HEALTH CARE
AND FEMALE EMPLOYMENT
A POTENTIAL CONFLICT?

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ABSTRACT

This paper presents a discussion of some general conceptual and empirical issues of increasing importance for the analysis of the consequences of ageing: the potential trade-off between ensuring informal health care for the elderly and at the same time achieving an increase in the employment participation ratio for women. It first provides an overview of some general issues in health economics and then turns to some theoretical and empirical investigations of these issues.

The future of health care for the elderly is, as demonstrated above, a most important aspect of the prospects for health care in general. The policy issues, however, do not present themselves in the same manner for all member states. In fact, the forward path of old-age care will be greatly determined by the starting position with respect to the level of formal and informal care, the present state of affairs as far as female labour market participation is concerned and the existing patterns of financing of old-age care.

Contents

Executive Summary

Jørgen Mortensen

I t is almost trivial to stress, once again, that the prospective ageing of the EU's population poses encompassing threats to society and to policy-making. The future sustainability of pension schemes is in danger everywhere and the issues have been extensively examined from the angles of both economic analysis and scenarios for reform.

Although the sustainability and adequacy of pension schemes is a major concern for policy-making, the scenarios for reform are 'technically' relatively simple, depending upon the key demographic parameters, the likely evolution of the economic dependency ratio and – a feature frequently left out of consideration – the uncertainties surrounding the demographic projections.

This paper presents a discussion of some general conceptual and empirical issues of increasing importance for the analysis of the consequences of ageing: a potential trade-off between ensuring informal health care for the elderly and at the same time achieving an increase in the employment participation ratio for women. It first provides an overview of some general issues in health economics and then turns to some theoretical and empirical investigations of these issues.

Long-term projections of health expenditure must take into account not only the demographic projections and risks but must also formulate views or scenarios for the future evolution of health in general and in particular the health of the elderly. Furthermore, the future of public health expenditure will to a considerable extent be influenced by the prospective shift from informal to formal health care and from privately financed to publicly-financed, institutionalised care. In addition, the future of health care will be importantly influenced by technological development, as far as the capacity for diagnosis and medication are concerned. Finally, the development of health care will also, to a greater or lesser degree, be influenced by the evolution of the general perception of and policy attitudes towards health and illness.

The future of health care for the elderly is, as demonstrated above, a most important aspect of the prospects for health care in general. The policy issues, however, do not present themselves in the same manner for all member states. In fact, the forward path of old-age care will be greatly determined by the starting position with respect to the level of formal and informal care, the present state of affairs as far as female labour market participation is concerned and the existing patterns of financing of old-age care.

A study by **C. Katharina Spiess and Ulrike Schneider** in chapter 2 examines eldercare in private households and the employment behaviour of female caregivers in Europe. Based on the first three waves of the European Community Household Panel they estimate probit-models to analyse the probability of care-giving and use a simplified difference-in-difference approach to explain the correlation between changes in care-giving behaviour and changes in working hours. They restrict the sample to middle-aged women in 12 EU countries. In order to control for country-specific effects they include country dummies in the models. In addition, they run separate estimations for northern European countries and southern European countries. They find a significant negative association between starting or increasing informal care-giving and the change in weekly working hours. No such association emerges for women terminating a care-giving spell or reducing care hours.

Against the backdrop of an ageing population and the associated increases in the number of elderly in need of care, **Torsten Schneider** suggests in chapter 3 that there is a genuine risk that the ageing of society will occur at the expense of women. A number of labour market studies have shown that career breaks are much worse for income and occupational careers later on than part-time work (e.g. Blossfeld & Hakim, 1997). Care-giving women who withdraw from the labour force normally experience depreciation in their human capital (Mincer & Ofek, 1982) and if they are older it can result in a final exit. From the perspective of employers, the increased risk of women interrupting their

employment to provide care for elderly relatives could mean that they do not hire or promote women as is predicted in the Theory of Statistical Discrimination (Schwab, 1986; Phelps, 1972). Consequently, it could mean that the ageing population represents a new labour-market risk for women. This risk, however, runs counter to the process of continually increasing the labour-force participation of women.

Nevertheless, it is not clear if daughters(-in-law) will be caregivers to the same extent in the future. Women's decisions will depend on different factors. The prices for care services are likely to be particularly important. If these costs are low, then a lot of women could do a cost-benefit analysis and make the decision to use professional caregivers. Care allowances will also have a great impact. Even if the intention behind nursing-care insurance is to encourage family care it is easier to pay for a nursing home if the care allowance is high.

The analyses in this contribution are restricted to women who are living with the persons in need of care. Further investigations are necessary with regard to older persons who have children living somewhere else. It is very important to find out who has a higher probability of receiving care in an institution and who is more likely to move into the household of his/her children if they are in need of care. Or from another perspective, which households provide care for their parents and which do not? And further, how does the employment of daughters(-in-law) influence this process?

The potential conflict between the need for ensuring appropriate health care for the elderly and the need for increasing the labour market participation of women is particularly acute in countries where at present a large number of women provide informal family care for elderly relatives. The contribution by **Joan Costa-Font and Concepcio Patxot** in chapter 4 shows that the demand for long-term care (LTC) in Spain is expected to significantly increase owing to social change as well as current demographic patterns. To examine the likely impact of this effect on social expenditure in Spain they have developed a macro-simulation model, which highlights sensitive changes in the population structure and utilisation of LTC.

Overall the results highlight the need of reforming the provision but especially the financing of LTC in Spain. Two possible policy options arise, depending on the definition of the responsibility for long-term care. First, there is the definition of a publicly funded entitlement to LTC financed though general taxation of social insurance contributions. Alternatively, if the responsibility for long-term care funding is considered to be an individual responsibility, then a private LTC insurance market joined with a housing-related instrument and a more developed means-test system would have to be implemented**.**

CHAPTER 1
HEALTH CARE AND FEMALE LABOUR MARKET PARTICIPATION: IS THERE A CONFLICT?
JØRGEN MORTENSEN[*]

1. Ageing of the population and the labour force

During the coming decades the EU and, indeed, large parts of the world, will be confronted with *unprecedented demographic changes*, generally characterised as 'ageing of the population'. In reality, ageing is the combined outcome of two distinct phenomena: firstly the secular *decline in mortality* and the resulting increase in life expectancy and secondly the pronounced *decline in fertility* since 1970 in most EU countries, which followed the baby-boom in the first post-war decade.

The decline in fertility during recent decades is now being reflected in a significant decline in the number of entries into the labour market, while the baby-boom generations are approaching retirement age. Consequently the ageing of the population will first and foremost be reflected in a pronounced *ageing of the European labour force*. According to the baseline projections prepared by Eurostat (1999 version), the total population in the EU (EU-15) can be expected to rise from about 376 million in 2000 to 386 million in 2020 but will thereafter decline to 364 million in 2050. The 2050 level is thus expected to be some 3% below that of 2000. Within this overall total there will, however, be huge changes in the number of persons in the different cohorts.

1.1 Increase in the demographic dependency ratio

The number of persons in the age groups of up to 54 years old is expected to decline significantly. A particularly strong decline is anticipated for the highly active age groups of 30 to 39 years, with the number of persons aged 30 to 34 expected to fall by 31.5% and the number of persons in the age group of 35 to 39 expected to drop by 29.7% between 2000 and 2050. For age groups in the range of up to 54 years old the declines are less pronounced but still considerably higher than the overall average for the population. This decline in the most active age groups is already taking place and will continue to 2050.

Furthermore, the combined effect of the rise in life expectancy and the decline in the number of persons in the active age groups will result in a *huge increase in the demographic dependency ratio* (the number of persons in the age groups above the conventional threshold of 65 years in proportion to the number of persons in the active age groups (of say 15 to 64 years). Although the 'economic dependency ratio' (the ratio of inactive persons to the number of employed persons) may not necessarily rise in parallel with the demographic dependency ratio, there is no doubt that a major challenge for European society and for the European economy is now building up.

1.2 Fall in the share of the life cycle devoted to work

The ageing of the European population, furthermore, takes place in a context of the emergence of the 'knowledge society' in which the allocation of total lifetime between education, work, leisure and retirement has been profoundly modified. In fact, on one side, the duration of education (investment in human capital) has considerably increased. On the other side, the duration of retirement has risen as a result of a lowering of the average retirement age in a context of an increase in life expectancy. Consequently*, the proportion of the life cycle allocated to gainful work has fallen dramatically over the last hundred years*.

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1.3 Political concerns

A number of studies of the consequences of ageing, notably of the consequences for the financing of pensions, were thus launched during the course of the 1980s. International organisations took steps to increase public awareness of the emerging challenges early on. In 1982, the UN in Vienna, and later the OECD in 1988 and again in an OECD report published in 1998, stressed that ageing presented the OECD countries with a "complex and formidable set of interrelated challenges" (see OECD, 1998). The World Bank (1994) prepared a major report on *Averting the Old Age Crisis*.

1.4 The approach of the European Commission

Over the last two decades the EU institutions have been increasingly concerned with these issues. A comprehensive analysis of the economic consequences of population ageing was published in 1999 in a Commission Economic Paper (European Commission, 1999). Furthermore, a working group on the consequences of ageing under the Economic Policy Committee has produced two important studies, one in 2000 on the impact of ageing on public pension systems (European Commission, 2000) and one in 2002 on the reform challenges facing public pension systems (European Commission, 2002).

1.5 Some features of the demographic projections

As a matter of general information, it should be noted that the basic Eurostat projections date from 1995 but were revised in 1999. The data can now easily be made available for research on various aspects of the ageing process. *National* demographic projections (projections from the national statistical institutes) are available on Newcronos and can be downloaded following the same procedures as for the Eurostat projections. Eurostat's baseline projection assumes a moderate rise in the rate of fertility while the more optimistic scenario assumes a certain rise and the low variant assumes little or no rise during the coming decades. None of Eurostat's scenarios assume a return of fertility to above the rate of 2.1 corresponding to a constant population (see Figure 1).

Figure 1. EU average fertility, Eurostat 1995 projections
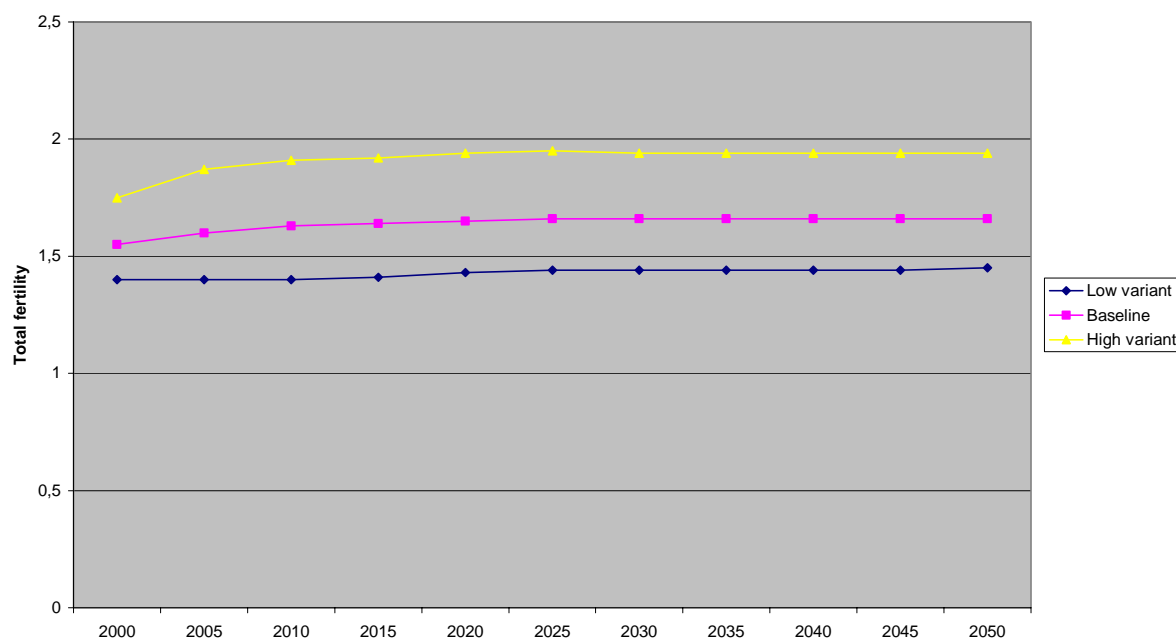
Annual net immigration is assumed to correspond initially to around 700,000 persons per year, declining to somewhat below 600,000 persons over the coming decades. Net migration is thus forecast to be equivalent to approximately 0.2% of the EU's population per annum over this period.

In the Eurostat baseline projection, life expectancy at birth is assumed to increase for men by close to five years and for women by four years over the five decades from 2000 to 2050. Nevertheless, the increase in life expectancy is projected to slow down considerably in the baseline scenario from more than one year per decade during the first two decades to practically nil during the decade from 2040 to 2050 (see Table 1).

Table 1. Life expectancy, EU-15 average, baseline projection

	2000	**2010**	**2020**	**2030**	**2040**	**2050**
Men	74.70	76.43	77.81	78.82	79.43	79.67
% Change	–	1.27	1.28	1.01	0.61	0.24
Women	81.13	82.54	83.62	84.41	84.89	85.06
% Change	–	1.41	1.08	0.79	0.48	0.17

Source: Eurostat.

As seen in Figure 2, all variants assume a levelling-off of life expectancy. Even in the high variant of life expectancy the anticipated rise takes place mainly during the next two to three decades, with little or no increase after 2030.

Figure 2. Life expectancy at birth, Eurostat projections
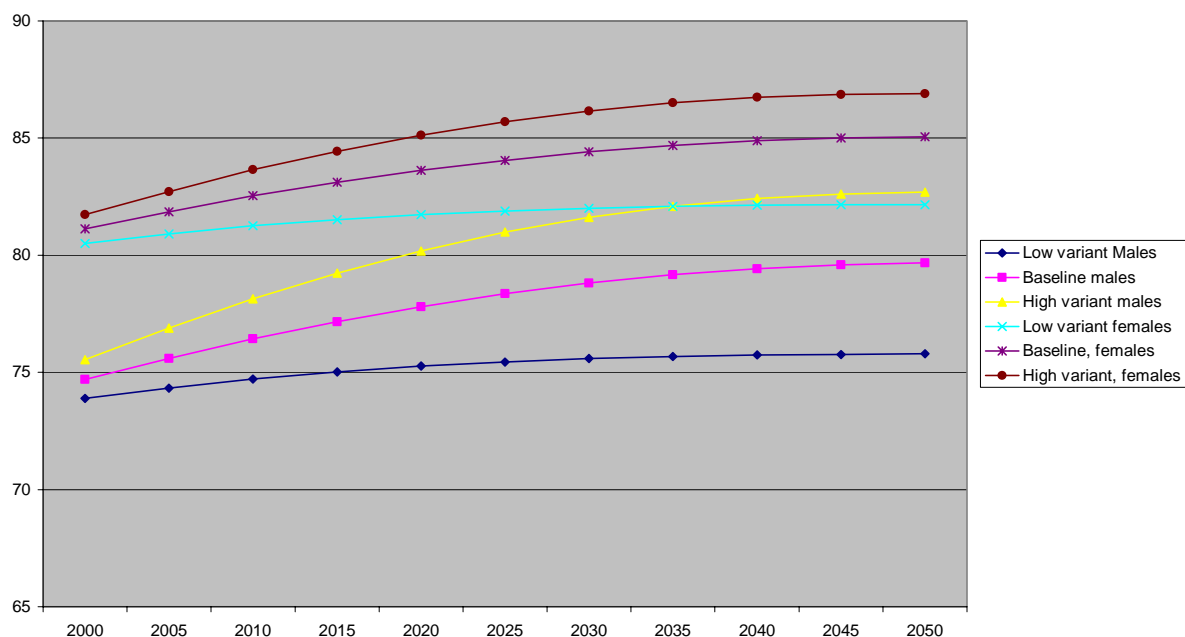
According to the baseline projections prepared by Eurostat (1999 version), the total population in the EU (EU-15) can be expected to rise from about 376 million in 2000 to 386 million in 2020 but will thereafter decline to reach 364 million in 2050. The 2050 level is thus expected to be some 3% below that of 2000. Within this overall total there will, however, be huge changes in the number of persons in the different cohorts.

As shown in Table 2, the number of persons in the age groups of up to 54 years is expected to decline significantly. A particularly strong decline is expected for the highly active age groups from 30 to 39

years, with the number of persons aged 30-34 to be down by 31.5% and the number of persons in the age group 35-39 by 29.7% between 2000 and 2050. For the other age groups in the range up to 54 years the declines are less pronounced but still considerably higher than the overall average for the population.

A close look at the figures in Table 2, however, shows additional significant changes in the structure of the population *during* the coming decades as the echo of the fluctuations in fertility in the 20th century are felt in the development of the different cohorts. Thus, during the period 2000-05 those born in the baby-boom years just after the First World War (1920-25) reach the age group 80-84, which consequently shows a large increase between 2000 and 2005. In contrast the small cohorts born during 1915-20 reach the age group of 85-89 years, which consequently is expected to show a pronounced decline between 2000 and 2005.

The post-1920 baby boom did not last long and was followed by a decline in fertility during the 1930s and 1940s. Those born in the years from 1930 to 1935 are by 2000 in the age groups of 65 to 70 and will by 2005 be in the cohort aged 70 to 74. This cohort consequently shows a very modest rise despite the overall increase in the number of elderly. On the other hand, those born during the baby boom in 1945-50 are in year 2000 found in the age group of 50 to 55, which thus shows a large increase between 2000 and 2005.

The most salient features shown in Table 2 nevertheless reflect the decline in fertility from 1970 onwards. As the cohorts born in say 1970-74 are in the age group of 25 to 29 by year 2000 and by 2005 are in the age group of 30 to 34, the latter shows a fall of almost 10% between the two end years and the same is the case for the following cohort, born in 1975-80.

Table 2. Eurostat baseline projection, total population by age groups

Time	2000	2010	2020	2030	2040	2050
EU-15						
TOTAL	100	101.9	102.6	102.2	100.4	96.9
Less than 5 years	100	95.2	91.1	88.3	84.8	81.7
5 to 9 years	100	94.5	88.9	86.4	83.2	79.9
10 to 14 years	100	93.9	89.5	85.7	83.1	80.0
15 to 19 years	100	95.6	90.4	85.2	82.9	79.9
20 to 24 years	100	95.4	89.8	85.8	82.3	79.9
25 to 29 years	100	87.9	84.2	79.9	75.5	73.7
30 to 34 years	100	82.4	78.8	74.4	71.2	68.5
35 to 39 years	100	92.2	81.4	78.1	74.2	70.3
40 to 44 years	100	111.6	92.3	88.4	83.6	80.1
45 to 49 years	100	117.6	108.8	96.2	92.5	88.0
50 to 54 years	100	109.8	122.9	101.9	97.8	92.6
55 to 59 years	100	114.9	135.9	126.2	111.9	107.7
60 to 64 years	100	111.6	123.6	139.2	116.0	111.5
65 to 69 years	100	106.3	124.0	148.2	138.5	123.3
70 to 74 years	100	109.1	124.6	140.2	159.4	133.6
75 to 79 years	100	106.8	117.4	140.8	170.9	160.8
80 to 84 years	100	154.6	177.8	212.2	244.4	280.2
85 to 89 years	100	122.9	141.5	164.0	205.2	253.7
90 years and over	100	101.1	161.6	204.1	257.4	311.2

Source: Eurostat.

Whereas the total population of the EU-15 in the baseline projection is projected to show a decline from 2030 onwards, the number of persons in the higher age groups is, as already stressed, likely to increase substantially. It may be assumed that as far as the need for health and nursing care is

concerned, the most relevant indicator is the number of persons in the age groups of 75 and older. In the baseline projection this number is projected to more than double during the coming decades, from about 27 million in 2000 to more than 59 million in 2050.

Within this age group a particularly strong increase is projected to take place for men, with an increase from some 9 to some 24 million. As far as the number of women is concerned, an increase from 17.5 to 30.5 million is projected (see Figure 3).

With an unchanged prevalence of disability and morbidity, a purely mechanical projection would thus suggest that the demand for health care for the elderly in the EU-15 as a whole could more than double over the coming decades. A key issue in this respect is whether the prevalence of disability among the elderly can be assumed to remain constant over this period. As will be shown below, the hope that the age-specific prevalence of disability would tend to decline in the long term is not confirmed by the admittedly scattered evidence available.

Another issue of importance is whether, with the projected rise in the labour market participation of women, the scope for providing informal (family-based) old-age care will be gradually reduced. This is a particularly important issue for the countries, such as notably the Mediterranean countries, where a large part of old-age care is still provided informally by families. If these countries experience a shift from informal health care to formal health care provided by specialised institutions or hospitals (or both), the publicly financed health care for the elderly could be expected to rise faster than the number of persons in these age groups.

Figure 3. Number of persons in the age groups of 75 and older (in millions)
        Eurostat baseline projection
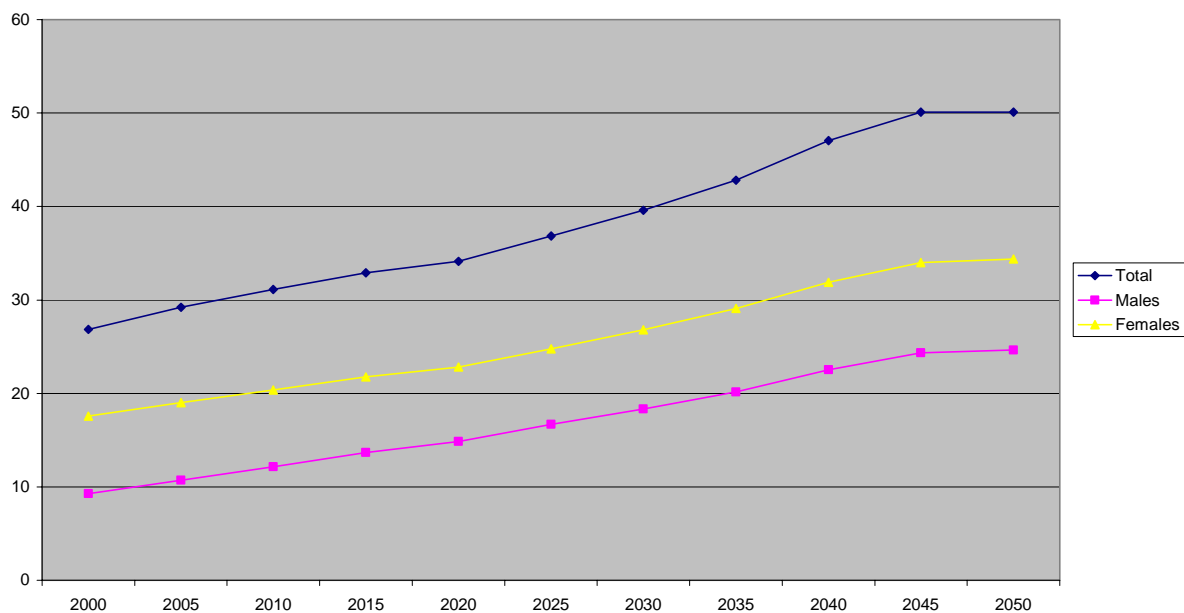
1.6 Synthetic indicators of life expectancy in good health

Owing to the lack of comparability of indicators of health and health expectancy over time it is practically impossible to provide convincing data for the long-term development of the health of the population. Yet by exploring various partial sources of qualitative and quantitative information the problem can be approached and some general conclusions attempted.

Global estimates of the life expectancy adjusted for periods of disability (disability-adjusted life expectancy or DALE) have been prepared by the World Health Organisation and were published for the first time in 1999. The indicator is synthetic in the sense that the World Health Organisation has

taken into account a number of partial indicators and pooled and weighted those to obtain one overall estimate of disability-adjusted life expectancy for the 191 member countries.

Comparing the figures for DALE with the unadjusted life expectancy (LE), one finds surprisingly little variation across a large number of countries in the difference between LE and DALE in absolute terms. In fact the DALE figures on average for men and women for 191 countries range from 74.5 for Japan to a low of 25.9 in Sierra Leone with a world average of 58.4 (57 unweighted). The corresponding LE data range between 81 for Japan and 34 in Sierra Leone with a world average of 65.9 (65 unweighted). The average difference between LE and DALE is, thus, 7.5 years (unweighted: 8 years) with a standard deviation (unweighted) of only 1.3 years. A charting of the difference between LE and DALE (a measure of the number of years lived in a state of disability) shows a very weak tendency for this difference to decline with a rise in LE: a 1-year rise in LE for the 191 countries included in the WHO calculations is accompanied by an increase in DALE corresponding to about 1.04. Consequently, applying this relationship between LE and DALE, the projected increase in LE of some 5 years on average over the next 50 years could thus be accompanied by an increase in DALE of around 5.2 years.

