the elderly person or separately, on the utilization of formal home care is not statistically significant. The obtained results suggest that despite low overall coverage, current social LTC policy in Estonia ensures equitable access to formal home care services among the elderly.

The remainder of this paper is organized as follows: Section 2 provides insights into the peculiarities of the organization of LTC in Estonia and describes public support for informal caregivers. Section 3 discusses the relationship between informal and formal home care and the endogeneity issue, and details the econometric methodology employed in this paper. Section 4 describes the data. The empirical results are presented and discussed in Section 5. Concluding remarks are provided in Section 6. The descriptive statistics are presented in the Appendix.

2. Background: LTC system organization in Estonia

The LTC system in Estonia is characterized by great reliance on informal care and an unusually strong family responsibility: the Constitution of the Republic of Estonia (Art. 27) stipulates that the family is responsible for taking care of its members in need of assistance. The family members who are required to provide such care include spouses and adult first- and second-degree ascendants and descendants (Family Law Act, 2009). If a person has no relatives or relatives cannot provide the assistance necessary for objective reasons, then state and local governments step in.

There is no care insurance scheme in Estonia. Responsibility for formal LTC provision in the country is shared by the health care and social welfare systems. Health care services are organized at the state level by the Estonian Health Insurance Fund (EHIF), whereas social LTC services are split between the state and local governments. As in many other European countries, the separation of funding streams between state and local governments provides little incentive to coordinate care between the health and social systems.

The social LTC system maintained by local governments offers general care home and day care centre services, home care, childcare, support person and personal assistance services, curatorship, transportation and housing services (Social Welfare Act, 2015). Municipalities can also ensure dwelling adaptation and provision of special equipment according to the needs of the disabled person.

Local governments are free to define their own policy for social LTC provision. The supply of these services is defined primarily by the social budget of each local government; therefore, the provision of social LTC is highly unequal across municipalities (World Bank, 2017). Due to strong budget limitations, social services are usually not advertised, and hence, public awareness of such opportunities is limited.

Depending on the policy of each municipality, eligibility requirements for some social LTC services, e.g. home care, do not necessarily include official disability status. This approach is based on the concept that the provision of LTC should not be strictly linked to the official disability group, thus the social LTC system in Estonia also covers persons with health deterioration, including frail elderly persons (World Bank, 2017).

2.1. Support for informal caregivers

Informal care can be considered the backbone of the current social LTC system in Estonia and is supported by local governments in the form of caregiver allowances. Most municipalities provide this type of benefit regardless caregiver-recipient kinship; however, some pay allowances only to non-relatives who provide a disabled person with necessary care. For example, in the case of incapacitated elderly persons,¹ some municipalities, including Pärnu city, Rakvere city, Haapsalu city, Lihula parish, and Saue parish, provide caregiver allowances only to carers who do not have family ties with the disabled person, thus targeting the most vulnerable elderly – those who do not have close relatives. The size of the allowance depends on the municipality, the disabled person's age and the severity of disability. In 2015, the monthly allowance for carers of retirement-age disabled persons ranged from 7 EUR to 200 EUR; allowances for carers of frail elderly persons without official disability status were available in approximately 1/10 of municipalities and

ranged from 15 to 70 EUR per month (World Bank, 2017). If a caregiver is registered with the Unemployment Insurance Fund as unemployed, the local government must pay a social tax for this person.

2.2. Formal home care

Formal home care usually is provided to persons with serious health deteriorations who live alone. The smallest standard package of home care services includes purchasing food once or twice a week and providing help with paying bills. As a rule, the price of this package is very low (a few euros) and can be adjusted if the person has a very low income; such payments do not cover the actual costs of care and are meant to stimulate the person to remain active and try to execute everyday activities independently. Nevertheless, some municipalities (e.g. Pärnu city) provide completely free home care services to persons who do not have any relatives. If necessary, more intensive and diversified help is provided to the disabled person: a social worker can, for example, clean the house, cook food, help with bathing, take the person to a doctor; however, services directly related to the duties of medical workers are not included.²

Local governments make a decision about the provision of home care services based on an assessment form (questionnaire) completed by a social worker or sometimes also by the person claiming for the service. In some municipalities, general physicians are involved in the assessment process; in others, such involvement is required only when a specific care plan is necessary. The service package and individual care plan is based on the results. Reassessment usually is carried out on an annual basis. The same assessment tool is, as a rule, used for the various social LTC services provided by a local government.

Due to the strict budget limitations of local governments, the provision of formal home care in Estonia is being expanded too slowly to meet the growing need for home-based services among the elderly, increasing the burden on institutional care and implying higher private and public expenditures (World Bank, 2017).

