

Informal Caregiving and Caregivers' Labor Supply in the Netherlands

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1. Introduction

Nowadays the majority of the developed countries experiences population aging. Therefore, the population of the elderly with disabilities or severe medical conditions, as well as the demand for care services is increasing. These trends can be observed in the Netherlands as well. For instance, the most recent edition of *Health at a Glance*¹ reports the prediction that the share of population aged 65 and over may rise from 18% in 2015 to about 28% in 2050 in the Netherlands; and informal carers are the very important source of long-term care in OECD countries. Informal caregivers can be defined as people providing any help to older family members, friends and people in their social network, living inside or outside the household, who require help with everyday tasks. The report shows that, on average across OECD countries, about 13% of people aged 50 and over provide informal care at least on a weekly basis. In the Netherlands this number is even higher: 17% of people from this age group are caregivers. Remarkably, the data reveals that the number of female carers is only slightly larger than the number of male caregivers: less than 58% of Dutch daily carers are women. However, women are usually less attached to the labor force, thus the effect of informal care provision on the labor supply can differ between men and women.

Even given that the available data on informal care is limited, it is clear that many caregivers are not young. Nevertheless, a significant share of them consists of people in working age. It is noteworthy that, according to Gray and Hughes (2005), 45% of male and 30% of female caregivers claimed that their caring responsibilities were the main reason why they were out of the labor force. However, Leigh (2011) suggests that some respondents felt social pressure and overstated their willingness to be employed. It is plausible that people who are less attached to the labor market might be more likely to become caregivers. Moreover, it should be mentioned that many informal carers are over 50, thus they may face some problems in returning into the labor force and prefer to retire if they have such an opportunity. Nevertheless, it is still reasonable to assume that a significant number of the informal caregivers are at the margin of the labor market and thus understanding how caring responsibilities affect the labor supply of carers is an important question for policymakers who are interested in increasing or maintaining the labor force participation rate.

¹ OECD (2017), *Health at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, p. 199.

It is also important to mention that, although formal care arrangements can substitute informal care, public expenditure on long-term care in the Netherlands equaled 4.2% of the country's GDP and this was the highest value in the European Union.² Therefore, supporting informal carers might help to limit the expenditures. Nevertheless, the negative labor supply effect can reduce the cost savings. It might be difficult for some informal caregivers to combine employment and caring responsibilities, thus it is possible that they decide to switch to part-time jobs or even leave the labor market, and as a result, the tax revenues of the government fall.

The impact of informal care provision on the labor market outcomes is currently an active area of research. Most recent publications on the topic report a negative link between caregiving and labor supply. However, the size of the estimated effect varies from negligibly small to substantial. It is reasonable to assume that the difference in findings depends not only on the methodology used but also on the LTC system and the labor market policies of the country under examination.

Therefore, the aim of this paper is to evaluate the effect of informal care provision on the labor supply of caregivers in the Netherlands. In particular, this goal presupposes the estimation of the impact on the labor force participation, on the probability of being retired and on the number of working hours. Recent literature on this topic shows that it is important to distinguish between the types of care being provided because it might be helpful for structuring LTC policies. Therefore, the effects of extra-residential care, extra-residential chore assistance, and intensive care provision are evaluated. The SHARE dataset, that covers a period from 2004 to 2015, is used in the analysis.³ The effects for men and women are examined separately given their different attachment to the labor force.

The rest of the thesis is structured as follows: The review of empirical literature is presented in Section 2. Section 3 provides a description of long-term care systems in OECD countries in general and in the Netherlands in particular. The results of an empirical analysis are presented in Section 4. Finally, Section 5 draws a conclusion.

² Economic and Financial Affairs. (2016). *Joint Report on Health Care and Long-Term Care Systems & Fiscal Sustainability*. Brussels: Publication Office of the European Union.

³ The SHARE (Survey of Health, Ageing and Retirement in Europe) collects information about health, socio-economic status and family networks of individuals aged 50 and over.

2. Literature review

For the last 30 years, many researchers have addressed the question how informal care provision could influence labor market outcomes. Lilly et al. (2007) who review 34 articles on this topic published in 1986-2006 summarize that mainly intensive caregiving is associated with a decrease in the labor force participation and the number of working hours. Many more recent papers provide some evidence that caregiving has modest but significant negative effect on labor supply (Bauer and Sousa-Poza, 2015).

The share of female caregivers almost in all countries is still substantially larger than 50%⁴ and women are usually less attached to the labor force, thus many researchers prefer to include in the samples female carers only (e.g. Casado-Marin et al., 2010; Michaud et al., 2010; Moscarola, 2010; Viitanen, 2010; Kotsadam, 2011; Crespo and Mira, 2014; Skira, 2015; Oshio and Usui, 2017; Schmitz and Westphal, 2017). However, many papers report different effects of caregiving for men and women (e.g. Lilly et al. 2010; Fevang et al. 2012; Meng 2012; King and Pickard 2013, Van Houtven et al. 2013). Nevertheless, some researchers, such as Nguyen and Connelly (2014), find no significant gender differences.

2.1 General empirical evidence

Some papers focus on the extensive margin of the labor market (labor force participation), others also take into account the impact on the intensive margin (number of working hours). The key results are summarized in Table 1. Most researchers have moved towards the consensus that in general informal care has only a modest effect on the probability of being employed if any. However, the findings concerning the impact on the intensive margin of the labor market differ considerably. For instance, Leigh (2011) reports that Australian caregivers are 4-6 percentage points (ppts) less likely to participate in the labor market. Similar results are obtained by Heim Mueller (2007) who uses the data from the British Household Panel Study. Oshio and Usui (2018) find that caregiving reduces the labor force participation of Japanese women by only 3ppts. According to Fevang et al. (2012), in Norway, the impact is even smaller: the probability of being employed decreases by around 1 percentage point among sons and 2 percentage points among daughters during the years just prior to the parent's death, other things being equal. This

⁴ OECD (2017), *Health at a Glance 2017: OECD Indicators*, OECD Publishing, Paris.

results might be explained by the high availability of the formal long-term care in Scandinavian countries. Furthermore, Meng (2012) finds no significant impact on the labor force participation of caregivers in Germany. However, Schmitz and Westphal (2017) show that German female caregivers are 4ppts less likely to be employed full-time but most of them switch to part-time jobs. Remarkably, Lilly et al. (2010) report that Canadian male caregivers are 9ppts less likely to have a job. However, the effect on the female labor force participation rate is not significant. This rather counterintuitive result shows that it might be important to distinguish between different type and intensity of informal care.

With regards to dynamic effects, Michaud et al. (2010) find that co-residential caregiving seems to be negatively associated with future employment of women from the UK. Similarly, Moscarola (2012) comes to a conclusion that Dutch women who provide informal care are 2.4 ppts less likely to be employed in the next time period.

2.2 Different type and intensity of informal care

It should be mentioned that co-residential care (caregiver and care recipients are from the same household) is associated with a larger decline in labor supply than extra-residential care (caregiver and care recipients do not live in the same household). For example, Heim Mueller (2007) provides some evidence that caring for someone at home may increase the probability of non-working by up to 15ppts. Michaud et al. (2010) report a negative effect of co-residential caregiving on the future employment of British women but the researchers also point out a negative effect of employment on future caregiving in general. According to Casado-Marin et al. (2010), Spanish women are about 3ppts more likely to be out of the labor force if they are co-residential carers, while extra-residential caregiving does not have a significant impact on the labor supply. Moreover, Nguyen and Connelly (2014) find that the effects on the labor force participation of co-residential female caregivers in Australia are twice bigger than those of extra-residential female caregivers (they are 12ppts and 6ppts less likely to have a job than women without caring responsibilities). Providing care for residents reduces the employment probability of male caregivers by 7ppts and the impact of extra-residential informal care is not significant for men.

Furthermore, some studies show that only intensive caregiving affects labor market outcomes significantly. Meng (2012) provides some evidence that caring 10 hours more

per week decreases the working hours of caregivers by 35-48 minutes per week, thus even intensive caregiving has a rather small impact on the labor market outcomes. In contrast, Schmitz and Westphal (2017) report that females who provide more than 3 hours of care per day are up to 15 ppts less likely to have a job and if they remain employed, they tend to work 1-2 hours fewer per week. However, Van Houtven et al. (2013) find that American women who provide care more than 10 hours per week also tend to work about 10 hours fewer. About three quarters of employed American women work full-time and this fact makes an impact of informal caregiving more noticeable. Moreover, intensive caregiving may have an impact on the extensive margin of the labor market as well. According to Casado-Marin et al. (2010), intensive caregiving (more than 28 hours per week) reduces the probability of being employed by 2.8-4.5ppts for females. King and Pickard (2013) conclude that British caregivers in their fifties who currently provide more than 10 hours of care per week are significantly less likely to remain employed in the next time period.

Predictably, being the main caregiver is associated with a larger impact on the labor market outcomes. For instance, Lilly et al. (2010) show that primary caregiving individuals are significantly less likely to have a job than other subgroups (secondary caregivers and non-caregivers). Nguyen and Connelly (2014) estimate the effect of caregiving on the labor force participation and report that the main caregivers are about 12ppts less likely to be employed but they find no effect on the employment probabilities of secondary caregivers.

Van Houtven et al. (2013) evaluate the effect of different type of caregiving (personal or chore assistance) not only on the probability of being employed but also on the probability of being retired (the retirement status is self-reported). Thus, according to their results, informal care provision does not have a significant effect on the probability of being employed for women. However, men are 2.4 percentage points less likely to have a job if they are personal caregivers. By contrast, caregiving does not have a significant effect on the probability of being retired for men while female core caregivers are 2.3 p.p. more likely to retire.

	Type of care	Country	Females	Males
Leigh (2011)	Any type	Australia	Caregiving reduces LFP by 4-6 ppts	
Oshio and Usui (2018)		Japan	Caregiving reduces LFP by 3 ppts	-
Fevang et al. (2012)		Norway	Caregiving reduces LFP by 2 ppts	Caregiving reduces LFP by 1 ppt
Meng (2012)		Germany	No significant impact on the LFP	
Schmitz and Westphal (2017)		Germany	Female caregivers are 4 ppts less likely to be employed full-time	-
Lilly et al. (2010)		Canada	No significant impact on the LFP	Caregiving reduces LFP by 9 ppts
Moscarola (2012)		The Netherlands	Caregivers are 2.4 ppts less likely to be employed in the next time period	-
Heimueller (2007)	Extra- and co-residential care	The UK	Co-residential caregiving reduces LFP by up to 15 ppts	
Michaud et al. (2010)		The UK	Co-residential caregivers are less likely to be employed in the next time period	-
Casado-Marin et al. (2010)		Spain	Co-residential caregiving reduces labor force participation by 3 ppts	-
Nguyen and Connelly (2014)		Australia	Co-residential caregiving reduces LFP by 12 ppts. Extra-residential caregiving reduces LFP by 6 ppts	Co-residential caregiving reduces LFP by 7 ppts. Extra-residential caregiving has no impact on the LFP
Casado-Marin et al. (2010)		Spain	Intensive caregiving reduces LFP by 2.8-2.5 ppts	-
Meng (2012)	Intensive care	Germany	Intensive caregiving decreases the WH by 35-48 minutes	
Schmitz and Westphal (2017)		Germany	Intensive caregiving reduces LFP by 15 ppts. It also decreases the WH by 1-2 hours	-
King and Pickard (2013)		The UK	Intensive caregivers are less likely to be employed in the next time period	
Van Houtven et al. (2013)		The US	Intensive caregiving decreases the WH by 10 hours	No significant impact on the LFP or WH

Table 1. Key results from studies on informal care and employment

2.3 Cross-country comparison

It is noticeable that most studies focus on Anglo-Saxon countries (the UK, the USA, and Australia) or Japan and Germany (two countries with the highest share of the elderly population). However, there is evidence that the impact of informal caregiving on the labor market outcomes is larger in Southern Europe where the formal long-term care is less available, at least in comparison with Northern Europe. For example, Kotsadam (2011) uses two classifications of countries to show that the effect on the women's labor supply varies markedly depending on the type of the LTC system. The results suggest no significant impact of the informal caregiving on the employment status and the number of working hours in Nordic countries (Denmark and Finland). However, it is present in Central (the Netherlands, Germany, Belgium, France) and Southern Europe (Portugal, Spain, Greece, Italy). For instance, the marginal effect of being an informal caregiver equals about 7% and 10.5% for Central and Southern European groups respectively. Caregiving duties are also associated with a decrease in working hours by 2-3% in Southern countries. Nevertheless, there is some evidence of a negative impact of care provision even in countries with more developed formal care (Belgium, Denmark, France, Germany, Luxemburg, the Netherlands, the UK), although it is smaller than in countries less developed formal care (Greece, Ireland, Italy, Spain, Portugal). Ciani (2012) finds that informal carers (men and women) from the same set of Southern European countries (Portugal, Spain, Greece, Italy) are 2ppts less likely to be employed on average while caregivers from Northern-Central countries (Austria, Belgium, Denmark, Finland, France, Germany, the Netherlands, the UK) are about 1ppt less likely to have a paid job. Crespo and Mira (2014) report a North-South gradient in the negative correlation between poor parental health and the labor force participation of daughters. According to a very recent paper by Kolodziej et al. (2018), European caregivers are 14ppts less likely to have a job and 17ppts less likely to work full time. However, the effect on informal care provision is fully driven by carers from Southern and Eastern European countries (Greece, Portugal, Estonia, Czech Republic, Hungary, Poland, Israel, Spain, Italy, and Slovenia) where the impact of the informal care provision on the labor force participation can be as large as -25ppts and caregivers are up to 28ppts less likely to work full time.