This finding, crude as it is, implies that the rate of morbidity of the ageing population, measured as the number of years spent in a situation of disability would not increase in line with the rise in life expectancy and may actually see a small decline. Whether this difference has actually changed over time in the past (for all countries) is, however, another matter, which will be discussed further below. Figure 4 shows the life expectancy and disability-adjusted life expectancy for 149 WHO member states with more than 1 million inhabitants. The regression line illustrates the tendency for the difference between LE and DALE to decline somewhat with the increase in LE. Yet a visual inspection seems to suggest the existence of two major groups of countries, clustered around a centre with an LE of about 45 years and an average difference between LE and DALE of about 9 years, and a second group with an average LE of a little more than 70 years and a difference of about 7.5 years between LE and DALE.

Figure 4. Life expectancy and duration of disability in 148 WHO member states
(Countries with less than 1 million inhabitants excluded)
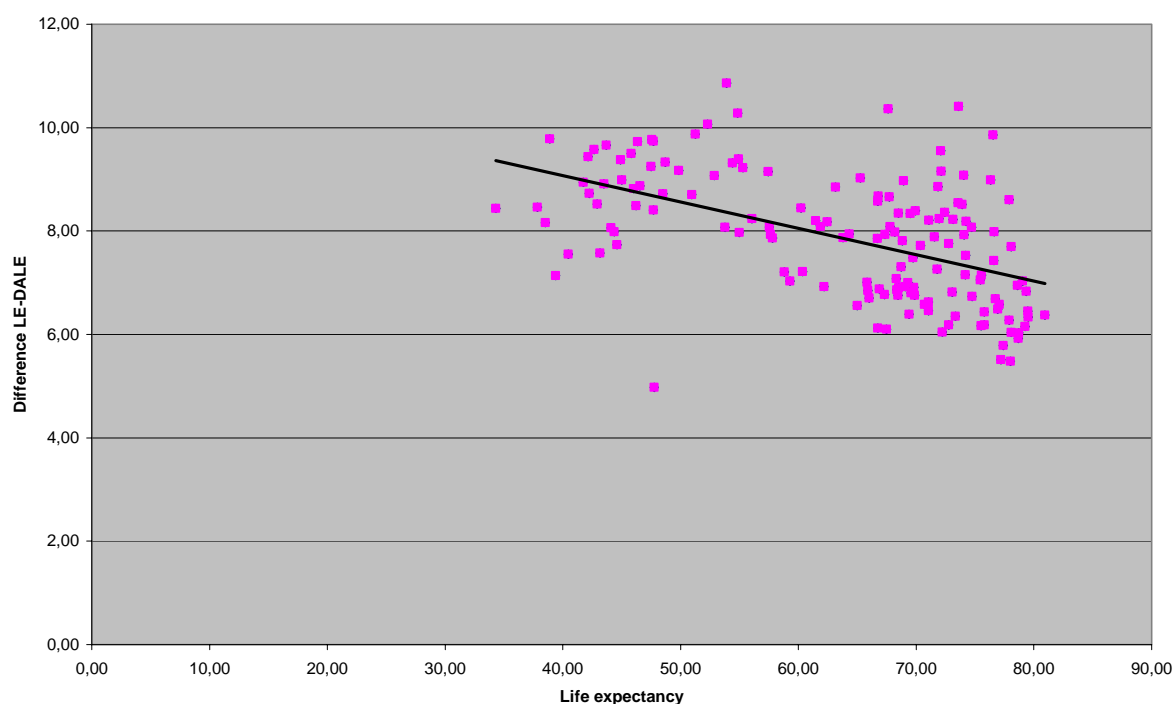
1.7 The REVES calculation of disability-free life expectancy

An alternative to the WHO synthetic indicator has been made available by the international network on research on ageing, REVES. A comparison in Table 3 between the WHO and the REVES figures shows general consistency but also some differences, which should be scrutinised with particular attention. Whereas the REVES figures downloaded from Eurostat concern 1994, the WHO data concern 1999 and may thus, in line with the general tendency towards increasing LE, incorporate a small rise both in LE and in DALE over this five-year period.

Table 3. Overall and disability-free life expectancy

	REVES, 1994			WHO, 1999		DIFF. WHO-REVES	
	LE	**DFLE**	**SDFLE**	**LE**	**DALE**	**LE**	**DALE**
Men							
EU-12	73.6	59.7	69.2	74.3	68.6	0.7	-0.6
BE	73.3	60.3	69.3	74.5	68.7	1.2	-0.6
DK	72.7	60.7	69.6	72.9	67.2	0.2	-2.4
DE	73.0	56.6	68.0	73.7	67.4	0.7	-0.6
GR	75.1	62.9	70.4	75.5	70.5	0.4	0.1
ES	74.2	61.8	70.0	75.3	69.8	1.1	-0.2
FR	73.7	60.1	66.8	74.9	69.3	1.2	2.5
IE	73.1	61.2	70.5	73.3	67.5	0.2	-3.0
IT	74.4	60.2	69.7	75.4	70.0	1.0	0.3
LU	73.1	59.1	70.0	74.5	68.0	1.4	-2.0
NL	74.5	58.9	70.1	75.0	69.6	0.5	-0.5
PT	71.6	55.0	66.0	72.0	65.9	0.4	-0.1
UK	74.0	59.0	70.5	74.7	69.7	0.7	-0.8
	REVES, 1994			WHO, 1999		DIFF. WHO-REVES	
	LE	**DFLE**	**SDFLE**	**LE**	**DALE**	**LE**	**DALE**
Women							
EU-12	79.8	61.5	74.3	80.7	74.1	0.9	-0.2
BE	80.1	61.4	74.3	81.3	74.6	1.2	0.3
DK	78.0	61.2	73.8	78.1	71.5	0.1	-2.3
DE	79.5	60.0	74.0	80.1	73.5	0.6	-0.5
GR	80.1	65.0	74.4	80.5	74.6	0.4	0.2
ES	81.4	63.5	75.4	82.1	75.7	0.7	0.3
FR	81.8	64.6	72.8	83.6	76.9	1.8	4.1
IE	78.6	63.9	75.7	78.3	71.7	-0.3	-4.0
IT	80.7	60.8	73.8	82.1	75.4	1.4	1.6
LU	79.8	61.0	76.5	81.4	74.2	1.6	-2.3
NL	80.2	58.8	74.0	81.1	74.4	0.9	0.4
PT	78.5	56.7	71.8	79.5	72.7	1.0	0.9
UK	79.3	60.8	74.7	79.7	73.7	0.4	-1.0

Notes: LE – life expectancy, DFLE – disability-free life expectancy, SDFLE – severe disability-free life expectancy, DALE – disability-adjusted life expectancy.

Sources: WHO, Eurostat.

In fact, on average for the EU-12 (the three newest member states are not included in the REVES calculations), for men LE amounts to 73.6 according to REVES and to 74.3 according to the WHO. Severe disability-free LE (SDFLE) amounts to 69.2 (which is not very different from the 68.6 calculated by the WHO). The REVES figures also include a more broadly defined disability-free LE

(DFLE), estimated at 59.7, but there is no comparable WHO figure on this measure. For women the REVES calculations arrive at 79.8 on average for the EU-12 against 80.7 according to the WHO. As far as the severe disability-free LE for women is concerned, the REVES arrives at 74.3 against 74.1 according to the WHO. Again the REVES calculations include a broadly defined disability-free LE estimated at 61.5 for women.

Whereas the differences between the calculation of the WHO and those of the REVES are modest for the EU as a whole, there are some striking differences for individual countries, which suggest that a further clarification of the methodology of the two calculations is desirable. This is the case for Denmark, where the REVES calculation arrives at a considerably higher disability-free life expectancy (DFLE) than the DALE calculated by the WHO. For France, the LE and DALE calculated by the WHO are considerably higher (notably in the case of DALE) than the corresponding figures from the REVES calculations. For other countries there are also differences needing further clarification.

1.8 Recent trends in good health and in disability

On the basis of surveys of disability undertaken in certain OECD countries, the prevalence of disability among the elderly does appear to have declined during the last decade or two. This emerges from an occasional paper produced by the OECD in 1999, examining data on disability for nine OECD countries (see Jacobzone et al., 1999).

In France the prevalence of severe disability, according to surveys undertaken by the Institut National de la Statistique et des Études (INSEE), declined a little among men in the age group of 65 to 74 and much more importantly in the age groups of 75 and older between 1981 and 1991. For women the decline was less pronounced and there was even a tiny rise for the very old between the two surveys.

The UK household surveys, undertaken since 1976, show a lowering of the prevalence of severe disability between 1980 and 1994 for both men and women in the age groups of 64 and older. The 1991 survey actually yielded figures lower than those observed for 1994 but is considered 'suspect' by the specialists and is therefore not taken into consideration for the establishment of longer-term trends.

Data for West Germany for 1986 and 1995 also show a decline in severe disability for both men and women and for all age groups of 65 and older. The decline in disability appears to be faster for the intermediate age groups, of say 65 to 75 or 80 than for the oldest age groups, as, in fact for the other countries. A similar tendency is observed in Sweden and, outside the EU, in the US and Japan. Canada emerges as the only country examined where the prevalence of severe disability for the age groups of 75 and older appears to have increased over a recent period, at least as far as men are concerned.

Nevertheless, judging from more recent indicators the longer-term improvement in the health status of the population may have slowed down or come to a halt. Thus – although the period covered is too short to allow firm conclusions – the European Community Household Panel (ECHP) survey, implemented annually from 1994 to 1999 (with the results of the 2000 survey to be published in 2003) shows little tendency towards improvement in the self-reported health status of the European population as a whole.

As seen from Figure 5, the number of men in the age group of 75 and older declaring to be in good or very good health in the EU-15 on average hardly changed between 1994 and 1998. (Data for 1999 have been disregarded for the time being owing to apparent problems of comparability for certain countries, notably the UK.)

For the age group of 65 to 74, the number of men declaring to be in good health actually showed some decline while an increase was observed for the age group of 55 to 64.

Figure 5. Self-reported health status, EU average, men (in percentages)
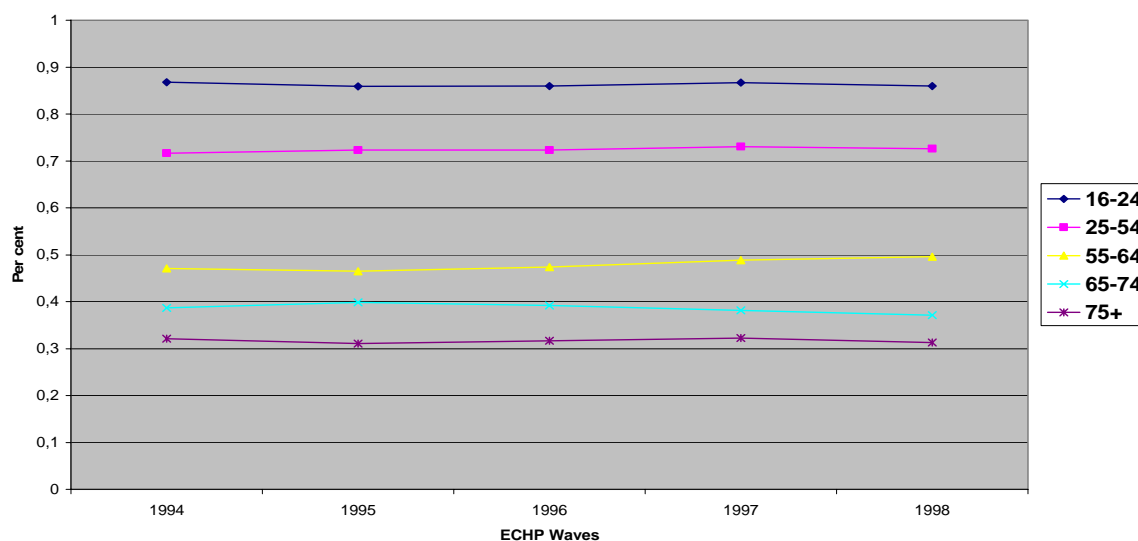
Note: EU average calculated with constant 1995 population figures as weights.
Source: ECHP.

As far as women are concerned, the self-reported health status shows roughly a development not substantially different from that for men. As seen from Figure 6, the health status of the oldest persons, in the age group of 75 and older, appears to be constant or slightly deteriorating. For the age groups of 55 to 64 and 65 to 74 the health status appears to have increased slightly.

Figure 6. Self-reported health status, EU average, women (in percentages)
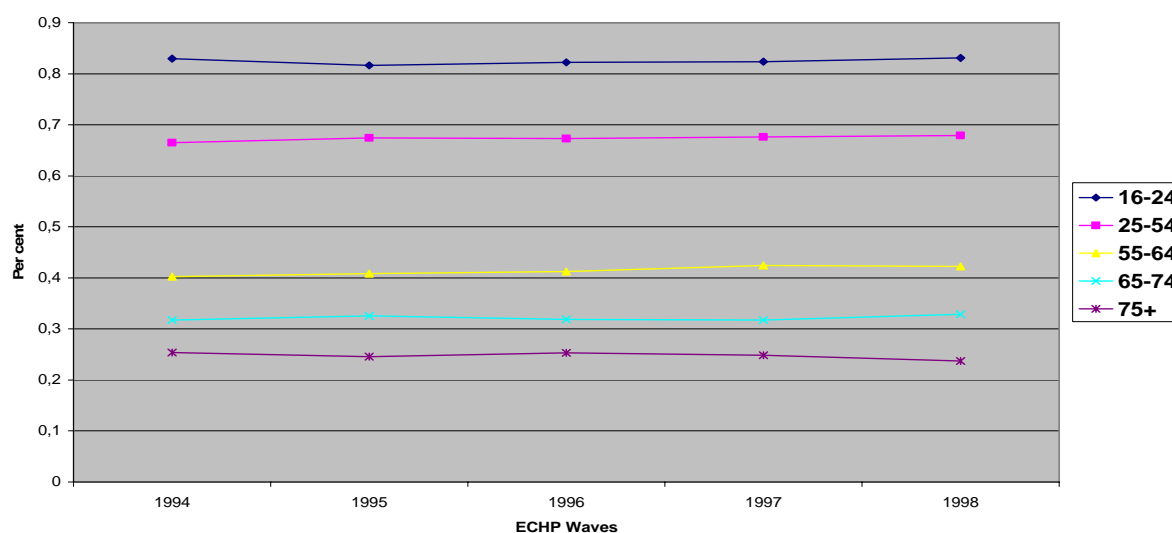
Note: EU average calculated with constant 1995 population figures as weights.
Source: ECHP.

There are many caveats to be taken into account in the interpretation of these figures. It is particularly important to take account of the fact that the ECHP covers only households and not the persons in institutions (long-term care institutions, hospitals and prisons, etc.). It therefore cannot be excluded that the changes in the share of persons declaring themselves to be in bad health may change because

of changes in the share of persons in long-term care institutions. Whereas the available ECHP data do not provide strong evidence of an improvement in the health status of the elderly, it is necessary to dig further into the material, with the aim, notably, of further analysing the health history of individuals (longitudinal studies) and studying other indicators on the development of health, morbidity and disability.

Figure 7. Prevalence of disability, EU average, men (in percentages)
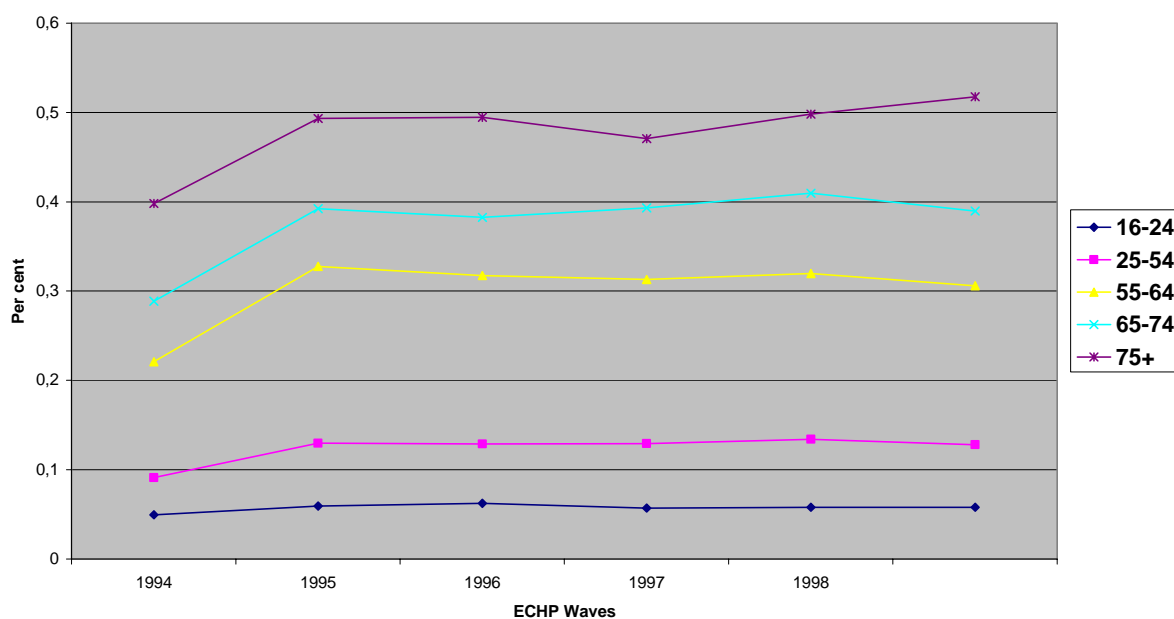
Figure 8. Prevalence of disability, EU average, women (in percentages)
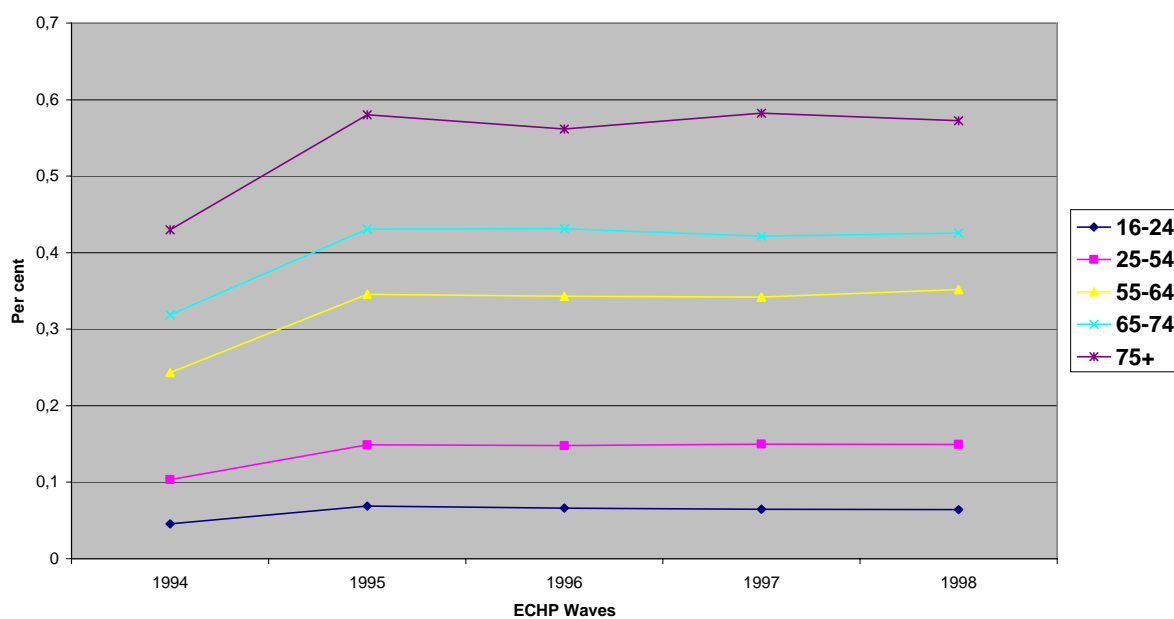
Although the ECHP data on general health status are based on a general declaration by the respondent on "being in very good, good, normal, bad or very bad health" (self-reported health status), the questions concerning disability are somewhat more specific while still of a general (not objective) nature. Judging from the ECHP data the overall prevalence of disability does not appear to have

improved during the period covered. As seen from Figure 7, if anything the share of men with a disability among those aged 75 and older shows a weak tendency to increase and the same can be said for those aged 65 to 74. Figure 8 shows that for women little change is observed during this period.[1]

2. Use of health and nursing care by the elderly

2.1 Earlier studies

As stated in a seminal OECD Working Paper (Jacobzone et al., 1999), until recently, the common hypothesis about life expectancy has been that if individuals reach the age of 80, their life expectancy beyond that is not much more than about 5 years. This has been seen as justifying an implicit convergence scenario applied in most demographic projections (including the Eurostat projections presented above) that the gains in life expectancy will slow down and that the life curve will move more towards a rectangular shape.

Nevertheless, according to this paper, there is important literature that argues that significant increases in life expectancy for those over 80 are indeed still possible, calling for a reconsideration of the whole ageing process. In fact, still according to this paper (quoting other authors such as Vaupel), age-related deficiencies are because of specific diseases for which medical research may offer continuous improvement. Consequently, current developments reflect not only an increased rectangularisation of the life expectancy curve and age pyramids but also a general trend towards gains in life expectancy at the most advanced ages.

As underlined above, however, the key issue here is whether the increase in life expectancy is or not accompanied by a corresponding increase in disability-free life expectancy (compression of morbidity). Examining various heterogeneous data on disability in a number of OECD countries, the authors concluded that significant declines in severe disability had been observed in Germany, France, Japan and the US. Moderate or no declines in the prevalence of disability had been observed in Australia, the Netherlands and the UK while in Canada and Sweden results were mixed or 'moderate'.

The authors stressed that, for example the improvement in the US may be related to possible transfers from nursing homes to the community. Yet a closer examination of disability levels within institutions and in the community did not reveal any directly measurable effects of the disinstitutionalisation process on the average health of people living in the community.

In another OECD paper, Jacobzone argued that (as could be expected) projections incorporating some degree of improvement in the prevalence of disability (dynamic projections) would result in a smaller rise in publicly financed long-term care than is indicated by purely static projections that assume constant prevalence.

Interpretations of data on health care in general and of the elderly in particular should, however, take account of the fact that the resources of health care systems show significant differences among even the most developed OECD countries. This beyond doubt reflects deep-seated differences with respect to the assignment of tasks, organisation of the health sector as a whole and possibly the differences with respect to financing health expenditure and social security in general.

In fact, as shown in a WHO paper by two Swedish researchers, Anell and Willis (2000), health care expenditure as a percentage of GDP among six OECD countries surveyed in 1996 ranged from 6.9% of GDP in the UK to 14.1% in the US. In 1999 the range had narrowed a bit, as health expenditure in proportion to GDP in the US had declined to 13% while that of the UK had risen to 7.1%. Expressed in US$ terms and per capita, health expenditure in the US nevertheless was way above the level of the other OECD countries included here as was per capita spending on pharmaceuticals (see Table 4).

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[1] As indicated above, data for 1999 have been disregarded pending a deeper analysis of comparability. Such problems would also seem to exist as far as the figures for 1994 are concerned.

Table 4. Selected measures of health care expenditure

	Denmark	France	Germany	Sweden	UK	US
Expenditures, % of GDP						
1986	8.2	9.5	9.1	8.7	5.9	10.8
1991	8.2	9.1	9.4	8.7	6.5	13.4
1996	8.1	9.8	10.8	8.6	6.9	14.1
1999	8.5	9.4	n/a	n/a	7.1	13.0
Expenditures per capita, US$ PPP						
1986	1165	1135	1286	1189	719	1917
1991	1486	1656	1600	1458	1006	3035
1996	1973	2005	2288	1704	1358	3926
1999	2358	2226	n/a	n/a	1666	4376
Drug expenditure per capita US$ PPP						
1986	85	185	178	86	101	170
1991	122	276	228	126	141	259
1996	168	337	281	222	225	370
1999	212	429	n/a	n/a	n/a	492

Source: OECD health data from 1986, 1991 and 1996 as quoted by Anell and Willis, 1999 from database.

In addition to surprisingly large disparities between the well-off OECD countries with respect to the overall level of health expenditure in proportion to GDP, major disparities also prevail with respect to the human and medical resources allocated (available) to this sector.

Thus as shown in Table 10, reflecting the very high level of health expenditure in the US, the overall employment in the health sector in this country in proportion to total employment in fact is at 7.4%, higher than the level seen in most other OECD countries. With respect to the level of employment, the UK is not far behind with the health sector accounting for 6.6% of total employment. Regarding the level of employment, however, the highest levels recorded are in Finland (10%) and Sweden (7.8%).

Large disparities are further observed with respect to the structure of employment in the health sector. As seen in the table, the US records about three nurses per physician and this ratio is also found in a number of other OECD countries. Yet in Italy the number of nurses per 100,000 of population is in fact lower than the number of physicians while in Finland the number of nurses is almost five times the number of physicians.

