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Substitute services: a barrier to controlling long-term care expenditures

Mark Kattenberg
Pieter Bakx

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Affiliations
Mark Kattenberg – CPB Netherlands Bureau for Economic Policy Analysis
Pieter Bakx – Erasmus University Rotterdam

Summary

Substitute services: a barrier to controlling long-term care expenditures
In many developed countries, long-term care expenditures are a major source of concern, leading policy makers to consider interventions to reduce costs. However, long-term care financing is highly fragmented in most countries, and hence reducing overall costs can lead to spillover effects: spending reductions on one type of care may be offset elsewhere in the system when consumers shop around for substitutes. These spillovers may be substantial, as we show using a budget change by municipalities for the most common type of publicly financed home care in the Netherlands, namely domestic help. We show that this reform led to lower consumption of this care type, but that this reduction was mitigated by offsetting changes in the consumption of three other types of home care, as these are financed through another public scheme and organized through regional single payers. Hence, the total spending reduction is far less than the effect on domestic help would suggest. This finding leads us to conclude that the fragmentation of long-term care financing limits the ability to control expenditure growth.

Samenvatting

In veel rijke landen zijn stijgende uitgaven aan ouderenzorg een belangrijke bron van zorg en een aanleiding voor beleidsmakers om maatregelen te nemen om die uitgaven onder controle te houden. De organisatie en financiering van ouderenzorg is echter in vrijwel alle landen sterk gefragmenteerd, wat mogelijk leidt tot waterbed-effecten: bezuinigingen in een deel van het systeem leiden mogelijk tot verplaatsing van de zorgvraag en daarmee tot stijgingen elders. Die verschuivingen zijn mogelijk aanzienlijk en doen een groot deel van de kostenbesparing teniet. Om deze hypothese te toetsen analyseren we de gevolgen van een verandering van het budget dat Nederlandse gemeenten krijgen om de via de Wet Maatschappelijke Ondersteuning (WMO) gefinancierde huishoudelijke hulp – de meest gebruikte vorm van thuiszorg – te organiseren. De budgetverandering die we analyseren had gevolgen voor van huishoudelijke hulp, maar dit effect werd teniet gedaan door in de tegenovergestelde richting van het gebruik van via de Algemene Wet Bijzondere Ziektekosten (AWBZ) gefinancierde help. Het effect op de totale uitgaven aan ouderenzorg was daardoor veel kleiner dan het effect op het gebruik van huishoudelijke hulp doet vermoeden. Dit resultaat suggereert dat het onderscheid tussen WMO en AWBZ het beïnvloeden van thuiszorg-gebruik bemoeilijkte. Ook suggereert het dat coördinatieproblemen mogelijk nog steeds voorkomen in Nederland, want thuiszorg wordt nog steeds uit meerdere bronnen gefinancierd. Dit geldt ook voor andere landen waar de financiering en organisatie van thuiszorg gefragmenteerd is.

1. Introduction

Government involvement to ensure equal access to long-term care (LTC) and to limit personal financial risk is intense, and hence most spending on LTC is publicly funded, also in the US (OECD 2018). Rising expenditures on long-term care for the elderly (LTC) are a major concern in all OECD countries (OECD 2011). In the Netherlands, for example, rising LTC costs have been identified as the number one threat to the sustainability of overall public finances (CPB 2014). On top of this, the financing and organization of LTC is highly fragmented in virtually all these countries. This means that curbing spending growth requires concerted efforts by various organizations, whose incentives may not be well-aligned (OECD 2011; Bakx et al. 2015). Consequently, the appropriate amount and mix of home care services may not be achieved. This may also impact the use of other, more expensive types of care such as nursing home care and hospital care.

These spillover effects are evident when studying whether types of LTC financed from different sources act as substitutes.[1] The effect is likely to be the largest for similar types of LTC, i.e. among the various types of home care, rather than, for instance, between home care and institutional care. However, most earlier studies have estimated substitution effects between broad classes of LTC – formal home care, informal home care and institutional care – and between LTC and other types of health care (Ettner 1994; Pezzin et al. 1996; McKnight 2006; Stabile et al. 2006; Bonsang 2009, Orsini 2010; Weissert and Frederick 2013; Guo et al. 2015; Karlsberg Schaffer 2015; Gonçalves and Weaver 2017; Hollingsworth et al. 2017). These studies disregard substitution among different types of home care, possibly because survey data usually contain only limited details on LTC use.[2] Consequently, not much is known about the forces driving the composition of home care, despite the important role assigned to home care when it comes to containment of health care costs.

We fill this gap in the literature by studying spillovers across five types of home care (domestic help, individual assistance, group assistance, nursing, and personal care). Of these, domestic help is the most common type of home health care, which in the Netherlands is organized by municipalities. We study whether a reform in the grant for domestic help also affects the use of the other types of home care, which are

1 Cross-price elasticities of demand in other health care settings have been studied extensively since the 1970s (e.g. Hill and Veney 1970, Davis and Russell 1972, Helms et al. 1978). Most recent studies are about prescription drugs; see Goldman et al. (2007) and Glazer and McGuire (2012) for overviews of this strand of the literature.

2 Bonsang (2009), however, shows that informal care differentially affects different types of home care: it is a complement to nursing but a substitute for domestic help.

not organized by municipalities and financed through other schemes. Such spillovers may occur if individuals who do not get all the domestic help that they need request more of the other types to compensate for this. Evidence of such effects would indicate that changing the level of LTC spending by changing subsidies on one type of care at a time may not be very effective.