2.4 Public LTC insurance and labor supply of informal caregivers

It is important to mention that the effect of informal care provision on the labor market participation depends on the availability of formal care. However, a very few papers

evaluate the effect on the new formal care policies on the labor supply of informal caregivers.

Yamada and Shimizutani (2015) examine to what extent the Japanese LTC insurance program was successful to remove obstacles to the labor supply of the informal caregivers 10 years after its introduction. The researchers show that the male main caregivers are 13.8-20.2ppts less likely to be employed and the fact that a care recipient is eligible for formal LTC services does not have a significant impact. However, being the female main caregiver reduces the probability of having a job by up to 58.1%, but daughters of people who can use LTC services are 33.4ppts more likely to work, holding all other regressors constant. Female caregivers also tend to reduce their number of working hours by 2.5-8ppts. Yamada and Shimizutani (2015) conclude that the availability of the LTCI program only partly mitigates the significant negative effect of being the main caregivers, and this effect is larger for females than for males. Fu et al. (2018) also report a positive spillover effect of the Japanese LTC insurance program as a policy to stimulate informal caregivers' labor force participation. According to their results, the male and female main caregivers became 15.8 and 3.7ppts more likely to have a job after the LTCI introduction. However, their probability of being employed is still 9.6 and 6.6%ppts lower than that of non-caregivers. In 2006 the Japanese government reduces benefits for recipients with mild care needs. As a result of this policy change, the employment probability of the women who provide informal care to people with mild care needs decreased by 7.7ppts.

Geyer and Korfhage (2017) evaluate the effect of the introduction of the LTCI program in Germany in 1995. Unlike the Japanese system, it is aimed to complement informal care rather than substitute it. For example, employed informal caregivers receive rights to take an unpaid leave of up to 6 months and apply for the short-term nursing home care of up to four weeks per year. However, the estimated effect on the labor force participation is negative for men and not significant for women. Nevertheless, Geyer and Korfhage (2017) do not take into account that the attitude towards male caregivers might have changed over time and they do not examine the changes at the intensive margin of the labor market.

3. Long-term care

In the OECD report written by Colombo et al. (2011), long-term care is defined as “a range of services required by persons with a reduced degree of functional capacity, physical or cognitive, and who are consequently dependent for an extended period of time on help with basic activities living”. It should be mentioned that this personal care is usually complemented with help with instrumental activities of daily living, such as cooking, cleaning, shopping, etc. According to predictions made by Eurostat (2011), the share of the population aged 65 and older in EU-27 countries is likely to increase from 16% in 2010 to about 30% in 2060. Similarly, the percentage of people aged 80 and over is expected to rise from 4% to 10%. It is also plausible that the old-age dependency ratio will double and exceed 50% by the end of this period. Thus, the demand for long-term care might increase substantially. Therefore, it could be challenging to finance generous public LTC programs. Norton (2014) emphasizes that changing demographic trends and economic environment can make an LTC system insolvent quickly, that is why it is important to introduce reforms in time.

3.1 Long-term care systems in OECD countries

The majority of OECD countries introduced public LTC programs that make formal long-term care available for the significant share of the population. Some of these programs also aim to support informal carers. However, public LTC expenditures vary significantly between countries. According to Eurostat data, Eastern and Southern European countries spent less than 1% of their GDP on LTC in 2014. Nevertheless, public LTC expenditures exceeded 2% of GDP in Belgium, Denmark, Ireland, the Netherlands, Switzerland, and Sweden. Predictably, Eurostat also reports a considerable difference in the coverage rates for LTC services for the population aged 65 and over. In the mid-2000s, it was lower than 10% in most countries in Eastern and Southern Europe and the US. This rate was between 10 and 20% in many Central and Western European countries and Canada, the coverage higher than 20% was observed in Israel, Finland, Norway, the Netherlands, and Denmark. Moreover, Carrera et al. (2013) find almost no bias towards residential (in homes for elderly or nursing homes) or home care: countries with low home care coverage tend to have low residential coverage as well and vice versa. Predictably, people in countries with higher public expenditures and coverage are more satisfied with LTC services. For example, care recipients from Belgium, Denmark, France, Luxembourg, the Netherlands, and Sweden are mostly satisfied with quality, availability, and costs of formal LTC while people from Bulgaria and Romania are mostly dissatisfied (Carrera et al. 2013).

	2006 (Eurostat)	2014 (Eurostat)	2014 (OECD)
Germany	1.51	1.77	1.1
Spain	0.65	0.84	0.7
Finland	1.35	1.68	3.5
France	0.88	1.18	1.9
Hungary	0.27	0.30	0.3
Netherlands	2.20	2.91	4.3
Portugal	0.11	0.23	0.5
Sweden	0.66	2.92	3.2

Table 2. Public LTC expenditures as a share of GDP in 8 OECD countries⁵

Source: Eurostat, OECD Statistics

According to the analysis performed by Damiani et al. (2011), Belgium, Iceland, the Netherlands, Norway, and Sweden are characterized by a good matching expenditures to elderly needs and high supply of formal care. Austria, Denmark, Finland, France, Germany, Ireland, Luxembourg and the UK are also characterized by high alignment between old age related expenditure and elderly needs but they provide less formal care. The Czech Republic, Greece, Poland and Spain show low alignment between old age related expenditure and elderly needs and low level of formal care. Other European OECD countries provide more formal care than the last two groups but they are characterized by unsatisfactory matching expenditures to elderly needs.

Colombo et al. (2011) provide a more detailed classification of public LTC systems depending on the scope of entitlement to benefits (universal or means-tested) and the structure of the systems (whether it is a single system or multiple complementing schemes). They focus on countries with substantial public LTC coverage only. According to these criteria, they can be divided into three groups: countries with universal coverage within a single program, countries with mixed systems, and countries with means-tested safety-net schemes.

In general, single programs with universal coverage make LTC services available to almost all people in need of care without any discrimination based on the income of care recipients or their families. Some of them also include several mechanisms to support

⁵ All statistics are based on the same classification but Eurostat and OECD Statistics could use different definitions (OECD Statistics do not provide detailed information about definitions)

informal caregivers. However, they usually create disincentives for informal care provision.

Means-tested safety-net systems, such as those introduced in the US and the UK, are designed to support individuals with low income who otherwise are not able to pay for the long-term care services. In this case, the total expenditures usually are not high. However, means assessment might be rather costly. In addition, it is always difficult to set an appropriate income threshold and determine other eligibility conditions.

Mixed systems are predictably very different from one another. Nevertheless, they have some common features. For instance, they cover at least a share of LTC costs. Income or assets can be used to determine the amount of subsidy that usually cannot exceed some limit values. It is important to mention that it might be difficult to evaluate the overall support received by care recipients because of the complexity of these systems.

It should be emphasized that LTC systems can be substantially different even if they belong to one group. With regard to countries with universal coverage, sometimes LTC provision is included in the general health system (for example, in Belgium) and sometimes it is organized separately (like in Scandinavian countries). Moreover, public LTC provision might be available to elderly people only (for instance, in Japan and Korea) or the eligibility does not depend on age (e.g. in Germany and the Netherlands).

Colombo and her co-authors (2011) also highlight differences between countries with tax-based LTC schemes, public LTC insurance programs, and LTC provided through the health system. In a similar vein, Rodrigues (2014) points out advantages and disadvantages of social insurance and taxed-based systems. Social LTC insurance systems are more transparent and the revenues under this regime are more reliable and predictable. However, the size of benefits is rather difficult to change quickly. Tax-based systems are potentially more flexible in benefits awarded and they rely on a broader tax base, nevertheless, they are less transparent.

Remarkably, even in countries with universal LTC coverage individuals face some out-of-pocket expenditures. Therefore, private LTC insurance schemes might be helpful in this case. However, Colombo et al. (2011) claim that private LTC insurance is still a niche product, used mostly by people with high income. It is plausible that the demand for

voluntary private LTC insurance will go up as the level of awareness of financial risk related to the long-term care increases.

It is not surprising that countries with similar public LTC schemes usually have similar general welfare systems. According to Esping-Andersen classification, Scandinavian countries with universal coverage within a single LTC program has the social-democratic type of welfare state; the US and the UK are countries with the liberal type of welfare state and means-tested safety-net LTC systems.

With regards to informal care, substantial cross-country variations can be observed as well. As it has been mentioned above, about 13% of people aged 50 and over provide informal care at least on a weekly basis (on average across OECD countries). This percentage varies from 6% in Poland to 21% in the Czech Republic. The corresponding shares of daily carers also differ from 4% in Sweden to 11% in the Czech Republic. On average, almost 60% of informal daily carers are women but only in two countries from the sample (Portugal and Poland) the share of men is less than 33%. Moreover, in Sweden the number of male daily caregivers is even larger than the number of female ones. It should be mentioned that the attitude towards informal care is also very different among European countries. At one extreme, only 10% of LTC recipients from Poland preferred formal care in 2007, while at the other extreme, about 85% of Swedish care receivers did not want to rely on informal care. Similarly, approximately 68% of people in Poland claimed that they were ready to provide informal care for their parents, however, less than 10% of Swedish population was intent to become informal caregivers (Carrera et al. 2013).

3.2 Long-term care system in the Netherlands

A system of public LTC insurances was established in the Netherlands in 1968 and the most significant change took place in 2015. The last year before the reform, there was almost 1 million individuals (about 8.5% of total population) who used some form of public LTC (Eggink et al. 2017); according to Maarse and Jeurissen (2016), slightly more than half of them received non-residential care (care at home). As it has already been mentioned in the previous subsection, the Dutch LTC system is characterized by high coverage and satisfactory level of co-payments. However, the public LTC expenditures have rocketed during the last 10 years. Moreover, according to Eggink et al. (2017), care use could rise by about 1.6% annually and in a few next decades that might lead to an increase of annual expenditures by 3.5% because of an upward trend in price levels.

Until 2007, LTC system was regulated by the Exceptional Medical Expenses Act (Algemene Wet Bijzondere Ziektekosten: AWBZ). It covers both residential and non-residential care which was mostly funded by income-related contributions. According to AWBZ, care recipients were allowed to choose between benefits in kind and cash benefits (persoonsgebonden budget: PGB). In 2014, about 9% of the LTC expenditures were funded through PGB (Maarse and Jeurissen 2016). Regional care offices were responsible for the implementation of the AWBZ.

In 2007, the AWBZ was complemented by the Social Support Act (Wet Maatschappelijke Ondersteuning: WMO) that focused on help with instrumental activities of daily living (e.g. housekeeping, transportation). Provision of these services was regulated at the municipal level, creating a significant difference in approaches to the policy implementation and the level of co-payments. The expenditures related to the WMO equaled around 5% of total public LTC expenditures (Maarse and Jeurissen 2016). Unlike the AWBZ, the WMO is a tax-funded scheme.

The AWBZ has covered only residential care since 2015. Non-residential care is now regulated by the Health Insurance Act (Zorgverzekeringswet, ZVW) and a new version of the WMO. While regional care offices are still in charge of residential care, non-residential care has become more decentralized: insurers are now responsible for contracting community nursing and personal care (ADL). Other types of non-residential care are provided at the municipal level, according to the new version of the WMO.