In a number of countries health care reforms aim at focussing hospital care mainly at the most urgent medical tasks and to reduce the number of hospital beds and limit the length of stays to the minimum required for appropriate diagnosis and treatment. Yet, it seems huge disparities still prevail with respect to the number of beds per 100,000 of population, ranging from a high of 14.4 in Norway to a low of 2.6 in Turkey. In this respect the level in the US is, at 3.6, one of the lowest among the most advanced OECD countries and the average length of stay is, at seven days, also among the lowest in the OECD. The same is the case for hospital discharges which, at 9,861 per 100,000 of population, is only about two-fifths of the level in Finland and France and close to a third of the level in Austria.

A more thorough analysis of the available data would certainly be warranted. Yet the review does suggest that in comparison with most of the EU member states the health sector in the US is substantially more capital-intensive (with respect both to buildings and equipment) and there is higher spending on pharmaceuticals. It is clearly not out of line with respect to human resources, suggesting that the productivity of the US medical personnel may be substantially above that of most European countries with the possible exception of Switzerland, which is even better equipped with medical technology than the US.

Table 5. Resources of health care 1999 (or 1998)

	Health exp. % of GDP 2000	Health empl. % of tot. empl.	Physicians per 1000 pop.	Practicing nurses per 1000 pop.	In-patient beds per 1000 pop.	Long-term care beds per 1000 pop.	Average length of stay (days)	Discharges per 100,000 pop.
Austria	8.0	n/a	3.0	9.0	8.8	1.9	8.9	28,060.1
Belgium	8.7	n/a	3.8	n/a	n/a	n/a	n/a	n/a
Canada	9.1	n/a	2.1	7.5	3.9	n/a	8.7	9,296.0
Czech Republic	7.2	4.6	3.0	8.2	8.7	0.6	11.3	20,802.8
Denmark	8.3	n/a	3.4	7.3	n/a	5.9	n/a	20,527.6
Finland	6.6	10.0	3.1	14.4	7.6	n/a	10.6	25,779.0
France	9.5	n/a	n/a	n/a	8.4	1.4	10.6	24,963.6
Germany	n/a	n/a	3.5	9.5	9.2	6.5	12.0	19,719.3
Greece	8.3	4.0	4.4	3.9	4.9	n/a	n/a	n/a
Hungary	6.8	n/a	3.2	5.0	8.3	1.8	10.0	24,196.7
Ireland	6.7	4.8	2.3	8.7	n/a	n/a	7.6	12,458.0
Italy	8.1	5.3	5.9	4.5	4.9	0.2	n/a	16,096.5
Luxembourg	n/a	2.3	3.1	7.1	n/a	n/a	n/a	n/a
The Netherlands	8.1	n/a	3.1	12.7	11.1	3.6	33.3	9,587.0
Norway	n/a	n/a	2.8	10.1	14.4	9.7	8.7	15,618.6
Poland	n/a	n/a	2.3	5.1	5.1	n/a	9.3	n/a
Portugal	8.2	2.8	3.2	n/a	n/a	n/a	n/a	9,194.9
Slovak Republic	5.9	n/a	n/a	n/a	8.1	0.2	10.4	19,638.0
Spain	7.7	4.4	3.1	3.6	4.1	n/a	n/a	11,363.0
Sweden	n/a	7.8	2.9	8.4	3.7	0.4	6.7	16,637.4
Turkey	n/a	1.2	1.2	1.1	2.6	0.2	6.0	5,983.3
UK	7.3	6.6	1.8	4.6	4.1	4.2	n/a	n/a
US	13.0	7.4	2.8	8.3	3.6	n/a	7.0	9,861.6

Source: OECD health data (2002).

This brief review of the supply-side aspects of the health care sector would seem to point to a few important features and questions for projections of health care and health expenditure over the coming decades:

1. The structure of employment in health care shows large disparities among OECD countries. What are the reasons for these disparities? Will they prevail or will a convergence take place towards a more common pattern?

2. The relatively high level of health expenditure in proportion to GDP in the US (and in Switzerland) seems to be explained to a large extent by a higher capital intensity and higher consumption of drugs and not by a higher level of employment in this sector. Will this gap between the US persist or should other OECD countries be expected to catch up with the US in this respect?

2.2 Health care for the elderly

As shown in the OECD working paper by Jacobzone et al. (1999), estimates of the allocation of resources to long-term care for the elderly show large variations within the group of OECD countries, typically ranging from less than 1% in Mediterranean countries to close to 3% of GDP in the Nordic countries and the Netherlands. Within this total, the share of public spending on long-term care shows even larger variations reflecting the fact that in some developed countries a comparatively large share of formal long-term care is financed through private insurance while in others, notably Sweden,

practically the whole of long-term care is funded by the general government budget and is ensured in specialised institutions. Assessing the prospective development of public spending on old-age health and nursing care will thus require the formulation of scenarios based on assumptions of, essentially, the following factors:

- the future evolution of disability and morbidity among the elderly;
- the potential shift from informal (family) to formal, institutionalised, care; and
- the prospective shift from hospitalisation to specialised care institutions.

The following sections provide some general reflections on the future evolution of disability and morbidity while the chapters included in this paper will provide additional views on the scope for and labour market implications of a shift from informal to formal health care.

2.3 No clear signs of a decline in age-specific morbidity

As already underlined above, the various general, recent survey-based indicators of the prevalence of disability do not provide convincing confirmation of a secular improvement in the prevalence of disability among the elderly. Furthermore, as will be shown below, there are no clear signs of a decline in the age-specific use of health and nursing care by the elderly.

First, in all countries the use of hospitals increases sharply as a function of age. On the other hand, as already suggested by the overall figures for hospital discharges in Figure 9, there are important disparities between the OECD countries with respect to overall hospital utilisation and these disparities are also found for the elderly.

Figure 9. Hospitalised persons in selected EU countries (per 1,000 inhabitants
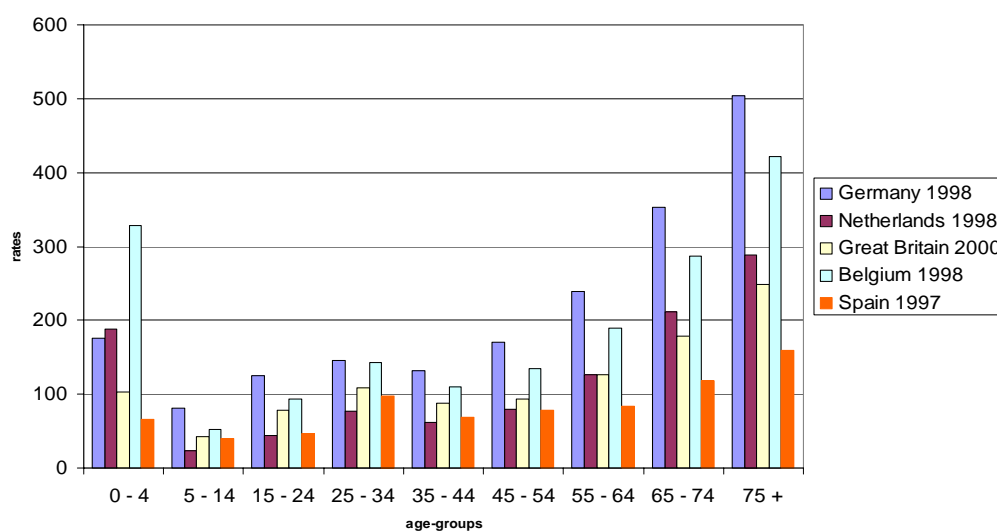
Source: DIW, Berlin.

Thus within the group of countries examined, the number of hospital admissions per year per 1,000 persons in the age group of 75 years and older in the late 1990s varied from about 500 in Germany to some 170 in Spain. In the age group of 65 to 74 disparities were of the same order of magnitude, with about 350 admissions in Germany compared with about 120 in Spain. The overall impression of these data is, therefore, that the increase in overall life expectancy is not necessarily accompanied by an equivalent increase in life expectancy in good health. This would seem to suggest that the demand for long-term health care for the elderly could rise in proportion to the rise in the number of persons in the higher age groups.

In a more favourable scenario the increase could be smaller but still significant. An important issue is therefore how the future society will face up to the challenge of allocating a higher proportion of resources to caring for the elderly. One important factor in this respect is the contribution of women, and notably, midlife women to this activity. This question is deeply related to the general issue of the future labour market participation of women.

3. Women's employment and care-giving: Is there a conflict?

According to the conclusions of the Lisbon European Council (24-25 March 2000), as confirmed at the Laeken and Stockholm meetings, the Council and the Commission were invited to develop an active employment policy by addressing the following four areas:

- improving employability and reducing skill gaps;
- giving higher priority to lifelong learning as a basic component of the European social model;
- increasing employment in services, including personal services; and
- furthering all aspects of equal opportunities, including occupational segregation and making it easier to reconcile working life and family life, in particular by setting a new benchmark for improved childcare provision.

Again according to the Presidency conclusions, the Council considered that the overall aim of these measures should be, on the basis of the available statistics, to raise the employment rate from an average of 61% today (that is in 2000) to as close as possible to 70% by 2010 and to increase the number of women in employment from an average of 51% to more than 60% by 2010. Recognising their different starting positions, member states should, following the conclusions, consider setting national targets for an increased employment rate. These measures, by enlarging the labour force, will reinforce the sustainability of social protection systems.

Yet at stake is the issue of whether in some countries at least, there may be a conflict between the role of women in care-giving and in active employment. In this respect the patterns of integration of women into the labour market during the most active part of their working life may be of major importance.

As seen in Figure 10, the total number of women in the active age classes (25-54), was on average about 72% for the EU as a whole (in 2000) and was in excess of 80% in Denmark, France, Finland and Sweden but around or below 60% in Greece, Spain, Ireland, Italy and Luxembourg.

The capacity of women to take care of children and provide partial care for the elderly may be considerably enhanced in countries where it is common and natural for women to work part-time. In this respect, however, the disparities between EU countries are even more striking than the overall labour market participation. As shown in Figure 10, part-time employment accounts for a major part of the total activity rate for women in the Netherlands and in the UK, but is also important in Belgium, Denmark, Germany, France, Austria and Sweden. Part-time employment for women is, on the other hand, comparatively low in Greece, Spain, Ireland, Italy, Portugal and Finland.

Whereas further research would be desirable, the more flexible labour markets in the Nordic countries, the Netherlands and the UK appear to offer an appreciable amount of part-time employment, allowing women to adapt more easily to changing family conditions, including the need for accompanying children and care for the elderly.

Figure 10. Employment activity rates in 2000, women in age groups 25-54
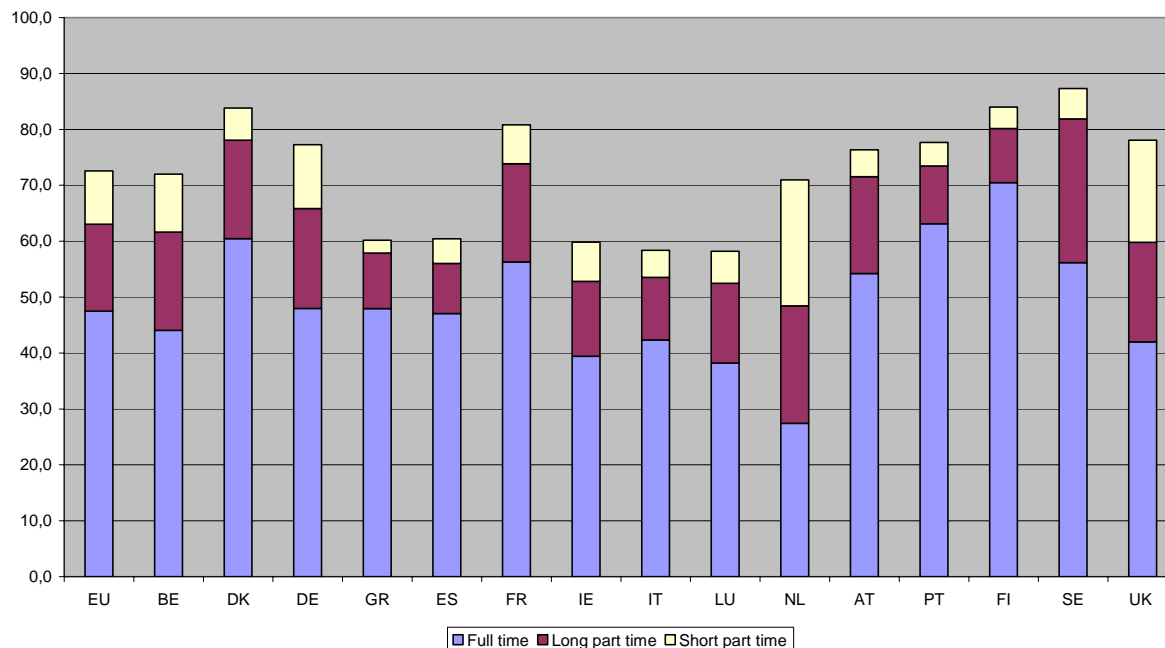
3.1 Midlife care-giving and women's employment

Studies of employment and care-giving indeed frequently focus on women, who are more likely to engage in care-giving and provide more time-intensive support than men. Research on the relationship between childcare and the labour-force participation of women is particularly replete in the literature. Informal care to older dependents has attracted less attention.

Scenarios on the social and economic consequences of ageing indeed frequently conclude that one response to the ageing of the population of the EU will be to increase the participation of women and, more generally, to roll back the tendency towards a lowering of the effective retirement age through less recourse to early retirement. Yet in many countries and regions of Europe women, and notably those who are middle-aged, are frequently involved in informal care-giving to the elderly and oldest-old. In fact, a low labour-force participation rate for women is in many countries associated with a relatively low level of development of formal, institutionalised care-giving for the elderly.

The vast majority of empirical work in this area relates to the US and Canada. Nevertheless, research on the implications of the process of ageing has now sparked off research on this side of the Atlantic. In chapter 2, C.K. Spiess and U. Schneider, using data from the European Community Household Panel, investigate eldercare and employment in 12 European countries. They focus in particular on the association between changes in weekly work hours and changes in weekly care hours for women aged 45 to 59.

They find that starting or increasing informal care-giving is normally associated with a reduction in the number of hours worked per week. Conversely, there does not appear a positive effect on hours worked for women terminating a care-giving spell or reducing care hours. This suggests that, among midlife women, reductions in work hours or exits from the labour force in order to provide care to family members are unlikely to be reversed after terminating care-giving responsibilities.

The (negative) link between the start of care-giving and a reduction of working time seems to be particularly strong in northern European countries, where formalised home care is more frequent and where re-entry into the labour market may be easier. In southern Europe and Ireland, where the participation ratio by women is comparatively low, the association between care-giving and labour market participation is significant if an already existing care activity is intensified. Nevertheless,

scenarios assuming an increase in women's labour-force participation rate in response to the ageing of the population should also take account of the need to replace the resulting decline in informal family care by the development of appropriate formal home or institutionalised care for the elderly.

3.2 Returning to employment after a spell of care-giving: The case of Germany

In January 2001, a new part-time work and temporary employment contract law was enacted in Germany. One important aim of this law was to promote part-time work, as it was seen as a possibility to help combine family and career aspirations. The rights of the employees for enforcing part-time work and for achieving more security for returning to full-time employment were strengthened.

As shown in an empirical analysis by T. Schneider, however, women did not use part-time jobs for combining work and care in the past even if they were part-timers (see chapter 3). In contrast to child-rearing, there seem to be a number of reasons why care-giving is a very special feature. Children – although relatively young – do go to nursery school and primary school. Consequently, mothers have well-regulated time off in which they can have a job. If the persons in need of care are disoriented or mentally deficient and therefore need constant observation or if they are bed-ridden and do not need permanent observation, but selective, non-predictable help, then women providing care do not have enough free time for regular work outside the home. Thus, according to Schneider the new law for part-time work did not apply to women providing care if they have no fixed time in which they are released from the responsibilities of providing care. Social policy and relevant labour market legislation should, according to Schneider, pay more attention to the care situation in the future.

Against the backdrop of an ageing population and the associated increases in the number of elderly in need of care, there is, in Schneider's view, a genuine risk that the ageing of society will come at the expense of women. A number of labour market studies have shown that career breaks are much worse for income and occupational careers later on than part-time work (e.g. Blossfeld & Hakim, 1997). Care-giving women who withdraw from the labour force normally experience depreciation in their human capital (Mincer & Ofek, 1982) or if they are older, withdrawal can result in a final exit. From the perspective of employers, the increased risk of women interrupting their employment to provide care for elderly relatives could mean that they do not hire or promote women as is predicted in the Theory of Statistical Discrimination (Schwab, 1986; Phelps, 1972). As a result, it could mean that the ageing population represents a new labour market risk for women. This risk, however, runs counter to the process of continually increasing the labour-force participation of women.

It is, however, not clear that daughters(-in-law) will be caregivers to the same extent in the future. Women's decisions will depend on different factors. The prices for care services are likely to be particularly important. If these costs are low, then a lot of women could do a cost-benefit analysis and make the decision to use professional caregivers. Care allowances will also have a great impact. Even if the intention behind nursing-care insurance is to encourage family care it is easier to pay for a nursing home if the care allowance is high.

The analyses in this contribution are restricted to women who are living together with the person in need of care. Further investigations are necessary with regard to older persons whose children live somewhere else. It is very important to find out who has a higher probability of receiving care in an institution and who is more likely to move into the household of his/her children if they are in need of care. Or from another perspective, which households provide care for their parents and which do not? And further, Schneider suggests further examination of how increasing employment of daughters(-in-law) may influence this process.

3.3 Switching from private to public care-giving: The Spanish case

Long-term care (LTC) is one of the most relevant health-related expenditures associated with old age. Nevertheless, as shown in a paper by C. Patxot and J. Costa-Font (see chapter 4), compared with other sources of health care, long-term care has a large share of social assistance.

In fact, Spain, in contrast to most other EU partners, does not have any social provision system to cover catastrophic risks associated with old-age dependency. Consequently, LTC is mainly ensured by the families by means of informal care. Residential services, when offered by the local and regional public sector, tend to be means-tested and subject to co-payments and private contributions. Chapter 4 shows that the ageing of the population will have a significant impact on the demand for long-term care services in Spain.

The major impact, however, will probably be in the period starting from 2031, which is not yet included in this first simulation model for Spain. From 2000-31 the number of elderly in the population will rise by 49% and those with a severe disability by some 44%. The effect of this demographic trend on the use of LTC will be very serious as Spain currently suffers from an undersupply of LTC services. Over the period considered, under plausible assumptions, formal LTC services should expand by some 66%, resulting in an increase in expenditure on LTC by 233%. Yet according to the estimates in chapter 4, public contributions will rise only by 87%. This means that a large share of LTC will have to be supplied (financed) by individuals and families from their own resources.

The projections for LTC developed in this chapter, even as approximations, are very sensitive to the type of data used, the assumptions made and the hypotheses undertaken mainly on future inflation rates and the role of informal care. There are good reasons to assume that the public sector may play a different role from that it has played until now in funding LTC. Moreover, the development of private LTC-insurance schemes may increase the availability of LTC to families that were previously unable to pay for formal care once disability appears at old age. The possible policy alternatives to current systems are numerous. The first alternative is the development of a private health-insurance scheme complementary to public assistance. Nevertheless, two main problems will arise.

The first problem is affordability: in fact, only 26% of the population is willing to pay for LTC insurance (Costa, 2001). This was computed using contingent valuation techniques that simulate a market for LTC insurance. The second issue is equity: as many individuals are not poor enough to receive public assistance and not rich enough to afford private LTC insurance, no coverage will be provided to these individuals. The alternative is the development of a social insurance scheme following the German example. This will have to cope with the existing constraints that the public pension-funding system already has in Spain, such as the dependency of LTC funding on the economic cycle.

4. Summary

4.1 The challenge of population ageing

During the coming decades the European Union and, indeed, large parts of the world, will be confronted with unprecedented demographic changes, generally characterised as the 'ageing of the population'. In fact, population ageing is the combined outcome of two distinct phenomena: first, the secular decline in mortality and the resulting increase in life expectancy; and second, the pronounced decline in fertility since 1970 in most European countries, which followed the baby-boom after the first post-war decade.

The decline in fertility during the recent decades is now being reflected in a significant decline in the number of entries into the labour market, while the baby-boom generations are approaching retirement age. Consequently the ageing of the population will first and most importantly be reflected in a pronounced *ageing of the European labour force*.

According to the baseline projections prepared by Eurostat (1999 version), the total population in the EU (EU-15) can be expected to rise from about 376 million in 2000 to 386 million in 2020 but will thereafter decline to 364 million in 2050. The 2050 level is thus expected to be some 3% below that of 2000. Within this overall total there will, however, be huge changes in the number of persons in the different cohorts.

4.2 Increase in the demographic dependency ratio

The number of persons in the age groups of up to 54 years old is expected to decline significantly. A particularly strong decline is anticipated for the highly active age groups of 30 to 39 years, with the number of persons aged 30 to 34 expected to fall by 31.5% and the number of persons in the age group of 35 to 39 expected to drop by 29.7% between 2000 and 2050. For age groups in the range of up to 54 years the declines are less pronounced but still considerably higher than the overall average for the population. This decline in the most active age groups is already taking place and will continue to 2050.

Furthermore, the combined effect of the rise in life expectancy and the decline in the number of persons in the active age groups will result in a *huge increase in the demographic dependency ratio* (the number of persons in the age groups above the conventional threshold of 65 years in proportion to the number of persons in the active age groups of say, 15 to 64 years). The number of persons in the age groups of 75 and older, the groups most likely to present a need for health care, will more than double, from 27 million in 2000 to close to 60 million in 2050 according to Eurostat's baseline scenario. Although the 'economic-dependency ratio' (the ratio of inactive persons to the number of employed persons) may not necessarily rise in parallel with the demographic dependency ratio there is no doubt that a major challenge for European society and for the European economy is now building up.

4.3 Fall in the share of the life cycle devoted to work

The ageing of the European population, furthermore, takes place in a context of the emergence of the 'knowledge society' in which the allocation of total life time between education, work, leisure and retirement has been profoundly modified. In fact, on one side, the duration of education (investment in human capital) has considerably increased. On the other side, the duration of retirement has risen as a result of a lowering of the average retirement age in a context of an increase in life expectancy. Consequently, the proportion of the life cycle allocated to gainful work has fallen dramatically over the last hundred years.

4.4 Political concerns

A number of studies of the consequences of ageing, notably of the consequences for the financing of pensions, were thus launched during the course of the 1980s. International organisations took steps to increase public awareness of the emerging challenges early on. In 1982, the UN in Vienna, and later the OECD in 1988 and again in an OECD report published in 1998, stressed that ageing presented the OECD countries with a "complex and formidable set of interrelated challenges" (see OECD, 1998). The World Bank (1994) prepared a major report on *Averting the Old Age Crisis*.

4.5 The approach of the European Commission

Over the last two decades the EU institutions have been increasingly concerned with these issues. A comprehensive analysis of the economic consequences of population ageing was published in 1999 in a Commission Economic Paper (European Commission, 1999). Furthermore, a working group on the consequences of ageing under the Economic Policy Committee has produced two important studies, one in 2000 on the impact of ageing on public pension systems (European Commission, 2000) and one in 2002 on the reform challenges facing public pension systems (European Commission, 2002).

5. Some tentative policy conclusions

It is almost trivial to stress, once again, that the prospective ageing of the EU's population poses encompassing threats to society and to policy-making. The future sustainability of pension schemes is in danger everywhere and the issues have been extensively examined from the angles of both

economic analysis and scenarios for reform. Although the sustainability and adequacy of pension schemes is a major concern for policy-making, the scenarios for reform are 'technically' relatively simple, depending essentially upon the key demographic parameters, the likely evolution of the economic dependency ratio and – a feature frequently left out of consideration – the uncertainties surrounding the demographic projections.

Long-term projections of health expenditure must take into account not only the demographic projections and demographic risks but must also formulate views or scenarios for the future evolution of health in general and in particular the health of the elderly. Furthermore, the future of public health expenditure will to a considerable extent be influenced by the prospective shift from informal to formal health care and from privately financed to publicly-financed, institutionalised care. In addition, the future of health care will be importantly influenced by technological development, as far as capacity for diagnosis and medication are concerned. Finally, the development of health care will also, to a greater or lesser degree, be influenced by the evolution of the general perception of and policy attitudes towards health and illness.

The future of health care for the elderly is, as demonstrated above, a most important aspect of the prospects for health care in general. The policy issues, however, do not present themselves in the same manner for all member states. In fact, the future path of old-age care will be greatly determined by the starting position with respect to the level of formal and informal care, the present state of affairs as far as female labour market participation is concerned and the existing patterns of financing of old-age care.

An increase in the activity rates for women is adopted as an overall employment objective by the Lisbon summit. Nevertheless, the review of current participation rates for women in Figure 10 above suggests that an increase in labour market participation most likely going to be accompanied by a considerable increase in the scope for offering part-time employment to women.

