Are Italian women *sick* of working?
Insights from a simultaneous equation model

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Abstract

According to the prevailing social and cultural norms and statistical data, women in Italy shoulder the primary responsibilities of family, childcare and housework. This paper explores the effects of family care responsibilities on the health status of Italian women and their employment. We move from the assumption that uneven share of family roles within the household are among the structural obstacles to successful labour market access. Our analysis is carried out through a two-equation system model on the longitudinal version of the 2010-2013 European Union Statistics on Income and Living Conditions survey. Our results suggest that multiple caring responsibilities negatively and significantly affect women's health status as well as their employment probability. These findings support the need for policy measures which, through a cultural shift, tend to alleviate the women's involvement in caring activities as a means of increasing their participation to the labour market.

Keywords: Women's health; family care responsibilities; women's employment; unpaid work.

JEL classification: J16, J21, C33

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1. Introduction

The economic involvement of women has steadily increased worldwide (and Europewide) in the last decades following the economic development of the individual countries and the social transformation thereto occurred (WEF, 2017). Nevertheless, the employment of Italian women fares low in the international rankings and comparisons and does not respond to the country's perceived socio-economic changes of the latest years (Del Boca et al., 2005), i.e. more education and more employment opportunities (Kabeer and Natali, 2013), ex-ante discrimination (Fortin, 2005), the secondary earner nature (Ciccia and Bleijenbergh, 2014) and family preferences/obligations (Addabbo et al., 2012).

Some authors (Cousins and Tang, 2004; Anxo et al. 2011; Gash et al., 2012, Istat, 2012) have investigated the time use of women and men to explain the different patterns of the employment dynamics of different countries, unveiling the fact that women, overall, work more than men do, when considering market and home work. Other authors have (Viitanen, 2005; Watts, 2008) linked this extra unpaid work not only to the reasons why women work less, but also to the negative self-perception of own health status.

Others (Bolin et al., 2008; Carmichael and Charles, 2003; Ciani, 2012; Crespo and Mira, 2014) have also argued that this negative perception of own health status further affect and discourages the efforts of women to access at all labour market and to build a career, from education attainment to employment maintenance.

This paper aims to assess the effect of the presence of family care caring (children, elderly and disabled household members) on employment and health of Italian women. The analysis of the relationship between effective opportunities for women to work and their family care responsibilities can help to explain the weak dynamics of women's employment in Italy (and in similar countries) and the persistently high gender gap, especially as for the dimension of economic participation and opportunities (as reported by the World Economic Forum through the Global Gender Gap Index, WEF 2017).[3]

The analysis offered might help building a stronger policy argument to facilitate the access to employment and the share of household responsibilities for women according to the different and intertwined facets which arise from the perspective of this analysis.

The paper proceeds as follows. Section 2 offers a review of the existing literature on the relation between health and employment. Section 3 introduces the econometric model. Section 4 describes the microdata and the

[3] The Global Gender Gap Index (World Economic Forum), ranked Italy at 82nd place out 144 in 2017. This place underlies a very differentiated situation in the four sub-indexes for economic participation and opportunity, education attainment, health and survival, and political empowerment. In the context of economic participation and opportunity, Italy faces a major disadvantage. Interestingly, only enrolment in tertiary education and one measure of health life expectancy record a gender gap in favour of women.

indicators used in our analysis, and Section 5 discusses the empirical results. Section 6 gives concluding remark and some policy recommendation.

2. Literature review

Some authors, following Grossman's interpretation (1972) of Becker's assumptions (1964) on health and human capital, argued that health is a component of human capital, able to influence employer's decisions and workers' choices, if and when properly disclosed and accounted for. Poor health has a considerable effect on most phenomena of interest to labour economics, i.e. labour force participation, wages, hours worked, retirement, job turnover, and benefits packages (see Currie and Madrian, 1999 for a thorough review).

According to these mentioned studies, then, what hampers women's participation and employment in the labour market has to be searched not only in their reproductive role and in subsequent family care responsibilities in general, but also in their health conditions and relevant health perception.

In OECD countries, more than one in ten adults are involved in informal, often unpaid, caregiving, and the majority of them are women - men become carers at later age (OECD, 2011) - though a wide heterogeneity is found across Europe (Schmitz and Stroka, 2014).

Informal care can increase women's workload and cause health stress (Miller et al., 1991; Coe and Van Houtven, 2009; Bauer and Sousa-Poza, 2015; Dukhovnov and Zagheni, 2015), thus influencing individual preferences towards the choice of not participating in labour market.

The higher load of paid and unpaid worked hours has a negative effect on health (Dinh et al. 2017). We know from other discipline, health sociology *in primis*, that the health determinants can be identified in socio-economic, cultural and environmental conditions (in which we find life and work conditions); social and community networks; individuals' lifestyle; constitutional factors. Health, in turn, becomes a determinant for other dimensions of the individual (Marmot and Wilkinson, 2005; Maciocco, 2009; WHO, 2017).

Poor health, however determined, also reduces labour productivity and leads to reduced labour force participation and employment, whereas health problems impose a cost on the whole economy in terms of care expenditure and production loss. A better understanding of the relationship between health and labour market outcomes, both influenced by family responsibilities, is therefore necessary to wholly understand the performance of women in their working life. Informally provided care activities, such as childcare and long-term care of co-residing elderly or disabled family members, can be important barriers to women's employment since

a higher share of time allocated in the household and a lower (sometimes null) share allocated in the market (Viitanen, 2005).

We analyse employment and health simultaneously, looking at how health status eventually drives women employment. Similar studies have been conducted mainly for the United States and Australia (Cai, 2010, Cai and Kalb 2006), not so many for European groups of countries. Very few studies have tried to simultaneously analyse the multiple roles of a family caregiver with the view of understanding employment and health outcomes, especially in a country like Italy where family and work roles of women appear to be peculiar with respect to other European countries.