The reform has several goals. First of all, it aims to encourage more independence and individual responsibility when it is possible, thus decentralization is one of the key aspects of the reform. Moreover, a substantial shift from residential to non-residential care was another important measure. Only people who need round-the-clock supervision has been eligible for residential care since 2015. It is obvious that another aim of the reform is to limit the public expenditures: they decreased by 5% in 2015. As a result, some provider organizations that had had contracts with municipalities reduced the supply of their services because of the low tariffs (Maarse and Jeurissen 2016). However, one may argue that the capacity of informal care was overestimated and potential negative externalities for informal caregivers were not taken into account. According to European Commission report, supporting family carers is still one of the challenges for the Dutch long-term care

system.⁶ The number of informal caregivers and the intensity of informal care provided could increase after the reform because fewer people became eligible for residential care. This, in turn, could lead to the reduction in the labor supply of potential caregivers but the evaluation of the impact of this reform is beyond the scope of this research.

⁶ Commission services (Directorate-General for Economic and Financial Affairs), Economic Policy Committee (Ageing Working Group). Joint Report on Health Care and Long-Term Care Systems & Fiscal Sustainability. Publications Office of the European Union, 2016.

4. Empirical investigation

4.1 Empirical strategy

The goal of this empirical research is to evaluate an impact of the informal care provision on the labor supply of informal caregivers in the Netherlands. The regressions include measures of informal care that are defined in several ways, a vector of demographic and socioeconomic variables and error components depending on the model specification used. Three labor market outcomes are analyzed, including the probability of participating in the labor force, the probability of being retired and the number of working hours per week conditional on being employed or self-employed.

It should be emphasized that caregiving decision might be endogenous with respect to the labor market supply. Panel data setting and instrumental variable method are the two most common approaches to address this problem. Some articles (e.g. Heitmueller 2007; Van Houtven et al. 2013) point out the advantages of fixed effects models because they allow to capture important individual characteristics that are likely to be time-invariant, such as a propensity to become a caregiver or an attachment to the labor force. However, it might be not enough to eliminate potential endogeneity, thus it is also tested if instrumental variables should be added to the regressions. Good instruments must be strongly correlated with caregiving decisions but have no influence on employment choices. Moreover, only time-variant variables can be used in fixed effects model specifications.

However, fixed effects models may produce rather imprecise estimates. Properly speaking, they could be inefficient if within-group variation is small, which may happen, for instance, if many individuals in the sample appear only a small number of periods. Comparing the outcomes with different estimation methods gives insight into the robustness of results, thus pooled OLS and random effects models are used as well. All analyses are performed separately for men and women, given their different attachment to the labor force.

4.2 Data and sample selection

Data from the Survey of Health, Ageing and Retirement in Europe (SHARE) is used in the analysis. The SHARE collects information about health, socio-economic status and family networks of individuals aged 50 and over. The first series of interviews were recorded in

2004, the second wave took place in 2007, and the survey has become biannual since 2011, thus the dataset covers a period from 2004 to 2015. Currently, six waves of this panel dataset are available, but the third wave (2008-2009) will be omitted from this research as it does not include all necessary factors and characteristics.

Following the approach of Van Houtven et al. (2013), individuals from 50 to 70 years old are included in the sample because people aged 70 and over are highly unlikely to work. Respondents who have no parents or parents-in-law alive in the current wave or two previous waves are also excluded from the sample. Labor force participation, retirement status and a number of working hours conditional on being employed are used as dependent variables. All information about these three variables is self-reported. People are considered to participate in the labor force if they are employed (including self-employment) or unemployed. If an individual has more than one job, total hours worked per week are included in the analysis. It seems to be reasonable to predict that informal caregiving has an impact not only on extensive margin on of the market but on the intensive margin as well because the share of part-time workers among employed individual in the Netherlands is rather high: it rose slightly from 35 to 38% in 2004-2015 and these values were twice as high as the OECD average.

Informal care provision is self-reported by SHARE respondents. Three key questions are present in all 5 questionnaires. The data includes information if a respondent provides personal care to a household member; if she or he provide informal care (personal or chore) to someone outside the household and how often she or he help someone outside the household. However, the question about the type of care provided to someone outside the household is included only in the questionnaires for wave one, two and six. On the basis of these questions, four binary variables were created. The first one indicates if a person is an informal caregiver (if he or she provides any type of informal care). The second variable equals one if a respondent provides informal care (personal or chore) to someone outside the household. The third one indicates if he or she provide chore assistance to someone outside the household. This variable is used only in the smaller sample consisting of three survey waves. The last one indicates if a person is an intensive caregiver. This variable equals one if a respondent provides informal care on a daily basis.

As it has been already mentioned above, caregiving decision might be endogenous with respect to the labor market supply, thus and instrumental variable method is one of the most commonly used approaches to address endogeneity. Parents are mentioned most

frequently as care recipients, that is why dummy variables indicating having at least one parent alive or having at least one parent with poor health are chosen as instrumental variables. The presence of elderly or ill parents affects the demand for informal care but does not have a direct influence on the labor market outcomes of adult children.

The same set of control variable was used in fixed effects models. It includes age, age squared, marital status (married/registered partnership or not), two dummy variables for self-reported health, number of children, an indicator whether there is a child under 18 in the household and an indicator for home ownership. In addition, two variables indicating if a respondent is between the early retirement (ERA) and the full retirement age (FRA) or if he or she has achieved the full retirement age are added. It should be mentioned that the eligibility to early retirement depends on the year of birth and the changes in the pension replacement rates, that took place in 2006, made early retirement less attractive. The last but not the least, pooled OLS and random effects models also include education dummies and a binary variable indicating if an individual is an immigrant.

4.3 Descriptive statistics: sample 1

The analysis is performed on two samples, the second one being a subsample of the first. The first one includes data from five survey waves while the second one is composed of the information from three waves (wave one, wave two and wave six) because the question about the type of extra-residential care provided was excluded from the questionnaires for the wave four and five.

<i>Share of caregivers (all types of informal care)</i>	56.1%
<i>Share of individuals who provide informal care (personal or chore) outside the household</i>	53.7%
<i>Share of individuals who provide informal care (personal or chore) outside the household on a daily basis conditional on being a caregiver</i>	7.0%
<i>Share of individuals who provide informal care (personal or chore) outside the household on a weekly basis conditional on being a caregiver</i>	30.1%
<i>Share of individuals who provide personal care to household members</i>	4.7%

Table 3. The percentage of informal caregivers in the sample depending on the type of care

The share of caregivers in the sample is rather high: more than one half of respondents provide informal care. Most people help individuals who are not the members of their household, but it should be also mentioned that only personal co-residential caregiving is reported, probably because it might be difficult to distinguish between chore co-residential care and some daily routines (e.g. housekeeping). However, only 7% of informal caregivers help their relatives or friends in need almost every day.

Table 4 shows to whom informal care is provided relatively more often. Respondents can mention more than one person they have helped, thus the sums of percentages in columns are greater than 100%. Not surprisingly, more than two thirds of caregivers provide informal care to their parents and parents-in-law who live separately and more than one third help other relatives. Remarkably, other people (friends, neighbors etc.) also become care recipients quite often. By contrast, spouses and partners are mentioned as care recipients who live in the same household as caregivers about 6 times more often than parents and parents-in-law. It can be interpreted that respondents are not likely to live with their parents even if the former are ready to provide some informal care for the latter.

	Outside household	In household
Spouse	2.3%	65.6%
Parents	48.2%	7.9%
Parents-in-law	18.9%	3.7%
Other relatives	34.1%	19.2%
Other acquaintances	28.3%	6.5%

Table 4. The share of people to whom informal care is provided

According to descriptive statistics (Table 5), there are no dramatic differences between caregivers and non-caregivers. The share of females is slightly higher than 50% in the first subsample but lower in the second, almost all respondents are married and the majority of individuals has two or three children. Relatively more caregivers have higher education in comparison with non-caregivers, thus it is plausible that the former are more attached to the labor force. Moreover, the labor force participation rate of non-caregivers is a few percentage points lower and they work fewer hours per week than caregivers. However, t-tests show that these differences are not significant. Furthermore, non-caregivers are older on average but the difference in the percentage of retired people is not significant as well.

	Caregivers	Non-caregivers
Gender	Female 55.4% Male 44.6%	Female 46.9%*** Male 53.1%***
Married or registered partnership	95.4%	93.4%**
Average number of children	2.3	2.3
Average age	55.8	56.3**
Labor force participation		
<i>Employed</i>	62.5%	59.3%
<i>Unemployed</i>	2.0%	3.4%
<i>Retired</i>	9.9%	11.6%
<i>Homemaker</i>	17.0%	13.7%**
<i>Permanently sick or disabled</i>	5.4%	9.9%***
Average number of working hours per week (conditional on working)	34.3	34.0
Education		
<i>Elementary education</i>	4.7%	6.8%**
<i>Secondary education</i>	61.5%	63.5%
<i>Higher education</i>	33.1%	27.7%**
Self-reported health		
<i>Good or better</i>	87.7%	81.6%***
<i>Fair</i>	10.6%	14.6%***
<i>Poor</i>	1.7%	3.8%***
Person-wave observations	2117	1655
Unique individuals	1352	1128

Table 5. Descriptive statistics (reported for the first survey wave in which the individual is observed)

***Significance at 1% (mean comparison t-test)

** Significance at 5% (mean comparison t-test)

Predictably, there are relatively more homemakers among caregivers and relatively more permanently sick and disabled people among non-caregivers. It should be mentioned that individuals in the sample can be care recipients as well. Remarkably, the share of permanently sick and disabled respondents is substantially larger than the share of individuals who report that their health is bad. The last but not the least, there are more caregivers with good or excellent health than non-caregivers.

As it can be seen from the last two lines of Table 5, the majority of respondents does not participate in all 5 waves. It should be also emphasized that all individuals over 70 were excluded from the sample as they are highly unlikely to work. As a result of the panel attrition and sample restrictions, information about 39.6% of respondents appears only once. It is possible to follow 29.4% of individuals for two time periods, data about 16.0% of people includes information from three waves, the share of respondents who participate in four waves is 9.8% and only 5.2% of individuals appear in all five waves.

4.4 Descriptive statistics: sample 2

Questions about the type of informal care provided outside the household were excluded from the forth and the fifth interview waves, thus it is possible to use information from three waves only. However, more than a half of individual from the sample provide extra-residential chore care, thus it is reasonable to evaluate the impact of extra-residential chore assistance separately. The new sample is smaller but descriptive statistics differ only slightly from the original sample. It is noticeable that the share of caregivers is 1-2 ppts higher in the smaller sample than in the larger one. In both cases about two thirds of caregivers help their parents or parents-in-law who live separately from them, however, other relatives and other acquaintances are also the important groups of care recipients.

	Smaller sample	Larger sample
Share of caregivers	57.3%	56.1%
Share of extra-residential caregivers	55.9%	53.7%
Share of chore extra-residential caregivers	53.0%	-

Table 6. The percentage of informal caregivers in the two samples depending on the type of care

	Smaller sample	Larger sample
Spouse	2.1%	2.3%
Parents	47.1%	48.2%
Parents-in-law	19.2%	18.9%
Other relatives	36.1%	34.1%
Other acquaintances	27.1%	28.3%

Table 7. The share of people to whom informal care is provided

Like in the larger sample, there are more females among caregivers and more males among non-caregivers. On average, people from both samples are of the same age. It seems to be that there are fewer people participating in the labor force and more homemakers in the smaller sample. According to the descriptive statistics, employed people from the smaller also work fewer hours on average. Similar to the previous results, t-tests show a significant difference in the shares of homemakers and permanently sick or disabled people among caregivers in comparison with non-caregivers. Like in the larger sample, on average, caregivers are more educated and have better health than non-caregivers. Remarkably, individuals from the bigger sample have higher education but a smaller percentage of them have good or excellent health.

