Acknowledgements

When I started this project, I did not have a clear idea of what "care" for children and for the elderly really meant. Support for childcare seemed an abstract concept. It is not the case anymore. I can now say (based on my personal experience and not on the data) that parental leaves (for both parents) and affordable and high quality childcare are essential to reconcile work and family life. When I started working on informal care, I did not know where it could lead to. I then realised what care giving is. It can certainly be a rewarding experience, but it is clear that as care responsibilities become larger the caregiver's health declines. And once the caregiver's burden is too large, it can lead to early retirement or even to a permanent poor health status. This is why I believe that well designed public policies can shape the extent into which, people can effectively care, while protecting them from the risk of poverty and poor health.

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(Chapter 4)

.

Farfan-Portet MI, Robert A., Swine C., Lorant V. Caring for your spouse: evil or blessing for survival? Submitted.
(Chapter 5)

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INTRODUCTION

CONTEXT AND GENERAL OBJECTIVE

When addressing care issues we should keep in mind that care is essential for human development. Waernes (2005) clearly points out that:

> " (..) care is an universal aspect in human existence. All people need care, even if the need requirement varies, not just based on cultural differences, but also on biological differences. A baby cannot survive without care, and disease, disability and ageing mean that the need is greater than it would be otherwise" (1).

The need for care was traditionally fulfilled within the family and, in almost all cultures, it was considered as a responsibility of women. Indeed, it is the moral virtue attributed to woman, such as altruism and choosing to put other's interested above of her own, that make them the elected carers. Yet, considering that caring is an intrinsic aspect of women's nature fails to take into account that traditions, laws and institutions can shape family's caring arrangements (2)

The analysis of care as a part of the welfare state is deeply rooted in the development of the concept of care among feminist scholars. In

the feminist literature, care is analysed from different perspectives: from an activity related to individual's feelings and moral values to the description of paid work and the provision and payments for care services (3). A common point from all these researches, is to consider how care giving affects the opportunities of women in terms of employment and personal achievements (4). In line with this objective, the concept of care in social policy has been used to understand how different types of welfare states divide the responsibility and the costs of caring (5;6).

A considerable number of studies on the role of care within the welfare state were developed as a critic to Esping-Andersen three typologies of the welfare state (7). Critics have pointed out that this typology, since it does not consider how care responsibilities are divided within the family, fails to appropriately take into account social inequalities relating to gender (8). Nevertheless, Esping-Andersen's framework is useful to understand how different factors (beliefs, or preferences), deeply rooted in each nation, play a crucial role in determining how care responsibilities are distributed between the state, the market and the family (7). Indeed, policy design in different welfare states varies across key issues such as risk coverage, distribution benefits and family policy. The three typologies of the welfare state can briefly be described as follows. The "liberal welfare" state provides only minimum benefits that are often targeted and means tested, with a market emphasis on provision of services and the state prioritizing care in the community (9;10). In this category, Esping-Andersen's classified only anglo-saxon countries, well known

for their liberal policies. While the United-states is considered as the most extreme example of a liberal welfare state, other countries belonging to this category are Great Britain, Canada and Autralia (11). The “conservative-corporatist” welfare state is based on high employment-based social insurance levels and supports the traditional provision of care in the family. In this category, we find among other countries, Belgium, France, Germany and Italy. Interestingly, critics of the Esping-Andersen’s framework have debated extensively on which countries do really belong to this category. For instance, some authors have argued that Italy should be considered in a different group (Mediterranean type) along with Spain, Greece and Portugal. Both models the liberal and the conservative-corporatist welfare states have been considered as supporting the male breadwinner model, in which the family’s income is provided by men and care responsibilities rely on women (12). Finally, the social democratic regime provides protection based on citizenship, encourages both men and women participation in the labour market and develops a large provision of care services. Sweden, Norway and Denmark belong to this category.

Women’s participation in the labour market has triggered some of the changes in the distribution of care responsibilities between the state, the market and the family (13). Indeed, it is unlikely that women will be able to be both full-time workers and full-time caregivers. In this context, *new social risks* emerge when considering that individuals need to have enough resources to manage their care responsibilities to be able to actively participate in the society (that is to say to

participate in the labour market) (14). Thus, risk of social exclusion lies on the fact that lack of access to care services (both childcare and eldercare) will directly impact women's (and also men) participation in the labour market (15). Moreover, in the post-industrial society, there is a pressing need for greater gender equality, i.e. to ensure, for men and women, an equal participation in the labour market and an equal share of care responsibilities. Thus, these new social care policies will play a greater role in the internal arrangement and distribution of housework and care responsibilities. As a consequence, care arrangements make an important part of the social policy agenda in the European Union. Indeed, since the ratification of the Lisbon Treaty by the European Council in 2000, the welfare state should no longer play a solely compensatory role for risks relating to unemployment, retirement or illness. The new "active welfare state" needs to fight social exclusion by setting comprehensive policies in terms of provision of care services that allow both men and women to combine paid work and family responsibilities. In this sense, the social democratic welfare state has been better adapted to absorb the socio-demographic changes of the last 25 years. Indeed, women's labour market participation has been supported by a large provision of publicly provided childcare and eldercare services. However, the biggest limit of this model resides on the difficulty to finance those services.

Interestingly, even if there is an agreement that services for childcare and eldercare are needed, in most European countries there is a wide gap between policies related to childcare and policies related to care

for the elderly and the ill (16). Indeed, while for the former care has shifted away from family to formal care services, for the latter care responsibilities still rely mostly on the family (17). Such a duality in the policies to cover different care needs has been related to three main factors.

Firstly, there is an agreement that in order to enable parents (especially the mother) to participate in the labour market, childcare must be available and affordable (18-23). By contrast, the extent into which elder care affects women's participation in the labour market is less clear-cut. Indeed, among couples, spouses are considered to be the primary source of informal care for the elderly (24-26) and because they tend to be old themselves, they are likely to have already exited the labour market. Nevertheless, there is a growing body of evidence showing that adult sons and daughters caring for unmarried frail parents, might interfere with their employment responsibilities (27-31).

Secondly, welfare state responsibilities on childcare issues are included among family and employment policies while care for older impair adults fits into the category of health policies. Moreover, in Europe policies such as maternity leaves are a part of social security policies, thus insuring a universal right to care. On the other hand, access to leave policies to care for the elderly or the ill, are often extremely limited and depend on complex eligibility rules (16;32). This is also because, in most of European countries, other health policies were developed to care for the elderly in hospitals or in

retirement homes that provided specific care for elder persons. It is only recently that more focus has been given to home care services for the elderly, mainly with the aim to reduce hospital costs and improve the well-being of elder persons by staying at home as long as possible.

Thirdly, some authors have pointed out that differences in policies for childcare and eldercare might depend on institutional arrangements and on the transfers of responsibilities for both sectors between central and local governments (33)

The consequences of caring for children and for the elderly and the ill have been analysed from different perspectives. Studies on caring for children considered the following three main issues: i) labour market participation of parents (mostly the mother), ii) child wellbeing and iii) income related inequalities in the access to childcare services. By contrast, consequences of non-professional care for the elderly and the ill have been analysed mostly in terms of: i) substitution between formal (in institutions or at home) and informal care ii) inequalities in the health between caregivers and non-caregivers.

The objective of this thesis is to provide new evidence on social inequalities in childcare and in eldercare (or care for the ill). For childcare, we analyzed how the use of formal childcare for families from different income groups was affected by public policies. For individuals looking after an elderly or ill person, we consider how caring might lead to differences in health between individuals. More precisely, we examined how caring for an elderly individual might

affect the health of adults aged 25 to 59 years and the risk of mortality of elderly individuals caring for their spouse. Hereafter, I present the state of knowledge on the literature relating to the aspects mentioned above.

ANALYSIS OF CONSEQUENCES OF PROVIDING CARE FOR THE CHILDREN AND FOR THE ELDERLY AND THE ILL.

Before presenting the review of the literature, hereafter the definition for childcare and care for the elderly and the ill are presented. When mentioning childcare, it implies registered care that can be organised collectively or individually and that can be subsidised or not. Thus, issues on childcare only regard the use of formal childcare services. As for care to the elderly and the ill, it implies care provided by family members and friends. Thus, informal care regards to non-professional help provided to individuals suffering from health related condition.

Different policy settings for Childcare and Informal care

Jenson and Sineau (2003) have pointed out that policies to help families in raising young children are set to incentive (simultaneously or not) parental and non-parental care (34). Indeed from a societal perspective, the existence of positive externalities (e.g. intergenerational transfers for retirement or accumulation of human capital) pleads in favour of helping families to bear the cost of raising

children (35). In order to do so, policy makers can choose from a wide spectrum of policy instruments depending on their policy objective. To promote parental care policymakers can set different leave arrangements. Indeed, parental leaves to care for young children are consider as essential to conciliate work and family life (35). In addition to this, recent evidence shows that children's well being is improved by setting long and well paid parental leaves (36). Family leave arrangements vary from country to country according to: i) its length, ii) payment; iii) entitlement based on the individual or the family; and iv) its flexibility (37) . However, the most controversial aspect of leave policies is that it still is consider as a "gender arrangement" and that it has negative impact in women's employment and their long-term income (35). When considering instruments used towards setting non-parental care policies, we consider also a wide number of alternatives. Indeed, non-parental care policies vary according to i) their institutional framework (collective or individual services); ii) provider of care services (publicly provided, private (for profit) or non-for profit organization); iii) type of subsidies for childcare (subsidies to providers or to parents). Jenson and Sineau (2003) argue that there is a "variety of policy mixes" when considering how childcare arrangements are distributed among the state, the market and the family (34). Moreover, they argue that policymakers can simultaneously incentive parental and non-parental care in order to meet needs of different families. "Care mixes" also include the development of formal services and the extent into which their provision relies on market mechanisms. In other words, childcare arrangements can be quite diverse. For instance, in Belgium, childcare

services can be either collective (crèche) or individually provided (gardienne). Childcare providers can be either non-profit or private organizations. In Belgium, the childcare authorities do not directly provide services but subsidise non-for profit childcare providers. Private organizations also provide care services and must follow quality guidelines. Finally, parents are allowed to deduct their childcare expenses from their taxable income if using registered services. Interestingly, childcare policies in Belgium have been directly linked to promoting women's labour market participation.

As mentioned, policies have traditionally differed between those to care for children and the elderly. However, scholars as well as support groups have urged policy-makers to fully value the costs and benefits of providing care to the elderly, chronically sick and disable to the caregiver, to the care recipient as well as to the society. Indeed, under the "active welfare state", providing informal care might be considered as a *new social risk* because it affects individuals' opportunities and well-being. For instance, Myles (2003) argues that pension reform and gender equity will directly depend on the extent that individuals will be able to care and to actively participate in the labour market (38). Moreover, the welfare state can also play an essential role in determining the degree to which it is financially feasible to informally care and maintain a healthy income, independently of the formal labour market. As a consequence, policies to support caregivers vary from reducing their care responsibilities, through the provision of formal services, to policies providing leaves allowing to directly care for the elderly and the ill.

Care giving is now considered as essential element for a sustainable long-term care policies (39). In order to partially cover the financial costs of providing informal care, several countries have set payments to informal caregivers. In Great Britain, the Carer's Allowance is considered as replacement revenue. However, Gledinning (2006) mentions that this policy is less costly than providing for other long-term arrangements and that the amount granted to caregivers "falls below the minimum means-tested social level assistance" (40). Interestingly, payments for informal care can be granted not only to the caregiver but also to the care recipient. This is the case of the dependence care allowance paid by the Flemish community of Belgium. The *Vlaamse Zorgverzekering* is allocated to dependent individuals leaving in the community as a lump sum if receiving they receive informal care, formal care or both (41). As for leave policies for childcare, most policies to cover the financial cost of caregivers are more likely to be used by low-income families and women. As a consequence, they might be enlarging the exiting income and gender inequalities.

Childcare, access and equity

In the literature, there is a consensus that policies for childcare are needed to allow parents to participate in the labour market. However, there is a wide debate on the type of polices that need to be implemented. Indeed, there is some concern that public policies must be equitable and must reduce the cost of childcare for all families.

However, attaining both objectives is not straight forward. Indeed, demand-side policies, such as tax relief of childcare expenses might reduce the cost of care, but have been criticized as benefiting wealthier families (42). Indeed, given that tax benefit depends on the marginal tax rate, families with higher income obtain greater fiscal benefit from the deduction of childcare expenses. Yet, the literature based on the US experience, shows that tax relief of childcare expenses is progressive at least for some parts of the income distribution. Indeed, the tax relief can be progressive if deductible care expenses are: a) limited; b) negatively related to the family's income; (3) and refundable (43). Interestingly, progressivity of the tax deduction might also depend on how it is measured. Indeed, it varies according to which households are considered as been affected by the tax deduction. For families claiming the tax deduction (44), the childcare tax credit increases the overall progressivity of the tax system. Opposite to this, for families with dependents the tax deduction is regressive in the first part of the income distribution (44).

Opposite to the debate on demand subsidies for childcare, there is an agreement that increasing the supply of childcare (through public provision or by subsidizing childcare providers) is more likely to grant "equitable" access to childcare (45). Yet, with the exception of Scandinavian countries, rationing in the number of childcare places is present in most European countries (45). In this case, equitable access to childcare will depend on which households are able to overcome the care deficit. For instance, if prices are not regulated and increase in response to an excess in demand for childcare, low-income families

will not be able to pay for childcare (20;46-51). Yet, if childcare is publicly provided and highly regulated, access to childcare does not longer depend on prices (48;49;52;53). Indeed, it will depend on parents' ability to pay for childcare, but parents' ability to find a childcare place. In this case, by allocating subsidized childcare places to low-income families, the use of formal childcare might not differ from that of high-income families. However, there is some evidence that even in highly regulated childcare sectors, families with stronger labour market commitment and who are better educated are the ones best able to overcome the lack of available childcare places (54). Knowing that income is positively related to education level, we might therefore expect that high-income families will be more likely to find a childcare place.

Consequences of Informal care on health of caregivers.

Health of caregivers of working age

Care giving is not an isolated phenomenon. In Belgium, 1 out of 10 individuals aged more than 15 years look after an ill relative or friend (55). Yet, little is known about the provision of informal care and its consequences on the health of caregivers from all age groups. Indeed, most of the research is based on small household sample surveys, who only analyze care giving among elderly adults (56). For this group, there is a strong consensus that once care giving activities become burdensome, caregivers' health is likely to be affected. Indeed, caregivers' depression is likely to arise in the presence of objective stressors (patient physical disability, cognitive impairment, the type and intensity of the care provided) as well as in the presence of

subjective stressors (perceived care burden, previous marital history) (25;57). In general, risk of poorer health for caregivers is greater as the time spent on caregiving increases.

Among middle-aged adults, who are most often the providers of care, some studies showed no differences in health outcomes between caregivers and non-caregivers (58) and others suggesting that caregiving activities have a negative (59;60) or even a positive effect on health (61). This lack of consistency could be due to the complexity of the relationship between work, multiple family commitments, and health. Indeed, because caring might reduce participation in the labour market, caregivers might be at risk of social exclusion or impoverishment (62). As a consequence, health inequalities between caregivers and non-caregivers, might arise because being a carer leads to low socioeconomic position (SEP) and thus to a poor general health (63). In addition to this, the health of carers of working age might be dependent of how public policies reduce the caring burden assumed by the family (9;64-67).

Mortality and informal care among the elderly

With evidence suggesting that elderly caregivers are more likely than non-caregivers to report poor subjective health (68) adopt riskier health behaviours (69), and display depressive symptoms, researchers have drawn attention to the possibility that chronic stress resulting from caring activities may also accelerate age-related disease (57;70). As a consequence, caregivers might not only have poorer health but also have a higher risk of mortality. Yet, studies have presented mixed

results when considering caregiving as an independent risk of mortality. The first study addressing this association showed that among elderly spousal caregivers, those reporting strain relating to their caring activities had a higher risk of mortality than their non-caregiver (71). More recent studies also reported higher mortality risk among spouses caring for a partner with Alzheimer's disease (72;73). Yet, lower mortality risk among elderly individuals was found in one recent study for individuals caring for their spouse (74) and in two studies for individuals providing care to other family members or friends (75;76) . The contradictory results from these studies may not entirely arise from a difference in the population sample and in the definition of caring activities, but also from analysis that overlooks the systematic differences between caregivers and non-caregivers (56;77;78).

OUTLINE OF THE THESIS

This thesis includes five chapters. Each chapter is structured around one main topic, contains its specific literature review, methods and conclusion. In the first two chapters of the thesis, the use of childcare services and how it is influence by public policies is analyzed. Chapter 1 is entitled “Progressivity of the tax policies for childcare in Belgium”. It aims at analyzing the evolution of the progressivity of the tax deduction and the tax credit for childcare in Belgium from 1994 to 2001. Using Aronson and Lambert’s decomposition of the Gini Coefficient (79), we evaluate the progressivity of tax relief not only among the families who can be targeted by these policy instruments (all families with dependents), but also among the families who claim

the deduction of childcare expenses. This allows us to examine both the effective use and the distribution of benefits from the tax deduction. We found that for families using formal childcare, the tax deduction with a limit has a progressive effect on the distribution of income. However, among all families with young dependent, the fiscal subsidy programs turn out to have a regressive effect.

Chapter 2 is entitled “Childcare policies in Belgium: the role of demand and supply-side policies in a context of rationing”. In this chapter, we extended the analysis of public policies for childcare by analyzing how demand-side (tax relief) and supply-side (availability of local childcare places) affects the access to childcare services for families belonging to different income groups. From a methodological point of view, we use a series of multinomial logit regressions to model how the use of formal childcare varies with respect to the geographical availability of services and to modifications on the tax relief for childcare. Our findings showed that, in the context of rationing, increasing supply and demand side polices have a different impact on the access to formal childcare for families from different income groups.

The socio-economic characteristics of caregivers and their health is analyzed in Chapters 3, 4 and 5. The first chapter of this part “Informal care in Belgium”, starts by giving an overview of caregivers’ characteristics. To do so, we used data from the complete Belgium Census of 2001 (labelled socio-economic survey) combined logit regression to describe how the provision of informal care varies

with respect to the individual's socio-economic characteristics. The following chapters (4 and 5) build up from this description and tackle the differences in health between caregivers and non-caregivers. In "Caring, employment and health among adults of working age: evidence from Britain and Belgium (Chapter 4)", the associations between the perceived general health status and care giving was analyzed using logistic regression models and data came from the 2001 British and Belgian censuses. The final model was stratified by employment status, given the significant interaction between care giving and employment. Our results provide evidence that individuals combining both employment and large caring responsibilities are likely to have a higher risk of poor health than those just being employed and having no caring responsibilities. As a consequence, policy-makers need to be aware that the cost of providing care must not only be measured in terms of income loss but also in terms of health. In chapter 5, "Caring for your spouse: evil or blessing for survival?", we analyzed the association between providing informal care to an elderly spouse and mortality. Information on health status and caregiving activities from couples was extracted from the 2001 Belgian Census and was matched with all causes of mortality over a 39-month follow-up period. To avoid selection bias, propensity scores were used to select pairs of matched individuals and were introduced as a separate stratum in the Cox proportional hazards models. Our findings showed that proving care to an elderly spouse is not associated with an increase in the risk of mortality for men. For women, we found no differences in mortality according to the caring status.

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Chapter 1: Progressivity of childcare tax policies in Belgium

ABSTRACT

In Belgium, families with young dependents receive *tax reliefs* depending on the type of care used. In this paper we analyze the Federal government policy that allows families using formal childcare to deduct their expenses out of their taxable income. For families using parental and informal care, a *tax credit* is granted for each child under three years old. We find that tax deduction of childcare expenses is a progressive tax policy among the users of formal day care. On the contrary, when considering all families with young dependents the tax policies for childcare are regressive.

En Belgique, les familles ayant des jeunes enfants reçoivent différentes réduction d'impôts selon le type de garde utilisé. En effet, le gouvernement Fédéral octroi d'une part, une déduction fiscale des frais de garde pour les familles utilisant des milieux d'accueils agréés (garde formelle) et d'autre part, une exemption d'impôts pour les familles utilisant un autre type de garde (garde informelle ou parentale). Ce travail montre que les politiques fiscales en matière de garde sont progressives parmi les utilisateurs de la garde formelle, mais régressives pour l'ensemble des familles ayant des jeunes enfants.

Key words: child care, equity, fiscal policy

INTRODUCTION

Until 1988, supply-side subsidies for childcare were provided at a community level and were the only ones available in Belgium. They were distributed among regulated institutions to cover 70% to 80% of the running costs. In 1988, the federal government introduced the tax deduction of childcare expenses. This reform was an important change in the orientations of childcare funding since it corresponds to the introduction of demand-side policies. Families using formal childcare, whether subsidised or not, could deduct 80% of their care expenses subject to a limit of €8.70 per day and families not claiming the tax deduction and having dependents under 3 years old were automatically granted a tax credit of 272.00EUR (Loi portant sur la réforme de l'impôt des revenus et modification des taxes assimilées au timbre, 16-12-1988). Tax credits in Belgium are set as a portion of income that is not taxed, and the reduction on the tax payments is computed by using the tax rates on the total amount of the tax credit.

In 2000 and 2001, the federal government increased the limit on maximum qualified expenses and the amount of the tax credit. The daily limit was raised to 1120EUR per day in 2000 and the percentage of deductible childcare expenses changed from 80% to 100% in 2001. The tax credit was increased to 297.00EUR in 1995 and to 322.00EUR in 2000. The tax deduction and the tax credit are non-refundable and so only families with positive tax liabilities can benefit from this subsidy

The tax relief of childcare expenses has been criticized as regressive given that take-up rates are much higher among middle-and upper-income families (1). Furthermore, given that the tax benefit depends on the marginal tax rate, families with higher income obtain greater fiscal benefit from the deduction of childcare expenses. Nevertheless, Gentry and Hagy (1995) point out that the progressivity of the tax relief does not only depend on take-up rates but also on features of the tax relief that determine the distribution of benefits. Indeed, the tax relief can be progressive if deductible care expenses are: a) limited; b) negatively related to the family's income; c) and refundable (2).

The literature based on the US experience, shows that tax relief of childcare expenses is progressive at least for some parts of the income distribution. Nevertheless, Gentry and Hagy (1995) mention that the progressivity of the tax relief might vary if measured among different groups of household. Dunbar and Nordhauser (1991) found that the childcare tax credit increases the overall progressivity of the tax system when considering all families with and without dependents (3). Yet, Altshuler and Schwartz (1996) found that for families with dependents the tax deduction is regressive in the first part of the income distribution, while among families claiming the deduction, it is progressive for the whole income distribution (4). Gentry and Hagy's results are similar to those of Altshuler and Schwartz (1996). Indeed, among a sample of families with dependents, the tax relief is regressive through the lowest quintile of the income distribution while being progressive throughout the remainder of the income distribution (2).

The purpose of this work is to analyze the evolution of the progressivity of the tax deduction and the tax credit for childcare in Belgium from 1994 to 2001. We evaluate the progressivity of tax relief not only among the families who can be targeted by these policy instruments (all families with dependents), but also among the families who claim the deduction of childcare expenses. This allows us to examine both the effective use and the distribution of benefits from the tax deduction. Based on Gentry's and Hagy's work (1995) we might expect that the tax deduction of childcare expenses is not progressive in Belgium. Indeed, deductible childcare expenses are neither negatively related to the family's income nor refundable. Furthermore, the limit on maximum qualified expenses was increase in 2000, benefiting families paying more than 8.70EUR a day, thereby excluding low-income families who pay less than this amount.

The paper is organized in five sections. Section 2 describes the data used in our work. Section 3 presents the methodology. The results are presented in Section 4. Section 5 concludes the paper.

Data

The data used is a sample of the overall tax claims of the households having dependents aged 0 to 3 years olds. The database (IPCAL) is provided by the National Institute of Statistics (INS) for the 1994-2001 fiscal years, corresponding to the earned incomes of 1993-2000. A few observations had to be deleted from the file because of invalid

information. The numbers of tax declarations before and after validation are provided in the following table.

Table 1: Number of observations

Earned Incomes	Fiscal Year	Number of households	Excluded cases	Final observations	% Excluded
1993	1994	292,228	347	291,881	0.119
1994	1995	285,345	4295	281,050	1.505
1995	1996	279,029	331	278,698	0.119
1996	1997	271,267	877	270,390	0.323
1997	1998	276,612	342	276,270	0.124
1998	1999	273,644	350	273,294	0.128
1999	2000	264,801	345	264,456	0.130
2000	2001	252,324	1369	250,955	0.540

Source: National Institute of Statistics (INS).

The fiscal database contains information about yearly net and gross income, family structure, yearly deductible childcare expenses, and yearly tax payments. It must be noted that no information is available neither on real expenditures, the effective utilization of day care nor the parents' working hours. Nevertheless, available information on the yearly deductible childcare expenses allows us to identify the families using formal childcare. Indeed, only families paying for care services from registered childcare providers can deduct their care expenses.

It is important to note that even if the tax deduction of childcare expenses and the tax credit were set at the same time, they usually are set to attain different policy objectives. The tax deduction is set to encourage the participation in the labor market, while the tax credit is a general subsidy generally targeting poorer families. In the case of Belgium, the tax deduction was clearly set to reduce the costs of formal childcare in order to allow mothers to work, while the tax

credit was the outcome of a political compromise. Indeed, the tax credit was set to reduce the tension among political groups to the implementation of the tax deduction. Both measures (tax deduction and tax credit) should help families to reduce the cost of raising young dependents, independently of the type of care used.

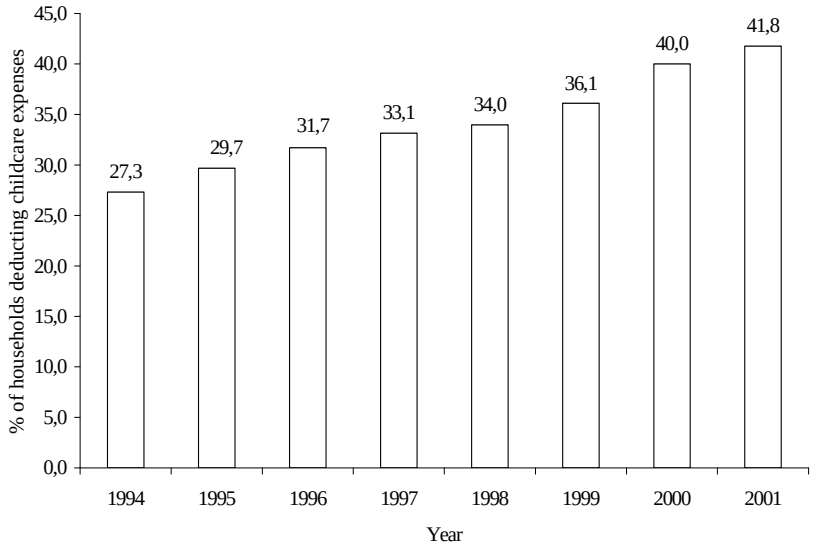
Evolution of tax relief for childcare

The percentage of households with young dependents using the deduction of childcare expenses has increased from 27.3% in 1994 to 41.8% in 2001, which has increased the government's revenue loss on childcare subsidies from 38.6 million euros in 1994 to 61.2 million euro in 2001. This loss represents 1.7% of total tax payments from families with young dependents in 1994 and 2.6% in 2001. The government’s loss from granting the tax credit is smaller than from the tax deduction of childcare expenses. In 1994 it accounted for 27.6 million euros while in 2001 it was only of 17.1 million euros. The reduction on the revenue loss from the tax credit is due to the decline in the number of families that receive the credit. Total revenue loss for the tax policies for childcare accounted for 66.2 million euros in 1994 and for 78.3 million euros in 2001. In the U.S. revenue loss from the Child Care Tax Credit was of 2.8 billion dollars in 1999

Although there has been a steady increase of the percentage of households claiming the tax deduction between 1994 and 1999, the increase between 1999 and 2000 mostly doubled in comparison with

the annual rate of 1994-99: respectively 10.8% and 5.7%. This result is associated to the 2000's reform that increased the deductible limit from 8.70EUR to 11.20EUR per day. Indeed by further reducing the cost of childcare, families who were using either parental care or informal care, may choose to pay for formal childcare. This result points out that tax relief can also be use to encourage the use formal care. It is beyond the scope of this paper to analyze how tax relief is likely to influence families' choice of childcare, nevertheless it is important to mention that there is a wide debate related to the efficiency of using tax relief as means to improve the type and quality of care purchased by parents (5-7).