To this end, we use administrative panel data, as these contain many more details about home care use than typical household surveys. We observe the use of LTC provided at home (domestic help, individual assistance, nursing, and personal care) as well as the use of LTC provided outside the home environment (group assistance and institutional care). Moreover, we use that the magnitude of the reform of the subsidies for domestic help varied across the 400 Dutch municipalities, leading to substantial variation in care use within the country.

Our results suggest that the domestic help grant reform led to substantial spillovers to other types of home care targeted at the elderly population. This spillover effect means that the reform in the grant for domestic help had less effect on overall home care use than is apparent from studying the change in domestic help use alone. Also, the reform of the grant for domestic help did not affect total LTC expenditures: the change in spending on domestic help is cancelled out by decreases in the other types of LTC provided at home. Also, we cannot rule out the null hypothesis that aggregate LTC expenditures remained unaffected. As Belgium and Switzerland have the same split in home care funding as the Netherlands (Bakx et al. 2015), and as in many other countries LTC financing is split between separate schemes in other ways (OECD 2011), our findings suggest that similar spillover effects may occur in these countries too.

The remainder of this paper is organized as follows. Section 2 discusses the institutional context. Next, we discuss the data and the empirical strategy (section 3) and the results (section 4). Section 5 puts our key conclusions in perspective and draws the implications

2. Home care in the Netherlands

In the Netherlands, virtually all LTC is publicly financed and organized. During the period studied (2007–2013), this was done through two schemes.[3] The first of these schemes was the Exceptional Medical Expenses Act (EMEA, in Dutch: *Algemene wet bijzondere ziektekosten*, *Awbz*), which provided universal and mandatory public LTC insurance, the second was the Social Support Act (SSA, in Dutch: *Wet maatschappelijke ondersteuning*, *Wmo*). These schemes were complimentary with regard to the types of care covered: domestic help was paid for through the SSA and organized by municipalities, the other types of home care and institutional care through the EMEA.

In both schemes, the main way care demand is restricted is through eligibility assessments. Individuals who want to use home care or institutional care put in a request for an eligibility assessment at either the independent agency that is responsible for the assessment for EMEA-financed care, at the municipality for SSA-financed care, or both. The contents of these assessments differ, and they are carried out separately. The EMEA and SSA furthermore differ in the way the care is funded and providers are contracted. Table 1 provides a summary of the institutional characteristics of both schemes.

This split in LTC financing came into place in 2007. Domestic help had been funded through the EMEA scheme but was made a responsibility of municipalities under the SSA in 2007. This change was intended to curb LTC expenditures (Tweede Kamer, 2004), and municipalities indeed kept use of domestic help in check as was intended: it increased by only 1% per year between 2007 and 2013, while total LTC spending increased by 30% over the same period (CBS 2014).

A major reason for this limited increase in spending was that municipalities were given the means and incentives to do so. The main way in which municipalities can reduce spending is by tightening the eligibility rules. Municipalities have considerable freedom in setting these rules so long as they adequately compensate individuals who cannot perform daily housekeeping activities on their own and who cannot rely on others in their network to do this. By law, municipalities do not have to provide domestic help if informal caregivers can assist the patient (Tweede Kamer, 2004). In addition, municipalities had an incentive to cut spending: they are compensated by an unconditional block grant, which may also be spent on other things (Ministry of the Interior, 2007).

3 Since 2015, LTC has been organized and financed through three schemes: the Long-Term Care Act, the Health Insurance Act and the SSA (CPB/SCP 2015).

Table 1: public LTC financing in the Netherlands

	Public LTC insurance	Public provision of LTC
Legal basis	Exceptional Medical Expenditure Act	Social Support Act
Period	1968–2015[a]	Since 2007
Home care benefits (2013 spending in billions of euros)[b]	Nursing (0.447), personal care (2.144), individual assistance (0.730), group assistance (0.490)	Domestic help (1.612)
Scheme also pays for:	Institutional care, long-term mental health care, assistance, and transportation	Social work, social policy, home adaptations
Funded through	Designated insurance premiums (73%), general taxation (18%), cost sharing (9%)	Lump sum grant paid from general tax revenues (80%), cost sharing (20%)
Organizer	32 regional single payers	408 municipalities (in 2013)
Financial risk	National government sets binding ceiling for care expenditures	408 municipalities determine expenditures on care
Eligibility decisions	10 regional offices of an independent agency, based on national guidelines	408 municipalities, based on local guidelines (as long as compensation for ADL problems is 'adequate')
Insured population	Universal	Universal

a Replaced by the Health Insurance Act (since 2006) and the new Long-Term Care Act.
b In-kind provision only. Source: CBS 2017, Zorgcijfers 2015

The grant reform

The grant that municipalities received for domestic help in 2007 was based on actual expenditures in 2005. Since 2008, the grant is calculated differently: a risk-adjustment formula is used to determine the amount that each municipality receives. The formula makes use of information about the composition of the population and the need for care, which can arguably not be affected by the municipalities themselves, or information from the regional single payers that organize the EMEA-financed care (see appendix for details). The grant reform that we analyze entailed a change in the *weights* of the risk-adjustment formula that was implemented in 2011. Specifically, the revised version attached more weight to indicators on income and health care demand and supply (Kattenberg and Vermeulen, 2017). This adjusted formula was announced in 2010 (Ministry of the Interior, 2010) following claims by municipalities in the eastern and southern parts of the Netherlands that the initial formula did not reflect demand for domestic help in their jurisdictions (see e.g. Notenboom et al., 2008). This reform led to redistribution of approximately €41 million among municipalities.