	Caregivers	Non-caregivers
Gender	Female 54.4% Male 45.6%	Female 46.6%*** Male 53.4%***
Married or registered partnership	96.5%	95.7%
Average number of children	2.3	2.3
Average age	55.8	56.3**
Labor force participation		
<i>Employed</i>	57.6%	56.8%
<i>Unemployed</i>	2.3%	3.1%
<i>Retired</i>	10.5%	11.6%
<i>Homemaker</i>	20.0%	15.6%**
<i>Permanently sick or disabled</i>	5.5%	10.4%***
Average number of working hours per week (conditional on working)	33.3	33.2
Education		
<i>Elementary education</i>	5.7%	9.1%***
<i>Secondary education</i>	64.5%	63.5%
<i>Higher education</i>	28.9%	25.0%*
Self-reported health		
<i>Good or better</i>	89.5%	84.2%***
<i>Fair</i>	9.3%	12.1%*
<i>Poor</i>	1.1%	3.7%***
Person-wave observations	1347	1006
Unique individuals	741	519

Table 8. Descriptive statistics (reported for the first survey wave in which the individual is observed)

***Significance at 1% (mean comparison t-test)

** Significance at 5% (mean comparison t-test)

* Significance at 10% (mean comparison t-test)

4.5 Results: labor force participation (sample 1)

Appendix A (Table 14) shows the coefficients obtained from the pooled OLS regressions. These models indicate that caregiving of any type and extra-residential caregiving of any type have no impact on the labor force participation. However, pooled OLS estimators ignore the panel structure of the data and do not account for individual heterogeneity, thus fixed effects models were also used. Fixed effects models allow to control for time-invariant individual characteristics and this is an important advantage that is often emphasized in the literature on the impact of informal caregiving on labor market outcomes. Nevertheless, many individuals appear in the sample only two or three times and the small number of time periods available for the analysis makes estimates rather imprecise. One of the fixed effects models indicates that men who provide informal care to people outside the household are 3.8 ppts less likely to participate in the labor force, holding other things constant. The fixed effects estimator is robust against correlation of the regressors with the fixed effect, but in the absence of such correlation, the random effects estimator is more efficient. The Hausman test did not reveal systematic differences between the fixed effects model and the random effects model, implying that the random effects specification may be preferred, thus the coefficients obtained from the random effects regression are also reported in Table 15. Interestingly, random effects models with more observations and additional time-variant regressors included show no impact of caregiving of any type and extra-residential caregiving of any type on the labor force participation, as it can be seen from the Table 16.

It should be also mentioned that the exogeneity of these two variables cannot be rejected at the 10% in pooled OLS and fixed effects models, thus instrumental variables are not used (see Appendix A, Table 17 and Table 18). The situation with intensive informal care is different. A dummy variable indicating that at least one parent of an individual has poor health is a strong instrument for the pooled OLS regression with female respondents but not for the fixed effects regressions with female respondents and both regressions with male respondents. In general, male caregivers mention parents as care recipients less often than female caregivers. It is a possible explanation why instruments perform worse in the regressions with male respondents. Nevertheless, other groups of relatives are mentioned as care recipients even less frequently. Remarkably, Van Houtven et al. (2013) also do not find strong instruments for men's intensive caregiving. Thus, a large magnitude of the significant coefficients (from -17 to -21.5 ppts) can be treated as a sign that this variable is endogenous and the actual effect might be not so severe.

Almost all significant coefficients of control variables have expected signs and plausible values (see Appendix A). The only exception is that the fixed effects model shows that males who are eligible for early retirement are more likely to work than younger individuals. In general, individuals with better health and higher education are more likely to participate in the labor force. The probability of having a job is lower for married women, holding other things constant, but there is no significant impact of men’s marital status on the labor force participation. Moreover, having children reduces the labor force participation of females but increases the labor force participation of males. Interestingly, only male house owners are more likely to work than tenants. Furthermore, being older than 65 (normal retirement age) has a significant negative effect on the labor force participation for men only while descriptive statistics show that, on average, both males and females retire a few months after they turned 65.

	Women			Men		
Pooled OLS linear probability models						
<i>Care (any type)</i>	-0.017 (0.024)			-0.024 (0.0186)		
<i>Extra-residential care (any type)</i>		-0.015 (0.023)			-0.023 (0.018)	
<i>Intensive care (daily)</i>			0.021 (0.350)			-0.215*** (0.055)
Fixed effects linear probability models						
<i>Care (any type)</i>	-0.017 (0.021)			-0.029 (0.022)		
<i>Extra-residential care (any type)</i>		-0.019 (0.022)			-0.038* (0.022)	
<i>Intensive care (daily)</i>			-0.054 (0.035)			-0.169*** (0.055)
Random effects linear probability models						
<i>Care (any type)</i>	-0.016 (0.018)			-0.020 (0.017)		
<i>Extra-residential care (any type)</i>		-0.016 (0.018)			-0.021 (0.017)	
<i>Intensive care (daily)</i>			-0.052 (0.032)			-0.193*** (0.051)

Table 9. Pooled OLS, fixed effects and random effects linear probability models of labor force participation

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

4.6 Results: retirement status (sample 1)

Like in the previous subsection, the exogeneity of the informal care variables in pooled OLS models for female respondents cannot be rejected at conventional significance levels, thus instrumental variables are not used, however, intense caregiving of male respondents cannot be tested for endogeneity because of the weak instrument problem (see Appendix B, Table 22 and Table 23).

According to all model specifications, caregiving of any type has no impact on the retirement status. Nevertheless, men who provide informal care to people outside the household are 2.8-3.9 ppts more likely to be retired. It corresponds to the results obtained from the regressions in the previous subsection (Table 9) suggesting that men from this group are 3.3-3.8 ppts less likely to be employed. Similar to the results depicted in the previous subsection, all models suggest that intensive caregiving has a severe positive impact (about 10ppts) on the men's probability of being retired, however, intensive caregiving dummy might be an endogenous variable.

With regards to the control variables (see Appendix B), obviously, age influences the probability of being retired. People aged 65 and over are significantly less likely to remain employed, however, the results show that individuals usually do not use opportunities to retire earlier. Remarkably, estimates do not show any impact of health on the retirement decision. It is plausible that individuals who experience serious health problems leave labor force before they reach the retirement age. Moreover, the fewer children people have the more likely they are retired. In addition, pooled OLS and random effects regressions provide some evidence that females with secondary education are significantly less likely to be retired, however, none of the models indicates that education has an impact on the retirement status of men.

	Women			Men		
Pooled OLS linear probability models						
<i>Care (any type)</i>	0.002 (0.012)			0.023 (0.015)		
<i>Extra-residential care (any type)</i>		0.006 (0.012)			0.030* (0.015)	
<i>Intensive care (daily)</i>			-0.099 (0.211)			0.099** (0.044)
Fixed effects linear probability models						
<i>Care (any type)</i>	-0.013 (0.016)			0.026 (0.021)		
<i>Extra-residential care (any type)</i>		-0.003 (0.016)			0.039* (0.021)	
<i>Intensive care (daily)</i>			0.044 (0.032)			0.100* (0.057)
Random effects linear probability models						
<i>Care (any type)</i>	0.009 (0.012)			0.021 (0.015)		
<i>Extra-residential care (any type)</i>		0.006 (0.012)			0.028* (0.015)	
<i>Intensive care (daily)</i>			0.030 (0.023)			0.098** (0.043)

Table 10. Pooled OLS, fixed effects and random effects linear probability models of retirement status

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

4.7 Results: hours of work (sample 1)

All model specifications suggest that informal caregiving has no significant impact on the weekly working hours of employed females. The second part of Table 11 includes not only the fixed effects estimations but also the coefficients obtained from a random effects regression because, according to Hausman test, the difference in coefficients between random effects and fixed effects model specifications are not systematic, thus random effects model may be preferred. The coefficients and additional statistics for the instrumental variable regressions can be found in Appendix C.

Pooled OLS and random effects model specifications also suggest that the higher education of women is, the more hours they tend to work. For instance, females with higher education may work about 10 hours more per week than those who did not finish school. Education dummies are not included in the fixed effects regressions because they can be considered as time-invariant regressors for people aged 50 and over. According to results obtained from fixed effects regressions, the better health women have, the more hours they work, holding other things constant. Remarkably, fixed effects model specification also provide some evidence that employed women with more children tend to work more hours than women with fewer children.

It should be mentioned that caregiving of male respondents cannot be tested for endogeneity because of the weak instrument problem (see Appendix, Table 27 and Table 28). Remarkably, pooled OLS models suggest that men who are caregivers of any type or extra-residential caregivers of any type tend to work more than those who do not provide informal care, which is rather counterintuitive. However, even random effects regressions show smaller magnitude and significance of the coefficients. According to fixed effects model specifications, they are not significant at all, as in regressions with female respondents. Moreover, pooled OLS and random effects models indicate that men who provide informal care at a daily basis tend to work about 3.5 hours fewer per week.

With regards to control variables (see Appendix C), men with higher education tend to work more hours than men with secondary education only, however, not all model specifications report a significant difference between the number of working hours of low educated men and other groups. It is noticeable that the estimated coefficients are smaller for men than for women. Remarkably, all regressions indicate that being a father of one more child tend to increase working hours by 1-1.5 hours per week.

	Women			Men		
Pooled OLS models						
<i>Care (any type)</i>	-0.231 (0.814)			1.309* (0.686)		
<i>Extra-residential care (any type)</i>		-0.386 (0.827)			1.481** (0.685)	
<i>Intensive care (daily)</i>			-0.455 (1.700)			-3.639** (1.762)
Fixed effects models						
<i>Care (any type)</i>	0.955 (0.658)				0.339 (0.605)	
<i>Extra-residential care (any type)</i>		1.040 (0.674)				0.614 (0.592)
<i>Intensive care (daily)</i>			0.734 (1.163)	0.242 (1.069)		
Random effects models						
<i>Care (any type)</i>	0.762 (0.603)			0.699 (0.516)		
<i>Extra-residential care (any type)</i>		0.715 (0.611)			0.921* (0.508)	
<i>Intensive care (daily)</i>			0.659 (1.147)			-3.639** (1.761)

Table 11. Pooled OLS, fixed effects and random effects models of weekly work hours conditional on working

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

4.8 Results: labor force participation and retirement status (sample 2)

Pooled OLS models show no effect of chore extra-residential caregiving on the women's probability of working or being retired. However, the same instruments are not strong enough to be used in fixed effects models, thus significant coefficients can appear because of the endogeneity of regressor (see Appendix D, Table 29 and Table 30). Fixed effects estimations are not reported, according to the results of the Hausman test which prefers random effects estimations as they seem to be more efficient.

Nevertheless, instruments appear to be strong enough to perform both pooled OLS and fixed effects models for the subsample of male respondents. A dummy variable indicating that an individual who provides chore assistance to someone outside the respondent's household can be treated as exogenous in all model specifications. Fixed effects model suggests that male chore caregivers are 6.8 ppts less likely to participate in the labor force and pooled OLS and random effects models show that they are about 3.5 ppts more likely to be retired. The impact on the number of working hours is not measured because of the small sample size.

With regards to control variables, coefficients are similar to those from the larger sample. People with the higher level of education and better health are significantly more likely to work. It is noticeable that the impact of education is larger for women but the impact of health is larger for men. Married women and women with children are less likely to participate in the labor force while the marital status for men is not statistically significant and the probability of working is higher for men with children.

Like in the larger sample described above, age has a significant influence on the probability of being retired. People aged 65 and over are significantly less likely to remain employed and the impact is greater for females. However, individuals who reached early retirement age are not more likely to retire. Remarkably, the presence of children has a negative impact of the probability of being retired for both genders.

