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THE IMPACT OF LONG-TERM CARE ON CAREGIVERS' PARTICIPATION IN THE LABOUR MARKET

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Abstract

In this paper we analyse the impact of long-term care on informal caregivers' status in the labour market. We focus on people's perceptions that their labour activity is hindered partially or totally by their care-giving commitments. We use the Eurostat ECHP dataset 1994-2001, which includes some questions specifically aimed to investigate whether people suffer care-giving constraints; this information allows us to overcome the endogeneity problem due to the double relationship between labour market participation and care-giving. We estimate the probability to be constrained according to a number of variables among the sample of caregivers, adjusting for sample selection through the Heckman 2-stage estimation procedure.

Our estimates confirm some results of previous studies: the heaviest burdens – characterised by higher informal-care intensity and co-habitation with the assisted person – hamper the caregiver from participating in the labour market as desired. The probability to incur constraints increases by 0.9% for each additional hour of care-giving, starting from 15 hours of care. Providing care to adults who are not living in the same place reduces this probability by about 3%. Among workers, those in part-time jobs have a 17% higher probability of suffering constraints. Among those not working, housewives seem to perceive stronger constraints than the unemployed. Furthermore, for those providing care to both children and adults, the probability to be constrained is 15% higher. These results show a general picture which assumes different characteristics in different countries. We have estimated the probability of being constrained for four countries (the Netherlands, Belgium, Italy and Spain), representative of the 'quantitative' clusters estimated by ANCIEN WP1. The main differences among these countries arise in how the gender gap emerges, the consequences of the double burden, and the place where the care is delivered (in the household or elsewhere).

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1.   Introduction

This paper aims to analyse the impact of long-term care (LTC) on informal caregivers' status in the labour market. In fact, when considering the balance between formal and informal care, the participation in the labour market has to be taken into account. The increase in labour market participation requested by the EU strategy[1] might be jeopardised by care-giving requirements linked to population ageing. As women bear most of LTC burden, women labour market participation might be affected.

Restrictions suffered by caregivers can affect not only labour market participation, but also working conditions. Some constraints can hamper labour market participation, but more generally can prevent individuals from undertaking the amount or kind of paid work they otherwise would do.

Therefore LTC policies (LTC public services availability, cash transfers to informal caregivers and immigration policy that affects the supply of private formal caregivers) can have labour market implications.

At the same time, is also important to observe that increased labour market participation might jeopardise care availability. Even if the focus of this study is not on this aspect, the double relationship between labour market participation and care-giving has to be taken into account.

Previous literature on European countries focused on how strong the impact of care-giving is. Heitmueller (2004) tries to answer the central question of whether individuals give up work to engage in informal care or they take up care responsibilities because they lack employment opportunities. Using data from the British Household Panel Study for 2002, he finds a high impact of LTC on labour market participation when using an instrumental variable approach and accounting for endogeneity. He underlines that the care-giving impact is stronger for those who cannot choose to become a caregiver, and that the degree of freedom in this decision is higher for individuals who provide few hours of care or whose caring responsibilities are outside their own home. LTC policies should then be different when labour market participation is restrained and when an individual becomes a carer because he is unemployed.

The hours of care prove to be relevant also in Masuy (2009) study, based on European Community Household Panel (ECHP) data: it is the intensity of care-giving which affects the probability of ceasing work, not simply being a caregiver.

Casado et al. (2011) estimate to what extent women providing informal care today incur labour opportunity costs in Spain. This study is based on the ECHP Spanish sub-sample and it uses an ordered probit (non-work, part-time, full-time) model, including the treatment of attrition and a sensitivity analysis. The results of this study show that labour effects of informal care are stronger for women caring after someone living at home and for those who continue to provide care for more than one year.

Spiess & Schneider (2002) estimate, using probit-models, the probability of care-giving, focusing on the correlation between changes in care-giving behaviour and changes in working hours for middle-aged women in 12 EU countries (the sample comes from the first three waves of ECHP). A difference-in-difference approach is used, controlling for country-effects and running separate estimations for Northern and Southern European countries. They find a significant negative association between starting and increasing informal care-giving and the change in weekly work hours, especially for Northern countries (except Ireland), whereas no such associations emerge when stopping care-giving or reducing care hours.

Viitanen (2005) examines whether informal caring constrains women in their labour market participation, using ECHP data regarding women aged 20-59, across 13 European countries (eight waves, 1994-2001). Both static and dynamic panel data estimations are carried out, as well as control for state dependence and attrition. Evidence is found that elderly care responsibilities increase with age and constrain women from participating in the labour force during their middle age; overall informal elderly care decreases women's labour force participation in most of the 13 EU countries analysed, at some point in their lifetime.

In this paper, we take advantage of the fact that ECHP contains some questions directly addressed to investigate the constraints experienced in labour market participation and more generally in working life due to care-giving of adults. If we assume that the questionnaire answers are reliable, there is no need to test if the caring decisions are endogenous with respect to labour market participation. We estimate, using a probit model, the probability for a caregiver to be constrained in the amount or kind of paid work because of giving care to an old, sick or disabled adult. As seen, previous works are mainly aimed to estimate the effect of care-giving on labour force participation (Viitanen, 2005). In our analysis instead, thanks to the ECHP questions on constraints, we focus directly on people who perceive their labour activity is hindered by care work – and also on those who are not working for care-giving reasons but would like to work. The aim is to identify the factors associated with restrictions. This information is useful in order to better target the policies in the different countries/contexts. We use the pooled cross-sectional data from the ECHP dataset for the available years and countries and adjust for sample selection. A probit model is also estimated for selected countries, which are chosen according to the clusters analysis carried out in ANCIEN WP1 (Kraus et al., 2010): the Netherlands, Belgium, Italy and Spain.

The next section describes the data used and the variables built to investigate labour market constraints. Section 3 presents some basic information on the prevalence and characteristics of informal caregivers according to ECHP data. It also explores the characteristics of people who describe themselves as caregivers and constrained for this reason. Then the estimation methods are described and estimates are given of the probability of reporting constraints experienced in paid work. Section 6 suggests some policy conclusions.

2. Data and variables on constraints

We used data from the Eurostat *European Community Household Panel* (ECHP) over the period 1994-2001 (European Commission, EUROSTAT, ECHP UDB – version of December 2003,

1994-2001 waves[2]) selecting the countries for which the relevant information is available (Denmark, The Netherlands, Belgium, France, Ireland, Italy, Greece, Spain, Portugal, Austria from 1995 and Finland from 1996). Information on the UK and Germany (data from national datasets) has been used only for the descriptive analysis on informal LTC supply, preliminary to the study on labour market constraints.

Then, for the estimations on single countries, we only selected the Netherlands, Belgium, Italy and Spain among the countries available in the ECHP data set. These four countries are representative of the groups obtained with the cluster analysis carried out in ANCIEN WP1 (Kraus et al., 2010).

Although the ECHP dataset includes data from the years 1994 to 2001 and do not include all ANCIEN countries, it contains very rare information on caregivers' labour market constraints, allowing us to overcome the endogeneity problem due to the double relationship between labour market participation and care-giving.

Generally speaking, only the individuals interviewed know if they suffer any constraints regarding their desire to participate in the labour market and their preferences on working-time arrangements (part time/full time). Obviously the answers are subjective and we cannot know if the individual would actually work (or seek work) if s/he did not have care responsibilities. In any case, to claim to be constrained is an expression of some aspiration to participate in the labour market or to work more. We have also to consider the possible existence of discouragement effects on the labour market side, which could hide the presence of a constraint (this must be taken into account when examining the results for countries with a persistently high rate of unemployment).

In order to evaluate the impact of LTC on caregivers' labour market participation and working conditions, we have constructed two different variables.

For the first variable, we considered the following question of the ECHP data base:

"*Does looking after children or other persons prevent you from undertaking the amount or kind of paid work that you otherwise would do*? " (PR010)

We created a binary variable equal to 1 when individuals answer "*yes*" to the previous question. In this way we can distinguish if an individual declares that he is constrained or not in doing his labour market activity because of being a caregiver. In order to select only caregivers of old, sick and disabled persons, we considered an additional question:

"*Do your present daily activities include, without pay, looking after children or other persons who need special help because of old age, illness or disability* ?" (PR006)

Then we selected only the following two options in the answers to the previous question:

"*Yes, looking after a person (who needs special help because of old age, illness or disability) other than a child*" and "*Yes, looking after a child and a person (who needs special help because of old age, illness or disability) other than a child*". This last answer concerns people who are caregivers for both adults and children.