Potential for spillovers from a reform

Elderly persons in the Netherlands and others who need help[4] can use five types of home care[5] – domestic help, individual assistance, group assistance, personal care, and nursing– which enable them to continue to live at home despite their need for assistance. Elderly persons often use multiple types of home care: 50% of the elderly requiring personal care or nursing also receive domestic help (Jonker et al., 2007).

Domestic help is the most common type of home care: about 40% of home care is provided in this form. Persons receiving domestic help are provided assistance with house cleaning, grocery shopping, or cooking. People with mental disabilities are also eligible for domestic help when they need assistance in planning or organizing housekeeping activities. The latter form of domestic help can therefore overlap with individual assistance, a form of LTC in which patients receive *general* assistance in organizing their lives.[6]

Other types of LTC are personal care (i.e. assistance with daily activities such as getting dressed, showering, or assistance in eating), nursing (i.e. nursing tasks such as cleaning wounds or providing medicine), and group assistance (i.e. learning to perform daily activities despite functional limitations). Of these, personal care is closely related to domestic help, although the tasks involved formally do not overlap but are complimentary. For instance, cooking and laying the table fall under domestic help, while assistance with eating falls under personal care.

Because of these overlapping or complementary tasks, a change in the budget for domestic care may have spillover effects to personal care, nursing, and individual assistance. This may occur when an individual who is eligible for fewer hours of domestic help than needed or wanted requests to be eligible for other types of home care instead in order to make up for the deficit. Indeed, the majority of nurses who provide personal care, individual assistance, or nursing report that they sometimes perform housekeeping activities to lower the burden on informal caregivers when no immediate domestic help is available (Kuiken and Pronk, 2016). In addition, there may be an indirect effect on the use of other types of home care because increased domestic care use may help postpone a nursing home admission (cf. Guo et al. 2015), thus leading to an increase rather than a decrease of the use of other types of home care.

4 Neither of the schemes is exclusively for the elderly; nonetheless, 67% of all LTC spending goes to users aged 65 and over.

5 Table A1 in the Appendix contains the definitions of these types of care. Group assistance is not provided in the home of the care recipient and hence is, strictly speaking, not home care. Nonetheless, we include it here because it is closely related to the other types of home care and because it is funded and organized in the same way.

6 This overlap sometimes makes it difficult to distinguish whether someone is eligible for domestic help or for individual assistance (CIZ 2010).

3. Data and methods

Data

To study whether there are spillovers from domestic care to the other types of home care and to institutional care, we link administrative data at the municipal level. This is the level at which the reform that we study occurred. Information on the domestic help granted in 2007 and 2013 comes from the Ministry of the Interior (2007, 2014).[7] From this information, we calculate the effect of the reform on the per capita grant that municipalities receive. We do this by rescaling the grant using pre-reform population estimates to remove the influence of population changes (see methods subsection and appendix for details). This information is linked to data on the use of each type of home care (in hours per capita)[8] and use of institutional care (in days per capita) in these years from administrative records from the Central Administration Office. Furthermore, we link population characteristics and data on election outcomes that are used as a proxy for local preferences, from Statistics Netherlands and the Electoral Council, respectively.

Methods

To find out whether spillover effects are significant when changing the spending on a particular type of home care, we investigate how the change in the weights of the risk-adjustment formula used for the financing of domestic help in 2011 affected the use of each LTC category. We do so by estimating Equation (1) for each of the four types of home care. In this equation, the change in use (Δh_i) is explained by the change in the grant for domestic help caused by the reform between the years 2007 and 2013 (ΔG_i):

$$\Delta h_i = C + \beta \Delta G_i + E_r + \varepsilon_i \tag{1}$$

To estimate this relationship, we need to account for outside factors and general time trends. To deal with time-invariant differences at the municipal level, we first consider differences between 2007 and 2013. To deal with time-variant differences, we proceed in three steps. First, the constant C controls for time-variant effects that

7 Municipalities follow four-year electoral cycles; we use data from the 2006 and 2010 elections.

8 Except for group assistance, which is expressed in the number of four-hour shifts. Use of domestic help is observed in 2007, 2010 and 2013, whereas use of assistance is observed in the last six months of 2010 and over 2013. Other types of health care are observed in 2007 and 2013. Eight municipalities granted inhabitants the right to a clean house; as such, hours of domestic help are not recorded by CAO. These municipalities are dropped and therefore we have data on 400 out of the 408 municipalities.

are common to all municipalities, including national-level reforms.[9] The EMEA-region specific effects *Er* capture any deviation from this time trend at the EMEA-region level, which is the level at which regional single payers organize other types of home care. Second, to ensure that the grant estimate is not biased by unobserved changes in demand for LTC, we follow Kattenberg and Vermeulen (2017) and only use the part of the change in the grant for domestic help that is caused by the reform, ΔG_i (the appendix contains a detailed description of the reform).

The grant reform entailed a change in the *weights* of the risk-adjustment formula that is used to calculate the grant. This risk adjustment is based on indicators of need at municipal level. Over time, however, the population make-up of municipalities changes too, and thereby also the *level* of each need indicator. As we are only interested in the effect of the reform (i.e. the change in the weights), we need to remove the effect of the population make-up on the grant. Hence, we derive this ΔG_i in three steps. First, we calculate the size of the grant for domestic help that municipalities would have received in 2013 if their need indicators had remained at their 2005 values. To this end, we multiply the weights of the need indicators in 2013 by the levels of these indicators from 2005. Second, we scale these amounts to the total amount of grant money received by municipalities in 2013. Third, we subtract the amount of grant money received in 2007, which is also based on information from 2005, to compute the difference over time. Hence, the variable ΔG_i only contains the variation caused by the reform of the grant allocation and no variation caused by the change in local demand for LTC.[10]

Another advantage of analyzing the grant reform is that it did not affect the EMEA scheme directly; any effect on home care that can be attributed to the grant reform should run via changes in municipal policy. Third, as the reform itself might be targeted towards specific municipalities[11], we include in a series of robustness checks control variables for i) pre-reform demand for LTC and political preferences at the municipal level and ii) changes in these characteristics.[12]

9 All other health care is organized at the national level.

10 Data on assistance are only available for the years 2010 and 2013. For the analyses with the use of assistance as the outcome, the endogenous variable represents changes in the use of domestic help over these years. We use this variable with the reform in the grant for domestic help for the years 2007 and 2013.