	Men			Women	
	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Random effects
<i>Chore extra-residential care</i>	-0.038** (0.019)	-0.068* (0.036)	-0.032 (0.021)	-0.037 (0.029)	-0.047* (0.026)
<i>Basic education</i>	-0.155*** (0.059)		-0.178*** (0.060)	-0.201*** (0.068)	-0.246*** (.070)
<i>Secondary education</i>	-0.042** (0.026)		-0.039** (0.025)	-0.129*** (0.034)	-0.163*** (0.033)
<i>Immigrant</i>	-0.074 (0.066)		-0.065 (0.066)	0.119* (0.063)	0.091 (0.064)
<i>Married or registered partnership</i>	0.017 (0.068)	0.056 (0.199)	0.031 (0.072)	-0.147** (0.069)	-0.145** (0.065)
<i>Age</i>	0.140*** (0.059)	0.063 (0.091)	0.124** (0.059)	0.083 (0.078)	0.129* (0.071)
<i>Age squared</i>	-0.002*** (0.001)	-0.001 (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	--0.001*** (0.001)
<i>ERA</i>	-0.021 (0.046)	0.147* (0.088)	0.008 (0.047)	0.085 (0.059)	-0.064 (0.047)
<i>FRA</i>	-0.182** (0.087)	-0.063 (0.137)	-0.173** (0.085)	0.148 (0.106)	-0.099 (0.096)
<i>Number of children</i>	0.020* (0.010)	0.006 (0.027)	0.024** (0.010)	-0.024* (0.013)	-0.023* (0.012)
<i>Child under 18</i>	0.027 (0.028)	-0.108** (0.048)	-0.001 (0.028)	-0.031 (0.052)	-0.031 (0.046)
<i>House owner</i>	0.080** (0.037)	-0.123 (0.114)	0.084** (0.036)	-0.012 (0.041)	0.044 (0.040)
<i>Very good or excellent health</i>	0.513*** (0.103)	0.337** (0.158)	0.472*** (0.105)	0.390*** (0.101)	0.312*** (0.086)
<i>Good or fair health</i>	0.441*** (0.103)	0.302* (0.158)	0.410*** (0.105)	0.294*** (0.099)	0.281*** (0.084)
<i>Constant</i>	-2.504 (1.722)	-0.099 (2.658)	-2.011 (1.731)	-0.246 (2.273)	-2.360 (2.041)
<i>Observations</i>	1091	667	1091	1104	1104

Table 12. Pooled OLS, fixed effects and random effects linear probability models of labor force participation

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Men			Women	
	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Random effects
Chore extra-residential care	0.036** (0.019)	0.029 (0.033)	0.033* (0.018)	0.020 (0.013)	0.016 (0.013)
Basic education	-0.009 (0.037)		-0.009 (0.038)	-0.062 (0.038)	-0.077* (0.040)
Secondary education	0.004 (0.020)		0.003 (0.020)	-0.027* (0.016)	-0.033** (0.016)
Immigrant	-0.025 (0.030)		-0.025 (0.032)	-0.012 (0.013)	-.0163545 .012888
Married or registered partnership	-0.024 (0.050)	0.085** (0.041)	-0.016 (0.049)	0.044*** (0.016)	0.044*** (0.017)
Age	-0.200*** (0.051)	-0.243*** (0.090)	-0.206*** (0.052)	-0.181*** (0.055)	-0.176*** (0.056)
Age squared	0.002*** (0.000)	0.002*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.001)
ERA	-0.027 (0.034)	-0.147* (0.083)	-0.035 (0.036)	0.013 (0.022)	-0.019 (0.016)
FRA	0.229*** (0.084)	0.170 (0.138)	0.231*** (0.084)	0.365*** (0.088)	0.317*** (0.086)
Number of children	-0.024*** (0.007)	-0.007 (0.021)	-0.025*** (0.007)	-0.017*** (0.006)	-0.016*** (0.006)
Child under 18	0.002 (0.019)	0.076* (0.042)	0.008 (0.019)	0.009 (0.007)	0.006 (0.007)
House owner	-0.002 (0.025)	0.091 (0.151)	-0.006 (0.025)	-0.027 (0.019)	-0.022 (0.019)
Very good or excellent health	0.066 (0.044)	0.016 (0.107)	0.066 (0.047)	0.031 (0.030)	0.032 (0.031)
Good or fair health	0.065 (0.043)	0.047 (0.106)	0.067 (0.047)	0.027 (0.028)	0.033 (0.029)
Constant	4.623*** (1.445)	5.808** (2.621)	4.814*** (1.499)	4.999*** (1.511)	4.652*** (1.553)
Observations	1091	667	1091	1104	1104

Table 13. Pooled OLS, fixed effects and random effects linear probability models of retirement status

***Significance at 1%

** Significance at 5%

* Significance at 10%

5. Conclusion

To sum up, the most remarkable finding of the empirical research is that the impact of caregiving on the labor market outcomes is significant for males but not for females. The results suggest a modest but significant impact of the extra-residential caregiving in general and chore extra-residential caregiving in particular on the external margin of the labor market: men who help someone outside the household are 3.3-6.8 ppts less likely to participate in the labor force and 2.8-3.9 ppts more likely to be retired. It is rather similar to results reported by Lilly et al. (2010). According to them, male caregivers from Canada are 9 ppts less likely to have a job, however, the effect on the female labor force participation rate is not significant. It might be reasonable to suggest that men who mostly work full-time could be not able to adjust the number of working hours and may decide to retire earlier if they have such an opportunity.

The magnitude of significant effects is in line with the literature on this topic. Informal caregiving reduces labor force participation by a few percentage points only but more than a half of Dutch people between 50 and 70 years who help someone outside the household, thus, the aggregated influence might be noticeable at the country level.

Quite clearly, the results show that it could be not enough to focus on the female carers only, moreover, they point out that the impact of informal caregiving might depend on the type of care provided, however, most researchers do not distinguish between personal care and chore assistance, for example.

Furthermore, it is usually assumed that parents and parents-in-law are main care recipients, nevertheless, spouses and partners are mentioned as care recipients who live in the same household as caregivers about 6 times more often than parents and parents-in-law. However, it could be challenging to find good instruments to use them in the analysis. The last but not the least, it seems to be important to evaluate the impact of the long-term care reform that took place in 2015. Unfortunately, the relevant data is not available yet.

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Appendices

Appendix A

	Women			Men		
Care (any type)	-0.017 (0.024)			-0.024 (0.0186)		
Extra-residential care (any type)		-0.015 (0.023)			-0.023 (0.018)	
Intensive care (daily)			0.021 (0.350)			-0.215*** (0.055)
Basic education	-0.165*** (0.063)	-0.168*** (0.062)	-0.158*** (0.060)	-0.168*** (0.052)	-0.170*** (0.054)	-0.169*** (0.053)
Secondary education	-0.094*** (0.031)	-0.098*** (0.029)	-0.095*** (0.030)	-0.055** (0.024)	-0.048** (0.024)	-0.048** (0.023)
Immigrant	0.093** (0.056)	0.124** (0.053)	0.153*** (0.059)	-0.073 (0.061)	-0.064 (0.060)	-0.053 (0.061)
Married or registered partnership	-0.104* (0.054)	-0.102* (0.053)	-0.100 (0.055)	0.018 (0.060)	0.021 (0.060)	0.017 (0.060)
Age	0.112** (0.056)	0.118** (0.056)	0.098* (0.060)	0.142*** (0.045)	0.167*** (0.045)	0.172*** (0.045)
Age squared	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.0005)	-0.001*** (0.000)	-0.002*** (0.000)	0.002*** (0.000)
ERA	0.005 (0.046)	0.022 (0.044)	0.038 (0.044)	-0.002 (0.034)	-0.017 (0.034)	-0.018 (0.034)
FRA	-0.014 (0.080)	0.012 (0.078)	0.023 (0.078)	-0.166** (0.067)	-0.169** (0.068)	-0.172** (0.068)
Number of children	-0.024** (0.015)	-0.023** (0.012)	-0.025** (0.012)	0.025*** (0.009)	0.023** (0.009)	0.022** (0.009)
Child under 18	-0.020 (0.039)	-0.023 (0.040)	-0.014 (0.050)	0.025 (0.020)	0.022 (0.025)	0.019 (0.025)
House owner	-0.022 (0.038)	-0.027 (0.038)	-0.017 (0.039)	0.069* (0.035)	0.068** (0.034)	0.065 (0.034)
Very good or excellent health	0.492*** (0.071)	0.504*** (0.075)	0.524*** (0.084)	0.452*** (0.088)	0.469*** (0.086)	0.468*** (0.086)
Good or fair health	0.400*** (0.069)	0.414*** (0.073)	0.436*** (0.079)	0.398*** (0.087)	0.418*** (0.085)	0.421*** (0.085)
Constant	-1.561 (1.629)	-1.678 (1.648)	-2.181 (1.516)	-2.531* (1.323)	-3.274** (1.313)	-3.425 (1.312)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1667	1785	1668	1668	1661	1661

Table 14. Pooled OLS linear probability models of labor force participation
Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men			
	Fixed effects			Fixed effects		RE	FE
Care (any type)	-0.017 (0.021)			-0.029 (0.022)			
Extra-residential care (any type)		-0.019 (0.022)			-0.038* (0.022)	-0.033* (0.018)	
Intensive care (daily)			-0.054 (0.035)				-0.169*** (0.055)
Married or registered partnership	-0.121 (0.130)	-0.121 (0.130)	-0.128 (0.133)	0.080 (0.100)	0.077 (0.099)	-0.011 (0.069)	0.088 (0.118)
Age	0.110* (0.057)	0.109* (0.058)	0.112* (0.058)	0.106* (0.063)	0.123* (0.064)	0.142*** (0.052)	0.133 (0.063)
Age squared	-0.001** (0.000)	-0.001** (0.001)	-0.001** (0.001)	-0.001** (0.001)	-0.001** (0.001)	- 0.002*** (0.000)	-0.001*** (0.001)
ERA	0.047 (0.040)	0.046 (0.041)	0.047 (0.041)	0.117*** (0.040)	0.109*** (0.040)	0.041 (0.035)	0.109*** (0.041)
FRA	0.010 (0.079)	0.0004 (0.081)	0.005 (0.081)	-0.050 (0.078)	-0.045 (0.079)	-0.127* (0.069)	-0.045 (0.073)
Number of children	-0.026 (0.027)	-0.027 (0.028)	-0.030 (0.028)	-0.011 (0.026)	-0.007 (0.025)	0.027** (0.011)	0.0005 (0.029)
Child under 18	0.001 (0.042)	0.002 (0.043)	0.002 (0.044)	-0.034 (0.038)	-0.035 (0.037)	0.004 (0.026)	-0.025 (0.042)
House owner	0.030 (0.084)	-0.027 (0.028)	0.021 (0.083)	0.055 (0.102)	0.055 (0.102)	0.074** (0.035)	0.043 (0.091)
Very good or excellent health	-0.012 (0.089)	0.008 (0.091)	(0.014) (0.093)	0.281*** (0.097)	0.308*** (0.099)	0.417*** (0.090)	0.303*** (0.082)
Good or fair health	0.012 (0.085)	0.029 (0.087)	0.035 (0.089)	0.258*** (0.094)	0.282*** (0.097)	0.363*** (0.089)	0.303*** (0.082)
Wave dummies	yes	yes	yes	yes	yes	yes	yes
Observations	1581	1560	1559	1410	1383	1383	1378

Table 15. Fixed effects linear probability models and random effects linear probability model of labor force participation

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	-0.016 (0.018)			-0.020 (0.017)		
Extra-residential care (any type)		-0.016 (0.018)			-0.021 (0.017)	
Intensive care (daily)			-0.052 (0.032)			-0.193*** (0.051)
Basic education	-0.179*** (0.061)	-0.179*** (0.062)	-0.177*** (0.061)	-0.177*** (0.051)	-0.179*** (0.052)	-0.177*** (0.051)
Secondary education	-0.117*** (0.027)	-0.116*** (0.028)	-0.115*** (0.028)	-0.044** (0.022)	-0.040* (0.022)	-0.039* (0.022)
Immigrant	0.074 (0.054)	0.075 (0.054)	0.076 (0.054)	-0.054 (0.052)	-0.048 (0.052)	-0.039 (0.052)
Married or registered partnership	-0.088* (0.050)	-0.088* (0.049)	-0.088* (0.050)	0.028 (0.056)	0.030 (0.056)	0.025 (0.055)
Age	0.084* (0.049)	0.088* (0.050)	0.089 (0.050)	0.117** (0.046)	0.139*** (0.046)	0.147 *** (0.045)
Age squared	-0.001** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
ERA	0.033 (0.035)	0.034 (0.036)	0.034 (0.036)	0.027 (0.032)	0.017 (0.032)	0.014 (0.031)
FRA	-0.003 (0.068)	-0.004 (0.070)	-0.002 (0.070)	-0.143** (0.064)	-0.140** (0.064)	-0.144** (0.064)
Number of children	-0.029*** (0.010)	-0.028*** (0.010)	-0.028*** (0.010)	0.025*** (0.008)	0.025*** (0.008)	0.024*** (0.008)
Child under 18	-0.005 (0.033)	-0.006 (0.034)	-0.009 (0.034)	0.002 (0.022)	0.004 (0.022)	0.002 (0.021)
House owner	0.021 (0.035)	0.017 (0.035)	0.015 (0.035)	0.076** (0.031)	0.076** (0.031)	0.073** (0.030)
Very good or excellent health	0.320*** (0.069)	0.334*** (0.072)	0.337*** (0.072)	0.410*** (0.081)	0.433*** (0.081)	0.435*** (0.081)
Good or fair health	0.276*** (0.068)	0.290*** (0.071)	0.292*** (0.071)	0.362*** (0.080)	0.386*** (0.080)	0.390*** (0.080)
Constant	-0.609 (1.421)	-0.722 (1.439)	-0.770 (1.439)	-1.732 (1.333)	-2.390* (1.322)	-2.630** (1.310)
Observations	1809	1785	1785	1688	1656	1688