Finally, matching the answers to the two questions, we obtained a binary variable equal to 1 when the individual reported being constrained in his amount or kind of paid work owing to his being a caregiver for a sick, old or disabled person (or for these categories and in addition for

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[2] The results and conclusions of this paper are those of the authors alone and not those of Eurostat, the European Commission or any of the national authorities whose data have been used.

children). This indicator is the one used in the estimates of the probability of being constrained because of care-giving.

The second variable has been built by means of a set of ECHP questions about being a caregiver and being constrained, addressed to individuals in different current or past employment status. This variable underlines the differentiation in the kind of constraints people have. We selected people who claim to experience one constraint among a set of possible restrictions:

1. People who stopped a previous job to look after an *old, sick or disabled person (*question*: "Reason for stopping in previous job"*; selected option: *"Looking after old, sick or disabled person"*)

2. People not seeking work to look after *old, sick or disabled person (*question*: "Main reason for not seeking work"; selected option "housework, looking after children or other persons"*)

3. People working less than full time to look after *old, sick or disabled person (*question*: "Main reason for working less than full time (less than 30 hours) in main job";* selected option: *"housework, looking after children or other persons"*)

4. People working full time (selected option: *"full-time workers"*)

In the last three cases, two further selections were needed: a) we considered only people who claim that looking after children or other persons prevents them from undertaking the amount or kind of paid work that they otherwise would do and b) we considered only people who are caregivers for adults or both adults and children. Therefore, we obtained a binary variable equal to 1 if individuals stopped a previous job, are not seeking a job or are working (less than full time or full time), but suffer constraints because of giving care to old, sick or disabled person.

3. Characteristics of informal care and constraints in paid work

The differences in LTC reflect many factors, such as the amount of formal and informal care, the persons who provide care and where the care is provided, the types of benefits, etc. These differences should be reconnected to various social care models in the EU countries. These social care systems are often categorised in three main models (Mot, 2010) that some authors define as the 'family care model', the 'state responsibility model' and the 'subsidiary model'.[3] Essentially the 'family care model' is characterised by limited public service coverage, and cash transfers are preferred to institutional services; this model is prevalent in the Southern European countries such as Italy, Spain, Greece and Portugal (Mediterranean model). The 'state responsibility model' in contrast is organised with public institutions providing more direct care than cash transfers, and this model is diffused in the Nordic countries (Scandinavian model). The 'subsidiary model' is in between the two models previously described and is typical in France and Belgium. Even the United Kingdom can be collocated in the middle between the Scandinavian and the Mediterranean model. The ANCIEN WP1 report (Kraus et al., 2010), using a large set of variables, proposes two new countries clusters specifically focused on LTC, whose results are different and partially contrast with the traditional classification roughly described above. The first approach is based on qualitative information, used to value two main dimensions, the Organisational Depth and the Financial Generosity. It identifies four clusters: the first cluster, with high Organisational Depth and Financial Generosity, includes Belgium, France, Germany, the Netherlands, Sweden and Denmark; the second, with medium Organisational Depth and Financial Generosity, includes Austria, Latvia, Slovenia, England, Spain, Italy and Finland; the other clusters concern Eastern European countries, not included in

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[3] European Commission (2009).

the ECHP database. The second approach, based on use and financing of care (quantitative approach), finds four typologies: limiting ourselves to the Western European countries, we observe that the first cluster includes Belgium and Germany, the second Denmark, the Netherlands and Sweden, the third Austria, Finland, France, Spain and England and the fourth only Italy. The first two clusters present a low share of private LTC spending. The second has also high public spending, together with the lowest informal care use but a rather high informal care support, whereas the first has low spending and high informal care, which goes with high informal care support. The other two clusters, with high share of private LTC spending and low public spending, present high informal care use and differ on informal care support, high only for group three. Therefore, these two clusters confirm in some way the existence of a Scandinavian model, but are more articulated for the other aspects than previous classifications.

According to ECHP data, the prevalence of individuals informally caring for elderly, sick or disabled people – over the period from 1994 to 2001 – is rather similar in most countries (Table 1 and Figure 1). The UK is the exception with much higher values – around three times higher than in most other countries (15.6% on yearly average). This finding, although surprising for the size of the difference between the UK and other countries, might be due to the nature of the British LTC system, which is "characterised as a 'safety-net' type of system that only supports those with very severe needs who are unable to meet the costs of their care" (Herrera et al., 2010) and to the fact that most formal care is means-tested.

Table 1. Prevalence of individuals caring after elderly, sick or disabled people (1994-2001)

Year / Country	1994	1995	1996	1997	1998	1999	2000	2001	Pooled data 1994-2001*	Pooled data 1994-2001* Women	Pooled data 1994-2001* Men
Germany	2.7	2.9	2.7	2.6	2.6	3.0	2.4	2.8	2.7	2.4	3.1
Denmark	4.9	5.2	5.4	5.8	6.0	5.2	5.0	4.4	5.3	6.5	3.9
Netherlands	6.7	6.9	6.4	6.1	6.8	6.7	6.6	6.4	6.6	8.3	4.8
Belgium	6.9	7.2	5.9	6.4	7.2	7.1	6.2	6.1	6.6	8.1	4.9
France	4.3	4.5	4.5	4.2	4.2	3.7	4.2	3.7	4.2	5.3	3.0
UK	15.7	15.6	14.5	15.1	14.3	16.5	16.4	17.0	15.6	17.2	13.9
Ireland	6.2	5.4	4.9	5.2	4.7	4.5	3.8	4.3	5.0	6.9	3.1
Italy	9.3	7.0	6.7	6.9	6.7	7.0	6.9	6.1	7.1	9.5	4.5
Greece	6.6	3.3	3.2	3.8	3.8	3.9	2.9	3.4	3.9	5.8	1.9
Spain	7.3	6.0	5.4	5.7	4.9	4.8	4.5	5.5	5.6	8.2	2.8
Portugal	3.1	2.7	3.5	3.8	4.5	4.3	3.5	3.5	3.6	5.9	1.1
Austria	-	5.6	4.6	5.3	4.9	3.8	4.0	3.8	4.6	6.8	2.2
Finland	-	-	6.0	5.2	6.1	6.7	6.3	7.8	6.3	7.3	5.2

* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

Figure 1. Prevalence of individuals caring for elderly, sick or disabled people – Pooled data 1994-2001*
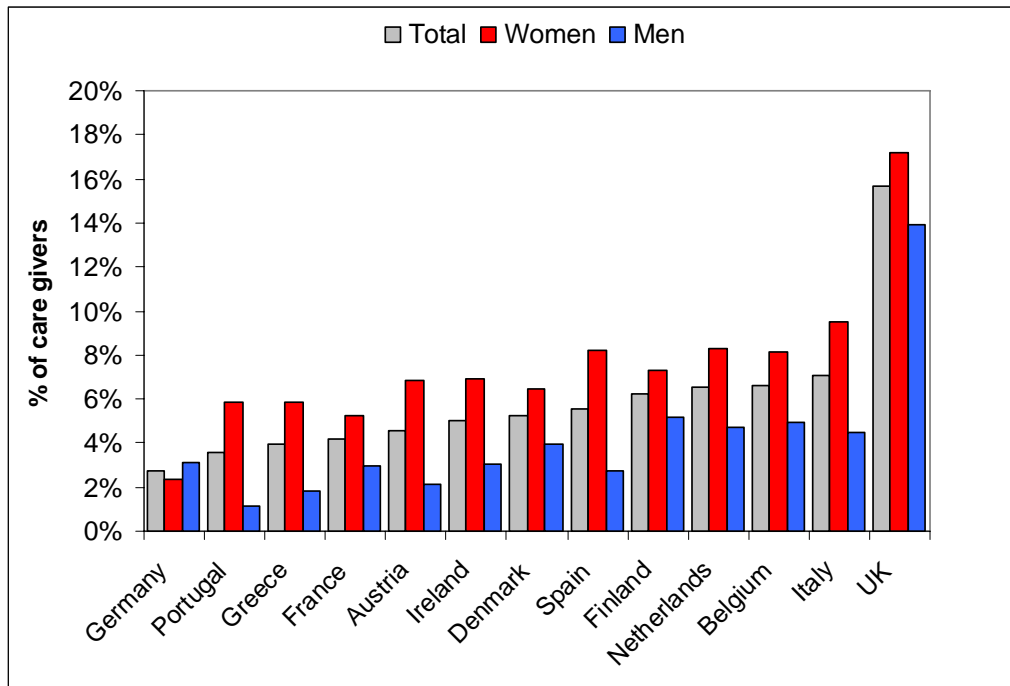
* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

In Germany, however, the prevalence of providing informal care is over 50% lower than in most other countries. This might be due to the mandatory social long-term care insurance system introduced in 1995 (Schultz, 2010), covering the entire population.