3. Relationship between informal and formal home care and endogeneity

3.1. Theoretical framework

Different LTC policies across countries result in not only varying coverage and distribution of services among socio-economic groups but also different associations between informal and formal home care. As Van Houtven and Norton (2004) note in their paper, whether formal and informal care are complements or substitutes is an empirical question. In the case of Estonia, this relationship is defined not only by the tightness of family and community ties, the level of altruism and the willingness to provide assistance to non-relatives but also by the adherence to principles and the strictness of local governments in deciding whether to provide social care services to elderly persons with families, for example, living in another municipality or region.

Holly et al. (2010) state that various institutional settings and markets for formal home care imply different incentives for both informal caregivers and the disabled; therefore, the direction of causality between informal and formal home care use can vary. The theoretical

framework proposed by Van Houtven and Norton (2004) is based on the assumption that incapacitated parents optimize their consumption of formal services given the amount of informal care provided by children. Conceptually, this framework does not suit the Estonian case for two related reasons: first, an additional decision maker – the local government – has to be introduced; second, in Estonia, elderly persons with children living in the same municipality are not usually eligible for formal home care. Nevertheless, in this paper, we assume the direction of causality from informal to formal care as this complies with the overall legal framework of LTC in Estonia that stipulates that the family is primarily responsible for those in need of care and that, in the absence of family, state and local governments step in (see Section 2).

As Bolin et al. (2008) highlighted, while the amount of informal care provided may be viewed as an outcome of a game between the elderly person and his or her relatives, one should take into account that the utilization of formal and informal care is endogenously decided. We tested the null hypothesis that informal care is exogenous in the formal home care equation (Rivers & Vuong, 1988); the hypothesis was rejected at the 7.6% level. Hence, the specification of our formal home care equation is formulated treating informal care as endogenously defined.

3.2. Econometric approach

In this paper, we analyse the association between formal home care and informal care applying models with two different specifications: in the first, a single informal care variable representing any kind of informal care received by a person is included in the formal home care equation, whereas in the second, the informal care variable is split into three parts according to the nature of the relationship between the caregiver and the recipient – informal care provided by (1) household members, (2) relatives not living in the same household and (3) non-relatives.

We did not manage to find good instruments that would simultaneously strongly correlate with the three informal care variables but not with the (estimated) error term of the formal home care equation. Therefore, we apply the approach proposed by Lewbel (2012) and employ the *ivreg2h* model implemented in Stata by Baum and Schaffer (2012) as an extension of Baum, Schaffer, and Stillman's *ivreg2* model (Stata J., 2003, 2007, 2010).

Lewbel's elaborated methodology serves to identify structural parameters in regression models with endogenous regressors in the absence of external instruments; this method exploits model heteroskedasticity and constructs instruments as simple functions of the available regressors. The Stata command *ivreg2h* written by Baum and Schaffer (2012) provides estimates for models using only external or generated instruments, as well as estimates using both the selected instrumental variables and generated instruments that supplement the external ones in order to increase the efficiency of the IV estimator. In this study, we rely on the *ivreg2h* option with the generated instruments.

In his earlier paper, Lewbel (2012) proposed the new method providing an estimator for models containing a continuous endogenous regressor, and in a recent work (Lewbel, 2018), he has shown that the assumptions required for his estimator can be satisfied when an endogenous regressor is binary, as in our case.

4. Data

This study uses micro data from the sixth wave (2015) of the Survey of Health, Ageing and Retirement in Europe (SHARE), a multi-disciplinary survey conducted biennially since 2004; it provides broad information on family networks, health, and economic and social conditions of the European population aged 50 and over. The survey design is harmonized with the US Health and Retirement Study and the English Longitudinal Study of Ageing, allowing for international comparison with Europe and the US.

The sixth wave of the SHARE covered 17 European countries and Israel, providing data on more than 68 thousand respondents. In this paper, we concentrate on the case of Estonia. A detailed description of the data, the content of the questionnaire and the fieldwork methodology is provided by Börsch-Supan et al. (2013).

4.1. Sample and dependent variables

The sample includes all individuals aged 60 or older surveyed in Estonia who personally completed the questionnaire or for whom the information was collected via a proxy interview, and whose LTC service utilization and socio-economic status (SES) could be identified in the database. Some values for SES and control variables have been imputed using the previous SHARE waves (wave 5 or otherwise wave 4) in order to maximize the sample size. The resulting sample consists of 4108 observations. The data set has a sufficient number of observations on users of formal care and informal home care services to ensure large enough cell sizes for the econometric analysis. Table A1 displays descriptive statistics for the variables used in the analysis.