Table 16. Random effects linear probability models of labor force participation
Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	0.050 (0.229)			0.172 (0.255)		
Extra-residential care (any type)		0.014 (0.229)			0.186 (0.221)	
Intensive care (daily)			0.021 (0.350)			2.910 (6.288)
Basic education	-0.148** (0.070)	-0.155*** (0.071)	-0.158*** (0.060)	-0.145** (0.067)	-0.142** (0.069)	-0.132 (0.120)
Secondary education	-0.097*** (0.030)	-0.095** (0.031)	-0.095*** (0.030)	-0.044 (0.028)	-0.037 (0.027)	-0.032 (0.050)
Immigrant	0.164* (0.089)	0.155 (0.091)	0.153 (0.059)	-0.039 (0.077)	-0.029 (0.073)	-0.148 (0.216)
Married or registered partnership	-0.104* (0.056)	-0.100* (0.055)	-0.100 (0.055)	-0.006 (0.067)	0.001 (0.065)	0.036 (0.120)
Age	0.087 (0.067)	0.097* (0.067)	0.098 (0.060)	0.141*** (0.047)	0.161*** (0.048)	0.065 (0.245)
Age squared	-0.001* (0.001)	-0.001*** (0.001)	-0.001* (0.001)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001 (0.002)
ERA	0.034 (0.044)	0.038 (0.044)	0.038 (0.044)	0.008 (0.043)	-0.007 (0.039)	0.029 (0.139)
FRA	0.016 (0.077)	0.023 (0.078)	0.023 (0.078)	-0.163** (0.072)	-0.172** (0.072)	-0.133 (0.181)
Number of children	-0.026** (0.013)	-0.025* (0.013)	-0.025 (0.012)	0.021** (0.010)	0.020** (0.010)	0.033 (0.029)
Child under 18	-0.007 (0.049)	-0.014 (0.050)	-0.014 (0.050)	0.024 (0.029)	0.025 (0.028)	0.078 (0.133)
House owner	-0.011 (0.038)	-0.017 (0.038)	-0.017 (0.039)	0.070* (0.036)	0.060* (0.035)	0.113 (0.124)
Very good or excellent health	0.507*** (0.075)	0.524*** (0.089)	0.524*** (0.084)	0.398*** (0.121)	0.377*** (0.118)	0.327 (0.270)
Good or fair health	0.417*** (0.071)	0.435*** (0.082)	0.436*** (0.079)	0.359*** (0.111)	0.341*** (0.109)	0.255 (0.308)
Constant	-0.758 (1.882)	-1.036 (1.895)	-1.062 (1.739)	-2.570** (1.392)	-2.679** (1.367)	-3.011 (1.444)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1712	1688	1688	1651	1620	1620
Test of endogeneity. H ₀ : variables are exogenous						
F-stat	0.083	0.013	0.071	0.694	1.019	0.902
p-value	0.773	0.911	0.790	0.405	0.313	0.343
First-stage regression						
F-stat	17.323	16.644	10.992	11.532	15.373	0.358

Table 17. Pooled OLS linear probability models of labor force participation with instrumental variables

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	-0.134 (0.237)			-0.167 (0.173)		
Extra-residential care (any type)		-0.105 (0.209)			-0.175 (0.185)	
Intensive care (daily)			1.290 (1.409)			-1.851 (2.862)
Married or registered partnership	-0.138 (0.115)	-0.127 (0.112)	0.079 (0.286)	0.057 (0.121)	0.055 (0.121)	0.113 (0.181)
Age	0.087 (0.066)	0.084 (0.067)	-0.039 (0.154)	0.102 (0.063)	0.128 (0.065)	0.224 (0.185)
Age squared	-0.001** (0.001)	-0.001* (0.001)	-0.00002 (0.001)	-0.001** (0.001)	-0.001*** (0.001)	-0.002 (0.001)
ERA	0.029 (0.044)	0.030 (0.043)	0.078 (0.068)	0.096 ** (0.043)	0.098** (0.042)	0.021 (0.143)
FRA	-0.033 (0.077)	-0.041 (0.078)	-0.069 (0.156)	-0.074 (0.074)	-0.050 (0.074)	-0.188 (0.237)
Number of children	-0.017 (0.041)	-0.021 (0.040)	-0.008 (0.060)	-0.003 (0.030)	0.015 (0.033)	0.056 (0.093)
Child under 18	-0.010 (0.044)	-0.008 (0.045)	0.077 (0.136)	-0.041 (0.042)	-0.036 (0.043)	0.025 0.115
House owner	0.044 (0.095)	0.047 (0.098)	0.199 (0.238)	0.106 (0.094)	0.104 (0.093)	-0.032 (0.249)
Very good or excellent health	-0.020 (0.088)	0.008 (0.087)	-0.110 (0.206)	0.320*** (0.092)	0.326*** (0.095)	0.342** (0.152)
Good or fair health	0.001 (0.085)	0.025 (0.084)	-0.072 (0.186)	0.288*** (0.087)	0.294*** (0.090)	0.315** (0.149)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1443	1413	1316	1251	1221	1221
Test of endogeneity. H ₀ : variables are exogenous						
Chi-sq(1) P-value	0.614	0.676	0.637	0.430	0.477	0.380
Weak identification test						
Cragg-Donald Wald F-stat	8.150	10.733	0.479	14.025	11.865	0.611
Stock-Yogo weak ID test critical values	6.66 (20% maximal IV size)	8.96 (15% maximal IV size)	5.53 (25% maximal IV size)	8.96 (15% maximal IV size)	8.96 (15% maximal IV size)	5.53 (25% maximal IV size)

Table 18. Fixed effects linear probability models of labor force participation with instrumental variables

***Significance at 1%

** Significance at 5%

* Significance at 10%

Weak identification test is used to determine if instruments are only weakly correlated with the care variables. The higher the Cragg-Donald Wald F-statistic is the stronger instruments are. Stock-Yogo weak ID test critical values are reported to compare them to Cragg-Donald Wald F-statistics.

Appendix B

	Women			Men		
Care (any type)	0.002 (0.012)			0.023 (0.015)		
Extra-residential care (any type)		0.006 (0.012)			0.030* (0.015)	
Intensive care (daily)			-0.099 (0.211)			0.099** (0.044)
Basic education	-0.048 (0.043)	-0.048 (0.043)	-0.045 (0.043)	0.003 (0.038)	-0.002 (0.038)	-0.006 (0.038)
Secondary education	-0.044*** (0.015)	-0.044*** (0.015)	-0.048*** (0.016)	0.014 (0.017)	0.014 (0.017)	0.013 (0.017)
Immigrant	-0.001 (0.018)	-0.0004 (0.018)	-0.011 (0.024)	-0.014 (0.029)	-0.015 (0.029)	-0.023 (0.029)
Married or registered partnership	0.016 (0.017)	0.017 (0.017)	0.019 (0.019)	0.020 (0.032)	0.023 (0.033)	0.026 (0.032)
Age	-0.172*** (0.048)	-0.180*** (0.048)	-0.177*** (0.050)	-0.251*** (0.041)	-0.257*** (0.042)	-0.259*** (0.042)
Age squared	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
ERA	0.019 (0.018)	0.020 (0.018)	0.018 (0.019)	-0.016 (0.026)	-0.020 (0.026)	-0.020 (0.026)
FRA	0.365*** (0.067)	0.360*** (0.067)	0.366*** 0.070	0.228*** (0.066)	0.216*** (0.066)	0.216*** (0.066)
Number of children	-0.019*** (0.005)	-0.020*** (0.005)	-0.017*** (0.006)	-0.019*** (0.007)	-0.019*** (0.007)	-0.018*** (0.007)
Child under 18	0.005 (0.007)	0.006 (0.007)	-0.001 (0.017)	-0.004 (0.015)	-0.004 (0.015)	-0.003 (0.015)
House owner	-0.004 (0.016)	-0.003 (0.016)	-0.002 (0.017)	0.019 (0.021)	0.012 (0.021)	0.015 (0.021)
Very good or excellent health	0.025 (0.032)	0.007 (0.030)	0.015 (0.036)	0.060 (0.037)	0.051 (0.039)	0.058 (0.039)
Good or fair health	0.022 (0.032)	0.004 (0.030)	0.012 .0342558	0.048 (0.036)	0.041 (0.037)	0.045 (0.037)
Constant	4.742*** (1.307)	4.975*** (1.312)	4.891*** (1.382)	6.138*** (1.165)	6.280*** (1.191)	6.365 (1.183)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1809	1785	1809	1688	1656	1656

Table 19. Pooled OLS linear probability models of retirement status
Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	-0.013 (0.016)			0.026 (0.021)		
Extra-residential care (any type)		-0.003 (0.016)			0.039* (0.021)	
Intensive care (daily)			0.044 (0.032)			0.100* (0.057)
Married or registered partnership	0.033 (0.110)	0.033 (0.109)	0.040 (0.109)	0.072** (0.033)	0.078* (0.034)	0.072** (0.033)
Age	-0.216*** (0.058)	-0.225*** (0.058)	-0.229*** (0.058)	-0.258*** (0.059)	-0.271*** (0.062)	-0.276*** (0.061)
Age squared	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
ERA	-0.099*** (0.028)	-0.010*** (0.029)	-0.010*** (0.029)	-0.110*** (0.036)	-0.121*** (0.037)	-0.118*** (0.036)
FRA	0.189** (0.085)	0.181** (0.087)	0.177** (0.087)	0.114 (0.080)	0.094 (0.082)	0.101 (0.082)
Number of children	0.007 (0.014)	0.008 (0.014)	0.008 (0.014)	0.0004 (0.023)	-0.006 (0.021)	-0.009 (0.021)
Child under 18	0.036* (0.019)	0.037* (0.020)	0.041** (0.020)	0.048 (0.031)	0.043 (0.031)	0.040 (0.031)
House owner	-0.005 (0.079)	-0.006 (0.080)	-0.001 (0.080)	0.028 (0.096)	0.023 (0.097)	0.031 (0.094)
Very good or excellent health	0.046 (0.067)	0.013 (0.062)	0.009 (0.063)	-0.034 (0.063)	-0.050 (0.065)	-0.044 (0.066)
Good or fair health	0.015 (0.064)	-0.013 (0.059)	-0.017 (0.060)	-0.016 (0.058)	-0.026 (0.060)	-0.021 (0.061)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1581	1560	1559	1408	1378	1378

Table 20. Fixed effects linear probability models retirement status

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	0.009 (0.012)			0.021 (0.015)		
Extra-residential care (any type)		0.006 (0.012)			0.028* (0.015)	
Intensive care (daily)			0.030 (0.023)			0.098** (0.043)
Basic education	-0.048 (0.043)	-0.048 (0.043)	-0.049 (0.043)	-0.001 (0.038)	-0.007 (0.039)	-.010 (0.039)
Secondary education	-0.044*** (0.015)	-0.043*** (0.015)	-0.044*** (0.015)	0.013 (0.017)	0.013 (0.017)	0.011 (0.017)
Immigrant	-0.001 (0.018)	-0.0004 (0.018)	0.001 (0.018)	-0.014 (0.028)	-0.015 (0.028)	-.0224494 (0.028)
Married or registered partnership	0.016 (0.017)	0.017 (0.017)	0.016 (0.017)	0.021 (0.032)	0.024 (0.033)	0.027 (0.032)
Age	-0.172*** (0.048)	-0.180*** (0.048)	-0.181*** (0.048)	-0.247*** (0.041)	-0.252*** (0.042)	-0.255*** (0.042)
Age squared	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
ERA	0.019 (0.018)	0.020 (0.018)	0.020 (0.018)	-0.026 (0.025)	-0.032 (0.026)	-0.032 (0.026)
FRA	0.365*** (0.067)	0.360*** (0.067)	0.360*** (0.070)	0.214*** (0.065)	0.201*** (0.065)	0.202*** (0.065)
Number of children	-0.019*** (0.005)	-0.020*** (0.005)	-0.020*** (0.005)	-0.020*** (0.007)	-0.020*** (0.007)	-0.019*** (0.007)
Child under 18	0.005 (0.007)	0.006 (0.007)	0.007 (0.007)	0.002 (0.014)	0.001 (0.015)	0.002 (0.015)
House owner	-0.004 (0.016)	-0.003 (0.016)	-0.002 (0.016)	0.015 (0.021)	0.009 (0.021)	0.011 (0.021)
Very good or excellent health	0.025 (0.032)	0.007 (0.030)	0.005 (0.030)	0.048 (0.039)	0.037 (0.041)	0.043 (0.040)
Good or fair health	0.022 (0.032)	0.004 (0.030)	0.003 (0.030)	0.039 (0.038)	0.032 (0.040)	0.035 (0.040)
Constant	4.742*** (1.308)	4.975*** (1.312)	5.003 (1.308)	5.994*** (1.178)	6.131*** (1.209)	6.238*** (1.200)
Observations	1809	1785	1785	1688	1656	1688

