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# LABOUR FORCE BEHAVIOUR OF MEN AND WOMEN IN ELDERLY TWO-ADULT HOUSEHOLDS

## EVIDENCE FROM EU COUNTRIES

MATTHIAS DESCHRYVERE

ENEPRI RESEARCH REPORT NO. 7

APRIL 2005

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ISBN 92-9079-560-3

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## Abstract

This paper studies the effect of individual and spousal characteristics on the labour force participation of individuals living in elderly two-adult households. The comparative approach taken here studies men and women separately and uses the first eight waves (1994-2001) of the European Community Household Panel (ECHP). We compare results of three countries: Finland (a country with a high degree of women's labour force participation), Belgium and Germany (countries where women's labour force participation is relatively low). Results of multinomial logit model estimations suggest that are substantive differences between countries as well as between the behaviour of men and women across the various channels out of employment. We find evidence that a wife exerts a stronger influence on a husband's retirement decision. One explanation for this may be found in asymmetric complementarities of leisure – a husband's enjoyment of non-employment may depend much more on his wife also being non-employed than vice versa. There is evidence that the *complementarities of leisure* hypothesis dominates the hypothesis concerning the *added worker* (where the labour supply of one spouse increases when the other spouse's income is reduced or disappears). These results are in line with evidence from the US and have some important implications: simulations of the effect of changes in the pension system on men's retirement may yield incorrect answers if spillover effects are ignored.


JEL classification: J16, J26.

Keywords: economics of gender, labour supply, retirement and retirement policies

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## 1. Introduction

Current and future trends are putting all European pension systems under severe pressure. The pressure originates from two main causes. First, there are the facts of the population structure and the rising share of older persons. This structure is developing as a result of falling fertility rates and rising life expectancies. A second fact concerns the declining labour force participation rates of older Europeans. This second point magnifies the rising share of older inactive persons and consequently the problem of financing pension systems. Although EU pension systems vary across member states, the pay-as-you-go (PAYG) system dominates most countries and thus has to be seen as most vulnerable. The analysis in this paper approaches the specific pension finance problem stemming from the inactivity of older persons, as we consider what leads them to leave employment.

The paper focuses on the labour supply behaviour of men and women in elderly households in three EU countries: Finland, Belgium and Germany. A common characteristic of these countries is their poor ranking of labour market participation rates for men aged 50 to 64. Finnish men (women) rank 20 (4) out of 30 OECD countries, Germans rank 21 (17) whereas Belgians take the second-to-last place of 29 (27). Table 1 presents key data per country and gender to describe the magnitude of the problem.

*Table 1. Employment rates, unemployment rates and retirement age*

| | Belgium | | Finland | | Germany | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Employment[a] | 46.9% | 18.2% | 50.8% | 42.1% | 59% | 29% |
| Unemployment[b] | 3.4% | 1.9% | 8% | 7.5% | – | – |
| Effective retirement age[c] | 58.8 | 57 | 60.1 | 59.9 | 60.8 | 60.5 |
| Official retirement age[d] | 65 | 62[e] | 65 | 65 | 65 | 63 |

[a] Employment/population rate (in percentages) adjusted for weekly hours worked for the age group 50-64 in the year 2000.

[b] Unemployment rate (in percentages of total labour force) of the age group 50-64 in 2001.

[c] Effective retirement age: average age of withdrawal from the labour force for individuals older than 40 years in 1995-2000.

[d] Official retirement age.

[e] This age increases to 65 for women working in the public sector.

*Source:* OECD (2003 and 2004).

The data underline that the (adjusted) employment rates for the age group 50 to 64 are very low. Further, there stands the gap between the official and the effective retirement age. Variation in this gap has been created by institutional changes, enabling employees to retire through early retirement channels. The high unemployment rate in Finland may reveal one of the latter effects.

Until recently, retirement research has concentrated on the labour supply behaviour of elderly men. As the labour force participation of women increased, attention has shifted towards the issue of the labour

supply behaviour of both men and women, and particular attention has been paid to the behaviour of both spouses in elderly couples. Although labour market research has shown that there are gender differences in several important areas, most of the research on retirement has focussed on men's behaviour. And while analyses of gender differences in retirement decisions are more limited, a small but emerging strain of retirement literature has diverted its focus from men to a broader couple approach, which takes into account the retirement decisions of women and the interrelation and differences between genders. Such studies document that husbands and wives coordinate work and retirement decisions. A second finding reports differences in the retirement behaviour between married and unmarried individuals.

This paper studies the labour force transitions of employed men and women aged 50 to 69 and analyses the effect of different individual and spousal characteristics on the retirement decision. We use information on socio-demographic, health and financial characteristics. Our study is based on the first eight waves (1994-2001) of the European Community Household Panel (ECHP), as these data offer high comparability between countries. The particular contribution of this paper is the comparison of men's and women's retirement behaviour across Belgium, Finland and Germany. It is crucial to compare results across EU countries in order to see the aspects in which countries are similar or different and the implications for the varying pension systems. Each country's institutional background is used to interpret results.

Our couple approach – explaining labour force transitions both by individual and spousal characteristics – is useful because it enables us to trace the significance of different cross-spousal effects. In addition, we are able to detect the asymmetries of the spousal effects across genders. This analysis tests three different hypotheses. A first hypothesis concerns the complementarities of leisure, a second is the assortative mating hypothesis and a third is the added worker hypothesis. The complementarities of leisure effect describes behaviour where the spouses coordinate work and leisure activities to spend time together. The assortative mating effect describes the fact that individuals tend to live with those who share similar preferences about work and leisure. In the first two hypotheses, the labour supply of the two spouses is positively correlated. The added worker effect describes behaviour where the labour supply increases when the spouse's income is reduced or disappears. If the latter income effect dominates, then the labour supply of both spouses should have a negative correlation. The justification for our approach is based on the fact that not taking into account these spousal effects may bias estimates and consequently the results of the simulation of policy changes.

This analysis contributes to the existing literature in at least three ways: 1) it pays special attention to women's retirement and gender differences; 2) it takes into account spillover effects between spouses, as neglecting these may lead to a bias in the simulation results of policy changes; and 3) it pays special attention to country differences.

The structure of the paper is as follows. Section 2 summarises aspects of the literature. Section 3 describes the model. Section 4 presents the data and section 5 summarises the estimation results. Section 6 concludes and lists some policy implications.

## 2. Previous literature

There are several ways in which the link between spouses' retirement is studied. A first group of studies assumes that preferences are given by a household utility function (family utility model) and estimates structural models of joint retirement (Hurd, 1990; Gustman & Steinmeier, 2000 and 2002) or studies joint retirement by explaining joint labour market states (Jiménez-Martín et al., 1999). A second group estimates reduced-form models exploring the cross-effects of one spouse's characteristics on the other spouse's retirement decision in order to learn whether men and women respond similarly to incentives for retirement and whether spillover effects are significant (Coile, 2003; Dahl et al., 2002; Johnson & Favreault, 2001).

This analysis uses a reduced-form model, as this method of analysing couples' retirement behaviour is agnostic about household behaviour. The advantage is that it does not impose a reciprocal influence on the labour force status of both spouses, which is relevant if asymmetries exist across genders.

A growing body of literature concludes that retirement decisions are made within the context of the family. It recognises that a significant share of husbands and wives coordinate their labour supply at older ages and retire at about the same time. Recent evidence shows that joint retirement is frequent among married couples. There are different explanations why an individual retirement decision may be influenced by the spillover effects of the spouse. If spillover effects are important, estimating individual retirement decisions may lead to significant errors in predicting the impact of a change in social security policy on retirement behaviour. This literature is mainly based on US data and has put forward various factors to explain joint retirement, as set out below.

A first factor is the widespread preference of husbands and wives to spend leisure time together, i.e. the complementarities of leisure hypothesis. The fact that married individuals may place greater value on leisure time when they can spend it with their spouses can raise retirement rates when the spouse is not working. This adds an extra dimension to the traditional modelling of the labour supply decision based on the assumption that individuals choose an optimal combination between the costs of foregone leisure and the benefits of increased income associated with paid employment. Previous studies in the US found substantial support for the hypothesis that individuals see the own leisure time and that of their spouse as complementary (Gustman & Steinmeier, 2000; Hurd, 1998). Coile (2003a) found that financial incentives in retirement plans affect the worker's retirement decision, which in turn affects the behaviour of the spouse. She explained the existence of spousal spillover effects through efforts by spouses to coordinate retirement decisions in a manner consistent with the above hypothesis.

A second factor is the fact that individuals tend to marry those who share similar preferences about work and leisure and not because they carefully coordinate work and leisure. This explanation for the coinciding timing of retirement is the assortative mating hypothesis.

A third factor is the similarity of financial incentives on the job encountered by husbands and wives. Yet neither spousal selection nor financial incentives are a central explanation for joint retirement outcomes in literature from the US.