In all countries but Germany, women more often provide informal care than men. The percentage of women caregivers is 24% higher in the UK, up to around 300% in Greece and Spain and 527% in Portugal. We observe the greatest disparities between women and men in the provision of informal care in Mediterranean countries such as Italy (213%), Greece (313%), Spain (299%), Portugal (527%), but also Ireland (226%) and Austria (316%).

It should be noted that the total data on the prevalence of informal care are not consistent with the cluster analysis of ANCIEN WP1,[4] but when we look more deeply at the characteristics of informal care we find that the differences between countries are consistent with those clusters. For instance, the results for gender distribution are consistent with ANCIEN WP1 clusters, where Austria is grouped together with some Mediterranean countries (Ireland is not present): Spain and Italy according to the first approach, Spain according to the second approach (which includes Italy in the fourth cluster with Hungary).

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[4] Nevertheless, is important to remember that ECHP data refer to the years 1994-2001: some countries may have changed their situation more than others during the last decade. For example Germany's great reform dates back to 1995 (Schulz, 2010), whereas the Dutch system experimented with some important innovations in the first years of the present century (Mot, 2010).

Besides, ECHP total prevalence data are not consistent with Eurobarometer and share data (see Pickard, 2010),[5] but the gender distribution is quite consistent with Eurobarometer.

Besides the average yearly prevalence in the observed period, the overall frequency of people who claim to have provided informal care at least once in the years 1994-2001 is an interesting bit of data as well, because the care burden can depend on an emergency situation which does not last long.

The frequency of individuals who provide informal care at least once in this period is about three times higher than the average yearly incidence for most countries, while it is the double for Germany and United Kingdom and it is four times higher for Greece. The relative differences between women and men are a bit lower than in Table 1, but follow approximately the same pattern among the countries (see Table 2).

In all countries, caregivers are more frequently in the age group from 45 to 60 years, and then among over 60 years olds.[6]

Table 2. Percentage of individuals caring for elderly, sick or disabled people at least once in the years 1994-2001*

Country	Total	Women	Men
Germany	6.4	5.4	7.5
Denmark	17.3	20.4	14.1
Netherlands	20.3	24.6	15.7
Belgium	19.6	23.0	15.8
France	12.9	15.9	9.6
UK	37.1	40.0	33.8
Ireland	14.8	19.6	9.6
Italy	21.2	27.0	14.9
Greece	14.7	20.3	8.6
Spain	18.1	24.4	11.2
Portugal	10.4	16.6	3.7
Austria	12.5	17.8	6.7
Finland	16.4	18.7	13.9

* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

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[5] Eurobarometer data regard the year 2007 and the previous ten years, so only a partial overlap exists with ECHP data.

[6] According to Eurobarometer data people in older age groups more frequently provide informal help, but this could partly depend on the fact that the data include past caring.

Figure 2. Prevalence of individuals caring after elderly, sick or disabled people by age* –
Pooled data 1994-2001**
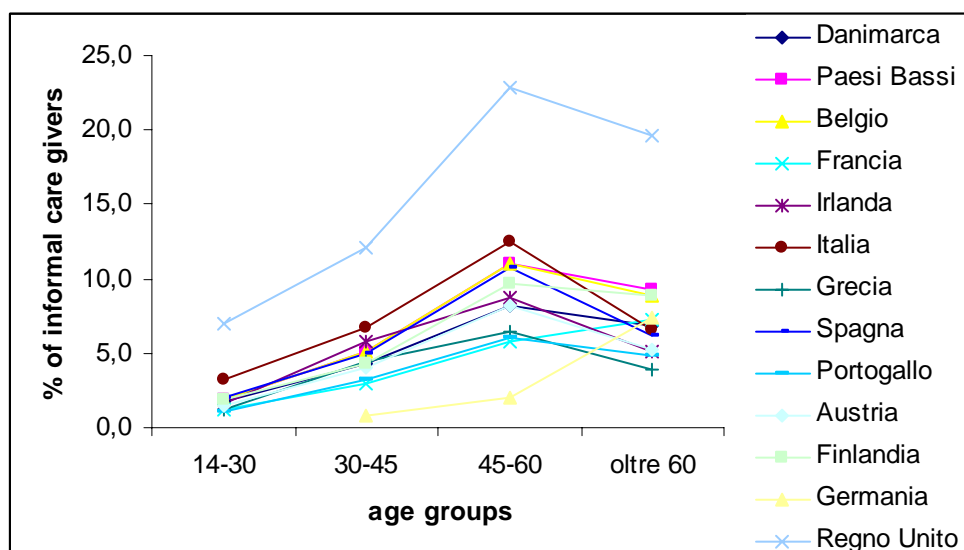
* Germany, class 14-30: 20-50 obs.

** For most countries, the years range from 1994 to 2001 but start at 1995 for Austria and at 1996 for Finland.

As for the activity status – distinguishing between working and not working people – the prevalence of informal caregivers to elderly, sick or disabled people is substantially higher among non working people (Table 3). Although this is true for all countries, in Germany, France and the Netherlands, this difference is particularly high. As indicated in the introduction, one issue analysed in the literature is exactly the reason for this situation: is it the care burden that hampers working or is it that being inactive or unemployed stimulate people to decide to become caregivers?

Table 3. Prevalence of individuals caring after elderly, sick or disabled people by activity status
– Pooled data 1994-2001*

Country	Working (1)	Not working (2)	Total	(2)/(1)
Denmark	4.4	6.8	5.3	1.5
The Netherlands	4.3	9.9	6.6	2.3
Belgium	4.9	8.5	6.7	1.7
France	2.7	5.7	4.2	2.1
Ireland	4	6.2	5.1	1.6
Italy	5.6	8.3	7.1	1.5
Greece	3.5	4.5	4	1.3
Spain	3.7	7	5.6	1.9
Portugal	2.9	4.8	3.6	1.6
Austria	3.7	5.9	4.6	1.6
Finland	5.4	7.4	6.3	1.4
Germany	1	5	2.7	5.2
UK	13	19.4	15.6	1.5

* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

If the prevalence of informal caregivers is not so different among countries, the most important differentiation on informal care seems to be related to the place where the care is provided, in the household or elsewhere, the latter including LTC institutes. It is important to underline that there are different patterns within Europe of co-residence of elderly parents and their adult children, not (only) in relation to LTC needs. "Co-residence is *the* Southern European way of transferring resources from parents to children and vice versa" (Albertini et al., 2007, p. 325). In any event, Albertini et al. (2007) also observe that a correlation exists between welfare regimes and intergeneration financial transfers and social support. So it is likely that care-receiving people are also living more frequently in the household when there are not a lot of appropriate public institutes and/or home-care services taking care of them when not fully self-sufficient, whereas the presence of a strong formal LTC system may exert a 'crowding-out' effect on informal support (see also the analysis on informal care use in Marcinkowska & Sowa, 2010).