11 For instance, Knight (2002) shows that US federal government grants for highways are biased towards states with a high demand for highways.

12 These changes may be influenced by the reforms, making them bad controls. They are therefore not included in the main specification (cf. Angrist and Pischke, 2008).

Equation (1) is a reduced form estimate of the effect of the reform on the five types of home care, which means we are agnostic about the adjustment processes driving the results.[13] The result could be driven by changes in the use of domestic help and the use of other municipal social services, plus there may be direct and indirect effects (e.g. through informal care or other types of formal care). Although we cannot separately identify the drivers of adjustments, the results are still informative as reforms in these type of grants are a major policy instrument for national governments in shaping the mix of home care that the elderly receive, especially in the context of home care, which is often organized at the local or regional level and financed through a patchwork of schemes (Bakx et al. 2015; OECD 2011).

13 It would be tempting to use the grant reform as an instrument for use of domestic help, However, the exclusion restriction for such a specification does not hold as municipalities are not obliged to spend additional funds on domestic help and may spend part of the money on other services for frail elderly persons.

4. Results

Descriptive statistics

Table 2 shows that the average per capita grant for domestic help rose by €3.48 per capita (3.8%). Part of this increase is caused by changes in the make-up of the population, as illustrated by the lower average grant change of (€2.48 per capita on average). This average amount masks substantial changes at the municipal level, however, as for some municipalities the reform caused a grant change of more than €40 per capita (Figure 1).

Trends in use differ by care type. Use of domestic help rose moderately on average, whereas personal care use and group assistance increased strongly and use of nursing fell substantially. The use of individual assistance hardly changed.

Figure 1: Distribution of the effect of the reform on the grant that municipalities receive for domestic help (2007-2013)