Figure 1: Percentage of households with young dependents claiming the tax deduction for childcare.



Sources: Tax base IPCAL . Own calculations.

Employment and the tax deduction

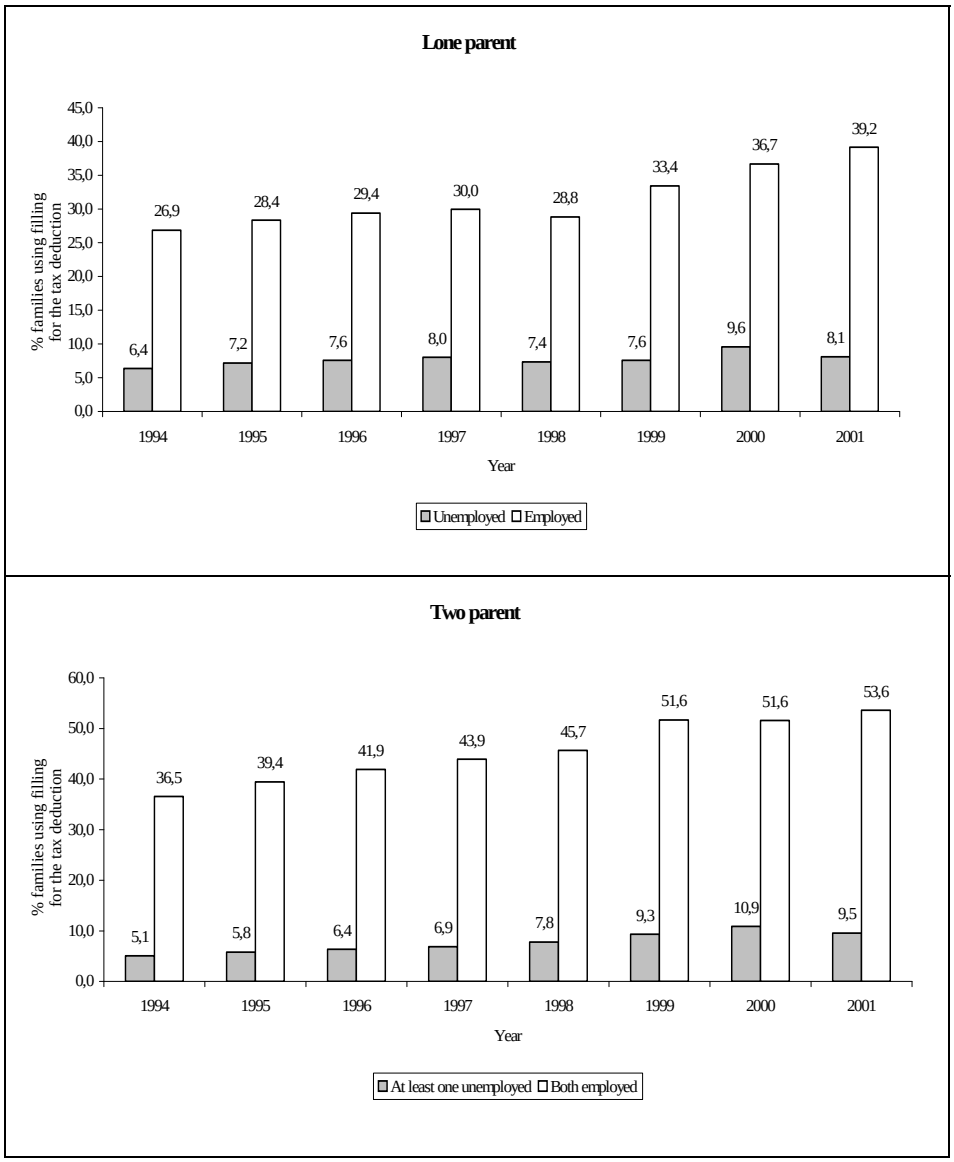
Our results also show that a small percentage of unemployed lone parents and of two parent households where at least one parent is not working claim the deduction of childcare expenses. This shows that parent's participation in the labor market is not the only reason why families use formal childcare. Duncan and Giles (1996) mention that families considered that the benefits from using formal childcare go beyond enabling mothers to work (15).

Figure 2 shows the percentage of households claiming the tax deduction with respect to the employment status of the parents (taxpayers). Since 1994, the percentage of working parents claiming the tax deduction has increased. For two-parent households the percentage of families deducting their childcare expenses when both parents are working increased from 36.5% in 1994 to 53.6% in 2001. For one-parent households, the percentage of families with young dependents deducting their childcare expenses increased from 26.9% in 1994 to 39.2% in 2001. Our results show that lone parents who are employed are less likely to claim the tax deduction than two parent households (when both parents work). Several hypotheses can explain this result. Firstly, lone parents might be more prone to use informal care from family and friends. Indeed, family and friends can provide care arrangements that can be less rigid than formal childcare (for instance caring longer hours for children) enabling them to better cope with their employment and caring responsibilities. Secondly, lone parents might find it difficult to cover the costs associated with formal childcare, which might lead them to use more informal care.

Previous works have shown that reducing the cost of childcare might change household's decisions on the use of childcare and labor supply, in particular for low-income mothers (8-13) As a consequence, we might expect that the increasing percentage of families claiming the deduction for childcare expenses is associated with a higher participation of parents in the labor market. Although it is beyond the purpose of this paper to analyze changes in labor supply and use of childcare, it is important to mention that these changes might affect the distributional impact of tax relief for childcare. For instance, the tax relief can induce low-income parents depending on the welfare system to work. This can affect the income distribution because the families' income might increase. Furthermore, because job market participation is significantly affected by the cost of childcare (14), the tax credit might increase families' income by enabling married mothers to work, thus leading to higher take-up rates among middle and high-income families.

Our results also show that a small percentage of unemployed lone parents and of two parent households where at least one parent is not working claim the deduction of childcare expenses. This shows that parent's participation in the labor market is not the only reason why families use formal childcare. Duncan and Giles (1996) mention that families considered that the benefits from using formal childcare go beyond enabling mothers to work (15).

Figure 2: Percentage of households claiming the tax deduction by employment status of the parents



Sources: Tax base IPCAL . Own calculations.

Methodology

The progressivity of the tax relief is calculated by comparing the performance of the tax system on distribution of income with and without the tax policies for childcare. We use Aronson and Lambert (1994) decomposition of the post-tax Gini Coefficient to evaluate how the tax relief affects the vertical equity, horizontal equity and reranking of the tax system for all families with dependents but also only for families claiming the tax deduction (16). Indeed, when using tax relief for childcare, the distribution of benefits might change not only among households belonging to different income groups (vertical equity), but also among households within the same income group (horizontal equity).

The Aronson and Lambert methodology breaks down the total redistributive effect (*RE)* of taxation into three components: vertical equity involving the reduction of income gap between individuals (*V)*, horizontal equity loss arisen when individuals with same income pay different taxes (unequal treatment of equals) *(H)*, and the redistribution loss from reranking households differently in the pre-tax and post-tax income distribution *(R).* The overall redistributive effect *RE* is computed as the difference between the pre-tax Gini coefficient (G_x) and the post-tax Gini coefficient (G_{x-t}). The decomposition of the total redistributive effect of taxes and transfers into a vertical equity effect, and a loss of redistribution due to either horizontal inequity or reranking is the following:

(1) $$RE = G_x - G_{x-t} = (G_x - G_b) - (G_{x-t} - C_{x-t}) - \sum_j \left(\frac{N_j^2 \mu_j}{N^2 \mu} \right) G_j = V - R - H$$

where *V* captures the gain that would have existed if equals had been treated equally by the taxation system. In other words, the vertical component measures the change in the income distribution if all individuals would have paid taxes according to their income. . V is calculated as the difference between the pre-tax Gini coefficient and the post-tax Gini coefficient (G_b) obtained by assuming that each individual in the same income group pays the group's average tax (i.e. perfect horizontal equity). The Atkinson-Plotnick (17;18) index of reranking *R* captures the effect of individuals being re-ranked from pre-tax to post-tax distribution and is computed as the difference between the post-tax Gini coefficient and the concentration index for post-tax income $C_{x\text{-}t}$. The concentration index for post-tax income $C_{x\text{-}t}$ is computed considering that within income groups order is not decreasing. More precisely, the concentration index is computed for the post-tax income using the ranking from the pre-tax income within each income group. Indeed let G_x and G_{x-t} be the Gini coefficients for the pre-tax and post-tax income distributions respectively. Then the reduction of income inequality brought about by the tax can be decomposed as $G_x - G_{x-t} = (G_x - C_{x\text{-}t}) - (G_{x-t} - C_{x\text{-}t})$ where the second term captures the redistribution loss of re-ranking. The argument is simple. If the tax causes reranking of income groups, then post-tax income is not an increasing function of pre-tax income and the Gini coefficient calculated over post-tax income must be corrected for the fact that the Lorenz curve must be adjusted accordingly since the n%

poorest individuals in the distribution are no longer the same.. Finally *H* captures the total loss of treating individuals with equal pre-tax income unequally. *H* is calculated as the weighted sum of the intra-group post-tax income Gini coefficient *Gj*. *Gj* is obtained by computing the gini coefficient on net income for each group *j* . The weight of each group j (where j corresponds to income decile) is calculated as the square of the number of individuals in this group *Nj* divided by the square of the total population, multiplied by the average post-tax income of this group μj and divided by the average post-tax income μ. *H* takes only positive values. When *H* equals zero there is no differential treatment within groups (*Gj =0* for all *j*). The horizontal component *H* and the index of reranking *R* measure the loss in the potential redistribution of the tax system (*V)*

To compute the net effect of the tax based policies for families with dependents under three years old we must compare the redistributive effect with and without the tax policies for childcare. From equation 1, we obtain :

(2)

$$RE^1 - RE^0 = G^0_{x-t} - G^1_{x-t} = (V^1 - V^0) - (R^1 - R^0) - (H^1 - H^0) = \Delta V - \Delta R - \Delta H$$

where the superscript 0 indicates the net redistribution without tax deduction and tax credit; and the superscript 1 indicates the net redistribution when tax deduction and tax credit are included. Detailed derivation of equation 2 can be found in the appendix. If the tax relief for childcare improves the after tax income distribution then ΔV is

positive. On the contrary, ΔV is negative if benefits from the tax relief are positively related to the families' income. If ΔH is positive it implies that the childcare subsidies are horizontally inequitable. Similarly if ΔR is positive the childcare subsidies increase the reranking from the pretax to the post-tax distribution of income.

As mentioned, progressivity of tax relief is evaluated for all families with dependents and for families claiming the deduction of childcare expenses. We choose to do so for two reasons. Firstly, when considering all families with young dependents, we evaluate progressity of tax relief among the target population. This is particularly important in Belgium's context, given that tax policies for childcare were set to grant some benefit to all families independently of their use of formal care. Secondly, because the main objective of introducing demand-side policies was to reduce the cost of formal childcare, progressivity of the tax relief needs to be evaluated among the families who pay for formal childcare.

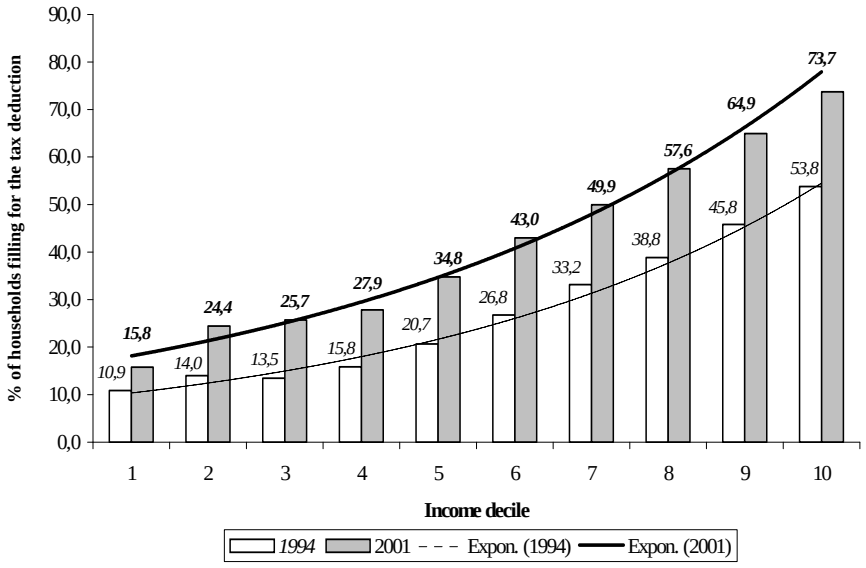
Results

Take-up rate and households' income

To understand how the tax deduction operates at different levels of income, we calculated the percentage of households that have deductible childcare expenses in each decile of post-tax income. This allows us to analyze if the take-up rate depends on the families' income. Firstly, we notice in Figure 3 that there has been in increase

in the percentage of households claiming the tax deduction in all income deciles from 1994 to 2001. Secondly, the percentage of families in each income decile that claim the tax deduction increases exponentially with income. Thirdly, the growth in the percentage of households using the tax deduction from families belonging to the income deciles 2 to 7 was bigger than 50%.

Figure 3: Percentage of households with young dependents claiming the tax deduction by income decile.



Sources: Tax base IPCAL (sample of the overall tax claims including those with dependents under four years of age). Own calculations.

However, we found that among the families deducting, those belonging to income deciles two to six had an increased share in the use of the childcare tax deduction. This implies that middle-income families increased their use of the tax deduction, even though 59% of

the total number of households using the deduction of childcare expenses still belonged to the upper part of the income distribution (income deciles seven to ten). Several authors have argued that higher take-up rate among middle and high-income families is not only related to the cost of formal care, but also to preferences on the type of childcare used. Indeed, a recent OCDE report showed that low-income families tend to rely more on informal care arrangements independently of the costs of formal childcare (7).

The average fiscal benefit was also computed by income decile for years 1994 and 2001 (Table 2a and 2b). There is a remarkable difference between the average fiscal benefit for all families with young dependents (Table 2a) when compared with families claiming the tax deduction for formal childcare (Table 2b). This is due to the fact that the tax credit that can be claimed by families not using formal care is relatively small in comparison to the tax deduction. The fiscal benefit appears to increase with income. Nevertheless, focusing on the families claiming the tax deduction suggests a somewhat more even distribution, even if the average fiscal benefit still increases with income. We also found that the average fiscal benefit received by families increased for all income deciles from 1994 to 2001. Furthermore, families with deductible childcare expenses belonging to income deciles 4 to 6 increased their average fiscal benefit by more than 25%.

To have a better idea of the impact on the tax payments of the tax reliefs we computed the effective subsidy rate as the ratio between the

fiscal benefit and the gross income. Altschuler and Swartz use this measure to analyze how progressive is the Child Care Tax Credit in the US (4). If this ratio increases (decreases) with income the tax relief is regressive (progressive). The results in Table 2a show that for all families with young dependents the effective subsidy rate credit is almost constant between income decile 4 to 9 and regressive for families in the income decile 1. Comparing 1994 and 2001, the relation between the fiscal benefit and the income increased for all income deciles. For the families with deductible childcare expenses the results in Table 2b (bottom) show that tax deduction is far more progressive given that the ratio decreases with income throughout income distribution. Furthermore when computing the ratio between the average fiscal benefit and the average tax payments we found that for income deciles one to three the tax deduction reduces their average tax payments by more than 10%. When comparing our results to those of the literature, we found a less equitable distribution of benefits from tax relief for families with dependents in Belgium than in the U.S. Indeed, Altshuler and Schwartz (1996) and Gentry and Hagy (1995) found that for families with dependents the tax relief was at least progressive in the second part of the income distribution (2;4).

Table 2 a: Estimation of the fiscal benefit by income decile for all households with young children

Households with and without deductible childcare expenses
(fiscal benefit from the tax deduction and tax credit**)**

Decile	1994*					2001					ΔFB % (6)
	Gross Income (1)	Taxes (2)	Fiscal benefit (3)	FB/T (4) [1]	SR (5) [2]	Gross Income (1)	Taxes (2)	Fiscal benefit (3)	FB/T (4) [1]	SR (5) [2]	
1	9 151	270	63	23,3	0,69	8 780	210	71	21,2	0,81	21,0
2	15 687	1 574	145	9,2	0,92	14 809	1 629	177	6,3	1,19	15,6
3	19 854	2 726	169	6,2	0,85	19 131	3 081	206	3,8	1,08	19,5
4	23 416	3 989	182	4,6	0,78	22 876	4 246	226	3,1	0,99	27,5
5	26 901	5 346	195	3,7	0,73	27 188	5 825	265	3	0,97	34,8
6	30 400	6 819	220	3,2	0,73	31 827	7 696	310	3	0,97	28,6
7	34 110	8 457	256	3	0,75	36 676	9 802	355	2,9	0,97	20,5
8	38 550	10 406	285	2,7	0,74	42 285	12 330	414	2,9	0,98	23,7
9	44 996	13 275	330	2,5	0,73	50 476	16 136	482	2,7	0,96	22,8
10	68 147	24 271	424	1,7	0,62	81 579	32 278	637	1,9	0,78	23,9

* In euros of 2001

[1] Column 4 is equal to the Fiscal benefit dived over the taxes

[2] The effective subsidy rate (column 5) is equal to ratio between the fiscal benefit and the gross income

Table 2b: Estimation of the fiscal benefit by income decile for households claiming the tax deduction

Households with deductible childcare expenses
(fiscal benefit from the tax deduction**)**

Decile	1994*					2001					ΔFB % (6)
	Gross Income (1)	Taxes (2)	Fiscal benefit (3)	FB/T (4) [1]	SR (5) [2]	Gross Income (1)	Taxes (2)	Fiscal benefit (3)	FB/T (4) [1]	SR (5) [2]	
1	9 817	595	234	39,4	2,39	9 119	513	283	55,0	3,10	21,0
2	15 689	2 230	362	16,2	2,31	14 840	2 127	418	19,7	2,82	15,6
3	19 894	3 514	380	10,8	1,91	19 136	3 778	454	12,0	2,36	19,5
4	23 509	4 501	367	8,2	1,56	22 942	4 955	468	9,4	2,03	27,5
5	26 998	5 640	370	6,6	1,37	27 283	6 221	498	8,0	1,82	34,8
6	30 466	7 013	412	5,9	1,35	31 902	7 916	529	6,7	1,67	28,6
7	34 170	8 551	471	5,5	1,38	36 734	9 910	568	5,7	1,54	20,5
8	38 637	10 515	494	4,7	1,28	42 349	12 378	611	4,9	1,45	23,7
9	45 125	13 390	542	4,0	1,20	50 607	16 201	665	4,1	1,31	22,8
10	67 027	23 985	655	2,7	0,98	81 104	32 109	812	2,5	1,00	23,9

* In euros of 2001

[1] Column 4 is equal to the Fiscal benefit dived over the taxes

[2] The effective subsidy rate (column 5) is equal to ratio between the fiscal benefit and the gross income

The redistributive effect

Hereafter, we examined the performance of the tax system without including the tax policies for childcare. Detailed results can be found in Table A 1 and Table A 2 in the appendix. We found that in Belgium income tax was progressive between 1994 and 2001 for both families with young dependents and for families using formal care. Furthermore, from 1996 to 2001 the redistributive coefficient RE^0 increased constantly, implying that income inequalities have been further reduced through the tax system. During this period, the redistributive coefficient RE^0 was on average of 6.3% for families with young dependents and of 5.3% for families claiming the tax deduction. It is interesting to note that gains in vertical equity outpaced the loss of redistribution due to either horizontal inequity (H^0) or reranking (R^0).

Impact of childcare tax policies from 1994 to 1999

Table 3 shows the changes in the distribution of income due to the tax policies for childcare for families with young dependents. Detailed results, on Gini indices and Concentration indices can be found in Table A 1 in the appendix. We found that post-tax Gini index including the tax policies for childcare ($G^1_{x\text{-}t}$) is bigger than without the use of the tax deduction and the tax credit ($G^0_{x\text{-}t}$). In other words, introducing the tax policies for childcare slightly reduce the impact of the tax system on the redistribution of income. It is important to mention that, because the deduction of childcare expenses and the tax credit are relatively small with respect to total tax payments, the

changes in the income distribution are small. This result might be related to the fact that take-up rates are higher among middle-income and high-income families, who receive higher benefits from the tax deduction. Indeed, the benefits from using the tax deduction are higher than the benefits from receiving the tax credit for childcare. As a consequence, the tax policies for childcare do not affect the overall progressivity of the tax system. Gentry and Hagy (1995) also found that in the U.S., the tax relief is also too small to significantly influence the income distribution in the U.S.

Table 3: Decomposition of the redistributive effect of childcare tax policies for all households with dependents under three years old (%)

Year	Total redistributive effect (RE^1-RE^0)	Vertical equity change ΔV	Horizontal equity change $-\Delta H$	Reranking equity change $-\Delta R$
1994	-0.017	-0.021	0.002	0.002
1995	-0.031	-0.035	0.002	0.001
1996	-0.024	-0.029	0.002	0.003
1997	-0.022	-0.028	0.003	0.003
1998	-0.021	-0.027	0.003	0.003
1999	-0.016	-0.023	0.003	0.004
2000	-0.032	-0.039	0.003	0.004
2001	-0.035	-0.041	0.003	0.003

Comparing each term of the decomposition of (RE^1-RE^0) , we find that the regressive effect from the deduction of childcare expenses and tax credit comes from an increase in the vertical inequality. As a matter of fact, ΔV is smaller than zero, showing that tax deduction of childcare expenses and the tax credit worsens vertical equity. On the other hand, tax deduction and tax credit improve horizontal equity and the reranking component. When using the tax deduction of childcare expenses and the tax credit, families in the same income group are more equally treated by the tax system. Our results are not in

accordance to those Altschuler and Schartz (1996) who found that the tax credit increased the overall progressivity of the income tax for taxpayers with dependents. Indeed, Altschuler and Schartz (1996) found that when including the tax credit, the Suits index increased of approximately 0.8%. Furthermore, our results are in line with those of Robins (1990) who point out that regressivity of tax relief of childcare expenses might be linked to higher take-up rates among middle and high-income families.

Table 4 shows the results on the equity of the fiscal benefit for families claiming the tax deduction for childcare expenses. Opposite to the results for all families with dependents, the redistribution of income is improved when including the tax deduction (RE^1-RE^0 is positive) for families using formal childcare. Furthermore, between 1995 and 1999, there was increased on the redistribution of income. In 1995 RE^0 was smaller than RE^1 by 0.09% and in 1999 this difference was of 0.148%.

Table 4: Decomposition of the redistributive effect of childcare tax policies for households using formal childcare (%)

Year	Total redistributive effect (RE^1-RE^0)	Vertical equity change ΔV	Horizontal equity change $-\Delta H$	Reranking equity change $-\Delta R$
1994	0.102	0.0920	0.004	0.006
1995	0.090	0.0820	0.003	0.005
1996	0.115	0.1050	0.003	0.007
1997	0.132	0.1200	0.003	0.009
1998	0.139	0.1290	0.002	0.008
1999	0.148	0.1370	0.003	0.008
2000	0.145	0.1350	0.002	0.008
2001	0.208	0.1910	0.007	0.009

We expected that tax relief for families using formal care would be regressive given that deductible childcare expenses are neither negatively related to the family's income nor refundable. Nevertheless, progressivity of the tax relief might be due to the daily limit on the deductible care expenses. If the deductible limit binds the deduction for higher income families, it will enhance the progressivity of the tax deduction. Figure 4 shows the relation between deductible childcare expenses (before and after the reforms) and the daily fees paid by parents to subsidized care providers. It is important to mention that fees in the subsidized sector are set according to the family's income. In 1999, the daily limit restricted the deduction for families with a post-tax income of more than 1,984.00EUR. As a consequence, the deduction made by high-income families was constrained by the daily limit. Yet, the progressivity of the tax relief also depends on the average amount paid by the users of formal childcare. In order to verify this hypothesis, we compared average fees and the maximum amount of childcare expenses that can be deducted. We found that in the French Community the average daily fee paid for a subsidized childcare place in 1999 was around 9.76EUR. In the Flemish Community the average daily fee amounted to 11.46EUR. Given that in 1999 the maximum deductible amount was set at 8.70EUR per day, we can say that in the subsidized sector at least half of the families' deduction was restricted by the daily limit. In the private sector, fees are normally set above the maximum fee in the subsidized sector. This value is over 18.00EUR a day in both Communities. Because of this, we may say that families using private childcare facilities will be constrained to deduct the daily limit. Therefore, more than half of all

the families using formal childcare are limited to claim the maximum deductible amount.

Previous studies showed that tax relief for childcare expenses is progressive for families claiming the tax deduction. Altschuler and Schartz (1996) found that when including the tax credit, the Suits index increased of approximately 4% for the families claiming the credit. As pointed out by Gentry and Hagy (1995), the progressivity of the tax relief does not only depend on take-up rates but also on features of the tax relief that determine the distribution of benefits. In Belgium's case, the tax deduction of childcare expenses is progressive for families using formal care thanks to the daily deductible limit, while in the U.S, progressivity of the tax relief depends not only on the limits on deductible care expenses but also on the limits on the amount deducted with respect to the family's income (2).

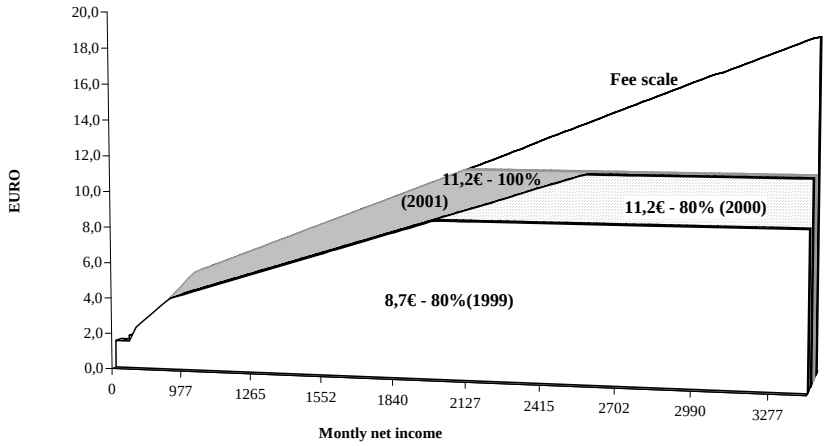
Impact of the tax policies for childcare in 2000 and 2001

In 2000 and 2001, the tax policies for childcare deteriorate the distribution of income for all families with young dependents. Indeed, the reforms were set to increase the amount of deductible care expenses while the tax credit was maintained almost unchanged.

For families claiming the tax deduction, the equalizing effect changed from 0.148% in 1999 to 0.145% in 2000. The reduction of 0.003% implies that the deduction of childcare expenses became less equitable in 2000 than it was in 1999. We may argue that this loss is created by the fact that the families benefiting from the limit change from 8.70EUR to 11.20EUR correspond to middle-income and high-income

families. Indeed, in the subsidized sector, the increase in the deductible limit benefited families with a post-tax income of more than 1,984.00 EUR (Figure 4, dotted area). When analyzing the decomposition of (RE^1-RE^0) for 2000 we notice an improvement on the vertical equity ($\Delta V>0$) as well as on the horizontal equity ($-\Delta H>0$) and reranking component ($-\Delta R>0$) due to the tax deduction of childcare expenses.