An important American study is that by Favreault & Johnson (2001), who apply a detailed approach in analysing the coordination of retirement. The authors analyse the effect of the circumstances of the withdrawal of a spouse on that coordination. Their analysis makes a distinction between retiring voluntarily and involuntarily. If a worker retires involuntarily – because of health problems or job displacement – financial considerations may prevent his/her spouse from retiring. It has been noted that married individuals are less likely to retire if their spouses report work limitations. Severe disability may, however, reduce working hours for reasons of providing personal care to the disabled spouse.

Although economists generally believe that retirement decisions are made based on a cost-benefit analysis and are always voluntary, for at least some workers this may not be the case. The circumstances of an individual's withdrawal may affect the labour supply decisions of his/her spouse. For example, the authors examined how the employment and health status of the spouse affect retirement decisions. Their study is based on the economic assumption that individuals make labour supply decisions so as to maximise utility subject to budget constraints, and also that they evaluate consumption and leisure. The predicted net effect of a spouse's labour supply on retirement is ambiguous. The income effect or added worker effect may dominate when a spouse's retirement is involuntary. This again suggests that individuals may delay retirement when their spouses stop working because of health problems. Their model accounted for the endogeneity of spousal work status by using full information maximum likelihood techniques to model joint retirement decisions and spousal work status. Treating spousal work status as an exogenous variable and ignoring the potential correlation of unobserved factors that affect work decisions could bias estimates. They estimated the models separately for women and for men. They conclude that a worker has a higher

probability of staying employed if his/her spouse has health problems as a reaction to the decline of family income. Spousal caregiving demands do not appear to encourage retirement for many persons at midlife. These findings underline the importance of marriage in providing insurance for those who become disabled. The importance of marriage highlights the relative vulnerability of those who are widowed, divorced or never married. It was also found that family roles are more important for wives' decisions than for husbands'. The latter react to more proximate factors, such as their wives' current work status. Men appear more likely to withdraw from the labour force to spend time with their spouses (Coile, 2003a). This evidence supports the view that there are asymmetries in the spillover effects across spouses.

The empirical analysis of European retirement decisions has relatively few contributions compared with the US. For Germany, Blau & Riphahn (1999) found a strong propensity among couples to spend leisure time together. Financial variables have asymmetric effects on spouses' labour force responses. There are strong impacts of health and age on transition behaviour with systematic cross-spouse effects. For Finland, Lilja (1996) found that the propensity for early retirement does not differ significantly between men and women and that the presence of a retired spouse encourages the other spouse to retire. In Belgium, Desmet & Lozachneur (2002) also detected spillover effects but wives were found to be more responsive to their husbands' financial incentives whereas the reverse did not hold. They used a dataset of male and female private-sector workers and explained the above result by asymmetries in the complementarities of leisure. For a sample of EU countries, Jiménez-Martín et al. (1999) found strong evidence of complementary (but asymmetric) effects between the labour supply decisions of both spouses. In contrast to our results, they find that a husband's decision affects a wife's decision more than vice versa. Their research does not find evidence supporting the added worker effect.

## 3. Models

### 3.1 The probit model

Individuals (i=1,…,n) flow out of employment at a certain point in time (t=1,…,T) because their expected utility ($U_{it}^{er}$) exceeds the expected utility of working ($U_{it}^{ew}$).

$$y_{it}^{*} = U_{it}^{er} - U_{it}^{ew} > 0 \tag{1}$$

The (change in) utility is determined by a vector of observable variables Xit (where is a vector of coefficients) and a stochastic error term uit. We assume the error term to follow a standard normal distribution.

$$y_{it}^{*} = X_{it}\beta + u_{it} \tag{2}$$

Unfortunately, the expected utility of an individual that either flows out of employment or keeps on working in period t is not observed. Whether an individual stops working is all that is observed. The observed counterpart to the latent metric variable $y_{it}^{*}$ is $y_{it}$, which takes a value of either 0 (keeps on working in t+1) or 1 (retires in t+1) as follows:

$$y_{it} = \begin{cases} 1 \;\; if \;\; y_{i}^{*} > 0 \\ 0 \;\; if \;\; y_{i}^{*} \leq 0 \end{cases} \tag{3}$$

Based on previous assumptions on the distribution of uit, the binary choice model can be specified as a probit model and (.,.) is the normal distribution function.

$$P(y_{it} = 1 | X_{it}) = F(X_{it}\beta) = \Phi(X_{it}\beta) \tag{4}$$

This is a non-linear model that expresses the probability of choosing to stop working and a maximum likelihood estimator is used.

We report the marginal effects found by differentiating equation (4). Thus, the marginal effects are to be interpreted as the change in the probability of flowing out of employment given a change in an explanatory variable Xit. We allow the covariates to have various impacts on the flow out of employment for the two genders by carrying out the analysis separately for men and women.

The sample only considers individuals who have selected themselves into the sample – first into employment and thereafter into non-employment. There are certainly lots of unobservable phenomena involved in individual choices. Because of this self-selection problem, reservations should be made concerning the interpretation of our results.

## 3.2 The multinomial logit model

For each individual we define a latent variable, which denotes the change in utility from moving from the state of working in year t to unemployment or inactivity in year t. Individuals (i=1,…,n) flow out of employment at a certain point in time (t=1,…,T) because their expected utility ($U_{it}^{en}$) exceeds the expected utility of working ($U_{it}^{ew}$).

$$y_{ijt}^{*} = U_{ijt}^{en} - U_{it}^{ew} > 0 \quad \text{with j = 0,1,2 and t = 1994..T} \tag{5}$$

The change in utility is determined by a vector of observable variables Xit (where is a vector of coefficients) and a stochastic error term uit. The underlying hypothesis is that the determinants of the transitions from work into the states of unemployment or inactivity are identical. We assume the error term to follow a type I extreme-value distribution that is independent and identical across alternatives j and individuals i.

$$y_{ijt}^{*} = X_{it}\beta_{j} + u_{ijt} \tag{6}$$

Unfortunately, the expected utility of an individual who either flows out of employment to unemployment, inactivity or keeps on working in period t is not observed. Whether an individual becomes unemployed, inactive or continues working is all that is observed. The observed counterpart to the latent metric variable $y_{it}^{*}$ is $y_{it}$, which takes a value of either 0 (keeps on working in t+1) or 1 (retires in t+1) is as follows:

$$y_{ijt} = \begin{cases} 1 \ \ if \ \ y_{ijt}^{*} > 0 \\ 0 \ \ if \ \ y_{ijt}^{*} \leq 0 \end{cases} \tag{7}$$

Based on previous assumptions on the distribution of uijt, the choice model can be specified as a multinomial logit model and (.,.) is the type I extreme-value distribution, identically distributed across alternatives and individuals.

$$P(y_{ijt} = 1 | X_{it}) = F(X_{it}\beta_j) = \Phi(X_{it}\beta_j) = \frac{e^{\beta_j x_{it}}}{\sum_{j=0}^{2} e^{\beta_j x_{it}}} \quad (8)$$

This is a non-linear model that expresses the probability of choosing state j and a maximum likelihood estimator is used.

## 4. Data description

### 4.1 The concept of retirement

Retirement can be defined in many ways. Empirical research has measured retirement based on information about either labour-market participation or income. To avoid the problematic nature of retirement our study uses labour force status as the basis for definition and measurement. In this approach we categorise individuals by their labour force status – employed or non-employed. The objective of this paper is to explain the transitions of elderly individuals out of employment. The sample only includes individuals who report to be working in year t. The dependent transition dummy has the value 1 in year t if an individual reports to be non-employed in year t+1. The transition dummy has the value 0 in year t if an individual reports that he/she is still employed in t+1. As it is crucial to raise the labour force participation of the elderly, the focus on simple transitions out of employment is highly relevant. Individuals may, however, flow out of employment to other states such as unemployment or inactivity. It may therefore be useful to concentrate on each of these channels by explaining a discrete variable that changes its value with each end state (see also Figure A.1). As a share of older persons gradually reduce their working time as they age, a useful elaboration of the analysis may take into account both part-time and full-time employment.

### 4.2 Couple's labour supply

In Table 2 we show the percentages of couples in all possible labour supply choices for our initial sample. It is clear that there are households with all possible combinations of men's and women's labour supply. The highest numbers of households are located in the cells representing the inactivity of both spouses (27% to 45%) and both spouses being employed (20 to 40%), which may point to complementarities in leisure. Nevertheless, there are many households where only one spouse is working while the other is inactive. In Belgium and Germany there is a higher share of employed husbands with inactive wives than the opposite. Remarkably, Finland shows a higher share of working wives with inactive husbands. In general, Finland has notably lower share of inactive wives (36%) compared with Belgium (69%) and Germany (55%).