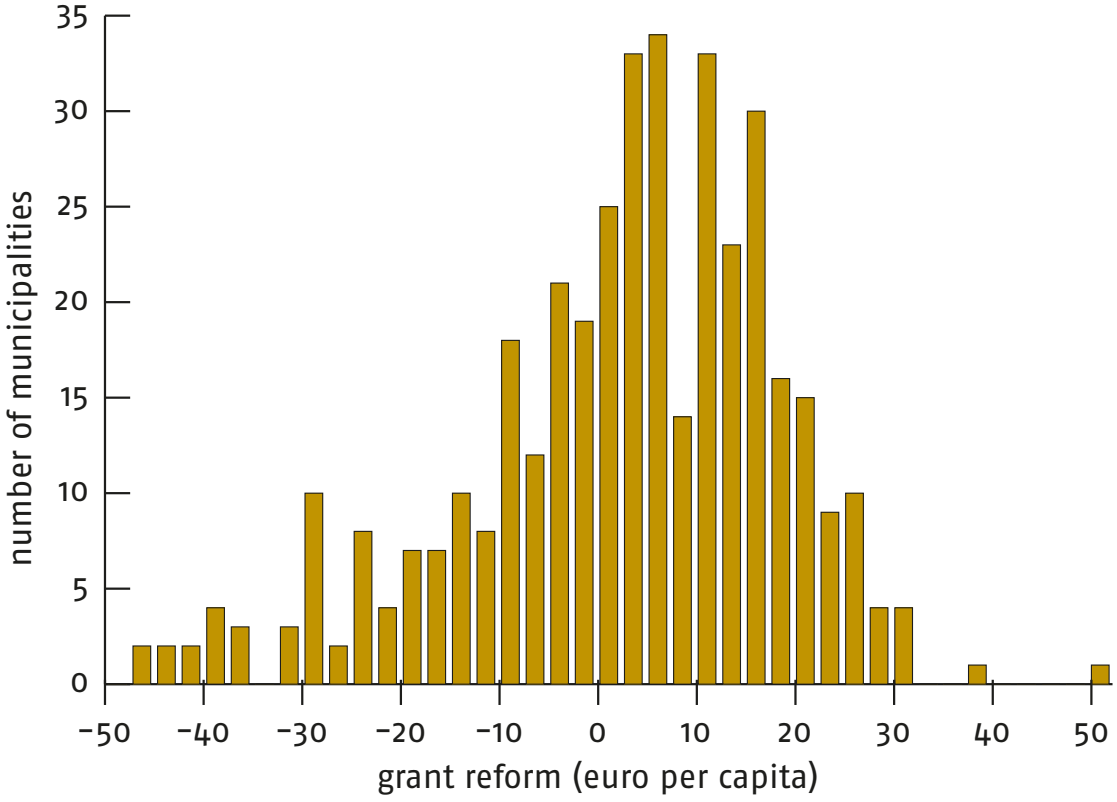


Table 2: Descriptive statistics

	Mean	Standard deviation	Minimum	Maximum	N
LTC use per capita: change over time					
Domestic help	0.15	0.62	−3.36	1.82	400
Personal care	0.91	0.56	−0.58	3.10	400
Nursing	−0.26	0.18	−1.21	0.39	400
Individual assistance (2010–2013)	0.00	0.23	−1.55	0.86	394
Group assistance (2010–2013)	0.10	0.20	−0.56	1.03	394
Institutional care	−0.10	0.71	−4.00	3.81	400
Domestic help grant (euros per capita): change over time					
Change grant for domestic help 2007–2013	3.48	18.06	−55.12	61.15	400
Reform of the grant for domestic help	2.58	15.97	−47.10	52.28	400
Lagged control variables					
Vote share for left wing parties	26.83	15.04	0.00	73.75	400
Vote share for Christian Democratic parties	26.75	13.16	0.00	86.92	400
Vote share for local and other parties	29.97	17.63	0.00	100.00	400
Share of the population aged 75 or older	6.29	1.53	2.61	13.16	400
Average personal income	14.60	1.59	10.21	23.06	400
Share of the population belonging to a minority group	12.38	7.16	2.29	50.89	400
Mortality rate	0.82	0.19	0.31	1.87	400
Population density	763.56	931.59	25.00	5711.00	400
Change in control variables					
Vote share for left wing parties	−7.82	8.36	−60.01	17.56	400
Vote share for Christian Democratic parties	−3.90	8.85	−62.61	23.33	400
Vote share for local and other parties	7.73	19.82	−27.19	99.30	400
Share of the population aged 75 or older	1.09	0.59	−0.81	3.01	400
Average personal income	−1.33	0.86	−9.06	2.93	400
Share of the population belonging to a minority group	0.27	0.38	−0.53	2.88	400
Mortality rate	0.07	0.11	−0.25	0.61	400
Population density	12.42	73.24	−471.35	430.00	400

Changes in LTC use are for the period 2007–2013, unless specified otherwise. Assistance in 2010 observed from week 25 onwards. Therefore, the change in uptake of individual assistance and group assistance between 2010 and 2013 is computed after multiplying the 2010 observations by 1/(52−25)*52. Domestic help, individual assistance, nursing, and personal care are measured in total hours divided by the municipal population in 2000; group assistance and institutional care are measured in total shifts and total days divided by the population in 2000 respectively. Lagged control variables are measured in 2005, except for the vote shares, which are the outcome of the 2006 election. Change in control variables are the change for the period 2007–2013, except for the vote share, which reflects the change between 2006 and 2010.

Table 3: Regression results

Dependent variable	(1) Effect of grant reform on per capita use in hours		(2) Effect of grant reform on per capita spending		N
Δ Domestic help	0.013	(0.003)***	0.290	(0.056)***	400
EMEA-financed care					
Total spillover effect	-0.006	(0.003)*	-0.172	(0.150)	394
Δ Personal care	-0.005	(0.002)**	-0.257	(0.107)**	400
Δ Nursing	0.003	(0.001)***	0.197	(0.058)***	400
Δ Assistance (group)	-0.001	(0.001)	-0.017	(0.011)	394
Δ Assistance (individual)	-0.002	(0.001)**	-0.090	(0.036)**	394
All home care					
Total change	0.008	(0.004)*	0.122	(0.169)	394
Nursing home care					
Δ Institutional care	-0.000	(0.003)	-		400

Dependent variables measured in total hours divided by municipal population in 2000. The grant reform – the change in the grant that municipalities receive for domestic help – is measured as the change in the grant caused by the reform expressed in euros per capita divided by municipal population in 2000. Changes in dependent and independent variables are calculated as the difference between 2013 and 2007 values, except for the change in the use of assistance, for which the difference is between 2013 and 2010. Expenditures on LTC are computed by multiplying use of care times prices of LTC (listed in Table A1). All specifications contain indicators for EMEA regions. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

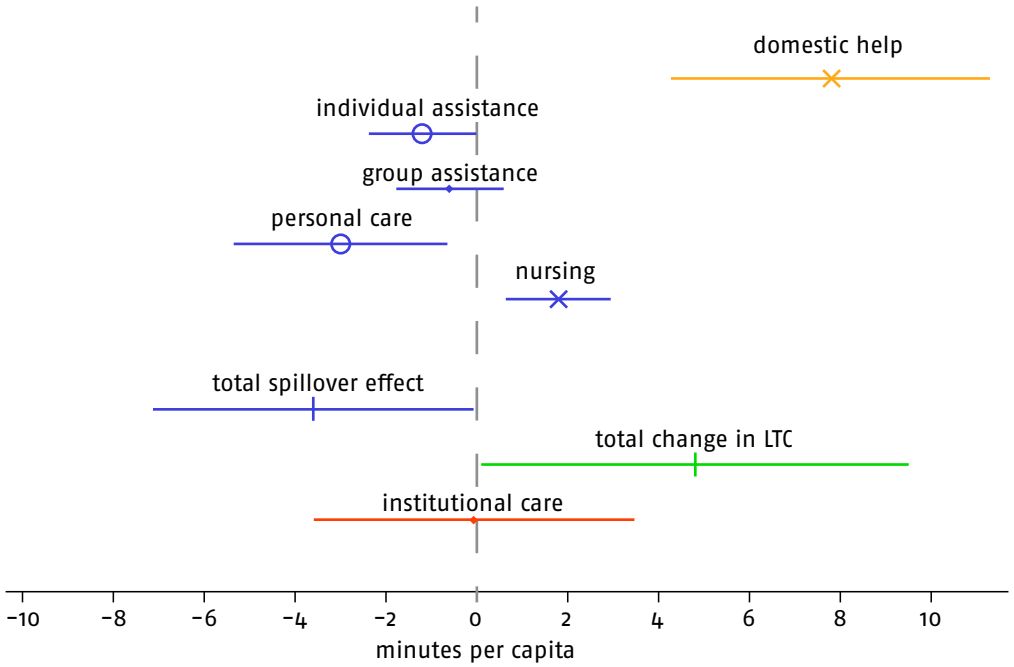
Regression results

Table 3 and Figure 2 summarize our main regression results. They suggest that a €10 increase in grant for domestic help increases the use of domestic help by 0.13 hour, i.e. 8 minutes (column 1 of Table 3). At an average rate of €22 per hour (Van Eijkel et al., 2017 – Appendix Table A1), this means that municipalities spend about €3 on this specific service when the grant increases by €10 (column 2 of Table 3).