Figure 4: Daily fees in the subsidized sector and deductible expenses limits

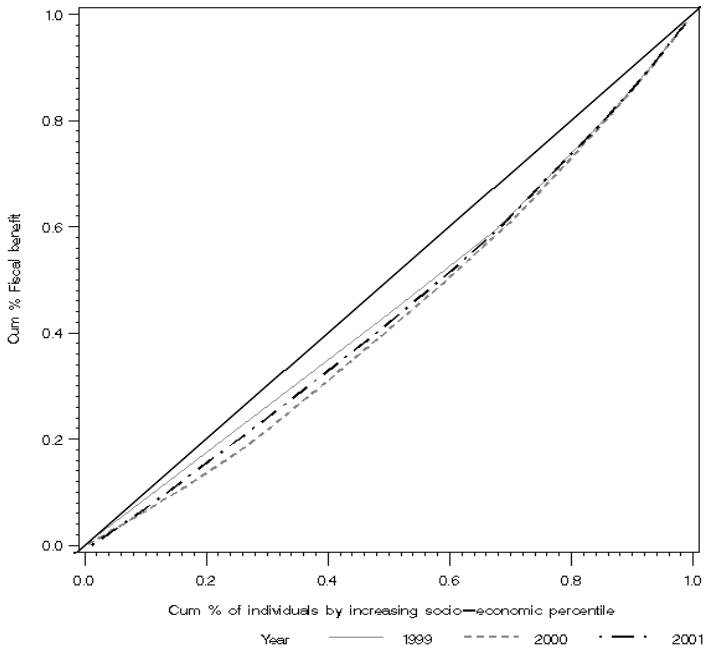


Source: Fee scale for subsidized care providers in 2000 (French Community-ONE). Two fee scales are set in Belgium, one for the French Community (ONE) and one for the Flemish Community (K&G). Differences between both scales are small, so for simplicity we only use one example.

Opposite to the results in 2000, we observed an equity gain in 2001 that corresponds to the abolition of the 80% limit on the amount of childcare expenses that could be deducted. This benefited families with a post-tax income of less than 2,559.00EUR (Figure 4, grey area). Furthermore, given that the daily limit is not modified, the

deductible amount for households who were already paying more that 11.20EUR was unchanged. In order to have a better idea of the impact of the limit reforms on the distribution of the fiscal benefit for families with deductible childcare expenses we plotted the Lorenz curve for years 1999, 2000 and 2001. As we notice from Figure 5, the Lorenz curve for year 2000 lies below the 1999 curve indicating that, increasing the daily limit made the distribution of childcare fiscal benefit still more unequal. Nevertheless, setting the maximum percentage of deductible childcare expenses to 100% did partially offset the negative effect of increasing the daily limit.

Figure 5: Unequal distribution of the fiscal benefit



Legend: Lorenz curve for the fiscal benefit for families with deductible childcare expenses.
Sources: Tax base IPCAL (sample of the overall tax claims including those with dependents less than four years of age). Own calculations

CONCLUSION

This paper examined the progressivity of the tax policies for childcare in Belgium for families with young dependents and for the users of formal childcare. Families using formal childcare can deduct a portion of their care expenses while those using informal or parental care arrangements benefit from a tax credit. Using an original sample of taxpayers with young dependent in Belgium, evidence is provided on the unequal distribution of childcare subsidies among income groups. When we take into account all families with young dependents, the fiscal subsidy programs turn out to have a regressive effect. On the contrary, among those families using formal childcare, it is shown that the *tax deduction* with a limit has a progressive effect on the distribution of income. Our results differ from those of Altshuler and Schwartz (1996) and Gentry and Hagy (1995) who find that the tax relief for childcare is progressive among all the families with young dependents. This can be due to the fact that in Belgium the amount deducted is not restricted by the family's income, while in the U.S. families with income higher than 10,000 dollars see the credit rate decrease by one percent for each additional 2,000 dollars of adjusted gross income. Moreover, even if the effective subsidy rate was similar among all income deciles, having more wealthier families claiming the tax deduction implies that the sum of the fiscal benefit increased at each income decile.

We also found that the percentage of working parents (both from lone or two parent households) claiming the tax deduction increased from 1994 to 2001. Because the tax deduction for childcare is an effective mechanism to reduce the costs associated with the use of formal childcare, household's participation in the labor market might have increased during this period. Although it is beyond the purpose of this paper to analyze changes in labor supply and use of childcare, it is important to mention that those changes might affect our results on the progressivity of the tax relief. Indeed, if tax relief for childcare induces low-income mothers to work, the distribution of income might be improved and our estimate on the redistribution effect might be underestimated. In addition to this, among all families with young dependents, regressivity of the tax policies for childcare might be in part due to the fact the tax relief enabled married mothers to work. Indeed, families claiming the deduction might have higher income because the mother was able to participate in the labor market.

Our results showed that the tax deduction could not always target the policy objectives of both being progressive and reducing the cost of formal care. Indeed, increasing the daily deductible limit reduced the cost of formal childcare only for middle and high-income families, and increased inequality of income distribution. Furthermore, policy makers must consider that the tax deduction can reduce the cost of formal childcare only if access to childcare services is not restricted. Yet, in Belgium as in other developed countries, the increasing demand for childcare has not been matched by the supply of formal childcare. Further research is needed to understand how, in this

context of rationing, tax relief of childcare expenses reduces the cost of formal childcare among families from different income groups. Indeed, if high-income families are more likely to overcome the rationing of childcare places, the tax relief can enhance the inequalities in the access to formal childcare.

Appendix A

Equation 1, 1a, 1b and 1c present Aronson and Lambert (1994) decomposition of redistributive effect (RE) into vertical (V), horizontal (H) and reranking (R) components (16).

(1)

$$RE = G_x - G_{x-t} = (G_x - G_b) - (G_{x-t} - C_{x-t}) - \sum_j \left(\frac{N_j^2 \mu_j}{N^2 \mu} \right) G_j = V - R - H$$

(1a) $V = (G_x - G_b)$

(1b) $R = (G_{x-t} - C_{x-t})$

(1c) $H = \sum_j \left(\frac{N_j^2 \mu_j}{N^2 \mu} \right) G_j$

Equation 2 and 3 present the decomposition of the total redistributive effect without and with tax policies for childcare. The superscript 0 indicates the total redistribution without tax deductions and tax credit; and the superscript 1 indicates the total redistribution when tax deduction and tax credit are included

(2) $$RE^0 = G_x - G_{x-t}^0 = (G_x - G_b^0) - (G_{x-t}^0 - C_{x-t}^0) - \sum_j \left(\frac{N_j{}^2 \mu_j^0}{N^2 \mu^0} \right) G_j^0$$

(3) $$RE^1 = G_x - G_{x-t}^1 = (G_x - G_b^1) - (G_{x-t}^1 - C_{x-t}^1) - \sum_j \left(\frac{N_j{}^2 \mu_j^1}{N^2 \mu^1} \right) G_j^1$$

Subtracting equation 2 from equation 3 we find:

(4)

$$RE^1 - RE^0 =$$

$$\left[(G_x - G_b^1) - (G_x - G_b^0)\right]$$

$$-\left[(G_{x-t}^1 - C_{x-t}^1) - (G_{x-t}^0 - C_{x-t}^0)\right]$$

$$-\left[\sum_j \left(\frac{N_j{}^2 \mu_j^0}{N^2 \mu^0}\right) G_j^0 - \sum_j \left(\frac{N_j{}^2 \mu_j^1}{N^2 \mu^1}\right) G_j^1\right]$$

Replacing equations 1a, 1b and 1c into 4 we find that changes in the redistribution of income due to the tax policies for childcare are equal to:

(5) $RE^1 - RE^0 = \left[V^1 - V^0\right] - \left[R^1 - R^0\right] - \left[H^1 - H^0\right] = \Delta V - \Delta R - \Delta H$

Appendix B

Table A 1: Decomposition of total redistributive effects of taxes and transfers for all households with dependents.

YEAR	Total redistributive effect RE^0	Vertical effect V^0	Horizontal effect H^0	Reranking effect R^0	Gini Index on gross Income G_x	Gini Index on the net income (No tax relief) G^0_{x-t}	Gini Index on the net income (With tax relief) G^1_{x-t}	Gini Index Without Tax Deduction G^0_b	Gini Index With Tax Deduction G^1_b	Concentration Index (No tax relief) C^0_{x-t}	Concentration Index (With tax relief) C^1_{x-t}
1994	6,14	6,75	0,56	0,05	28,12	21,98	22,00	21,37	21,39	21,93	21,94
1995	5,72	6,26	0,47	0,07	27,04	21,32	21,35	20,78	20,81	21,25	21,28
1996	6,22	6,86	0,58	0,06	29,06	22,84	22,87	22,20	22,23	22,78	22,80
1997	6,35	7,05	0,63	0,07	29,97	23,62	23,64	22,92	22,95	23,55	23,57
1998	6,35	7,02	0,61	0,06	30,37	24,02	24,05	23,35	23,37	23,96	23,98
1999	6,39	7,08	0,63	0,06	30,70	24,31	24,33	23,62	23,64	24,25	24,27
2000	6,60	7,32	0,66	0,06	31,53	24,93	24,96	24,21	24,25	24,87	24,90
2001	6,87	7,64	0,61	0,16	31,50	24,63	24,66	23,86	23,90	24,47	24,51

Table A 2: Decomposition of total redistributive effects of taxes and transfers for households with deductible childcare expenses

YEAR	Total redistributive effect RE^0	Vertical effect V^0	Horizontal effect H^0	Reranking effect R^0	Gini Index on gross Income G_x	Gini Index on the net income (No tax relief) G^0_{x-t}	Gini Index on the net income (With tax relief) G^1_{x-t}	Gini Index Without Tax Deduction G^0_b	Gini Index With Tax Deduction G^1_b	Concentration Index (No tax relief) C^0_{x-t}	Concentration Index (With tax relief) C^1_{x-t}
1994	5,12	5,67	0,49	0,06	23,95	18,83	18,73	18,28	18,19	18,77	18,67
1995	4,57	5,06	0,42	0,07	22,09	17,52	17,43	17,03	16,95	17,45	17,36
1996	5,21	5,79	0,51	0,07	24,72	19,51	19,39	18,93	18,83	19,44	19,33
1997	5,43	6,05	0,56	0,06	25,60	20,17	20,04	19,55	19,43	20,11	19,98
1998	5,31	5,91	0,54	0,06	25,65	20,34	20,21	19,74	19,61	20,28	20,14
1999	5,36	5,99	0,56	0,07	26,15	20,79	20,64	20,16	20,03	20,72	20,58
2000	5,6	6,27	0,61	0,06	27,28	21,68	21,54	21,01	20,88	21,62	21,47
2001	5,8	6,65	0,59	0,26	27,65	21,85	21,65	21,00	20,81	21,59	20,39

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Chapter 2: Access to childcare services: the role of demand and supply-side policies

ABSTRACT

Different demand-side or supply-side instruments can be used in order to encourage the use of formal childcare. With the budgetary constraints of the last two decades, some countries have changed their childcare policy leading to the implementation of demand-side rather than supply-side instruments. The introduction of demand-side subsidies to encourage the use of formal childcare services was a major change in Belgium since, until 1988, subsidies were directly granted to childcare services providers in order to reduce their running costs. The purpose of this paper is to analyze the impact of both demand-side and supply side subsidies on the use of formal childcare by low-income families. From this perspective, we analyzed, on the one hand, the effect of the tax deduction instrument implemented in Belgium and, on the other hand, the effect of an increase in the provision of subsidized childcare places on the use of formal childcare services. We found that the choice of policy instruments is not neutral in terms of access to formal childcare for families belonging to different income groups. Indeed, while a higher supply of childcare places increases the probability of access for low-income families, the tax deduction can have a mixed outcome as far as access to childcare is concerned.

Keywords: Childcare, welfare-state, policy instruments, subsidies

INTRODUCTION

For different reasons, going from gender equality to the increase of the employment rate, European governments have adopted policies to enhance the labor market participation of women, and of mothers in particular (1;2). Among those policies, support to childcare is considered as particularly essential to enable mothers to participate in the labor market. Some experts also highlight the contribution of childcare services in the development and socialization of children and in the reduction of social inequalities (3). In addition to this, there is some evidence that childcare can influence women's fertility decisions (4). Government intervention to reduce the cost of childcare can take the form of subsidies (or tax deductions) to parents who use formal childcare or of direct subsidies to services childcare providers (5). Although both types of subsidies are aimed at ensuring access to childcare, parents' choices might not only be constrained by the cost of childcare but also by the availability of childcare places (6). It is therefore interesting to study in parallel both types of instruments. We used data from Belgium to analyze how the use of formal childcare varies for families from different incomes groups, when considering supply-side policies (aimed at increasing the availability of childcare places) and demand-side policies (tax deduction for childcare expenses). We argue that when childcare is highly regulated and when there is a lack of childcare places, increasing the *affordability* of childcare using a tax deduction might not reduce the inequalities in the access to formal childcare. By "highly regulated", we mean that a

public authority controls quality standards and sets the rules to fix prices for childcare providers.

The purpose of this paper is to analyze the impact of both demand-side and supply-side subsidies on the use of formal childcare by low-income families. This paper is structured as follows. The first part of the paper reviews the literature related to the impact of availability of childcare services on the use of formal childcare. The second part describes the Belgian childcare system. The third part presents the data and the method used in our empirical analysis. The fourth part presents the results. The last section concludes.

Childcare rationing and its impact in the use of formal childcare

The use of formal childcare has mostly been analyzed under the assumption that prices are fixed by equilibrium between the supply and demand for childcare (7). In this case, if the demand for childcare exceeds the supply, fees will increase and low-income families will not be able to pay for childcare services, with the risk that mothers from these families exit the labor market. By contrast, when prices are regulated, access to childcare for families belonging to different income groups is less straightforward. When subsidized childcare places are allocated at a fee below the market price and priority is given to low-income families, the use of formal childcare might not differ from that of high-income families. Indeed, recent research shows that in countries where childcare is publicly provided and

highly regulated, the use of childcare might be more influenced by the availability of childcare services than by the cost of childcare (8-12).

In Italy, Chuiri (2000) finds that the probability to pay for formal childcare is more sensitive to the availability of places than to a change in prices, while the female labor market participation is more dependent upon the household's characteristics and the lack of informal care (9). Del Boca (2002) finds that the availability of places increases both the probability of using formal childcare and the mother's participation in the labor market (13). Kreyenfeld et al. present evidence from Germany and argue that under a highly regulated childcare system, families' decisions on childcare use and employment might be more influenced by the availability than by the affordability of childcare (12). Viitanen (2005) argues that, in the case of the UK, changes in prices of childcare have little influence on the use of childcare (and on female market participation). Indeed, lower prices cannot increase parent's use of formal childcare, because parents are not able to find a childcare place(14).

Other authors have estimated the number of childcare places needed to cover the care needs of families. Wrohlich (2008) shows that, in Germany, there is an excess of demand for childcare even among working parents. Indeed, the author estimates that 255.000 new places for childcare are needed for children of working parents and an additional 35,000 places for children who's mother is willing but unable to work (15). Kornstad and Thorensen (2007) argue that demand for childcare varies according to different combination of

work and care arrangements. Thus, availability of childcare is measured taking into account the type and hours of childcare used as well as whether parents were denied access to center-based care (16). The authors show that in Norway, childcare availability plays an important role in the use of formal childcare and labor market participation of women.

Gustafsson et al. (1992) also found that in Sweden, in regions where there is a lack of childcare places, prices do not influences family's childcare choice and labor supply (11). However, they point out that rationing in the supply might reduce the use of formal childcare by low-income families. Indeed, families who are more educated and have a stronger labor market commitment are the ones most able to overcome the lack of available childcare places. For instance, if some parents are better informed about the childcare rationing, they are more likely to enroll their children sooner in the institutions' waiting lists. Knowing that income is positively related to education level, we might therefore expect that high-income families will be more likely to find a childcare place. Moreover, if cash benefits or tax deductions are implemented, they will therefore benefit high-income parents who are the one's able to secure a childcare place. As a consequence, we make the assumption that a tax relief of childcare expenses can enhance the inequalities in the access to formal childcare. Note that social inequalities in the access to formal childcare services are complex to analyze since they are determined by a number of economic, social and cultural factors whose discussion comes out of the focus of this paper.

The childcare system in Belgium

Among OECD countries, Belgium is considered as having one of the most comprehensive systems for care and education for children under six years of age (OCDE 2001). Indeed, free pre-primary education, which is part of the education system, is available for all children from 2 and a half years on. By contrast, the childcare sector, which provides services for children under the age of three is not part of the education system but is still well developed in comparison with most European countries. Belgium is a federalized country in which two different institutions at the (linguistic) Community level are responsible for childcare services: the Bureau of Birth and Childhood (Office de la Naissance et de l'Enfance - ONE) for the French speaking community and Child and Family (Kind en Gezin – K&G) for the Flemish speaking community. Both institutions authorize formal childcare services, grant subsidies to childcare providers and set their own quality standards and control procedures. Childcare responsibilities are shared between both institutions for the Brussels Region, relying on the ONE for the Walloon Region and on K&G for the Flanders Region. The ONE and K&G set fees of subsidized services according to their own income scale and establish a minimum and a maximum daily fee. The formal childcare system can broadly be described as follows. By formal, we mean licensed care services for children under the age of three that can be organized collectively (crèches and family day-care) or individually (childminders that are associated and supervised by an organization). Since we do not consider parental care

or unlicensed care, we intend formal childcare when we speak about childcare. The childcare authorities do not directly provide childcare services but allocate subsidies to public (municipal) providers and to non-for profit childcare providers. These services receive direct public subsidies per child per day and functioning subsidies. Non-subsidized private childcare includes individual services provided by registered childminders and collective services, such as crèches provided by private "enterprises". Nevertheless, non-subsidized private childcare facilities must follow the quality guidelines set either by the ONE or the K&G while fees are set freely on the market[1].

Table 1 Number of subsidised and non-subsidised childcare places per hundred children

Year		1994	1995	1996	1997	1998	1999	2000
Wallonia	Subsidised	11,6	12,3	12,4	12,4	12,5	12,6	12,5
	Non-subsidised	3,2	3,6	3,9	4,3	4,4	4,4	4,1
Brussels	Subsidised	19,5	19,8	19,8	20	19,7	19,4	19,1
	Non-subsidised	8,4	9,4	9,1	9,6	9,3	9,4	9,5
Flanders	Subsidised	11,4	13	14,3	18,4	20,1	21,6	21,3
	Non-subsidised	5,9	6,5	6,8	6,9	7,4	8	7,6
Belgium	Subsidised	12,3	13,5	14,2	16,5	17,5	18,4	18,1
	Non-subsidised	5,2	5,8	6,1	6,3	6,6	7	6,6

Given the differences in the socio-economic and political context and the division of childcare responsibilities between the Belgian Communities, differences in childcare policies have emerged. The first difference relies is the provision of childcare through collective or

[1] This explains why we use the distinction between subsidized or non subsidized childcare and not the classical distinction between public and private childcare since some private non-profit organisations receive public subsidies such as public ones.

individual services. Indeed, in Flanders policy for childcare followed the ideal of “surrogate motherhood” thus emphasizing care services through individual provision (17). On the contrary, childcare in Wallonia followed the French tradition of providing care services through collective arrangements. In 2000, 60% and 40% of licensed childcare by the ONE and K&G respectively, were provided in collective services. Secondly, there is a *regional gap* in the number of childcare places per hundred children (coverage rate). In 1993, coverage rate was respectively of 13.8 in Wallonia, 27.5 in Brussels and 15.1 in Flanders In 2000, Wallonia’s coverage rate was of 16.6, of 28.6 in Brussels, and of 28.9 in Flanders (18). The larger expansion of childcare services in Flanders with respect to Wallonia was due to a larger development of non-subsidized childcare services (19). Indeed, opposite to other countries, where high level quality regulation and competition from public childcare providers prevent the development of childcare private providers, there is a co-existence of both types of providers in Belgium, roughly one fourth of all childcare providers being non-subsidized (18). Competition between subsidized and non-subsidized childcare leads non-subsidized providers to set their fees around the maximum fee charged in subsidized structures, because of the lack of demand at higher prices. Indeed, given that access to subsidized childcare facilities is not restricted with respect to the family’s income, setting fees too high in non-subsidized childcare facilities can lead to a crowding-out effect from families who can always try to find a subsidized childcare place. However, recent research shows that parental fees do not cover all running costs from small-scale non-subsidized childcare providers (20). As a

consequence, there is high turn-over in the number of non-subsidized providers that enter and exit the market for childcare services (19).

In addition to direct supply subsidies from the Communities to childcare providers, the Federal government has introduced in 1988 a tax deduction for childcare expenses for all parents using formal childcare. Until 1998, these parents could deduct 80% of their care expenses in the limit of a ceiling of 8.70 EUR per day (Loi portant sur la réforme de l'impôt des revenus et modification des taxes assimilées au timbre, 16-12-1988). Childcare expenses are deducted from the taxable income in a different category than work-related expenses, and families not claiming the tax deduction are granted a limited income exemption. All parents are eligible for the tax deduction as long as at least one has a work related income. The deduction of childcare expenses is not means-tested as it is in other countries, which implies that the subsidy is universally granted to all families using formal care. The Federal government modified for the first time since 1988 the deductible amount in 1999 and in 2000. In 1999, a new law raised this ceiling to 11.20EUR. In 2000, the percentage of deductible childcare expenses changed from 80% to 100%, always subject to the 11.20EUR daily limit.

Although Belgium's provision of childcare is high, particularly in Flanders (17), there is an important rationing in the number of childcare places. This has a directly effect on the use of formal childcare. Firstly, due to the lack of available childcare places, access to subsidized childcare services is given in priority to children with

working parents (19). Secondly, there are long waiting lists for childcare places, in particularly in the subsidized sector(21;22). Indeed, there is some evidence that covering the demand for childcare would imply increasing the number of available childcare places up to 30% (23). As mentioned earlier, in such a context, parents with a high income or a high level of education are more likely to get the places. Moreover, families that do not find a subsidized childcare place may look for a place in the non subsidized sector, which can imply paying higher fees (21;22)Evidence shows that only high-earning dual-income families can afford childcare in non-subsidized services (19). As a consequence, the rationing is likely to concern mainly low-income families and to influence their participation on the labor market. The rationing also appears from the fact that parents have little choice between different forms of non-parental care and must settle for whatever option they can find (24).

It is interesting to stress that the Federal government increases in 1999 and in 2000 the amount of deductible childcare expenses as a part of the reforms aimed at reducing the unemployment trap (1999). Although, this measure was not set to directly counter balance the lack of available formal childcare places, it contributed to reduce the cost of childcare who are particularly high among parents who pay for childcare from non-subsidized providers. Yet, if high-income families are the ones who can overcome the childcare rationing more easily, we may assume that using tax deduction or vouchers to encourage the use of formal childcare will reduce their childcare expenses but not reduce inequality in access to childcare.

In the next section, we present a model to identify the availability of childcare places as well the recent modifications in the tax deduction of childcare expenses have affected the use of formal care by families belonging to different income groups in Belgium.

Data and method

We used a register of all tax claims of households having dependent children aged less than three years old or having claimed a tax deduction for childcare expenses. The National Institute of Statistics provides the tax claim database for the 1994-2001 fiscal years, corresponding to the earned incomes of 1993-2000. The fiscal database contains information about yearly net and gross income, family structure, yearly deductible childcare expenses, and yearly tax payments. Data about prices is not included in our model given that our database only contains information on the deductible amount of childcare expenses. Given that only parents using formal childcare are entitled to deduct their care expenses, we considered that the yearly deductible childcare expenses are a good measure of parent's use of formal childcare. It is important to mention that all licensed childcare providers have to give to families a yearly record of their childcare expenses to be included in their fiscal declaration. For this reason, all the families filling a tax form (even if they will end up paying no taxes) are included in the database. We then make the assumption that claiming a tax deduction is a good indicator to estimate the use of formal childcare. Note also that it is estimated that around 3% of

children are cared by unlicensed childcare providers in Belgium (25). This combination of quality regulations and tax incentive indeed reduces the risk of using unlicensed care (26). Further details on the database can be found in appendix A.

Dependent variable

The use of formal childcare was estimated by the claim of a tax deduction of childcare expenses (the variable is equal to 0 if the deduction is equal to zero (= if there is no childcare expenses) and 1 otherwise).

Independent variables

Three types of independent variables were included in our analysis: household's characteristic, environmental variables and policy variables.

Household characteristics

Given that our aim was to compare the use of childcare from families from different income groups, we ranked them into income quintiles using the gross yearly income. Although income was not strictly comparable across years because of inflation, we considered that each year ranking was a good measure of the distribution of income, with poorer families being classified in the first income quintile. We also used information on the sources of family's incomes to create dummy variables that accounted for the parent's participation in the labor market. Four sources of income were used: unemployment benefits, incapacity benefits, work-related income as an employee and work-related income as a self-employed person. For each category, we created a variable representing the number of persons in the household

receiving a given income. We also included in our analysis the marital status of the parents (the variable is equal to 0 for a single-parent household and to 1 for a two-parent household), the number of dependent children (the variable is equal to 0 one children, 1 for two-children and 2 for more than two children) and the number of other dependent persons (the variable is equal to 0 for no other dependent and 1 for one or more dependents in the household).

Environmental characteristics

Environmental variables were included because some variables were likely to be correlated with both the use of formal childcare and the supply of services. For example, households living in rural areas may have a lower use of formal childcare because of cultural habits, stronger social networks, higher travelling costs or because of a more limited supply than in urban areas. Therefore, it is important to introduce a variable such as the population density in the analysis. After reviewing the literature, we have included the following environmental variables: the log of population density (number of habitants/km^2) and the unemployment rate of women (number of unemployed/number of working age) (11;27-29). The unemployment rate of women can give some indications on both the women's willingness to participate in the labor market and the job's availability.

Policy variables

Two different policy variables were included in our analysis. To account for supply-side polices we used a measure of accessibility to

childcare facilities and to account for demand -side policies we used dummy variables for 1999 and 2000 reflecting the years in which the tax deduction was changed. The first dummy for year 1999 represents the increase of the deductible ceiling from to 8.7 euro to 11.20 euro. The second dummy for year 2000 accounts for allowing families to deduct 100%, (instead of 80%) always subject to the 11.20 euro daily limit.

To measure the accessibility to childcare facilities, we included both subsidized and non-subsidized childcare places. We created a database for the period 1994-2000 that included the total number of childcare places for the 589 Belgium's municipalities. We considered that households' use of childcare is not limited to their local community. The availability of childcare places may go beyond municipality boundaries, particularly in such a densely populated country[2].

Following various models of accessibility (30-32) a measure of accessibility was built using the following formula:

$$A_i = \sum_j \frac{S_j f(d_{i,j})}{\sum_k C_k f(d_{j,k})}$$

[2] Indeed, households are distributed in the whole municipality in such a way that those living near another community may shop around for available childcare. Furthermore, households might consider available childcare places in nearby municipalities, for different reasons, such as being on the way to their office, to the extent that they are willing to incur transportation costs.

Where A is the Accessibility in area i, Sj is the number of childcare places in area j, $f(d_{i,j})$ is a decay function expressing the cost of moving from area i to area j. Ck is the number of children in area k and $f(d_{j,k})$ is their decay function. The form of the decay function was estimated using previous estimates of distance decay for school mobility in Belgium (33). The following decay function was applied:

$$f(d_{ij}) = e^{-0.172 d_{ij}}$$

where dij is the distance between the centroid of area i and area j. It is important to mention that the variable on the availability of childcare places reflects differences in policies between the regions and also within each region. Descriptive statistics of the variables mentioned above are given in Table 2.