Further evidence of the labour force participation structure of the households is provided by Tables 3 and 4. Most of the male and female transitions are out of the labour force. Flowing directly from employment to inactivity is most frequent for Belgian households. In all three countries the transition from unemployment to inactivity is frequently made. This shows that becoming inactive is reached through unemployment in a significant number of cases. This is especially true for German men and women where up to 30% of the unemployed flow into inactivity. This can partly be explained by the fact that in Germany employed elderly men and women have the highest probability of becoming unemployed.

*Table 2. Couple's labour supply choices (in percentages)*

| **Belgium** | | wife | | | |
|---|---|---|---|---|---|
| | | employed | unemployed | inactive | Total |
| husband | employed | **20** | 3 | 21 | 45 |
| | unemployed | 1 | **0 (0.3)** | 3 | 4 |
| | inactive | 4 | 2 | **45** | 51 |
| | Total | 25 | 6 | 69 | 100 |
| **Finland** | | wife | | | |
| | | employed | unemployed | inactive | Total |
| husband | employed | **40** | 4 | 8 | 52 |
| | unemployed | 3 | **2** | 1 | 6 |
| | inactive | 12 | 3 | **27** | 42 |
| | Total | 56 | 8 | 36 | 100 |
| **Germany** | | wife | | | |
| | | employed | unemployed | inactive | Total |
| husband | employed | **24** | 4 | 19 | 46 |
| | unemployed | 3 | **1** | 4 | 8 |
| | inactive | 9 | 3 | **33** | 46 |
| | Total | 36 | 9 | 55 | 100 |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table 3. Transition rates of husbands (in percentages)*

| **Belgium** | | Final state | | |
|---|---|---|---|---|
| | | employed | unemployed | inactive |
| initial state | employed | **88,57** | 1,00 | 10,43 |
| | unemployed | 6,25 | **76,56** | 17,19 |
| | inactive | 0,99 | 0,83 | **98,18** |
| | Total | 44,31 | 4,32 | 51,37 |
| **Finland** | | Final state | | |
| | | employed | unemployed | inactive |
| initial state | employed | **90,17** | 2,82 | 7,01 |
| | unemployed | 13,07 | **60,30** | 26,63 |
| | inactive | 2,97 | 0,61 | **96,42** |
| | Total | 51,43 | 5,37 | 43,2 |
| **Germany** | | Final state | | |
| | | employed | unemployed | inactive |
| initial state | employed | **86,40** | 5,16 | 8,44 |
| | unemployed | 11,61 | **57,37** | 31,02 |
| | inactive | 2,37 | 2,12 | **95,51** |
| | Total | 46,06 | 8,61 | 45,33 |

*Source:* Author's calculations based on the ECHP (1994-2001).

It is important to note that persons in Belgium have the lowest probabilities of changing labour force states. There is a strong trend towards becoming and staying inactive, which shows the inflexibility of the Belgian labour market. In Finland more women than men become unemployed. It is also clear from the tables that non-participation is not necessarily an absorbing state: there is a small probability of re-entering the labour market after an initial period of non-participation, which is especially true in Germany and Finland.

*Table 4. Transition rates of wives (in percentages)*

| Belgium | | Final state | | |
|---|---|---|---|---|
| | | employed | unemployed | inactive |
| initial state | employed | **85,67** | 1,65 | 12,69 |
| | unemployed | 0,00 | **81,17** | 18,83 |
| | inactive | 0,86 | 1,02 | **98,12** |
| | Total | 20,45 | 5,88 | 73,67 |
| **Finland** | | Final state | | |
| | | employed | unemployed | inactive |
| initial state | employed | **89,59** | 4,04 | 6,37 |
| | unemployed | 11,19 | **64,93** | 23,88 |
| | inactive | 2,78 | 1,02 | **96,20** |
| | Total | 52,08 | 8,31 | 39,61 |
| **Germany** | | Final state | | |
| | | employed | unemployed | inactive |
| initial state | employed | **84,49** | 6,28 | 9,23 |
| | unemployed | 11,09 | **62,28** | 26,62 |
| | inactive | 2,40 | 1,74 | **95,86** |
| | Total | 31,40 | 8,91 | 59,69 |

*Source:* Author's calculations based on the ECHP (1994-2001).

Our analysis only focuses on the transitions from employment to non-employment, as these have the biggest negative impact on a country's production and budget. It is clear that a complementary approach could concentrate on transitions from unemployment to inactivity.

## 4.3 Data

The dataset used in this study is the ECHP. The ECHP encompasses a lot of socio-economic information such as the respondents' economic background, employment status, job history, income sources, health status and wealth. This dataset contains eight waves that have been released from 1994 to 2001 for up to 15 EU countries. The same questionnaire is adopted by the national data collection units in each participating country. The advantage of these country data is their high comparability level. The survey is composed of a household and a personal file, and the same individuals and families are interviewed over time. In the first wave (in 1994) a sample of some 60,500 nationally representative households – approximately 130,000 adults aged 16 years and older – were interviewed in the EU member states. Austria (1995) and Finland (1996) have joined the project since then. For the fourth wave of the ECHP, in 1997, the original ECHP surveys were stopped in three countries, namely Germany, Luxembourg and the UK. In these countries, existing national panels were used and comparable data were derived from the German Socio-Economic Panel (GSOEP) and the British Household Panel Survey (BHPS) – back from 1994 onwards.

## 4.4 Sample formation and descriptive statistics

This analysis focuses on members of two-adult households. Our sample of Belgian, Finnish and German households includes men and women aged 50 to 69 with a spouse aged 45 to 70. As described earlier, our sample consists only of employed individuals as our analysis studies the transitions from employment to non-employment. The sample selection is for employed individuals who belong to a two-adult household (with both members alive in each period). Table 5 presents the sample shares of two-adult households by seven economic types. The shares are fairly similar across countries although Finland has a higher share of households with one dependent child. After deleting observations that

are missing important information, we have a maximum sample of 2,544 households, which are observed in up to eight consecutive periods. Summary statistics of these observations with respect to socio-demographic and economic variables can be found in Appendix A.

*Table 5. Sample shares per economic household type (in percentages)*

| Household type (economic typology) | Belgium | Finland | Germany |
|---|---|---|---|
| Two adults without a dependent child, with at least one person aged 65 or older | 4.94 | 6.66 | 7.04 |
| Two adults without a dependent child, with both under age 65 | 41.07 | 54.64 | 49.88 |
| Other household without dependent children | 24.71 | 12.74 | 27.39 |
| Two adults with one dependent child | 10.86 | 14.37 | 5.87 |
| Two adults with two dependent children | 6.48 | 5.66 | 2.04 |
| Two adults with three or more dependent children | 1.63 | 0.95 | 0.30 |
| Other household with dependent children | 10.30 | 4.98 | 7.48 |

*Source:* Author's calculations based on the ECHP (1994-2001).

Of the final sample of the employed, between 15.5% (FI) and 35.6% (DE) of the individuals flow into non-employment (for BE the figure is 27.5%). We observe that 8.3% of individuals have a spouse who flows out of employment together with them within the sample timeframe. It is important to note that Finland has the highest percentage of couples flowing out of employment in the same year (14.23%), whereas Belgium (11.7%) and Germany (8.69%) are behind in that respect. This can partly be explained by the smaller mean of the age difference between spouses in Finland in our sample. About two-thirds of the synchronised outflows are towards inactivity. The synchronised outflow to unemployment is most profound in Germany and very limited in Belgium. Of the individuals' spouses in the final sample, 61.9% are employed, 7.7% are unemployed and 30.4% are inactive. Individuals are about twice as likely to have an inactive spouse in Belgium and Germany as in Finland.

A quick glance at the data reveals some interesting characteristics per country and gender. Table A.1 depicts results for working men and women aged 50 to 69. The sample consists of 13,027 observations for three countries: Belgium (2,130), Finland (3,984) and Germany (6,913). Men comprise 60% of the sample and the average age is 54.5. More than 90% of the individuals are married. For obvious reasons the share of men with children is about three times higher for men than for women. The average net annual salary is about €25,000 for men and €15,000 for women. The average capital income is about €2,000 and a minimum of 58% of the individuals bought a house. Part-time work has a typically high share of employment for women (18%) compared with men (3%). Germany has a very small share of self-employed persons, which thus contributes to a lower labour supply. Self-employed men have a larger share of the sample in Belgium (10%) and especially in Finland (15%). Public-sector workers contribute about 25% to the sample of men and nearly double that to the sample of women.

If we turn to figures on transitions out of employment we note that numbers vary from 6.2% to 14.7%. Transitions are more frequent for women than for men, except in Belgium. Germany especially has high transition figures both for men (11.4%) and women (14.7%), whereas Finland has a more moderate frequency of transitions at about 6%. In the Belgian final sample transitions to inactivity are rather scarce (see Table A.1). In all cases transitions to unemployment are more often noted than transitions to inactivity. In Germany the unemployment channel seems to be most frequently used.