The specific literature on the reciprocal/simultaneous effects of employment and health is therefore adding new insights and perspectives, possibly leading to more efficient implications. This literature suggests that more favorable working conditions and high job security give the way to better health conditions (e.g., Datta Gupta and Kristensens, 2008, and Llena-Nozal, 2009). On the other hand, inadequate (qualitative and quantitative) working conditions and disregard to job satisfaction are thought to affect health negatively. Cottini and Lucifora (2013) have used 3 waves of the European Working Conditions Survey to study fifteen European countries and investigate the impact of work on health. Their findings suggest that a set of workplace attributes, such as working in shifts, performing complex and intensive tasks and having restricted job autonomy lead to a higher probability of reporting health problems. Another strand observed that there is a self-selection of workers with a lower health status into specific jobs, which can cancel the negative relation between temporary contract and health (Ehlert and Schaffner, 2011).

Our empirical analysis wants to add up to those studies that have proved the negative relation between family responsibilities and women's employment (Leigh, 2010; Munasinghe et al., 2008) by extending the debate to important factors which lay outside the labour market. Summing up, the major obstacles found impeding the access or the permanence in the labour market are generally identified in the lack (or scarcity) of public or publicly funded family services and support (childcare; extra-school hours; external day care for disabled; home support for disabled). These obstacles have also an indirect negative effect for those women who strived to remain in the labour market while reconciling their family and working roles (Del Boca, 2015) in terms of pay and career opportunities.

We focus on Italy because it is an interesting case study: the high cost of (limitedly) available childcare strongly and negatively influences women attitude to work (Brilli et al., 2016).

In Italy, cultural factors and low availability of formal childcare still define gender roles based on the breadwinner model in which the role of carer in the household is mainly delegated to women (Anxo et al., 2011; Garcia-Mainar et al., 2011; Cutillo and Centra, 2017). As above stated, informally provided – and unpaid – care activities constitute obstacles to women's participation in labour market (Viitanen, 2005; Watts, 2008). This fact is worsened by the lowest ever participation rate of Italian women in the whole EU supporting the argument of what is known in the literature as "discouraged worker effect" (see, for instance, Baussola and Mussida, 2014). The women who stay out of employment are those who would have earned the lowest returns from the market work because of lower education attainments and/or relatively heavier family responsibilities share. These effects increase if the dependents they have in charge have an impairing disability/limitation in daily activities or two groups or more of dependents are cared for within the same family: children, disabled children, disabled household member, sick/disabled elderly (Bratti et al., 2005; Marenzi and Pagani, 2005).

As for the availability and affordability of care services, Italy is identified as a Southern/conservative country (Bambra and Eikemo, 2009) where the responsibility of individuals' care is mostly in the hands of family members (especially women), and less on the state, due also to the scarcity of the provision of public services. Then, the "natural" provider of care in the Italian households, not only for small children, but also for all other types of dependents, is a woman: mother, daughter, daughter-in-law (Del Boca, 2015). These findings are strengthened by the data on time use: statistics at the European level from the Harmonised European Time Use Survey (HETUS), and the study on time use from the National Italian Institute of Statistics (Istat, 2012) picture Italian women working, in both paid and unpaid work, more than other European women and more than Italian men. The study on time use depicts Italian women working, on the whole, like other European women residing in Spain, Germany, UK and Sweden. The main difference rests on the division of market/domestic work: Italian women work in the house/for the family more than their European counterparts, and more than Italian men do. This unbalanced division of care responsibilities, while worsening the burden of duties for women, it nevertheless helps to disentangle one of the most relevant reason for the existence of these obstacles to a balanced work-family life in Italy.

Therefore, the double role held in work and family activities, which caused these women to be defined as member of the "sandwich generation",[4] becomes triple (childcare) and even quadruple (disabled or elderly care), exacerbated by the meager provision and support of public services. This makes the Italian adult women among the most fragile and susceptible to health stress during working age of all women in comparable European

[4] For the "sandwich generation" see Miller (1981). Although dating back in previous decades, these concepts are still largely used in the relevant literature (Do et al., 2014; Suh, 2016).

countries. Thus, the multiple roles played by women in daily life has become a major challenge, especially in Italy where low fertility, limited sharing of family responsibilities among sexes and limited provision of public family services are still impossible to be met simultaneously.

3. Empirical Strategy

As explained above, we are interested in investigating the effects of family care responsibilities (the presence of family members with different dependence needs) on health status and employment probabilities of Italian women.

Because the health status possibly guides employment decisions, an endogeneity problem due to simultaneity (two-way relationship between employment probability and health status or reverse causality) possibly arises.

In order to consider this endogeneity issue, we estimated a two-equation system model. One equation modelled the employment (probability) choice suspected of being endogenous, while the other modelled the health status, and included the employment indicator on its right side. This resulted in a structural equation model (see Altonji et al., 2005 for a similar application) that could be consistently and efficiently estimated by full information maximum likelihood.

The aim of our estimation strategy is to understand whether employment is really endogenous in the health equation and to get insights on the relationship between health and employment. Possible confounding factors affecting both caring decisions and health/employment, as also suggested by the existing literature, are individual motivations, preferences, attitudes to work of women, as well as family structure, type of marriage/relationship, knowledge and attitude of women towards child, elderly and disabled care services (see, for instance, Glick, 2002; Nigacu et al., 2014). While we are able to control for some of those factors, such as family structure and type of relationship (see Section 4), we do not have information on the other potential confounders. Our model strategy helps to control for those confounders and to understand their potential relationship with both health and employment outcomes of women by assuming, as we will see at the end of this section, that the error terms of both equations are correlated. The sign and significance of such correlation (proxied by the *rho* parameter) helps understanding whether there is endogeneity (rho significant) and the nature of such a relationship between the two outcomes (positive or negative *rho*).