Table 2 Descriptive statistics

	1994		**1996**		**2000**	
	Mean	Std	Mean	std	Mean	Std
Household yearly gross income (current euro)	28038	17073	29474	56024	32266	22579
Work related income as an employee (number of persons)	1,41	0,65	1,40	0,65	1,38	0,64
Work related income as self-employed (number of persons)	0,24	0,52	0,24	0,52	0,23	0,49
Incapacity benefits (number of persons)	0,36	0,52	0,36	0,52	0,33	0,51
Total number of children in the household	1,86	0,99	1,86	0,98	1,85	0,98
Number of other adults	0,00	0,05	0,00	0,06	0,00	0,07
Unemployment benefits (number of persons)	0,55	0,67	0,44	0,62	0,35	0,56
Number of children in the municipality	2 126	3 524	1 971	3 247	2 007	3 295
Population density (ha/km in log)	6,40	1,21	6,41	1,21	6,45	1,22
Paying for formal childcare (%)	27,31	-	33,12	-	41,75	-
Marital Status (% of couples)	0,86	0,35	0,83	0,38	0,75	0,43
Coverage rate (%)	17,94	4,13	21,94	4,06	25,45	5,55
Local women unemployment rate (%)	8,40	3,08	7,75	3,22	6,21	3,70

Table 3 provides information on the use of formal childcare separately for families living in areas with low and high availability of services. The cut-point between low and high availability was calculated as the mean coverage rate per year. As expected, childcare use is less common in areas where provision of childcare is low. We also computed the ratio between the percentage of families using formal childcare in areas with low and high availability. Interestingly, this ratio increases at each income decile. As a consequence, availability of childcare seems to have a greater effect in the use of childcare of low-income than in the one of high income families.

Table 3 Percentage of households using formal childcare according to the level of provision

		Year						
	Provision	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
	Mean [1]	17,5	19,5	20,3	22,7	23,8	25,5	25,9
Income decile								
First quintile	low	10,3	11,5	11,2	10,7	12,1	13,8	14,8
	high	18,1	18,9	18,5	18,0	20,1	23,8	25,9
	Low/high	*0,57*	*0,61*	*0,60*	*0,59*	*0,60*	*0,58*	*0,57*
Second quintile	low	12,8	14,4	14,9	14,9	16,5	19,6	21,1
	high	21,9	23,7	24,4	24,0	26,1	30,8	32,9
	Low/high	*0,59*	*0,61*	*0,61*	*0,62*	*0,63*	*0,64*	*0,64*
Third quintile	low	22,2	24,1	25,2	25,2	27,7	31,0	32,7
	high	33,1	35,1	35,8	35,3	37,9	42,7	44,3
	Low/high	*0,67*	*0,69*	*0,70*	*0,71*	*0,73*	*0,72*	*0,74*
Fourth quintile	low	34,3	36,3	38,0	39,7	41,7	46,5	47,0
	high	45,6	48,4	49,4	49,7	51,4	56,6	58,4
	Low/high	*0,75*	*0,75*	*0,77*	*0,80*	*0,81*	*0,82*	*0,81*
fifth quintile	low	48,9	51,9	54,1	55,8	57,8	63,9	63,4
	high	58,6	61,6	63,2	64,0	65,5	71,8	72,6
	Low/high	*0,84*	*0,84*	*0,86*	*0,87*	*0,88*	*0,89*	*0,87*

[1]This was computed as the mean coverage of the 589 municipalities

Analysis

We ran a series of multinomial logit regression to estimate the probability of paying for formal childcare taking into account the household characteristics, the environmental characteristics and the policy variables that are the accessibility to childcare places and the two dummy variables for 1999 and 2000 reflecting the years in which the tax deduction was changed. Because dummy variables might capture trend fluctuations not related to the fiscal policy changes, we included a time trend to account for such fluctuations. A variable controlling for regional differences in childcare policies was not included in the analysis because it is highly correlated with the variable on the accessibility to childcare places. Moreover, we choose to use the latter variable because it provides additional information on difference in availability of childcare within each region.

Three models were tested: Model 1 included the household's characteristics only. Model 2 added environmental variables to the previous model, the accessibility measure and the effect of the two fiscal policies for the tax deduction of childcare expenses introduced in 1999 and in 2000. The inclusion of environmental variables in Model 2 was intended to correct our model from specific characteristics that go beyond the household level. Model 2 was also used to analyze the accessibility to childcare and how the tax policies affect the overall probability of paying for formal childcare. Model 3 is set out to understand whether or not the impact of the accessibility to childcare and the two modifications on the tax deductions of childcare expenses was homogeneous across different income groups.

To attain this objective we included the interaction of household's income with both the accessibility to childcare and with the two modifications of the tax deduction system. This allows us to estimate whether childcare policies have a different effect among families from different income groups. To compare the different models, we computed the likelihood ratio statistic and, based on the chi-square statistic, we determined whether the new variable coefficients were statistically different from zero (34). All these models were controlled for the number of persons receiving the different income types in each household and included the time trend.

Our study presents some limitations. Our data could not differentiate families using childcare provided by subsidized or non-subsidized services, because the tax deduction is valid for all types of formal childcare. It is thus likely that the impact of the availability of places in the subsidized sector on the probability of paying for formal childcare has been underestimated. Secondly, we used dummy variables to capture the effect of the tax deduction on the probability of using formal childcare. Because dummies can capture other fluctuations we are unable to use our results to make simulations, which could measure how further policy changes could affect the use of formal childcare. Finally, further research is needed to improve our knowledge on the simultaneous decisions of using formal childcare and of participating in the labor market. Indeed, previous studies have shown that work and childcare decisions are made simultaneously (Blau, D. and Robins, P. K. 1988; Chiuri, M. C. 2000; Connelly, R. 1992; Gustafsson, S and Stafford, F 1992; Kreyenfeld, M. and Hank,

K. 2000). As a consequence, some of the variables on the right hand side of our equation are likely to be determined simultaneously with some of the left hand side. However, the main purpose of this paper is to analyze the impact of the changing childcare policies in the access to formal childcare and not on the household's labor supply. Furthermore, the database does not contain enough information (i.e. parent's age and education level, number of hours spent working or caring four young children, number of hours of childcare use) to allow us to specify a household labor supply model.

Results

Table 4 reports the results for the three models mentioned above. Model 1 linked individual variables to the probability of using formal care. We find that with respect to the wealthiest household's (belonging to income quintile 5), those belonging to other income deciles are less likely to pay for formal childcare. Two-parent households are less likely to pay for formal care than single-parent households are and the presence of other dependent adults also reduces the likelihood of paying for formal childcare. Compared to families with three children or more, those with only one child are more likely to pay for childcare.

Comparing the likelihood ratio statistic of Model 1 and Model 2 with a chi-square statistic with three degrees of freedom (22.5 significant at 0.1%), allows us to reject the hypothesis that the new variable

coefficients in Model 2 are statistically equal to zero. We find that if the unemployment rate of women increases, families are less likely to pay for formal childcare decreases. This result might be explained in two different ways. Firstly, municipalities with high unemployment rate are less likely to have a large supply of formal care. Indeed, given that the allocation of subsidized childcare places depends on the parents' participation in the labor market, it is expected that high coverage rate will exist in municipalities with high female employment. As a consequence, women might not be able to look for a job because they do not have a non-parental care alternative for their children. Secondly, it is also likely that some women choose to stay unemployed to care for their children.

Table 4 Parameter estimates from the logistic regressions for the household's decision of paying for formal childcare

Variable	Model 1		Model 2		Model 3	
	exp(B)	Sig level	exp(B)	Sig level	exp(B)	Sig level
Time trend	1,12	*	1		1	
Individual characteristics						
Income (Ref=Fifth quintile)						
First quintile	0,2	***	0,2	***	0,14	***
Second Quintile	0,28	***	0,29	***	0,21	***
Third quintile	0,45	***	0,48	***	0,41	***
Fourth quintile	0,65	***	0,68	***	0,66	***
Household type (Ref=single parent)	0,25	***	0,25	***	0,25	***
Number of dependent children (Ref=Three or more children)						
One children	1,28	***	1,3	***	1,3	***
Two children	0,83	***	0,84	***	0,84	***
Other dependents (Ref=No dependents)	0,84	***	0,77	***	0,81	***
Environmental variables						
Women's unemployment rate			0,96	***	0,96	***
Population density (log)			1,09	***	1,09	***

Variable	Model 1 exp(B)	Sig level	Model 2 exp(B)	Sig level	Model 3 exp(B)	Sig level
Policy Variables						
Supply-side Instruments						
Accessibility to childcare			1,04		1,05	***
Interaction accessibility * income (fifth quintile=ref)						
First quintile					1,021	***
Second Quintile					1,018	***
Third quintile					1	
Fourth quintile					1	
Demand-side instrument						*******
Dummy for the tax policy 1999 (increasing deductible ceiling; fifth quintile=ref)			1,15	***	1,23	***
Interaction tax policy 1999 * income (fifth quintile=ref)						
First quintile					0,98	
Second Quintile					0,965	
Third quintile					0,931	***
Fourth quintile					0,934	**
Dummy for the tax policy 2000 (eliminating the 80% limit; fifth quintile=ref)			1,26	***	1,296	***
Interaction tax policy 2000 * income (fifth quintile=ref)						
First quintile					1,172	***
Second Quintile					1,084	***
Third quintile					1,021	
Fourth quintile					0,979	
Quasi R^2	0.26		0.27		0.27	
Chi-Square differences	$\chi^2_{17} > 32.9$		$\chi^2_{6} > 22.5$	***	$\chi^2_{17} > 32.9$	***

Level of significance: *≤5%; **≤1%; ***≤0.1%

Note: Coefficients on income source and the interaction between the trends and the income groups are available in an unpublished table from the authors.

Model 1: Controlled by individual variables

Model 2: Controlled by individual variables, environmental variables, the accessibility to childcare and the two dummies for the modifications on the tax deduction of childcare expenses.

Model 3: Controlled by individual variables, environmental variables, the accessibility to childcare and the two dummies for the modifications on the tax deduction of childcare expenses and the interaction between of household's income with both the accessibility to childcare and the two dummies for the modifications on the tax deduction of childcare expenses.

For all models the Huber-White estimator of variance was computed given the share regional variables in the access to childcare as well as on the labor market structure.

The estimates of the rest of the variables in Model 2 are consistent with the results in Model 1. Let us now analyze the impact of the

accessibility to childcare on the use of formal childcare. We find that an increase in the provision of formal childcare significantly enhances the likelihood that parents will choose to pay for formal childcare (1.04). As for the impact of the two fiscal policies, we find that increasing the deductible ceiling and eliminating the 80% limit had a positive effect overall on the likelihood of paying for formal childcare (1.15 and 1.26 respectively).

We found that the new variable coefficients added in Model 3 are statistically different from zero by comparing the likelihood ratio statistic from Model 2 and Model 3 with the chi-square statistic with 12 degrees of freedom (32.9 significant at 0.1%). To interpret the results in Model 3, we must take into account both the coefficient for the policy variable and the interaction. Indeed, the overall effect of the policy among each group of households results from the combination of the coefficient for the policy variable and for interaction. More precisely, the coefficient for each policy variable must be interpreted as the impact of that specific policy on the use of formal childcare for households in comparison with the income quintile 5 (reference group). For other households, the interaction coefficient shows the extent into which the impact of the policy differs from that of the reference group. We found that an increase in the provision of formal childcare significantly enhances the likelihood that all parents use formal childcare (1.05). Interestingly, because the interaction term is positive and statistically significant for households belonging to quintiles 1 and 2 (1.02), it implies that accessibility to childcare has a greater impact on the probability that low-income families use formal childcare. In this context, a policy that increases the provision of

childcare services would be more distributive. Conversely, the lack of available formal childcare would lead more low-income parents to look for an alternative in the unlicensed sector. This latter might lead families to use low quality childcare, given that this sector does not have to meet minimum quality standards. The lack of available childcare services might also induce parents to exit the labor market to care for their children. In general, families choosing this last option belong to low-income groups(1).

Let us now analyze the effect of the two fiscal policies on the probability to pay for formal childcare for different income groups. The introduction of a modification of the tax deduction in 1999 increases the probability of using formal childcare for households in income group (1.23) However, compared to families in income group 5, the probability of using of formal childcare increased less after the new tax policy for families in income groups 3 and 4. Indeed, the interaction coefficient between this tax modification and household's income is negative and statistically significant for families belonging to income groups 3 and 4. This was also true for families from income deciles 1 and 2, although the results were not statistically significant. This result is not surprising, given that this policy only benefited families paying more than 10.20EUR (parents could deduct 80% of the fee which corresponds to the maximum deductible ceiling of 8.70EUR). Knowing that fees are set according to household income, we might expect that families benefiting from the new deductible ceiling belong to the higher part of the income distribution. On the contrary, after eliminating the 80% limit on the deductible

amount of childcare expenses, the interaction coefficient for families belonging to income groups 1 and 2 was positive and statistically significant. As a consequence the second policy modification had a higher increase on the probability of low-income families of using formal childcare. This result can be explained by the fact that this measure allowed low-income families to deduct all their care expenses, while the tax deduction for high-income families was not changed since they were bind to deduct the maximum daily limit.

CONCLUSION

In this paper we showed that, in the context of rationing, supply and demand side policies might have different impact on the access to formal childcare for different income groups. We used a logistic regression to capture the impact of the accessibility to childcare and of the tax deduction of childcare expenses on the likelihood to pay for formal childcare. When analyzing the impact of accessibility to childcare we found that it benefited all families, but that the effect is greater for low-income families. This result confirms that childcare use of low-income families is highly dependent on the availability of services. The two modifications of the tax deduction of childcare expenses increased the likelihood of paying for formal childcare. Yet, our results showed that increasing the deductible ceiling increased more the probability of using formal childcare of wealthier families. On the contrary, eliminating the 80% limit on the deductible amount increased more the probability of using formal childcare for low- and middle-income families. In other words, the effect of changes in tax

policies on families belonging to different income groups is dependent on the tax policy structure. Moreover, setting demand-side subsidies when there is a rationing in the number of childcare places might further penalize low-income families. Indeed, demand-side subsidies (like tax deduction) will benefit wealthier families because they are the one's able to find a childcare place more easily. In other words, increasing the tax relief can enhance the already existing inequalities in the access to formal childcare. Furthermore, the most controversial issue about the tax deduction of childcare expenses is whether or not it is an equitable measure. Some studies suggested that the redistributive effect of the tax deduction of childcare expenses depends on whether or not it is refundable and on whether the deductible amount is negatively related to the family's (35;36). Considering how other variables affect the likelihood of paying for formal childcare, we found that two-parent households are less likely to pay for formal care than single-parent households and that the presence of other dependent adults also reduces the probability of paying for formal childcare. Both coefficients are consistent with the fact that the availability of care provided within the family reduces the use of formal childcare (35-37). It is important to mention that two-parent households may choose to care for their children while one of the parents exits the labor market. In general, mothers are more likely to care for their children and so it is not surprising that an increase in the unemployment rate of women reduces the probability of paying for formal childcare (29;37). Moreover, given that childcare places are allocated in priority to working parents, children from unemployed or marginalized parents are often excluded from the formal childcare

sector. In order to address this problem, both governmental agencies have launched specific initiatives addressing the care needs of poor families (26). However, even if these initiatives allow under-privileged children to access to formal childcare services, it may increase the social segmentation of the services between social categories (1). Moreover, the lack of direct funding for childcare has lead to use alternative resources associated with other policies such as active labor market policies (38). This tendency to finance employment in the childcare sector neither encourages the development of a high-quality childcare infrastructure nor does it recognize the importance of the technical and/or relational skills needed to provide quality childcare services, unless training programs are included and staff turnover is limited (39).

Despite differences in the type of non-parental care services and the role of private providers in the childcare sector from the two authorities regulating Belgium's childcare system, they both pursue similar objectives in the years to come. Indeed, childcare policy is becoming more focused on the children's needs and bigger efforts are to be made to ensure more access to childcare services. Furthermore, both authorities aim at granting universal access to childcare services. Attaining the universal access ideal to childcare for all children between 0 and 3 years could be envisaged by integrating the childcare sector to the education system. Recent evolutions in the conception of childcare as a right for all children and in the designation of childcare services not anymore in terms of childminding (*garde*) but in terms of care (*accueil*) could be seen as a move to integrate childcare services

for 0-3 years into the education system. This is already the case for care for children from 3 years old. Moreover, the role in terms of education and socialization of childcare for very young children is more and more put forward.

The creation of new services that target unemployed parents or families at risk must also be analyzed carefully. These targeted services are necessary and crucial for the development of children with special needs. The creation of these programs are coherent with the recent declaration of childcare as a right for all children as they set particular alternatives for those who need it. This need can be seen in terms of the education and socialization of children. Nevertheless these programs must be seen as a complement to a larger childcare policy that aims at attending universal access while fulfilling the families and children's different care needs. Indeed, the risk is to use these specific services to compensate for the care deficit as one way of increasing the coverage rate without increasing significantly public expenditure, since these services are only marginally subsidized by childcare policies. Unfortunately, while restrictions on the number of childcare places exist, it is likely that the working status of parents will still be the first eligibility rule to be applied when it comes to allocate childcare places. The creation of targeted services has to be considered as a limited response to the restrictions in childcare places. Our results show that a comprehensible policy increasing the overall supply of formal childcare places is an effective measure to reduce inequalities in the access.

Appendix A

A small number of observations had to be deleted from the tax claim database because of invalid information. The numbers of tax declarations before and after validation are provided in the Table 5.

Table 5. Number of observations.

Fiscal Year	Number of households	Excluded cases	Final observations	% Excluded
1994	292228	347	291881	0.119
1995	285345	4295	281050	1.505
1996	279029	331	278698	0.119
1997	271267	877	270390	0.323
1998	276612	342	276270	0.124
1999	273644	350	273294	0.128
2000	264801	345	264456	0.130

Source: National Institute of Statistic

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Chapter 3 : Les soins informels en Belgique

ABSTRACT

Research on the provision of care is mostly based on household sample surveys, which cannot measure the prevalence of care-giving in the general population. In order to appraise the individuals' involvement in the provision of informal care, specific questions on the care provided were included in Belgium's 2001 Census. Using data from the census we aim at analyzing how the provision and the amount of informal care, varies with respect to the individual's socio-economic characteristics. We found that 1 out of 10 Belgians provides informal care. As expected, most caregivers can be found among middle-aged women. Yet, the percentage of men and women providing informal care at home is quite similar. The education level has an unexpected influence on the provision of care: more educated individuals are more likely to be caregivers while lesser educated individuals are more likely to provide more hours of care. Given that informal care is a valuable resource for meeting the care needs of today's societies, more attention should be given to the consequences of providing it. Indeed, not considering the negative aspects of providing informal care, such as the deterioration in the health status of caregivers or the competing demands between working and caring, can lead to a reduction of the amount of informal care provided.

Keywords: Caregiver, Socioeconomic factors.

INTRODUCTION

Face à la maladie, le malade dispose de plusieurs options : s'accommoder aux symptômes, prendre soin de lui-même, demander l'aide de ses proches ou encore requérir l'aide d'un professionnel de la santé. Le choix du malade parmi ces trois options est lié d'une part, à la sévérité de sa maladie et d'autre part, aux ressources à sa disposition (1). L'essentiel de la recherche sur le « help-seeking » s'est principalement intéressé à l'utilisation des soins professionnels. Néanmoins, force est de constater que le premier aidant est d'abord un proche.

Les soins prestés par des membres de la famille, des amis ou des voisins sont généralement associés à trois facteurs : i) la demande de soins, ii) la disponibilité et la volonté pour assumer le rôle de soignant, iii) la disponibilité d'alternatives dans le système de santé. Depuis les années 1980, les changements démographiques et les contraintes budgétaires de la sécurité sociale ont eu un impact direct sur ces trois facteurs. D'un côté, l'augmentation de la demande de soin est associée à certains facteurs démographiques comme le vieillissement de la population. En effet, les personnes âgées souffrent davantage de problèmes de santé, notamment de maladies chroniques (2-4), ce qui entraîne une plus grande demande d'aide et de soins (5).

Le changement dans l'offre de soins informels est aussi lié à des facteurs démographiques et socio-économiques. Selon Daartland, dans l'actuel contexte européen l'accroissement de la participation des femmes au marché du travail, l'augmentation du taux de divorce, l'augmentation du

nombre de personnes isolées ainsi que la réduction du taux de natalité risquent de réduire la disponibilité de l'aide informelle au sein des ménages (6). Par ailleurs, les restrictions budgétaires ont amené les gouvernements à ralentir l'accroissement des investissements dans les services sociaux, notamment ceux liés à la garde des jeunes enfants et aux services aux personnes âgées. En conséquence, les familles supportent des responsabilités croissantes, non seulement dans les domaines du marché du travail mais aussi dans la prise des problèmes de santé des enfants et des personnes âgées.

La demande de soins informels est aussi liée à l'offre d'autres types de soins, notamment les soins professionnels. La relation entre l'offre de soins professionnels et les soins informels est loin d'être évidente. En effet, plusieurs études montrent que ces deux types d'offre de soins peuvent être complémentaires ou substituts selon la pathologie du patient et son niveau de dépendance (1;7-10). Néanmoins, les politiques actuelles visent à réduire la durée du séjour à l'hôpital favorisant un retour rapide à domicile. De plus, en ce qui concerne les personnes âgées, la plupart des pays appartenant à l'Union Européenne mettent la priorité au maintien à domicile (11). Cette réduction des durées de séjours et le maintien à domicile accroissent le poids sur les soignants informels. Dans ce contexte, plusieurs politiques visent à soutenir l'aide formelle à domicile (soins infirmiers, centres de coordination de soins et services à domicile, aides aux familles et aux personnes âgées etc.) Cependant, plusieurs études montrent, que les soins formels sont insuffisants pour couvrir les besoins des malades et que les soignants informels jouent un rôle central dans le maintien à domicile.

Plusieurs auteurs mentionnent la difficulté de distinguer les différents types de soins « formels » et « informels » (12-14). En effet, aujourd'hui les limites entre les responsabilités assumées dans la sphère privée et la sphère publique sont nettement moins définies. Nous constatons qu'il existe actuellement une juxtaposition des initiatives visant la prise en charge des personnes par le secteur public, par les familles et par le marché (15). Selon Kröger, l'État-Providence prend de plus en plus en considération la soutenabilité des réseaux de soins basés sur des liens de solidarité entre les individus, notamment ceux tissés au sein des ménages. En conséquence, différentes politiques sont mises en place pour compenser et inciter la prise en charge des personnes par leurs proches. Ces compensations peuvent prendre la forme de déductions fiscales ou de transferts monétaires. Ceci constitue des « nouvelles formes de rémunération» pour les activités « informelles » qui étaient jusque là considérées comme gratuites.

Depuis les années 1990, l'aide des proches est reconnue comme essentielle dans la prise en charge des personnes, des aînés et des malades chroniques (16). Cependant, les données nécessaires pour évaluer et quantifier la prise en charge par la famille sont en général manquantes. Les données sur les soins informels sont en général récoltées en utilisant des enquêtes (ayant des tailles d'échantillonnage variables) et plus récemment, en utilisant des questionnaires dans les recensements (voir Annexe 1). En 2001, la Belgique a inclus pour la première fois des questions sur les soins ou aides informels dans son recensement. A partir de ces données, l'objectif de cet article est

d'analyser les caractéristiques socio-économiques des soignants informels. Il est important de mentionner que malgré qu'il existe une différence entre une aide et un soin, ne pouvons pas distinguer les deux à partir de nos données. Pour cette raison, nous traiterons les termes aide et soin ainsi qu'aidant et soignant en tant que synonymes. La première partie de cet article analysera les facteurs socio-économiques du ménage influençant la prestation de soins informels en Belgique. Nous aborderons ensuite les différences entre les soignants informels selon la personne à qui elles donnent des soins. La troisième partie de cet article sera consacrée au temps de soins presté.

CARACTERISTIQUES DES SOIGNANTS INFORMELS

Le recensement belge a inclus trois questions sur les soins informels permettant d'identifier les personnes ayant une activité régulière en tant qu'aidant (au moins une fois par semaine), le receveur de soins et le temps consacré à prester des soins informels (**Annexe 1**). L'exploitation des données du recensement belge permet d'améliorer la compréhension du besoin de soins et du rôle des soignants informels dans la société actuelle.

En Belgique, 9,37% des personnes âgées de plus de 15 ans prestent des soins informels. Les femmes prestent plus de soins que les hommes : 10,77% contre 7,9% respectivement (voir **Tableau 1**).

Nous calculons le risque de devenir aidant en utilisant des régressions logistiques. En contrôlant par l'âge et le sexe, les femmes ont un risque de devenir un aidant qui est supérieur à celui des hommes (OR = 1,42 ;

voir Tableau 1, colonne 4). Ce résultat est cohérent avec la littérature consacrée aux facteurs déterminant la prestation de soins informels. En effet, les femmes jouent plus souvent le rôle de soignantes non seulement au sein du couple, mais aussi lorsque les soins sont prestés aux parents âgés (17;18).

Tableau 1 : Soins informels parmi les personnes âgées de plus de 15 ans : pourcentage et risque relatif

	Total des personnes (1)	Aidants		OR (4)
		% (2)	N (3)	
Sexe				
Homme	3.741.479	7,90	295.577	1,00
Femme	3.939.263	10,77	424.259	1,42
Groupe d'âge				
15-24	1.740.957	4,25	73.991	1,00
25-44	2.170.668	7,39	160.412	1,80
45-64	2.292.223	13,95	319.765	3,69
65-74	845.280	12,39	104.730	3,14
75+	631.614	9,70	61.267	2,24
Total	7.680.742	9,37	719.686	-

Source : Recensement belge de 2001-Calculs propres.

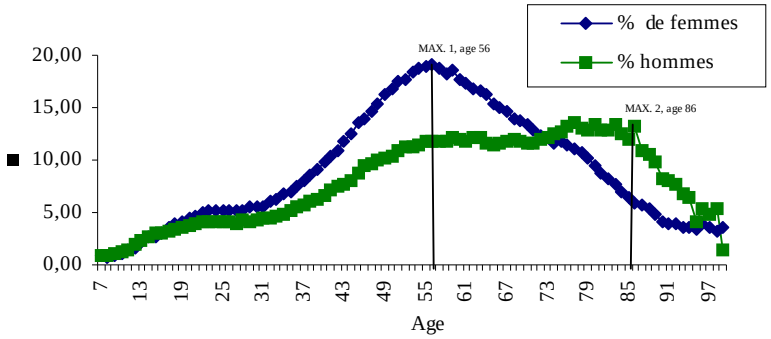
La prévalence des soins informels varie en fonction de l'âge du soignant. Nous constatons que le pourcentage de la population prestant des soins informels augmente dans les trois premiers groupes d'âge, passant de 4,25% pour le groupe des personnes âgées de 15-24 ans à 7,39% pour ceux ayant entre 25 et 44 ans et à 13,95% pour les personnes ayant entre 45 et 64 ans. Pour les deux derniers groupes d'âge (65 et plus), nous observons une faible réduction de la prévalence d'aidant. Nous constatons que 12,39% des personnes âgées entre 64 et 75 ans et 9,7% des personnes ayant plus de 75 ans prestent des soins informels.

Par rapport aux personnes âgées entre 15 et 24 ans, les personnes appartenant aux autres groupes d'âge ont une plus grande probabilité de donner des soins. Le risque de devenir aidant est particulièrement élevée lorsque nous considérons le groupe des personnes âgées entre 45 et 64 ans (OR=3,69). Dans la littérature, la forte prévalence des soignants informels parmi les adultes âgés entre 45 et 64 ans est souvent nommé «la Génération Sandwich » (19). En effet, chez ces personnes, la prestation de soins informels peut concurrencer leur participation au marché du travail ainsi que leur responsabilité envers leurs enfants. Ce phénomène prend de plus en plus d'ampleur dans le contexte démographique actuel, en raison de l'accroissement du taux de participation des femmes dans le marché du travail ainsi que de la naissance de plus en plus tardive des enfants (20).