As health is an important determinant of the labour supply behaviour of the elderly it is of interest to compare different health variables between our sub-samples at this stage. The sample share of persons with bad health varies between countries. Women report to be in bad health more often than men. An especially high share of German men and women are reported to be in bad health (about 17%). Belgium has a very small share of about 1% whereas Finland has about 4%. The share of persons reporting a chronic physical or mental health problem is very high (about 38%) in both Finland and

Germany but is remarkably lower in Belgium (about 10%). A lot of Finns (about 25%) and Germans (about 35%) are also hampered in their daily activities by health problems although these problems are clearly worse for Germans and again the least significant for Belgians (about 10%). The share of men and women who have been an inpatient at a hospital during the last 12 months is largest for Finland but generally varies around 10% in all the sub-samples. On average, Germans stay the longest in the hospital (more than one night) whereas Finns and Belgians only stay about half a night. It should be noted that all results have to be interpreted as conditional on each country's age structure. The age means are nevertheless very similar and for Germany are only about one year higher. There is a concern, however, that the differences in health reports across countries may not only be the result of real health differences but also related to differences in reporting behaviour (Lindeboom & Van Doorslaer, 2003).

## 4.5 The probabilities of ending in various end states

In Table 6 we have calculated the probabilities of transition to different states for each gender, conditional on working. The probabilities of staying employed decrease over time. Simultaneously, the probabilities of ending in the states of being unemployed or inactive increase over time. This can be explained by the fact that the individuals in our sample are growing older. We found some striking differences across genders. Women are more likely to end up as unemployed whereas men tend to have a higher probability of continuing to work. Becoming inactive is more likely for men in Finland and Belgium than in Germany.

*Table 6. Exit probabilities (in percentages)*

| Females | Belgium | | | Finland | | | Germany | | |
|---|---|---|---|---|---|---|---|---|---|
| year | UNEMP | INACT | EMP | UNEMP | INACT | EMP | UNEMP | INACT | EMP |
| 1994 | 0,0 | 10,8 | 89,2 | | | | 6,4 | 8,6 | 85,0 |
| 1995 | 2,5 | 9,9 | 87,7 | | | | 6,5 | 10,4 | 83,1 |
| 1996 | 1,2 | 6,1 | 92,7 | 5,5 | 4,3 | 90,3 | 9,7 | 7,3 | 83,0 |
| 1997 | 2,5 | 8,8 | 88,8 | 3,5 | 6,7 | 89,8 | 5,4 | 10,2 | 84,4 |
| 1998 | 1,3 | 8,8 | 90,0 | 3,5 | 4,1 | 92,4 | 5,7 | 6,7 | 87,6 |
| 1999 | 1,3 | 9,0 | 87,7 | 2,9 | 2,9 | 94,1 | 5,2 | 6,8 | 88,0 |
| 2000 | 2,7 | 9,5 | 87,8 | 3,1 | 5,1 | 91,8 | 4,6 | 6,7 | 88,8 |
| weighted probability | 1,6 | 9,0 | 89,1 | 3,7 | 4,6 | 91,7 | 6,2 | 8,1 | 85,7 |
| Males | Belgium | | | Finland | | | Germany | | |
| year | UNEMP | INACT | EMP | UNEMP | INACT | EMP | UNEMP | INACT | EMP |
| 1994 | 1,0 | 10,5 | 88,5 | | | | 3,9 | 7,9 | 88,2 |
| 1995 | 1,0 | 6,2 | 92,8 | | | | 5,0 | 9,9 | 85,1 |
| 1996 | 0,5 | 11,7 | 87,8 | 4,1 | 4,7 | 91,3 | 5,9 | 8,5 | 85,7 |
| 1997 | 0,5 | 10,4 | 89,1 | 2,0 | 8,7 | 89,3 | 6,2 | 6,6 | 87,2 |
| 1998 | 1,6 | 7,3 | 91,2 | 1,9 | 4,4 | 93,8 | 6,3 | 9,1 | 84,6 |
| 1999 | 0,5 | 10,3 | 89,1 | 3,4 | 4,7 | 92,0 | 4,8 | 7,4 | 87,9 |
| 2000 | 1,2 | 7,1 | 91,8 | 2,0 | 3,7 | 94,2 | 5,0 | 6,0 | 89,0 |
| weighted probability | 0,9 | 9,1 | 90,0 | 2,7 | 5,2 | 92,1 | 5,3 | 7,9 | 86,8 |

*Source:* Author's calculations based on the ECHP (1994-2001).

## 5. Estimation results

We estimated reduced-form models of labour force participation. The estimation results of the multinomial logit model are summarised by country and gender in Table A.7. As the magnitudes for the coefficients are difficult to interpret we compute partial effects. The tables show these marginal effects and the z-values. For continuous variables the latter are evaluated at the mean. The three possible outcomes are unemployed, inactive and employed. The base category is employed. The explanatory variables are individual characteristics and spouse characteristics.

We want to learn if men's and women's labour-force participation decision is similarly influenced by their individual characteristics. The goal is to estimate the impact of each individual's characteristics and his/her spouse's characteristics on an individual's labour force decision. We also check for possible asymmetries in the spousal spillover effects. Results have to be interpreted carefully. Spurious effects may occur if we do not control for all the variables that are likely to have an independent influence on labour force participation. For example, such effects are likely if we fail to take into account pension incentives.

Results of the Wald test and likelihood-ratio tests rejected the null hypothesis that the coefficients equal zero across all equations. We also performed Wald and likelihood-ratio tests on whether any pair of outcome categories can be combined. In addition, we computed the Hausman test of the assumption of the independence of irrelevance alternatives (IIA) for each possible omitted category

### 5.1 Individual characteristics

For Finland and Germany the results of the multinomial logit model are reported per gender as marginal effects with their corresponding z-values (see Tables A.3 to A.6). As the number of transitions to unemployment was too small for Belgium we estimated a probit model (see Table A.7).

As expected, the older the individual the higher the likelihood s/he has of becoming inactive and the lower the likelihood s/he has of continuing to work. The linear age effect is positive and significant in all three countries for each gender. The effects are marginally stronger for men than for women and especially high in Belgium and Germany. In our sample age has no significant effect on becoming unemployed.

It is expected that a higher investment in human capital should lower the propensity to retire as more highly educated persons start their working life later and perform on average less physically demanding jobs than those with less education (see also Figure A.2). The propensity to stay employed rises significantly for higher-educated Belgian and Finnish women.

In Finland the number of children under the age of 14 has a negative effect on the propensity to become inactive for men whereas it has a positive effect for women (see Perrachi & Welch, 1994). The effect is significant for Finnish women becoming inactive. A negative effect for men suggests that this may have something to do with the obligations of being the principle earner whereas women could have a higher propensity to retire to take care of the household. In Germany having dependent children has an insignificant negative effect on becoming inactive for both men and women. The difference between women's behaviour in Finland and Germany could be explained by the fact that the expected period of the dependency of children is higher in Germany and also by the fact that there are more housewives in Germany.

The results show that in Finland both the married men and women in two-person households have a higher propensity to become inactive; Finnish men also have a higher propensity to become unemployed. Opposite results were found for married Belgian men. Results for Germany are insignificant.

### *Health variables*

The effect of bad health on the labour force transitions of elderly couples has the expected positive sign except in Belgium, where there are very few observations of persons in bad health. A first dummy variable has the value 1 if individuals report to be in bad or very bad health. A second dummy variable refers to the stay in a hospital during the last 12 months. The decision to include both variables in the specification is based on the fact that both variables measure the relatively weak correlation between the two variables and the robustness of the results along alternative specifications. Under two definitions, gender and country (except Belgium), bad health has a significant positive effect on the propensity to retire (see also Figures A.3 and A.4). The opposite sign for Belgium does not have much credibility as the average Belgian reports to be in better health than Germans and Finns (so there are very few observations left in the bad health category). The effect is stronger for men than for women. The most significant effects are seen for Finland. The effect of being hospitalised recently is also positive but not always significant. Although there should be no doubt about the significance of these positive effects of bad health, the strength of the effect should be interpreted with care and may be too strong or too weak because of endogeneity problems (Bound, 1991). Concerning occupations, sectors in which health risks are greater may be more likely to have or develop institutions (such as pensions or disability insurance) that allow for early retirement.

Relatively few studies examine both men and women in the same framework. Loprest et al. (1995) observe that the effects of disabilities on labour force participation are greater for men and single women than for married women. Kreider (1996) finds that non-working African Americans, high-school dropouts and former blue-collar workers are more likely to over-report disabilities than white-collar workers, and that men are more likely to over-report than women. These findings are consistent with the idea that workers in more physically demanding jobs may find disability a more compelling excuse for leaving the labour force than other workers or alternatively that white-collar workers are less likely to feel that a given condition limits their ability to work. Ettner (1997) finds that among women, self-reported measures of health are not affected by employment status (i.e. there is less reporting bias among women). The health measure was instrumented by the parents' health. She points out that women may be under less pressure socially to attribute non-employment to ill health.