We estimate the probability of being employed and the health status of Italian women aged between 25 and 64 years using a two-equation system of pooled probit regression model for the time period immediately after the

great recession, that is 2010-2013.[5] The choice of binary pooled regression models reflects the need to obtain a simplified representation of both labour market participation of women to employment and women's health status. With a binary representation we can split our sample in a more convenient and simple manner. In terms of employment, our dependent variable is one if the woman is employed and zero otherwise. For health, the analysis is based on the perceived health status of the individual. Our dependent variable is one for good health or absence of chronic (long-standing) illness or condition and zero for chronic (long-standing) illness or condition. The variable is expected to include different dimensions of health, such as physical, social an emotional function and biomedical signs and symptoms (for additional information on the variable for health, see footnote 5).The probit model used to estimate the employment equation was derived from a latent continuous variable y_1^* related to a set of explanatory variables x, according to a standard linear model that can be represented as follows:

$$y_{1i}^*=\beta x_i + v_i \quad (1)$$

where β is a vector of associated parameters to x and υ is an error term drawn from a standardized normal distribution. The vector x includes a variable, the regional annual unemployment rate, introduced for identification purposes. The estimates of the employment equation, as explained above, could be problematic because of the potential endogeneity. We consider the employment decision as endogenous and we use the regional unemployment rate as an instrument because it affects the employment decisions (suspected to be endogenous) but not the health status. High regional annual unemployment rates may induce women to stay at home/out of the labour market (reduce employment) given the difficulties they may otherwise have in obtaining a job. Moreover, given that we analyse the period immediately after the Great Recession, the condition of women in the labour market is even worse due to the discouragement worker effect, as also suggested by the literature (i.e. Baussola and Mussida, 2014). This would not exert any effect on the health status of women. Variations in local labour market conditions have been used as an identification strategy in a number of works on labour market outcomes, education and training choices, and skill acquisition including, among others, Campolieti et al. (2010), Parent (2006), and Riddell and Riddell (2014).

While y_1^* is unobserved, y_1 would be observed, and related to y_{1i}^* by the following relationship:

[5] We estimated our model also for a period before the economic crisis and the differences before and after the crisis were not statistically significant. We then decided to focus on one period, that is 2010-2013.

$$y_{1i} = \begin{cases} 1 \text{ if } y_{1i}^* > 0 \\ 0 \text{ otherwise} \end{cases} \quad (2)$$

The probit model for the health status equation also derived from a latent continuous variable y_2^* related to a set of explanatory variables z according to a standard linear model as follows:

$$y_{2i}^* = \alpha y_{1i} + \gamma z_i + u_i, \quad (3)$$

where α is the coefficient associated with the endogenous employment variable, γ is a vector of associated parameters to z, including some x-variables, and u is an error term drawn from a standardized normal distribution.

The two-equation system model allowed the error terms of both equations to be correlated. Accordingly, we also estimated a correlation term $\rho_{\upsilon u}$ measuring the correlation between residuals related to health with that of the employment equation. In particular, a positive correlation would be indicative that common unobserved confounding factors (for example, motivations, preferences and attitudes) improved both the health status and employment probabilities, and vice versa in the case of negative correlation. Accounting for the resulting endogeneity is therefore essential to avoid biased estimations (see Campolieti et al., 2010).

4. Data and Sample

Our data are from the European Union Statistics on Income and Living Conditions (EU-SILC) survey. The survey is based on the harmonized methodology and definitions across most members of the European Union (see Eurostat, 2010, for further and technical details about the EU-SILC data). The topics covered by the survey are living conditions, income, social exclusion, housing, work, demography, health, and education. We select data for Italy, where the survey is conducted on a yearly basis by the Italian National Institute of Statistics (ISTAT) under the coordination of Eurostat. We analyse the time period 2010-2013. Our sample includes women aged between 25 and 64 years. In order to avoid to get mixed up with education enrolment and early retirement issues, we exclude from our analysis women under the age of 25 years and over the age of 64 years.

We also drop individuals with missing values for some variables used in the econometric analysis. Considering both the non-employed and the employed in the age range examined, 6,399 women observations remain over the period 2010-2013. Table 1 reports summary statistics of the variables used in the econometric analysis computed on the sample of women.

The dependent variable for the health equation is the perceived health status. We note that 81.46% of the sample does not suffer of any/a chronic or long-standing illness or condition and declares a health status that ranges

among very good, good, and fair. For the remaining (less than one fifth of the sample) the health status is either bad or very bad.[6]

The dependent variable for the employment equation is the probability of being employed. In a first attempt, we introduced a disaggregation by (rough) type of work (e.g., permanent, temporary, part-time, full-time, self-employed) but we did not find different impacts by type of employment on health. The association between employment and health did not change with the type of employment.

Table 1. Descriptive statistics of individuals and households' characteristics of women: health and employment equations. 2010-2013 (%)[(a)]

	Share of the sample	Std. Dev.
Health equation[(b)] Good health	81.46	38.86
Employed	50.10	50.00
North	49.32	50.00
Centre	21.22	40.89
South	29.46	45.59
Employment equation		
Employed	50.10	50.00
Age [25, 34]	14.72	35.43
Age [35, 44]	26.94	44.37
Age [45, 54]	30.74	46.14
Age [55, 64]	27.60	44.70
Primary education	42.13	49.38
Secondary education	39.60	48.91
Tertiary education	18.27	38.64
Being in a relationship	72.09	44.86
Living in a densely populated area	39.51	48.89
Caring responsibilities		
Dependent children in the household	74.95	91.80
Non-disabled elderly in the household	8.08	27.25
No disabled in the household	76.04	42.69
Disabled in the household	17.66	38.14
Strongly disabled in the household	6.30	24.29
Regional annual unemployment rate	9.85	4.38
Observations	6,399	

Source: Authors' calculations from EU SILC 2010-2013.
Notes: (a) Figures are in percentage.
(b) For the health equation we only report the descriptive statistics of the covariates not included in the employment equation.

[6] We create the health status by using the EU-SILC variable PH020 which corresponds to the answer to the survey question: 'Do you suffer from a chronic (or long-standing) illness or condition?' The answer is 'yes' if the health status is either bad or very bad, while it is 'no' if the health status is fair, good, or very good. We also tried to use the variable PH010 which offers a disaggregation of the 'general health status' into five categories, that are very good, good, fair, bad, and very bad. However, the relative sample sizes of some categories (for instance, bad and very bad) were too low to conduct any statistical or econometric investigation.