La **Figure 1** montre l'évolution de la part des hommes et des femmes donnant des soins en fonction de leur âge. La part des femmes donnant des soins est supérieure à celle des hommes jusqu'à l'âge de 74 ans. Avant 74 ans, l'écart le plus important entre la part des aidants hommes et femmes se situe à l'âge de 56 ans. En effet, cette différence est de 7,34% (19,11% des femmes contre 11,76% des hommes). A partir de 75 ans, cette tendance s'inverse et la part des hommes donnant des soins est supérieure à celle des femmes. Lorsque les personnes sont âgées de 86 ans, la différence entre la part d'aidant homme et femme atteint sont maximum: 7,21% (5,94% des femmes contre 13,14% des hommes). Plusieurs raisons peuvent expliquer le renversement de la tendance dans la prestation des soins. En effet, en raison de leur plus faible taux de mortalité, un nombre élevé de femmes âgées ne doivent plus prester des

soins car elles ont perdu leur conjoint ainsi que leurs parents. En conséquence, la part des femmes « soignantes » diminue. Par contre, il est probable que les hommes ayant plus de 74 ans qui vivent avec leur conjoint soient menés à aider ou soigner leur conjoint. En effet, l'évolution générale de l'état de santé des hommes et des femmes âgés est tel que des hommes arrivant à des âges avancés auraient un meilleur état de santé que leur conjoint qui risque de souffrir de maladie provocant plus de dépendance (polyarthrite) (21).

Figure 1 Pourcentage d'aidants informels selon l'âge et le sexe



Source : Recensement belge de 2001-Calculs propres.

Nous avons analysé la prestation des soins selon la position du soignant dans le ménage. Ceci permet d'identifier la place de l'individu dans le ménage ainsi que le type de ménage auquel il appartient. La part des personnes donnant des soins informels est plus élevée parmi les époux sans enfant (12,76%), les parents dans un ménage monoparental et parmi les personnes ayant une autre position dans le ménage (14,62%). Par contre, la part des aidants informels est la plus faible chez les enfants appartenant à un couple marié ou à un couple cohabitant (4,2% et 4,1%) et chez les cohabitants avec enfants. En contrôlant par l'âge et le sexe,

nous obtenons l'effet ajusté de la position de l'individu dans le ménage sur la prestation de soins (**Tableau 2**).

Tableau 2 : Soins informels selon l'âge, le sexe et la position dans le ménage parmi les personnes âgées de plus de 15 ans : pourcentage et risque relatif

	Total des personnes (1)	Aidants % (2)	N (3)	OR (4)
Position individu dans le ménage				
enfant d'un couple marié	950.841	4,20	39.935	0,96
enfant d'un couple cohabitant	38.182	4,10	1.565	0,96
enfant dans ménage monoparental	284.444	9,65	27.449	1,84
isolé	1.164.133	8,68	101.047	0,85
époux (épouse) sans enfant	1.699.099	12,76	216.805	1,13
époux (épouse) avec enfant(s)	2.368.284	9,67	229.013	1,00
cohabitant sans enfant	312.999	7,07	22.129	0,91
cohabitant avec enfant(s)	235.896	6,56	15.475	0,85
parent ménage monoparental	344.027	11,22	38.600	1,04
résidant dans ménage 2 à 6 personnes	100.425	7,16	7.190	0,86
autre position	96.120	14,62	14.053	1,67
ménage collectif	86.292	7,59	6.550	0,76

Source : Recensement belge de 2001-Calculs propres.
Les odd ratios sont contrôlés sur l'âge et le sexe.

Par rapport aux époux avec enfant, les époux sans enfant ont risque supérieur de prester des soins informels (OR=1,3). Par contre, les cohabitants sans enfant et les cohabitants avec enfants ont moins de chance de donner des soins informels que les époux avec enfants (OR=0,96 et OR =0,96). Ces résultats semblent suggérer un lien entre la structure «légale » du ménage et son offre de soins informels. En effet, il se peut que les personnes appartenant aux nouvelles structures familiales soient moins disponibles à donner des soins que les personnes appartenant à des structures familiales plus traditionnelles. Par ailleurs, les personnes appartenant à des nouvelles structures familiales peuvent

être en meilleure santé ou peuvent se séparer lorsqu'un des membres du ménage tombe malade. Nous constatons que les enfants dans un ménage monoparental ont un risque plus élevé de prester des soins informels que les époux avec enfants (OR=1,84). Par contre, les enfants dans un couple marié et dans couple cohabitant ont moins de chance de donner des soins informels que les époux avec enfants (OR=0,96 et OR =0,96). Ceci peut s'expliquer en tenant compte que les partenaires du couple sont considérés comme les «principaux » soigneurs et que les enfants assument le rôle de soigneur lorsque l'une des deux personnes du couple est absente ou ne peut pas prester les soins requis (19).

La prestation de soins informels varie peu selon le niveau d'éducation. En effet, ce pourcentage est de 9,73% pour les personnes ayant un niveau d'éducation primaire, de 9,91% pour les personnes ayant un niveau d'éducation secondaire inférieur, de 8,54% pour les personnes ayant un niveau d'éducation secondaire supérieur et de 9,05% pour les personnes ayant un niveau d'éducation supérieur ou universitaire. Par ailleurs, le pourcentage des personnes ne spécifiant pas leur niveau d'éducation qui prestent des soins est de 11,69%. Cependant, les personnes âgées sont le plus souvent faiblement scolarisées. Il est donc important de tenir compte de cet effet « âge ». Les résultats de la régression logistique (voir **Tableau 3/a**) montrent que les personnes ayant un niveau de scolarité primaire ont un plus faible risque de donner des soins que ceux ayant un niveau de scolarité supérieur (OR=0.71). Ce résultat doit être interpréter avec précaution car nous ne considérons pas la nature de l'aide fournie. En effet, derrière ce résultat surprenant, nous pouvons envisager les personnes ayant un niveau d'éducation élevé ont plus de contacts

réguliers avec des parents âgées sans pour autant fournir des soins personnels (22).

Tableau 3/a : Soins informels selon la scolarité, la région et le statut professionnel parmi les personnes âgées de plus de 15 ans : pourcentage et risque relatif

	Total des personnes (1)	Aidants % (2)	N (3)	OR (4)
Éducation				
Primaire ou moins	1.466.138	9,73	142.655	0,71
Secondaire inférieur	1.929.011	9,91	191.165	0,91
Secondaire supérieur	2.069.750	8,54	176.757	0,97
Supérieure ou universitaire	1.882.202	9,05	170.339	1,00
Inconnu	333.641	11,69	39.003	-
Région				
Flandre	4.543.845	8,78	398.950	1,00
Bruxelles	668.818	9,65	64.541	1,15
Wallonie	2.468.079	10,4	256.680	1,21
Activité				
Actif travaillant	3.823.710	7,79	297.867	1,00
Actif a la recherche d'emploi	447.610	10,04	44.940	1,28
Inactif	3.327.720	11,02	366.715	1,43

Source : Recensement belge de 2001-Calculs propres.
Les odd ratios sont contrôlés sur l'âge et le sexe.

Le pourcentage des personnes prestant des soins en Flandre, en Wallonie et à Bruxelles est respectivement de 8.78%, 9,65% et 10,40%. Si l'on tient compte des variables socio-économiques, les habitants de Bruxelles (OR=1.15) et de Wallonie (OR=1.21) ont plus de risque de donner des soins informels que les personnes habitants en Flandre.

Le pourcentage des personnes ayant un emploi qui prestent des soins est de 7,79%. Par ailleurs, le pourcentage des actifs à la recherche d'emploi et des inactifs prestants des soins est respectivement de 10,04% et 11,02%. Ces résultats peuvent s'expliquer en tenant compte de deux hypothèses. Les personnes à la recherche d'un emploi ou les inactifs

donnent plus de soins car ils ont plus de temps disponible. Par ailleurs, il est probable que les personnes décident d'arrêter de travailles pour pouvoir se consacrer à prester des soins. Par rapport aux actifs travaillant, les inactifs et les actifs à la recherche d'emploi plus de risque de donner des soins informels (OR=1,43 et OR=1.28). Notons cependant que certaines personnes pourraient opter pour un travail à temps partiel afin de s'occuper d'un proche. Les odd ratios sont contrôlés par l'âge, le sexe et la position dans le ménage.

CARACTERISTIQUES DES DONNEURS ET DES RECEVEURS DE SOINS INFORMELS

Le recensement belge de 2001 permet d'établir qui est (sont) le(s) receveur(s) des soins informels. Cette question permet d'établir si les soins sont prestés au sein du ménage, à l'extérieur du ménage à un membre de la famille, à l'extérieur du ménage à un voisin ou à un ami. Cependant, nos données ne permettent pas d'identifier quelles sont les caractéristiques des personnes recevant de l'aide. Les aidants remplissant cette question, peuvent choisir parmi plus d'un choix. En effet, il se peut que l'aidant soigne en même temps son conjoint (aide dans le ménage) et ses parents (aide à la famille en dehors du ménage). Cette variable peut être considérée comme une approximation de la demande de soins.

Nous constatons que les soins sont prestés principalement dans le cercle familial. En effet, 38,56% des aidants disent donner des soins à un membre du ménage et 48,76% prestent des soins à un membre de la famille, à l'extérieur du ménage. En ce qui concerne la prestation de

soins à des personnes n'appartenant pas à la famille, 13,16% sont des amis et 6,52% sont des voisins (voir **Tableau 3/b**).

Tableau 3/b : Distribution des soins informels par type de personne aidée et par groupe socio-économique de l'aidant (%)

	Dans le ménage	**Famille**	**Voisins**	**Amis**	**N**
Total	38,56	48,76	6,52	13,16	683.669
Sexe					
Homme	43,99	43,58	6,00	13,30	280.239
Femme	34,79	52,35	6,88	13,07	403.430
Groupe d'âge					
15-24	39,29	46,34	5,00	17,46	69.669
25-44	34,76	53,92	5,81	12,71	152.321
45-64	31,40	58,10	5,81	11,30	306.448
65-74	51,68	30,45	9,52	15,71	99.007
75+	63,86	19,13	8,86	14,77	56.224
Education					
Primaire ou moins	54,16	34,67	6,60	10,14	134.981
Secondaire inférieur	39,40	48,58	6,70	12,03	183.022
Secondaire supérieur	33,47	54,26	5,91	13,31	168.809
Supérieure ou universitaire	26,92	58,56	6,36	16,62	162.173
Inconnu	52,66	31,88	8,93	14,02	34.684
Position dans le ménage					
enfant d'un couple marié	54,1	33,61	4,33	15,76	37.669
enfant d'un couple cohabitant	49,89	38,87	3,28	15,67	1.461
enfant dans ménage monoparental	69,46	23,9	3,5	9,85	26.142
Isolé	9,71	55,56	13,79	31,71	93.523
époux (épouse) sans enfant	45,03	46,05	5,93	8,92	207.568
époux (épouse) avec enfant(s)	37,65	55,43	4,81	8,17	218.904
Cohabitant sans enfant	29,97	56,19	5,36	14,93	21.081
cohabitant avec enfant(s)	35,71	54,13	5,28	11,76	14.698
parent ménage monoparental	33,95	49,84	7,91	16,73	36.655
résidant ménage 2 à 6 personnes	58,74	33,05	3,4	11,5	6.716
autre position	62,12	28,2	4,83	11,96	13.370
ménage collectif	52,8	15,77	8,99	31,06	5.882
Région					
Flandre	41,58	49,40	4,20	9,31	376.683
Bruxelles	31,95	45,81	10,56	23,45	61.084
Wallonie	35,57	48,50	9,07	16,52	245.902
Activité					
Actif travaillant	29,91	60,23	4,89	11,42	284.285
Actif à la recherche d'emploi	35,09	49,70	7,52	17,03	42.909
Inactif	45,77	39,54	7,69	14,15	347.263

Source : Recensement belge de 2001-Calculs propres.

Le pourcentage des aidants masculins donnant des soins dans le ménage est similaires à celui des aidants masculins donnant des soins aux membres de la famille en dehors du ménage est similaire (respectivement 43,99% et 43,58%). Par contre, le pourcentage des aidantes femmes donnant des soins en dehors du ménage à la famille est plus élevé que le pourcentage des femmes donnant des soins dans le ménage (52,35% contre 34,79%).

Le **Tableau 4** montre la distribution de l'aide selon le sexe dans chaque catégorie de personnes aidées. La différence entre le pourcentage des soins prestés au sein du ménage par des hommes et par des femmes est faible (46,74% contre 53,24%). Par contre, les femmes prestent 63,35% du total des soins à des membres de la famille en dehors du ménage. Nous pouvons interpréter ce résultat en faisant l'hypothèse que la majorité des soins prestés en dehors du ménage à la famille correspond aux soins prestés par des enfants à leurs parents. Par ailleurs, les soins dans le ménage correspondent à ceux prestés au sein du couple. En tenant compte de ces hypothèses, le fait que les femmes soient plus engagées à donner des soins à des membres de la famille que les hommes, indiquerait que les filles prestent plus de soins à leurs parents que les fils. Ce résultat est en concordant avec la littérature (19;23)

Tableau 4 : Pourcentage des soins informels prestés Selon le sexe et le type de receveur (%)

	Dans le ménage	**Famille**	**Voisins**	**Amis**
Homme	46,76	36,64	37,72	41,43
Femme	53,24	63,35	62,27	58,61
Total des aidants – (%)	263.623	333.357	44.575	89.971

Source : Recensement belge de 2001-Calculs propres.

Les personnes âgées entre 15 et 64 prestent des soins principalement en dehors du ménage à des membres de la famille. Par contre, les personnes ayant entre 64 et 75 ans ainsi que celles âgées de plus de 75 ans prestent des soins principalement au sein du ménage. Nous retrouvons ici l'hypothèse selon laquelle les soins informels au sein du ménage correspondent à ceux prestés dans le couple (correspondant à des couples âgés) et les soins prestés à des membres de la famille en dehors du ménage correspondent à ceux prestés par des enfants à leurs parents. Ceci montre que la demande de soins varie entre les différents types de ménage et qu'elle est fortement influencée par la structure familiale et l'âge des individus. Le pourcentage des soins prestés à des amis est particulièrement élevé pour les personnes âgées entre 15 et 24 ans (17,46%). Par ailleurs, nous constatons que le pourcentage des soins prestés aux voisins est plus élevé pour les personnes âgées entre 65 et 75 ans (9,52%) ainsi que pour les personnes âgées de plus 75 ans (8,86%).

Les ménages collectifs ainsi que les enfants dans un ménage monoparental donnent des soins principalement au sein de ménage. Les soins prestés dans le ménage par des époux sans enfant sont aussi important que ceux prestés à des membres de la famille en dehors du ménage. Par contre, les couples mariés avec enfant parent, les parents dans un ménage monoparental ainsi que les cohabitants avec et sans enfant(s) donnent des soins principalement à des membres de la famille en dehors du ménage.

Les aidants ayant un niveau d'éducation primaire prestent des soins principalement dans le ménage (54,16%). Ce pourcentage est plus faible pour les personnes ayant une éducation de niveau secondaire inférieur (39,40%), secondaire supérieur (33,47%) ainsi que supérieur ou universitaire (26,92%). Nous constatons que 58,56% des personnes ayant un niveau d'éducation universitaire donnent des soins en dehors du ménage. L'interprétation de ces résultats doit être faite en tenant compte des résultats obtenus selon l'âge des soigneurs. En effet, nous pouvons considérer qu'une grande partie des personnes âgées de plus de 65 ans donnant des soins dans le ménage, ont un niveau d'éducation primaire.

Le pourcentage des personnes donnant des soins au sein du ménage en Flandre, en Wallonie et à Bruxelles sont respectivement de 41,58%, 31,95% et 35,57% (voir **Tableau 3/b**). Le pourcentage des personnes prestant des soins à des membres de la famille en dehors du ménage varie moins entre les régions: 49,40% pour la Flandre, 45,81% pour Bruxelles et 48,50% pour la Wallonie. Il est intéressant de constater que le pourcentage des personnes donnant des soins aux amis est élevé à Bruxelles (26,45%) ; ceci pouvant être expliqué par les caractéristiques particulières des structures familiales à Bruxelles.

CARACTERISTIQUES DES SOIGNANTS INFORMELS ET NOMBRE D'HEURES DE SOINS PRESTEES

Le recensement inclut une question visant à établir la fréquence (nombre de jours par semaine) et le nombre d'heures de soins prestées quotidiennement. La plupart des aidants donnent des soins au moins une

fois par semaine (50,96%) (voir **Tableau 5**). Parmi les personnes donnant des soins quotidiennement, celles prestant entre 30 minutes et 2 heures de soins sont les plus nombreuses (17,2%).

La fréquence et le nombre d'heure de soins prestés par des hommes et par des femmes sont similaires. La part des soignants donnant des soins au moins une fois par jour décroît avec l'âge. Cependant, les soins prestés de façon hebdomadaire restent les plus fréquents dans les différentes catégories d'âge. Le pourcentage des aidants donnant plus de 4 heures de soins par jour est particulièrement élevé pour les personnes âgées entre 64 et 75 ans ainsi que pour celles âgées de plus de 75 ans (20,08% et 26,56%). Il est fort probable que dans ces groupes d'âge, des individus prestent des soins à leur partenaire âgé et dans ce cas, il est probable que la demande de temps de soins soit importante.

La part des aidants donnant plus de 4 heures de soins par jour est supérieure à la moyenne nationale (13,18%) parmi les couples mariés sans enfant (16,39%), les ménages collectifs (16,00%), les autres types de ménage (24,93%) ainsi que chez les ménages monoparentaux (16,34%).

Le pourcentage des personnes prestant des soins au moins 1 fois par semaine ou quotidiennement pendant moins de 30 minutes s'accroît avec le niveau d'éducation. La part des soignants donnant des soins de façon hebdomadaire est particulièrement élevée auprès des individus ayant un niveau d'éducation universitaire (63,35%). Par ailleurs, la part des soignants donnant des soins quotidiennement pendant plus de 30 minutes décroît avec le niveau d'éducation. La part des soignants donnant des

soins pendant plus de 4 heures par jour est particulièrement élevée auprès des individus ayant un niveau d'éducation primaire (22,71%).

Tableau 5 : Total des personnes donnant des soins informels (en %) selon le nombre d'heures

	Pas tous les jours au moins 1 fois par semaine	Tous les jours				N
		Moins de 30 min	30 min à 2 h	2 h à 4 h	4h et plus	
Total	50,96	12,05	17,2	6,59	13,18	684.369
Sexe						
Homme	49,42	13,43	18,04	6,70	12,39	281.148
Femme	52,03	11,08	16,61	6,52	13,73	403.221
Groupe d'âge						
15-24	61,94	12,95	13,06	4,39	7,64	70.215
25-44	56,03	11,88	15,72	5,69	10,65	153.459
45-64	53,18	11,27	18,03	6,39	11,10	307.442
65-74	39,93	12,66	18,71	8,60	20,08	97.910
75+	30,17	14,59	19,22	9,44	26,56	55.343
Education						
Primaire ou moins	35,71	13,22	19,57	8,76	22,71	133.466
Secondaire inférieur	48,69	12,55	18,39	7,11	13,23	182.648
Secondaire supérieur	55,78	11,45	16,69	5,97	10,08	170.132
Supérieure ou universitaire	63,65	10,61	14,51	4,56	6,64	165.224
Inconnu	36,77	14,77	17,05	8,31	23,07	32.899
Position dans le ménage						
enfant d'un couple marié	55,46	15,81	15,84	5,10	7,76	37.881
enfant d'un couple cohabitant	56,35	14,68	14,41	5,34	9,20	1.478
enfant dans ménage monoparental	35,10	15,21	22,28	8,92	18,47	26.109
Isolé	64,88	9,44	13,21	5,37	7,07	93.975
époux (épouse) sans enfant	43,97	12,45	19,44	7,73	16,39	206.360
époux (épouse) avec enfant(s)	52,94	11,84	16,90	6,13	12,16	220.389
Cohabitant sans enfant	58,22	10,46	14,73	5,23	11,33	21.026
cohabitant avec enfant(s)	57,35	11,47	14,17	5,10	11,88	14.775
parent ménage monoparental	54,69	10,35	14,56	5,55	14,83	36.510
résidant ménage 2 à 6 personnes	37,65	16,16	19,30	8,48	18,39	6.661
autre position	31,33	13,43	21,23	9,06	24,93	13.137
ménage collectif	34,12	18,04	21,24	10,58	16,00	6.068
Région						
Flandre	47,23	11,33	18,84	7,56	15,02	379.048
Bruxelles	60,68	10,44	12,74	5,39	10,73	59.906
Wallonie	54,35	13,55	15,74	5,39	10,94	245.415
Activité						
Actif travaillant	60,07	12,24	16,29	4,81	6,56	287.789
Actif à la recherche d'emploi	52,98	11,13	15,77	6,91	13,19	42.585
Inactif	43,45	11,97	18,15	8,00	18,41	345.393

Source : Recensement belge de 2001-Calculs propres.

Parmi les aidants ayant un emploi, 60,07% prestent des soins au moins une fois par semaine. Le pourcentage des personnes s'engageant à donner des soins pendant plus de 4 heures par jour, est supérieur à la moyenne nationale, parmi les actifs à la recherche d'emploi ainsi que parmi les inactifs.

La fréquence et le nombre d'heures de soins prestés varient considérablement en fonction du niveau d'éducation et de l'activité des soignants. Ceci peut s'expliquer en tenant compte que la réduction de salaire liée à réduire le temps de travail pour se consacrer à prester des soins est plus élevée pour les aidants ayant un niveau d'éducation élevé. En conséquence, les individus pour lesquels la perte de revenu est moindre sont plus disponibles pour prendre en charge une personne ayant besoin de beaucoup d'heures de soins. Par ailleurs, il peut exister un effet de sélection parmi les aidants qui, de par le fait qu'ils sont au chômage, décident de donner plus de soins.

Dans les trois régions, la part des individus prestant des soins de façon hebdomadaire est la plus élevée. En Flandre, le pourcentage des individus donnant entre 2 et 4 heures de soins (7,56%) ainsi que ceux donnant plus de 4 heures de soins (15,02%) sont supérieurs à la moyenne nationale.

Pour mesurer l'impact des facteurs socio-économiques sur l'intensité des soins prestés, nous avons calculé la probabilité de donner plus de 2 heures de soins par jour. Nous avons choisi cette catégorisation car les

aidants donnant plus de 20 heures[1] de soins par semaine sont considérés dans la littérature comme des aidants ayant une charge de soins « lourde » (24;25).

Tableau 6 : Probabilité de donner plus de deux heures de soins par jour parmi les soignants

	ODD
Sexe	
Homme	1,00
Femme	1,04
Groupe d'âge	
15-24	1,00
25-44	1,87
45-64	1,55
65-74	2,14
75+	3,09
Éducation	
Primaire ou moins	2,33
Secondaire inférieur	1,64
Secondaire supérieure	1,39
Supérieur ou universitaire	1,00
Position dans le ménage	
enfant d'un couple marié	0,96
enfant d'un couple cohabitant	1,01
enfant dans ménage monoparental	2,01
Isolé	0,50
époux (épouse) sans enfant	0,85
époux (épouse) avec enfant(s)	1,00
Cohabitant sans enfant	0,90
cohabitant avec enfant(s)	1,16
parent ménage monoparental	0,99
résidant ménage 2 à 6 personnes	1,34
autre position	1,80
ménage collectif	0,94
Région	
Flandre	1,00
Bruxelles	0,74
Wallonie	0,69
Activité	
Actif travaillant	1,00
Actif à la recherche d'emploi	2,02
Inactif	2,09

Source : Recensement belge de 2001-Calculs propres.

[1] Dans le recensement, les personnes donnant 20 heures semaine peuvent appartenir aux catégories « 2h à 4h de soins par jour » ou « plus de 4h de soins par jours ».

La probabilité de donner plus 2 heures de soins par jour est similaire pour les hommes et pour les femmes (OR=1,04, Tableau 6). Par rapport aux personnes âgées entre 15 et 24 ans, les personnes âgées entre 65 et 74 ainsi que les personnes âgées de plus de 75 ans ont un plus grand risque de prester plus de 2 heures de soin par jour. Les personnes ayant un niveau d'éducation primaire ont 2,3 fois plus de risque de donner plus de 2 heures de soins que les personnes ayant un niveau d'éducation universitaire.

Il existe donc deux effets différents en ce qui concerne le niveau d'éducation et l'aide informelle. En effet, les personnes ayant un niveau d'éducation élevé ont un plus grand risque d'être aidant, mais un plus faible risque de s'investir de façon intensive dans leurs activités d'aide. Plusieurs explications peuvent être avancées. Les personnes instruites ayant un coût d'opportunité élevé (via un meilleur salaire), peuvent choisir de s'investir dans des tâches nécessitant moins de temps. Ceci est notamment le cas de l'aide nécessaire pour rechercher des informations et la coordination des services d'aide formels. Par ailleurs, ils peuvent aussi être en mesure de payer des soins formels pour couvrir les besoins de leurs parents âgés. Par rapport aux personnes ayant un emploi, les inactifs et les actifs à la recherche d'emploi ont un risque plus élevé de donner plus de 2 heures de soins. Ce résultat peut aussi s'expliquer par le fait que les personnes ayant un emploi ont un coût d'opportunité plus élevé d'être aidant et en conséquence, s'investissent moins dans des activités d'aide de longue durée.

Par rapport aux époux avec enfants, les cohabitants avec enfants, les enfants dans un ménage monoparental ainsi que les personnes ayant une autre position dans le ménage, ont une plus grande probabilité de donner plus de deux heures de soins par jour. Si l'on considère les variables socio-économiques, les habitants de Bruxelles (OR=0,74) et de la Wallonie (OR=1,69) ont moins de risque de donner plus de 2 heures de soins que les personnes habitant en Flandre.

CONCLUSION

En Belgique, le secteur des soins informels a pu être étudié pour la première fois de façon exhaustive pour l'ensemble du pays grâce aux données du recensement de 2001. De cette première observation, il ressort que les soins informels concernent 1 personne sur 10. Par ailleurs, l soignant sur 2 preste des soins en dehors du ménage à des membres de la famille et la fréquence des soins le plus communément déclarée se situe à au moins une fois par semaine. L'analyse a permis de dégager des profils d'aidants tant en fonction du type de personne aidée que pour le volume de soins apportés. Les aidants sont plus souvent des femmes âgées de plus de 45 ans. Les femmes représentent plus de 63% du total des aidants s'occupant des membres de la famille en dehors de leur ménage. Néanmoins, le pourcentage des hommes et des femmes donnant des soins au sein du ménage est très similaire. En ce qui concerne la fréquence des soins, les personnes de plus de 75 ans ont trois fois plus de chance de prester des soins « intensifs » (plus de 2h par jour). Les soins informels sont plus fréquents parmi les époux sans enfant, reflétant la prépondérance de ce type de ménage parmi les personnes âgées, et parmi les enfants dans un ménage monoparental. Tant pour les époux sans

enfant que pour les enfants dans un ménage monoparental, les soins sont prestés le plus souvent au sein du ménage. La prestation de soins informels varie peu selon le niveau de scolarité. Néanmoins, cette absence de différence est en part masquée par les différences d'âge entre niveaux de scolarité. En effet, nous pouvons considérer que les personnes âgées prestent plus de soins à cause de leur âge (notamment chez les couples âgés) et non à cause de leur faible niveau d'éducation (les personnes plus âgées sont moins scolarisées). Néanmoins à âge égal, les personnes ayant un niveau de scolarité primaire ont une plus faible propension à avoir le rôle de soignant que ceux ayant un niveau de scolarité supérieur. Par contre, les personnes ayant un niveau de scolarité faible ont plus de propension à donner plus de 2 heures de soin par jour que ceux ayant un niveau de scolarité supérieur. Toutes autres choses égales par ailleurs, les inactifs, les individus faiblement scolarisés et les enfants vivant dans un ménage monoparental ont deux fois plus de chance de prester des soins intensifs.