Next, we consider the effect on overall EMEA-financed home care. Our results present some evidence that a €10 per capita increase in the grant for domestic help causes a drop in EMEA-financed home care of 4 minutes per capita (ten times 0.06 hours), but that it had no significant effect on total expenditures on these types of care. This difference occurs because the prices of EMEA-financed types of care differ.

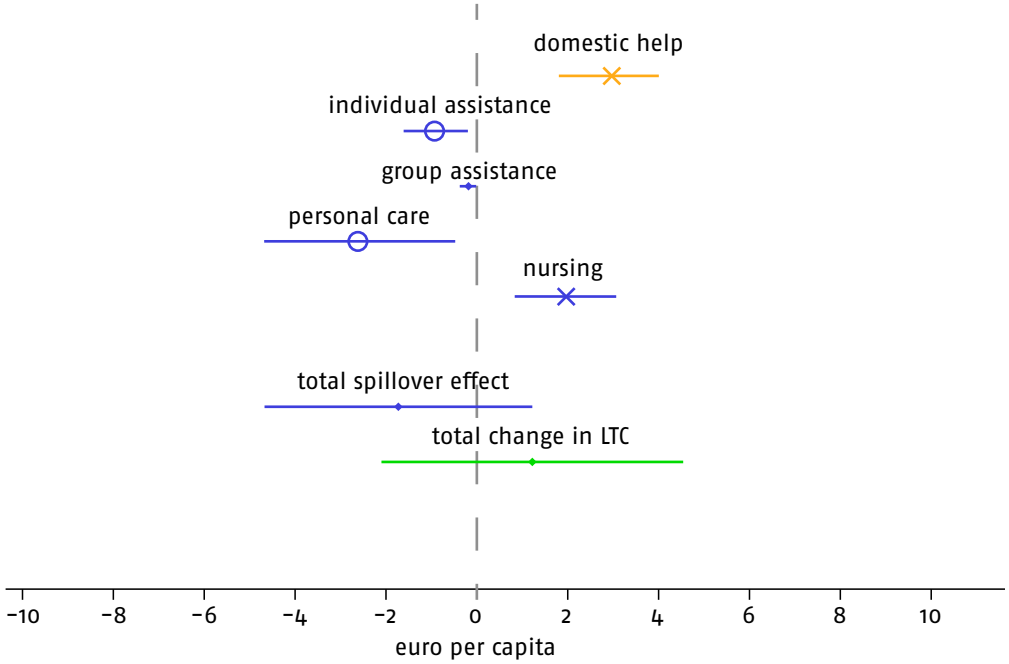
Specifically, Table 3 shows that a €10 increase in the grant for domestic help leads to a decrease in the use of personal care of 3 minutes per capita (ten times 0.005 hour times 60 minutes) and of individual assistance of 1 minute per capita (ten times 0.002 hour times 60 minutes). Using listed maximum prices for these types of home care, these changes convert to a €2.60 decrease in expenditures on personal care and a €0.90 decrease in expenditures on assistance. For nursing we find evidence

Figure 2: Illustration of main regression results in Table 3



|, ○ and × indicate the parameter is significant at 10,5 or 1 percent.
horizontal lines indicate 95% confidence intervals.

Panel A: Change in use of each of the types of LTC following a €10 per capita increase in the grant for domestic help following the reform



|, ○ and × indicate the parameter is significant at 10,5 or 1 percent.
horizontal lines indicate 95% confidence intervals.

Panel B: Change in expenditures on each of the types of LTC following a €10 per capita increase in the grant for domestic help following the reform

suggesting the opposite: a €10 increase in the grant for domestic help increases the use of nursing by 2 minutes per capita implying a €2 increase in expenditures[14]. We do not find evidence that the use or expenditures on group assistance are affected by the reform in the grant for domestic help (Table 3). As group assistance is related to the other types of LTC, but provided outside of the home environment, this strengthens our belief that our estimates reflect substitution of LTC that is provided at home.

Taken together, the effects of the reform of the grant for domestic help on i) the use of domestic help and ii) on EMEA-financed home care show that a €10 increase in the grant for domestic help increases the use of home care by about 5 minutes (10 x 0.008 hour x 60 minutes) per capita. This estimate is almost 40% less than the effect of the reform on domestic help alone. In fact, the change in aggregate home care spending, which is the sum of the changes in the use of all types of home care multiplied by their respective prices, is not significantly different from zero. Finally, we do not find evidence that the reform in the grant for domestic help influenced institutional care use.

The checks of robustness show that the results are largely unaffected after including four sets of lagged levels or changes of variables that proxy for preferences for LTC policy (Table 4 – Columns 2 and 3), proxies for LTC demand (Columns 4 and 5), changes in the other funds that municipalities receive from the central government (Column 6), and changes in the hourly co-payment for domestic help (Column 7). The effects on individual types of home care are the same or similar in all specifications, while the total spillover effect is significant at the 10% level in all but two specifications. The effect on the total number of hours of home care used is significant and equal in all specifications.