We note that 50.10% of the active women are employed in 2010-2013. The definitions of employment and non-employment do not match the ILO definition. In the EU-SILC questionnaire, the respondents are indeed asked to self-define the main economic status in the current year.

We split the overall age range [25, 64] into four dummy variables (for the age ranges [25, 34], [35, 44], [45, 54], [55, 64]) as this allows capturing the characteristics of different types of women. First, women in their late 20s - early 30s (age range [25, 34] in our sample) will be having their first child, while women in their 50s and early 60s (age range [55, 64] in our sample) are very unlikely to have a young child. Second, differently from the older women, the youngest women are unlikely to have ageing parents demanding care. Finally, the probability of being employed is higher among the younger women.

Educational variables are defined according to UNESCO's International Standard Classification of Education (ISCED). The EU-SILC distinguishes between education completed in the lower secondary stage (ISCED 0–2), upper secondary education (ISCED 3), and post-secondary or tertiary education (ISCED 5–7). In our sample we find that, despite women have made notable progress in higher education in Italy (OECD, 2012), roughly 80% of our sample is low or middle educated (around 42% of the sample with primary education, and slightly less than 40% with secondary education).

Three dummy variables for the geographical area of residence (North, Centre, and South) are included in the model specification for health. Around half of the sample resides in the North of Italy (49.32%), followed by the South (slightly less than 30%) and the Centre (21.22%). In the employment equation we included an indicator for densely populated area. The geographical variations are indeed captured in that model by the regional unemployment rate which, as explained above, is used for identification purposes. Indicator for being in a relationship, that includes a relationship on a legal basis, i.e. married, or not legal, i.e. non-marital cohabitation, is included in the model, as it is likely to affect job opportunities. More than 70% of women is involved in a relationship.

The focus of this work is on the effects of caring activities on women health status and employment. First, caring activities refer to the presence of dependent children in the household. A dependent child is any person aged below 18, as well as aged 18 to 24 years living with at least one parent and economically inactive. Dependent children need supervision time when at school and economic support when out of school, which may impact women's availability for employment. Second, we account for possible caring tasks due to the presence of non-disabled elderly (individuals aged 65 years or over) in the household. Finally, we control for the presence of

disabled household members with different degrees of activity limitations (some activity limitations and strong activity limitations).

A set of explanatory variables is used to capture the effects of the presence of the family dependents (pertaining to the three main categories just described) mentioned on women employment opportunities and health status.

We included an indicator for the joint presence of dependent children and non-disabled elderly in the household. The use of the interaction between these two variables is primarily due to the fact that the presence of non-disabled elderly in the household might generate opposite effects on women's employment (and health status). On the one hand, non-disabled elderly might need care (care responsibilities increasing effect) and therefore might represent an obstacle for women employment (and possibly have a negative effect on health status), but on the other hand they might offer support for the caring activities of other household members, that is taking care of children (care responsibilities decreasing effect) thereby facilitating women's employment (and possibly exert a positive effect on health status). The use of interactions between the two possible caring responsibilities of women, i.e. children and elderly care, allow disentangling those effects on women's employment and health status and therefore to avoid spurious estimates.

We account for the presence of disabled household members with different degrees of disability. The EU-SILC defines disability as limitation in daily activities of different degree (variable PH030 in the EU-SILC code). We used indicators for the presence of household members with both some activity limitations and strong activity limitations, as different degrees of disability presumably entail different intensity of caring responsibilities.

In the employment equation we added an indicator to approximate the demand-side effect, that is the regional annual unemployment rate for women (available from the ISTAT at http://dati.istat.it/). The unemployment rate, as explained above, was used for identification purposes.

Finally, because we are using panel data, we included yearly dummy variables in our set of covariates.

5. Results

We adopted a structural two-equation system model to estimate the impact of health on women employment probability, accounting for endogeneity of employment. Tables 2 and 3 report the average marginal effects (AME) related to the equations for employment probability and health status, respectively, for the period 2010-2013. The use of the AME allows an interpretation of the effects in percentage points. For dummy variables, the AME give the impact (in percentage points) of a change from zero to one of the dummy variable on the dependent variable. For continuous variables, such as the regional annual unemployment rate, marginal effects

give the impact (in percentage points) of an infinitesimal change of these variables on the dependent variable. In what follows, we report and comment on the impact of the explanatory variables described above (and in Table 1) on health status and employment probability of women.

5.1 Health equation

The AME for the health status of women (Table 2) suggest that employment exerts a role on women health status, in that we find a positive association between employment and the subjective health status of women. Being young (age range [25, 34]), low educated (primary educational attainment level), and being in a relationship and residing in the South of Italy positively affect the health status of women. As far as caring activities are concerned, we find a positive association between the health status of women and the presence of non-disabled elderly in the household (+6.1 percentage points). We note instead a negative association between health status and caring of disabled both with some and strong activity limitations (-6.2 percentage points and -6.3 percentage points, respectively).

According to our findings from the employment equation and to those of health status, caregiving negatively affects not only employment probability but also (and significantly) women's health status. There are some differences in the key findings (on the effect of care responsibilities) between employment probability and health status that deserve more attention. These differences will be investigated in the next section by using also graphical representations.

Our estimation results also reveal that employment is endogenous in the health equation. The estimated *rho* parameter is significant and negative (-0.723). A negative sign of the *rho* parameter suggests that confounding factors, such as individual motivations, preferences and attitudes increase the employment probability of women and negatively affect health status. For instance, motivations, preferences and good attitudes to work might increase the labour market participation of women, and this might cause a deterioration in their health status because women also must afford stress and fatigue due to other care responsibilities. It is therefore essential to consider endogeneity, and our results reassured us on the adequacy and appropriateness of the model strategy adopted.