Figure 3. Percentage of informal care beneficiaries living in the household –
    Pooled data 1994-2001*
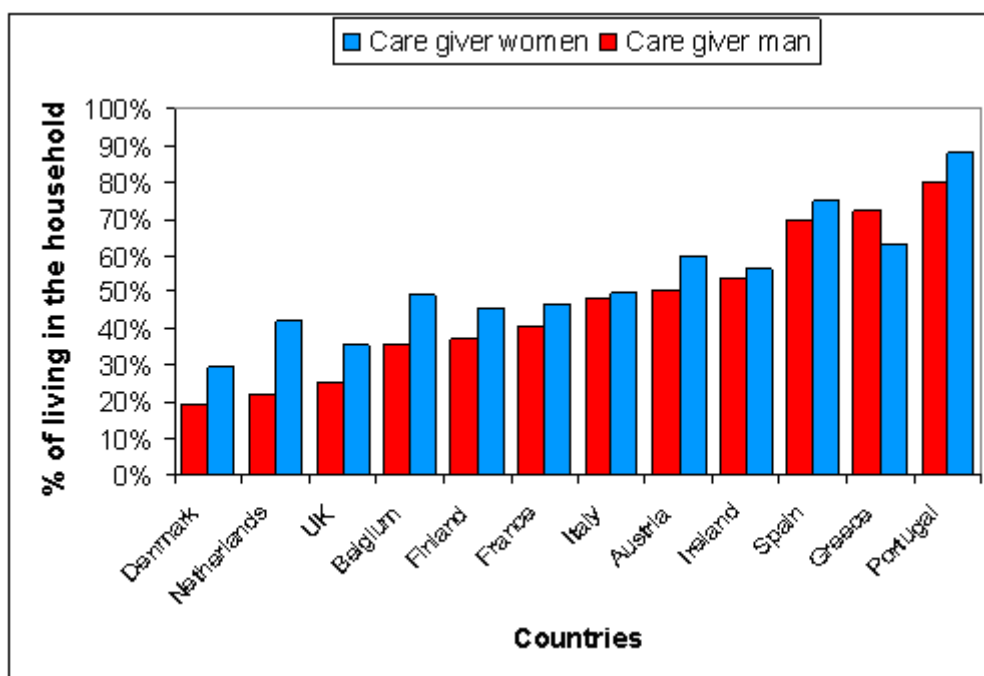
* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

In fact in Southern European countries and in Ireland and Austria, a big proportion (over 50%) of informal caregivers provide care to people who are living in the household, while in the other countries this proportion is much smaller (Figure 3),[7] as expected. It is to be noticed that in the UK, which is the country with the highest prevalence of informal care, only 25-35% of carer provide care to people living in the household. Additionally, in many countries women tend more often to look after individuals living elsewhere than men do.

The intensity of care, in terms of number of hours per week, presents a higher degree of variability across countries (Table 4). It is higher in Spain, Portugal, Ireland, Austria and Italy, and is particularly low in Finland and Denmark. This might partially be related to the fact that in the latter countries there is a wide availability of LTC services.

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[7] These data are consistent with the "Share" ones, analysed in Marcinkowska & Sowa (2010).

Table 4. Average number of hours of care to elderly, sick or disable people by working condition – Pooled 1994-2001 data*

Country	Working (1)	Not working (2)	(2)/(1)
Denmark	8.06	12.32	1.53
The Netherlands	13.05	18.5	1.41
Belgium	10.52	15.39	1.46
France	9.12	15.56	1.71
Ireland	18.11	29.94	1.65
Italy	14.42	23.35	1.62
Greece	14.97	26.49	1.77
Spain	24.78	37.73	1.52
Portugal	23.34	31.71	1.36
Austria	16.47	25.92	1.57
Finland	8.74	17.01	1.95

* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

Table 5. Average number of hours of care to elderly, sick or disable people by gender – Pooled 1994-2001 data*

Country	Women (1)	Men (2)	(2)/(1)
Denmark	8.2	7.9	1.04
The Netherlands	14	11.9	1.18
Belgium	10.9	10.1	1.08
France	10.1	7.9	1.28
Ireland	20.8	14.9	1.40
Italy	15.6	12.8	1.22
Greece	16	13	1.23
Spain	27.5	20.1	1.37
Portugal	25.1	16.4	1.53
Austria	17.7	13.2	1.34
Finland	8.8	8.7	1.01

* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

Therefore, examining the information on where and how much care is supplied, we find data consistent with ANCIEN WP1 clusters.

Informal caregivers not working at the time of the survey usually provide a higher number of hours of care than those working.

In all countries but Finland, women provide a higher number of hours of care than men (Table 5). The difference between women and men is greater for France, Ireland, Italy, Greece, Spain, Portugal and Austria.

The distribution of constraints in the amount and kind of paid work have been analysed using the two variables described in section 2.

The percentage of the population of individuals suffering constraints in their working activity because of care-giving does not vary significantly among countries. It is a bit higher in Southern European countries and Ireland (the Netherlands only with the first variable) (see Tables 6-7).

Table 6. Percentage of individuals claiming to be constrained in their amount or kind of paid work (first variable)* – Pooled data 1994-2001**

Country	Working (1)	Not working (2)	Total
France	-	0.6	0.3
Denmark	0.5	0.4	0.5
Finland	0.3	0.7	0.5
Belgium	0.6	1.2	0.9
Austria	0.7	1.2	0.9
Greece	0.7	1.2	1.0
Portugal	0.7	1.8	1.1
The Netherlands	0.8	1.9	1.2
Italy	0.7	1.8	1.3
Ireland	0.9	2.1	1.5
Spain	0.7	2.1	1.5

* For France, there are less than 20 observations in the category "working".

** For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

In all countries but Denmark, the proportion of the individuals reporting to suffer a constraint is higher among those who are not working (left the job and not looking for a job, according to our second variable), but the workers also suffer constraints.

The percentage of caregivers suffering constraints has a wider variability among countries (Table 8), with Southern European countries, Austria and Ireland presenting a frequency over 20%, the Netherlands and Belgium between 10% and 20% and the other countries under 10%.

Table 7. Percentage of individuals claiming to be constrained in their amount or kind of paid work (second variable)* – Pooled data 1994-2001**

Country	Not working (left the job, not looking for a new one)	Working full or part-time	All
Denmark	0.17	0.26	0.43
The Netherlands	0.37	0.33	0.70
Belgium	0.46	0.23	0.69
France	0.45	-	0.46
Ireland	1.32	0.32	1.64
Italy	0.85	0.23	1.08
Greece	0.68	0.18	0.86
Spain	1.26	0.18	1.44
Portugal	0.82	0.24	1.06
Austria	0.52	0.29	0.81
Finland	0.17	(0.10)	0.27

* For France, there are less than 20 observations in the category "working full time or part-time".

** For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

Table 8. Percentage of caregivers claiming to be constrained (first variable) –
Pooled 1994-2001 data*

Country	Women	Men	Total
Finland	7.5	6.9	7.24
France	11.25	1.07	7.77
Denmark	9.95	7.0	8.87
Belgium	15.93	8.13	13.18
Netherlands	25.29	5.86	18.45
Italy	22.47	10.76	18.93
Austria	23.7	4.2	19.36
Greece	28.2	11.7	24.51
Spain	32.57	10.38	27.28
Ireland	36.1	13.8	29.49
Portugal	34.48	12.02	31.18

* For most countries, the years range from 1994 to 2001, but start at 1995 for Austria and at 1996 for Finland.

These results show that even if the percentage of caregivers do not change consistently across countries, labour market restrictions related to care-giving hit differently the caregivers of different countries.

In order to examine the differences among countries, Figure 4 focuses on women and shows the correlation between the percentage of women claiming to be constrained among the female caregivers in each EU country and the activity rate of women in the age 20-64. Using the average values to divide the graph into four parts, we observe that Denmark, Finland and France have the best combination with high women activity rate and low constraints, while Italy, Greece, Spain and Ireland experience the worst situation, with low employment rates and high constraints. The Netherlands, Portugal and Austria show a rather high women activity rate but also high constraints and Belgium has an activity rate below the average and low constraints.