14 The increase in nursing associated with the increase in the grant for domestic help may have many different causes. It is possible, for example, that domestic help enables patients with severe functional limitations to leave the hospital sooner but that these patients need more nursing, or that increase in domestic help enables the regional authorities that organize EMEA-financed care to restructure the home care that they provide. Highly specific data – or qualitative research – may shed light on which mechanisms play a role. However, the distinction between nursing and personal care was abolished with the 2015 reform, meaning that the aggregate spillover effect matters most for policymakers.

Table 4: Robustness checks

Additional covariates included	(1) Main specification	(2) Initial vote shares	(3) Change in vote share	(4) Initial population composition	(5) Change in population composition	(6) Change in total grant	(7) Change in domestic help co-payment	(8) N
Dependent variables (in hours)								
Δ Domestic help	0.013 (0.003)***	0.013 (0.003)***	0.013 (0.003)***	0.013 (0.003)***	0.013 (0.003)***	0.013 (0.003)***	0.013 (0.002)***	400
EMEA-financed care								
Total spillover effect	0.008 (0.004)*	0.008 (0.004)*	0.008 (0.004)*	0.007 (0.004)	0.008 (0.004)*	0.007 (0.004)	0.007 (0.004)*	394
Δ Personal care	−0.005 (0.002)**	−0.005 (0.002)**	−0.005 (0.002)**	−0.006 (0.002)***	−0.005 (0.002)**	−0.006 (0.002)**	−0.005 (0.002)**	400
Δ Nursing	0.003 (0.001)***	0.003 (0.001)***	0.003 (0.001)***	0.003 (0.001)***	0.002 (0.001)***	0.003 (0.001)***	0.003 (0.001)***	400
Δ Assistance (group)	−0.001 (0.001)	−0.002 (0.001)*	−0.001 (0.001)	−0.001 (0.001)	−0.002 (0.001)*	−0.001 (0.001)	−0.001 (0.001)	394
Δ Assistance (individual)	−0.002 (0.001)**	−0.002 (0.001)**	−0.002 (0.001)**	−0.002 (0.001)**	−0.001 (0.001)*	−0.002 (0.001)**	−0.002 (0.001)**	394
All home care								
Total change	−0.006 (0.003)*	−0.006 (0.003)*	−0.006 (0.003)*	−0.006 (0.003)**	−0.005 (0.003)*	−0.006 (0.003)**	−0.005 (0.003)*	394
Nursing home care								
Δ Institutional care	−0.000 (0.003)	−0.001 (0.003)	−0.000 (0.003)	−0.002 (0.003)	−0.002 (0.003)	−0.001 (0.003)	−0.000 (0.003)	400

Changes in dependent and independent variables are calculated as the difference between 2013 and 2007 values, except for the change in the use of assistance for which the difference is between 2013 and 2010. All specifications contain indicators for EMEA regions. Robust standard errors in parentheses.

* p<0.1, ** p<0.05, *** p<0.01.

5. Conclusion

In most developed countries, LTC is subsidized and organized through a patchwork of public schemes. Changes to one scheme have implications for use of the care that is subsidized through other schemes, and these spillover effects need to be accounted for when evaluating the effects of a reform. This article makes use of detailed administrative records on LTC use and exogenous changes in the grants that Dutch municipalities receive to organize domestic help, for the purpose of estimating the spillover effects on other types of home care and on institutional care which are financed through other financing schemes.

Prior research has treated home care as a single type of care, possibly because of data limitations, and has focused on substitution with institutional care and informal care. Yet, substitution between different types of home care financed through separate systems is at least as likely, and it is equally relevant for governments and insurers seeking to curtail public spending and to ensure effective and equitable allocation.

The reform in the grant for domestic help changed the use of domestic help as municipalities thereafter spent on average 30% of the additional funds on domestic help. In addition, the results show that there are substantial spillovers from the reform: it decreased the use of other types of home care. More than a third of the change in the use of domestic help is undone by the changes in the other types of home care. In monetary terms, the spillover effects on the other, more expensive, types of home care are even more striking as the effect on total home care spending is insignificant.

Like McKnight (2006) but unlike several other studies (Ettner 1994; Pezzin et al. 1996; Orsini 2010; Guo et al. 2015), we do not find an effect of changes in home care subsidies on the use of institutional care. A possible explanation for the absence of an effect on institutional care use is that formal care delivered at home or informal caregiving is a closer substitute than institutional care for domestic help.

Our results are of direct relevance to policymakers in the Netherlands, as well as in other OECD countries where the financing of LTC is fragmented. The spillover effects such as those documented in this paper, which limit their ability to alter long-term care spending growth, is likely to be an inherent negative consequence of this fragmentation. In 2015, a broad set of LTC reforms was implemented in the Netherlands, which further complicated LTC financing. Part of these reforms was a 30% reduction in the budget that municipalities receive for domestic help (Ministry of the Interior 2014). In addition, the financing and organization of all assistance was transferred to

municipalities under the SSA. The other types of home care are now financed through the Health Insurance Act and organized by health insurers, while institutional care is still covered through the public LTC insurance scheme. On the one hand, these reforms mean that municipalities may integrate assistance, domestic help, and other services that they offer. This is beneficial because, as our results show, there are substantial spillovers to the use of assistance when the budget for domestic help changes, and municipalities are now incentivized and thus more likely to incorporate these spillovers when deciding about spending on domestic help. On the other hand, these reforms mean that coordination between assistance of the types of home care that are now organized by health insurers have become more complicated. If similar spillovers exist when the budget for assistance is changed, as we observed for domestic help, this means that budget cuts on assistance might lead to higher costs for health insurers.