### *Economic variables*

The effects of the net annual real wages are in the expected direction: higher wages are associated with a stronger attachment to employment. A higher net wage motivates men and women to keep on working longer and not to become inactive or unemployed. High wages naturally correlate with higher education, responsibilities and work satisfaction. The response to a given change in wages (and indirectly benefits) is generally between two (Finland and Belgium) to three (Germany) times larger for women than for men, consistent with the generally higher labour supply elasticities for women than men found in the literature. The elasticities are especially high for Belgium and Germany (Table 7). It is important to note that in Finland wages are only significant in explaining the transition to employment and unemployment whereas in Germany it is also significant for the transition to inactivity.

*Table 7. Inactivity elasticities of wages*

| | Belgium | Finland | Germany |
|---|---|---|---|
| Men | -0.053 | -0.003 | -0.38 |
| Women | -0.105 | -0.005 | -0.099 |

*Source:* Author's calculations based on the ECHP (1994-2001).

Capital income is used as a proxy for wealth. A priori, the influence of own wealth on the retirement decision is not clear. On the one hand, increased wealth will improve the possibility of early retirement through the increased ability of self-support. Our results are in line with this view as the wealth proxy almost always has a positive impact on the probability of moving towards inactivity, which is especially true for men. On the other hand, wealth may be a proxy for both ability and social status. In that case we would expect a reduced probability of exiting to early retirement. Yet we do not find convincing evidence of the latter effect. Individuals with capital income may also be the ones that retire at the earliest years of the age range 50-69, as the wealth variable becomes more significant if persons aged 50 to 55 are added to the sample.

### *Employment variables*

An interesting result concerns the significant negative impact of the part-time dummy on the probability of flowing into unemployment for both men and women. Women who work part-time have an especially smaller probability of using the unemployment channel. The effect is most significant for Germany and Finland and least for Belgium. The part-time dummy does not seem to play a significant role in the flow to inactivity.

Satisfaction with work is expected to have a negative impact on the propensity to leave work while satisfaction with leisure should prompt individuals to have more of it by leaving work. The negative impact of work satisfaction and the positive impact of satisfaction with leisure are observed for both men and women. Effects seem to be especially significant for the flow into unemployment. In that sense satisfaction with work and leisure is a good predictor of becoming unemployed. These two important variables may, however, have a significant correlation with other variables such as bad health, income, education, working status and occupation.

The self-employed form a special group of individuals as they generally have a particular pension system. Being self-employed has in most specifications a significant negative impact on the propensity to flow into unemployment and inactivity. The effect is more significant for men than for women. One explanation for this negative overall effect is certainly related to the pension schemes for the self-employed. In Belgium, the self-employed have their own pension system, which is less generous than the ones of the public or private sector. Belgian self-employed persons do not have access to the unemployment insurance system and there is no other special regime they could use to retire early. Although there is a public disability system, the application of more stringent criteria than that which applies in the private sector prevent it from becoming a ‘well-loved’ early retirement channel. German self-employed persons are mainly self-insured, although some of them also participate in the public retirement insurance system. Finnish self-employed persons also have less generous pension rules. Yet a second explanation for the negative impact may be independent of the institutional background. Self-employed persons may have common characteristics in that they are motivated, energetic individuals who like to work. Owing to the particular character of the pension system for self-employed persons and their individual characteristics, self-employed persons are sometimes excluded from the samples in retirement research although they certainly form an interesting category to focus on in future studies.

Being a civil servant has a mostly positive effect on the probability of entering retirement in Finland and Germany. In the case of Finland this can be explained by the fact that the accrual rate used to be higher (see Appendix C). In the case of Germany this can be explained by the fact that civil servants have acquired pension claims that are very generous compared with workers in the private sector (see Appendix C). By contrast, for Belgian men and women, being employed in the public sector has a negative impact. In Belgium the public sector has its own pension system. It differs from the private sector system in that the official retirement age for women (65) is still higher and is equal to the one of men. The negative effect is especially significant for the broad retirement specification and signals that Belgian civil servants have more job security and do not (collectively or individually) use the unemployment channel as often as private-sector workers.

We compared three occupational categories – managers and professionals, technicians, clerks and service workers – with blue-collar workers as a reference category and expected all three to have a more negative impact on the propensity to retire. Blue-collar workers have on average a more physically demanding job and start to work earlier in their life cycle. The negative impact for the three occupation dummies on the probability of moving out of employment is seen for Belgian men and women; in other countries the evidence is mixed. The negative impact is the strongest for clerks, service workers and technicians. For women the results are more dubious. In Finland, female technicians, clerks and service workers have a higher propensity to become unemployed. This shows that the Finnish unemployment channel may be used especially by women working in these occupations. There is similar but weaker evidence for German women, whereas German men working as clerks and service workers have a smaller probability of becoming unemployed. This can be explained by the fact that clerks and service workers enjoy more protected employment (for both women and men) but women use the unemployment channel more often to retire.

The evidence of the impact of working in a small company is mixed. For men it has a negative impact on the transition to inactivity, which is significant for Germany and Belgium. The reason for this may be that in small companies the interpersonal connections are closer and the working atmosphere is better. As the social aspect is higher in smaller companies we may also assume that unsatisfied workers may leave smaller companies faster and as such those persons who are left are on average more satisfied. The effect on the probability of unemployment is positive for Finnish women and negative for German women.

The year dummies (reference year 2000) are meant to take care of the timing and magnitude of the business cycles, as well as structural changes in the form of modifications and adjustments of the rules in force. The lack of gender coincidence could be explained by the fact that men and women work in different sectors. Institutional changes and business cycles influence the sectors differently. This influence was not picked up fully by the occupational dummies.

## 5.2 Characteristics of couples

For couples there are several sources of joint retirement behaviour, added worker versus assortative mating effects, and/or correlation in unobservables. As previously discussed, the added worker effect describes behaviour where the labour supply increases when the spouse's income is reduced or disappears. The assortative mating effect describes behaviour where the partners have the same preferences, or in other words where the labour supplies of the two spouses are positively correlated.

To analyse this potential impact, the list of explanatory variables is expanded with specific variables that refer to the characteristics of an individual's spouse. For spouse variables we include:

1) the age difference between the individual and his/her spouse;
2) the capital income of the spouse;
3) the annual net wages of the spouse;
4) a sickness and invalidity benefit dummy;
5) a dummy for the spouse being an inpatient at a hospital during the last 12 months;
6) a dummy for the spouse being inactive; and finally,
7) a dummy for the spouse being unemployed.

The estimation with gender-specific samples allows us to check whether the spousal effects are symmetrical or asymmetrical by gender. This analysis found mixed and scarce evidence of spousal spillover effects. Although there is evidence both for the added worker effect and the complementarities of leisure hypothesis, the latter effect dominates. Further, there is evidence of asymmetries in spousal effects, as husbands seemed to be more influenced by their wives than the opposite. Concerning this finding, the most significant results were obtained for the German sample.

One would expect that individuals who are older (younger) than their spouse ceteris paribus have a higher (lower) propensity to retire. In our sample the difference in age between individuals and their spouses has no sizable effect on retirement behaviour. The insignificant impact is, however, mostly positive as expected: the higher the age difference with the spouse, the higher the propensity to retire.

In order to capture the wealth effect of the spouse, a capital income variable was included. For Finland this differs across genders as it is positive for men and negative for women. In Germany it is positive for the unemployment channel of men, negative for the unemployment channel of women and positive for the women's inactivity channel. For Belgium men and women it is not significant. For Finland the effect is larger for men and very small for women. The evidence suggests that Finnish women have a stronger influence on the retirement decisions of men. The wealth results for Finland bring some evidence of the added worker effect for the male specification.

A variable that correlates with the spouse being employed is the annual net wage of the spouse. The direction of the impact of the income variable clearly differs across country and gender. It is significant for the unemployment channel of German men and has a negative impact, supporting the complementarities of leisure or assortative mating hypothesis. For Belgium the impact is not significant. For Germany, Blau & Riphahn (1999) found a number of sizeable cross-spouse effects of the wage income. Having a high-earning husband generally increases the labour force mobility of wives, making them more likely to leave the labour force. Husbands of high-earning wives have increased probabilities of exiting employment. Finally, along with Blau & Riphahn, we found some evidence of cross-spouse wage effects that are asymmetric between the German spouses.

The health of an individual can influence his or her preferences and our results revealed that individuals with bad health have on average a higher propensity to retire. The health characteristics of a spouse may also influence an individual's retirement decision. Two contrasting effects have to be listed: 1) health problems of the spouse can prevent him/her from earning money and thus may force the individual to stay employed longer to financially compensate the loss of income (i.e. the added worker effect); and 2) if the spouse with health problems receives sickness or disability benefits the individual may have an extra incentive to stay at home and take care of the spouse (i.e. the assortative mating effect). Certainly the type of health problem involved is important. To capture health problems that prevent a spouse from being able to work, the inpatient-at-a-hospital variable is used. As both effects work in opposite directions, the composed effect depends on the stronger of the two.