The overall conclusion is that women's labour market participation, childcare and caring for the elderly need to be considered in a global context of labour market reforms aimed at increasing labour market flexibility and easing entry into and exit from employment. This would seem to be a particularly urgent task in countries where the labour market participation for women is now at a comparatively low level.

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MIDLIFE CARE-GIVING AND EMPLOYMENT
AN ANALYSIS OF ADJUSTMENTS IN WORK HOURS AND INFORMAL CARE FOR FEMALE EMPLOYEES IN EUROPE
C. KATHARINA SPIESS & ULRIKE SCHNEIDER[*]

1. Introduction

Long-term care policy in all OECD countries currently focuses on home care in general and family care in particular, which are considered cost-effective settings to provide for the frail elderly. A variety of studies, however, show that informal care implies considerable monetary and non-monetary cost for family caregivers. The indirect cost of family care-giving consists in a compression of leisure and social activities as well as in foregone employment opportunities. This chapter explores the relationship between care-giving and employment. The question to be answered is whether informal care is adversely related to employment. If this were the case, there would be empirical grounding for the deepening concerns with the increase in women's labour-force participation and how it will affect the future supply of family care-giving.

Studies of employment and care-giving frequently focus on women, who are more likely to engage in care-giving and provide more time-intensive support than men. In addition, women tend to be confronted with a sequence of care demands over their adult life cycle, starting with childcare and followed by care of spouses, frail parents and grandchildren. Thus far, research and policy interest in family labour has focused on the earlier stages of the family life cycle, whereas informal care for older dependents has attracted less attention. Empirical evidence on the relationship between employment and care-giving remains particularly scarce in Europe.

Our analysis uses data from the European Community Household Panel (ECHP) to investigate eldercare and employment in 12 European countries. We describe the association between *changes* in weekly work hours and *changes* in weekly care hours for midlife women. The models control for policy variation across groups of countries.

2. Theoretical backdrop

The relationship between care-giving and work has been studied in the labour supply, home production and care-giving literatures. A variety of contributions embark on microeconomic time-allocation theory to derive testable hypotheses for the time-use patterns of caregiver households. The parent-care model presented by Johnson & Lo Sasso (2000, pp. 5-10) provides an illustration. The model focuses on the caregiver household, which is the household of an altruistic adult child of the dependent. With altruism, the utility function of the caregiver accounts for the utility derived from

own consumption and for the utility derived from the well-being of the care recipient. The maximisation problem of the caregiver is subject to the familiar budget constraint and a time constraint.

The time allocation model suggests a variety of factors that determine the strength of the relationship between work hours and care hours. It implies that decisions on work hours and care hours are interrelated, because care-giving and employment compete for the caregiver's time resources. The model predicts that caregivers allocate their time in a way that an additional hour of time in paid work, leisure or care-giving generates the same utility. An increase in the marginal utility of care-giving (*ceteris paribus*) prompts a reduction in work hours and leisure and vice versa. The value of an hour of the caregiver's time spent in paid employment can be measured by the wage rate. The marginal value of care-giving depends on factors such as the care-recipient's health status, the hours of care provided by third parties and the prices of market substitutes for informal care.

Time allocation models rest on a standard set of assumptions from microeconomic theory, such as rational and unrestricted choice (Kooreman & Wunderink, 1997). This implies that caregivers could realise any combination of work and care hours. "However, carers may not be able to achieve their preferred choice because of either resource constraints on residential or domiciliary care or (...) because a personal optimum is not socially efficient" (Smith & Wright, 1994, p. 140).

Rationing is a very real possibility in the case of elderly care. A caregiver may want to share his responsibility with other family members. Yet, this option depends on the size and structure of family-networks. Social norms and traditions that relate to family care-giving further restrain caregivers' choices. Institutional factors such as collective bargaining agreements and legal provisions on part-time and flexitime work or organisational factors are likely to interfere with a flexible and smooth adjustment of work hours. Finally, informal caregivers who would prefer to purchase formal care services may find such services to be inadequate or on short supply. Waiting lists for placements in nursing homes or day care centres are indicative of rationing.

In summary, a complete structural model of the work and care-giving relationship should allow for simultaneous decisions on both activities. In the ideal case, the estimation of such a model would also account for the impact of workplace factors and factors that pertain to the supply of formal care on the work-care association. Estimating such a model is empirically challenging. Our approach to the issue is just a first step towards a more complex, structural model. In this chapter we are content to describe the correlation between *changes* in work hours and *changes* in the care-giving status. The analysis does, however, devote some attention to institutional factors that determine the work-care relationship. Multinational analysis has the advantage of introducing variation into the policy environment. More specifically, using pooled data from 12 countries allows analysis to control for the provision of long-term care services and caregiver benefits (see section 4).

3. Previous research

The empirical literature offers mixed findings on the relationship between transfers of time and money on the one hand and employment on the other. Transfers appear to affect work behaviour differently in different stages of the life cycle and also depend on whether support mainly consists in financial transfers or time transfers. Soldo and Hill (1995) hypothesise that financial support of dependents tends to encourage paid work, whereas time help is supposed to affect employment in an adverse manner. Another possible reason for patchy conclusions on the work-care relationship is the great diversity of research designs used in investigating the problem.

The majority of studies on the relationship between employment and time help to older dependents have either treated employment status or care-giving status as exogenous.[1] In the former case, the

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[1] See Wolf & Soldo (1994, pp. 1260-62) and Pavalko & Artis (1997, pp. 170-71) for a brief review and discussion of the literature.

analysis tests for the negative effects of employment on the odds or intensity of informal care. This 'care-giving crunch' hypothesis has little grounding in empirical evidence.[2] In a similar manner, care-giving status has been used as an exogenous predictor of employment, generating inconclusive results.[3] To the extent that decisions on paid work are interrelated with decisions on adult care, these approaches imply a simultaneity bias.

Also, past research on employment and care-giving has often used samples of workers or non-probability samples of caregivers. In these cases, findings are subject to selectivity bias. Studies, for instance, that focus on persons who are both employed and care-giving miss *potential* caregivers among employees as well as caregivers that were forced to give up employment in order to meet the care-recipient's needs. Furthermore, the sample design also by-passes persons who are either looking for work or opting out of work for reasons other than care-giving commitments.

Simultaneous estimates of employment and care-giving for the US have been presented by Wolf and Soldo (1994), Ettner (1995) and Johnson and Lo Sasso (2000). Wolf and Soldo do not find a significant negative relationship between care-giving and employment. Ettner as well as Johnson and Lo Sasso report large and significant negative effects of care-giving on work hours. Johnson and Lo Sasso use longitudinal data from the 1994 and 1996 waves of the Health and Retirement Survey and focus on parent care. Schneider and Wolf (2000) present evidence for Germany. They investigate the impact of care-giving to adults (irrespective of family bonds), building on cross-sectional data from the European Community Household Panel. Their bivariate Probit model controls for both simultaneity and selectivity. Schneider and Wolf find a small but insignificant trade-off between care-giving and employment. Among the explanations offered for this result one relates to sample size (n = 227). Therefore, it will be intriguing to conduct further estimations for Europe, using the full ECHP data set.

Our own analysis (see section 4) constitutes a first move into this direction. The sample design tries to avoid selectivity bias. We do not, however, test a model of simultaneous decisions on work and care hours. The aim is to provide descriptive information on the correlation between *changes* in work hours and *changes* in care hours. We do not pretend to use any structural model or explain a causal relationship in one or the other direction. In our further methodological approach, we follow Pavalko and Artis (1997) who study the relationship between *changes* in work hours and *changes* in care-giving. We will now briefly summarise the research strategy and findings from their paper. Next we present our own endeavour to replicate and improve their approach with European data.

Pavalko and Artis use the 1984 and 1987 waves of the National Longitudinal Survey (NLS) of Mature Women to analyse changes in care status and in usual work hours over a three-year period. Their estimation sample includes women aged 50 to 64 in 1987 caring for husbands, ill or disabled children, parents or grandchildren. The authors estimate the likelihood of starting care-giving in 1987 and proceed with estimating the association between working hours and care-giving. Four groups of independent variables are used in the estimation: demographic controls, care-giving status (in the employment estimation), employment variables (status, hours, wages and satisfaction) and work history variables.

Findings from this study show that the initiation of care-giving is independent of employment status. Employed women and women with a higher work status were as likely to start care-giving as other women in 1987. Job tenure displays a positive (though marginal) effect on the odds of care-giving, which supposedly reflects better chances of workplace flexibility.

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[2] See, for example, studies for Canada (Rosenthal et al., 1999) and the US (Starrels et al., 1995; Gerstel & Gallagher, 1994; or Brody & Schonoover, 1986).

[3] Pavalko & Artis (1997) and Mutschler (1994) for instance, find that time-help adversely affects work hours. Franklin et al. (1994) show that care-giving prompts short-term rather than long-term adjustments in the workplace.

The impact of care-giving on work hour changes (hours in paid work) is asymmetrical depending on whether care-giving is being taken up or terminated: the start of care-giving adversely affects work hours, while stopping care provision is not associated with resuming usual work hours.

Our analysis for Europe reproduces the study by Pavalko and Artis with regard to sample design and the main issues considered: it focuses on women aged 45 to 59 and studies the likelihood of becoming a caregiver, the incidence of labour-force participation, the frequency of dual work-care commitments, and the correlation between changes in work and changes in care-giving. It should be made clear, however, that we take a different approach to estimating the association between work hours and care hour changes than Pavalko and Artis, whose empirical model is unsatisfactory in this respect.

To study the association between changes in work and care hours, Pavalko and Artis regress usual weekly work hours in 1987 on a vector of independent variables, using 1984 work hours as a right-hand side control variable. In doing so, they interpret independent variables in terms of their effect on *changes* in work hours. Formally, they posit the following empirical model:

$$y_{t+3} = \beta_0 + \beta_1 \cdot y_t + \beta_2 \cdot X + \varepsilon,$$

where *y* denotes work hours, *X* is the vector of other independent variables and *t* is a time index. This 'regressor-variable approach' is widely used in sociology. It does not represent either a bivariate or a Heckman two-stage type of model.

The study of Pavalko and Artis compares a) female employees with and without care-giving responsibilities and b) female caregivers in paid employment with care providers who are not employed. Moreover, their empirical model exploits the panel quality of data. Looking at *changes* in work and care hours, individuals are supposed to serve as their own controls.

We hold, however, that the model of Pavalko and Artis is not equivalent to regressing the change on work hours on the same vector of control variables and, more importantly, that it may cause problems of serial correlation.[4] Therefore, we base our empirical analysis for Europe on a simplified version of a difference-in-difference approach. The major distinction between the latter and the regressor-variable approach concerns the dependent variable, which in our model is the true difference between the work hours at the two points of time. Hence, the work hours at the beginning of the observation period enter the left-hand rather than the right-hand side of the equation. The next section details the data, method and variables underlying our estimations.

4. Empirical analysis

4.1 Data

The analysis is based on data from the European Community Household Panel, a large-scale longitudinal survey set up and funded by the European Union.[5] The first wave of data was collected in 1994 in 12 countries, using a standardised questionnaire. Additional waves followed in each of the subsequent years. The ECHP offers data on individual characteristics, household composition, income and expenditure, education, employment and unemployment, and various measures of life satisfaction. A small range of questions are related to childcare and to the care of adults who need special help because of old age, illness or disability. The survey focuses on regular care-giving to persons living in the same household or elsewhere. It identifies caregivers among adult household members (age 16 and over) and provides information about the average weekly hours of care-giving. The survey does not, however, ask for characteristics of care-recipients (other than their co-residence status) nor does it query the use of formal care services.

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[4] There would be serial correlation if, for example, there were a 'fixed effect' in *y*, making y_t correlated with the error term in the equation for y_{t+3}.

[5] For further details see EUROSTAT (1996a and 1996b), Clémenceau & Verma (1996) and http://forum.europa.eu.int/Public/irc/dsis/echpanel/library.

Nevertheless, ECHP data offer considerable advantages for our analysis. To begin with, the data are not subject to selectivity bias and thus allow consideration of several counterfactual states: employment and care-giving, employment and no care, no employment but care-giving, and neither employment nor care-giving. Second, national panels in Europe often fail to ask whether a person is involved in caring other than childcare. Surveys that account for adult care do not always provide a measure of care intensity.[6] In addition, the information on the individual care responsibilities can be linked with the entire set of employment questions addressed at each individual aged 16 and older. Furthermore, the ECHP is relatively large compared with some other data sets: more than 12,000 middle-aged women participated in the 1994 survey. Last but not least, owing to the concept of 'input harmonisation' that underlies the data collection, our results are directly comparable across countries.

The following countries participated in the 1994 survey: Denmark, the Netherlands, Belgium, Luxembourg, France, the UK, Germany, Ireland, Italy, Greece, Spain and Portugal. Austria, Finland, and Sweden joined the ECHP in 1995 (wave 2), 1996 (wave 3), and 1997 (wave 4) respectively. We analyse changes over time of both work hours and care-giving hours. In order to capture a fair number of transitions between the various care modes, we consider changes over the two-year period of 1994 to 1996.[7] This implies that only the 12 countries that participated in the first three waves of the ECHP can be included in the analysis, while Austria, Finland and Sweden are missing.

4.2 Method and measures

Our analysis builds on maximum-likelihood probit estimation and ordinary-least square regressions. First, we estimate probit models analysing a) if a woman commits herself to start care-giving and b) whether a person who starts care-giving provides more than 14 hours of care per week. In each case the dependent variable is a dummy that takes on the value of 1 for the two positive outcomes 'starts care-giving' or 'starts high-intensity care-giving'.

The predictors entering the probit models fall into two categories. The first category of predictors comprises micro-level variables relating to individual characteristics and circumstances at the time of the first interview in 1994 (age, education, nationality, health, employment status, family status and household type).[8] The second category includes macro-level variables. We use the ratio of the population aged 65 and older to midlife women as a proxies of the informal care demand in each of the 12 countries under study, along with the unemployment rate of women, variables capturing the influence of long-term care policy and country-group dummies.

Countries are grouped according to the labour market participation of women and according to the relative importance of institutional care on the respective long-term care policy agendas.[9] The institutionalisation rates for the older population refer to the early 1990s.

We discern seven country groups, where the two 'groups' at the poles include only one country each: Denmark is the one extreme, with a very high proportion of older persons living in institutions and a degree of labour market participation of women high above the EU-average. Greece is located at the

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[6] The German Socio-Economic Panel, for instance, does not ask how much time individuals spend on care-giving. The care-giving commitments for individual household members can only be derived from the information that was obtained on the care needs of other household members.

[7] The 1997 wave was not available for the scientific community at the time we finished our empirical work.

[8] If a woman started care-giving, these controls reflect a non-caregiver status in 1994 and a caregiver status in 1996.

[9] For a further description of the various European long-term care policies, see for example, Hutten & Kerkstra (1996).

opposite pole and is characterised by an almost marginal proportion of institutionalised elderly persons and a labour-force participation of women that is markedly below average.[10]

A second set of estimations uses ordinary least squares (OLS) regressions to explore the association between changes in work hours and changes in care-giving hours. The question on the usual weekly care-giving hours was bracketed in the first wave of the ECHP. Therefore, changes in care-giving have to be measured as changes between three levels of care intensity. Adjustments in employment, by contrast, can be measured by the hour. Thus, the dependent variable is the change in weekly work hours, that is, work hours in 1996 minus work hours in 1994.

Formally, the model we are using can be described as follows:

$$Y_{t+2} - Y_t = \beta_0 + \beta_1 \cdot Z + \beta_2 \cdot X_t + \varepsilon.$$

In the equation, y again denotes work hours, t is a time index, X is a vector of independent variables describing the starting situation and Z is a vector of independent variables capturing the change in either care status or care intensity from t to $t+2$.

This empirical model takes full advantage of the care-giving information in the data. Most importantly, it makes use of the information on the intensity of care-giving, which is exceptionally rare in most large-scale, representative household surveys. Using bivariate probit estimations would confine the analysis to incidents of change, that is, to studying the likelihood of starting or stopping care-giving, or the probability of changing work hours.

The difference-in-difference model, by contrast, allows consideration for the level (intensity) of changes in work hours. In addition, while bivariate models certainly have their own merits, they are also subject to a very restrictive set of assumptions. Yet, we also have to concede that the results obtained from difference-in-difference estimations are subject to bias if unobserved variables vary over time.

Independent variables in the OLS regressions greatly overlap with the predictors in the probit estimation. The two modifications in the vector of independent variables concern 1994 work hours and variables pertaining to care-giving. In the OLS models, 1994 work hours enter the left-hand side of the equation. Furthermore, we add five substantive independent variables that are dichotomous and capture changes in the care-giving status and care-giving intensity from 1994 to 1996: i) whether the respondent stopped care-giving, ii) whether she started care provision, iii) whether she increased, iv) or decreased her care intensity, v) did not adjust care-giving hours at all or vi) neither reported care-giving in 1994 nor in 1996.

Table 1 shows the means and ranges of the independent variables that were included in the probit and OLS models.

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[10] In the early 1990s the proportion of elderly people receiving long-term care in institutions in Denmark ranged between 5.5 and 6.4% while the corresponding proportion for Greece was less than 1% (Royal Commission on Long-Term Care, 1999, p. 161). Denmark reported the highest (76%) and Greece one of lowest rates (44%) of labour force participation by women in 1994 (European Commission, 1999).

Table 1. Description of independent variables

Name	Description	N	Range	Mean	SD
Socio-demographic 1994					
Age	Age	12,027	43-57	49.55	4.30
Age^2	Age squared	12,027	1,849-3,249	2474.38	429.51
Education	Second/Third-level education = 1	12,027	0-1	0.38	0.49
National	Nationals = 1	12,027	0-1	0.98	0.14
Married	Married = 1	12,027	0-1	0.82	0.38
Unwed	Never Married = 1	12,027	0-1	0.05	0.22
Health	Housework limited by health =1	12,027	0-1	0.13	0.33
Children aged 12 and younger	Child(ren) younger than 12 years of age in household =1[*]	12,027	0-1	0.12	0.32
Children aged 12-15	Child(ren) 12-15 years of age in household =1[*]	12,027	0-1	0.13	0.34
Care-giving					
Start care	Start care-giving in 1996	12,027	0-1	0.06	0.23
Stop care	Stop care-giving in 1996	12,027	0-1	0.08	0.28
Both care	Care-giving in 1994 and 1996	12,027	0-1	0.06	0.25
Increase care	Increase in care hours from 1994 to 1996 (and both care=1)	12,027	0-1	0.01	0.12
Decrease care	Decrease in care hours from 1994 to 1996 (and both care=1)	12,027	0-1	0.02	0.13
Stable care	No change in care hours from 1994 to 1996 (and both care=1)	12,027	0-1	0.03	0.18

Notes: *As these variables are not included in the 1994 wave, this information refers to 1995.
   Table continues on the following page.

Table 1, continued

Name	Description	N	Range	Mean	SD
Employment characteristics 1994					
Employed	Employed	12,027	0-1	0.50	0.50
Wage	Current wage and salary earnings (net monthly), logged	5,056	-0.83-4.49	1.48	0.87
Vulnerability	Ability making ends meet (6 = very easily)	5,056	1-6	3.65	1.27
Satisfaction	Satisfaction with leisure time (6 = fully satisfied)	5,056	1-6	3.91	1.43
Employment history 1994					
Unemployed	Former unemployment period = 1 (only if hours >= 15)	5,056	0-1	0.14	5.48
Tenure	Years in current job (since 1980)	5,056	0-14	9.49	5.48
Macro-level variables					
Dep. ratio	Dependency ratio (elderly population/ middle-aged women) 1994	12,027	1.17-1.39	1.28	0.07
Unemp. rate	Female unemployment rate 1994	12,027	4.1-31.4	14.30	7.12
Country group 1	Denmark (a) high (b) above*	12,027	0-1	0.05	0.21
Country group 2	The Netherlands, Luxembourg (a) high (b) below*	12,027	0-1	0.09	0.28
Country group 3	Germany, France, UK (a) modest (b) above*	12,027	0-1	0.26	0.44
Country group 4	Belgium, Ireland (a) modest (b) below*	12,027	0-1	0.11	0.32
Country group 5	Portugal (a) small (b) above*	12,027	0-1	0.10	0.30
Country group 6	Italy, Spain (a) small (b) below*	12,027	0-1	0.30	0.45
Country group 7	Greece (a) very small (b) below*	12,027	0-1	0.11	0.31

Note: *Country groups are classified according two main characteristics: a) proportion of older persons living in institutions (high, medium, small or very small) and b) the labour market participation of women(above or below EU-average).

Sources: ECHP, 1994 and 1996 (midlife women), own calculations.

4.3 Results

Patterns of care-giving and employment across EU-countries: Descriptive statistics

So far, empirical studies of employment and care-giving almost entirely relate to North America and results vary depending on the type of data used. Some analyses build on samples of caregivers, while others use samples of employees, where both approaches confront selectivity problems. Evidence from caregiver samples find 30 to 40% of US caregivers to be employed. Surveys at the corporate level show that at least 8% of US employees face dual work and care-giving responsibilities (Fast, Williamson & Keating, 1999, p. 312; Tennstedt & Gonyea, 1994).

These estimates for North America account for male and female caregivers and consider employees of all age groups. Nevertheless, similar to Europe, in the US care to older dependents is predominantly provided by middle-aged and older women. Hence, evidence from the US still provides a useful backdrop for our analysis of midlife women (aged 45 to 59) in 12 EU countries. Among European midlife women with care-giving commitments (see below) more than 40% spend time in paid work, which is consonant with US evidence. There is, however, considerable variation in the employment and care-giving patterns across Western Europe.

At first glance, employment and care-giving appear to be negatively related. On average, one of two women in this age group participates in the labour market, one in seven women provides care, and one in 16 women – some 6% of all women – combine employment and care-giving (see Table 2). Countries displaying the highest labour-force participation rates for midlife women report relatively low proportions of caregivers in the very same group and vice versa. The top three countries with regard to labour-force participation of midlife women are Denmark, the UK and Germany. Care-giving is most prevalent in the southern European countries of Italy, Spain and Greece.

Table 2. Labour-force participation and care-giving commitment: European midlife women, 1994 (row percentages)

	Midlife women	Proportion of women working	Proportion of women caring	Proportion of women doing both
	N	%	%	%
EU-12	12,526	49.3	15.1	6.1
Belgium	614	51.5	14.6	5.8
Denmark	567	75.8	10.1	7.1
Germany	1,089	60.9	14.3	7.2
Greece	1,285	40.9	17.4	8.4
Spain	1,520	31.4	19.3	4.7
France	1,447	57.2	8.5	3.6
Ireland	842	32.0	16.8	4.0
Italy	2,056	40.5	21.6	7.2
Luxembourg	223	43.2	11.0	3.4
The Netherlands	860	50.5	14.5	5.6
Portugal	1,276	57.6	8.2	4.6
United Kingdom	747	71.3	16.4	10.2

Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

A similar country pattern emerges when focusing on the subsample of care-giving women (Table 3). With the exception of Portugal and Ireland, the differences in the prevalence of work and care-giving appear as the differences between north and south. Table 3 also shows that, on average, the percentage of women combining employment and care-giving is markedly lower when the intensity of care-giving exceeds 14 hours per week. In the UK there is a difference of 10 percentage points in the

labour-force participation rates of the 'full' and the 'high-intensity' caregivers. This relationship, however, is not equally pronounced in all countries considered. Where the overall percentage of working caregivers is low, it is hardly conceivable at all.

Table 3. Employment status of caregivers 1994: European midlife women, 1994 (row percentages)

		Caring at all			Caring more than 14 hrs	
		Employed	**not employed**		**Employed**	**not employed**
	N	%	%	N	%	%
EU-12	1,861	40.1	59.9	1,193	32.1	67.9
Belgium	92	39.8	60.2	39	32.3*	67.7
Denmark	54	70.6	29.4*	8	/	/
Germany	157	50.0	50.0	87	43.0	57.0
Greece	233	48.4	51.6	151	44.2	55.8
Spain	277	24.5	75.5	229	24.1	75.9
France	118	42.7	57.3	44	/	80.9
Ireland	139	23.7	76.3	101	/	90.9
Italy	424	33.4	66.6	322	27.0	73.0
Luxembourg	24	31.0*	69.0*	8	/	/
The Netherlands	119	38.6	61.4	43	41.3*	58.7*
Portugal	99	56.3	43.7	90	54.6	45.4
UK	125	62.4	37.6	71	51.9	48.1

Notes: (/) N ≤ 10; (*) N = 11-30.
Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 4 presents the incidence of changes in care-giving hours and work hours from 1994 to 1996. On average, three-quarters of all women that were providing care to an adult dependent in 1994 have adjusted their weekly hours of care-giving over time. A 'change in care-giving hours' is defined as a move between three levels of care-giving intensity: 1 to 13 hours, 14 to 28 hours and more than 28 hours of care-giving per week.