Table 21. Random effects linear probability model of retirement status

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	-0.053 (0.134)			-0.132 (0.195)		
Extra-residential care (any type)		-0.065 (0.136)			-0.131 (0.171)	
Intensive care (daily)			-0.100 (0.211)			-2.047 (4.450)
Basic education	-0.053 (0.049)	-0.057 (0.049)	-0.045 (0.043)	-0.008 (0.048)	-0.018 (0.048)	-0.025 (0.082)
Secondary education	-0.050*** (0.016)	-0.052*** (0.017)	-0.048** (0.016)	0.004 (0.021)	0.004 (0.020)	0.0001 (0.035)
Immigrant	-0.019 (0.043)	-0.024 (0.046)	-0.011 (0.024)	-0.041 (0.037)	-0.043 (0.035)	0.040 (0.152)
Married or registered partnership	0.018 (0.020)	0.018 (0.020)	0.019 (0.019)	0.041 (0.039)	0.041 (0.038)	0.016 (0.086)
Age	-0.166*** (0.053)	-0.172*** (0.053)	-0.177*** (0.050)	-0.253*** (0.041)	-0.255*** (0.042)	-0.187 (0.176)
Age squared	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.002 (0.001)
ERA	0.015 (0.019)	0.016 (0.019)	0.018 (0.019)	-0.025 (0.033)	-0.028 (0.030)	-0.053 (0.098)
FRA	0.367*** (0.069)	0.365*** (0.070)	0.366*** (0.070)	0.227*** (0.069)	0.219*** (0.068)	0.191 (0.138)
Number of children	-0.016** (0.007)	-0.017*** (0.007)	-0.017** (0.006)	-0.015** (0.007)	-0.015** (0.007)	-0.025 (0.022)
Child under 18	-0.0004 (0.016)	-0.001 (0.016)	-0.001 (0.017)	-0.006 (0.017)	-0.005 (0.017)	-0.043 (0.091)
House owner	-0.002 (0.016)	-0.0002 (0.016)	-0.002 (0.017)	0.020 (0.021)	0.020 (0.023)	-0.017 (0.083)
Very good or excellent health	0.028 (0.036)	0.018 (0.041)	0.015 (0.036)	0.101 (0.070)	0.105 (0.072)	0.139 (0.186)
Good or fair health	0.025 (0.034)	0.014 (0.037)	0.012 (0.034)	0.076 (0.058)	0.082 (0.061)	0.143 (0.214)
Constant	4.581** (1.433)	4.765** (1.449)	4.891** (1.382)	6.215*** (1.176)	6.270*** (1.191)	4.241 (5.141)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1712	1688	1688	1651	1620	1620
Test of endogeneity. H ₀ : variables are exogenous						
F-stat	0.180	0.298	0.399	0.693	0.963	0.681
p-value	0.672	0.586	0.528	0.405	0.327	0.410
First-stage regression						
F-stat	17.323	16.644	10.992	11.532	15.373	0.358

Table 22. Pooled OLS linear probability models of retirement status with instrumental variables

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	0.289 (0.210)			-0.151 (0.168)		
Extra-residential care (any type)		0.219 (0.174)			-0.153 (0.182)	
Intensive care (daily)			1.668 (2.623)			-1.616 (2.844)
Married or registered partnership	0.075 (0.102)	0.048 (0.093)	0.292 (0.445)	0.054 (0.117)	0.056 (0.118)	0.107 (0.180)
Age	-0.234*** (0.058)	-0.238*** (0.056)	-0.370 (0.276)	-0.249*** (0.061)	- 0.262*** (0.063)	-0.178 (0.184)
Age squared	0.002*** (0.001)	0.002*** (0.000)	0.004 (0.002)	0.002*** (0.001)	0.003*** (0.001)	0.002 (0.001)
ERA	-0.077** (0.039)	-0.085** (0.036)	-0.076 (0.076)	-0.123*** (0.041)	- 0.131*** (0.041)	-0.198 (0.142)
FRA	0.197** (0.068)	0.182** (0.065)	0.041 (0.263)	0.112 (0.071)	0.093 (0.073)	-0.027 (0.236)
Number of children	-0.016 (0.036)	-0.009 (0.033)	0.044 (0.077)	0.006 (0.029)	-0.004 (0.032)	0.032 (0.092)
Child under 18	0.043 (0.040)	0.041 (0.037)	0.183 (0.239)	0.048 (0.041)	0.045 (0.042)	0.098 (0.115)
House owner	-0.036 (0.084)	-0.041 (0.081)	0.216 (0.381)	-0.008 (0.091)	-0.017 (0.091)	-0.136 (0.247)
Very good or excellent health	0.079 (0.078)	0.025 (0.072)	-0.126 (0.260)	-0.018 (0.090)	-0.018 (0.093)	-0.004 (0.151)
Good or fair health	0.044 (0.075)	-0.001 (0.067)	-0.152 (0.257)	0.003 (0.084)	0.011 (0.088)	0.029 (0.148)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	1443	1413	1413	1251	1221	1221
Test of endogeneity. H ₀ : variables are exogenous						
Chi-sq(1) P-value	0.096	0.168	0.185	0.260	0.253	0.346
Weak identification test						
Cragg-Donald Wald F-stat	8.150	10.733	0.479	14.025	11.865	0.611
Stock-Yogo weak ID test critical values	6.66 (20% maximal IV size)	8.96 (15% maximal IV size)	5.53 (25% maximal IV size)	8.96 (15% maximal IV size)	8.96 (15% maximal IV size)	5.53 (25% maximal IV size)

Table 23. Fixed effects linear probability models and random effects linear probability model of retirement status with instrumental variables

***Significance at 1%

** Significance at 5%

* Significance at 10%

Appendix C

	Women			Men		
Care (any type)	-0.231 (0.814)			1.309* (0.686)		
Extra-residential care (any type)		-0.386 (0.827)			1.481** (0.685)	
Intensive care (daily)			-0.455 (1.700)			-3.639** (1.762)
Basic education	-9.903*** (2.796)	-9.884*** (2.807)	-9.791*** (2.760)	-4.455* (2.474)	-4.400* (2.477)	-4.623* (2.496)
Secondary education	-6.073*** (1.006)	-6.022*** (1.007)	-6.000*** (1.008)	-2.492*** (0.850)	-2.238*** (0.854)	-2.275*** (0.855)
Immigrant	0.115 (1.686)	0.164 (1.705)	0.207 (1.701)	-2.7404 (1.838)	-2.825 (1.825)	-2.690 (1.807)
Married or registered partnership	-3.986** (1.737)	-4.067** (1.734)	-4.067** (1.738)	3.406** (1.735)	3.482** (1.740)	3.525** (1.712)
Age	2.973 (3.200)	2.614 (3.210)	2.618 (3.222)	3.366 (2.897)	3.611 (2.892)	3.671 (2.890)
Age squared	-0.030 (0.029)	-0.027 (0.029)	-0.027 (0.029)	-0.034 (0.026)	-0.036 (0.026)	-0.036 (0.026)
ERA	0.701 (1.438)	0.810 (1.445)	0.800 (1.447)	-0.454 (1.213)	-0.320 (1.214)	-0.598 (1.204)
FRA	6.168 (4.246)	6.174 (4.274)	6.186 (4.277)	2.335 (3.712)	2.406 (3.689)	2.148 (3.653)
Number of children	-0.113 (0.411)	-0.115 (0.407)	-0.122 (0.407)	1.171*** (0.387)	1.121*** (0.385)	1.149*** (0.389)
Child under 18	0.041 (1.257)	0.019 (1.262)	0.046 (1.270)	0.118 (0.909)	0.282 (0.911)	0.252 (0.918)
House owner	1.032 (1.330)	(0.998) (1.327)	1.004 (1.325)	-0.344 (1.091)	-0.583 (1.048)	-0.637 (1.064)
Very good or excellent health	-3.298 (4.448)	-3.347 (4.468)	-3.333 (4.506)	5.465* (3.297)	3.597 (3.226)	4.353 (3.285)
Good or fair health	-4.638 (4.432)	-4.595 (4.452)	-4.566 (4.490)	6.228* (3.242)	4.22 (3.172)	4.818 (3.246)
Constant	-32.733 (87.363)	-21.921 (87.686)	-22.501 (74.740)	-53.156 (80.003)	-58.436 (79.724)	-60.2145 (79.699)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	886	857	857	977	970	970

Table 24. Pooled OLS models of weekly work hours conditional on working

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women				Men		
	Fixed effects			RE	Fixed effects		
Care (any type)	0.955 (0.658)				0.339 (0.605)		
Extra-residential care (any type)		1.040 (0.674)				0.614 (0.592)	
Intensive care (daily)			0.734 (1.163)	0.242 (1.069)			-0.076 (1.569)
Married or registered partnership	-3.188 (4.377)	2.946 (4.372)	3.102 (3.250)	-2.638 (1.788)	2.496 (5.048)	2.600 (5.034)	2.402 (5.069)
Age	5.865 (3.919)	4.993 (3.881)	5.625** (2.628)	4.819** (2.415)	3.052 (2.817)	2.627 (2.855)	2.6434 (2.871)
Age squared	-0.053 (0.036)	-0.045 (0.035)	-0.049** (0.023)	- 0.046** (0.022)	-0.032 (0.025)	-0.028 (0.026)	-0.028 (0.025)
ERA	-1.431 (1.384)	-1.398 (1.372)	-1.397 (1.291)	-0.365 (1.168)	0.518 (1.324)	0.391 (1.357)	0.361 (1.348)
FRA	1.374 (4.373)	1.078 (4.337)	1.297 (3.768)	2.352 (3.484)	2.806 (3.169)	2.429 (3.236)	2.382 (3.221)
Number of children	1.595* (0.813)	1.320* (0.778)	1.429 (1.019)	-0.400 (0.426)	1.063* (0.544)	0.988* (0.538)	1.004* (0.544)
Child under 18	1.053 (1.219)	0.781 (1.228)	0.723 (1.213)	0.816 (1.057)	0.579 (0.921)	0.708 (0.936)	0.630 (0.940)
House owner	1.074 (3.658)	0.999 (3.695)	1.522 (2.899)	1.812 (1.393)	-6.861* (3.701)	-6.848* (3.648)	-6.819* (3.688)
Very good or excellent health	7.429** (3.369)	7.610** (3.361)	7.341* (4.121)	7.594* (3.974)	1.884 (1.642)	1.845 (1.849)	1.933 (1.848)
Good or fair health	6.507** (3.263)	6.618** (3.251)	6.326 (4.052)	6.431 (3.929)	1.955 (1.460)	1.916 (1.679)	1.975 (1.681)
Wave dummies	yes	yes	yes	yes	yes	yes	yes
Observations	691	683	683	683	714	707	707

Table 25. Fixed effects models and a random effects model of weekly work hours conditional on working