4.1.1. Informal care

In this study, we split the informal care variable according to the nature of caregiver-recipient relationship and analyse care provided by (1) household members, (2) relatives not living in the same household and (3) non-relatives. We create three binary variables and estimate the associations between various socio-economic factors and the probabilities of using each of these three kinds of informal care. Information on the amount of care received within the household is not collected by the SHARE given the complexity of such estimates for respondents and, therefore, the substantial anticipated bias. Hence, in this study, the regularity of care is analysed only for informal care provided by relatives living separately and non-relatives. For this purpose, we create two ordinal variables where each is a discrete realization of several underlying ordinal indicators and describes the frequency of informal care received within the last 12 months: 0 – never received such care, 1 – less than once a month, 2 – approximately 1–3 times per month, 3 – approximately once a week, 4 – approximately 2–3 times per week, 5 – approximately daily or several times a day.

4.1.2. Formal home care

The formal home care measure includes only the social component of home-based services, i.e. it does not cover home nursing services. The variable encompasses professional care services such as help with personal care and domestic tasks in person's home, as well as other tasks such as help with drug dosages that an elderly cannot perform independently due to physical, mental, emotional or memory problems. The SHARE does not

include a question on the volume or regularity of home care services received. Therefore, we create a binary indicator of formal home care use, where the value 1 is assigned if the person received any of the above-listed home care services within the past 12 months and 0 otherwise.

The SHARE data do not distinguish between privately and publicly provided formal care; however, the survey includes a question on the sum a person paid for formal home care without being reimbursed by insurance. Given that there is no social LTC insurance scheme in Estonia, all related expenditures are covered out-of-pocket. In our sample, 87.9% of the Estonian elderly who used formal home care services within the past 12 months reported having zero or very low (up to EUR 40 per month) co-payments, and another 6.7% could not provide the information on the price paid. Based on this indirect evidence, we can assume that most elderly people who reported using formal home care received services provided by local governments, with a relatively small share using privately provided care.

4.2. Explanatory variables

The list of explanatory variables included in the empirical models comprises person's age, gender, household size, presence of a partner in the household, number of children, number of living siblings, level of formal education, equivalised household income (logarithmic), place of residence represented by two variables – rural area (dummy) and regional variable at the NUTS 3 level, language in which the interview was conducted as a proxy for ethnicity (Estonian vs other), self-assessed health (SAH) status, number of limitations with activities of daily living (ADLs) and instrumental activities of daily living (IADLs), mobility limitations, and memory. Given the high correlation between the ADL and IADL variables, we create a combined measure representing the sum of such limitations named by the person, while the number of mobility limitations is included as a separate parameter. The memory variable takes a value from 0 to 10 based on the number of words a person recalled out of 10 listed by an interviewer (delayed recall).

Access to social and health care services among the elderly depends not only on their own or their partner's income but also on their children's financial resources. While the SHARE database does not include information on the respondent's children's income (unless they live in the same household), it provides information on their employment status, which we use as a proxy for income – we create a dummy variable that takes the value 1 if at least one person's child is employed and 0 otherwise.

5. Empirical results and discussion

In this section, we discuss the results for informal and formal home care utilization among the Estonian elderly. Descriptive statistics of the dependent and independent variables are provided in [Table A1](#).

5.1. Informal care

[Table 1](#) summarizes the regression results for the use of informal care provided (1) by someone in the elderly person's household, (2) by relatives not living with the elderly

Table 1. Determinants of informal care utilization.