La prestation de soins informels n'est pas un phénomène propre à la Belgique. En effet, les résultats des recensements effectués en 2001 tant au Royaume-Uni qu'au Canada révèlent toute l'importance du soignant informel dans la prise en charge des personnes malades. Les principales différences observées dans ce domaine entre les 3 pays peuvent être liées à l'accessibilité aux soins formels, aux fortes différences dans la densité de population, aux différences culturelles ou démographiques, ainsi qu'aux formulations des questions dans chaque recensement. En effet, pour le Canada la question porte exclusivement sur les soins aux personnes âgées, pour la Belgique la question porte sur les « personnes

ayant une maladie, une affection ou handicap durable » et pour le Royaume-Uni l'aide est peut être liée aux besoins des personnes âgées ou aux besoins de personnes ayant une maladie ou un handicap. En terme de volume de prestataires, au Royaume-Uni ainsi qu'au Canada, la part de la population prestant des soins informels est plus élevée qu'en Belgique et s'élève respectivement à 18.1% et 12.4%. On observe que le groupe d'âge qui preste le plus de soins informels se situe dans la population en âge de travailler. Parmi les 45-64 ans, la part des individus prestant des soins est respectivement de 19.7%, 23.8% et 20.0% pour le Royaume-Uni, le Canada et la Belgique. Il est intéressant de constater que parmi les 25-44 ans la part des soignants reste élevée : 9.75%, 17.4% et 7,39% pour le Royaume-Uni, le Canada et la Belgique respectivement (26;27).

Nos résultats sont particulièrement interpellant dans le contexte actuel où le vieillissement de la population a pour effet d'augmenter la demande de soins formels et informels. En dépit de cette demande croissante, plusieurs facteurs peuvent cependant réduire la prestation de soins informels. En effet, la forte participation des femmes au marché du travail, le faible taux de natalité, l'augmentation des ménages composés par un seul individu et les nouvelles structures familiales peuvent entraîner une diminution de l'offre de soins informels. Par ailleurs, la prestation de soins informels n'est sans conséquence pour les soignants En effet, des études montrent que prester des soins informels peut réduire la participation au marché du travail (23;28;29) ainsi que détériorer la santé du soignant (24;30-32). En conséquence, le maintien de l'offre de soins informels dépendra non seulement des facteurs démographiques

mais aussi des politiques visant à réduire les coûts liés à la prestation de soins informels.

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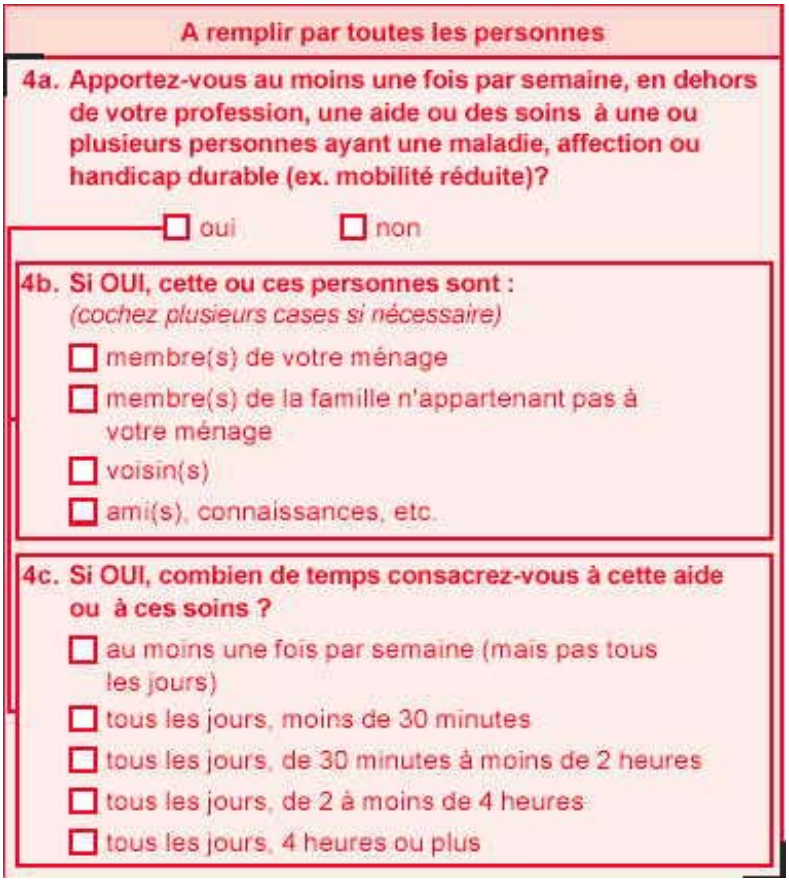
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Annexe 1 Sources de données concernant les soins informels

Pays	Source des données				Sujet relié à	
	Nom	Type	Perspective	Année	Santé	Emploi du temps
Angleterre	Census 2001[1]	Recensement	Aidant	2001	*	
Belgique	Census 2001	Recensement	Aidant	2001	*	
Nouvelle Zélande	Census [2]	Recensement	Aidant	2001		*
Canada	Census [3]	Recensement	Aidant	1996 et 2001		*
	General Household Survey[4]	Enquête	Soigné / Aidant	Différents modules de l'enquête entre 1985-2002	*	*
France	Handicap-incapacité-dépendance (HID) [5]	Enquête	Soigné	1998 à 2002	*	
	Enquêtes permanentes sur les conditions de vie des ménages [6]	Enquête	Soigné	1996 à 2004	*	
Etats-Unis	National Long Term Care Survey (NLTCS) [7]	Enquête	Soigné	1984, 1989, 1994 et 1999.	*	
	Assets and Health Dynamics Among the Oldest Old (AHEAD) [8]	Enquête	Soigné	1993 , 1995, 1998, 2000, 2002 et 2004	*	*
	Survey of Income and Program Participation (SIPP) [9]	Enquête	Soigné / Aidant	Différents modules de l'enquête entre 1984-1996	*	*
UE	Panel socio-économique européen[10]	Enquête	Aidant	1994 à 2001		*

Source : [1] (33) ; [2] (34) ; [3] (27); [4] (35)
[5] (36) ; [6] (17) ; [7] (10;19;37). Certaines vagues incluent des enquêtes spécifiques pour les aidants.
[8] (38-40); [9] (23)
[10] Les données sur les soins informels sont incluses dans la partie de relations sociales. http://epp.eurostat.cec.eu.int

Annexe 2 Questions sur les soins informels dans le recensement belge de 2001



A remplir par toutes les personnes

4a. Apportez-vous au moins une fois par semaine, en dehors de votre profession, une aide ou des soins à une ou plusieurs personnes ayant une maladie, affection ou handicap durable (ex. mobilité réduite)?

☐ oui ☐ non

4b. Si OUI, cette ou ces personnes sont :
(cochez plusieurs cases si nécessaire)

☐ membre(s) de votre ménage
☐ membre(s) de la famille n'appartenant pas à votre ménage
☐ voisin(s)
☐ ami(s), connaissances, etc.

4c. Si OUI, combien de temps consacrez-vous à cette aide ou à ces soins ?

☐ au moins une fois par semaine (mais pas tous les jours)
☐ tous les jours, moins de 30 minutes
☐ tous les jours, de 30 minutes à moins de 2 heures
☐ tous les jours, de 2 à moins de 4 heures
☐ tous les jours, 4 heures ou plus

Source : Questionnaire du recensement de 2001.
Ministère des Affaires Economiques
Institut National de Statistique

Chapter 4: Caring, employment and health among adults of working age: evidence from Britain and Belgium

ABTRACT

Background: For those of working age, results are inconclusive when exploring the health impact of providing care. Moreover, population data is lacking and the impact of welfare policies on the caregivers' health has not been yet analyzed. **Method.** Associations between general health and care giving, adjusting for differences in employment and socio-economic position, were explored for working age adults using logistic regression models. Data came from the 2001 British census (*n*=1,361,222, 5% sample) and from the 2001 Belgian census (*n*=4,368,637). The final model was stratified by employment status, given the significant interaction between caregiving and employment status. **Results.** In both countries, when compared to those providing no care, men and women providing 20 or more hours of care per week had an increased risk of poor health. This increased risk was attenuated after adjustment for socio-economic position and particularly after adjustment for differences in employment status. However after stratifying by employment status, a positive relationship between time spent caring and poor health was observed for the employed and unemployed, but not for the economically

inactive. **Conclusion.** Despite contrasting welfare systems**,** employment status plays an important role in the association between caring and health in both countries. For the economically active, providing more care increases the risk of poor health. Whilst formal employment may be good for general health, having to informally care whilst in formal employment may have a detrimental health impact.

Keywords: Caregiver, Socioeconomic factors, self reported health.

INTRODUCTION

In OECD (Organization for Economic Co-operation and Development) countries informal care provided by family members, friends, or other individuals is recognized as essential to maintaining chronically ill patients, the elderly, and people with disabilities at home(1). The burden of care for informal caregivers, however, is not without consequences. Studies have shown that, compared to non-caregivers, caregivers are more likely to report poor subjective health(2) and display depressive symptoms(3), to adopt riskier health behaviours(4), to have poorer immune responses to influenza vaccines(5), and even to have a higher risk of mortality(6). Furthermore, previous research indicates a dose-response relationship between caring and health, with more weekly hours of caring being associated with increased risk of poor health(7). Most of these studies have addressed specific groups, such as elderly women caregivers. Moreover, among middle-aged adults, who are most often the providers of care(8), the results are less consistent, with some studies showing no differences in health outcomes between caregivers and non-caregivers(9) and others suggesting that caregiving activities have a negative(10;11) or even a positive effect on health(12). This lack of consistency could be due to the complexity of the relationship between work, multiple family commitments, and health(13;14). Indeed, because caring might interfere with employment, caregivers might be at risk of social exclusion or impoverishment(13). As a consequence, health inequalities between caregivers and non-

caregivers, might arise because being a carer leads to low socioeconomic position (SEP) and thus to poor general health(15).

In this study we use data from the 2001 Belgian and British censuses that included questions about health and caregiving activities. This provides an opportunity to analyze how different welfare state policies might influence the association of caregiving with health. Indeed, how welfare (income and services) is provided ,either by the state, the market or the family, influences the extent into which individuals assume caring responsibilities(16-20). For the health of carers of working age, the welfare regime type may reflect the degree to which the caring burden of the family / household is lessened by state provision and the degree to which it is financial feasible to informally care and maintain a healthy income independent of the formal labor market.

Belgium has been classified as a corporatist welfare state, initially supporting the male breadwinner role and relying on the family for the provision of care(21;22). Yet, Belgium has generous levels of publicly provided (or financed) care services, fees are income related and organization depends largely on the French and Flemish communities(23-25). Britain is classified as a liberal regime, where there is a market emphasis with the state prioritizing care in the community, providing only minimum benefits that are often targeted and means tested(16;21). Nevertheless, Britain was a pioneer in developing a specific model for care services based on market provision which is mostly arranged by local authorities(16;18;26).

How the health of carers may vary in these two regime types is not clear, given for different ideological preferences, they rely heavily on the family for the provision of care. This research aims to inform the evidence base. Therefore, in this chapter we give a detail description of the health of adults aged 25 to 59 years according to their caregiving status and to explore caregiver' health status in the two countries.

METHODS

The data for this study came from the 2001 censuses in Britain (England, Scotland, and Wales) and Belgium. The census was carried out by a field force and postal returns in Britain and by the postal service in Belgium. The participation rates were 94% in Britain and 97% in Belgium. In Britain post-census imputation was used with the aim of achieving total population coverage. The datasets used in this study are a 5% sample of the British census (Sample of Anonymised Records)(27) and the whole Belgium census. . For the first time in both countries, the census provides information about who provides care and the time spent caring. Information on the British census questionnaire can be found at http://www.statistics.gov.uk/census2001/censusform.asp and an English version of the Belgian questionnaire can be found at http://www.sesa.ucl.ac.be/questionnaires. The analysis was restricted to residents of private households aged 25 to 59 (n= 1,361,222 in Britain and n=4,368,637 in Belgium).

Definition of variables

Outcome variable. Both censuses included a measure of global self-rated health. The British census included a three-item question ("good", "fairly good". and "not good") and the Belgian census a five-item question ("very good", "good", "average", "bad", and "very bad"). Respondents who reported "not good health" in Britain and "bad" or "very bad" health in Belgium were regarded as having poor health. In analysis we compared, using a binary variable, those in poor health to everyone else.

Independent variables. In both censuses, it was clearly stated that answers on informal care should only include activities not related to paid employment and related to other individuals' health problems (excluding activities such as childcare). People who reported providing more than 20 hours of care in Britain and those providing "over 2 hours but less than 4 hours per day" and "more than 4 hours per day" in Belgium were regarded as heavy caregivers (see the appendix). A series of questions was asked in both censuses to determine a person's economic activity status, housing tenure and education(28). People were categorized as being employed, unemployed (out of work but seeking employment) or economically inactive (out of work but not seeking a job, because of retirement, sickness or looking after the family). A person's housing tenure was categorized as owner-occupied, privately rented, or socially rented(29). For education we used a modified version of the ISCED

classification for both countries. Finally, age was categorized 25 to 29, 30 to 39, 40 to 49, and 50 to 59 for both countries. These were the smallest age ranges available in the British SARs 5% sample.

To meet the two aims of the analysis we fitted a series of models using logistic regression. Separate analyses were carried out for men and women because of their different employment, caregiving, and family commitment patterns(30;31). To assess the magnitude of the association between caregiving status and poor health, we controlled for age and the various measures of socio-economic status one by one. The goal of this modeling strategy was to understand the extent to which SEP confounds the association between caregiving and poor health. We proceeded to explore whether any association between caring and health varied by employment status, modeling the interaction between employment and caring status. Having found evidence of significant interaction between caregiving and employment, we finally stratified the analysis by employment status.

RESULTS

Descriptive statistics. In 2001 approximately 9% and 14% of all individuals in Belgium and Britain respectively provided informal care. Among these, adults aged 25 to 59 years accounted for 61.8% and 66.4% of all caregivers in Belgium and Britain respectively. Among men aged 25 to 59 years, 7.5% in Belgium and 11.3% in Britain were informal caregivers. Among women aged 25 to 59 years,

the prevalence of caregiving was 11.7% in Belgium and 16.3% in Britain. Caring for less than 20 hours was more frequent (men 8.4% and 6.5% and women 11.3% and 9.8% in Britain and Belgium respectively) than caring for 20 or more hours (men 2.9% and 1.0% and women 5.0% and 2.9%). Generally, caregivers were more likely to be older than non-caregivers (Table 1a and 1b). Those doing less than 20 hours per week of caring were similar to non-caregivers regarding their housing tenure, employment status, and education. In comparison with both of these groups, however, those caring for more than 20 hours were more likely to be out of work, to be tenants, and to have a lower education level. Among those caring 20 or more hours, 29.9% of British carers lived in social housing compared with only 9.4% in Belgium. Yet, the percentage of unemployed heavy carers in Britain (men 5.6% and women 2.1%) was much lower in Belgium (men 11 % and women 10.7%).

Prevalence of poor health was lower in Belgium than in Britain, in all caregiving status groups (Table 2). In both countries, those providing 20 or more hours of care had the highest levels of poor general health. The prevalence of poor health among caregivers providing 20 or more hours of care was higher among Belgian and British men (12.5% and 17.2% respectively) than among Belgian and British women (7.9% and 14.8% respectively).

Table 1a: Socio-demographic characteristics of British women and men in the 2001 census by hours of caring per week: percentages and numbers

	Women			Men		
	Non- carer	*Under 20 hours*	*20 or more hours*	*Non- carer*	*Under 20 hours*	*20 or more hours*
N	578,731	77,908	34,759	594,085	56,113	19,626
Age, %						
25 to 29	15.1	6.2	6.4	14.4	5.9	5.8
30 to 39	34.3	21.6	25.7	33.4	20.3	23.4
40 to 49	27	33.1	30.2	27.6	31.9	31.2
50 to 59	23.6	39.1	37.7	24.6	41.9	39.6
Tenure, %						
Owner occupied	73.1	82	62.2	74.8	83.6	62.2
Private rented	10.8	5.9	7.9	11.5	6.3	8.3
Social rented	16.1	12.2	29.9	13.7	10.1	29.5
Economic activity, %						
Employed	70.6	74.1	42.1	84	85.4	56.9
Unemployed	2.8	2.5	2.1	4.6	4.1	5.6
Economically inactive	26.6	23.4	55.8	11.4	10.5	37.5
Education, %						
Post-secondary	24.3	24.6	12.7	24.9	25.6	13.7
Upper secondary	7.5	7.6	5.2	7.5	7.9	5.6
Lower secondary	39.4	40.2	34.4	36.3	36	31.1
Less than lower secondary	28.9	27.6	47.8	31.3	30.6	49.5

Table 1b: Socio-demographic characteristics of Belgian women and men in the 2001 census by hours of caring per week: percentages and numbers

	Women			Men		
	Non- carer	*Under 20 hours*	*20 or more hours*	*Non- carer*	*Under 20 hours*	*20 or more hours*
N	1,904,021	211,567	40,989	2,046,660	142,980	22,419
Age, %						
25 to 29	14.2	6.1	5.5	13.5	7.3	5.4
30 to 39	32.9	19.7	21.5	32.1	20.9	22.3
40 to 49	30.1	35.9	32.2	30.4	34.4	32.4
50 to 59	22.8	38.4	40.9	23.9	37.5	39.9
Tenure, %						
Owner occupied	74.3	78.5	74.9	74.9	76.4	71.3
Private rented	20	15.3	15.7	20.7	18	19.2
Social rented	5.8	6.2	9.4	4.4	5.6	9.6
Economic activity, %						
Employed	66.3	58.5	37.9	84.8	78	59.4
Unemployed	8.9	8.6	10.7	5.6	7.3	11
Economically inactive	24.8	32.9	51.4	9.6	14.8	29.6
Education, %						
Post-secondary	34.1	32.1	19.1	31.4	29.9	17.5
Upper secondary	29.1	28.5	26.8	30.4	29.1	26.5
Lower secondary	22.3	25.9	30.6	24.2	26.8	31
Less than lower secondary	14.4	13.5	23.4	14	14.2	25.1

Table 2: Percentage of British and Belgian men and women of working age reporting poor health, by caring status

	Poor Health, %					
	Britain			**Belgium**		
	Non-carer	*Under 20 hours*	*20 or more hours*	*Non-carer*	*Under 20 hours*	*20 or more hours*
Women	8.6	8	14.8	4.4	4.5	7.9
Men	7.8	8.0	17.2	4.2	6.5	12.5

Association between hours spent caring and self-reported poor health. Although 20 or more hours of care were still associated with greater risk of poor health after age adjustment, fewer than 20 hours of caring were associated with poorer health amongst Belgian men only (OR = 1.3; 95% CI = 1.28, 1.34) (Table 3). In fact, less than 20 hours of caring was associated with a slightly reduced risk of poor health compared to those not caring for both men (OR = 0.83; 95% CI = 0.8, 0.86) and women (OR = 0.75; 95% CI = 0.73, 0.77) in Britain. In Belgium, however, this was only true for women (OR=0.82; 95% CI=0.8, 0.84). Additionally controlling either for tenure or for education slightly reduced the association between caring and poor health. By contrast, adjusting for employment status greatly reduced the association of caring with poor health, with the odds ratios close to one. In the fully adjusted model, caring for 20 or more hours a week for men and women in Britain was associated with a slightly reduced risk of poor health. In Belgium caring for 20 or more hours was associated with poor health only among men.

Table 3 Odds ratios for poor health by amount of weekly caring for British and Belgian women and men in the 2001 census, adjusted for age and additionally for education, employment status, and housing tenure

Britain

	Adjusted for age*		Adjusted for age and education*		Adjusted for age and housing tenure*		Adjusted for age and employment*		Adjusted for age and all socio-demographic factors	
Care status	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
Non- carer	1	1	1	1	1	1	1	1	1	1
Under 20 hours	0.75 (0.73, 0.77)	0.83 (0.80, 0.86)	0.81 (0.79, 0.83)	0.90 (0.87, 0.93)	0.82 (0.79, 0.84)	0.93 (0.90, 0.96)	0.83 (0.80, 0.85)	0.96 (0.93, 1.0)	0.89 (0.87, 0.92)	1.06 (1.02, 1.10)
20 or more hours	1.56 (1.51, 1.61)	2.06 (1.98, 2.14)	1.41 (1.36, 1.45)	1.86 (1.79, 1.93)	1.32 (1.28, 1.37)	1.64 (1.58, 1.71)	0.95 (0.92, 0.98)	0.84 (0.8, 0.88)	0.87 (0.84, 0.90)	0.77 (0.74, 0.81)

Belgium

	Adjusted for age*		Adjusted for age and education*		Adjusted for age and housing tenure*		Adjusted for age and employment*		Adjusted for age and all socio-demographic factors	
Care status	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
Non-carer	1	1	1	1	1	1	1	1	1	1
Under 20 hours	0.82 (0.80, 0.84)	1.30 (1.28, 1.34)	0.89 (0.87, 0.90)	1.37 (1.34, 1.40)	0.84 (0.82, 0.86)	1.30 (1.28, 1.33)	0.80 (0.78, 0.82)	1.20 (12, 1.23)	0.86 (0.84, 0.87)	1.24 (1.21, 1.27)
20 or more hours	1.48 (1.43, 1.54)	2.68 (2.57, 2.79)	1.34 (1.29, 1.39)	2.32 (2.32, 2.42)	1.44 (1.38, 1.45)	2.49 (2.40, 2.60)	1.05 (1.01, 1.09)	1.48 (1.4, 1.5)	1.03 (0.99,1.07)	1.42 (1.36, 1.49)

*Note: *(OR, 95% CI). OR= odds ratio, CI= Confidence Interval*

Poor health and interaction between employment and caregiving responsibilities. When the interaction between employment and caregiving was included in the fully adjusted models, the majority of interaction terms were significant ($p < 0.05$) and the model fit was improved (likelihood ratio test $p < 0.05$). Accordingly, we further stratified by employment status to explore the association between providing care and poor health; we present the results in Table 4. For the employed and the unemployed, caring was associated with poorer health compared to non-care. Amongst the economically inactive, however, providing care was generally associated with less risk of reporting poor health although this was not true for Belgium men.

Table 4 Odds ratios for poor health within strata of employment status for British and Belgian women and men in the 2001 census

		Men			Women		
Country	**Employment status**	**Non-carer**	**Under 20 hours**	**20 or more hours**	**Non-carer**	**Under 20 hours**	**20 or more hours**
Britain	Employed	1	1.40 (1.34 to 1.47)	2.06 (1.91 to 2.22)	1	1.32 (1.26 to 1.37)	1.72 (1.61 to 1.84)
	Unemployed	1	1.41 (1.23 to 1.61)	1.38 (1.14 to 1.66)	1	1.30 (1.11 to 1.53)	1.66 (1.32 to 2.08)
	Inactive	1	0.70 (0.66 to 0.74)	0.52 (0.50 to 0.55)	1	0.67 (0.64 to 0.69)	0.71 (0.68 to 0.74)
Belgium	Employed	1	1.78 (1.72 to 1.85)	2.95 (2.73 to 3.18)	1	1.31 (1.26 to 1.37)	2.07 (1.89 to 2.27)
	Unemployed	1	1.25 (1.17 to 1.33)	1.52 (1.35 to 1.70)	1	1.05 (0.99 to 1.12)	1.21 (1.08 to 1.36)
	Inactive	1	0.90 (0.87 to 0.94)	1.02 (0.97 to 1.08)	1	0.71 (0.69 to 0.73)	0.89 (0.85 to 0.93)

Note: OR= odds ratio, CI= Confidence Interval
Models control for age, housing tenure, and education

DISCUSSION

Although this study was focused on the health status of informal caring rather than the reasons for the level of informal caring, it was notable that rates of (full-time) informal caring were higher in Britain than in Belgium. This is consistent with recent changes in welfare policies, where some conservative countries (such as France and Belgium) have extended the coverage of long term policies, while in Britain policies have shifted to provide more care to those more seriously dependent individuals(17;18;26). Thus, the need to rely on the family for the provision of care is less important in Belgium than in Britain. However, because there is some evidence that care is given in proportion to sickness(32;33), higher rates of caring in Britain with respect to Belgium, might reflect not only lower provision of services(34), but also higher levels of poor health and more income-related health inequalities(35). From a gender perspective, we found that more women than men provide care in both countries. This is in line with previous findings that women are still the main providers of care(8;30;31).

In terms of the health status of informal caring this study adds to the literature, as it presents population-level information for adults of working age in two European countries on the association between caring and health. In age only adjusted models caring for 20 or more hours per week was consistently associated with poorer general health in Britain and Belgium whilst less than 20 hours was generally associated with slightly lower odds of poor health. However, our

analysis showed that there were important differences in the socio-economic and employment profile of heavy carers and light and non-carers. When controlling for these differences, particularly employment status, in the full samples of men and women, the independent association of caring with health was much reduced. These results reflect both the overall importance of employment status for self rated health, the absence of full time carers from the labor market, and the interaction between employment status, informal caring and health. Amongst the employed and the unemployed we found that, in general, there is a dose-response effect between the time spent caring and poor health. This was not the case for the inactive.

Overall, the pattern of results from the two countries in this study was broadly similar. The one important exception was that for Belgian economically inactive men there was little evidence of the protective association of caring seen amongst their British counterparts.

Previous studies have presented conflicting results when analyzing the association between work, multiple family commitments, and health for those of working age(9;10;12). A study from the West of Scotland (Glasgow and surrounding areas) found no evidence of poor health among carers and no interaction with employment status(9). It is notable however, that the population in and around Glasgow experiences some of the highest levels of poor health, and some of the highest levels of worklessness in Europe. In contrast to the West of Scotland study, a Canadian study found that caring was associated with poorer health, although it also found no evidence of an

interactive effect between employment status and caring on health(10). Our results suggest that the association between caregiving and health is highly dependent on the time spent caring, and on the individual's employment status. Amongst the employed, the negative dose-response association between the time spent caring and poor health supports the "scarcity" hypothesis that assuming multiple roles as a caregiver and a worker might have a negative impact on general health(36). Among the unemployed, providing care is also associated with greater risk of poor health. For the unemployed who provide care, poorer health has been attributed to the accumulation of the effects of poverty and of the burden of being a caregiver(37). In addition, individuals in a low SEP might face a restricted choice between regaining employment and providing care if they cannot purchase formal care services(13).On the other hand, a positive effect on health is observed among the inactive population who have a caring responsibility, compared to those not involved in caring. This is in line with the "expansion" hypothesis that caring might have positive effects relating to role gains and feelings of accomplishment(12). Yet another explanation may be related to the fact that, among the inactive, those not providing care are in worse health than those who provide it.

Our results raise important questions for policy and future research. Firstly, it is important to recognize that full time carers are much more likely to live in poor socio-economic circumstances and to be economically inactive than part time and non-carers. Both poor socio-economic circumstances and economic inactivity are associated with

poorer health, so that, for example, the economically inactive still have worse health than the employed or unemployed in this study despite the additional negative effects of caring being seen for the employed and unemployed only. One policy response may be to increase the employment levels amongst the economically inactive given the potential benefits for self reported health and poverty alleviation. However, such employment policies may place a double burden on carers and thus there may still be negative consequences for their health. Hence there is a tension between maximizing employment rates, and its possible positive benefits for health, and the need for the provision of long-term care. Nevertheless, government policies are actively trying to find solutions to support employers to fulfill their caring responsibilities. In Britain, the government is seeking to increase employment amongst carers whilst also recognizing the dual burden of working carers by legislating for carers to claim flexible working patterns and by extending support in other ways, for example by providing holidays from caring for carers(16). In Belgium, there is current debate on how to allocate budgets enabling dependent individuals to stay at home without increasing the caregivers' burden(38).

Further work is needed to understand the difference in the rates of informal caring between countries and, in particular, the impact of providing care on health. Indeed, in social democratic welfare regimes, high availability of social care might not only reduce rates of full time care, minimize gender differences in the provision of care, but also reduce the caregivers' burden (39;40).