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	0.762 (0.603)			0.699 (0.516)		
Extra-residential care (any type)		0.715 (0.611)			0.921* (0.508)	
Intensive care (daily)			0.659 (1.147)			-3.639** (1.761)
Basic education	-10.06*** (2.631)	-10.03*** (2.629)	-10.20** (2.615)	-3.473 (2.986)	-3.241 (2.986)	-4.623 (2.496)
Secondary education	-5.992*** (0.999)	-5.949*** (1.002)	-5.979*** (1.000)	-2.420*** (0.777)	-2.070*** (0.779)	-2.275*** (0.855)
Immigrant	-0.677 (1.823)	-0.615 (1.821)	-0.717 (1.814)	-2.510 (1.843)	-2.463 (1.825)	-2.690 (1.807)
Married or registered partnership	-1.892 (1.740)	-1.952 (1.739)	-1.946 (1.735)	2.548 (1.989)	2.571 (1.987)	3.524** (1.712)
Age	4.652 (3.065)	4.545 (3.069)	4.670 (3.092)	3.408 (2.310)	3.454 (2.312)	3.671 (2.890)
Age squared	-0.044 (0.028)	-0.043 (0.028)	-0.045 (0.028)	-0.035* (0.021)	-0.035* (0.021)	-0.036 (0.026)
ERA	-0.681 (1.165)	-0.586 (1.168)	-0.566 (1.169)	0.169 (1.054)	0.230 (1.068)	-0.598 (1.204)
FRA	2.603 (3.729)	2.815 (3.718)	2.886 (3.708)	2.197 (2.816)	2.223 (2.833)	2.148 (3.653)
Number of children	0.061 (0.398)	0.082 (0.401)	0.099 (0.399)	1.216*** (0.348)	1.138*** (0.344)	1.149*** (0.389)
Child under 18	0.193 (0.967)	0.132 (0.969)	0.077 (0.964)	0.218 (0.724)	0.406 (0.730)	0.252 (0.918)
House owner	0.956 (1.254)	0.921 (1.250)	0.971 (1.255)	-0.892 (1.133)	-0.972 (1.071)	-0.637 (1.064)
Very good or excellent health	1.787 (4.098)	1.690 (4.129)	1.562 (4.067)	3.090* (1.730)	2.527 (1.850)	4.353 (3.285)
Good or fair health	0.568 (4.061)	0.523 (4.093)	0.369 (4.032)	3.541** (1.653)	2.884 (1.775)	4.818 (3.246)
Constant	-90.770 (84.445)	-87.225 (84.566)	-89.979 (85.256)	-47.725 (63.472)	-49.116 (63.408)	-60.215 (79.699)
Observations	866	857	857	977	970	970

Table 26. Random effects models of weekly work hours conditional on working
Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	0.064 (6.305)			-3.281 (7.800)		
Extra-residential care (any type)		-0.166 (5.870)			-4.123 (11.882)	
Intensive care (daily)			2.920 (11.391)			82.530 (279.093)
Basic education	-9.760*** (2.903)	-9.759*** (3.220)	-9.726 (2.455)	-8.636** (3.033)	-8.990** (3.947)	-5.600 (8.465)
Secondary education	-5.980*** (0.795)	-5.931*** (1.021)	-5.923 (0.889)	-2.661* (0.996)	-2.787* (1.682)	-2.088 (1.638)
Immigrant	0.152 (1.740)	0.196 (1.995)	0.833 (1.649)	-5.379 (2.707)	-5.659* (3.383)	-11.754 (24.557)
Married or registered partnership	-3.808** (1.350)	-3.878** (1.751)	-4.677 (1.375)	5.051** (1.950)	5.389*** (2.024)	3.231 (6.811)
Age	2.877 (3.356)	2.543 (3.322)	1.766 (3.561)	1.184 (3.632)	0.483 (4.487)	3.344 (8.317)
Age squared	-0.030 (0.031)	-0.027 (.030)	-0.020 (0.032)	-0.014 (0.032)	-0.007 (0.040)	-0.034 (0.079)
ERA	0.857 (1.510)	0.982 (1.507)	1.129 (1.490)	-1.295 (1.965)	-1.479 (2.282)	1.504 (8.081)
FRA	6.400 (5.043)	6.473 (4.546)	6.057 (5.005)	1.758 (4.652)	0.985 (5.321)	6.619 (15.829)
Number of children	-0.132 (0.359)	-0.132 (0.442)	-0.161 (0.345)	1.118** (0.353)	1.133** (0.532)	1.423 (1.352)
Child under 18	0.033 (1.378)	0.005 (1.472)	0.113 (1.389)	0.835 (1.074)	0.899 (1.098)	0.529 (2.186)
House owner	1.099 (1.074)	1.057 (1.320)	1.187 (1.100)	-0.720 (1.276)	-1.087 (1.623)	0.529 (4.920)
Very good or excellent health	-3.223 (4.327)	-3.265 (4.437)	0.045 (5.331)	2.674 (5.235)	3.088 (5.799)	-0.646 (7.826)
Good or fair health	-4.557 (4.301)	-4.509 (4.414)	-1.119 (5.326)	3.120 (4.933)	3.531 (5.128)	-0.867 (10.744)
Constant	-29.946 (90.166)	-19.695 (89.392)	-0.441 (98.748)	9.663 (102.747)	29.232 (128.082)	-45.435 (214.152)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	855	846	846	680	675	675
Test of endogeneity. H ₀ : variables are exogenous						
F-stat	0.006	0.005	0.136	0.206	0.250	0.142
p-value	0.936	0.942	0.712	0.651	0.618	0.706
First-stage regression						
F-stat	11.525	11.994	12.727	5.253	4.277	0.288

Table 27. Pooled OLS models of weekly work hours conditional on working (with instrumental variables)

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women			Men		
Care (any type)	4.916 (6.093)			-0.152 (5.237)		
Extra-residential care (any type)		2.558 (5.679)			0.228 (5.939)	
Intensive care (daily)			10.822 (25.527)			-1.324 (34.600)
Married or registered partnership	1.459 (5.303)	1.567 (5.304)	1.613 (4.074)	2.263 (5.251)	2.410 (5.304)	2.325 (5.157)
Age	3.392 (5.628)	3.770 (5.283)	3.150 (6.540)	3.130 (2.798)	2.657 (2.829)	2.584 (3.526)
Age squared	-0.024 (0.054)	-0.030 (0.050)	-0.024 (0.064)	-0.032 (0.025)	-0.028 (0.025)	-0.028 (0.032)
ERA	-1.502 (1.629)	-1.398 (1.541)	-1.428 (1.622)	0.438 (1.352)	0.331 (1.358)	0.265 (1.856)
FRA	-1.032 (5.693)	0.108 (4.974)	-0.495 (6.272)	3.371 (3.085)	3.003 (3.128)	2.897 (3.899)
Number of children	1.214 (1.097)	1.112 (1.087)	1.470 (0.927)	1.053 (0.797)	0.986 (0.802)	0.996 (0.809)
Child under 18	0.740 (1.758)	-0.171 (1.578)	0.084 (2.078)	0.331 (1.137)	0.474 (1.170)	0.458 (0.997)
House owner	0.577 (3.083)	0.708 (3.285)	4.741 (9.077)	-6.772* (4.027)	-6.858* (3.872)	-6.837* (3.900)
Very good or excellent health	12.016* (6.446)	11.366** (5.655)	8.486 (9.183)	1.895 (2.115)	1.901 (2.181)	2.035 (3.066)
Good or fair health	11.361* (6.335)	10.774* (5.528)	7.983 (9.188)	1.919 (1.817)	1.935 (1.870)	2.052 (2.963)
Wave dummies	yes	yes	yes	yes	yes	yes
Observations	555	541	541	628	623	623
Test of endogeneity. H ₀ : variables are exogenous						
Chi-sq(1) P-value	0.446	0.700	0.657	0.917	0.938	0.972
Weak identification test						
Cragg-Donald Wald F-stat	7.822	7.743	1.020	8.371	6.338	1.989
Stock-Yogo weak ID test critical values	6.66 (20% maximal IV size)	6.66 (20% maximal IV size)	5.53 (25% maximal IV size)	6.66 (20% maximal IV size)	5.53 (25% maximal IV size)	5.53 (25% maximal IV size)

Table 28. Fixed effects models of weekly work hours conditional on working (with instrumental variables)

Standard errors clustered at the individual level

***Significance at 1%

** Significance at 5%

* Significance at 10%

Appendix D

	Women		Men	
	Pooled OLS	Fixed effects	Pooled OLS	Fixed effects
Chore extra-residential care	0.167 (0.209)	1.151 (1.380)	0.130 (0.208)	-0.207 (0.293)
Basic education	-0.169** (0.077)		-0.138** (0.068)	
Secondary education	-0.125*** (0.035)		-0.038 (0.026)	
Immigrant	0.182** (0.088)		-0.033 (0.084)	
Married or registered partnership	-0.133** (0.065)	-0.159 (0.146)	-0.007 (0.078)	0.042 (0.220)
Age	0.041 (0.088)	-0.221 (0.370)	0.119** (0.063)	0.061 (0.095)
Age squared	-0.001 (0.001)	0.002 (0.003)	-0.001** (0.001)	-0.001 (0.001)
ERA	0.091 (0.061)	0.271 (0.268)	-0.004 (0.053)	0.117 (0.117)
FRA	0.109 (0.111)	-0.090 (0.416)	-0.197** (0.091)	-0.089 (0.147)
Number of children	-0.029** (0.014)	-0.205 (0.236)	0.017 (0.010)	0.008 (0.030)
Child under 18	-0.006 (0.060)	0.121 (0.260)	0.023 (0.030)	-0.094* (0.053)
House owner	-0.007 (0.042)	0.449 (0.415)	0.080** (0.037)	-0.018 (0.102)
Very good or excellent health	0.360*** (0.103)	0.391 (0.322)	0.467*** (0.120)	0.341** (0.152)
Good or fair health	0.277*** (0.096)	0.490 (0.383)	0.409*** (0.117)	0.315** (0.150)
Constant	0.825 (2.503)		-1.960 (1.810)	
Observations	1096	637	1087	643
Tests of endogeneity. H ₀ : variables are exogenous				
p-value:	0.320	0.096	0.422	0.630
First-stage regression (pooled OLS)				
F-stat	21.638		13.927	
Weak identification test (fixed effects)				
Cragg-Donald Wald F-stat		1.306		5.940
Stock-Yogo weak ID test critical values		5.53 (25% maximal IV size)		5.53 (25% maximal IV size)

Table 29. Pooled OLS and fixed effects linear probability models of labor force participation (with instrumental variables)

***Significance at 1%

** Significance at 5%

* Significance at 10%

	Women		Men	
	Pooled OLS	Fixed effects	Pooled OLS	Fixed effects
Chore extra-residential care	-0.063 (0.104)	-0.091 (0.540)	-0.068 (0.163)	-0.322 (0.308)
Basic education	-0.065* (0.038)		-0.022 (0.045)	
Secondary education	-0.028* (0.016)		0.002 (0.020)	
Immigrant	-0.037 (0.034)		-0.053 (0.048)	
Married or registered partnership	0.040** (0.018)	0.059 (0.055)	0.001 (0.058)	0.045 (0.108)
Age	-0.172*** (0.059)	-0.126 (0.151)	-0.185*** (0.052)	-0.210** (0.102)
Age squared	0.002*** (0.001)	0.002 (0.001)	0.002*** (0.000)	0.002** (0.001)
ERA	0.007 (0.023)	-0.277** (0.111)	-0.037 (0.039)	-0.244** (0.121)
FRA	0.380*** (0.090)	-0.028 (0.203)	0.242*** (0.084)	0.118 (0.159)
Number of children	-0.014** (0.006)	0.033 (0.087)	-0.021*** (0.007)	-0.013 (0.042)
Child under 18	-0.003 (0.014)	0.061 (0.097)	0.004 (0.021)	0.080 (0.050)
House owner	-0.022 (0.018)	-0.124 (0.168)	-0.004 (0.025)	0.047 (0.133)
Very good or excellent health	0.040 (0.035)	0.092 (0.116)	0.084 (0.058)	0.035 (0.127)
Good or fair health	0.034 (0.031)	0.046 (0.145)	0.073 (0.052)	0.072 (0.123)
Constant	4.774 (1.600)		4.240 (1.460)	
Observations	1096	637	1083	642
Tests of endogeneity. H ₀ : variables are exogenous				
p-value:	0.416	0.814	0.511	0.173
First-stage regression (pooled OLS)				
F-stat	21.638		13.927	
Weak identification test (fixed effects)				
Cragg-Donald Wald F-stat		1.306		5.940
Stock-Yogo weak ID test critical values		5.53 (25% maximal IV size)		5.53 (25% maximal IV size)

Table 30. Pooled OLS and fixed effects linear probability models of retirement status (with instrumental variables)

***Significance at 1%

** Significance at 5%

* Significance at 10%