		Probability of informal care								Frequency of informal care			
		Within the household (subsample)		Within the household (full sample)		By relatives living separately		By non-relatives		By relatives living separately		By non-relatives	
		Coef.	Rob. S.E.	Coef.	Rob. S.E.	Coef.	Rob. S.E.	Coef.	Rob. S.E.	Coef.	Rob. S.E.	Coef.	Rob. S.E.
Age		0.011	0.007	0.014**	0.007	0.015***	0.003	−0.008 ^a	0.005	0.017***	0.003	−0.008*	0.005
Female		−0.007	0.099	0.078	0.092	0.067	0.054	−0.032	0.074	0.105**	0.052	0.004	0.071
Household size		0.035	0.065	0.384***	0.050	−0.190	0.041	−0.129**	0.065	−0.131***	0.041	−0.148**	0.065
Lives with a partner		−0.083	0.146	0.714***	0.131	−0.167**	0.067	−0.366***	0.101	−0.163**	0.065	−0.367***	0.097
Number of children (ref. cat: 0)	1	0.016	0.196	0.352*	0.198	0.560***	0.095	−0.525***	0.106	0.525***	0.091	−0.562***	0.103
	2	0.116	0.189	0.403**	0.198	0.625***	0.092	−0.357***	0.097	0.591***	0.088	−0.379***	0.095
	3	0.161	0.205	0.468**	0.218	0.610***	0.106	−0.671***	0.131	0.611***	0.101	−0.672***	0.129
	4 or more	0.232	0.229	0.339	0.248	0.598***	0.124	−0.667***	0.164	0.614***	0.120	−0.638***	0.165
Number of siblings alive		0.031	0.036	0.028	0.035	0.003	0.018	−0.046*	0.026	0.009	0.017	−0.044*	0.025
Education level (ref. cat: lower secondary or below)	Upper secondary	0.129	0.131	0.117	0.115	−0.011	0.062	−0.096	0.087	−0.034	0.058	−0.092	0.087
	Post-secondary non-tertiary	0.098	0.142	0.062	0.127	0.042	0.078	0.102	0.104	0.045	0.072	0.082	0.103
	Tertiary	0.350***	0.134	0.301**	0.127	0.033	0.072	0.007	0.100	0.005	0.067	0.006	0.099
Income (ln)		0.002	0.088	−0.051	0.075	−0.015	0.042	0.113*	0.066	−0.017	0.039	0.104	0.066
Rural		−0.171	0.121	−0.146	0.113	0.108*	0.057	0.234***	0.079	0.058	0.055	0.200**	0.077
Region (ref. cat: Northern Estonia)	Western Estonia	−0.085	0.180	0.006	0.161	0.349***	0.079	0.446***	0.107	0.342***	0.075	0.426***	0.106
	Central Estonia	0.119	0.171	0.161	0.165	−0.178**	0.088	−0.043	0.135	−0.093	0.087	−0.006	0.134
	Northeast Estonia	0.131	0.161	−0.094	0.147	−0.037	0.084	0.120	0.124	−0.046	0.078	0.104	0.123
	Southern Estonia	0.009	0.143	−0.085	0.121	0.250***	0.070	0.397***	0.096	0.241***	0.065	0.369***	0.095
Ethnic minority		0.239*	0.133	0.296**	0.118	0.097	0.069	0.036	0.103	0.085	0.063	0.050	0.101
Poor self-assessed health		0.296**	0.115	0.214**	0.102	0.163**	0.063	0.105	0.085	0.175***	0.059	0.112	0.086
Number of limitations with ADLs + IADLs		0.192***	0.023	0.142***	0.015	0.046***	0.011	0.029**	0.014	0.071***	0.011	0.04***	0.014
Number of mobility limitations		0.166***	0.022	0.172***	0.022	0.068***	0.012	0.041**	0.016	0.061***	0.011	0.042***	0.016
Memory		−0.027	0.024	−0.043**	0.022	0.035***	0.012	0.005	0.016	0.017	0.011	0.001	0.016
Constant		−3.551***	1.020	−5.006	0.920	−2.319***	0.478	−1.431**	0.687				
Number of observations		2838		4108		4108		4108		4108		4108	

Note: Estimations using probit and ordered probit. Asterisks *, **, *** indicate a statistically significant difference from a reference group at the 10%, 5%, 1% level, respectively. ^aAn effect is significant at the 11% level. Subsample of the elderly 60+ not living alone: n = 2838. Full sample of the elderly 60+: n = 4108.

person and (3) by non-relatives. Binary probit is used to estimate the associations between various factors and the probability of receiving these three kinds of informal care, while the regularity of care is analysed applying ordered probit.

The models for care provided by relatives living separately and non-relatives are estimated using the full sample of respondents aged 60 and over ($n = 4108$), whereas for care provided within the household, the main model is estimated based on the subsample of elderly people living with someone else, i.e. excluding persons living alone who cannot receive assistance within their household ($n = 2838$). One could argue that children (or other relatives) are more inclined to share households with incapacitated elderly parents (or relatives) who need intensive assistance, implying that the subsample defined may, to some extent, be seen as an outcome of the health condition of the elderly person, thus calling into question the interpretations of the estimated coefficients. To validate the interpretation of the results and our conclusions, we include in [Table 1](#) a model for care provided within the household estimated using the full sample of Estonian elderly persons.

As an additional check, the models for informal care provided by relatives living separately and by non-relatives have been estimated using the subsample of elderly persons not living alone. The obtained results are broadly consistent with the main ones and do not affect our conclusions.³

Women tend to outlive their partners and, at older ages, are more likely to have severe physical limitations. This at least partly explains why females, on average, utilize care from relatives living separately more intensively than males, despite having approximately the same chances of receiving assistance (other parameters equal).