Limitations

There are some caveats to consider, when interpreting these results. Firstly, the cross-sectional nature of these data cannot disentangle the causality between poor health, caregiving, and SEP for adults of working age. Indeed, poor health among caregivers might be due to the fact that they are self-selected from a group of individuals having low SEP and thus having a greater risk of poor health . Indeed, studies show that individuals of low SEP are more likely to assume caring responsibilities, because they have less access to formal care services and have less to gain from the formal labor market(13). In addition, individuals not working may engage in caring activities not only because they are more "available"(13) but also because they might face higher care demands: caregivers from low SEP may be more likely to care for people who are poorer and, thus, more likely to be in poorer health(15). Yet, increasing care demands from our aging societies, have a direct impact on the likelihood of becoming a caregiver in all socio-economic groups(39). Our results suggest that caring has an effect on health above and beyond SEP, given that we found a dose-response effect between caregiving and health.

Secondly, there was no information about the type of care given, that is, about those activities of daily life that determine the caring burden. Previous studies, however, have shown that the time spent caring is not only highly related to the range of difficulty of the caregiving activities but also directly affects caregivers' health(3). Moreover, the dose-response effect supports the validity of our indicator.

Thirdly, we do not have any information on the characteristics of the care-receiver. Lack of information on the care-receivers' illness does not allow us to identify caregivers who might be more at risk of poor health outcomes. Indeed, previous studies have shown that the negative health effects of providing informal care may be more pronounced among individuals looking after patients suffering from dementia or Alzheimer's disease. This very specific group of carers cannot be identified with our data.

Fourthly, differences between the questions on self-rated health in different censuses might influence cross-national comparisons. Previous work, however, has shown that different self-rated measurements consistently assess subjective health(41) and that items conform a continuum from poor to good health(42). Moreover, we used a dichotomous variable for both countries, which has been shown not to affect results in previous works(28;43).

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Chapter 5: Caring for your spouse: evil or blessing for survival?

ABSTRACT

Objectives. We examine the association between providing informal care to an elderly spouse and mortality. **Method.** Information on health status and caregiving activities was extracted from the 2001 Belgian Census and was matched with all causes of mortality over a 39-month follow-up period. The final sample consisted of 262,815 men and 256,552 women. Individuals were grouped into non-caregivers, those giving less than 20 hours of care per week (light caregivers), or those providing more than 20 hours of care (heavy caregivers). To avoid selection bias, propensity scores were used to select pairs of matched individuals and were introduced as a separate stratum in the Cox proportional hazards models. **Results.** Male caregivers had lower mortality risks than their non-caregiver counterparts. For women, no significant differences in mortality were found between caregivers and non-caregivers. **Conclusions.** Among older adults, providing informal care to a spouse is associated with lower mortality, particularly among men.

Key words: Mortality, caregiving, elderly, spouse.

INTRODUCTION

Informal care and services are often provided by relatives and friends to chronically ill patients, older adults with dependency, and people with disabilities, in order to keep them living at home (1). The burden of care for informal caregivers, however, is not without consequences. Studies have shown that, compared to non-caregivers, caregivers are more likely to report poor subjective health (2), to display depressive symptoms (2-5), to adopt riskier health behaviors(6), and to have poorer immune responses to influenza vaccines (7). Furthermore, previous research indicated a dose-response relationship between caring and health, with more weekly hours of caring being associated with increased risk of poor health (8). Indeed, researchers have drawn attention to the possibility that chronic stress resulting from caring activities may accelerate age-related disease processes and result in a decline of physical health in some caregivers (7;9). As a consequence, a higher mortality risk has been observed, particularly in spouses caring for a partner with Alzheimer's disease (10;11). An earlier study also reported that among elderly spousal caregivers, those reporting strain relating to their caring activities had a higher risk of mortality than their non-caregiver controls(12). Yet, lower mortality risk among elderly individuals was found in one recent study for individuals caring for their spouse (13) and in two studies for individuals providing care to other family members or friends (14;15). The contradictory results from these studies may not result entirely from a difference in the population sample and in the definition of caring activities, but may also result from analysis that overlooks the systematic differences between caregivers and non-

caregivers(5;16;17). As a consequence, estimates of the mortality risk effect of providing care may be biased. In this article, we examine whether providing informal care increases the risk of mortality among married individuals aged between 65 and 85 years. To perform this analysis, we based our work on two pivotal elements. Firstly, we used the complete population of married Belgian couples aged between 65 and 84 years. Secondly, we used matching based on propensity score to select appropriate controls in which the distribution of observed covariates was as similar as possible to the distribution in the caregiver group. This enabled us to avoid bias in the estimator when analyzing the association between providing care and the risk of mortality.

METHODS

Study Population

The data for this study came from the 2001 Belgian census. The census was delivered by the postal service in Belgium and the participation rate was 97%. An English-language version of the Belgian questionnaire can be found at http://www.sesa.ucl.ac.be/questionnaires. Information on all-cause mortality came from the national population register. The analysis was restricted to residents of private households aged between 65 and 85 years who at the time of the census reported being married and living with their spouses. By restricting our analysis to this specific group we were able to identify socio-economic characteristics as well as information on health for both members of the household. We included only couples where information on the caring status was

available for at least one spouse (556,592 individuals; 278,296 households). Among these households, information on caring status was unavailable for 5.9% and 8.5% of men and women respectively. The final sample consisted of 262,815 men and 256,552 women.

Outcome variables

Information on all cause mortality was matched with census data. Survival time was estimated as the number of months between the census and the end of the follow-up period (39 months) or dead

Independent Variables

Caregiving activities. The census included two questions on caregiving activities: i) Do you, at least once a week, look after or give any help, outside of your professional activities, to one or more persons having any long-term illness, health problems, or disability (e.g. reduced mobility)?; ii) If yes, is this/are these person(s): a) household member, b) family member that does not belong to the household, c) a neighbour, d) friend(s). The extent of the caring activities was measured in hours per day. Individuals' caring status was defined as: non-caregivers, light caregivers (those reporting not caring every day or less than 2 hours per day), or heavy caregivers (those reporting caring 2 or more hours per day). This cut point was chosen for two reasons. Firstly, previous studies have showed that providing 20 or more hours of care is associated with higher caregiver burden (18) and poor subjective (19). Secondly, caring for 20 hours or more per week is used to formally assess caregiver's who might be at risk (20;21). Caregivers were asked whether the care was provided to

a household member, to a relative not belonging to the household, to a neighbor, or to a friend. To ensure that the care-receiver was one of the spouses, our analysis considered: i) only elderly married couples leaving without other family members; ii) included only co-resident caregivers, thus individuals looking after a household member.

Health Status. Two questions were included in the census to assess individuals' health: one on global self-rated health and one on the presence of long-term illness. Two additional questions linked existing long term illness to being bedridden as well as to having limitations on daily activities. For both questions, individuals could answered that they were rarely, occasionally or always limited their daily activities (or bedridden). A composite score on the level of disability was calculated combining these three questions. Validity of the disability index was previously evaluated (22). More formally, the disability index is a 4 level variable. Individuals not suffering from long term illness were considered as non dependent. For individuals suffering from long-term illness, low level of dependence corresponded to being rarely limited on daily activities and rarely or occasionally bedridden. Middle level dependence was defined as being occasionally or always limited on daily activities and rarely or occasionally bedridden. Individuals with high level of dependence were always bedridden and always limited on their daily activities. The question on global self-rated health offered five levels of response ("very good", "good", "average", "bad", and "very bad"). Respondents who reported "bad" or "very bad" health were regarded as having poor health.

Socio-economic position. Households' socio-economic position (SEP) was assessed using housing tenure and education (23). A person's housing tenure (24) was categorized as owner-occupied, privately rented, or socially rented. Education level was classified into 4 categories using a modified version of the International Standard Classification of Education (25): i) as having no or primary education; ii) lower secondary, iii) higher secondary; or iv) post-secondary.

Statistical Analysis

The major focus of our analysis was to determine whether providing care to one's spouse leads to an increase in mortality, independently of individuals' socio-economic characteristics. The dependent variable in the regression model was the survival time in months and the survival status at the end of the observation period. Mortality analysis was carried out using separate Cox proportional hazards models for men and women, given their well-known differences in mortality (26;27). Prior to setting our mortality analysis, we considered whether selection bias in our analysis might arise, given the existing systematic differences between caregivers and non-caregivers. Indeed, failing to control for the selection into being a caregiver would lead to confounding in the result estimates. To deal with this problem we used propensity scores (28) to select matched paired individuals sharing similar characteristics. By doing so, the effect of the exposure on the outcome will be estimated reducing selection bias. Choice of covariates and estimation of the propensity scores was done following

two recent guidelines (29;30). Firstly, we included true confounders in the estimation of the propensity scores. Indeed, by including variables related to treatment assignment (being caregiver) as well as to the outcome (mortality) we reduce the estimation biased of the treatment effect (29). True confounders were identified by reviewing previous studies on caregiving and on mortality among the elderly. Being a caregiver has been associated with individuals' age, housing tenure, education level (5;16;17) and also to the characteristics of the spouse (6;31-35). Risk of death among the elderly, is associated to individuals' age, lower self-rated health (36) housing tenure, education level, income level (37) as well as to the characteristics of the spouse (38-41). Variables included in the propensity score were individual age, education level, housing tenure and the spouse characteristics (age, education, self-rated health, and the disability index). Sstandardised differences between control and treatment groups were used to examine the imbalances in individual covariates (29;42;43). Common support region was established using the minima and maxima criteria. More precisely, observations whose propensity score was smaller than the minimum and larger than the maximum of the other group.

Secondly, given that individuals' caring status was defined as in terms of one of three mutually exclusive groups (no care, light caregivers, and heavy caregivers), propensity scores were estimated through a series of binomial models (44;45). Two propensity scores were computed for the non-exposed group of those not providing care and against an exposed group defined as being either light caregivers or

heavy caregivers. An additional propensity score was estimated using as the non-exposed group light caregivers, with “exposed” defined as meaning heavy caregivers.

Thirdly, matching of individuals was done according to nearest neighbor without replacement. Fourthly, once the propensity score for matching was validated, resulting pairs of matched individuals were introduced as one stratum in the conditional Cox hazards model.

Fourthly, because there is a complex relation between individuals own health and their ability to provide care, we did not include the individuals’ health status in the estimation of the propensity score, Indeed, there is some evidence that healthy individuals are more likely to start caring, but at the same time, providing care is associated with poor health (46). Thus we carried out an analysis of sensibility to assess the robustness of our results. Mortality was estimated using four models. In the baseline model (Model 1), individuals’ mortality depends on their self-rated health, the disability index, and caring status. Models 2 to 4 were used to evaluate the sensitivity of our analysis by excluding health measures from the mortality model and adding them to the specification of the propensity scores (thus excluding them from the Cox hazards model). In Model 2 only the disability index and caregiving status were included. Model 3 included self-rated health and caregiving status. Finally, in model 4, both health variables were excluded from the conditional Cox hazards model and thus priory included in the propensity score model.

RESULTS

Descriptive statistics

In 2001, approximately 8.1% of women and 8.8% of men aged between 65 and 84 in Belgium provided informal care for their spouses. Those providing more that 20 hours of care per week amounted to 4.1% of women and 4.7% of men among all individuals aged between 65 and 84. Among the baseline male population, the death rate was 13.9% for non-caregivers and 13.8% for both light and heavy caregivers Table 1 shows that, when compared to male non-caregivers, light and heavy caregivers were older and reported having higher levels of disability and being in poorer health. Male heavy caregivers also had lower levels of education than non-caregivers. When considering differences among men caring for spouses, heavy caregivers reported being less dependent than light caregivers. Women receiving care from their spouses were older, more dependent, and had poorer self-rated health than those not receiving care.

In tables 1 and 2 standardized differences (SD) correspond to mean differences as the percentage of the pooled standard deviation of both groups. For dichotomous variables, SD is equal to:

(1) $$SD = 100(p_t - p_c) / \sqrt{((p_t(1-p_t) + p_c(1-p_c))/2},$$

Where pt and pc correspond to the poportion of treated and untreated individuals. SD greater than 10% were considered as meaningful.

Table 1 : Characteristics of men and their spouses by caregiving status of men

	No care	Light care	Heavy care	SD (%)+ Light care - no care	Heavy care - no care	Light care -heavy care
Characteristics of men						
N	240329	12066	10420			
Total number of deaths	33406	1665	1448			
Mortality after 39 months	13.9	13.8	13.8			
Dependency Index (%)						
No dependence	54.6	36.0	46.0	*-39,7*	*-18,8*	*20,5*
Low level	24.5	31.4	27.0	*16,3*	*7*	*-9,3*
Middle level	12.7	20.4	17.6	*20,9*	*13,8*	*-7,1*
High level	8.3	12.3	9.4	*14*	*4,6*	*-9,4*
Self-rated health (%)						
Very Good to average	86.7	80.6	82.9	*-17,3*	*-10,8*	*6,5*
Bad to very bad	13.3	19.4	17.1	*17,3*	*10,8*	*-6,5*
Age group (%)						
65-69	25.3	19.3	17.4	*-14,6*	*-19,5*	*-4,8*
70-74	36.2	32.7	30.8	*-7,1*	*-10,8*	*-3,7*
75-79	27.1	32.2	34.6	*11,1*	*15,7*	*4,6*
80-84	11.4	15.8	17.2	*12,7*	*16,4*	*3,8*
Education Level (%)						
Primary or no education	40.5	40.1	48.5	*-1*	*14,5*	*15,5*
Lower secondary	24.0	25.4	23.5	*2,3*	*-2*	*-4,3*
Higher secondary	14.5	13.5	11.8	*-3,3*	*-7,5*	*-4,2*
Superior or universitary	12.6	11.4	7.5	*-5,4*	*-18,6*	*-13,3*
Unknown	8.3	9.6	8.8	*7,8*	*5,4*	*-2,4*
House Ownership (%)						
Owner	85.3	82.4	80.2	*-8,6*	*-13,1*	*-4,4*
Other renters	9.6	10.4	10.7	*2,5*	*3,9*	*1,4*
Social renters	5.2	7.1	9.1	*7,9*	*14,5*	*6,6*
Characteristics of their wives						
Dependency Index (%)						
No dependence	57.8	6.8	2.5	*81,1*	*145,8*	*51,4*
Low level	25.0	20.3	7.8	*57,3*	*40,4*	*-16,5*
Middle level	11.2	35.4	27.9	*-11,8*	*-48,1*	*-36,3*
High level	6.0	37.5	61.9	*-124,4*	*-145,7*	*-21,7*
Self-rated health (%)						
Very Good to average	90.5	51.7	27.1	*-93*	*-166,3*	*-52,3*
Bad to very bad	9.5	48.3	72.9	*93*	*166,3*	*52,3*
Age group (%)						
65-69	40.0	28.6	23.9	*-24,2*	*-34,7*	*-10,3*
70-74	34.4	33.3	31.7	*-2,6*	*-5,7*	*-3,1*
75-79	20.1	27.9	31.3	*18,6*	*25,4*	*6,7*
80-84	5.5	10.2	13.1	*17,3*	*26,2*	*9,1*
Education Level (%)						
Primary or no education	46.0	49.9	55.6	*6,7*	*17,5*	*10,8*
Lower secondary	26.6	25.2	22.8	*-3,6*	*-10,2*	*-6,5*
Higher secondary	11.8	9.5	7.7	*-8*	*-14*	*-6,1*
Superior or universitary	6.9	5.2	3.9	*-7,7*	*-14*	*-6,4*
Unknown	8.7	10.2	10.1	*7,7*	*8,7*	*1*

For women in the baseline population, mortality was 6.2%, 5.9%, and 5.8% among non-caregivers, light caregivers, and heavy caregivers respectively. Compared to non-caregivers, women providing care were older, had a higher level of disability, and reported poorer health (Table 2). Among caregiving women, heavy caregivers reported lower levels of disability than light caregivers. Husbands receiving care were older and reported higher level of disability and poorer health than those not receiving care.

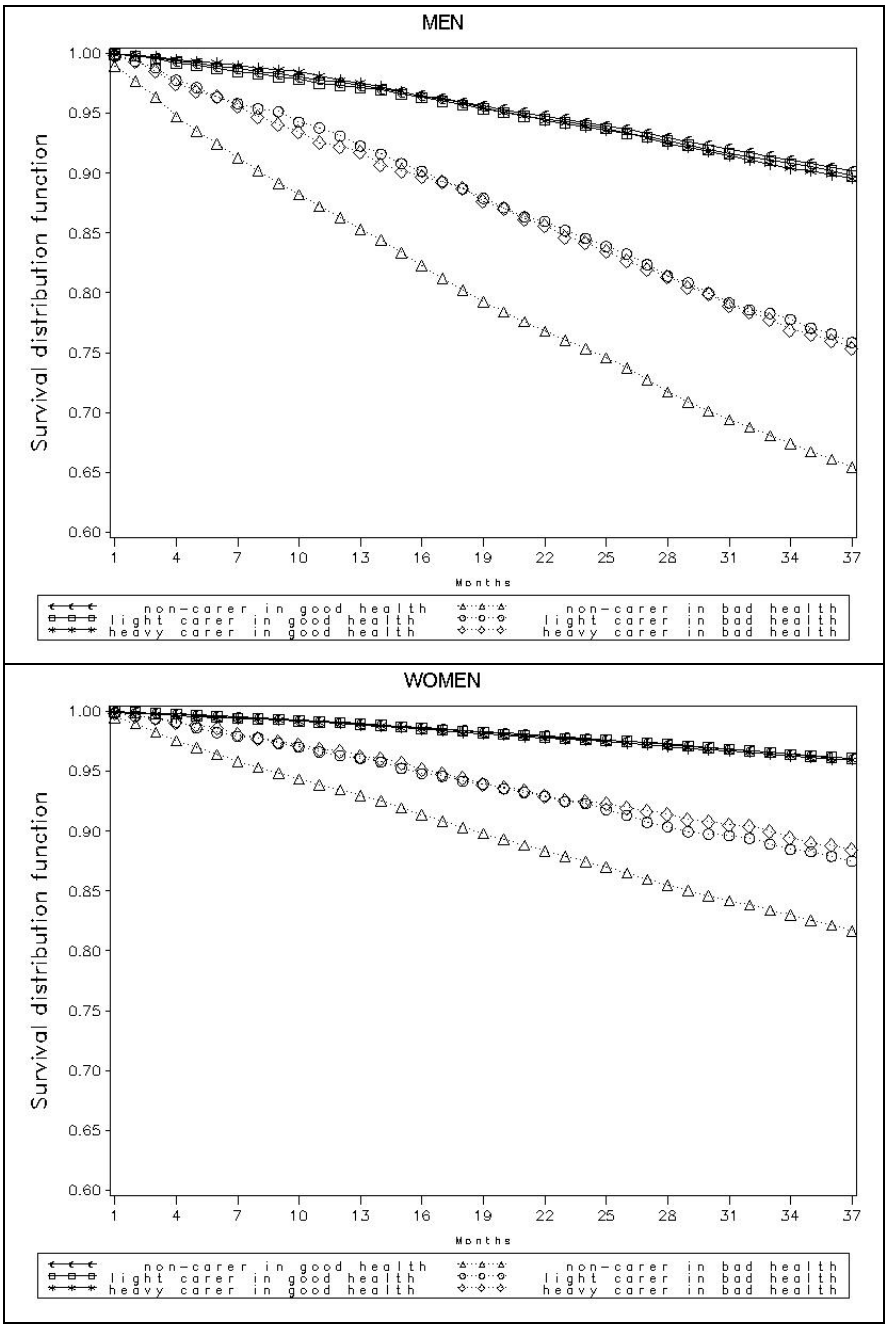
Table 2 : Characteristics of women and their spouses by caregiving status of women

	No care	Light care	Heavy care	SD (%)+ Light care - no care	Heavy care - no care	Light care - heavy care
Characteristics of women						
N	240329	12066	10420			
Total number of deaths	33406	1665	1448			
Mortality after 39 months	13.9	13.8	13.8			
Dependency Index (%)						
No dependence	54.6	36.0	46.0	*-39,7*	*-18,8*	*20,5*
Low level	24.5	31.4	27.0	*16,3*	*7*	*-9,3*
Middle level	12.7	20.4	17.6	*20,9*	*13,8*	*-7,1*
High level	8.3	12.3	9.4	*14*	*4,6*	*-9,4*
Self-rated health (%)						
Very Good to average	86.7	80.6	82.9	*-17,3*	*-10,8*	*6,5*
Bad to very bad	13.3	19.4	17.1	*17,3*	*10,8*	*-6,5*
Age group (%)						
65-69	25.3	19.3	17.4	*-14,6*	*-19,5*	*-4,8*
70-74	36.2	32.7	30.8	*-7,1*	*-10,8*	*-3,7*
75-79	27.1	32.2	34.6	*11,1*	*15,7*	*4,6*
80-84	11.4	15.8	17.2	*12,7*	*16,4*	*3,8*
Education Level (%)						
Primary or no education	40.5	40.1	48.5	*-1*	*14,5*	*15,5*
Lower secondary	24.0	25.4	23.5	*2,3*	*-2*	*-4,3*
Higher secondary	14.5	13.5	11.8	*-3,3*	*-7,5*	*-4,2*
Superior or universitary	12.6	11.4	7.5	*-5,4*	*-18,6*	*-13,3*
Unknown	8.3	9.6	8.8	*7,8*	*5,4*	*-2,4*
House Ownership (%)						
Owner	85.3	82.4	80.2	*-8,6*	*-13,1*	*-4,4*
Other renters	9.6	10.4	10.7	*2,5*	*3,9*	*1,4*
Social renters	5.2	7.1	9.1	*7,9*	*14,5*	*6,6*

	No care	Light care	Heavy care	SD (%)+ Light care - no care	Heavy care - no care	Light care - heavy care
Characteristics of women Characteristics of their husbands						
Dependency Index (%)						
No dependence	57.8	6.8	2.5	*81,1*	*145,8*	*51,4*
Low level	25.0	20.3	7.8	*57,3*	*40,4*	*-16,5*
Middle level	11.2	35.4	27.9	*-11,8*	*-48,1*	*-36,3*
High level	6.0	37.5	61.9	*-124,4*	*-145,7*	*-21,7*
Self-rated health (%)						
Very Good to average	90.5	51.7	27.1	*-93*	*-166,3*	*-52,3*
Bad to very bad	9.5	48.3	72.9	*93*	*166,3*	*52,3*
Age group (%)						
65-69	40.0	28.6	23.9	*-24,2*	*-34,7*	*-10,3*
70-74	34.4	33.3	31.7	*-2,6*	*-5,7*	*-3,1*
75-79	20.1	27.9	31.3	*18,6*	*25,4*	*6,7*
80-84	5.5	10.2	13.1	*17,3*	*26,2*	*9,1*
Education Level (%)						
Primary or no education	46.0	49.9	55.6	*6,7*	*17,5*	*10,8*
Lower secondary	26.6	25.2	22.8	*-3,6*	*-10,2*	*-6,5*
Higher secondary	11.8	9.5	7.7	*-8*	*-14*	*-6,1*
Superior or universitary	6.9	5.2	3.9	*-7,7*	*-14*	*-6,4*
Unknown	8.7	10.2	10.1	*7,7*	*8,7*	*1*

To have a better overview of differences in mortality in our population, survival curves were plotted according to individuals caregiving activities and self-rated health. As expected, survival curves of individuals in good health are systematically above of that in poor health. For men and women in good health, their survival curves did not differ according to their care activities. On the contrary, for men and women in poor health, the survival curve for caregivers (for both light caregivers and heavy caregivers) is consistently higher than the survival curve for non-caregivers. This indicates that when individuals are in poor health, caregivers have a better survival prognosis than non-caregivers.

Figure 1: Survival curves for the population of married elderly individuals according to their care activities and health status



Mortality results among matched cohorts

Table 3 presents the death rate for the matched cohorts as well as odds ratio to formally test differences in the association between caregiving and mortality according gender. Gender differences in the association in mortality and caregiving were statistically significant among the first matched cohort (OR=0.72; χ^2=121.2) and the second matched cohort (OR=0.58; χ^2=309.9) . For men, when selecting controls for heavy caregivers and light caregivers, the death rates were 18.6% and 21.2% respectively for their respective controls chosen among the non-caregiver group. For women, death rates for controls from the non-caregiver group were 7.5% and 8.6% when matching light and heavy caregivers respectively.

Table 3: Mortality among exposed and non-exposed individuals in the three matched groups

	Men			Women			Test for gender differences[1]		
	N	**Deaths**	**Mortality**	**N**	**Deaths**	**Mortality**	**Odd ratio (CI)**	χ^2	P-Value
First matched cohort[1]									
No care	12 066	2250	18.6	11171	840	7.5			
Light care	12 066	1668	13.8	11171	659	5.9	0,72 (0.61-0.86)	121. 2	p<0.001
Second matched cohort[1]									
No care	10420	2204	21.2	9131	781	8.6			
Heavy care	10420	1440	13.8	9131	533	5.8	0,58 (0.52-0.65)	309.9	P<0.001
Third matched cohort[1]									
Light care	10420	1432	13.7	9131	547	6.0			
Heavy care	10420	1440	13.8	9131	533	5.8	1	0.01	NS

Propensity scores used for matching included individuals' age, education level, and housing tenure and the spouse's characteristics (education, self-rated health, and the disability index)

[1] χ^2 adjusted by the Mantel Haenszel method

Mortality among pairs of matched individuals from the no-care and light care groups. Among men, being a light caregiver was associated with a lower risk of death of 0.82 (95% CI =0.76, 0.88, Table 4). Mortality among men was also associated with increases in the level of disability (Table 4). Men in bad health had 71% higher risk of mortality than those reporting being in good health. Mortality among women light caregivers was not statistically different from that of women non-caregivers (HR= 0.91; 95% CI =0.80, 1.02). For both women and men, severe levels of disability and of self-rated health seemed to be a strong predictor of mortality (Table 4).

Mortality among pairs of matched individuals from the no-care and heavy care groups. In comparison with male non-caregivers, providing 20 hours or more of care per week reduced the risk of death by 0.85 (95% CI =0.73, 0.92). For women, mortality was not statistically different between heavy caregivers and non-carers (HR= 1.02; 95% CI =0.89, 1.16, Table 4).

Mortality among matched pairs from the light and heavy care groups. An increase in mortality was found for both men and women heavy caregivers compared with light caregivers (for men HR= 1.09; 95% CI =1.00, 1.17; for women HR= 1.08; 95% CI =0.95, 1.23). For women, however, the results were not statistically significant.

Table 4: Effect of caregiving status and caregiver's disability index and self-rated health on mortality in men and women

	First matching		Second matching		Third matching	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
Caregiving status						
No care	1	1	1	1	-	-
Light caregiver	0.82***	0.91				
	(0.76-0.88)	(0.80-1.02)	-	-	1	1
Heavy caregiver			0.85***	1.02	1.09 *	1.08
			(0.73-0.92)	(0.89-1.16)	(1.00-1.17)	(0.95-1.23)
Disability Index						
No disability	1	1	1	1	1	1
Mild disability	1.52***	1.77***	1.52***	1.34*	1.44***	1.29*
	(1.32-1.75)	(1.39-2.25)	(1.32-1.77)	(1.04-1.74)	(1.25-1.67)	(1.01-1.65)
Moderate disability	2.08 ***	2.57 ***	1.45***	1.80***	1.65 ***	1.89***
	(1.78-2.42)	(1.97-3.35)	(1.23-1.70)	(1.35-2.40)	(1.40-1.95)	(1.44-2.48)
Severe disability	2.89***	3.79***	2.18 ***	3.41***	2.10***	2.32***
	(2.40-3.48)	(2.82-5.10)	(1.80-2.65)	(2.50-4.65)	(1.70-2.60)	(1.68-3.20)
Self-rated health						
Good health	1	1	1	1	1	1
Bad health	1.71***	2.05***	2.13***	1.89 ***	1.72 ***	1.97 ***
	(1.49-1.97)	(1.62-2.59)	(1.83-2.47)	(1.48-2.42)	(1.46-2.02)	(1.52-2.55)

****p <0.001,** p<0.01, *p<0.05

Note: Values are Hazards ratio (95% CI)

All the health variables included in Table 4 correspond to those of caregivers and their controls. For model 1, propensity scores used for matching included caregiver's age, education level and housing tenure and spouse characteristics (education, self-rated health, and the disability index)

Sensitivity analysis

Sensitivity analysis was carried out in order to test the robustness of our results (Table 5a and 5b). Compared with our baseline model for men, results were quite insensitive for different specifications of the propensity score (Table 5a). The only exception was that that in Model 4 the difference in mortality between men heavy caregivers and light caregivers was no longer statistically significant.