Table 4. Frequency of changes in care-giving hours and work hours 1994-96 (as a percentage of women caring/working in 1994)

	Changes in categories of care hours	**Changes in work hours**
EU-12	78.0	65.9
Belgium	75.6	66.3
Denmark	57.7	41.0
Germany	75.4	61.4
Greece	87.6	81.1
Spain	80.8	75.5
France	74.3	61.6
Ireland	71.0	79.5
Italy	83.6	58.9
The Netherlands	71.1	58.4
Portugal	74.2	71.6
United Kingdom	73.2	69.7
N	1,787	4,965

Note: Luxembourg is missing because of sample-size problems.

Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Again, there is considerable cross-country variation in the percentages of women that report such changes (less than 60% of caregivers in Denmark but close to 90% of Greek women report such adjustments). Two-thirds of women that were working at the time of the first interview adjusted the number of hours worked per week, with a cross-country variation of 30 percentage points between Denmark (50%) and Greece (80%).

Adjustments in care-giving and employment can also be expressed in terms of the direction of the changes in the care-giving or employment status between the first interview in 1994 and the 1996 interview (Tables 5 and 6).

Table 5. Frequency of change in care-giving status and care-giving intensity, 1994-96 (N=12,027)
(row percentages)

	No care at all	Caring				
		No change	Decrease	Increase	Stop care	Start care
EU-12	79.35	3.32	1.89	1.42	8.46	5.57
Belgium	78.21	3.60*	/	/	8.33	7.03
Denmark	84.82	4.19*	/	/	4.40*	5.29*
Germany	80.00	3.54	2.03*	1.73*	7.07	5.62
Greece	78.20	2.16*	1.69*	1.55*	12.00	4.40
Spain	74.04	3.66	1.86*	2.61	10.88	6.94
France	87.35	2.19*	1.17*	/	4.58	4.11
Ireland	78.08	4.85	1.84*	1.20*	9.07	5.22
Italy	72.53	3.59	4.60	1.36*	12.29	5.63
The Netherlands	77.40	4.15	/	1.54*	8.04	8.22
Portugal	87.13	2.08*	/	/	4.32	4.83
United Kingdom	78.31	4.39	1.73*	1.54*	8.70	5.32

Notes: (/) N ≤ 10; (*) N = 11-30; Luxembourg is missing completely owing to sample-size problems.
Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 6. Frequency of change in employment status and work intensity, 1994-96 (N=12,027)
(row percentages)

	Not employed	Employed				
		No change	Decrease	Increase	Stop work	Start work
EU-12	45.45	16.88	13.67	12.17	6.82	5.01
Belgium	46.47	17.34	16.15	12.15	5.60*	2.16*
Denmark	20.70	37.21	16.50	14.47	7.81	3.30
Germany	34.06	23.57	18.86	12.24	6.41	4.86
Greece	52.34	7.73	12.80	10.07	10.27	6.79
Spain	64.84	7.72	9.01	8.06	6.65	3.72
France	36.88	22.20	14.79	13.80	7.03	5.30
Ireland	58.84	6.81	9.31	10.50	6.57	7.96
Italy	55.06	17.36	8.73	10.29	5.81	2.76
Luxembourg	55.44	17.16	9.98*	6.90*	8.76*	/
The Netherlands	43.28	20.96	12.88	13.96	2.55	6.38
Portugal	36.52	16.00	19.08	14.02	7.25	7.11
United Kingdom	22.66	21.65	20.28	21.64	7.74	6.03

Notes: (/) N ≤ 10; (*) N = 11-30; Luxembourg is missing completely owing to sample-size problems.
Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Among the 20% of midlife women who were care-giving in at least one of the years 1994 or 1996, most experienced a change in either care status *or* care-giving hours. More of the women who report adjustments terminated a care-giving spell or decreased hours than started or increased informal care-giving. Only 3% did not experience any changes in their care-giving commitment. Yet, women in the latter group may still have adjusted their time input (and the type of help provided) within the distinct intervals of care-giving hours.

Looking at individual countries, the absolute number of women in the sample who decrease or increase care-giving hours between 1994 and 1996 (changing between low-, medium- or high-intensity care-giving) is very small. Less than 2% of caregivers in each country (except Italy) report a decrease in the intensity of care-giving. Similarly, less than 2% have increased their care hours (with the exception of Spain). This underlines the benefit of clustering countries for the analysis.

A higher share of women in the sample are employed in 1994 or 1996 when compared with the percentage of women that engage in care-giving at some point of time. Therefore, there is no 'small-n-problem' when it comes to analysing an adjustment in weekly work hours for singular countries, except for Luxembourg and Belgium. The majority of women in paid employment in the EU-12 do adjust weekly work hours. Again, decisions to stop working or to decrease work hours are more prevalent than taking up a paid employment or increasing work hours. The same overall pattern holds for individual countries. Yet it appears that in southern European countries and in Ireland, where the percentage of women working in at least one of the two years under study is relatively small, the percentage of women who do not adjust their hours is also small.

There is more cross-country variation in the frequencies of different types of changes in employment than was the case for changes in care-giving. One possible explanation for this difference is that changes in work hours can be measured continuously. In any case, the frequencies for the changes in employment and informal care display an interesting communality. On average, midlife women tend to reduce rather than expand time spent on these two 'productive' activities. This behaviour does not fit into the picture of an adverse relationship between work and informal care, where one activity should increase (decrease) at the expense (to the benefit of) the other.

Table 7 describes – over a two-year interval – the bivariate relationship between changes in informal care-giving and changes in employment.[12] It shows that changes in care-giving status or care intensity only partly overlap with changes in employment. Nonetheless, some of the frequencies reported in the table conform to the hypothesised negative trade-off between care-giving and employment:

- The percentage of women that neither worked in 1994 nor in 1996 is higher for caregivers than non-caregivers. This could suggest that care-giving is conducive to maintaining a given non-working status.

- Among women who start care-giving, a smaller fraction than in any other group (4.4%) also starts working, although the differences are very small.

- The transition from a non-working status to employment occurs most often when women reduce care-giving hours or stop care-giving altogether.

- Non-caregivers more frequently stick to their schedules and are also more apt to increase the hours worked per week than any group of care-giving women.

- The share of women who decrease work hours and the percentage reporting transitions into a non-working status are both times highest in the group of respondents that have an increasing intensity of care-giving.

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[12] Not shown in the table is the (significant) result of the Pearson chi-square test, which indicates that the rows and columns of Table 7 are independent.

Table 7. Changes in care-giving and employment for the EU-12, 1994-96 (N=12,027)
(row percentages)

Employment change / Care-giving change	Not working both times	Start working	Working, no change	Working, hours increase	Working, hours decrease	Stop working
Not care-giving both times	43.6	4.9	17.9	12.8	14.0	6.8
Start care-giving	50.1	4.6	14.6	9.8	12.7	8.4
Care-giving, no hours change	58.4	4.9	13.4	8.9	10.9	3.5
Care-giving, hours increase	45.0	5.1	12.3	11.5	15.0	11.2
Care-giving, hours decrease	56.9	6.2	10.4	11.1	10.4	5.1
Stop care-giving	52.7	5.9	12.0	9.9	12.9	6.7

Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Still, a relatively sizeable proportion of care-giving women start both care-giving and working, or increase both work hours and care-giving hours, or reduce work effort along with care effort. Even if it concerns only a minority of all cases, this behaviour could point to additional financial needs and economic strain that are related to a care-giving responsibility.

A closer look at Table 7 reveals that changes in the opposite direction dominate the picture for caregivers that start or increase a care-giving commitment: they rather decrease than increase work hours and more often stop than start working. This pattern breaks when care-giving is terminated. In this case adjustments in both activities tend to run parallel to each other: higher percentages of respondents decrease rather than increase work hours and stop rather than start working. Hence, the response of employment to changes in care-giving appears to be asymmetrical.

Table 8. Size of change in work hours by changes in the care mode (N=12,027)
(in hours per week, EU-means)

	All	Start care-giving	Stop care-giving	Both care-giving	Not care-giving
Reduced hours	-9.5 hrs	-9.5 hrs	-9.7 hrs	-9.6 hrs	-9.5 hrs
Increased hours	8.9 hrs	9.5 hrs	10.5 hrs	9.7 hrs	8.6 hrs

Sources: ECHP, 1994 and 1996 (midlife women) (percentages are weighted), own calculations.

Table 8 reports the mean hours of reductions and increases in weekly work hours for the entire sample, for different sub-samples of care-giving women and for women who were not care-giving in the period under study. The average reduction in work hours for midlife women in the EU-12 between 1994 and 1996 amounts to 9.5 hours per week. On average, non-caregivers in the sample reduced their work hours by exactly the same amount.

With regard to the mean increase in work hours, all sub-samples of caregivers show above average increases, whereas non-caregivers slightly fall behind. The average increase in work hours is highest

for women who stopped care-giving altogether (10.5 hours) and for women who were providing care in both years (9.7 hours). Nevertheless, the differences are not significantly large.

Taken together, no clear pattern emerges from the descriptive statistics for the relationship between changes in care-giving and changes in work hours. On the one hand, we find that work hours increase markedly as the provision of informal care is terminated, which supports an adverse relationship between employment and care-giving for midlife women. On the other hand, the reduction in work hours for employed women who start care-giving and for women who were working in 1994 and 1996 is well in line with the average decline in work hours. More importantly, the *increase* in work hours for the same two subgroups of employed caregivers even exceeds the sample average. The potential economic strains of care-giving offer an explanation for this fuzzy picture. The primarily negative relationship between changes in care-giving and changes in work hours could be mitigated if economically distressed caregivers are forced to increase their weekly work hours. Hence a secondary effect of care-giving on work hours may unfold through the economic circumstances of caregivers and care recipients.

The following sections build on multivariate procedures to further explore the relationship between employment and care-giving. We first examine factors that determine the likelihood of care-giving using probit analysis, paying special attention to employment status and the weekly workload.

Probability of care-giving: multivariate analysis

Tables 9 and 10 show the results of the probit estimations. The predictive power of the models is low, ranging from a Pseudo-R^2 of 5% (for the odds of high-intensity care-giving) to a Pseudo-R^2 of 1% (for the odds of care-giving at all). This comes as no surprise, given that we could not include the information on the characteristics of the care-recipient. There is sound empirical evidence that the odds and intensity of care-giving are needs-driven.[13] If there was a way to include information on the functional status of the care recipient, the explanatory power of the models would – most probably – increase considerably. For some of the ECHP countries (i.e. Germany), such information can be derived from additional country-specific variables. Yet our analysis for the EU-12 has to dispense with these predictors.

In a similar vein, information on the size and structure of the family network would greatly enhance the explanatory capacity of the model. Empirical evidence for the US points to differences in the division of care tasks across different types of sibling groups, which are categorised by size and gender mix. A variety of literature indicates that the number of relatives that are women and the resource distribution in the extended family are significantly related to the likelihood of care-giving. Wolf, Freedman and Soldo (1997) as an example, show that the higher the number of sisters of a potential caregiver, the less likely that caregiver is to be engaged in parent care. Women with sisters devote significantly less time to parent care, whereas the number of brothers does not affect care effort.

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[13] "In short, the provision of care appears to be determined by the needs of the parent, while the ease with which children can fulfil those needs plays only a secondary role" (Johnson & Lo Sasso, 2000, p. 27). See also McGarry & Schoeni (1995) and Wolf, Freedman & Soldo (1997).

Table 9. Probit model predicting the start of care-giving (midlife women not care-giving in 1994)
(t-statistics in parentheses, marginal effects in italic)

1994 Variables	Start caring > 0 hours			Start caring > 14 hours			Start caring > 14 hours, only at home+		
	N=10,240			N=10,240			N=9,369		
Employed	-0.038	(-0.484)	*-0.005*	-0.196*	(-1.845)	*-0.013*	-0.318**	(-2.311)	*-0.014*
Hours	-0.002	(-1.005)	*-0.000*	-0.000	(-0.035)	*-0.000*	0.004	(1.408)	*0.002*
Age	0.065	(0.541)	*0.008*	-0.027	(-0.183)	*-0.002*	-0.044	(-0.238)	*-0.002*
Age_2	-0.001	(-0.577)	*-0.000*	0.000	(0.149)	*0.000*	0.000	(0.219)	*0.000*
Education	-0.012	(-0.260)	*-0.001*	-0.132**	(-2.211)	*-0.009*	-0.196**	(-2.482)	*-0.008*
Children_12	0.042	(0.664)	*0.005*	0.122	(1.620)	*0.009*	0.221**	(2.500)	*0.011*
Children_15	-0.048	(-0.769)	*-0.006*	0.044	(0.579)	*0.003*	0.062	(0.667)	*0.003*
Married	-0.077	(-1.329)	*-0.010*	-0.049	(-0.643)	*-0.003*	0.042	(0.406)	*0.002*
Unwed	0.129	(1.348)	*0.018*	0.245*	(2.061)	*0.020*	0.299**	(1.971)	*0.017*
National	0.176	(1.257)	*0.019*	0.280	(1.362)	*0.014*	0.259	(0.954)	*0.009*
Health	-0.073	(-1.207)	*-0.009*	-0.042	(-0.557)	*-0.003*	-0.027	(-0.287)	*-0.001*
Unemployment rate	0.001	(0.357)	*0.000*	0.014**	(2.518)	*0.001*	0.009	(1.315)	*0.000*
Dep. ratio	-0.103	(-0.226)	*-0.013*	-0.347	(-0.527)	*-0.023*	0.342	(0.372)	*0.015*
Country group 2	0.110	(0.956)	*0.015*	0.825***	(3.158)	*0.102*	-	-	-
Country group 3	-0.027	(-0.264)	*-0.003*	0.592**	(2.344)	*0.052*	-0.199	(-1.042)	*-0.008*
Country group 4	0.038	(0.350)	*0.005*	0.533**	(2.061)	*0.052*	-0.272	(-1.503)	*-0.009*
Country group 5	-0.052	(-0.451)	*-0.006*	0.850***	(3.304)	*0.105*	0.317**	(2.198)	*0.018*
Country group 6	0.060	(0.521)	*0.008*	0.669**	(2.576)	*0.062*	-0.015	(-0.080)	*-0.001*
Country group 7	-0.090	(-0.791)	*-0.011*	0.763***	(2.981)	*0.089*	0.137	(0.867)	*0.007*
Intercept	-2.963	(-0.979)		-1.594	(-0.416)		-1.648	(-0.348)	
Pseudo-R^2	0.01			0.03			0.05		
Pred. probability	0.06			0.03			0.02		

Notes: *** p < 0.01; ** p < 0.05; * p < 0.10; + without Denmark.
Sources: ECHP, 1994 and 1996 (midlife women), own calculations.

Table 10. Probit model predicting the start of care-giving (midlife women in salaried employment not care-giving in 1994)
(t-statistics in parentheses, marginal effects in italic)

	Start caring > 0 hours			Start caring > 14 hours		
1994 Variables	N=4,437			N=4,437		
Hours	-0.003	(-1.075)	*-0.000*	-0.005	(-1.423)	*-0.000*
Age	0.0512	(0.271)	*0.006*	-0.199	(-0.750)	*-0.009*
Age_2	-0.000	(-0.187)	*-0.000*	0.002	(0.853)	*0.000*
Education	0.066	(0.915)	*0.007*	0.048	(0.458)	*0.002*
Children_12	0.155	(1.507)	*0.019*	0.265*	(1.942)	*0.014*
Children_15	0.106	(1.118)	*0.013*	0.177	(1.340)	*0.009*
Married	-0.133	(-1.563)	*-0.015*	-0.117	(-0.936)	*-0.005*
Unwed	0.265**	(2.099)	*0.035*	0.327*	(1.897)	*0.019*
National	0.357	(1.332)	*0.030*	-0.052	(-0.163)	*-0.002*
Health	0.055	(0.548)	*0.006*	0.083	(0.585)	*0.004*
Wage	-0.051	(-1.072)	*-0.006*	-0.093	(-1.392)	*-0.004*
Vulnerability	-0.004	(-0.124)	*-0.000*	-0.058	(-1.483)	*-0.003*
Satisfaction	-0.034	(-1.418)	*-0.003*	-0.010	(-0.290)	*-0.000*
Unemployed	-0.119	(-1.171)	*-0.012*	0.002	(0.018)	*0.000*
Tenure	-0.006	(-0.816)	*-0.001*	0.013	(1.215)	*0.001*
Unemployment rate	0.002	(0.218)	*0.000*	0.023**	(2.203)	*0.001*
Dep. ratio	-0.253	(-0.387)	*-0.028*	-0.649	(-0.625)	*-0.028*
Country group 2	-0.013	(-0.086)	*-0.001*	0.685*	(1.858)	*0.053*
Country group 3	-0.102	(-0.801)	*-0.011*	0.575*	(1.668)	*0.030*
Country group 4	0.035	(0.238)	*0.004*	0.487	(1.331)	*0.032*
Country group 5	-0.315*	(-1.757)	*-0.029*	0.700*	(1.882)	*0.055*
Country group 6	-0.019	(-0.112)	*-0.002*	0.608	(1.634)	*0.040*
Country group 7	-0.151	(-0.829)	*-0.015*	0.719*	(1.925)	*0.059*
Intercept	-2.832	(-0.586)		2.605	(0.385)	
Pseudo-R^2	0.02			0.06		
Pred. probability	0.05			0.02		

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.
Sources: ECHP, 1994 and 1996 (midlife women), own calculations.

Furthermore, the model does not include controls for the economic status of the caregiver household or for the financial status of care recipients. Income and wealth variables have been found to be of minor (if any) importance for the likelihood of care-giving.[14] Yet, they may affect the employment and care-giving relationship for pockets of economically distressed households and may also gain importance over the course of a care-giving relationship.[15] We still decided to not to account for economic status, because a) we were not interested in modelling and estimating inter-family or intra-family decision-making on care-giving and b) information on the income and wealth of care recipients was not available for the analysis. Adding economic status to the controls calls for the consideration of non-work income as well as the employment status and income of husbands. Such an endeavour should be grounded in theory and approached with a structural model. That being said, some tentative conclusions can still be drawn from the probit estimations.

Indications for a negative trade-off between employment and care-giving nearly exclusively emerge for the odds of providing more than 14 hours of care per week. This holds for the employment status, in particular. Being employed in 1994 reduced the likelihood of taking on high-intensity care responsibilities in 1996. For women with paid employment in 1994[16] the analysis does not reveal any significant relationship between the weekly work hours, wages or other employmedt-related variables and the likelihood of starting care. But we estimate a small and significant impact of the country-specific female unemployment rate on the odds of becoming a caregiver who provides 14 or more hours of care per week. This effect is more marked for the sub-sample of employed women.

Other than employment-related factors (which turn out to be significant predictors for the likelihood of becoming involved care-giving) are education and family status. The negative coefficient of the education variable shows that, all else being equal, higher-educated persons had a lower probability of starting care-giving in 1996. This effect is only significant for the full sample. One could argue that the wage-variable absorbs the effect of education in the model-specification for employed women. This argument is in line with time-allocation theory, which proposes that the higher the value of time spent on paid work the higher the opportunity cost of care-giving. If education is merely a proxy for potential earnings, the wage rate could indeed cannibalise the education effect. In an alternative specification of the model for the full estimation sample (not shown here), we have tested if the significance of the education variable disappears as wage is included. The result shows that this is not entirely the case. Education preserves its significant influence despite the inclusion of a wage variable.

The odds of care-giving were also found to be higher for never-married women. This variable proved to be the most important predictor of care-giving commitments in all probit estimations. Living with young children (aged 12 or under) is positively related to the odds of high-intensity care-giving. For both samples, this effect is only significant for women caring more than 14 hours, which points to economies of scale and scope in household production.

The influence of the country group variables differs by care intensity and between the full sample and the sub-sample. In the estimations, Denmark is used as the (omitted) reference case. Looking at the estimates for the full sample, the institutional and labour-force participation factors appeared to affect the likelihood of taking on a care-giving responsibility. Yet the difference between countries mainly occurs if the high-intensity care measure is used. As we might expect, midlife women in all countries had a higher probability of starting care-giving than their Danish peers.

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[14] See for example McGarry & Schoeni (1995) for caregivers aged 50 to 60.

[15] McKinlay et al. (1995), to quote an example, find that economic circumstances co-determine transitions into institutions. "In short, impact on the caregiver's time and financial situation, rather than impact on family life and work, appeared to lead to institutionalization of the elder" (McKinlay, Crawford & Tennstedt 1995, p. 519).

[16] As we expect a substantially different relationship between changes in care and work hours for self-employed women, the sample of employed women only refers to women in salaried employment (a similar approach is proposed by Pavalko & Artis, 1996).

Portuguese women in particular (country group 5), who are confronted with labour market conditions and a long-term care environment that are utterly distinct from the Danish setting, had a significantly higher probability of starting care-giving at home. This is also the case if we use the regular care measure for employed women.

Compared with the results of Pavalko & Artis (1997), who used a very similar model specification for the US, we detect a greater variety of significant relationships. The only factor that proved to be an important predictor of care-giving in their study – job tenure – does not even come close to significance in our estimations. In return, our results highlight family status, education and country-specific settings. These findings corroborate evidence from previous studies that socio-demographic factors and behaviour assume primary importance in care-giving decisions.

Association between adjustments in care-giving and work hours: Multivariate analysis

Using OLS regressions to explore the association between changes in work hours and changes in care-giving reveals several general patterns. Tables 11 to 13 show the results of the different OLS regressions on the difference in work hours from 1994 to 1996. As indicated by the respective values for R^2, the explained variation in the dependent variable is low for all models and particularly so for models that pertain to the sub-sample of employed women (the same holds true in the study of Pavalko & Artis, 1997). The explanation for this relatively poor fit may be similar to the one suggested for the probit estimates. Given the data limitations, however, our results still offer valuable insight into the relationship between changes in care hours and changes in work hours in Europe.

Since the dependent variable is the change in weekly work hours, a positive (negative) coefficient for an independent variable may be read in two different ways: it either signals that an overall reduction in work hours is mitigated (reinforced) or that the variable adds to (reduces) an increase in work hours between 1994 and 1996. Our descriptive statistics show that the majority of women in the sample cut down on work hours between 1994 and 1996. Therefore we suggest that a negative association between an explanatory variable and the dependent variable actually indicates a net reduction in weekly work hours.

To begin with, the response of changes in work hours to changes in care-giving is asymmetrical. In all models and for almost all estimation samples, starting care-giving and increasing the hours spent on informal care are both significantly and negatively correlated with a change in the number of weekly work hours. Equally important is the finding that terminating the provision of care, restraining care efforts or maintaining the same level of care intensity stand in no significant relationship with the change in work hours. These findings are consonant with those from Pavalko and Artis (1997) for the US.

Among the variables controlling for the respondent's situation in 1994, age, education and health are significantly related to a change of work hours in almost all models. The overall relationship between age and a change in work hours is positive and non-linear. As age increases so do positive adjustments in weekly work hours. Also the relationship between health and change in work hours goes in the expected direction: *ceteris paribus*, women with health problems in 1994 tended to decrease their weekly work hours from 1994 to 1996. Women with a high level of education in 1994 significantly and positively adjusted their weekly work hours in comparison with respondents who reported lower levels of education. The influence of the remaining predictors varies by employment status in 1994, country group or care-giving status in 1996.

Table 11. OLS regression prediction of change in work hours, 1994-96 (t-statistics in parentheses)

	All women		Employed women, 1994 (not self-employed)	
	N=12,027		N=5,672	
Stop care	-0.282	(-0.638)	0.276	(0.335)
Start care	-1.417***	(-2.640)	-1.776*	(-1.689)
Increase care	-2.838***	(-2.645)	-2.087	(-1.103)
Decrease care	0.274	(0.307)	-0.536	(-0.290)
Stable care	-0.367	(-0.613)	0.696	(0.511)
Employed	-9.202***	(31.916)	–	–
Age	1.656**	(2.291)	3.631***	(2.764)
Age_2	-0.019***	(-2.701)	-0.040***	(-3.002)
Education	1.791***	(6.604)	2.471***	(5.754)
Children_12	-0.184	(-0.437)	0.596	(0.866)
Children_15	0.497	(1.287)	1.199**	(1.989)
Married	-0.456	(-1.289)	-0.550	(-1.070)
Unwed	1.015	(1.613)	-0.248	(-0.291)
National	1.896**	(2.192)	1.872	(1.198)
Health	-1.469***	(-4.444)	-2.267***	(-3.361)
Unemployment rate	-0.029	(-1.065)	-0.107*	(-1.782)
Dep. ratio	-0.914	(-0.359)	-2.815	(-0.737)
Country group 2	-0.643	(-1.051)	1.222	(1.584)
Country group 3	-0.215	(-0.382)	0.104	(0.156)
Country group 4	-1.904***	(-3.048)	-1.409	(-1.602)
Country group 5	-0.381	(-0.535)	-1.210	(-1.151)
Country group 6	-1.693**	(-2.585)	-0.382	(-0.389)
Country group 7	-2.772***	(-3.944)	-5.956***	(-4.987)
Intercept	-29.622	(-1.614)	-82.865	(-2.546)
R^2		0.10		0.05

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$; robust standard errors.
Sources: ECHP, 1994 and 1996 (midlife women), own calculations.