In the case of care received within the household (the model is estimated based on the sample of elderly persons living with someone else, most often a partner or child), we find no statistically significant effect for either the partner variable or the number of children. This suggests that once a person lives with a relative (or relatives), the number of children and the presence of a partner per se become unimportant in the context of care provided within the household, because the family member or members who live with the disabled person take on the main burden.

As expected, living with a partner and in larger households is associated with a lower chance of receiving assistance from relatives living separately and from non-relatives. Elderly people who have two children, other parameters equal, have a higher probability of receiving care from family members living separately compared to their counterparts with three or more children; this suggests that in larger families, one of the children relatively more often prefers to move in with the elderly parent in order to provide decent regular help.

According to the Family Law Act (2009), sisters and brothers are not included in the network of relatives with a responsibility to take care of family members in need. We find that, in practice, the number of siblings does not have a statistically significant effect on probability and regularity of informal care provided by relatives, suggesting that in the case of disability, elderly persons in Estonia can rather rely on the support of their descendants, spouses or, in the absence of those relatives, on friends and neighbours, while siblings usually are not of much help. At the same time, persons who have siblings are less likely to receive informal care from non-relatives, which implies that the latter are not very motivated to help someone who has relatives.

Having tertiary education is positively related to obtaining informal care within the household; however, the effect on the probability and regularity of informal care provided outside the household (either by relatives or non-relatives) is not statistically significant. Well-off elderly persons are more likely to receive care from non-relatives, while the probability and regularity of care provided by family members does not seem to be related to income level.

Elderly persons living in rural areas have greater chances of receiving domestic help from someone outside their household (relatives or non-relatives). While the working age population is concentrated in cities, elderly persons living in rural areas live with their children less often compared to their counterparts in urban areas; therefore, other parameters equal, they more often receive help from descendants living separately. In the case of care from non-relatives, the positive effect of the rural area dummy can be explained by closer community relationships and better developed mutual support in rural areas compared to cities.

Other parameters equal, ethnic minorities are found to receive care within their own households more often than ethnic Estonians; at the same time, ethnic differences are not observed for the other kinds of informal care.

While physical health indicators such as the number of limitations in ADLs and IADLs, as well as mobility limitations, have statistically significant effects on the probability of receiving all three kinds of informal care, a more subjective indicator – self-assessed health – is found to be important only in the case of care provided by relatives. Poor memory is associated with a lower probability of informal care provided by relatives living separately since, in the case of substantially declining cognitive abilities, the elderly person is more likely to be taken into his or her child's household.

The model comparison summarized above indicates that the same socio-economic factors might differentially affect the propensity to use various kinds of informal care,⁴ indicating the necessity of disaggregating informal care according to the type of recipient-provider relationship.

5.2. Formal home care

Table 2 reports the results from the IV models for formal home care utilization among the elderly in Estonia. When informal care is included in the model as a single explanatory variable, the results suggest that informal and formal home care are complements. However, when the informal care variable is split based on the nature of caregiver-recipient relationship, i.e. informal care provided by (1) household members, (2) relatives not living in the same household and (3) non-relatives, we find that the effect for the two first variables is not statistically significant, and the strong positive effect is found only for care provided by non-relatives.

These results comply with the legal LTC framework in Estonia that places primary responsibility for care on family members but does not preclude situations in which a frail elderly person without family receives both informal care provided by non-relatives and formal home care provided by local governments. The absence of negative estimated effects for informal care provided by relatives can, to some extent, be explained by two factors. First, although local governments distribute their limited resources among the elderly living alone, they are not usually very strict and do not exclude from care provision

Table 2. Determinants of formal home care utilization.