The spillover effects matter for public finance: the effect of changes in the budget for domestic help on total home care spending were mitigated because they are offset elsewhere in the system. Hence, our results lend credibility to the belief that the 2015 budget cuts had important spillovers to other types of home care, but not to institutional care or group assistance. Hence, a full evaluation of these reforms should focus on all types of home care, including those financed through other systems. In addition, such decentralization means that a significant part of the funds may be spent on other things than home care when the funds are not earmarked.

Lastly, although it might be considered optimal to finance related health care services in separate schemes, our results show that such a split can reduce the ability to keep total spending in check because of coordination problems. As LTC financing is divided among separate schemes in many countries (OECD 2011, Bakx et al. 2015), our findings suggest that similar spillover effects may occur elsewhere too.

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Appendix

Description of the domestic help grant allocation

This appendix provides more details on the grant allocation formula. The formula was developed for the Ministry of the Interior and was used for the first time in 2008. A revised version, implemented in 2011, attached more weight to indicators on income and health care demand and supply (see Kattenberg and Vermeulen, 2017). In Table A1, we list the 23 need indicators and the weights that were used to distribute the grant for domestic help to municipalities in 2013 (column 1). The size of the grant that a municipality received in 2013 equaled the sum of the municipal score on the need indicators times their weights.

Column 2 shows the average share of grant money distributed by need indicator. Clearly, not all need indicators are equally important: the most important variable distributes about 20% of grant money on average, whereas the least important one distributes less than 0.1 promille. We have divided the need indicators into four groups. This grouping shows that about two-third of the grant is distributed using eight indicators related to average income. Almost 20% of grant money is distributed using eleven variables on municipal population, and about 12% is distributed using two indicators on health care demand and supply. The fourth group of indicators distributed adds up to only about one percent.

The change in the grant for domestic help resulting from the reform is computed as follows. First, we take the weights in 2013 of the allocation formula and multiply them by the corresponding demand indicators as measured in 2005. We use this result to compute the share of total grant money that each municipality would have received in 2013 based on the value of the demand indicators in 2005. Second, from this share we subtract the share of total grant money that a municipality received in 2007. Third, this difference is multiplied by the total amount of grant money supplied in 2007 and divided by the population of the municipality to express the grant change in euros per capita. Defining the instrument this way means that variations are only caused by pre-reform needs.

Table A1: Types of LTC

Type	Price	Brief description
Domestic help	23	Help in managing the household.
Group assistance	46.82	Assistance in maintaining a structured life by providing group activities.
Individual assistance	53.29	Assistance in activities of daily living and in maintaining a structured life; increasing self-reliance (including psychosocial).
Personal care	49.45	Performing tasks that a person usually carries out personally (self-care)
Nursing	73.88	Performing nursing tasks; signaling, supporting and counseling; practicing self-care.

Descriptions based on CIZ (2012) (Van Eijkel et al. 2017). Prices are maximum unit prices in euros in 2013, except for domestic help which is the average price (Van Eijkel et al. 2017, NZA 2013a, NZA 2013b).

Table A2: Allocation formula for domestic help in 2013

Indicator	Weight	Percentage[a]
Indicators on composition of the municipal population		
Population size	0.32	0.42
Population younger than 19	0.26	0.08
Population younger than 65	8.17	8.92
Population aged 65 or older and younger than 75	0.23	0.03
Population aged 75 or older and younger than 85	0.23	0.01
Population 85 or older	0.23	0.00
Population belonging to a minority group	0.83	0.09
Potential number of people visiting from nearby municipalities	1.49	1.96
Single person households with head aged 65 or older and younger than 75	31.77	0.92
Single person households with head aged 75 or older and younger than 85	127.06	3.38
Single person households with head aged 85 or older	222.36	2.92
Subtotal		*18.7*
Indicators related to average income		
Households with low income	0.98	0.17
Number of people who receive social support excluding welfare recipients	80.36	5.82
Number of people with low income times the number of households with head aged 65 to 74 [b]	263.20	3.93
Number of people with low income times the number of households with head aged 75 to 84 [b]	1052.82	9.73
Number of people with low income times the number of households with head aged 85 or older [b]	1842.43	6.1
Average standardized income times the number of households with head aged 65 to 74 [c]	226.90	8.31
Average standardized income times the number of households with head aged 75 to 84 [c]	907.61	20.5
Average standardized income times the number of households with head aged 85 or older [c]	1588.31	12.71
Subtotal		*67.3*
Indicators on health care demand and supply		
Capacity of local institutional care providers [d]	1.01	1.80
Function of number of people who are chronically ill [e]	239.60	10.92
Subtotal		*12.7*
Other indicators		
Municipal housing density times housing stock divided by 1000	−0.44	0.51
Lump sum transfer	24263.31	0.78
Subtotal		*1.3*

(a) Share equal to the average value of the indicator times its weight divided by the sum of average values of indicators times their weights. As one weight is negative, we have used the absolute values of weights.
(b) Function equal to the maximum of zero or [(the number of people with low income divided by the housing stock) minus 0.1].
(c) Function equal to the average municipal income over municipal income minus 0.55.
(d) Equal to 26 times the capacity in mental health care plus 132.3 times the capacity in nursing homes plus 365 times the capacity to provide mentally disabled health care. Capacity measured in number of beds.
(e) Function equal to (share of population that is chronically ill minus 0.11) times population size.

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