Results were most convincing for Germany. Only for German men did we find evidence of spousal health effects. For German men in particular the probability of becoming inactive declines if their spouse is receiving sickness or disability benefits. This supports the idea that a reduction in the wife's income has to be compensated by a prolongation of the working career of the husband, a result in favour of the added worker effect. Yet this seems to depend on the kind of health problem experienced. Health problems leading to a recent hospital visit raise the probability of men becoming inactive. The latter weaker effect supports the idea that men stop working to take care of a hospitalised wife, a result in favour of the assortative mating effect. In no other cases did we find spousal health effects. That these mixed results are only valid for Germany is most probably connected with the different health care institutions in the other countries.

For Germany, Blau & Riphahn (1999) found that wives are less likely to exit the labour force if the husband has a chronic condition and is still working and more likely to exit if the husband has left the labour force. But they also found that the same pattern does not hold for men – husbands are less likely to stop employment if the wife has a health condition. The latter result is in line with our findings. For a sample of EU countries, Jiménez-Martín et al. (1999) found that the individual's own poor health is important and forms a positive incentive to withdraw from the labour force. The magnitude of this health effect depends on the labour force status of the spouse, suggesting either complementarities in leisure or a correlation in the unobservables of both spouses. Additionally, they find important and asymmetric cross-effects. It is striking that their results are the opposite of ours, as their results show that the husband's health status is crucial in explaining joint retirement.

Two other variables refer to the spouse being unemployed or inactive. The labour market state of the spouse definitely matters for the transition probabilities of men. In Finland men are less likely to keep on working if their spouse is inactive, although for women the results are less strong. In Germany women are more likely to become unemployed if their spouse is inactive. In Belgium the probability of men staying employed falls if the spouse is inactive, and for women the same effect holds if the spouse is unemployed. These results support the view that couples want to spend their leisure time together by synchronising their labour market states, favouring the assortative mating effect.

## 6. Conclusions

This analysis has found evidence of spousal spillover effects on the decision of elderly persons to continue participating in the labour force, although it varies across countries. Spillover effects have turned out to be significant, especially for the German sample. Additional evidence supports the existence of asymmetries of spousal effects across genders. There was more support for women than men having an effect on the labour force transitions of their elderly spouses. The effects are mostly shown through the wealth and participation variables of the spouse and spousal health effects were only found to impact German men. Although there is evidence of the added worker effect and the complementarities of leisure effect, the overall conclusion is that the latter hypothesis dominates. Further, there was no clear evidence of the assortative mating effect in our sample.

As previously mentioned, spousal health effects were found to be significant for German men. The strongest effect supports the added worker hypothesis. A weaker effect shows, however, that if one's wife has been hospitalised the probability of quitting work rises, which may be connected with care-giving. That these results are only valid for Germany may have something to do with the different health care institutions in the countries studied. Additionally, the distinction between transitions from employment to other states of activity/inactivity is important as there are different routes out of employment. Certain determinants of labour supply seem to play varying roles in the different channels. For example, for Belgium the unemployment channel is not important at first glance.

Transitions by the members of elderly two-adult households towards inactivity are influenced by important individual characteristics. Age plays a significant role, explaining the transitions as it is a crucial component for the eligibility and computation of benefits across the different types of inactivity. The impact of age effects is up to twice as strong for men as women. Yet it seems to play a much less important role on becoming unemployed. A second individual characteristic that has a significant impact on the probability of becoming inactive is the health status of the individual. A bad health condition has a large positive impact on the probability of an individual becoming inactive. Individuals who have become inactive are among those who use the disability path to retirement. The effect of bad health is especially significant for men and stronger for men than for women. The impact of bad health is insignificant, however, for the transition to unemployment. We found indirect evidence that men tend to retire more through the disability channel whereas women tend to flow out more often through the unemployment channel.

A further very significant and robust result is that self-employed men and women have a higher probability of staying employed and a lower probability of becoming both unemployed and inactive. *Ceteris paribus* it is good for the labour force to encourage self-employment. Further, a higher degree of work experience is valuable to making a successful switch to self-employment. The more flexible working hours are also more appreciated by elderly couples. A policy conclusion here is that it may be worth stimulating self-employment for older two-adult households. The labour force participation of elderly self-employed persons is an area for further study.

In line with the recent body of literature concentrating on the labour supply of couples, this study concludes that it is crucial to take into account the influence that spouses can have on the retirement decisions of each other, as not doing so may bias estimates of the determinants of retirement that can be used in policy simulation exercises. Useful extensions for future research can concentrate on the modelling of pension incentives and the endogeneity problems concerning health.

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# Appendix A
# Tables

*Table A.1. Summary statistics: Sample of working men aged 50 to 69*

| **male sample (age 50- age 69)** | Belgium | | Finland | | Germany | |
|---|---|---|---|---|---|---|
| | 1497 | obs. | 2064 | obs. | 4273 | obs. |
| | Mean | st-dev. | Mean | st-dev. | Mean | st-dev. |
| Outflow from employment | 9.52% | 0.93% | 6.25% | 0.68% | 11.47% | 0.68% |
| Transition to inactivity | 0.71% | 0.22% | 2.46% | 0.45% | 3.59% | 0.38% |
| Transition to unemployment | 8.69% | 0.90% | 3.83% | 0.52% | 7.68% | 0.57% |
| Age | 54.68 | 0.10 | 54.29 | 0.10 | 55.78 | 0.09 |
| Primary education | 28.29% | 1.33% | 33.45% | 1.45% | 10.93% | 0.62% |
| Secondary education | 32.66% | 1.43% | 36.92% | 1.44% | 52.79% | 1.10% |
| Tertiary education | 36.06% | 1.43% | 29.23% | 1.22% | 36.08% | 1.05% |
| Married | 97.62% | 0.40% | 92.96% | 0.84% | 98.09% | 0.22% |
| Cohabitation | 99.79% | 0.16% | 99.89% | 0.08% | 99.92% | 0.06% |
| Separation/divorce /widowhood | 1.91% | 0.34% | 3.98% | 0.68% | 1.37% | 0.19% |
| Children 0-13 | 3.75% | 0.53% | 10.01% | 2.34% | 9.87% | 0.83% |
| Children 0-15 | 8.50% | 0.80% | 24.35% | 3.69% | 17.56% | 1.10% |
| Household size | 3.06 | 0.03 | 2.68 | 0.05 | 2.94 | 0.03 |
| Non-national | 4.87% | 0.56% | 1.17% | 0.31% | 9.35% | 0.67% |
| Net annual salary/wage (10000 Euro's) | 2.26 | 0.04 | 2.75 | 0.06 | 2.50 | 0.04 |
| Gross annual salary/wage (10000 Euro's) | 4.24 | 0.09 | 4.39 | 0.10 | 4.42 | 0.10 |
| Capital income (10000 Euro's) | 0.24 | 0.04 | 0.23 | 0.06 | 0.26 | 0.02 |
| Owner occupied | 92.55% | 0.74% | 86.76% | 0.97% | 66.58% | 0.96% |
| Satisfaction with work (rising scale: 1 to 6) | 4.57 | 0.04 | 3.99 | 0.06 | | |
| Satisfaction with leisure (rising scale: 1to 6) | 4.19 | 0.04 | 3.80 | 0.06 | | |
| Low work status | 40.57% | 1.46% | 47.83% | 1.48% | | |
| High work status | 22.08% | 1.23% | 23.25% | 1.14% | | |
| Working experience | 30.80 | 0.12 | 30.71 | 0.11 | 31.39 | 0.09 |
| Hours (total, weekly) | 42.52 | 0.30 | 41.59 | 0.31 | 42.90 | 0.21 |
| Hours (main job, weekly) | 41.93 | 0.30 | 41.00 | 0.31 | 42.56 | 0.21 |
| Part time | 2.27% | 0.48% | 5.66% | 0.67% | 0.30% | 0.09% |
| Self employment | 9.13% | 0.86% | 14.99% | 0.96% | 0.94% | 0.19% |
| Public employment | 25.18% | 1.24% | 28.60% | 1.25% | 26.23% | 0.89% |
| Firm size < 20 | 14.46% | 1.03% | 33.80% | 1.34% | 13.00% | 0.72% |
| Managers, professionals | 26.53% | 1.28% | 26.01% | 1.15% | 27.40% | 0.99% |
| Technicians | 13.26% | 1.03% | 19.44% | 1.08% | 17.75% | 0.89% |
| Clerks, service workers | 15.22% | 1.06% | 6.77% | 0.73% | 10.13% | 0.61% |
| Blue-collar worker | 19.13% | 1.17% | 36.71% | 1.51% | 39.15% | 1.05% |
| Health (declining scale: 1 to 5) | 1.85 | 0.04 | 0.98 | 0.11 | 2.74 | 0.02 |
| Bad health | 1.19% | 0.28% | 3.77% | 0.56% | 16.74% | 0.92% |
| Good health | 81.44% | 1.08% | 49.62% | 1.47% | 39.33% | 1.06% |
| Chronic physical/mental health problem | 11.67% | 0.92% | 36.75% | 1.36% | 39.54% | 1.10% |
| Limitation | 10.70% | 0.87% | 22.81% | 1.19% | 36.70% | 1.09% |
| Inpatient at a hospital | 9.52% | 0.83% | 10.22% | 0.75% | 9.63% | 0.65% |
| Hospital nights | 0.60 | 0.13 | 0.54 | 0.06 | 1.50 | 0.14 |
| 1-5 visits to the doctor | 55.44% | 1.48% | 63.15% | 1.38% | | |
| 6+ visits to the doctor | 35.58% | 1.42% | 25.28% | 1.22% | | |
| Spouse age difference | 1.82 | 0.10 | 2.03 | 0.11 | 2.60 | 0.08 |
| Spouse capital income (10000 Euro's) | 0.10 | 0.01 | 0.09 | 0.02 | 0.02 | 0.00 |
| Spouse annual net wages (10000 Euro's) | 0.52 | 0.03 | 1.52 | 0.04 | 0.59 | 0.02 |
| Spouse Old-age benefit receiver | 8.07% | 0.75% | 7.21% | 0.66% | 4.65% | 0.45% |
| Spouse Sickness-invalidity benefit receiver | 6.80% | 0.71% | 18.19% | 1.08% | 2.47% | 0.27% |
| Spouse inpatient at hospital | 10.76% | 1.00% | 11.87% | 1.03% | 11.12% | 0.70% |
| Spouse inactive | 49.68% | 1.50% | 14.69% | 1.22% | 47.65% | 1.11% |
| Spouse unemployed | 8.67% | 0.88% | 7.59% | 0.74% | 7.04% | 0.51% |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table A.2. Summary statistics: Sample of working women aged 50 to 69*