		Model I		Model II	
		Coef.	Rob. S.E.	Coef.	Rob. S.E.
Informal care		0.038**	0.017		
Informal care provided within the household				0.024	0.028
Informal care provided by relatives living separately				0.027	0.018
Informal care provided by non-relatives				0.050**	0.021
Age		0.001**	0.001	0.001**	0.000
Female		−0.001	0.007	0.002	0.007
Household size		−0.001	0.005	0.000	0.005
Lives with a partner		−0.010	0.009	−0.002	0.008
Number of children (ref. cat: 0)	1	−0.027	0.017	0.001	0.015
	2	−0.031*	0.016	−0.009	0.014
	3	−0.022	0.015	0.001	0.016
	4 or more	−0.045***	0.016	−0.018	0.015
Number of siblings alive		−0.002	0.002	−0.001	0.002
Education level (ref. cat: lower secondary or below)	Upper secondary	−0.007	0.010	−0.012	0.009
	Post-secondary non-tertiary	−0.002	0.010	0.000	0.010
	Tertiary	0.004	0.011	0.006	0.010
Income (ln)		0.002	0.006	0.004	0.006
Rural		−0.013	0.008	−0.010	0.007
Region (ref. cat: Northern Estonia)	Western Estonia	−0.025**	0.011	−0.015	0.011
	Central Estonia	−0.009	0.011	−0.003	0.011
	Northeast Estonia	−0.027**	0.012	−0.019*	0.010
	Southern Estonia	−0.015	0.011	−0.010	0.010
Ethnic minority		−0.013	0.010	−0.007	0.009
Poor self-assessed health		0.019*	0.011	0.013	0.011
Number of limitations with ADLs + IADLs		0.010***	0.003	0.008***	0.003
Number of mobility limitations		0.007***	0.002	0.005**	0.002
Memory		0.000	0.002	0.000	0.001
At least one person's child is employed		−0.012	0.009	−0.008	0.008
Constant		−0.035	0.073	−0.077	0.067
Number of observations		4108		4108	

Note: Estimations using ivreg2 h (IV with generated instruments). Asterisks *, **, *** indicate a statistically significant difference from a reference group at the 10%, 5%, 1% level, respectively.

disabled elderly persons who have children who live in other municipalities or regions (See endnote 2). Therefore, although most (77%) Estonian elderly persons who used formal home care services reported receiving some informal care during the past 12 months, the latter was mostly provided by someone living outside the person's household. Second, some of the elderly who reported receiving both informal and formal home care were using privately provided professional services.

Our conclusions contrast with some previous studies that find that (in other countries) informal and formal home care are substitutes (Balía & Brau, 2014; Bolin et al., 2008; Greene, 1983; Holly et al., 2010). However, our results are consistent with Bonsang's (2009) conclusion: he proposes that as the disability level increases, the relationship between the two types of care may change such that they become complements. Due to strict budget limitations, local governments in Estonia target social LTC services to those who need them the most, i.e. severely handicapped persons. Only 5.5% of surveyed elderly persons in Estonia reported receiving formal home care during the last year, which is approximately 4 times lower than in Belgium, 3 times lower than in France and Israel, and more than twice as low as in Germany, Spain and some other SHARE countries (author's calculations based on SHARE data from 2015). The official data also indicate

very low coverage of publicly provided formal home care in Estonia: for example, in 2014, only 6.5 thousand Estonians received municipal home care (Ministry of Social Affairs data). Hence, given relatively poor population health indicators in Estonia on the one hand and low formal home care coverage on the other, the relationship between informal and formal LTC in this country may be different from that observed in countries with more generous LTC systems.

Elderly persons who have children, other parameters being equal, are substantially less likely to receive formal home care,⁵ while the presence of siblings, as in the case of informal care, plays no discernible role.

The effect of income level – both own income and that of one's children (estimated via proxy⁶) – on the use of formal home care services is not statistically significant. There can be two possible reasons or computational combinations behind this effect. In our data, formal home care is a mix of privately and publicly provided services; however, due to data limitations, distinguishing between these two types of care – private and public – is not possible. Nevertheless, indirect evidence allows us to assume that in our sample, elderly persons who reported using formal home care services mostly received publicly provided care, with a small share using privately provided services (for more, see Section 4.1.2). In Estonia, publicly provided social services are not means tested and the system of no or symbolic co-payments does not seem to create tangible barriers for less well-off elderly persons; thus, one may find zero income effect on the use of formal home care provided by local governments. In turn, privately provided home care services are available only to more affluent social groups, and we anticipate a positive income effect on the utilization of these services. However, the share of elderly persons who used privately provided social care is relatively small in our sample; hence, this effect could be neutralized by the zero effect observed for publicly provided formal care.

The second and intuitively more plausible explanation of the absence of an income effect on the utilization of formal home care is as follows. If a high income level is positively related to the use of privately provided social services and negatively related to the use of publicly provided formal home care, the overall income effect in our sample could be offset by these two opposite effects. Given that the SHARE data do not allow us to distinguish between privately and publicly provided home care, we cannot verify or reject either of these two possible explanations in this study.