For women, our sensitivity analysis showed that results in the baseline model were also quite robust but some differences need to be mentioned. Firstly, women heavy caregivers had a slightly higher mortality than non-carers in the baseline model, while in subsequent models for the analysis of sensitivity mortality was higher in the former group (Table 5b). In all four models, however, the results were not statistically significant. Secondly, light caregivers had lower mortality risk; that is now statistically significant in Model 2 (HR=0.81; 95% CI=0.78, 0.97) and Model 4 (HR=0.89; 95% CI=0.78, 0.97).

Table 5a: Sensitivity analysis including different estimations of the propensity scores for men

		First matched cohort	Second matched cohort	Third matched cohort
Model 2	**Caregiving status**			
	No care	1	1	-
	Light care	0.79***	-	1
		(0.74-0.85)		
	Heavy care	-	0.85 ***	1.09*
			(0.79-0.92)	(1.01-1.19)
	Self-rated health			
	Good health	1	1	1
	Bad health	1.97***	1.95***	1.93***
		(1.72-2.26)	(1.69-2.25)	(1.69-2.25)
Model 3	**Caregiving status**			
	No care	1	1	-
	Light care	0.80 ***	-	1
		(0.75-0.7)		
	Heavy care	-	0.83***	1.10*
			(0.77-0.90)	(1.02-1.19)
	Disability Index			
	No disability	1	1	1
	Mild disability	1.46***	1.52***	1.52***
		(1.26-1.68)	(1.32-1.75)	(1.32-1.75)
	Moderate disability	1.92***	1.57***	2.06***
		(1.64-2.25)	(1.34-1.84)	(1.75-2.42)
	Severe disability	2.74***	2.28***	2.32***
		(2.28-3.28)	(1.88-2.77)	(1.93-2.79)
Model 4	**Caregiving status**			
	No care	1	1	-
	Light care	0.78***	-	1
		(0.73-0.84)		
	Heavy care	-	0.85***	1.07
			(0.78-0.92)	(0.99-1.16)

Model 2: Hazards ratio for mortality adjusted by caregiving status and self-rated health. Propensity scores used for matching included all variables in
Model 3: Hazards ratio for mortality adjusted by caregiving status and disability index. Propensity scores used for matching included all variables in Model 1 and added the caregiver's self-rated health.
Model 4: Hazards ratio for mortality adjusted by caregiving status only. Propensity scores used for matching included all variables in Model 1 and added the caregiver's self-rated health and disability index.

Table 5b: Sensitivity analysis including different estimations of the propensity scores for women

		First matched cohort	Second matched cohort	Third matched cohort
Model 2	**Caregiving status**			
	No care	1	1	-
	Light care	0.79***	-	1
		(0.74-0.85)		
	Heavy care	-	0.85 ***	1.09*
			(0.79-0.92)	(1.01-1.19)
	Self-rated health			
	Good health	1	1	1
	Bad health	1.97***	1.95***	1.93***
		(1.72-2.26)	(1.69-2.25)	(1.69-2.25)
Model 3	**Caregiving status**			
	No care	1	1	-
	Light care	0.80 ***	-	1
		(0.75-0.7)		
	Heavy care	-	0.83***	1.10*
			(0.77-0.90)	(1.02-1.19)
	Disability Index			
	No disability	1	1	1
	Mild disability	1.46***	1.52***	1.52***
		(1.26-1.68)	(1.32-1.75)	(1.32-1.75)
	Moderate	1.92***	1.57***	2.06***
	disability	(1.64-2.25)	(1.34-1.84)	(1.75-2.42)
	Severe disability	2.74***	2.28***	2.32***
		(2.28-3.28)	(1.88-2.77)	(1.93-2.79)
Model 4	**Caregiving status**			
	No care	1	1	-
	Light care	0.78***	-	1
		(0.73-0.84)		
	Heavy care	-	0.85***	1.07
			(0.78-0.92)	(0.99-1.16)

Model 2: Hazards ratio for mortality adjusted by caregiving status and self-rated health. Propensity scores used for matching included all variables in
Model 3: Hazards ratio for mortality adjusted by caregiving status and disability index. Propensity scores used for matching included all variables in Model 1 and added the caregiver's self-rated health.
Model 4: Hazards ratio for mortality adjusted by caregiving status only. Propensity scores used for matching included all variables in Model 1 and added the caregiver's self-rated health and disability index.

DISCUSSION

This large population study in older adults shows that providing informal care among spouses is associated, broadly, to a lower mortality risk. Indeed, after selecting appropriate controls, our results show that providing informal care have a reduced risk of mortality compared with non-caregivers, particularly among men. For women, no significant differences in mortality were found according to their caregiving status.

To our knowledge, this is the first study using population census data matched with all-cause mortality, and using proper selection of controls, to assess the association of informal care with mortality. Selection of controls is a key aspect of our analysis; therefore we validated our results through a comprehensive sensitivity analysis. Moreover, using propensity score for matching allows dealing with high correlation between the caregiving status and the health of the care-receiver. Indeed, when including both variables directly in the mortality estimation we might not be able to assess the importance of each independent variable in the risk of death (47). In addition to this, not controlling for concordance in health between spouses (38;41;48-51) might lead to attribute an increase risk of death to caregiving that is actually related to the care-receivers' health.

Previous studies addressing this question have either relied on small samples(12) or did not control for systematic differences between caregivers and non-caregivers (15;52). Despite the methodological

differences, important concordances and differences need to be discussed.

Firstly, our results are consistent with those of Brown et al. (13) showing that compared to non-caregivers, spouses heavily involved in caring activities had a lower risk of death. Yet, for spouses providing less hours of care, the authors did not find a statistically significant difference in mortality compared to that of non-caregivers. Secondly, we did not confirm the general observation of Schulz et al. (12) suggesting that strained elderly spousal caregivers had a higher mortality. Yet, because Shultz et al. identified individuals who are stressed because of their caregiving activities, they are able to indentify caregivers who might be more at risk. Other studies among individuals providing care to other family members or friends have also showed that, compare to non-caregivers, caregivers have a reduce risk of death (14;15). Yet, while O'Reilly et al. found an even higher reduced mortality for women providing informal care, our results show no significant differences in mortality among these groups.

.Although results from previous studies have show negative aspects of caregiving, there is a growing literature considering that individuals might also experience positive aspects from their caregiving experience. Schulz et al. (2007) point out that the stress-coping models (53) have failed to include the patient suffering and the caregiver's compassion in the process that determines the caregiver's burden (54). The authors argue that by reducing the suffering of a loved one, caregivers' psychological and physical health might be

improved. This might be particularly important when considering the health of individuals caring for their spouse. Indeed, previous studies have showed that marital history and attachment play an important role in reasons for providing care and on the caregivers' psychological well being (55). Moreover, role gains and feelings of accomplishment(56) associated with caregiving as well as feelings of compassion among spousal caregivers might not only increase the amount and quality of care but also help them overcome the stress relating to their caring activities.

Our finding that only male caregivers have a reduced risk of mortality might be explained by two factors. Firstly, women typically report greater burdens associated with caregiving activities than do men (57). Differences in the burden experienced among older women giving care have been associated with the facts that women provide more personal care, receive less support from adult children, seek less formal support, and even feel that that their caring role is more an obligation than a choice as compared with men (58). Secondly, there is some evidence that the health of the spouse plays a greater role on the health of women than that of men (41;49;50). Thus positive effect of caring among women might be outpaced by shared poor health among spouse.

Overall, the extensive debate on the consequences of providing care on the health of caregivers is far from over. Indeed, caregiving is a unique experience for each individual and is determine by aspects that

are not easily measure such as closeness and history between caregiver and care-receiver.

There are some caveats to consider when interpreting these results. Firstly, information on health status is only self-reported since our data does not include objective recording of prevalent diseases. However, self-reported measures of health are highly correlated with true health and are good predictors of mortality (59;60). Secondly, to measure the caregiver burden we use the amount of time spent caring given that no information is available on which activities of daily life are caregivers providing help for. Previous studies, however, have shown that the time spent caring is highly related to the range of difficulty of the care giving activities (8;61;62). and also directly affects caregivers' health (53;63). Thirdly, we assessed that the care-recipient is the spouse based on the household information. Moreover, lack of information on the care-receivers' illness does not allow us to identify caregivers who might be more at risk of poor health outcomes. Indeed, previous studies have shown that the negative health effects of providing informal care may be more pronounced among individuals looking after patients suffering from dementia or Alzheimer's disease (8;10;64). It can be estimated that a substantial proportion of informal care provided in couples aged over 75 is devoted to cognitively impaired subjects. Finally, our data does not allow us to identify whether changes in the caregiving status may have an additional impact on the risk of mortality. Indeed, our database does not provide information on when the caregiving activities started or whether they ended during the follow-up period. However, by using

propensity score matching, we indirectly take into account whether controls are more likely to become either light or heavy caregivers at some point, in response to the health status of their spouse.

Our results show that providing informal care is not necessarily associated with higher mortality. Caregiving engagement probably needs a good objective health status, explaining why those men giving care have a better survival. Research is needed to better understand the factors underlying the ambiguous effect of care burden on mortality. Regarding the differences in the results of this study with previous studies, it is likely that they are in part dependent on the definitions and correlates of caregiving as well as on the health profile of the recipients. Moreover, our results only provide evidence on mortality and caregiving for individuals caring for their spouse. For other caregivers, such as individuals looking after their elderly parents, the association between mortality and caring might depend on the extent into which caregiving interferes with their family and work responsibilities. Policy makers should pay attention not only to the health of the person cared for, but also the health of the person providing care. In particular, those providing heavy informal care should be prioritized since they are more at risk than those proving lighter care, particularly among older men.

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Conclusion

RESEARCH QUESTIONS AND MAIN FINDINGS

The new challenge for the welfare state is to protect individuals from traditional social risks (such as unemployment and old age pensions) and also to allow them to actively participate in the social an economic life (1). In order to do so, the welfare state needs to provide enough tools to cover for new social risks arisen when caring for children and the elderly. Indeed, caring can increase income inequalities between households and between men and women. Moreover, policies aiming at alleviating the cost of caring may have unequal effects among these socio-economic groups.

This thesis analyzed from two different perspectives inequalities relating to caring for children and for the elderly and the ill. From a childcare perspective, we considered how families from different incomes groups benefit from policies to incentive the use of formal childcare. From the perspective of the care provided to the elderly and the ill, the thesis focuses on how the health of carers was affected by their caring responsibilities. This thesis is divided in five chapters, each addressing one specific research questions. We specifically analyzed:

1. The progressivity of the tax deduction of childcare expenses in Belgium (Chapter 1).
2. The impact of demand-side policies (tax deduction) and supply-side policies (the availability of childcare services) on the use of formal childcare for families from different income groups (Chapter2).
3. The socio-economic characteristics of caregivers in Belgium.
4. The association between poor health and caregiving among working-age groups in Britain and Belgium.
5. The risk of dead among elderly individuals caring for their spouse.

Each of these research objectives correspond to an unanswered question identified in the literature review. *Firstly,* progressivity of tax relief for childcare expenses has been analyzed mostly for the US. In the US, results showed that among all the families with young dependents, tax relief for childcare is progressive. Indeed, because the tax deduction is limited with respect to the families income, fiscal benefits are granted to middle and low-income families (2;3). This thesis contributes to the debate on the progressivity of tax deductions for childcare by analyzing the case of Belgium, a country were childcare is highly regulated. Indeed opposite to the US, in Belgium, the tax deduction is not means tested (thus accessible to all income groups). However, the tax deduction is limited by a maximum daily amount.

Progressivity of tax relief for childcare was assessed using the Aronson and Lambert decomposition of the Gini Index (4). Among all families with young children, the tax relief for childcare has a regressive effect on the income distribution. This result differs from those of Altshuler and Schwartz (1996) and Gentry and Hagy (1995) who find that in the US tax relief for childcare is progressive among all the families with young dependents. Yet, when considering only families using formal childcare in Belgium, tax relief for childcare is progressive because the daily amount that can be deduct is limited by a ceiling.

Secondly, the use of formal childcare has mostly been analysed under the assumption that fees are set under a market system (5). In this case, if the demand for childcare exceeds the supply, fees will increase and low-income families will not be able to purchase childcare services (6-9). By contrast, when prices are regulated, access to childcare for families belonging to different income groups is less straightforward. This thesis provided new evidence on how, in a highly regulated market, demand-side subsidies (tax

deduction for childcare expenses) and supply-side subsidies (availability of childcare services) affect the access to childcare services for families from different income groups. Logistic regression where used to assess how use of formal childcare varies according to families socio-economic characteristics and to -public policies for childcare. The findings are in line with previous studies in that under a heavy regulated childcare system, availability of childcare places and not cost of childcare plays an important role in the use of childcare services(10-12). Moreover, availability of childcare services is has a greater effect on the use of formal childcare of low-income families. The results also point out that, tax policies targeting low-income families increased their probability of using formal childcare. However, tax relief for childcare cannot always target low-income families. In addition to this, given that they are not enough services to cover the care needs of all families, tax policies will only benefit those being able to get a childcare place. In general, results showed that families overcoming the care rationing are those with high incomes. In this context, setting tax relief for childcare will increase the already existing inequalities in the access to care services.

Thirdly, without doubt, the help of family members and friends is not only essential, but often the first source of care for elderly or chronically-ill patients. Yet, information on caregivers have been focus on specific population, and thus little was known of the caregiving experience for carers of all ages in the general population (13). The socio-economic profile of informal caregivers was analysed using data from the Belgium's Census of 2001 combined with logistic regressions. The results in this study showed that care giving is not an isolated phenomenon thus confirming that it is an important source of care for the ill and the elderly. Indeed, in Belgium, 1 out of 10 persons provided care to a family member or friend. This prevalence was found to be higher in Britain and in Canada than in Belgium (14;15).

This study provides evidence that women are still the main providers of care (16-19). However, among individuals aged more than 65 years no gender differences were found in the provision of care. Caregivers are also more likely to be out of work or inactive than non-caregivers. Moreover, those providing more than 2 hours of care per day are more likely to have a lower education level (20).

Fourthly, the literature review showed that there is no consensus on how caring affects the health of adult caregivers (20-22). Moreover, although international comparisons have tried to understand how the health of individuals varies between countries, little is know of how the welfare state might affect the health of caregivers. In this study, for both Britain and Belgium, active individuals providing informal care reported poorer health outcomes than non-caregivers This is in line with the 'scarcity' hypothesis in that assuming multiple roles as a caregiver and a worker might have a negative impact on general health (21;23). On the other hand, for the inactive our study is line with the 'expansion' hypothesis (21;24) in that caring might have positive effects relating to role gains and feelings of accomplishment.

Fifthly, previous research has presented contradictory result when considering the association between the risk of death and caring for an elderly spouse (25;26). Contradictory results from these studies may not entirely arise from a difference in the population sample and in the definition of caring activities, but also from analysis that overlooks the systematic differences between caregivers and non-caregivers. The research findings in this thesis are at odds with those of Schulz et al. (26) but are consistent with those presented by Brown et al. (25) and of O'Reilly et al. (27). Indeed, results showed that compared to non-caregivers, men providing care had a

lower mortality risk. However, no differences in mortality between caregivers and non-caregivers were found for women.

Limitations

When interpreting results, there are some caveats must be consider. Hereafter we mention those limitations and in particular how they might affect the results.

In chapters 1 and 2, we analyze how benefits of public policies for childcare are distributed among families from different income groups. However, the extent into which different childcare policies address a specific policy target *(gender equality, labor market of parents and children's well-being*), might also indirectly determine how families from different incomes benefit from demand or supply subsidies for childcare. This is particularly important when considering that public policies might incentivize parents to participate in the labor market. Indeed, childcare policies do not only incentivize the use of formal childcare but also parents (often the mother) decision to work. In other words, labor market participation and childcare choices are made simultaneously (10-12;28-30). This might affect our results on the progressivity of tax relief (chapter 1) in two ways. Firstly, if tax relief for childcare induces low-income families to work, the distribution of income might be improved and our estimate on the redistribution effect might be underestimated. Secondly, some of the regressivity of the tax relief among all households with young children might be linked to the fact that this demand-subsidy enables both parents to work, thus increasing the household income.

In chapter 2, we found that the use of formal childcare of low-income families increases with the availability of care services. However, we could

not differentiate changes in the use of formal childcare in the subsidized or non-subsidized network. Indeed, low-income families will be able to purchase childcare in subsidised facilities given that prices are fixed on an income scale. Thus, results in chapter 2 might underestimate how availability of childcare services influence use of childcare among low-income families if there is an increase in the number of subsidized childcare places. Opposite to this, if the supply of care services increases only among non-subsidized providers, low-income families unable to pay their fees will not use formal childcare. A second limitation in this study relies on the use of dummy variables to capture the effect of the tax deduction in the probability of using formal childcare. Because, dummies can capture other time fluctuations, we were unable to simulate how changes in the policy can affect the use of formal childcare. Finally, claiming the tax deduction of care expenses is used as *proxy* for enrolment in formal childcare. Thus, households not claiming the fiscal benefit (e.g. not filling the tax deduction) but might not be considered in the analysis. However, we considered the tax claim as a good proxy variable for three reason: i) a record of deductible care expenses must be provided by registered childcare providers ii) this record must be joined to the tax form even if low-income parents end up not paying taxes; iii) for those not using formal childcare services, a tax credit is granted.

In chapters 3, 4 and 5 we analyzed the socio-economic characteristics and the health status of caregivers. Opposite to previous studies, that use small samples, the results in this thesis are based on the complete population of Belgian caregivers. However, because the data comes from the 2001 census, information on health status and caregiving is self-reported. Thus we must take into account that same levels self-rated health and reported disability might correspond to different levels of "true health" (e.g. different pathologies and true level of disability). Our only measure of care is the

number of hours spent caring and we cannot clearly identify who is the care-receiver (except as done in chapter 5 by controlling for where the care is provided and restricting the analysis to household of only two persons). Nevertheless, there is a large literature providing evidence that self-reported measures of health are a good proxy for “true health” (31-35) and even are a good predictor of mortality (36-38).

A second limitation relies on the fact that we use cross-sectional data. The results presented in chapter 3 and 4 do not allow to disentangle the causality between poor health, caregiving and employment for adults of working age. Indeed, we cannot control for the health of individuals before taking caring activities. Thus this means that the health of those that end being a caregiver might be lower than that of those who do not provide care because they are selected from a group in poor health. Indeed, persons in low socio-economic position (SEP) are more likely to face high care demands and thus become full time carers. In this case, caregivers also belong to low SEP and as a consequence they are also more likely to be in poor health.

Finally, our results in chapter 5 are only applicable to spousal caregivers. Indeed previous work suggests that caring for a spouse is different in terms of the care provided and on its consequences on health. Moreover, the lack of information on the care-receivers’ illness and on when the care activities started (and ended) does not allow us to identify caregivers who might be more at risk of poor health outcomes. Indeed, there is some evidence that caregivers who might be more at risk are those looking after patients suffering from dementia or Alzheimer's disease (39-41) and those who have been providing care for a long time.

Implications

The work on this thesis provides new evidence on the effectiveness of public policies for childcare and a more clear perspective on caregivers and their health. This might be particularly, given that recent evaluation of policies in Members States of the European Union have showed that: i) the targets for childcare provision have not been met (42); ii) Policies aiming at maintaining the elderly an the ill in the community will not be viable *unless* more support is given to caregivers (43;44).

To our knowledge, this is the first work assessing in a highly regulated market, the progressivity of tax policies for childcare and how the combination of demand and supply subsidies affect the use of childcare for families from different income groups. Because we used the complete population of families with young children (instead of a sample), we provide robust results in terms of cost of policies and distribution of benefits. In addition to this, results showed that tax relief for childcare can benefit low-income families. Indeed, allowing families to deduct 100% of their care expenses, up to a certain deductible amount (reform in 2000) reduced more the cost of childcare for low-income families than for higher income groups. Moreover, if the tax relief appropriately targets low-income families, their use of formal childcare might also increase. Opposite to this, a policy increasing the *deductible amount* (reform in 1999) could not reduce the cost of formal care while being progressive. Indeed, this reform only benefited middle and high income families. The results in this chapter provide new evidence on how to limit the tax deduction in order to make this policy progressive. Indeed, in most countries (such as the US, Great Britain and Australia), in order to limit the fiscal benefit received by wealthier families, the deductible amount decreases with respect to families' income. In the case of Belgium, by setting a limit on daily deductible amount, the fiscal benefit

received by wealthier families is restricted. Yet, this is possible because prices at childcare providers are fixed according to an income scale.

The results also showed that, rationing in the number of childcare places might affect more low-income families than higher families. Thus, setting demand-subsidies (like tax deduction) will benefit wealthier families because they are the one's able to find a childcare place. In other words, increasing the tax relief can enhance the already existing inequalities in the access to formal childcare. Yet, when combined with strong supply-side policies, demand side policies are more likely to be redistributive.

A main strength of the work on informal care, relies on the fact that results are based on a complete population. Our results provide evidence that not only middle-age women and elderly individuals are involved in caregiving activities. For instance, we showed that more than 6% of all "full-time carers" in Belgium are aged less than 24 years old. In order to further generalize our findings, this thesis includes an international comparison on caregivers' activities and their health between Belgium and Britain. Despite differences in the prevalence of carers between Belgium and Britain, large care responsibilities were associated with poor health in both countries. The results point out that the opportunity cost of providing care might need to be measured not only in terms of income loss but also in terms of health. Yet, appropriately targeting poor health among caregivers is not straight forward. Indeed, the stress-coping model (45), shows that caregivers' stress is a complex process that depends on different stressors as well on different mediator factors. Stressors are divided into primary stressors (factors relating directly to the care recipient's health status and needs) and secondary stressors (conflicts arisen between caregiving activities and other aspects of the caregiver's life). For adults of working age, secondary stressors seam to

play a determinant role when considering their poor health. Indeed, role conflicts arisen when working and caring can lead to high levels of fatigue and thus to poor health (e.g. depressive symptoms) (46). Moreover, individuals providing care might be forced to reduce their work time or even exist the labor market (47). For these individuals, income loss relating to their caring activities might also lead to health decline. For policy-makers, it is important to consider that in order to improve the caregivers' health, they might not only need to reduce their care load but also be able to maintain or regain employment. For instance, for caregivers who have been away from the labor market for a long time, this implies regaining skills that will allow them to regain employment. Yet, caregivers must be able to free themselves from their caring responsibilities to actively seek employment, thus respite care policies must also put into place.

The health of caregivers was also analyzed under a different perspective. For elderly individuals, we considered whether looking after their spouses is an independent risk factor of mortality. This study differs from previous works in three aspects: i) we used a complete population; ii) we controlled for systematic differences between caregivers and non-caregivers, iii) we formally assessed if this relations varies according to gender. An interestingly "health paradox" was found in our analysis. Indeed, while men caring for their spouse reported poorer health outcomes (higher levels of disability and being in poorer health), they also had a reduce risk of death compared to non-caregivers. They are two different hypotheses to explain why caregivers in poorer health still have a lower risk of dead. First of all, we cannot rule out that even after selecting controls among non-caregivers, information on self-rated health and reported disability represents different levels of "true health" for caregivers and non-caregivers. Indeed, it is reasonable to believe that caregivers reporting a high level of disability must be still healthy enough to look after their sick spouse. On the other hand,

although results from previous studies have show negative aspects of caregiving, there is a growing literature considering that individuals might also experience positive aspects from their caregiving experience. Schulz et al. (2007) points out that the stress-coping models (45) have failed to include the patient suffering and the caregiver's compassion in the process that determines the caregiver's burden (48). The authors argue that by reducing the suffering of a loved one, caregivers' psychological and physical health might be improved. This might be particularly important when considering the health of individuals caring for their spouse. Indeed, previous studies have showed that marital history and attachment play an important role in reasons for providing care and on the caregivers' psychological well being (49) . Thus, feelings of compassion among spousal caregivers might not only increase the amount and quality of care but also help them overcome the stress relating to their caring activities and even reduce their risk of death.

The results also add new evidence on the gender differences in the care giving experience. Indeed, compared to their non-caregiver counterparts, only men caregivers (and not women caregivers) have a reduced risk of mortality compared to non-caregivers. This might be associated to differences in the care giving burden between men and women. Indeed, higher care burden experienced among older women giving care have been associated with women providing more personal care, receiving less support from adult children and seeking less formal support. Moreover, there is some evidence that the health of the spouse plays a greater role on the health of women than that of men (50-52). Thus, positive aspect of care giving might be less pronounced among women because they are more affected by the poor health of their spouse.

Overall, the extensive debate on the consequences of providing care on the health of caregivers is far from over. Indeed, caregiving is a unique

experience for each individual and is determine by aspects that are not easily measure such as closeness and history between caregiver and care-receiver. However, it is important to recognize that caring is related to inequalities in terms of health and even employment. Indeed, our results showed that full time carers are much more likely to live in poor socio-economic circumstances and to be economically inactive than part time and non-carers. Moreover, caregiving is still is a women's affair. As a consequence, they might be more exposed to poor health outcomes and even to be further excluded from the labor market.

Future Research

Care for children and the elderly is a main issue in the policy agenda of member states of the European Union. Indeed, higher care needs are related to the population not only getting older, but also to an important increase in the oldest-old age group. A recent report for Belgium, shows that as soon as 2011, the age dependency ratio (number of individuals aged 65+ divided by those aged less than 14) will drastically increase (Bureau federal du Plan, 2009). As a consequence, fewer individuals will be responsible for higher costs in terms of pensions and health care. Thus, it is likely that future cost containment policies in the health care sector, will imply that individuals might need to rely more on the care provided by family members.

In terms of services, both the childcare and eldercare sector might face similar challenges in the years to come. Firstly, there is a growing awareness that individuals are seeking to have more choices when selecting care services. In this context, demand side subsidies are best suited to allow users to choose their preferred care alternative. However, for childcare and eldercare services, often they are little alternatives to choose from. Thus, more research is needed to understand, how lack of formal services determines the choices made by individuals looking for formal care services

A second issue that needs to be considered is that provision of care services needs to be assessed in terms of both quantity and quality. Moreover, the type of policy instrument (demand side or supply side) implemented to cover individuals care needs is not neutral in terms of quality of services. Indeed, cash transfers (demand-side policies) might be effective in reducing the cost of care, but do not necessarily improve the quality of the care purchased. On the other hand, subsidizing providers (supply-side policies) is more likely to ensure higher quality of services. Yet, little is known on how combining supply and demand subsidies can ensure to have access to high quality care. Moreover, research is needed to understand if setting demand-side policies to cover the cost of formal care services can incentive the creation of new services.

It is essential to fully understand the causality between poor health, socio-economic position and employment. Indeed, studies have showed that for adult caregivers, maintaining employment is important not only to avoid income loss but also because it allows then to better manage their care load. In this sense, labor market policies granting more time flexibility and thus helping them to maintain employment can play a key role in improving (or maintaining) their health. It is also important to evaluate how health decline relating to care activities can translate into permanent income loss. Moreover, given the gender gradient existing in care giving women are more likely to cumulate social risks.

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