Table 2. Health status of Italian women: pooled probit model estimates, 2010/2013

	Coef.	Std. Err.	AME	
Dependent variable: health status				
Employed	1.453	0.126	0.393	***
Age: Reference – [55, 64]				
Age [25, 34]	0.638	0.089	0.165	***
Age [35, 44]	0.030	0.078	0.008	
Age [45, 54]	-0.135	0.066	-0.035	*
Education: Reference - Primary				
Secondary education	-0.226	0.050	-0.059	***
Tertiary education	-0.436	0.066	-0.113	***
Being in a relationship	0.279	0.043	0.074	***
Geographical area of residence: Reference – South				
North	-0.447	0.044	-0.116	***
Centre	-0.342	0.051	-0.089	***
Caring responsibilities: dependent children, non-disabled elderly, disabled in the household				
Interaction between presence of dependent children and presence of non-disabled elderly (base: absence of children and elderly)				
Presence of only non-disabled elderly	0.299	0.074	0.061	***
Presence of only dependent children	-0.017	0.044	-0.007	
Presence of both elderly and children	0.162	0.153	0.030	
Disabled in the household	-0.229	0.049	-0.062	***
Strongly disabled in the household	-0.234	0.074	-0.063	***
Yearly dummies				
2011	-0.082	0.049	-0.021	*
2012	0.033	0.050	0.009	
2013	0.006	0.050	0.002	
Rho	-0.723	0.078		**
Log-likelihood		-6537.62		
Observations		6,399		

Notes: Average Marginal Effects (AME). * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.
Source: Authors' calculations from EU SILC 2010-2013.

5.2 Employment equation

Table 3 shows that employment probabilities are negatively associated with age. We include dummy variables for specific age ranges and interesting results/differences among age ranges emerge. We note that middle-aged women (age range 35-44) have the highest employment probability (+26.4 percentage points), compared to the base category, that is older women (age range 55-64). The employment probability of women aged 45-54 is also high and precisely 25 percentage points higher with respect to older women. We also note that young women (age range 25-34) have a higher employment probability with respect to older women (+11.4 percentage points), but it is relatively low compared to the ones of the other age ranges examined (age ranges 35-44 and 45-54). These different findings are mainly due to the differences between the types of women captured by the age ranges. First, women in their late 20s - early 30s will be having their first child, and therefore relatively low employment probability, while women in their 50s and early 60s are very unlikely to have a young child but more likely to be at the end of their working career. Second, differently from the older women, the youngest and

middle-aged women are unlikely to have ageing parents demanding care. Third, and subsequently, the probability of being employed would be higher among the middle-aged women, that are women in the 35-44 age range.

The employment probability is instead positively associated to education. Women with secondary education, and especially those with tertiary education, significantly increase their employment probabilities compared to low educated women. The employment probability of women with secondary educational attainment levels is on average 18.7 percentage points higher with respect with the one of primary educated women and the percentage increases to 31.9 percentage points for tertiary educated ones. The positive role of education for women is confirmed by similar studies on Italian women labour force participation (Di Tommaso, 1999; Del Boca, 2002; Bratti and Staffolani, 2012).

Being in a relationship reduces the employment probabilities by 9.3 percentage points. Moving to caring responsibilities, to better explain the sign and significance of the presence of dependent children and non-disabled elderly in the household, we have estimated the joint effect of the two indicators on employment by using interaction variables. In general, we find a negative association between the employment probability of women and the presence of such household members, that are dependent children and/or non-disabled elderly, suggesting that quite often child- and elderly-care is almost entirely borne by women (Coe and Van Houtven 2009; Bauer and Sousa-Poza 2015; Dukhovnov and Zagheni 2015). Interestingly, we found that the negative impact on employment is at its highest when non-disabled elderly are present (-12.3 percentage points) and remain relatively high when dependent children are present (-9.7 percentage points) and both kinds of dependents are present (-6.8 percentage points). These findings confirm that both non-disabled elderly and child need care, thereby increasing caring responsibilities of women, and therefore represent an obstacle for women's employment. Moreover, the results for the presence of both kinds of dependents suggest that the presence of non-disabled elderly in the household does not represent a sufficient source of (free) informal care that might alleviate the overall care responsibilities of women (see, for instance, Carmichael and Charles 2003; Viitanen 2010).

These findings confirm the relevance of using interactions between the presence of dependent children and non-disabled elderly, that represent the main caring activities of women, to avoid spurious estimates and interpretations.

The presence of disabled in the household decreases the employment opportunities of women and the reduction is larger the higher the degree of disability or activity limitations. The presence of disabled with some activity

limitations reduces the employment probability by 5.4 percentage points and the reduction more than doubles for the presence of disabled with strong activity limitations in the household (-11.9 percentage points). Estimates of our main model suggest that caring activities negatively and significantly affect employment probability of women. Our findings are in line with similar previous works examining the effect of child (and elderly care) on women labour force participation in Italy. Marenzi and Pagani (2005), and Bratti and Staffolani (2012), among others, find that the presence of children and disabled members in the household reduces women labour force participation.

As regards demand-side factors, a high unemployment rate (used for identification purposes) reduces women employment probabilities (by 2.1 percentage points), and this is in line with expectations.

Table 3. Employment probability of Italian women: pooled probit model estimates, 2010-2013

	Coef.	Std. Err.	AME	
Dependent variable: employment probability				
Age: Reference – [55, 64]				
Age [25, 34]	0.345	0.059	0.114	***
Age [35, 44]	0.800	0.053	0.264	***
Age [45, 54]	0.755	0.048	0.250	***
Education: Reference - Primary				
Secondary education	0.566	0.038	0.187	***
Tertiary education	0.965	0.050	0.319	***
Being in a relationship	-0.282	0.041	-0.093	***
Living in a densely populated area	-0.142	0.032	-0.047	***
Caring responsibilities: dependent children, non-disabled elderly, disabled in the household				
Interaction between presence of dependent children and presence of non-disabled elderly (base: absence of children and elderly)				
Presence of only non-disabled elderly	-0.459	0.075	-0.123	***
Presence of only dependent children	-0.070	0.042	-0.097	*
Presence of both elderly and children	-0.360	0.152	-0.068	*
Disabled in the household	-0.163	0.045	-0.054	***
Strongly disabled in the household	-0.361	0.071	-0.119	***
Regional annual unemployment rate	-0.063	0.004	-0.021	***
Yearly dummies				
2011	-0.051	0.047	-0.017	
2012	0.147	0.048	0.049	***
2013	0.211	0.050	0.070	***
Observations		6,399		

Notes: Average Marginal Effects (AME). * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.
Source: Authors' calculations from EU SILC 2010-2013.