We do not find evidence of inequity in access to formal home care related to ethnicity and education. Living in a rural area, other parameters equal, also does not seem to reduce the chances of accessing formal home care.⁷ Although the number of social workers and other specialists is very limited in small, rural municipalities and the social budgets of such municipalities are, on average, considerably lower than those of cities, social services are physically close to people and usually very well informed not only about all the disabled persons in their area but also about their needs thanks to close cooperation between GPs and social workers (See end note 2). The mentioned benefits of public LTC provision in small, rural municipalities in Estonia are expected to be negated by the administrative reform implemented in 2017. Before the reform, 169 of 213 Estonian municipalities had fewer than 5,000 residents; the measure formed 79 larger and stronger municipalities through mergers. At the same time, the reform is expected to have a number of positive effects, including more efficient resource planning and availability of more diversified LTC services in less densely populated areas.

We find that measures reflecting a person's disability status, such as limitations in mobility and activities of daily living, are strongly positively associated with receiving formal home care, while the effect of a more subjective indicator – self-assessed poor health – is less robust.

According to the obtained results, the effect of the memory variable is not statistically significant, suggesting that the system manages to cover persons with cognitive impairments, probably thanks to the proximity of social services to residents and cooperation with GPs, as well as the so-called 'neighbour watch' when a disabled person's neighbours alert social services about a need for assistance; this information channel was rather efficient in small municipalities (See endnote 2); however, its role is expected to diminish after the administrative reform. While cognitive scores among the elderly in Estonia are low compared to the average EU peer (World Bank, 2017), it is particularly important to maintain an LTC system that does not exclude persons with cognitive impairments.

6. Conclusions

Given that the Estonian LTC system is centred on informal care and public spending on social LTC as well as the associated coverage indicators are low, analysing the distributional fairness of LTC services is particularly important in Estonia. Using wave 6 of the SHARE, this study examines the socio-economic determinants of the utilization of informal and formal home care services among the Estonian elderly aged 60 and over.

We highlight the importance of analysing informal care by splitting it into different kinds based on the nature of the relationship between the carer and the recipient. In this paper, we distinguish among three kinds of informal care – care provided by (1) household members, (2) relatives not living with the elderly person and (3) non-relatives. This approach reveals that the same determinants affect the propensity to use various kinds of informal care in different directions. Such distinctions stem from a number of factors, starting with considerably different intensity and content of care that is usually provided to elderly persons within and outside the household and ending with varying incentives for care provision: while the legislative framework places the burden of care onto close family members, other relatives and non-relatives accept this burden voluntarily and are more often supported by local governments through caregiver allowances.⁸

Disaggregation of informal care according to the carer-recipient relationship also allows more accurate conclusions about the association between informal and formal home care. When using a single informal care variable, we find that informal care complements formal home care, which contradicts the overall LTC policy in Estonia in which public home care provision is conditional on the absence of familial care. However, when three kinds of informal care are included in the formal home care equation, a strong positive effect is observed only for assistance provided by non-relatives, whereas the effects for the other two kinds of care (provided by relatives) are not statistically significant.

The positive association between assistance received from non-relatives and the probability of formal home care use suggests that when the amount of the former is insufficient, a person seeks formal care. However, the legislative framework does not preclude the reverse consecution and, hence, causality between informal care provided by non-relatives and publicly provided home care could be reciprocal. Further research would be necessary to investigate the causal effects of these two sources of care.

The results of the developed formal home care models suggest that the currently defined social LTC policy in Estonia ensures equitable access to formal home care services: after adjusting for the need level, we find no tangible income-, ethnicity- or education-related inequities in formal home care utilization.

The absence of urban/rural disparities in access to formal home care indicates that the proximity of social services to clients in rural municipalities facilitated a more individual approach, which at least partly compensated for limited budget resources and a lack of specialized staff in small municipalities. The administrative reform implemented in 2017 is expected to allow more efficient planning and distribution of resources, and provision of more diversified social services in cases of need; however, it implies that local governments and social services are, on average, located farther away from the clients. Therefore, it is important to reassess the situation using data collected after the reform and related major reorganizations to determine whether the system managed to maintain equity in the provision of formal home care along the urban/rural dimension as well as along other dimensions.