| **female sample (age 50- age 69)** | Belgium | | Finland | | Germany | |
|---|---|---|---|---|---|---|
| | 633 | obs. | 1920 | obs. | 2640 | obs. |
| | Mean | st-dev. | Mean | st-dev. | Mean | st-dev. |
| Outflow from employment | 8,61 % | 1,27 % | 6,42 % | 0,63 % | 14,73 % | 1,30 % |
| Transition to inactivity | 1,95 % | 0,67 % | 3,00 % | 0,44 % | 5,19 % | 1,02 % |
| Transition to unemployment | 7,40 % | 1,15 % | 3,44 % | 0,46 % | 8,99 % | 0,91 % |
| Age | 53,38 | 0,13 | 54,29 | 0,10 | 54,87 | 0,13 |
| Primary education | 20,10 % | 1,70 % | 36,00 % | 1,38 % | 26,34 % | 1,41 % |
| Secondary education | 35,95 % | 2,19 % | 32,91 % | 1,37 % | 58,15 % | 1,56 % |
| Tertiary education | 38,84 % | 2,18 % | 30,93 % | 1,23 % | 15,36 % | 0,97 % |
| Married | 95,88 % | 0,80 % | 93,47 % | 0,74 % | 96,95 % | 0,39 % |
| Cohabitation | 100,00 % | 0,00 % | 99,94 % | 0,05 % | 99,91 % | 0,06 % |
| Separation/divorce /widowhood | 2,46 % | 0,60 % | 4,18 % | 0,60 % | 2,84 % | 0,38 % |
| Children 0-13 | 0,41 % | 0,24 % | 3,91 % | 0,56 % | 3,71 % | 0,69 % |
| Children 0-15 | 3,19 % | 0,70 % | 9,67 % | 0,87 % | 4,63 % | 0,72 % |
| Household size | 2,74 | 0,04 | 2,47 | 0,02 | 2,56 | 0,04 |
| Non-national | 2,86 % | 0,69 % | 0,73 % | 0,23 % | 7,16 % | 0,59 % |
| Net annual salary/wage (10000 Euro's) | 1,43 | 0,04 | 2,04 | 0,03 | 1,21 | 0,03 |
| Gross annual salary/wage (10000 Euro's) | 2,68 | 0,07 | 3,08 | 0,05 | 2,07 | 0,04 |
| Capital income (10000 Euro's) | 0,19 | 0,04 | 0,10 | 0,02 | 0,03 | 0,01 |
| Owner occupied | 91,06 % | 1,34 % | 88,00 % | 1,00 % | 58,50 % | 1,54 % |
| Satisfaction with work (rising scale: 1 to 6) | 4,56 | 0,06 | 4,43 | 0,04 | | |
| Satisfaction with leisure (rising scale: 1to 6) | 4,02 | 0,06 | 4,24 | 0,04 | | |
| Low work status | 65,74 % | 2,12 % | 67,84 % | 1,28 % | | |
| High work status | 8,00 % | 1,34 % | 8,27 % | 0,75 % | | |
| Working experience | 29,22 | 0,17 | 30,76 | 0,11 | 31,36 | 0,15 |
| Hours (total, weekly) | 33,04 | 0,51 | 37,94 | 0,28 | 32,68 | 0,35 |
| Hours (main job, weekly) | 32,93 | 0,50 | 37,07 | 0,25 | 32,40 | 0,34 |
| Part time | 26,45 % | 2,03 % | 11,63 % | 0,88 % | 19,84 % | 1,31 % |
| Self employment | 4,90 % | 0,81 % | 5,33 % | 0,53 % | 0,37 % | 0,12 % |
| Public employment | 40,17 % | 2,15 % | 57,09 % | 1,40 % | 33,49 % | 1,34 % |
| Firm size < 20 | 14,92 % | 1,66 % | 40,51 % | 1,42 % | 26,69 % | 1,48 % |
| Managers, professionals | 25,26 % | 1,96 % | 21,63 % | 1,05 % | 10,06 % | 0,75 % |
| Technicians | 11,44 % | 1,28 % | 16,42 % | 1,05 % | 21,83 % | 1,23 % |
| Clerks, service workers | 32,01 % | 2,13 % | 40,63 % | 1,41 % | 37,36 % | 1,67 % |
| Blue-collar worker | 7,27 % | 1,08 % | 14,31 % | 1,07 % | 22,96 % | 1,35 % |
| Health (declining scale: 1 to 5) | 1,92 | 0,05 | 1,82 | 0,07 | 2,75 | 0,03 |
| Bad health | 0,95 % | 0,47 % | 4,68 % | 0,55 % | 17,20 % | 1,03 % |
| Good health | 78,87 % | 1,75 % | 53,06 % | 1,41 % | 40,31 % | 1,68 % |
| Chronic physical/mental health problem | 8,94 % | 1,32 % | 38,86 % | 1,38 % | 38,64 % | 1,47 % |
| Limitation | 8,31 % | 1,23 % | 25,52 % | 1,24 % | 37,30 % | 1,45 % |
| Inpatient at a hospital | 10,13 % | 1,38 % | 11,78 % | 0,97 % | 9,38 % | 0,83 % |
| Hospital nights | 0,48 | 0,13 | 0,50 | 0,06 | 1,09 | 0,13 |
| 1-5 visits to the doctor | 44,62 % | 2,21 % | 55,48 % | 1,41 % | | |
| 6+ visits to the doctor | 50,94 % | 2,23 % | 38,16 % | 1,38 % | | |
| Spouse age difference | -1,64 | 0,14 | -1,76 | 0,12 | -2,92 | 0,10 |
| Spouse capital income (10000 Euro's) | 0,73 | 0,25 | 0,27 | 0,07 | 0,18 | 0,03 |
| Spouse annual net wages (10000 Euro's) | 1,79 | 0,09 | 1,75 | 0,06 | 1,11 | 0,05 |
| Spouse Old-age benefit receiver | 15,02 % | 1,61 % | 16,36 % | 0,98 % | 22,98 % | 1,67 % |
| Spouse Sickness-invalidity benefit receiver | 7,09 % | 1,22 % | 24,92 % | 1,26 % | 5,74 % | 0,57 % |
| Spouse inpatient at hospital | 11,49 % | 1,46 % | 11,70 % | 0,84 % | 10,72 % | 0,79 % |
| Spouse inactive | 16,24 % | 1,65 % | 26,80 % | 1,28 % | 33,95 % | 1,75 % |
| Spouse unemployed | 3,51 % | 0,75 % | 6,54 % | 0,65 % | 7,74 % | 0,71 % |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table A.3. Multinomial logit model estimates for male members of elderly two-adult households in Finland*