5.3 Marginal Effects of Health Status and Employment Probability

The key findings from the health status and employment probability analyses, as explained above, suggest that caregiving negatively affects both women employment probability and women health status. We found some differences in the findings for the effects of our interest, that are those of care responsibilities, on employment

probability and health status. The aim of this section is to analyse these differences by means of graphical representations and quantifications of the predictive margins of interests.

Figure (and Table) A1 in the Appendix reports the predictive marginal effects of being employed conditional on the key variables, while Figure (and Table) A2 shows the predictive margins of the health status on the same set of covariates. We focus our attention on the effects of the key variables related to care responsibilities, that are the interaction between presence of dependent children and non-disabled elderly in the household, presence of disabled with some and strong activity limitations in the household, and the indicator for being in a relationship. We can draw some interesting considerations.

From the top left panel of Figure A1, we note that the absence of dependent children and non-disabled elderly in the household is associated with higher employment probability (+ 52.3 percentage points). The employment probability diminishes for the presence of dependent children (+50.1 percentage points). There are important reductions if both kind of dependents are present and especially if only non-disabled elderly are present (-37.3 percentage points). The magnitude of the impact is higher for the health status compared to employment probability (see Table A2), but the effect is significantly positive only for the presence of non-disabled elderly (+84.8 percentage points).

If we look at presence of disabled, the employment probability significantly decreases with the presence of disabled and with the severity of their activity limitations. The presence of disabled with some activity limitations reduces employment probabilities by 5.5 percentage points (from 51.2 to 45.7 percentage points, see Table A1) and the reduction more than doubles with the presence of disabled with strong activity limitations (reduction by 11.5 percentage points, from 50.9 to 39.4 percentage points). From Figure A2, we note that there is a negative association also between the presence of disabled and health status, but the effect does not change significantly with the severity of disability. The health status, indeed, deteriorates by 9.5 percentage points for the presence of disabled household members with some activity limitations in the household, and by 12.4 percentage points for strongly disabled ones.

Finally, if we look at being in a relationship we note an opposite effect on employment probability and health status (bottom-right panel of Figures A1 and A2). Interestingly, being in a relationship diminishes the employment probability of women by 10 percentage points (from 57 to 47 percentage points, Table A1), while it increases health status by 5 percentage points (from 77.8 to 82.7 percentage points). Being in a relationship is an obstacle for women employment while it improve women health status. This suggests that, on the one hand, being in a relationship often implies additional responsibilities for women also due to a possible unequal share of

housework between partners. On the other hand, having a partner/relationship exerts a positive effect on the health status.

6. Conclusions

In our research, we simultaneously analysed the health status and employment probabilities of Italian women by pinpointing the effects of the presence of family responsibilities (presence and number of children, non-disabled elderly, and disabled in the household). We ran this analysis for Italy, a country in which child and family-related allowances are low and unevenly spread, making the reconciliation of family and working roles difficult. This is true especially for women, who so add an extra responsibility which, if not taken into account, threatens to negatively affect both present and future health status.

We find that caring activities negatively affect their perceived health status and the probability of successful access (finding a job) of women to the labour market as well. When considering education levels, the results suggest that high-educated women are more likely to be employed and healthier, a confirmation of previous literature, but here we confirm this also in presence of family commitments.

These same factors (education and paid work) are also renowned to have an impact on the health status of women. Therefore, the discussion on the mutual influence of employment outcomes and health status of women (i.e. those family members who mainly work and provide care for the family) can add to the debate on how much and for how many reasons a public intervention is highly recommendable. These considerations are to be made not only on a pure economic basis of computing the worth to the contribution made in the family production, but also on the basis of public efficiency purposes.

The social savings implied by informal, unpaid, stressed caregivers cannot become private costs borne only by those households who, by the unforeseeable events of life, end up with the triple care responsibilities for children (temporary at the beginning of professional life), elderly (at the peak/end of professional life), disabled family members (most likely all lifelong).

Our attempt to sketch the nature of the shaping factors of the health status of women suggests that private life preferences and decisions (family formation, career) and other circumstances affecting private life and citizen status (health status, presence of disabled, chronic illness of ageing family members) cannot be treated separately. They need to be monitored and accompanied by family friendly measures for the sake of cost-effectiveness and sustainability of a decent job as well as the right of family formation. A further necessary point

has to be made on the perspective of tackling one of the most threatening demographic challenge: the ageing of population and the low fertility rates who will fuel further this negative dynamic.

The descriptive data on the use of time show us a strong specialization of the tasks of Italian women and men, with a marked decrease in remunerated working hours for mothers and a parallel increase of those of fathers, unlike some other European countries, where the decision of working for the market seems independent from family composition and related care responsibilities.

It is well accounted for, in these data, that the presence of children further accentuates gender imbalance, increasing specialization roles. The sharp decline in hours of paid job of Italian mothers, and on the contrary, the rise in hours of paid work for the fathers, just after the birth of their children, is not so strong in any other country. Italy is also the only country where women's employment does not increase once the children are grown up. This effect, while partly being attributable to a cohort effect, is nevertheless significantly present only in Italy. This situation reflects the difficulties of Italian women trying to reconcile maternity, and family care responsibilities more in general, and work, brought by both cultural factors (i.e. traditional gender roles with poor participation in housework on behalf of the fathers) and structural constraints, such as the rigidity of the labour market and the limited supply of child and family care services.