Figure 4. Female activity rate (20-64) and percentage of women caregivers claiming to be
constrained

percentage of women caregivers claiming to be constrained
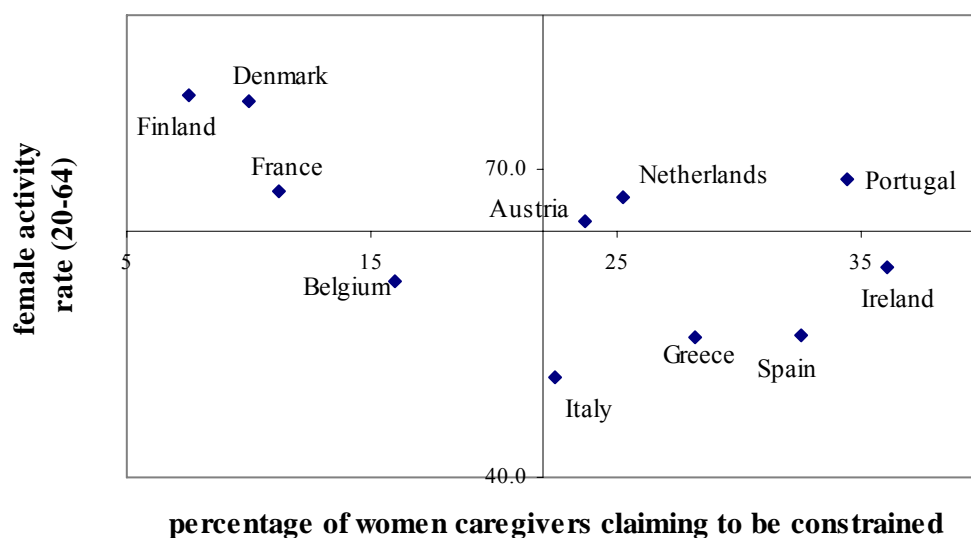
4. Estimation methods

The analysis focuses on the estimation of the probability that a caregiver will be constrained in the amount or kind of paid work because of giving care to an old, sick or disabled adult (referring to the first variable on constraints described above). We have used pooled cross-sectional data from the ECHP dataset, 1994-2001 (eight waves) for the European countries where the information on the informal care is available. Asking people if they are constrained, we overcome the problem of endogeneity (the fact that we do not know if participation in the labour market is jeopardised by the care tasks or if the care tasks are accomplished because there are not hindrances due to labour market).

The dependent variable is described above in detail (the first indicator is a binary variable equal to 1 when the individual reports that he is constrained in the amount of paid work because he is a caregiver).

To study the determinants of the constraints, we estimated a probability model. Underlying this analysis is a latent variable C_{ij}^* measuring the intensity of the caregivers' constraint, where i indicates the individual and j the country he belongs to. We model C_{ij}^* as:

$$C_{ij}^* = \alpha + X_{ij}^{'} \beta + \gamma f_{ij} + \varepsilon_{ij} \tag{1}$$

where $X_{ij}^{'}$ is a vector of observable variables, α, β and γ are parameters, f_{ij} are a set of country fixed effects and ε_{ij} is a random variable distributed normally with zero mean and variance σ^2. The vector X includes a full set of year dummies.[8]

C_{ij}^* is not observable but we observe an indicator C_{ij} that is equal to 1 when the individual is constrained, and equal to zero otherwise. We model the answer to the question as follow:

$$C_{ij} = 1 \text{ if } C_{ij}^* > 0 \tag{2}$$

$$C_{ij} = 0 \text{ if } C_{ij}^* <= 0 \tag{3}$$

Hence to estimate the probability of being constrained in the amount or kind of paid work because of being a caregiver, a probit model is estimated:

$$\text{Prob}(C_{ij}=1) = \text{prob}(X_{ij}^{'}\beta + \gamma f_{ij} + \varepsilon_{ij} > 0) = \text{prob}(\varepsilon_{ij} > - X_{ij}^{'}\beta - \gamma f_{ij}) \tag{4}$$

We included the following variables as explanatory variables:

- demographic and socio-economic characteristics of the caregiver (age, gender, education, marital status, health status, main activity status, part time, employee);
- characteristics of care-giving (hours per week, care-giving at home or elsewhere, care-giving old, sick and disabled persons and children); and
- control variables for the years and for the countries considered, as well as for the number of years that individuals are present in the survey in order to control for attrition in the sample.

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[8] Although we used a pooled sample, we have not reported the time subscripts denoting the years of the survey, just to save on notation.

We have used pooled cross-sectional data from the ECHP dataset 1994-2001 (eight waves) for the European countries where information on the informal care and on constraints is available.[9] Since the dependent variable is observed only for a restricted, non-random sample – those who provide care for adults can suffer the constraints – we adjusted for sample selection using a Heckman 2-stage estimation procedure (Heckman, 1976, 1979).

In a first stage we estimated a probability model of care-giving including a set of explanatory variables (age, gender, education, marital status, control variables for the years and for the countries considered and the number of years that individuals are present in the survey to control for attrition). To achieve identification and to distinguish the probability of being a caregiver from the probability of being constrained, we imposed as an exclusion restriction the number of adults in the household, a proxy of the potential demand for care faced by the respondents, which affects the probability of being a caregiver but not that of being constrained. From this first-stage probit, which is reported in the Appendix, we computed an error correction factor, the inverse of the 'Mills ratio', that has then been added as a regressor on the final estimate on probability of being constrained, in order to obtain consistent estimates. The basic model on probability of being constrained included the same set of explanatory variables as the first stage model.

In the first stage probit estimates used to adjust for sample selection of our estimates of being constrained because of care-giving, A_{ij} denote an indicator variable equal to 1 if individual i in country j is a caregiver, zero in the case he is not. This variable spans the whole sample whereas the constraint in care-giving is only defined for the first group.

We denoted with Z_{ij} a vector of variables that affect the allocation of an individual to the two groups. We modelled the probability that an individual is a caregiver as function of:

$$\delta Z_{ij} + \theta f_{ij} + \upsilon_{ij} \tag{5}$$

where (as in the text) f_{ij} denotes a set of country fixed effects and υ_{ij} denotes a random variable, assumed to be normally distributed with $\upsilon_{ij} \sim N(0, \sigma^2)$ and cumulative distribution $F(\upsilon)$. Hence,

$$\text{Prob}\,(A_{ij} = 1) = \text{Prob}\left(\upsilon_{ij} > \delta Z_{ij}' - \theta f_{ij}'\right) = F(-\delta Z_{ij}' - \theta f_{ij}') \tag{6}$$

Given normality of υ_{ij} we can estimate the parameters δ and θ with a standard probit model. To achieve an identification of the vector Z_{ij} includes all the variables that appear in the second stage regression (i.e. the vector X_{ij} in equation (1)) and in addition the number of adults in the family used as an exclusion restriction.

The estimate of this model – out of which we obtain the inverse Mill's ratio term used to account for selection – for the pooling including all the available countries is shown in the Table A1 in the Appendix.

The results of the second stage probit are presented in the next section (Table 9, first column). The probability of being constrained has then been enriched with the addition of a group of

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[9] The countries surveyed are the Netherlands, Belgium, France, Ireland, Italy, Greece, Portugal, Austria and Finland.

variables on characteristics of care-giving and a third specification that includes some labour market status variables and a control for the health status of the carer. The pooling estimate is run also on a sample of women only.[10]

Besides running estimates on the sample including all countries, we also report results using a subset of countries – the Netherlands, Belgium, Italy and Spain. In fact, each of these countries belongs to one of the four groups of the cluster analysis indicated in ANCIEN WP1 (see section 3). Finally, the estimations are separately run for each of the four representative countries in order to compare coefficients across countries.

5.   Estimation results

This section analyses the results of the estimations looking at the main factors associated with the probability of being constrained in the amount or kind of paid work because of care-giving.

Most explanatory variables are dummies – implying that for each variable a category is omitted and the effects are measured relative to the omitted group – and the coefficients are expressed in terms of marginal effects.

Table 9 presents the results of the estimates for the pooling of the available countries and years.

In the model presented in the first column, the probability of being constrained is connected to a set of explanatory variables (such as age in a non-linear form, gender, marital status, level of education); a set of control variables for the years and for the countries are also included, alongside a variable indicating the years in which the individuals are present in the survey, used to control for the attrition in the sample. The Mill's ratio is added in order to correct for sample selection bias.

In the second column, some additional explanatory variables are introduced in order to control for characteristics of care-giving (hours of care-giving per week in a non-linear form, care-giving at home or elsewhere and care-giving to both an adult and a child): as seen, in fact, the literature suggests that often the features of care-giving (as intensity and where care-giving is supplied) are the main determinants of constraints.

In the third column, some variables on labour market status are included (activity status, part-time, employee) as well, to verify how the constraint acts on individuals in different conditions in the labour market. In the fourth column the estimation is run for the sample of women.

In the results description, we mainly refer to the third column, where the specification that includes a broader set of explanatory variables is shown.

As expected, the probability of being constrained increases significantly with age (7% more for each additional year starting at 45 years of age), if women (+7%), with the hours of care-giving (0.9% more for each additional hour starting from 15 hours of care), and among individuals who look after both children and old, sick or disabled adults (+15%) – compared to those who only look after adults – (in fact, these individuals sustain a double-care burden, arising also from heterogeneity in the nature of assistance required by a child and by a dependent adult). The probability to suffer constraints is lower if the assisted person lives elsewhere (-3%) rather than in the carer's household, as seen before and as shown in the literature.