Table 12. OLS regression prediction of change in hours of work, 1994-96 for northern and southern countries (t-statistics in parentheses)

	All women				Employed women, 1994 (Not self-employed)			
	Northern countries		Southern countries		Northern countries		Southern countries	
	N= 5,322		N=6,705		N=3,009		N=2,109	
Stop care	-0.760	(-1.225)	0.043	(0.072)	-0.024	(-0.026)	0.463	(0.355)
Start care	-1.895***	(-2.599)	-1.011	(-1.311)	-2.641**	(-2.378)	-0.449	(-0.219)
Both care	-0.311	(-0.488)	-0.987	(-1.490)	0.359	(0.334)	-1.386	(-0.809)
Employed	-8.021***	(-21.216)	-10.133***	(-23.926)	-	-	-	-
Age	2.570**	(2.558)	0.788	(0.768)	5.394***	(3.641)	1.662	(0.685)
Age_2	-0.029***	(-2.871)	-0.011**	(-1.037)	-0.057***	(-3.801)	-0.021	(-0.847)
Education	1.930***	(5.418)	1.810***	(4.320)	1.750**	(3.379)	3.629***	(4.807)
Children_12	0.380	(0.562)	-0.544	(-1.010)	2.413**	(2.962)	-1.121	(-1.028)
Children_15	1.115**	(1.976)	0.039	(0.076)	1.939**	(2.928)	0.238	(0.230)
Married	-1.069**	(-2.462)	0.402	(0.666)	-1.171**	(-2.169)	0.925	(0.808)
Unwed	0.521	(0.627)	1.829*	(1.934)	-0.515	(-0.534)	0.601	(0.382)
National	1.039	(1.197)	5.293**	(2.058)	1.700	(1.149)	4.807	(0.738)
Health	-2.152***	(-4.885)	-0.743	(-1.497)	-2.920***	(-3.877)	-1.0230	(-0.771)
Unemployment rate	-0.116	(-1.449)	-0.369*	(-1.879)	-0.119	(-1.069)	-0.113	(-0.298)
Dep. ratio	1.051	(0.330)	106.366*	(1.673)	-2.667	(-0.614)	6.497	(0.052)
Group 2 (north)	-0.355	(-0.548)	-	-	1.232	(1.557)	-	-
Group 3(north)	0.030	(0.051)	-	-	0.028	(0.040)	-	-
Group 4 (north)	-2.071**	(-2.594)	-	-	-1.743	(-1.527)	-	-
Group 6 (south)	-	-	-8.472*	(-1.834)	-	-	-0.368	(-0.040)
Group 7 (south)	-	-	-5.931**	(-2.405)	-	-	-5.278	(-1.085)
Intercept	-53.302	(-2.103)	-138.58	-1.797	-126.796	(-3.484)	-49.162	-0.307
R²		0.10		0.11		0.04		0.04

Notes: *** p < 0.01; ** p < 0.05; * p < 0.10; robust standard errors.
Sources: ECHP, 1994 and 1996 (midlife women), own calculations.

Table 13. OLS regression prediction change in hours of work 1994-96 – midlife women in salaried employment in 1994
(t-statistics in parentheses)

	Caregivers 1996		Non-caregivers 1996	
	N=513		N=4,543	
Care 94	1.754	(1.230)	0.848	(1.063)
Age	12.995***	(2.688)	2.154	(1.605)
Age_2	-0.134***	(-2.750)	-0.025*	(-1.805)
Education	1.674	(0.981)	0.598	(1.283)
Children_12	2.843	(1.051)	0.395*	(0.567)
Children_15	-1.061	(-0.482)	1.155	(1.841)
Married	-0.027	(-0.014)	-0.189	(-0.350)
Unwed	0.653	(0.261)	-0.445	(-0.492)
National	11.921	(1.579)	1.709	(1.030)
Health	1.203	(0.649)	-2.595***	(-3.544)
Wage	2.500*	(1.674)	3.705***	(8.825)
Vulnerability	-0.514	(-0.808)	-0.041	(-0.208)
Satisfaction	1.523**	(2.910)	0.408**	(2.370)
Unemployed	-3.389	(-1.117)	-4.691***	(-6.687)
Tenure	-0.461**	(-2.437)	-0.314***	(-5.856)
Unemployment rate	0.010	(0.048)	-0.110*	(-1.801)
Dep. ratio	22.751*	(1.816)	-7.931*	(-1.921)
Country group 2	3.8223	(1.539)	1.721**	(2.046)
Country group 3	-0.335	(-0.158)	1.382*	(1.922)
Country group 4	0.766	(0.267)	-0.061	(-0.064)
Country group 5	6.136	(1.325)	2.474**	(2.046)
Country group 6	-0.721	(-0.222)	2.590**	(2.436)
Country group 7	1.283	(0.356)	-1.186	(-0.811)
Intercept	-365.307	(-3.043)	-45.445	(-1.368)
R^2	0.10		0.08	

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$; robust standard errors.
Sources: ECHP, 1994 and 1996 (midlife women), own calculations.

Table 11 presents the results for specifications of the OLS models that include six country dummies (where Denmark is again used as the reference case). We report estimates for the full estimation sample and for the sub-sample of employed women. Among the variables of primary interest, taking on a new care-giving responsibility or increasing the hours of care in previous commitments show a significant adverse effect on changes in weekly work hours. For the sub-sample of employed women, however, the 'start care' dummy is only significant at the 10% level. The coefficient for the increase in care hours turns out to be insignificant for this group of women.

Other differences in the predictors of a change in work hours between the full sample and the sub-sample of employed women concern i) the effect of having older children in the household and ii) citizenship. The first variable positively and significantly affects the change in work hours for employed women only.[17] By contrast, the positive impact of citizenship on the change in work hours only unfolds in the estimation for the full sample. Similarly, the influence of the country dummies on changes in the dependent variable differs between the full sample and the sample of employed women. Relative to Danish women and irrespective of their employment status in 1994, women living in the country groups 4 (Belgium and Ireland), 6 (Italy and Spain) and 7 (Greece) tended to decrease weekly work hours significantly from 1994 to 1996. Among employed women, the country of residence only mattered significantly for those living in Greece. At the same time, the coefficient on living in Greece was much more pronounced than in the full sample and is by far the most striking coefficient in the model for employed women.

Our results for the impact of age and employment status match the findings of Pavalko and Artis (1997) for the midlife women in the US. Using a similar set of independent variables our study finds that age positively affects changes in weekly work hours, whereas being employed in the starting year has a significant and adverse effect on the dependent variable.

Table 12 displays the results by country groups. The group of so-called 'southern' countries comprises Greece, Ireland, Italy, Spain and Portugal. These countries are characterised by a very modest policy focus on institutional care or formal home help (The Royal Commission on Long-Term Care, 1999). The second group accommodates northern countries with a much stronger focus on institutional care or formal home help. This specification of the model uncovers that the northern countries fully account for the significant impact of care-giving on changes in work hours whereas no such association emerges for the southern countries. One may conclude that the role overload is simply not an issue in these countries because being employed does not fit into the standard role expectations for midlife women, whereas family care-giving naturally does.

Among both country groups and for all models there were no significant differences in the impact of education on changes in work hours. The effects on family status variables, nationality and health status differed by country group as well as between the full sample and the sample of employed women. Poor health has a significant negative impact in northern countries only. Co-residence with older children is significantly associated with positive adjustments in work hours in northern countries only and more so in the sample of employed women. The same holds true for the significant and negative effect of marital status on the dependent variable. The nationality effect is entirely 'southern driven'. Once again, country dummies are used to highlight differences within groups. The model for northern countries includes country dummies for country groups 2 (the Netherlands and Luxembourg), 3 (Germany, France and the UK) and 4 (Belgium and Ireland), where country group 1 (Denmark) serves as the omitted category. The specification for southern countries makes use of the country dummies for groups 6 (Italy and Spain) and 7 (Greece), with Portugal as the reference case. For both sub-samples, country-dummies are only significant for the full sample of women. Cross-national variation appears to be more relevant for the group of southern countries, with a relative high aptitude of midlife women in Italy, Spain and Greece to reduce work hours (or to increase work hours only moderately) when compared with Portuguese women. The coefficients for country groups 6 and 7 are

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[17] As stated earlier, in most cases, this means that women still *reduced* work hours, but to a lesser extent than women in households without children aged 15 and older.

not only significant but also quite large. Among northern countries changes in weekly work hours for women in Belgium and Ireland significantly and negatively deviate from changes measured for their Danish peers.

Table 13 provides results for the sub-sample of women in salaried employment at the time of the first interview by care-giving status in 1996. The models highlight the differential impact of various explanatory variables for caregivers and non-caregivers, who were employed in 1994. Among both groups the care-giving status in 1994 does not show a significant association with the change of work hours from 1994 to 1996. With regard to other controls, there are some important differences in the predictors of changes in work hours between 1996-caregivers and non-caregivers.

Overall, we can identify more significant relationships for the non-caregiver sample than for the caregiver sample. If we look at relationships that are significant at the 5% or 1% level the caregiver model uncovers three and the non-caregiver model reveals eight significant relations. The (positive) coefficient for age is extremely powerful and highly significant in the estimation for the caregiver sub-sample but hardly matters for women who were not care-giving in 1996. The significant effects on the adjustment of weekly work hours of health status, the wage rate and a former unemployment spell are all confined to the sample of non-caregivers. The wage earned in 1994 and employment history show the most striking coefficients in the latter group. The wage rate exerts a positive influence on changes in work hours whereas an unemployment spell in the past is associated with a decrease (or a diminished increase) in work hours. Further differences between both groups concern the macro-level predictors, namely the unemployment rate, the dependency ratio and the country dummies. There is a puzzling difference in the coefficients for the dependency ratio in the estimation for caregivers on the one hand and the estimation for non-caregivers on the other hand – although these effects are only significant at the 10% level. With regard to the country-specific variables, no systematic pattern can be discerned. In the estimation for non-caregivers more country variables show a significant association with changes in work hours: in this sub-sample, women who are living in the Netherlands, Italy, Portugal and Spain tend to increase their work hours (or reduce hours more slowly) relative to Danish women.

Some of the differences may be a result of the much larger sample size of the non-caregiver sub-sample. The significant relationship between the satisfaction and tenure variable with the change in work hours, however, is strong enough to even emerge in the much smaller caregiver sample. More satisfied employees tend to increase work hours, while those with longer tenure tend to decrease work hours. The latter effect might be caused by women, who have spent enough years in paid employment to meet the qualifying requirements for social security benefits or employer pensions.

A final comparison of our results for Europe with the results of the almost identical models for the US as presented in Pavalko and Artis (1997) shows that there are more similarities than differences. This lends support to the hypothesis that even against the background of different policy settings there are common patterns describing the relationship between changes in care-giving and changes in work hours. Both studies find significant results for age and satisfaction on the job, and it is obvious that employment-related factors play a more significant role than socio-demographic factors other than age.

5. Conclusions

With this chapter we made a first attempt at studying the empirical relationship between the changes in care-giving and changes in weekly work hours in a European context. A better understanding of this association is particularly relevant in light of population ageing on the one hand and an increase in the labour-force participation of women on the other hand.[18] While we know that the growth of the population aged 65 and older does not necessarily increase the population in need of long-term care, a

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[18] This holds particularly true for midlife women who enter a period in which most children can take care of themselves.

variety of empirical research in fact projects a rise in the demand for long-term care.[19] And although we know that not all women wishing to join the labour market will actually succeed in doing so, there is solid evidence for a continuing increase in the labour-force participation of women in general and of midlife women in particular (Jenson and Jacobzone 2000, pp. 12-13; Schulz et al., 2001a, p. 34).

Given these two main trends a better understanding of the relationship between care-giving and work is overdue. What do the results of our study contribute to fill this knowledge gap? In our bivariate descriptive analysis we found that apart from cross-national differences among the 12 European states under study, there is some evidence of a negative correlation between changes in work hours and changes in hours of care-giving. The first set of multivariate models, which explained the probability of starting care-giving in 1996 shows that employment status or other work-related factors hardly explain why women become caregivers. Yet, employment status does matter for women who start to provide at least 14 hours of care per week, which is a plausible result. It is easier to combine employment with low-intensity rather than high-intensity care-giving.

In view of this result we can conclude that the provision of care to older persons in need of high levels of support is more of an issue in respect to the labour-force participation of midlife women than is care-giving to the less incapacitated elderly. Independent of the intensity of care, the age and the family status of a woman are significantly related to the likelihood of becoming a caregiver. Never-married midlife women are much more likely to assume a caring responsibility than those who are married, divorced or widowed. This finding is in accordance with empirical evidence for the US indicating that competing family obligations (childcare, time spent with partners or significant others) reduces the odds of care-giving.

The models to describe the relationship between the changes in weekly work hours and changes in care-giving show that a change in work hours is significantly and negatively associated with the start or the increase of informal care-giving, while no such association emerges for women terminating a care-giving spell or reducing care hours. This suggests that among midlife women, reductions in work hours or exits from the labour force are not likely to be recovered after care-giving responsibilities stop.

The negative association between starting or intensifying the provision of care and changes in work hours is significant in northern Europe (except for Ireland) but not in southern countries, and it is stronger for women who were employed at the time of the first interview. The first result might be influenced by better substitution possibilities for women in northern countries, with a more intensive focus on institutional care and formal home help. Women in these countries really have a choice in deciding if they should start care-giving or increase their care-giving, while strong family boundaries and limited access to formal care may not leave such a choice to women in southern countries. Thus their care-giving decision is independent of any change in the work hours.

It would be intriguing to compare our results with estimations that use bivariate models. In addition, further research is needed to account for simultaneity in the decisions on work hours and care hours, to improve our understanding of country-specific effects, and to explore the role of economic distress in explaining patterns of work and care for midlife women.

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[19] For the German context, see for example, Schulz et al. (2001a).

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CARE-GIVING FOR OLDER PERSONS AND PERSONAL EMPLOYMENT A NEW PROBLEM FOR WOMEN

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1. Introduction

The population of the Federal Republic of Germany is ageing and radical changes in the age structure are predicted, especially starting from 2020. The ratio of the number of persons aged 60 years and older to the number of persons aged between 21 and 59 years old is often used to measure the extent to which a population has aged. This ratio was 0.4 in the mid-1990s. In other words, there were four elderly persons for every ten middle-aged persons. An intermediate-term projection for the year 2030 indicates that this ratio will rise to 0.75 (Lutz & Scherbov, 1998, p. 97). An increase in the number of elderly in need of care goes hand and hand with the process of population ageing. New estimates expect the number of persons in need of long-term care to rise from 1.9 million to 2.94 million people in 2020 and perhaps even to 4.73 million in 2050 (Schulz, Leidl & König, 2001, p. 70). Another important change that has taken place in the last few decades is the increasing labour-market participation of women. This increase is related to the fact that more married women have entered the labour market (Blossfeld & Hakim, 1997).

At first glance these two macro-level processes seem to have nothing to do with each other, but if one asks who provides the care for the elderly in Germany then the focus quickly shifts to primarily daughters or daughters-in-law, but also on institutional care in nursing homes. The law on nursing-care insurance passed in 1994 was intended to support family members who provide long-term care in their private household. Empirical research in the last few decades has shown that, alongside care provided by daughters, a second noteworthy source of potential care-giving exists within the family – the partner (BMFSFJ, 1996, p. 134; Mayer & Wagner, 1996, p. 270; Thiede, 1988, p. 235). Nevertheless, daughters and daughters-in-law play a crucial role in coverage of the care risk. This applies in particular if the person needing care is already widowed. In contrast, the involvement of sons in care is very infrequent. A reduction of working hours in their careers is normally not considered (Conen, 1998). Instead, it is the daughters who have to juggle two time-consuming duties. This can lead to conflicts and such conflicts can be expected to become even more severe with the increased labour-market participation of women. As a result, the conflict of care-giving and employment is an important question for social policy.

We use event history analysis to analyse the effects of having an elderly person in need of care in the household on the labour-market participation of women. Event history analysis has been increasing in popularity in the past ten years and has been used for many analyses of the effects of children and changing household structure on the working careers of women (Drobnič, 1997; Stephan, 1995; Lauterbach, Huinink & Becker, 1994; Blossfeld & Hakim, 1997; Kurz, 1998a; Drobnič, Blossfeld & Rohwer, 1999). In the empirical part we first analyse how the presence of an elderly person in need of care in the household influences women's decisions to leave the labour force. In our ensuing analysis we divide these working women into part-timers and full-timers. Full-timers normally have a higher income, but they also have less time for family tasks. Finally, we analyse whether a shift from full-time to part-time work is a strategy that is really implemented by full-timers to combine the competing spheres of care-giving and employment.

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In the next section we provide a brief overview of the development of the labour-force participation of women in West and East Germany followed by a section dealing with current research on care-giving. Thereafter, we describe a theoretical framework for the conflict between care-giving and employment with the use of Becker's New Household Economics.

2. Long-term trends in women's labour-force participation in West and East Germany

The greatest shift in the work orientation of women was observed for married women in the course of many decades in West Germany. There are a various factors promoting their increased work orientation. Owing to a longer life expectancy and a decreasing number of children, married women are not solely occupied with childcare from the birth of their first child until their own death. Instead, a new phase of life has emerged, the so-called 'empty nest', in which women are released from the responsibility of child rearing, but are still at an employable age. Maternity is becoming more predictable because of contraception and induced termination, so that women are better able to plan childbirth and the number of children. Consequently, women can also better reconcile a working career with motherhood. Marriage is also no longer a guarantee of lifelong security provided to the woman by her husband because an increasing number of marriages end in divorce. Women without their own secure source of income have a high probability of sinking into poverty after divorce. Housework has been rationalised by the introduction of new technical equipment into the household. As a result, the value of domestic work has depreciated on the one hand, while on the other, less time is needed for household tasks (see Beck, 1986, p. 116, 182). A very important additional influence is the expansion of education in which women have benefited to a greater extent than men (Blossfeld, 1985, 1989, 1991).

Women's change in orientation towards work is reflected in modified forms of labour-market participation. Thus, marriage itself has lost the effect of a woman's withdrawal from the labour market. Instead, the birth of the first child has become important (Lauterbach, 1994). As a result, the duration of the absence from the labour market for childcare has been getting shorter and shorter during the last few decades (Blossfeld & Rohwer, 1997; Drobnic, 1997). Yet, in spite of women's greater labour-market participation, the working careers of women are different from the typical careers of men, even for young married women. In West Germany, a lot of married mothers make use of part-time work in order to combine family demands and work (Blossfeld & Hakim, 1997). For such women part-time work is a way to keep in touch with the labour market. And they can thereby benefit from a number of positive aspects such as having colleagues, experiencing acceptance of their work and improving the household's income situation.

In any case, part-time work reinforces gender specific roles in the family, as family work is still done primarily by women (Schupp, 1991). "The majority of female part-timers regard breadwinning as the primary (but not exclusive) responsibility of men and see wives as secondary earners whose primary (but not exclusive) responsibility is for the home" (Hakim, 1997, p. 39).

In contrast to West Germany, there was a more rapid and more comprehensive process of including women in the labour force in the German Democratic Republic. Labour-intensive production and a reduction in the manpower potential by migration to West Germany brought about a high level of integration of women into the labour force. The state therefore maintained a widespread system of day care (Geißler, 1996, p. 275), but domestic work also remained the responsibility of women in the German Democratic Republic (Holst & Schupp, 1995, p. 7). The political and economic breakdown of the socialist part of Germany caused the labour market situation there to worsen rapidly. This affected women in particular, but East German women still have greater labour market participation rates than West German women as we can see in the economic activity rates (StBA, 1998, p. 261, p. 349; Kurz, 1998b, p. 183). Part-time work was very uncommon in the German Democratic Republic and is still very unpopular today (Holst and Schupp, 1995, p. 7). Altogether, large differences between West and East German (married) women exist.

3. Care-giving and its influence on labour-market participation

Numerous empirical studies show that persons who combine work and care-giving have two conflicting time-consuming duties (Beck, 1997, p. 201; Gottlieb, Kelloway & Fraboni, 1994, p. 818; Neal et al., 1993, pp. 129-137; Scharlach & Boyd, 1989; Brody et al., 1987). Thus, employees with older family members in need of care take more sick leave, come late to work and have to leave work early more often. They tend to be more frequently in need of time-off than persons without care-giving activities. Care-giving persons are also often distracted at work, reducing their efficiency. These persons seldom take part in professional training because of time constraints. Care-giving employees experience more stress and often cancel their leisure activities, such as volunteer work or private contacts, in favour of providing care. Most studies stress that gainful employment is restricted further as the need for care increases.

There are remarkable differences between care-giving men and women: women have a greater burden than men if we control for the level of care needed and working conditions (Neal et al., 1993, p. 135). Also the perception of the care-giving/employment conflict is quite different for men and women. As Dallinger (1997b, p. 277) states, women often feel they have to justify their ongoing employment while men see their employment as something which is normal and does not need to be questioned. Although married and unmarried women justify their gainful employment, usually only married women leave the labour force in order to provide care full-time. Most of the time these women have a secure existence provided by their partners.

Withdrawal from the workforce in order to provide care reduces family income and payments into old-age pension schemes in the long run.[1] If middle-aged women are confronted with the risk of having a relative in need of care, the chance that they will re-enter the labour force after a withdrawal is slim because of their age, so that leaving work could also mean a complete withdrawal from the labour force (Dallinger, 1997b, p. 74).

The German welfare state increases the probability that care will be provided in private households rather than in a nursing home. The primary reason for this is the cost incurred by institutional care. If the pension and wealth (alongside the payments of the nursing-care insurance) of the person in need of care are too small to cover the nursing home costs, then the person receives money from the social assistance system called 'Hilfe zur Pflege' (Bundessozialhilfegesetz, §§ 68, 69). But social assistance is subsidiary in the Federal Republic of Germany, which means that the children have to repay this assistance to the local community if they have enough income and wealth. The anticipation of potential payments to the local community if the parents move into a nursing home should increase the occurrence of care-giving in private households. Even after the implementation of nursing-care insurance, the cost incurred by institutional care is so high, that 44% of persons in need of care in West Germany and 29% of those in need of care in East Germany who receive a 'care allowance' from the nursing-care insurance still receive social assistance (Schneekloth & Müller, 2000, p. 179). Children have also the chance to save the wealth of their parents and consequently their potential inheritance by providing care in their own household.

Cross-sectional studies indicate that a very large part of care-giving women quit their work and that the level of care needed drives this process (Schneekloth & Müller, 2000; Dallinger, 1997a; BMFSFJ, 1996, pp. 147-149). This is particularly the case in West Germany. The most important cause for lower rates of job departures by East German women is that they are more labour-market oriented. There is no evidence that the observed higher rates of using supplementary home-nursing care is a strategy to combine care-giving and own employment. Although the portion of supplementary home-nursing care is greater in East Germany (37% in East Germany versus 19% in West Germany), the proportion of working and non-working women with supplementary help is the same in East Germany (Dallinger, 1997a, p. 152).

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[1] The implementation of the nursing-care insurance improved the situation of care-giving persons, as under certain circumstances contributions to the pension scheme are made by the nursing-care insurance.

4. Household production and division of labour as a reason for the provision of care and labour-market decisions

According to neo-classical labour market theory, individuals face the problem of combining leisure time and work time in such a way that they obtain maximum utility. They increase their working hours until the utility of an additional working hour is as high as the utility lost by giving up an additional hour of leisure time.

In basic neo-classical theory leisure time is oversimplified as 'good'. This is different from new approaches such as the New Household Economics of Gary S. Becker (1993a, p. 97). He states that individuals produce goods and services, referred to as 'commodities' during their leisure time. These commodities are, for example, cleaning or childcare. For the production of such commodities individuals need time and mostly income. This income can be earned income or unearned income such as gains from funds or property as well as state transfers such as child allowances or care allowances. It is important to note that it is not possible to use market goods for the production of such commodities if a person has no income. Thus individuals have to jointly maximise household and market goods.

According to Becker's theory of New Household Economics, what options are available if there is a person in need of care in the household?

If there is an elderly relative in need of care, then the person can reorganise household production. Time-consuming commodities could be replaced by market goods or dropped altogether in favour of the new commodity of 'care-giving'. This reorganisation may have no effect on the existing division of working and non-working time, in which case care-giving would have no influence on labour-market participation.

But in cases where an elderly person needs round-the-clock care, the restructuring of leisure time alone cannot be enough. Yet, a reduction of working hours or a withdrawal of the labour force is only possible if there is enough money from other sources.

The commodity of 'care-giving' could, however, mean that the value of leisure time increases. Thus, the equilibrium of working and non-working time could shift and result in an increase of leisure time.