The road to a more equal set of opportunities of market access, family responsibilities and good health maintenance and perception passes through a real and aware sharing of family and house responsibilities between partners and also among adult members of the family. The compulsory paternity leave in Italy, despite being extended year by year, is only of 5 days. The parental leaves up to 10 months (up to 3 years for parents of children with strong disability) for both parents are, so far, at best a palliative: until the collaboration of fathers/men will be socially blamed and generally unacceptable by peers and employers, any other possible measure – universally differentiating the conditions of women with family responsibilities – has to be found to level up what past behaviours and resilient culture have made profoundly unlevelled in economic, social and personal terms.

A sizeable disadvantage of women's labour market participation is observed in many other countries labour markets, and this has so far partly reflected the so-called breadwinner model, which, though dated and overtaken in many countries, unfortunately continues to negatively affect some areas in Southern Europe, Italy *in primis*. This is especially true for low educated women and for those who bear heavy family responsibilities: care of children and other family members affected by activity limitations/disability. The responsibility of caring for disabled can last for a long period, thereby making it even more difficult to access or stay in the labour market

and possibly have strong consequences in the health status of the caregivers, if not at the time of care, in their future (as a long-run effect on women health of caring).

In conclusion, effective actions to alleviate the heavy women involvement in family care tasks should more and more encompass considerations on joint health and employment effect of a relevant part of the population, by no means implying that the costs of these be borne by women only. Integrated policy actions, from education, women's (girls) empowerment to social services provision, from labour conditions to anti-discrimination surveillance (also at preliminary regulatory level), need to be conceived and planned in a systemic way.

The overall estimated effect of this kind of action has been already shown to be beneficial to the overall population, but this will entail big changes also in social and cultural norms, which, in turn, will help to shape new and fairer economic and health outcome for women. Previous studies on the relation between family care provision and employment have found empirically negligible effects, but this is true in northern and central European countries. Other studies, similarly to our results, found those effects to be significant in southern countries, due to women's different attitudes towards work as well as family ties. Despite the limitations and methodological constraints we pointed out in our paper, our research strand has a big potential for further developments. Possible steps for future research might include a gender analysis investigating and systematically discussing how provision of care and family responsibilities sharing affect employability of both women and men. An extension to other countries with either similar or very different framework of economic, social and cultural norms could also contribute to confirm a wide application of our results.

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APPENDIX: ADDITIONAL TABLES AND FIGURES

Figure A1. Predictive margins of employment conditional on specific covariates, with 95% confidence intervals

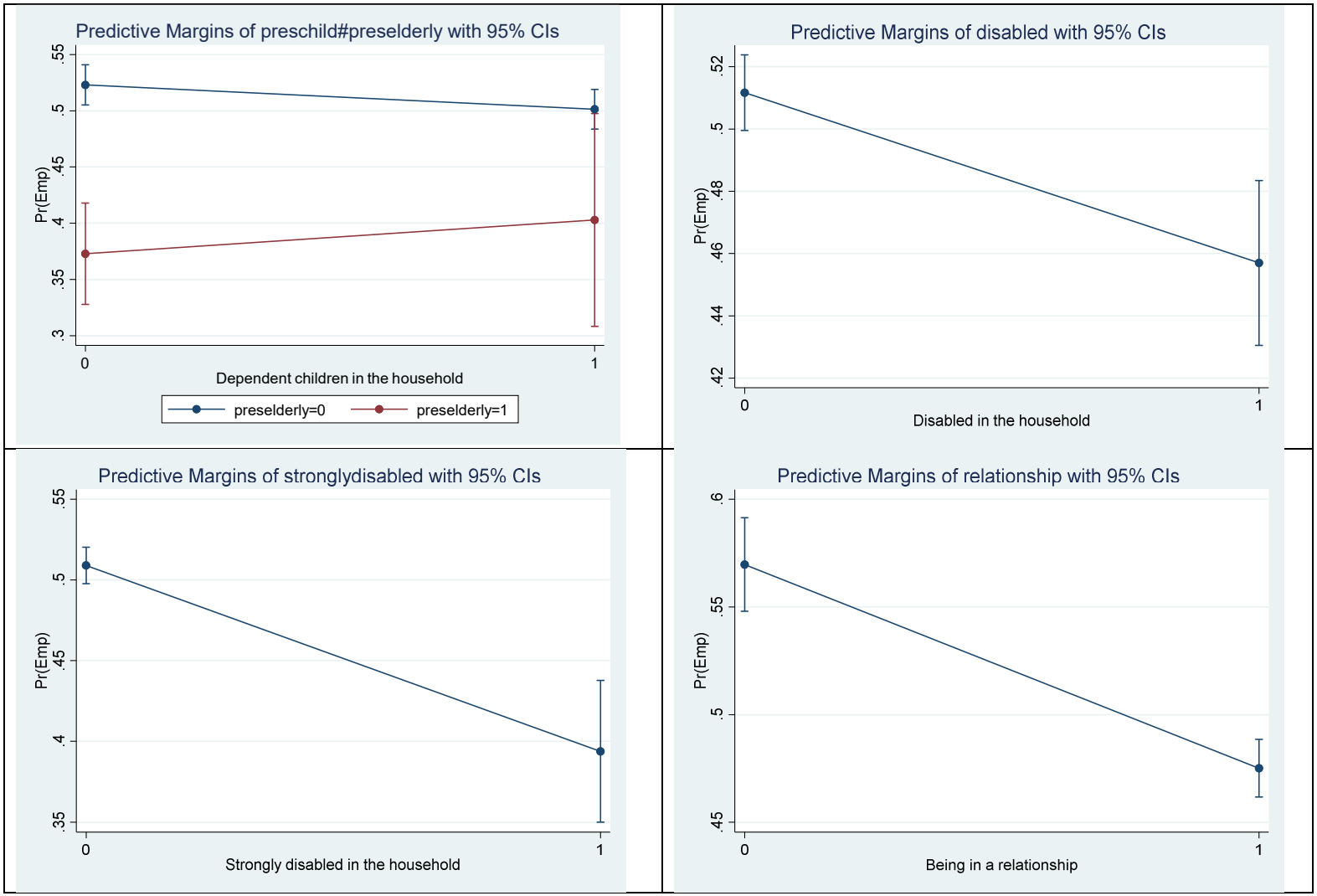

Figure A2. Predictive margins of health status conditional on specific covariates, with 95% confidence intervals