Moreover, the probability of claiming some constraints is also higher when an individual reports that her main activity status is "doing housework and/or looking after children or other persons" (+13%) or "unemployed" (+3%) compared to a working person. Remembering that the constraints concern both working and non-working people, we can confirm that housewives (or

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[10] We did not carry out the estimation for men because the sample is too small.

'househusbands'), and in a minor way unemployed, often claim that a possible participation in the labour market is hampered by their care burden. The probability of suffering constraints is also higher if employees (-5.3%) are compared to self-employed and when working part-time (+17%) compared to full-time. As for employees, the result seems a bit surprising, because they should have less flexibility in working hours than independent workers. Nevertheless, they could find it easier to share working from non-working time. The result on part time was expected, as people often choose a part-time job to reconcile work and care-giving.

The marital status is not significant in the third regression, but in the first one, where the characteristics of care-giving and activity status are not considered, unmarried women are less constrained than those who are or have been married. The same happens for education variables: in the third specification, only the tertiary level is significant (and the positive coefficient is 1.8), while in the first one both secondary and tertiary levels matter (and the coefficients are higher).

We also included a set of time dummies: estimated time effects do not show any relevant tendency for the probability of claiming to be constrained (the base year is 2001); country dummies show that there are some systematic differences in averages across countries. *Ceteris paribus*, the fraction of constrained persons is lower in the Netherlands, France, Austria and Finland, compared to Spain (the omitted country) and is higher for Portugal (the other countries do not show significant differences from Spain).

Given the continuous increase in the female labour force participation, providing informal care may imply important economic costs for women in terms of reduced employment or missed opportunity of being employed. Table 1a confirms that women are traditionally the main care providers. Knowing the difficulties that women face to combine care-giving responsibilities with labour market participation, we can verify if there are systematic differences in the way genders respond to the determinants of the probability of being constrained. Nevertheless, in the estimate on women the signs of the significant coefficients do not change, although the size is a bit higher. A couple of variables become relevant: retired persons show a higher probability to be constrained (3%) than working people and economically inactive persons show a lower one (-3%). It is difficult to understand what the positive coefficient for retired people signal. They could have retired because they had to care for somebody or the restraint could concern working activity that they carry out – or would like to carry out – during the time of retirement. In addition, we find some differences in the time and in the country effects: the probability to be constrained in Belgium, Italy and Greece becomes significantly lower than in Spain and in four out of six years, it is lower than in 2001, showing some hardening of the constraints for women in the last year of the considered period.

The estimates in Table 10 consider only four countries, each one representative of a group in the cluster analysis presented in ANCIEN WP1. The results are very similar to the ones obtained for the whole sample of countries, and for this reason we are not looking at all variables in detail. We only underline that in this case in Belgium and Italy the probability of being constrained is lower than in Spain, like in the Netherlands. Moreover, retired persons present a higher probability to be constrained than working people, whereas health status does not have a relevant impact.

Finally, in the following pages, we look at the estimations for the selected countries separately (Table 10). In fact, marginal responses to the various factors that affect the probability of being constrained may vary across countries, also because of the different institutional set-ups that people face, including public arrangements for care-giving. Cross-country comparisons highlight the differences across countries in the variables influencing the probability of being constrained.

Firstly it is to be noticed that in Belgium, formal long-term care services are well developed, even if informal care is widespread (Willemé, 2010): this fact could explain the low percentage of constrained caregivers (see Table 8) and also that only a few variables in the estimation of the probability of being constrained for Belgium (Table 10) are significant.[11]

The probability of being constrained in paid work increases if the caregiver is a woman in two countries (the Netherlands and Spain). In Italy the gender coefficient is not significant, but this seems to be compensated for by a significant and high coefficient for housewives, and for people with a double burden (both children and adults), suggesting that the commitment of care-giving discourage women from entering the labour market. The probability significantly increases when the individual is looking after both adults and children in all the countries. The double family tasks make the constraints take effect even in Belgium.

As for the exit from the labour market, in Italy we find also a significant, positive coefficient for retired persons, suggesting that retirement could also be chosen to face care burdens. In the Netherlands, the probability to be constrained is higher among the unemployed, whereas in Italy and Spain to be unemployed is not a significant variable. This may depend on the worst conditions of the labour market in the Mediterranean countries, where the unemployed have less opportunity to work, apart from care burden. In this case the care-burden constraints do not take effect, and it is also possible that people in this specific case do not perceive the restraints. People who are not actively seeking for a job or have not hope to find it could even find it difficult to reckon if their behaviour is due to labour market discouragement or to the fact that they have somebody to care for. In Belgium, instead, the probability of being constrained decreases when an individual is in the category of others economically inactive, compared to workers: in this country, the inactive people are not strongly conditioned by the care-burden in their decision to stay out of the labour market.

To be an employee is significant only in the Netherlands and Spain. In these two countries, the coefficient of part-time is very high: for instance in the Netherlands the probability to be constrained for an individual working part-time is 25% higher than for people working full-time. Part-time work seems to be the way many people in the Netherlands face care burden.

The probability to suffer constraints for people who look after a person living elsewhere is lower than for those who cohabit with the assisted person in the Netherlands, whereas in Italy and Spain it is not significant. This could be due to the fact that, as seen, in the Mediterranean countries both the seriously non-self sufficient persons and those who are not in very bad conditions often live with their descendants, while in the Netherlands the elderly more frequently live on their own if they can afford it and this choice is made easier by the consistent public support they receive.

The variables on marital status and level of education are generally not significant; Spain is the only country with significant, positive coefficients for people with secondary and tertiary levels of education.

As for the years control variables, it is possible to identify a trend for Italy, where the probability of suffering constraints seems to decrease, and Spain, where it seems to increase.

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[11] Note that, checking for collinearity problems among the explanatory variables, we have not found evidence of this problem.

Table 9. Probability of being constrained in the amount or kind of paid work because of giving care to old, sick or disabled persons –
    Sample of pooled countries (11 countries) and sample of women

Variables	1		2		3		Only women	
	dF/dx	z	dF/dx	z	dF/dx	z	dF/dx	z
age	0.0080	6.34	0.0138	9.63	0.0153	10.54	0.0213	9.90
age^2	-0.0001	-10.53	-0.0002	-12.74	-0.0002	-13.57	-0.0003	-12.71
Woman	0.1271	20.26	0.1089	15.31	0.0671	8.88	-	-
separated/divorced	0.0483	4.41	0.0132	1.18	0.0131	1.18	0.0236	1.54
widow	0.0546	4.57	0.0031	0.25	-0.0153	-1.32	0.0064	0.41
married	0.0745	12.99	0.0303	4.49	0.0069	0.99	0.0164	1.67
second stage of secondary level education (ISCED3)	0.0179	2.59	0.0281	3.65	0.0116	1.54	0.0146	1.39
recognised third level education (ISCED 5-7)	0.0604	9.63	0.0494	7.10	0.0181	2.56	0.0197	2.00
looking after children and others	-	-	0.1543	30.77	0.1454	29.07	0.1701	26.51
looking after persons (other than children) live elsewhere	-	-	-0.0231	-4.87	-0.0295	-6.23	-0.0414	-6.41
hours of care	-	-	0.0066	22.30	0.0059	19.78	0.0067	16.83
hours of care^2	-	-	0.0000	-13.54	0.0000	-11.95	0.0000	-9.87
employee	-	-	-	-	-0.0531	-7.81	-0.0847	-8.44
part time	-	-	-	-	0.1726	20.29	0.2152	19.21
unemployed	-	-	-	-	0.0308	3.07	0.0423	2.96
retired	-	-	-	-	0.0167	1.88	0.0300	2.29
doing housework, looking after children or other persons	-	-	-	-	0.1306	16.71	0.1547	14.83
others economically inactives	-	-	-	-	-0.0154	-1.55	-0.0334	-2.48
not hampered in daily activity because of health problems	-	-	-	-	0.0156	3.24	0.0175	2.66
years present in the survey	0.0032	3.26	0.0001	0.12	-0.0004	-0.31	0.0002	0.14
mills	0.0316	0.62	-0.1934	-3.28	-0.3194	-5.41	-0.3651	-4.87