The recourse to professional caregivers could be an alternative or a supplement to private care-giving. Thus persons can compare the shadow price of the commodity of care-giving with the price of the market good. If we assume that each hour of leisure time has the same value as each working hour, we could calculate the shadow price as the amount of time for care-giving times the wage rate. If the shadow price of care-giving within the household is lower than the price of the market good, then the person should reduce his or her working hours and give care to the elderly relatives themselves.

As previously mentioned, institutional care is very expensive. If the income of the person in need of care is not sufficient to cover the costs of such an institution, social assistance payments are provided, but the local government then turns to the children to demand repayment of the money. Thus the children incur costs if they refuse to provide the necessary care themselves. These costs minimise the value of working time. Private care may be forced onto people by this construction of the welfare state.

Persons in need of care have been eligible for a care allowance since April 1995 (SGB XI, §§ 1, 37). If the person in need of care hands this money on to the care-giving person, then the value of leisure time rises and a reduction of work would be likely.[2]

As noted above, market goods are usually necessary for the production of commodities. Hence, a care-giving person cannot quit his/her job if sufficient income from other sources does not exist. A person

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[2] According to the New Household Economics, only time spent in the labour force is considered working time. Caregivers receiving transfer income are not employed by the state or by the care-needing person. Hence transfers increase the value of the leisure time and a work reduction in favour of care-giving is not a job change.

in a partnership does not base his or her decisions on his or her own market income alone, but in combination with that of his or her partner, so it is necessary to extend the model.

According to Becker (1993b, p. 30), not every single household member tries to maximise his own utility function alone. Instead, the household members maximise one joint utility function together. Consequently, all household members have to negotiate the division of working time and leisure time with respect to each other. This theory does not include family power structures. The allocation is only related to comparative advantages in household and market work. "The theory of comparative advantage implies that the resources of members of a household (...) should be allocated to various activities according to their comparative or relative efficiencies" (Becker 1993b, p. 32).

Owing to specific investments in human capital, the income from labour market work varies across partners. The principle of labour division according to comparative advantages is that the person who invested more in the labour market and has a higher wage rate, still continues to invest in this area and stays in the labour market. This person is usually the husband. The partner, usually the wife, concentrates more on housekeeping. As empirical research has shown, the division of labour cannot be explained by human capital advantages alone. Blossfeld, Drobnic and Rohwer (1996, p. 22) investigated this topic for Germany by using the German Socio-Economic Panel (SOEP). They state: "even in those couples where wives have a much higher earnings potential than their husbands, husbands will normally work full-time and the wives (...) will adjust their paid (full-time and part-time) work in response to family demands". To explain the discrepancy between the theoretical model of comparative advantages and the observed labour division, Becker falls back on biological factors. As women have the potential of becoming pregnant and bearing a child, they should have a higher affinity to child education/rearing and household work. There was a lot of justified criticism on this topic (see for example Ferber, 1987, p. 16; Etzioni, 1988, p. 42 and Döring, 1996, p. 177).

Becker's theory cannot explain the beginning of labour divisions in families, but once a wife has quit her job (or reduced her hours) in order to concentrate on family work, the predicted process of specialisation in the household seems very plausible. If a family member increasingly needs care and a potential of providing care in the private household exists, then it can be predicted that it is not men with their higher income potential who reduce their work for the benefit of private care, but (married) women with their specific investments in family work. Because of their experience in child rearing, married women have more knowledge in the field of nursing and hygiene. If women were absent longer from the labour market because of marriage or child rearing, then they have reduced human capital for the labour market. They should therefore have a higher probability of taking over care. Consequently, married mothers should have a stronger tendency than single, childless women to quit their job in order to provide care, because the former have more household-specific human capital, while the human capital of the latter is more labour-market specific. In addition, unmarried women should have a higher need of providing for their own secure existence. We will therefore concentrate on married women in our analysis.

At this point some critical comments on the effectiveness of the economic approach should be mentioned. Notably, norms and family power structures are not taken into account. The questions that arise include: Are there any norms in German society that compel women, and not men, to take over care? Are there differences if the person in need of care is a parent or parent-in-law? Furthermore, it should be stated that a continuous time division on the labour market is very unrealistic.

The effect of the event of having an older person in need of care in a household on the employment of a working wife is analysed here by three transitions. First of all, we examine the transition from employment to non-employment. In the term 'non-employment' we do not include retirement or transitions to unemployment where persons are still looking for work. In further analyses, we distinguish between full-time and part-time employment, as part-time employment is seen as a possibility to combine the time-competing spheres of family and job, especially if there are children in the family.

Whether or not part-time work is truly a possibility for combining a working career and care-giving is still an open question. Part-timers normally have a smaller income and, therefore, low opportunity costs of a withdrawal from the labour market. Full-timers have higher income and should therefore be less influenced by transfers from the nursing-care insurance. They also generally have more money to buy services.

The following analysis is not able to explain in general if the existence of an elderly relative in need of care influences the employment careers of women, because we cannot observe care that takes place outside an SOEP-household. Although there are older relatives in need of care who enter an SOEP-household, we are not able to observe if a refusal to take over care of an elderly person living outside an SOEP-household has taken place. We can, however, observe if women living with a care-needing person can combine work and care and if part-time work is a strategy used for doing so.

5.   Data, methods and variables

The research uses data from the Socio-Economic Panel (SOEP). The SOEP is a longitudinal study of persons, households and families and serves as a basis for analysing social and economic change in the Federal Republic of Germany. The main topics are employment, income, family structure, housing, time consumption and subjective perceptions of living conditions (see SOEP, 2001). In our analysis we use samples A and C. Sample A was drawn in 1984 and is normally headed by West Germans. Sample C was drawn in 1990 and contains East German households.

Respondents are not only asked about their actual employment each year but also about changes in the previous year on a monthly basis. In addition, every person is asked once about his/her complete job history for each year of his/her working life, so that in general we have information on a person's entire working career. Information on family events is also requested in a similar manner.

We focus on two parallel processes in our research: the presence of a person in need of care in a household and the working career of married women. We thereby model the occurrence of needing care as an independent event and job changes as dependent events. The observation period starts in July 1984 for West Germans and in July 1991 for East Germans. It ends in December 1996 with the 14th survey wave. We restrict our analysis to married women aged 40 years and older, because these women are at a typical age in which the problem of care-giving and employment arises.

We constructed new employment episodes for the analysis. Consecutive episodes of part-time and full-time employment are combined into only one episode for the overall analysis of withdrawal from employment. These episodes end with an event if a women leaves the labour market altogether and is otherwise right-censored. Right-censoring exists if the employment spell lasts longer than the end of the observation window or if a women changes to another employment status such as retired or unemployed. For the second investigation, consecutive part-time episodes are combined into a new employment spell, which ends with an event if a woman leaves the labour market. We approached the construction of full-time spells in a similar manner, but for full-timers we analyse two competing events. The first is a change to non-employment (as in the part-time case), the second is a change to part-time work.

Owing to the fact that information on persons in need of care exists only as a cross-sectional variable for the actual time of the interview while the employment history is on monthly basis, we expand the presence of a care-needing person to a period that starts in July of the previous year and ends in December of the current year. Persons in need of care were recorded in three categories from 1985 until 1990 and in four categories since 1991. We made a dummy variable if there is a person in need of care according to the following categories: 'the person is not bed-ridden, but is in need of help with daily domestic tasks in the household' and 'the person is bed-ridden' (categories until 1990), along with 'simple tasks, e.g. help with dressing, washing, etc.' and 'complex tasks, e.g. moving from the bed, bowel movements, etc.' (categories since 1991).

Furthermore, we restrict the persons in need of care to those aged 60 years and older in order to limit the investigation to care for older persons. We adopt the often-used age limit of 60 years to demarcate older persons (Tews, 1994). A list of variables in which the care variable as well as all other covariates and their parameter values can be found is located in the appendix.

By including control variables we want to prevent the influence of care from being merely a pseudo-effect. We therefore control for the 'age of the woman'. Furthermore, we include the age of the youngest child, because empirical research has shown that this is the most important family variable affecting the labour-market participation of women (e.g. Drobnic, 1997; Lauterbach, Huinink & Becker, 1994, p. 188). The younger the child, the more likely is a withdrawal from the labour market. The age of the youngest child is characterised in one of three dummy variables: one for children in the pre-school age ('child under 6 years'), one for children in the ages of elementary school ('child 6-10 years') and one for children between 10 and 16 years old ('child 10-16 years')

Because the Human Capital Theory (Mincer, 1974) predicts higher earning for persons with a higher level of education, one may expect that women with a higher level of education should seldom quit their jobs or reduce their hours from full-time to part-time. The educational level of a person is measured by a metric proxy variable ('education') that indicates the years normally needed for the observed highest-reached school and vocational level of each person (Blossfeld, 1985). The gain in labour-market and job-specific human capital is captured by the variable 'maximum 12 months in current employment status'. This variable has the value of 1 if a person has not been in his or her current employment status longer than 12 months and is 0 otherwise.

Individual labour-market attachment is captured by the total time a person has spent in a full-time or in part-time position ('years in full-time' and 'years in part-time'). Withdrawal from the labour market should occur less often when there is greater labour-market attachment, especially for women who have been in full-time employment longer. Transitions to part-time work should be more likely for women who have longer experiences in this area.

Although we combine consecutive spells of full- and part-time employment for the first analysis, we retain the information on which periods a person was employed full-time. As full-timers usually have higher incomes, they should have higher opportunity costs if they quit their job. We can also assume that full-timers have a higher labour-market attachment. The variable 'full-time working' has the value of 1 if we observe such employment and is 0 otherwise.

We use the sample membership ('East German sample') and the economic activity rate ('activity rate of married women') as macro-structural variables. Although women in East Germany were more often hit by unemployment related to the collapse of the GDR, they should have lower transitions to non-employment, as non-employment means a 'voluntary' withdrawal from the labour market. East German women should have a higher labour-market attachment because of their socialisation in the GDR, where it was more common for women, even those with children, to work.

An additional factor is the fact that the labour-market situation in the former GDR is poorer in general, so that households often can not afford to do without income from women. The economic activity rate of married women (StBA database, 1998, p. 261, p. 349) serves as a further indicator for the labour market orientation. It is considered both as time-varying and as region-specific (West versus East Germany).[3] A higher activity rate should lead to lower transitions into non-employment.

All variables are time-varying except the 'East German sample' and 'educational level'. This means that these variables reflect changes in a state over time (e.g. children are getting older) or they are updated yearly if they are changing continuously (e.g. increasing years in full-time employment). These time-varying covariates can be incorporated by the method of episode splitting, in which every episode of the dependent process is divided into sub-episodes if an independent variable alters its

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[3] Due to the fact that there is no value for the year 1992 for East German women, we approximate the value for that year with 70.9, which is the mean of the previous year (73.0) and the following year (68.9).

value. In a second step each sub-episode is assigned the correct value of the time-varying covariate (see Blossfeld & Rohwer, 1995). We use continuous event history models in order to analyse withdrawals from the labour market and transitions from full-time to part-time employment (Blossfeld & Rohwer, 1995; Rohwer & Pötter, 1998; Allison, 1995).[4] Using exponential models we estimate the hazard rate for the transition from the origin state 'j' (e.g. part-time employment) to the destination state 'k' (e.g. non-employment). In the third analysis we use a competing risk model with one origin state (full-time employment) and two destination states (k = 1: non-employment, k = 2: part-time employment). For each single transition we estimate a separate constant $\alpha^{(jk)}$ and separate coefficients $\beta^{(jk)}$ for the independent variables represented by the row vector $X^{(jk)}$:

$$r_{jk}(t) = \exp(\alpha^{(jk)} + X^{(jk)} \beta^{(jk)}) \, .$$

Empirical results are presented in the next section.

6. Empirical results

Estimates of the transition from the status of working to non-employment are given in Table 1. The first model contains only family variables indicating children and elderly persons in need of care. There we can see that the main variable of interest, 'elderly in need of care', is highly significant and has a positive effect on transitions to non-employment. Thus, the occurrence of having a person in need of care in the household raises the rate of withdrawal by 146%.[5] Highly significant effects on the transition rate are also apparent if children of pre-school or elementary school age live in the household. The variable 'children between 10 and under 16 years' has a weaker effect and is less significant. This effect will disappear completely in the later models 1c and 1d.

We control for the age of the women in model 2a. Transitions become more likely as the age of the women increases. A 55-year old woman has, for example, a transition rate which is 186% higher than that of a 40-year old woman.[6] It can be seen that, in line with Human Capital Theory, education does have an influence in model 2a, but this effect disappears in the later models if we control for full-time employment and sample membership. Furthermore, we can see in the models 2a to 4a that women have a very high transition rate if they have not been working full-time or part-time longer than a whole year.

In model 2a we can see a confirmation for our hypothesis that longer experiences in the labour market reduce the transition rate and that the effect of experiences in full-time employment has a stronger impact than for part-time experiences. If we control for the current employment status (full-time versus part-time) and the sample membership, then we observe a reduction in the effect of experiences in full-time employment. This should not be astonishing because long-term, full-time working women should have a higher probability of being currently full-time employed and East German women have generally higher labour-market experience, especially in full-time employment. The opportunity costs incurred by current full-timers in the event of a withdrawal from the labour market are higher. Full-timers therefore have a lower transition rate than part-timers.

If we include the economic activity rate of married women, we can see that 'voluntary' withdrawals from the labour force are fewer when the activity rate is higher. At the same time, the effect of East German women vanishes, as married East German women generally have a higher activity rate than West German women. Model 4a is on the significance level of 5% better compared with model 3a, as we obtain by a model comparison a likelihood-ratio value of 5.5 with one degree of freedom.[7]

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[4] The models were estimated using the statistical programme TDA [6.2] (Rohwer & Pötter, 1998).

[5] As (exp(0.90)-1)*100% = 146%.

[6] As (exp(55*0.07-40*0.07)-1)*100%=(exp(15*0.07)-1)*100%=186%.

[7] We can compute the value of the likelihood-ratio-test as follows: LR = 2*(LogLik(present model) – LogLik(reference model)) with *m* degrees of freedom (m d.f.), whereas *m* is the different number of variables in

Table 1. Effects on the transition rate from work to non-employment for married women
40 years and older[8]

	Model 1a		Model 2a		Model 3a		Model 4a	
	coeff.	t-statistic	coeff.	t-statistic	coeff.	t-statistic	coeff.	t-statistic
Constant	-5,35**	-99,70	-7,37**	-14,76	-6,52**	-13,29	-4,73**	-5,23
Elderly in need of care	0,90**	3,32	0,82**	3,02	0,64*	2,32	0,64*	2,33
Child under 6 yrs	1,07**	5,16	1,24**	5,52	0,84**	3,69	0,88**	3,85
Child 6-10 yrs	1,02**	7,36	1,04**	6,68	0,73**	4,68	0,75**	4,82
Child 10-16 yrs	0,21*	1,87	0,28*	2,25	0,09	0,71	0,09	0,74
Age of the woman			0,07**	7,67	0,05**	5,33	0,05**	5,42
Education			-0,04*	-2,37	-0,02	-1,04	-0,02	-0,95
Max. 12 month in recent empl. status			1,36**	15,41	1,37**	15,20	1,36*	15,06
Years full-time			-0,07**	-12,25	-0,03**	-5,72	-0,03**	-5,78
Years part-time			-0,03**	-4,87	-0,04**	-5,40	-0,04*	-5,38
Working full-time					-1,20**	-9,40	-1,20*	-9,41
East German Sample					-1,61**	-6,13	-0,67	-1,39
Activity rate of married women							-0,004*	-2,35
Log likelihood (starting values)	-3395,61		-3395,61		-3395,61		-3395,61	
Log likelihood (final estimates)	-3361,94		-3122,26		-3022,52		-3019,77	

Notes: ** $\alpha \leq 0.01$; * $\alpha \leq 0.05$; + $\alpha \leq 0.1$.

After including diverse covariates, the power of the care-variable decreases somewhat, but the variable is still significant even if on a lower level. We can therefore confirm the hypothesis that married women leave the labour market in the event that an elderly person in their household needs care.

In the following group of analyses, working wives are distinguished by their working volume. The results of the estimates are presented in Table 2 for part-timers. The models 1b to 4b have the same variables as the models 1a to 4a in Table 1 except for the variable 'full-time working'. The effects for children, age of the woman, short-term tenure, sample membership and activity rate are nearly identical with the effects presented in Table 1. The result for education, however, is slightly different. In model 2b (Table 2) we cannot find any influence of education on the transition from part-time work to non-employment. Other empirical studies with SOEP-data were not able to find any impact of education on this transition (for example Blossfeld & Rohwer, 1997, p. 181) either. Therefore, we were unable to confirm the Human Capital Theory.

Now, let us look at the variable of interest, 'elderly in need of care', in Table 2. The care variable is significant at the 5% level in models 1b and 2b, but only at the 10% level in models 3b and 4b. As the total number of persons in need of care is very small in our sample, it can be supposed that there really is a serious effect, although the significance is not very good. So we assume that women do not combine part-time work and care-giving. These results are a contradiction to the behaviour of young women with infants, who use part-time work in order to manage family and job demands (Blossfeld & Hakim, 1997).

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the present and the reference model. This test can only be made with hierarchical models. The computed values are nearly chi^2-distributed. In our example, LR = 2 ((-3019.77)-(-3022.12)) = 5,5 with 1 d.f.

[8] Includes 1828 women (1222 West German, 606 East German) with 2537 episodes of which 549 episodes end with a transition to non-employment.

Finally, the models are estimated for full-timers with the two competing destination states, complete withdrawal from the labour market and part-time work. Two models are presented in Table 3. The care variable has a very high effect on withdrawals from the labour force in model 1c. It raises the hazard rate by 229%.[9] The care variable is significant at the 5% level. Children under 6 years old have no effect on transitions to non-employment. Such a missing effect is caused by the fact that we designed our sample to include women aged 40 years and older. Full-time working wives with small children are very seldom among this age group in Germany.

Table 2. Effects on the transition rate from part-time to non-employment for married women 40 years and older[10]

	Model 1b		Model 2b		Model 3b		Model 4b	
	coeff.	t-statistic	coeff.	t-statistic	coeff.	t-statistic	coeff.	t-statistic
Constant	-4,77**	-80,58	-6,74**	-12,51	-6,57**	-12,31	-4,82**	-4,93
Elderly in need of care	0,75*	2,45	0,63*	2,06	0,54+	1,76	0,55+	1,79
Child under 6 yrs	0,91**	4,29	0,99**	4,23	0,85**	3,63	0,90**	3,80
Child 6-10 yrs	0,76**	5,15	0,76**	4,57	0,68**	4,09	0,71**	4,25
Child 10-16 yrs	0,06	0,50	0,10	0,75	0,06	0,42	0,06	0,46
Age of the woman	–	–	0,05**	5,54	0,05**	4,77	0,05**	4,87
Education	–	–	-0,02	-0,81	-0,01	-0,36	-0,01	-0,29
Max. 12 month in recent empl. status	–	–	1,28**	12,87	1,33**	13,38	1,32**	13,23
Years full-time	–	–	-0,04**	-6,67	-0,03**	-4,60	-0,03**	-4,66
Years part-time	–	–	-0,04**	-5,82	-0,04**	-5,43	-0,04**	-5,43
East German sample	–	–	–	–	-1,80**	-4,64	-0,88	-1,51
Activity rate of married women	–	–	–	–	–	–	0,004*	-2,13
Log likelihood (starting values)	-2623,87		-2623,87		-2623,87		-2623,87	
Log likelihood (final estimates)	-2604,32		-2465,49		-2446,38		-2444,11	

Notes: ** $\alpha \leq 0.01$; * $\alpha \leq 0.05$; + $\alpha \leq 0.1$.

It is remarkable that labour-force experience in full-time employment has a strong negative impact on leaving the labour market, but experiences in part-time work have no influence. If we include the variable for East German women,[11] there is an expected effect, but at the same time the significance level goes down for our care variable. We can assume that in spite of the low significance level caused by the small number of elderly persons in need of care, an influence of persons in need of care on the labour-market behaviour of part-timers does exist.

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[9] As (exp(1.19)-1)*100% = 229%.

[10] Includes 1036 women (861 West German, 175 East German) with 1516 episodes of which 465 episodes end with a transition to non-employment.

[11] If we include the economic activity rate, there is only a very small change in the Log Likelihood-value, and the significance of the variables for the activity rate and for the East German sample vanishes, because these two indicators are multi-collinear.

Table 3. Effects on the transition rate from full-time work to non-employment or to part-time work for married women over 40 years and older[12]

	Model 1c				Model 2c			
	Non-employment		Part-time work		Non-employment		Part-time work	
	coeff.	*t-statistic*	coeff.	*t-statistic*	coeff.	*t-statistic*	coeff.	*t-statistic*
Constant	-7,74**	*-5,94*	-6,37**	*-7,96*	*-7,44**	*-6,00*	-6,46**	*-7,97*
Elderly in need of care	1,19*	*2,00*	-0,69	*-0,69*	*1,01+*	1,70	-0,66	*-0,66*
Child under 6 yrs	0,33	*0,32*	-0,33	*-0,46*	*0,15*	0,15	-0,30	*-0,42*
Child 6-10 yrs	1,05*	*2,26*	0,53+	*1,68*	*0,99**	2,14	0,54+	*1,71*
Child 10-16 yrs	0,24	*0,71*	0,15	*0,73*	*0,24*	0,73	0,14	*0,71*
Age of the woman	0,07**	*3,24*	0,02	*1,53*	*0,06**	2,55	0,03+	*1,71*
Education	-0,12*	*-2,25*	-0,01	*-0,23*	*-0,09+*	-1,71	-0,01	*-0,38*
Max. 12 month in recent empl. status	1,24**	*5,34*	1,09**	*7,18*	*1,33**	5,61	1,07**	*7,05*
Years full-time	-0,05**	*-4,40*	-0,03**	*-3,08*	*-0,04**	-3,01	-0,03**	*-3,25*
Years part-time	-0,02	*-1,19*	0,02	*1,44*	*-0,01*	-0,83	0,01	*1,29*
East German sample	–	*–*	–	*–*	*-1,33**	-3,62	0,16	*1,04*
Log likelihood (starting values)	-1951,15				-1951,15			
Log likelihood (final estimates)	-1861,44				-1852,35			

Notes: ** $\alpha \leq 0.01$; * $\alpha \leq 0.05$; + $\alpha \leq 0.1$.

In Table 3 the effects on the transition from full-time work to part-time work are also listed. There is no evidence that full-time working women try to combine work and care by reducing their working hours (models 1c and 2c). The care variable is far from any acceptable significance level. Overall, there are hardly any effects on the transition from full-time to part-time work. The variables 'children of primary school age' and 'age of the woman' (only in model 2c) have only a weak significance (10% level). There are only strong influences from the tenure in the employment status and from the number of years spent in full-time employment. Women who are relatively new full-time workers have a high risk of reducing their working hours and women with a lot of experience in full-time work have a lower risk of changing to part-time work. Contrary to our hypothesis, the amount of part-time experience has no impact on taking up a part-time job.

The results presented in Table 3 show that part-time work is not a strategy for these women to juggle care and employment. Instead, we found that full-timers as well as part-timers have a higher risk of withdrawal from the labour market if there is a person in need of care in their household.

7. Conclusions and outlook

In January 2001, a new part-time work and temporary employment contract law was enacted. One important aim of this law is to promote part-time work, as it is seen as a possibility to combine family and career. The rights of the employees for enforcing part-time work and for achieving more security for returning to full-time employment have been strengthened.

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[12] Includes 1135 women (592 West German, 543 East German) with 1450 episodes of which 84 episodes end with a transition to non-employment and 205 episodes to part-time work.

But as we have shown in our empirical analysis, people did not use part-time jobs for combining work and care in the past, even if they were part-timers. In contrast to child rearing, there seem to be reasons why care-giving is very special. Children – although relatively young – do go to nursery school and primary school. Consequently, mothers have well-regulated time-off in which they can have a job. If the persons in need of care are disoriented or mentally deficient and therefore need constant observation or if they are bed-ridden and do not need permanent observation, but selective, non-predictable help – then women providing care do not have enough free time for regular work outside the home. Consequently, the new law for part-time work does not apply to women providing care if they have no fixed time in which they are released from the responsibilities of providing care. Social policy and relevant labour-market legislation have to pay more attention to the care situation in the future.

Against the backdrop of an ageing population and the associated increases in the number of elderly in need of care, there is a genuine risk that the ageing of society will come at the expense of women. A number of labour market studies have shown that career breaks are much worse for income and occupational career later on than part-time work (e.g. Blossfeld & Hakim, 1997). Care-giving women who withdraw from the labour force normally experience depreciation in their human capital (Mincer & Ofek, 1982) or if they are older it can result in a final exit. From the perspective of employers, the increased risk of women interrupting their employment to provide care for elderly relatives could mean that they do not hire or promote women as is predicted in the Theory of Statistical Discrimination (Schwab, 1986; Phelps, 1972). Consequently, it could mean that the ageing population represents a new labour-market risk for women. This risk, however, runs counter to the process of continually increasing the labour-force participation of women.