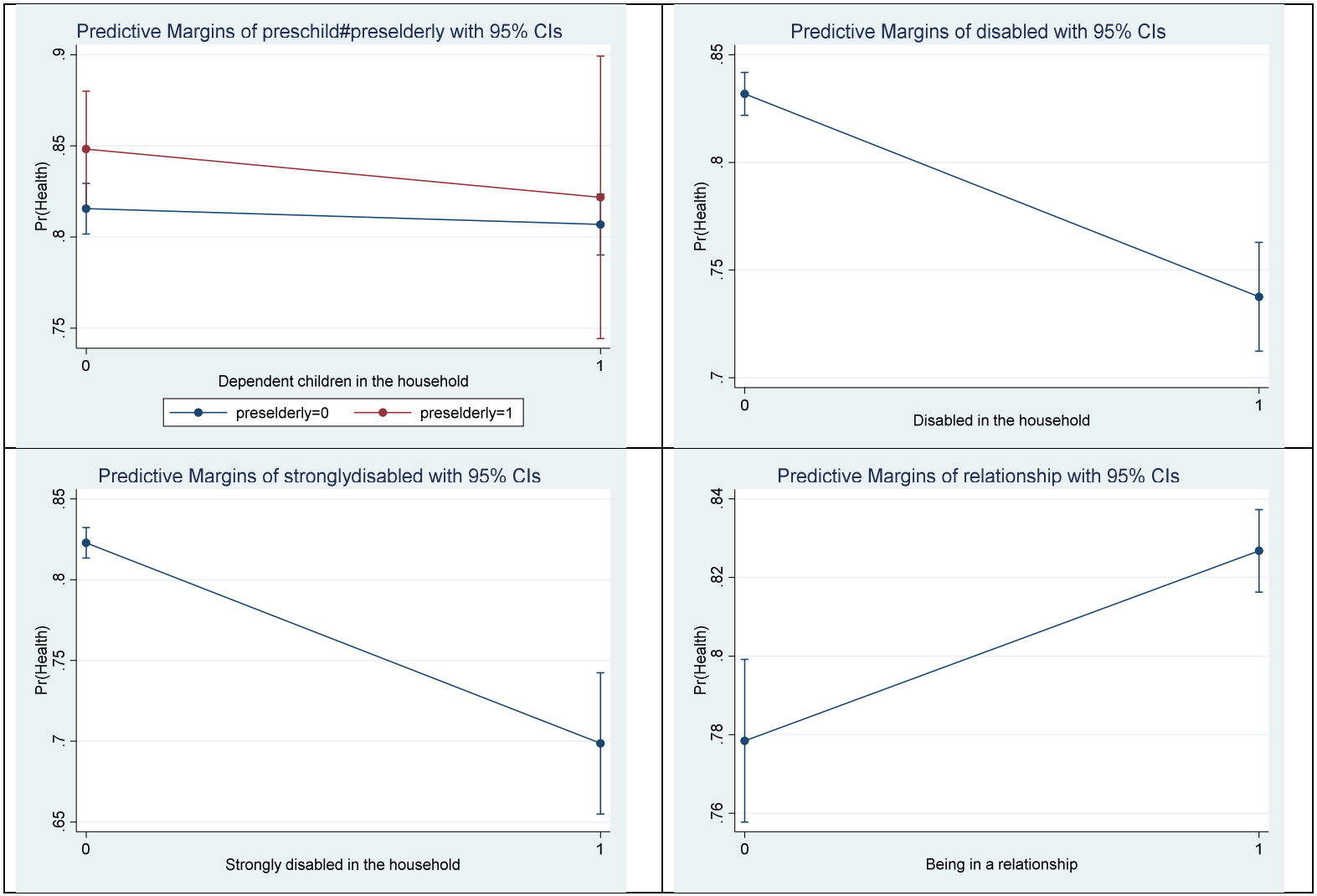

Table A1. Predictive margins of specific covariates on women employment probability

	Margin	Std. Err.	
Interaction between presence of dependent children and presence of non-disabled elderly in the household			
Absence of children and elderly	0.523	0.009	***
Presence of only non-disabled elderly	0.373	0.023	***
Presence of only dependent children	0.501	0.009	***
Presence of both elderly and children	0.403	0.048	***
Disabled with some activity limitations in the household			
Absence of disabled with some activity limitations	0.512	0.006	***
Presence of disabled with some activity limitations	0.457	0.013	***
Disabled with strong activity limitations in the household			
Absence of disabled with strong activity limitations	0.509	0.006	***
Presence of disabled with strong activity limitations	0.394	0.022	***
Being in a relationship (either on a legal or not legal basis)			
No relationship (single women)	0.570	0.011	***
In a relationship	0.475	0.007	***

Source: Authors' calculations from EU SILC 2010-2013.

Table A2. Predictive margins of specific covariates on women health status

	Margin	Std. Err.	
Interaction between presence of dependent children and presence of non-disabled elderly in the household			
Absence of children and elderly	0.815	0.007	***
Presence of only non-disabled elderly	0.848	0.016	***
Presence of only dependent children	0.807	0.008	***
Presence of both elderly and children	0.822	0.039	***
Disabled with some activity limitations in the household			
Absence of disabled with some activity limitations	0.832	0.005	***
Presence of disabled with some activity limitations	0.737	0.013	***
Disabled with strong activity limitations in the household			
Absence of disabled with strong activity limitations	0.823	0.005	***
Presence of disabled with strong activity limitations	0.699	0.022	***
Being in a relationship (either on a legal or not legal basis)			
No relationship (single women)	0.778	0.010	***
In a relationship	0.827	0.005	***

Source: Authors' calculations from EU SILC 2010-2013.