year 1994	-0.0263	-3.53	-	-	-	-	-	-
year 1995	-0.0176	-2.38	-0.0190	-2.57	-0.0170	-2.43	-0.0316	-3.25
year 1996	-0.0039	-0.52	-0.0062	-0.84	-0.0065	-0.88	-0.0221	-2.29
year 1997	0.0180	2.31	0.0155	2.01	0.0145	1.88	0.0075	0.74
year 1998	-0.0006	-0.08	0.0019	0.25	0.0036	0.46	-0.0043	-0.42
year 1999	-0.0069	-0.89	-0.0096	-1.24	-0.0097	-1.27	-0.0283	-2.81
year 2000	-0.0147	-1.85	-0.0143	-1.80	-0.0142	-1.80	-0.0234	-2.23
Denmark	-0.1024	-11.73	-0.0411	-3.68	-0.0040	-0.33	-0.0203	-1.19
The Netherlands	-0.0491	-7.74	-0.0181	-2.40	-0.0252	-3.36	-0.0248	-2.38
Belgium	-0.0757	-10.18	-0.0239	-2.54	-0.0102	-1.07	-0.0340	-2.65
France	-0.1207	-18.06	-0.0736	-8.79	-0.0670	-7.81	-0.0685	-5.65
Ireland	0.0266	3.37	0.0189	2.10	-0.0036	-0.42	-0.0187	-1.62
Italy	-0.0457	-8.43	-0.0196	-3.09	-0.0098	-1.53	-0.0325	-3.85
Greece	-0.0110	-1.54	-0.0110	-1.33	-0.0122	-1.49	-0.0217	-2.02
Portugal	0.0272	3.35	0.0368	4.07	0.0459	4.98	0.0661	5.83
Austria	-0.0499	-6.04	-0.0394	-4.55	-0.0348	-4.00	-0.0385	-3.32
Finland	-0.1261	-16.38	-0.0874	-9.28	-0.0614	-6.04	-0.0913	-6.18
obs. Probability	0.19		0.19		0.19		0.24	
pred. Probability	0.16		0.15		0.14		0.19	
Number of observations	44732		35564		35564		25422	
Pseudo R^2	0.10		0.17		0.20		0.18	

* The omitted categories for the dummy variables are: *men* for "gender", *not looking after children and others* for "present daily activity without pay", not married for "marital status", *self employment* for "status in employment", *full time for "working hours", less than second stage of secondary education* (ISCED 0-2) for "level of education", *working* for "main activity status", hampered in daily activity because of health problems for "health status", *not looking after persons (other than children) or looking after persons who live in the household or that live in the household and elsewhere for* "place of caregiving if caregive", *2001* for "years", *Spain* for "countries".

Table 10. Probability of being constrained in the amount or kind of paid work because of giving care to old, sick or disabled persons – Sample of pooled countries (4 countries) and sample of each country among the four countries considered

Variables	Pooling four countries		Netherlands		Belgium		Italy		Spain	
	dF/dx	z	dF/dx	z	dF/dx	z	dF/dx	z	dF/dx	z
age	0.0177	7.34	0.0242	5.58	-0.0109	-1.76	0.0134	2.48	0.0239	5.09
age^2	-0.0002	-9.26	-0.0003	-6.79	0.0001	0.96	-0.0001	-2.98	-0.0003	-6.29
woman	0.0757	6.51	0.1341	7.57	-0.0347	-1.30	0.0323	1.24	0.1296	5.03
looking after children and others	0.1655	22.77	0.1198	9.01	0.0644	4.21	0.2125	18.69	0.1439	8.36
separated/divorced	0.0315	1.82	0.0630	2.07	0.0511	1.64	-0.0453	-1.27	0.0558	1.33
widow	-0.0178	-0.97	0.0210	0.55	0.0810	1.38	-0.0419	-1.22	-0.0547	-1.59
married	0.0107	0.98	0.0397	1.97	0.0330	1.32	-0.0090	-0.43	-0.0203	-0.91
employee	-0.0406	-3.64	-0.1144	-6.77	-0.0169	-0.63	0.0147	0.69	-0.0778	-2.93
part time	0.1633	12.41	0.2480	10.87	0.0017	0.07	0.1451	5.65	0.2293	6.75
second stage of secondary level education (ISCED3)	0.0006	0.05	0.0217	0.91	-0.0272	-1.63	-0.0167	-0.85	0.0890	2.79
recognised third level education (ISCED 5-7)	0.0124	1.16	0.0140	0.62	-0.0197	-1.14	-0.0177	-0.97	0.0971	4.04
unemployed	0.0662	4.29	0.1081	4.52	0.0543	1.50	0.0281	0.94	0.0104	0.32
retired	0.0478	3.20	-0.0163	-0.31	-0.0313	-0.98	0.0799	3.15	0.0715	1.93
doing housework, looking after children or other persons	0.1106	9.24	0.0426	2.72	0.0068	0.23	0.1906	7.93	0.1426	5.39
others economically inactives	-0.0057	-0.36	0.0036	0.15	-0.0755	-2.56	0.0577	1.76	-0.0319	-0.98
not hampered in daily activity because of health problems	0.0066	0.86	0.0181	1.70	-0.0141	-0.79	-0.0031	-0.20	0.0377	2.32
looking after persons (other than children) live elsewhere	-0.0361	-5.21	-0.1359	-9.06	-0.0272	-1.71	-0.0081	-0.77	-0.0182	-1.13
hours of care	0.0047	10.54	0.0040	4.45	0.0032	3.31	0.0053	5.90	0.0057	5.97
hours of care^2	0.0000	-4.89	0.0000	-2.50	0.0000	-1.65	0.0000	-2.59	0.0000	-2.81
years present in the survey	-0.0016	-0.90	0.0018	0.65	0.0022	0.49	-0.0048	-1.50	-0.0013	-0.36
mills	-0.2328	-2.63	-0.8611	-4.48	1.0075	4.15	-0.2853	-1.36	-0.4354	-2.66
year 1995	-0.0428	-4.04	-0.0541	-2.93	-0.0418	-1.77	-0.0223	-1.15	-0.0648	-2.98

year 1996	-0.0120	-1.10	-0.0327	-1.72	-0.0533	-2.34	0.0863	4.07	-0.0925	-4.28
year 1997	0.0176	1.55	-0.0428	-2.29	0.0045	0.18	0.1162	5.34	-0.0546	-2.45
year 1998	-0.0038	-0.33	-0.0075	-0.42	-0.0506	-2.20	0.0475	2.30	-0.0491	-2.12
year 1999	-0.0106	-0.94	-0.0324	-1.91	-0.0330	-1.36	0.0597	2.87	-0.0683	-2.94
year 2000	-0.0203	-1.75	0.0294	1.54	-0.0279	-1.12	-0.0281	-1.40	-0.0448	-1.78
The Netherlands	-0.0424	-4.60	-	-	-	-	-	-	-	-
Belgium	-0.0378	-3.45	-	-	-	-	-	-	-	-
Italy	-0.0224	-2.82	-	-	-	-	-	-	-	-
obs. Probability	0.21		0.18		0.13		0.21		0.27	
pred. Probability	0.17		0.10		0.10		0.16		0.23	
Number of observations	17835		3847		2213		6753		5022	
Pseudo R^2	0.16		0.28		0.13		0.17		0.15	

6.   Conclusions

This study analysed labour market constraints due to giving care to an adult, using the ECHP database. The ECHP survey includes some questions specifically aimed to investigate whether people suffer such constraints. Constraints affect both people employed and those not employed, even if individuals claiming to be constrained in their amount or kind of paid work more often are non-working people. In the literature the problem of whether individuals give up work to engage in informal care or take up care responsibilities because they lack employment opportunities is crucial. Thanks to the ECHP database, we know that a certain number of individuals claim to have working constraints because of being a caregiver: they had either to give up work or to stop looking for it or to work less than they would have liked, or more generally were prevented from undertaking the amount or kind of paid work they otherwise would be willing to undertake.

We investigate this issue estimating the probability to be constrained according to a number of variables among the sample of caregivers.

Our estimates confirm some results of previous literature in this field: besides the well-established role of gender and age, the features of care-giving are crucial for the consequences for the labour market, because only the heaviest burdens hamper the caregiver from participating in the labour market as desired. Serious burdens are characterised by higher informal-care intensity and the co-habitation with the assisted person. Considering the pooling of all the ECHP countries, the probability to incur constraints increases by 0.9% for each additional hour of care-giving, starting from 15 hours of care. Looking after adults who are not living with the carer reduces the probability of about 3% (4% in the estimation for women only).