Notes

1. In these municipalities, the policy defined for families of disabled children is different: parents (and other relatives) of disabled children are eligible for caregiver allowances.
2. Insights from site visits and interviews with local government and social service representatives conducted as part of the World Bank 'Estonia Long-Term Care RAS' project (January 2016).
3. These results are available upon request.
4. The analysis conducted with the full sample and subsample for all the three types of care indicates that the observed differentiated effects of some factors on various types of informal care do not stem from the different samples or from the selection bias discussed above.
5. If we exclude from the model the variable 'at least one person's child is employed', which correlates with the number of children, all categories of the number of children variable become statistically significant.
6. As for a person's equivalised household income variable, the proxy for children's income ('at least one person's child is employed') is not statistically significant in the formal home care model. To test the validity of the proxy variable, based on the SHARE data, we developed several models analysing the utilization of various social and health care services among the elderly. The proxy was proven to behave similarly to the person's equivalised household income variable – it has a strong significant effect with the same sign in the models that include the person's household income variable and it is not statistically significant in the models in which the person's household income is not significant.
7. Although the effect of the rural area dummy is statistically significant in the formal care equation with a single informal care variable (Table 2), it is not robust and becomes non-significant if the correlated covariate – at least one person's child is employed – is removed from the model.
8. In 2015, many municipalities in Estonia did not provide caregiver allowances to family members of disabled elderly persons and paid them to non-relatives only.

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Notes on contributor

Irina Mozhaeva is a researcher at the University of Latvia and an external consultant at OECD. She received her PhD in economics (subfield – econometrics) from the University of Latvia. Her research and publications focus on health economics, social policies, social inclusion, etc. She has participated in numerous World Bank and OECD projects in Latvia and Estonia, e.g. 'Estonia: Long-Term Care', 'Active Ageing', 'Developing a Health System Strategy for Priority Disease Areas in Latvia', 'Connecting People with Jobs', 'Investing in Youth: Latvia', 'Latvia: Who is Unemployed, Inactive or Needy? An Assessment', 'Latvia Public Expenditure Review 2010', as well as in the other national research projects.

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Appendix

Table A1. Descriptive statistics (part I).

		Weighted N	Share, %
Received informal care	1556.6	37.9	
Received informal care from household member/s	284.4	6.9	
Received informal care from relatives not living in the same household	1230.9	30.0	
Received informal care from non-relatives	354.8	8.6	
Frequency of informal care received from relatives living separately	never	2877.1	70.0
	less often than once a month	230.6	5.6
	1–3 times per month	321.9	7.8
	approximately once a week	309.2	7.5
	approximately 2–3 times a week	101.2	2.5
	approximately daily	268.1	6.5
Frequency of informal care received from non-relatives	never	3753.2	91.4
	less often than once a month	120.2	2.9
	1–3 times per month	84.5	2.1
	approximately once a week	98.4	2.4
	approximately 2–3 times a week	4.4	0.1
	approximately daily	47.2	1.2
Received professional homecare	225.2	5.5	
Age	60–69	1590.9	38.7
	70–79	1529.2	37.2
	80 and over	987.9	24.1
Gender	male	1354.7	33.0
	female	2753.3	67.0
Lives with a spouse / partner	1853.4	45.1	
Number of children	0	454.3	11.1
	1	1089.8	26.5
	2	1676.0	40.8
	3	586.3	14.3
	4 or more	301.6	7.3
Number of siblings (alive)	none or does not know	1606.0	39.1
	1	1300.1	31.7
	2	681.5	16.6
	3 or more	520.4	12.7
Education (ISCED-97)	ISCED 0–2 (pre-primary, primary or lower secondary)	1369.0	33.3
	ISCED 3 (upper secondary)	1268.5	30.9
	ISCED 4 (post-secondary non-tertiary)	614.8	15.0
	ISCED 5–6 (tertiary)	855.7	20.8

Table A2. Descriptive statistics (part II).

		Weighted N	Share, %
Rural		1220.8	29.7
Region (NUTS 3)	Northern Estonia	1187.9	28.9
	Western Estonia	589.5	14.4
	Central Estonia	500.3	12.2
	Northeast Estonia	550.9	13.4
	Southern Estonia	930.2	22.6
	NA	349.3	8.5
Household equivalised net income, EUR	below 2000	257.5	6.3
	2000–3999	989.7	24.1
	4000–5999	1811.8	44.1
	6000–7999	540.2	13.2
	8000–9999	200.2	4.9
	10,000 and above	308.6	7.5
Language of the interview	Estonian	3215.7	78.3
	Russian	892.3	21.7
Poor SAH		993.8	24.2
Number of limitations with ADLs and IADLs	0	2723.4	66.3
	1–5	1017.2	24.8
	6–10	243.7	5.9
	11–15	123.7	3.0
Number of mobility limitations	0	1316.2	32.0
	1–5	1992.4	48.5
	6–10	799.4	19.5
Memory (scale 0 – extremely poor to 10 – extremely good)	0	822.5	20.0
	1–3	1302.8	31.7
	4–6	1645.5	40.1
	7–10	337.3	8.2
At least one person's child is employed		2564.6	61.8