It is not, however, clear whether daughters(-in-law) will be caregivers to the same extent in the future. Women's decisions will depend on different factors. The prices for care services are likely to be particularly important. If these costs are low, then a lot of women could do a cost-benefit analysis and make the decision to use professional caregivers. The care allowance will also have a great impact. Even if the intention behind nursing-care insurance is to encourage family care, it is easier to pay for a nursing home if the care allowance is high.

The analyses in this contribution are restricted to women who are living together with the person in need of care. Further investigations are necessary to investigate older persons that have children living somewhere else. It is very important to find out who has a higher probability of care in an institution and who moves into the household of his/her children if they are in need of care. Or from another perspective, which households provide care for their parents and which do not? And further, how does the employment of daughters(-in-law) influence this process?

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Appendix
Description of the variables

Variable name	Time-varying	Values and description of the variable
Elderly in need of care	yes	1 = person in need of care in the household who is 60 years and older, 0 otherwise.
Child under 6 years	yes	1 = youngest child is aged under 6 years old, 0 otherwise.
Child 6-10 years	yes	1 = youngest child is aged between 6 and under 10 years old, 0 otherwise.
Child 10-16 years	yes	1 = youngest child is aged between 10 and under 15 years old, 0 otherwise.
Age of the woman	yes	Age in years, actualised yearly.
Education	no	Years of education (combination of schooling attained and vocational graduation): from 8 = without graduation to 19 = university degree.
Max. 12-months in recent employment status	yes	1 = person is not longer than 12-months in the recent employment status (full-time, part-time).
Years in full-time employment	yes	Number of years in which a woman has worked full-time; updated annually
Years in part-time employment	yes	Number of years in which a woman has worked part-time; updated annually
Working full-time	yes	1 = woman works full-time, 0 = woman works part-time.
East German sample	no	1 = woman belongs to sample C (East German women), 0 = woman belongs to sample A (West German women).
Activity rate of married women	yes	Economic activity rate of married women; values for West and East German women; values from 42.5 to 73.0.

PROJECTING EXPENDITURE AND DEMAND FOR LONG-TERM CARE IN SPAIN (2000-50)

JOAN COSTA-FONT & CONCEPCIO PATXOT*

1. Introduction

The Eurostat 1999-based central demographic projections for Spain suggest a rise in the number of persons aged 65 or older by 43% between 2000 and 2030 and by 76% between 2000 and 2050. The most important rise in the numbers of older persons will take place between 2030 and 2050. Because the need for long-term care is sensitive to demographic changes and the age-gender composition of the Spanish population, one of the primary concerns resulting from the ageing process of Spaniards is the future need of long-term care. Yet, the provision and financing of long-term care has been a very recent policy concern in Spain, probably as a result of its relatively recent population ageing process, compared with other developed countries.

Adding public expenditure (€953 million, 28% of the total) and private expenditure (€2,580 million, 72% of the total) the whole amount that Spain allocates to community and institutional long-term care is slightly over 0.65% of GDP. This percentage is similar to other southern European countries, although it is far below the figures prevalent in the rest of the countries in the European Union. According to the southern European social-policy model, public services play a subsidiary role, assuming responsibility only for those groups of the population lacking economic means, familiar support or both.

Long-term care is financed mainly through taxes, although it is subject to significant co-payments that differ substantially among regions. When long-term care is publicly provided (or arranged) it is means-tested and, as noted, means-tested contributions are linked with the individuals' income level. In some regions, such as Catalonia, the overall family resources are taken into account, so that the dependent person can sign a debt document that may be payable with inheritance assets. This means-tested access to public services occurs both in the case of *home care* services (managed by local authorities) and in the case of *nursing home* services and *day care* centres (which fall under the responsibility of regional governments).[1] Co-payments are significant, comprising 75% and 25% of pensions for residential care and day care centres respectively.

From the provision-of-care perspective, one of the key characteristics of the system is the quasi-federal structure of the welfare system. Health and social care have been a regional responsibility since the development of the constitutional provisions on social care rights. Therefore, it should be acknowledged that in reality there is no such thing as a 'Spanish long-term care system', but instead there is a system of regional long-term care services. This feature, also present in the health system, has many implications for policy design and makes the description of recent developments more complex. Furthermore, unlike the health system, the long-term care system is by far less developed.

Reform proposals to increase public sector involvement in funding long-term care are now a matter of extensive policy debate, in the context of the issues raised by population ageing. Discussions date back to the late 1990s, but there is no specific law regulating the financing and the provision of long-term

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[1] The amount of co-payments is not well known. Nevertheless, according to the latest estimates available (Casado & López, 2001), out-of-pocket payments for home care services are roughly 5% of the total cost and 30% in the case of nursing homes.

care as yet, although a new law was expected at the time this chapter was prepared. Social protection for long-term care is only explicitly regulated in the 1978 Spanish Constitution under the so-called 'sufficiency principle at old age' (Art. 50). One of the primary issues in determining the need for reform refers to examining the future expenditure on long-term care attributed to demographic changes that result from the relative ageing process of the Spanish population.

This study aims at examining the impact on the demand and expenditure on long-term care resulting from the ageing process of the Spanish population. The next section provides a brief introduction to the system, section 3 describes the macro-simulation model employed, section 4 provides the results and section 5 concludes this chapter.

2. Ageing and long-term care

As in other European countries, the family is the main provider of long-term care services. Nearly 70% of older Spanish persons who are dependent receive care exclusively from their families, mainly provided by women and children. In fact, nearly 5% of the population are caregivers – 83% of which are female – while scarcely 3% of older persons receive social services.

Nevertheless, the patterns of care in Spain are expected to change significantly because of the ageing process and social change. The process of ageing in Spain has been driven by an increase in life expectancy and by a reduction in the fertility rate, which is still very low (an average of 1.2 children). Also, and parallel to the fall in fertility, patterns of social change show an increase in female labour-market participation in the younger cohorts, which will presumably continue in the coming decades.[2] On the other hand, we may expect a reduction in the number of potential informal caregivers in the near future, which could lead to the expansion of the demand for formal long-term care services. All of these changes are expected to interact in the future provision of care to older persons, and in particular, may produce a transition from a 'family-based' model to a 'community-based' model.

Health care services are provided by the National Health Service (NHS) and are free of charge except for pharmaceuticals, orthopaedics and dental care. In contrast, social care is subject to means-testing and is mostly provided by local authorities, but private (although mostly non-profit) organisations also have an important role. As a result, regional differences are significant in social care, both in terms of how health and social care are integrated and in terms of the 'individual entitlement' to long-term care. Access to publicly funded long-term care is based on an assessment of needs and resources.

3. Evidence and modelling long-term care

3.1 Description

The model presented in this section has been designed in order to produce projections of the demand for long-term care services in Spain, from 2000 to 2050, and the resulting expenditure. The projections are carried out in several steps: first, by obtaining the projected future numbers of older persons (aged 65 and over); second, their dependency level; third, their likely level of demand for long-term care services; and, finally, the costs associated with meeting this demand. The output of the projections will provide information relevant to the growing debate – discussed in the description of the Spanish system in section 1 of this report – about the need for the Spanish government to further intervene in the financing or provision of the incipient Spanish long-term care system (or both).

The model covers informal care provided by family and friends and a wide range of long-term care services demanded by older persons in Spain. It includes key formal, non-residential social services, such as home care, day care and meals. Private domestic help is also included, though this should be

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[2] At the moment Spain has a very low labour-participation rate for women with respect to the rest of the EU countries. But, by looking at the age profiles, an increasing tendency is apparent.

treated with caution, as it may not always be related to care needs. Residential care, nursing-home care and long-stay hospital care are also included.

The model makes projections of public and private expenditure on long-term care services. The projections of public expenditure cover health and social services but not social-security cash benefits, special housing or other services. The projections of private expenditure include both user charges for publicly subsidised social services and out-of-pocket payments for the private purchase of services. The projections do not include estimates of the opportunity costs of informal care. Nevertheless, the inclusion of informal care in the model permits an evaluation of the sensitivity of public and private expenditure to potential changes in the patterns of care, including the balance between formal and informal care.

3.2 The data

The Spanish model uses data from a wide range of sources. These include:

- Eurostat and Fernández-Cordón (2000) population projections;

- data from a survey on the loneliness of the elderly (ESPM – Encuesta sobre la soledad de las personas mayors – CIS, 1998); and

- other official data on the numbers of recipients of long-term care services and costs and co-payments for services.

The study uses Eurostat 1999-based population projections, for the central projection and two variant scenarios that modify mortality, fertility and migration assumptions. Those projections are compared with the most recent Spanish population projections available (Fernandez-Cordón, 2000) that give projections from 1998 to 2050, starting from the last population census available (INE, 1991 and INE, 1998).

The Spanish model uses data on the characteristics of older persons living in the community and their use of long-term care services from the 1998 wave of the ESPM (CIS, 1998). This survey is chosen for several reasons. First, unlike other health surveys, this one was especially devoted to the elderly and, as a result, it provides a larger sample size for our purposes. Second, the sample selection process was specially designed to obtain sufficient numbers of the oldest age groups (85 and older) in order to obtain representative information on this relatively understudied and more dependent population group. Third, the survey contains data on both the dependency level and the utilisation of long-term care services. All these factors make this survey most suitable for our purposes. There is an alternative data source – *Encuesta sobre Discapacidades Deficiencias y Estado de Salud* (INE, 1987) – conducted over the whole population and whose sample size is large enough to produce a sufficient sample size for the older population, but its most recent wave is still not available. The 1998 wave of the ESPM has a sample size of 2,445 older persons living in the community. This dataset provides information on the ability of these individuals to perform tasks and on their use of community care services (public and private home care and informal care).

The total number of individuals staying in care homes and the number of persons attending a day care centre in the year 2000 was provided by IMSERSO, MTAS (2002). The distribution by age and gender of persons in institutions and day care centres in 1996 is available from the National Statistics Institute, INE (1998). Data on the dependency status of those persons is not available from that source. Yet, it is known that 73% of those in institutions and day care centres are considered as highly dependent, while the rest are considered as having low dependency (IMSERSO, MTAS 1998).

Data on the cost of services is taken from IMSERSO (2001), adjusted for inflation from 1998 to 2000. In the absence of the necessary data, and following Casado and López (2001), the costs of public and private services are assumed to be the same. The weighted average of the hourly costs of home care, residential care and day care centres for all the Autonomous Communities has been used as a 'national' figure. With respect to residential care, a different cost for low dependency and high

dependency residents is available. In some cases it has also been possible to estimate the size of co-payments in the base year 2000. The current co-payments are established at (for residential care) 75% of the pension, and for day care centres at 25% (IMSERSO, 2001). The average retirement pension income by age and gender has been taken from MTAS (2000). This co-payment, obtained from publicly financed care homes and day care centres, is subtracted from public expenditure and added to private expenditure – leaving total cost unaffected.

3.3 Spanish Eurostat projections

The Spanish long-term care model estimates that on base case assumptions the numbers of older persons with dependency[3] in Spain will rise from 2,310,000 in 2000 to 4,657,000 in 2050 (an increase of 102%). The model projects that between 2000 and 2050, the number of dependent older person relying exclusively on informal care for their long-term care needs will rise from 1,728,000 to 3,452,000 (an increase of 100%). The numbers of recipients of home-based formal care will rise from 360,000 in 2000 to 716,000 in 2050 (an increase of 99%). The numbers of individuals in institutions will rise by 120%, from 222,000 in 2000 to 488,000 in 2050. These are the projected increases required to keep pace with demographic pressures.

Total long-term care expenditure in Spain in the year 2000 was around €3.56 billion, of which €983 million was publicly financed and €2.58 billion was privately funded. Under the central base case assumption, expenditure on long-term care services for older persons in Spain is projected to rise to around €21.68 billion in 2050, an increase of 509%. (The projection for 2050 is in 2000 prices, i.e. with expected real increases but not nominal changes in care costs). As shown in Table 1 below, this amounts to a rise from around 0.65% of GDP in 2000 to around 1.62% of GDP in 2050 (an increase of 149%). Under the comparative base case, the projected rise on long-term care expenditure between 2000 and 2050 is 115% in absolute terms and as a percentage of GDP.

Table 1. Spain, base-case projections

	2000	2030	2050	% growth 2000-50
Numbers over 65	6,596,000	9,448,000	11,581,000	76%
Numbers over 85	638,000	1,223,000	1,872,000	194%
Numbers with dependency	2,310,000	3,521,000	4,657,000	102%
Recipients of informal care only	1,728,000	2,621,000	3,452,000	100%
Recipients of home-based care	360,000	545,000	716,000	99%
Recipients of institutional care	222,000	356,000	488,000	120%
Total expenditure (€ million)	3,563	10,520	21,683	509%
Total expenditure, % of GDP	0.65%	1.12%	1.62%	149%

3.4 Definition of dependency

The definition used in the Spanish model is based on dependency questions asked in a survey of older individuals living in households, the *Encuesta sobre la Soledad de las Personas Mayores* (CIS, 1998).

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[3] Defined as people who report needing help to perform at least one instrumental activity of daily living or at least one activity of daily living.

The survey asked whether the older person…

1. could perform without help
2. could perform without help, but with difficulties
3. needs a small amount of help to perform
4. needs a big amount of help to perform
5. cannot perform at all (not even with help)
6. does not perform because has never done so

… the following activities:

Activities of daily living (ADLs):

- getting up, dressing and basic hygiene
- bathing and/or showering
- walking within the home.

Instrumental activities of daily living (IADLs):

- cooking
- cleaning and other housework
- walking up and down stairs
- getting out and walking in the street
- using the phone
- using public transport
- going on holiday
- handling personal affairs
- dealing with money.

For the Spanish model, it was considered that all of those who needed at least 'a small amount of help' to perform at least one IADL were dependent. The Spanish model distinguishes between two severity levels: one or more IADLs and one or more ADLs. See Table 2 for the distribution of dependency within the Spanish old-age population.

For those in institutions, the measures of dependency were not available in terms of activities of daily living. Official data about individuals in institutions classifies them as either 'low dependent' or 'high dependent' (IMSERSO MTAS, 1998). The Spanish model has taken the approach of assuming that the 'low-dependent' status of persons in institutions is equivalent to a moderate dependency level (equivalent to needing help with instrumental activities of daily living) and the 'high-dependent' status as being equivalent to severe dependency (needing help with one or more ADL).[4]

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[4] The difference between low- and high-dependency residents is not clearly stated in practice in Spain. IMSERSO (1998) gives some criteria. Since the devolution each Autonomous Community can define its own criteria (see for example the case of Castilla-León: Resolución de 5 de junio de 2001, B.O.C y L 117). Similarly, some institutions have defined operational criteria (see for example www.geriatricos-ayuda.org/busqueda.htm). In all those cases the established criteria tend to measure the need of help in ADLs. So it seems reasonable to identify high-dependency persons as those with one or more ADLs while low-dependency residents can be identified with at least some dependence (only IADLs).

Table 2. Dependency rates by age and gender, 2000 (%)

	No Dependency	Dependency, i.e.	
		1 IADL or more*	1 ADL or more**
Men			
65-69	83	12	5
70-74	84	10	6
75-79	72	15	13
80-84	57	26	17
85-90	43	26	31
90+	14	34	52
Women			
65-69	80	17	3
70-74	65	27	8
75-79	55	29	16
80-84	38	34	28
85-90	18	35	47
90+	7	22	71
All 65+	63	23	14

Notes: * Refers to those that do not have ADL problems.
 ** Refers to those with or without IADL problems.

Sources: Own elaboration using data from the *Encuesta sobre la Soledad de las Personas Mayores*, CIS (1998) and other data sources.

3.5 Overview of the model

The model used here is a cell-based or macro-simulation model. As indicated above, it makes projections of the future demand for long-term care services, based on several key variables: the expected numbers of older persons (aged 65 and older); their dependency level; their likely level of demand for long-term care services; and, finally, the costs associated with meeting this demand. This model uses, to some extent, the same data sources used by a previous Spanish long-term care model developed by Casado and López (2001). Their model estimated long-term care expenditure in Spain for the period 1998 to 2026. The model described here has some new distinctive features compared with that of Casado and Lopez. The most important is that, in this model, the utilisation rates of all the services vary according to dependency status. This enables the sensitivity of expenditure projections to changes in dependency rates to be investigated. This has been achieved by making a number of assumptions, which are described in section 4.2. Also, this study makes projections over a longer period of time, which is particularly important since the population ageing process in Spain peaks at the end of the 2040s.

The model has been constructed with the aim of investigating the sensitivity of the projections to various factors. First, the sensitivity to different population projections can be investigated by modifying the fertility, mortality and migration assumptions. Second, changes in the age and gender-specific prevalence rates of dependency can be investigated. Third, changes in the coverage or the structure of the long-term care system (such as an increased reliance on formal care provision) can be studied. Finally, it is also possible to investigate changes in the growth rate of the cost of services and of real GDP.

The first part of the model classifies the projected numbers of older people into subgroups, according to age bands, gender and dependency. Three dependency levels are used: independent, moderately dependent and severely dependent. The data available for those living in households and those in institutions come from different sources.

The second part of the model is concerned with projections of the volumes of services demanded. The utilisation rates of long-term care services by age, gender and dependency are combined with the numbers of individuals in each of those groups as obtained from the first part of the model. The services covered include a range of services relevant to meeting the long-term care needs of older persons with dependency, as outlined above. As a result of the different sources of information for those in households and in institutions, the calculation of utilisation rates by age, gender and dependency involved make a number of assumptions. The estimated proportion of each sub-group of the older population by age, gender and dependency who received each service was then held constant for future years. This means that the projections are based on recent patterns of care for older persons, except where changes in the pattern of care are specifically investigated.

The third part of the model projects total expenditure on the formal services demanded. It covers the costs to the health service, social services and users of services, for those long-term care services included in the model. Yet, this does not comprise the total costs of long-term care to society. That would require the inclusion of the costs of a wider range of services to a wider range of public agencies and to service users and the opportunity costs of informal care. This part of the model uses two main inputs, the projected levels of services demanded as estimated in the second part of the model and data on the costs of services from IMSERSO (2001). Finally, projections for future years need to take account of expected rises in the real unit costs of care, such as the cost of one hour of home care. The unit costs of care are uprated to reflect these rises.

3.6 Obtaining utilisation rates by age, gender and dependency

As discussed above, the most suitable data source on care received by older persons is the ESPM (1998). The main limitation of this data source is that it excludes the older population living in institutions. An additional constraint faced was the lack of data on the dependency status of older persons living in institutions. It is only known that, on average, 27.5% of them are considered to have low dependency, while the other 72.5% are considered highly dependent. In the case of day care centres the same kind of information is available.

One of the key assumptions in projecting future long-term care expenditure is the extent to which the expected increases in the future numbers of older persons will affect the future numbers of those with dependency and, consequently, the utilisation of long-term care services. In order to capture those effects, the projection model uses, as an input, both dependency rates (by age and gender) and utilisation rates (by dependency level).[5] The approach taken has first assumed that the low dependency status of those in institutions is equivalent to a moderate dependency level (equivalent to needing help with instrumental activities of daily living) and the high dependency status as being equivalent to severe dependency (needing help with one or more activity of daily living).[6] A similar assumption is made for individuals using day care centres. The dependency rates of the household population are obtained – by age and gender – from the ESPM (1998). This process provides the most reliable dependency rates for entire older population that can be obtained with the available data. In addition, given that information on those in institutions (care homes and day care centres) is available by age and gender, the final utilisation rates are also distinguished by these categories.

The age variation of utilisation rates is relevant only in the case of institutions, because it is the only service for which reliable information by age and gender information is available. Residential care tends to be used predominantly by persons over 80 with severe dependency and the rate of use rises

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[5] The number of observations was not large enough to be able to obtain utilisation rates by age and gender.

[6] See footnote 4 of this chapter regarding dependency levels.

with increasing age. This pattern is not observed for home care (even when home care is publicly provided) or for day care, which show a relatively stable age/gender pattern. Finally, the use of informal care exclusively decreases with age. This is because of the severity of dependency rising with age, which has implications for the ability of informal carers to be the sole source of care.

4. Results

4.1 Changes in the numbers of dependent older persons

Table 3 shows an important rise in the number of older persons (based on the Eurostat central 1999-based projections) which is the greatest in Europe (Comas et al., 2003). The number of persons aged 85 and over in Spain is projected to be nearly three times larger in the year 2050 than at present. The table also shows that the increases in the future numbers of older persons do not translate directly into similar increases in the numbers of dependent older individuals. *The numbers of dependent older individuals are projected to rise by less than one and a half times as fast as the overall numbers of older persons*.

Table 3. Projected changes in the future numbers of older persons with dependency, percentage increase between 2000 and 2050

Numbers over 65	76%
Numbers over 85	194%
Numbers with dependency*	102%

Note: These figures should be treated with caution as they are based on different measures of dependency.

Source: Model projections.

4.2. Changes in the volume of services demanded

The volume of services demanded depends on a variety of factors, such as dependency and other needs-related characteristics of older persons, the availability of informal care and the preferences of older persons for different types of care. Table 4 shows the projected growth between 2000 and 2050 in the numbers of users of the three main types of long-term care: informal care only (that is, relying exclusively on informal care), home-based care and institutional care. This is compared (below) with the projected growth in the numbers of individuals with dependency. The numbers of those with dependency who receive only informal care and the numbers who receive home-based care increase at a similar rate to the projected numbers of persons with dependency. *The numbers of individuals in institutions are projected to grow faster than the numbers of those with dependency*, or than the numbers using informal care only or home-based care. This is partly because, in all four countries, the rate of institutionalisation of older dependent persons rises with age (as, particularly for women, the probability of being widowed increases with age).

Table 4. Projected changes in the volume of services demanded, percentage increase between 2000 and 2050

Recipients of informal care only	100%
Recipients of home-based care	99%
Recipients of institutional care	120%
Numbers with dependency*	102%

Note: These figures should be treated with caution as they are based on different measures of dependency.
Source: Model projections.

### 4.3. Changes in future long-term care expenditure

Future long-term care expenditure depends not only on the volume of services demanded, but also on the real growth in the unit costs of long-term care, such as the cost of an hour's home care. The growth in unit costs of care, as well as the other macroeconomic factors determine the affordability of long-term care expenditure. Table 5 shows the projected changes in long-term care expenditure between 2000 and 2050. The growth in projected expenditure takes account of the projected increased volume of demand only, as real unit costs are held constant. The projections are thus consistent with the patterns discussed above in relation to changes in the future volume of services demanded. The projections include the impact of the projected real rises in unit costs of care in each country. The growth of total projected expenditure as a percentage of GDP is determined by the projected growth in the volume of demand and by the difference between the projected rate of growth of the real unit costs of care and the growth in GDP. Therefore, we expect to find a rise in the Spanish GDP of 509% in absolute terms and 149% in relative terms. Indeed, Figure 1 highlights that long-term care expenditure is projected to vary from 0.65% to more than 1.5% of the GDP from 2000 to 2050.

Table 5. Projected changes in future long-term care expenditure, percentage increase between 2000 and 2050 in Spain

Total expenditure	509%
Total exp. as % of GDP	149%

Source: Model projections.

Figure 1. LTC Expenditure as a share of the GDP
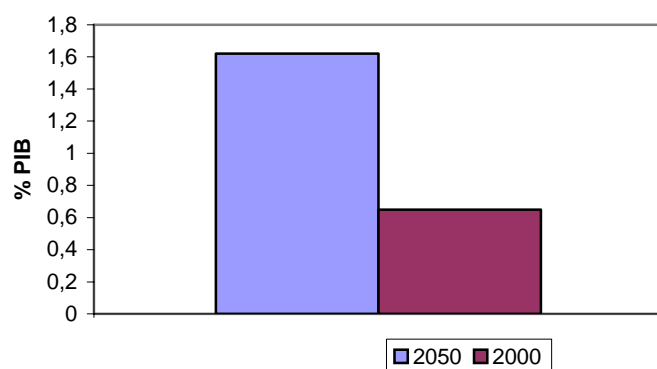
5. Concluding remarks

The demand for long-term care in Spain is expected to significantly increase because of social change as well as current demographic patterns. To examine the likely impact of this effect on expenditure in Spain we have developed a macro-simulation model that highlights sensitive changes in the population structure and utilisation of long-term care.

Overall the results highlight the need of reforming the provision but especially the financing of long-term care in Spain. There are two possible policy options depending on the definition of the responsibility for long-term care. First, a publicly funded entitlement to care, funded though general taxation of social insurance contributions would need to be developed. Alternatively, if the responsibility for long-term care funding is considered to be individually-based, then a private care-insurance market joined with a housing-related instrument and a more developed means-test system would have to be implemented.

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