For the purpose of taking policy decisions, Heitmueller (2004) observed that it is important to know whether labour market participation is restrained by care tasks or if people who cannot enter the labour market become a carer. The present study, focusing on those whose labour market participation is restrained, suggests that policies to increase labour market participation should be addressed to reduce the care burden for those caring for people requiring a high intensity of care.

Among workers, those in part-time jobs have a probability to suffer constraints 17% higher than those with a full-time job. This result suggests that many people are induced to choose part-time jobs to be able to provide care. The flexibility in working-time arrangements can increase the employment rate, allowing those who are working full time to reduce the hours of work, those who are out of the labour market and would like to enter or to re-enter to reconcile working activity with care responsibilities. Among those not working, housewives seem to perceive stronger constraints than do the unemployed compared to working people. It is interesting to observe that in this group of non-active people – mainly women – many individuals would desire to become active. Furthermore, people who have to provide care to both children and adults at the same time have more problems (the probability to be constrained is 15% higher than for those who care only for adults). Thus policies addressed to alleviate the care burden and increase women's participation in the labour market are desirable, and a widening of the opportunities to work part time could perhaps represent an acceptable compromise; an increase of childcare services would also help.

These results show a general picture that assumes different characteristics in the different countries. It is important to analyse these differences, because policies have to be designed according to specific circumstances. We have focused our attention on four countries (the Netherlands, Belgium, Italy and Spain), belonging to the 'quantitative' cluster estimated by ANCIEN WP1.

The main differences among these countries in the field of labour market constraints regards how the gender gap emerges, the consequences of the double burden and the place where the care is given (in the household or elsewhere). In the Netherlands women have a higher probability to be constrained than men (+13%), whereas in Italy the problems specifically affect housewives, who desire to work but suffer constraints with a probability of 19% higher than workers (in the Netherlands, this probability is only 4% higher). Therefore in Italy a problem emerges on the labour supply side that is hampering participation in the labour market, mainly regarding women's participation. Spain has significant and high coefficients both for women and for housewives. Thus, in Italy (and Spain), an improvement in the LTC system is required to favour women's participation in the labour market, which is particularly low, whereas in the Netherlands policies should rather focus on reducing constraints on active women. Moreover, providing care to children, besides adults, increases the probability of constraints in all countries studied, but mostly in Italy (+21%) followed by Spain (+14%). This probably reflects a lack of childcare services. The double burden affects labour activity even in Belgium, where most variables are not significant.

In the Netherlands, co-habitation with the assisted person is a strong determinant of the constraining burden (the probability diminishes by 14% if the assisted person lives elsewhere), while in Italy and Spain the coefficient sign of this variable is negative but the result is not significant. It is likely that in Mediterranean countries co-habitation is more frequent also when the assisted person does not require a strong support. In the Netherlands, instead, the assisted person is more likely to live alone, taking advantage of widely available public support. In Belgium the coefficient is not significant, but in this case the wide range of public services supplied, both residential and at home, is likely to be the cause.

These results suggest that in countries such as the Netherlands policies to remove labour market constraints due to care-giving should focus on people who face the heaviest care burdens and on active women, while in other countries such as Italy and Spain, the main problem is women's participation in the labour market, requiring improvements in adult and children care services, along with more opportunities to work part time.

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Appendix: The selection equation in the two-stage Heckman model

We present below in Table A1 the first-stage probit estimates used to adjust for sample selection our estimates of being constrained due to giving care. Interestingly, the number of adults increases the probability of being a caregiver and its effect is highly statistically significant – offering reassurance that the exclusion restriction has predictive power on the probit model. As expected, being a caregiver is more likely among women and the equation is concave in age. The probability is higher for those with higher education and is lower for those who are married, separated or divorced, as well as being widowed compared to being single. Some sort of trend emerges, with a significant and positive coefficient for the earlier years studied. A group of countries shows a higher probability to be a caregiver (Denmark, the Netherlands, Belgium, Italy and Finland) compared to Spain, whereas another group presents a lower probability (France, Ireland, Greece, Portugal and Austria).

Table A1. Probability of care-giving old, sick or disabled persons

First Stage	dependent variable: being a caregiver	
variables	Marginal effects	z
age	0.0073	84.84
age^2	-0.0001	-74.08
woman	0.0392	87.88
separated/divorced	-0.0082	-7.81
widow	-0.0241	-29.11
married	-0.0133	-19.21
second stage of secondary level education (ISCED3)	0.0115	15.76
recognised third level education (ISCED 5-7)	0.0104	16.04
years present in the survey	0.0001	0.72
number of adults in the household	0.0082	44.14
mills	-	-
year 1994	0.0168	17.36
year 1995	0.0067	7.25
year 1996	0.0040	4.48
year 1997	0.0035	3.88
year 1998	0.0036	3.95
year 1999	0.0015	1.63
year 2000	-0.0006	-0.62
Denmark	0.0033	2.80
The Netherlands	0.0114	12.33
Belgium	0.0148	13.16
France	-0.0092	-11.58
Ireland	-0.0020	-2.14
Italy	0.0087	11.60
Greece	-0.0116	-14.76
Portugal	-0.0177	-23.36
Austria	-0.0051	-5.00
Finland	0.0114	9.72
obs. Probability	0.05	
pred. Probability	0.04	
Number of observations	834818	
Pseudo R^2	0.08	

* the omitted categories for the dummy variables are: *men* for "gender", *not looking after children and others* for "present daily activity without pay", *not married* for "marital status", *self employment* for "status in employment", *full time* for "working hours", *less than second stage of secondary education (ISCED 0-2)* for "level of education", *working* for "main activity status", *hampered in daily activity because of health problems* for "health status", *not looking after persons (other than children) or looking after persons who live in the household or that live in the household and elsewhere* for "place of caregiving if caregive", *2001* for "years", *Spain* for "countries".

About ISTAT

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ANCIEN

Assessing Needs of Care in European Nations

FP7 HEALTH-2007-3.2-2

Launched in January 2009, ANCIEN is a research project financed under the 7th EU Research Framework Programme. It runs for a 44-month period and involves 20 partners from EU member states. The project principally concerns the future of long-term care (LTC) for the elderly in Europe and addresses two questions in particular:

1) How will need, demand, supply and use of LTC develop?

2) How do different systems of LTC perform?

The project proceeds in consecutive steps of collecting and analysing information and projecting future scenarios on long term care needs, use, quality assurance and system performance. State-of-the-art demographic, epidemiologic and econometric modelling is used to interpret and project needs, supply and use of long-term care over future time periods for different LTC systems.

The project started with collecting information and data to portray long-term care in Europe (WP 1). After establishing a framework for individual country reports, including data templates, information was collected and typologies of LTC systems were created. The collected data will form the basis of estimates of actual and future long term care needs in selected countries (WP 2). WP 3 builds on the estimates of needs to characterise the response: the provision and determinants of formal and informal care across European long-term care systems. Special emphasis is put on identifying the impact of regulation on the choice of care and the supply of caregivers. WP 6 integrates the results of WPs 1, 2 and 3 using econometric micro and macro-modelling, translating the projected needs derived from WP2 into projected use by using the behavioral models developed in WP3, taking into account the availability and regulation of formal and informal care and the potential use of technological developments.

On the backbone of projected needs, provisions and use in European LTC systems, WP 4 addresses developing technology as a factor in the process of change occurring in long-term care. This project will work out general principles for coping with the role of evolving technology, considering the cultural, economic, regulatory and organisational conditions. WP 5 addresses quality assurance. Together with WP 1, WP 5 reviews the policies on LTC quality assurance and the quality indicators in the EU member states, and assesses strengths, weaknesses, opportunities and threats of the various quality assurance policies. Finally WP 7 analyses systems performance, identifying best practices and studying trade-offs between quality, accessibility and affordability.

The final result of all work packages is a comprehensive overview of the long term care systems of EU nations, a description and projection of needs, provision and use for selected countries combined with a description of systems, and of quality assurance and an analysis of systems performance. CEPS is responsible for administrative coordination and dissemination of the general results (WP 8 and 9). The Belgian Federal Planning Bureau (FPB) and the Netherlands Bureau for Economic Policy Analysis (CPB) are responsible for scientific coordination.

For more information, please visit the ANCIEN website (http://www.ancien-longtermcare.eu).