| | Men | | | | | |
|---|---|---|---|---|---|---|
| | unemployed | | inactive | | employed | |
| | M.E. | z-value | M.E. | z-value | M.E. | z-value |
| Age | 0.0013346 | 1.47 | 0.0047257 | 5.13 | -0.0060603 | -4.55 |
| Married | 0.0174714 | 3.49 | 0.0111841 | 2.63 | -0.0286555 | -4.24 |
| Number of children 0-13 | -0.0003347 | -0.06 | -0.0129073 | -1.43 | 0.013242 | 1.25 |
| Tertiary education | 0.0036656 | 0.38 | -0.0053085 | -0.86 | 0.0016429 | 0.14 |
| Inpatient at hospital | 0.0090499 | 0.95 | 0.0000957 | 0.01 | -0.0091456 | -0.79 |
| Bad health | 0.0013173 | 0.08 | 0.1281217 | 2.41 | -0.1294389 | -2.40 |
| Annual net wages | -0.0103675 | -3.07 | -0.0026507 | -0.81 | 0.0130182 | 2.73 |
| Capital income | 0.0036755 | 2.52 | 0.0004175 | 0.26 | -0.0040931 | -1.77 |
| Satisfaction with work | -0.0047472 | -1.86 | 0.000641 | 0.26 | 0.0041062 | 1.09 |
| Satisfaction with leisure | 0.0049897 | 1.92 | -0.0008456 | -0.35 | -0.004144 | -1.15 |
| Supervisory job status | -0.0056911 | -0.88 | -0.0088991 | -1.55 | 0.0145902 | 1.63 |
| Part time | -0.0137071 | -2.86 | 0.0197593 | 1.18 | -0.0060522 | -0.33 |
| Self employment status | -0.0170636 | -2.60 | -0.0124557 | -2.57 | 0.0295194 | 3.52 |
| Public employment | -0.0036107 | -0.53 | 0.0104222 | 1.62 | -0.0068115 | -0.71 |
| Firm size < 20 | 0.0026077 | 0.39 | 0.0016282 | 0.31 | -0.004236 | -0.47 |
| Managers, professionals | 0.0023867 | 0.16 | -0.0036584 | -0.44 | 0.0012717 | 0.07 |
| Technicians | -0.0025928 | -0.37 | -0.0047753 | -0.93 | 0.0073681 | 0.82 |
| Clerks, service workers | -0.003407 | -0.35 | 0.0047159 | 0.41 | -0.001309 | -0.09 |
| Spouse age difference | -0.0005852 | -0.79 | 0.0005131 | 0.72 | 0.0000722 | 0.07 |
| Spouse capital income | -0.0024529 | -0.36 | 0.0017553 | 3.27 | 0.0006975 | 0.10 |
| Spouse annual net wages | 0.004003 | 1.26 | 0.000786 | 0.28 | -0.0047889 | -1.10 |
| Sickness-invalidity benefit receiver | 0.0083112 | 0.92 | 0.001457 | 0.23 | -0.0097681 | -0.88 |
| Spouse inpatient at hospital | 0.006243 | 0.55 | -0.0012251 | -0.20 | -0.0050179 | -0.39 |
| Spouse inactive | 0.0316789 | 1.58 | 0.0183483 | 1.14 | -0.0500272 | -1.89 |
| Spouse unemployed | 0.0369563 | 1.19 | 0.0231289 | 1.15 | -0.0600852 | -1.59 |
| Year 1996 | 0.0261038 | 1.30 | 0.0022157 | 0.26 | -0.0283196 | -1.31 |
| Year 1997 | 0.0157445 | 0.94 | 0.017127 | 1.50 | -0.0328715 | -1.65 |
| Year 1998 | 0.0136193 | 0.84 | 0.0109535 | 0.98 | -0.0245728 | -1.25 |
| Year 1999 | 0.0365331 | 1.43 | 0.0124622 | 1.03 | -0.0489953 | -1.72 |
| Observations | 1541 | 47 | | 92 | | 1402 |
| Percent correctly predicted | 91.48 | | | | | |
| Log likelihood | -383.93 | | | | | |
| Pseudo R-squared | 0.2766 | | | | | |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table A.4. Multinomial logit model estimates for female members of elderly two-adult households in Finland*

| | Women | | | | | |
|---|---|---|---|---|---|---|
| | unemployed | | inactive | | employed | |
| | M.E. | z-value | M.E. | z-value | M.E. | z-value |
| Age | 0.0004662 | 0.81 | 0.0034576 | 4.01 | -.0039238 | -3.69 |
| Married | 0.0063802 | 1.19 | 0.0071139 | 2.36 | -0.0134941 | -2.18 |
| Number of children 0-13 | -0.0003315 | -0.05 | 0.015237 | 2.34 | -0.0149055 | -1.24 |
| Tertiary education | -0.0061538 | -1.10 | -0.0078526 | -2.14 | -.0140064 | 2.00 |
| Inpatient at hospital | 0.0008543 | 0.16 | 0.0057264 | 0.99 | -0.0065807 | -0.84 |
| Bad health | 0.0039042 | 0.41 | 0.025735 | 1.59 | -0.0296392 | -1.71 |
| Annual net wages | -0.0206373 | -3.92 | -0.0048009 | -1.14 | 0.0254382 | 3.91 |
| Capital income | -0.005272 | -0.45 | 0.001205 | 2.61 | 0.0040671 | 0.35 |
| Satisfaction with work | -0.0023923 | -1.32 | 0.0011699 | 0.79 | 0.0012224 | 0.51 |
| Satisfaction with leisure | 0.0028176 | 1.69 | 0.0013096 | 0.97 | -0.0041273 | -1.86 |
| Supervisory job status | -0.0068643 | -1.09 | 0.0007707 | 0.12 | 0.0060936 | 0.71 |
| Part time | -0.0075088 | -2.35 | 0.0001465 | 0.03 | 0.0073622 | 1.38 |
| Self employment status | -0.0130526 | -2.91 | -0.0070019 | -2.33 | 0.0200545 | 3.70 |
| Public employment | -0.006093 | -1.40 | 0.0033129 | 1.09 | 0.0027801 | 0.52 |
| Firm size < 20 | 0.0080796 | 1.76 | -0.0017694 | -0.60 | -0.0063102 | -1.13 |
| Managers, professionals | 0.0250863 | 0.91 | 0.0246661 | 1.23 | -0.0497523 | -1.54 |
| Technicians | 0.0577785 | 1.81 | 0.0025032 | 0.43 | -0.0602817 | -1.86 |
| Clerks, service workers | 0.0181498 | 1.82 | -0.0021636 | -0.57 | -0.0159862 | -1.47 |
| Spouse age difference | 0.000214 | 0.41 | 0.0002458 | 0.67 | -0.0004598 | -0.72 |
| Spouse capital income | 0.0010006 | 0.60 | -0.0006591 | -1.47 | -0.0003415 | -0.20 |
| Spouse annual net wages | -0.0008912 | -0.59 | -0.0007672 | -0.58 | 0.0016585 | 0.81 |
| Sickness-invalidity benefit receiver | -0.0013499 | -0.31 | 0.0029552 | 0.67 | -0.0016053 | -0.25 |
| Spouse inpatient at hospital | -0.0043124 | -1.12 | -0.0009207 | -0.29 | 0.0052331 | 1.06 |
| Spouse inactive | -0.0022948 | -0.42 | 0.0039157 | 0.71 | -0.0016209 | -0.20 |
| Spouse unemployed | -0.0104079 | 1.02 | -0.0013419 | -0.33 | -0.009066 | -0.83 |
| Year 1996 | 0.0058375 | 0.83 | -0.0041841 | -1.51 | -0.0016534 | -0.22 |
| Year 1997 | -0.0024725 | -0.51 | 0.0024083 | 0.50 | 0.0000642 | 0.01 |
| Year 1998 | 0.0035325 | 0.63 | -0.0013132 | -0.33 | -0.0022193 | -0.32 |
| Year 1999 | -0.003217 | -0.67 | -0.0030803 | -0.93 | 0.0062973 | 1.12 |
| Observations | 1470 | 60 | | 75 | | 1335 |
| Percent correctly predicted | 92.14 | | | | | |
| Log likelihood | -332.63468 | | | | | |
| Pseudo R-squared | 0.3175 | | | | | |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table A.5. Multinomial logit model estimates for male members of elderly two-adult households in Germany*

| | Men | | | | | |
|---|---|---|---|---|---|---|
| | unemployed | | inactive | | employed | |
| | M.E. | z-value | M.E. | z-value | M.E. | z-value |
| Age | 0.0004536 | 0.92 | 0.0094001 | 5.24 | -0.0098537 | -5.33 |
| Married | -0.0193902 | -1.59 | -0.0332984 | -0.66 | 0.0526886 | 0.96 |
| Number of children 0-13 | 0.0056198 | 1.12 | -0.0307417 | -1.40 | 0.0251219 | 1.12 |
| Tertiary education | 0.0108298 | 1.88 | 0.0075139 | 0.71 | -0.0183437 | -1.47 |
| Inpatient at hospital | -0.0022896 | -0.66 | 0.0292056 | 1.99 | -0.026916 | -1.76 |
| Bad health | 0.001839 | 0.55 | 0.0390211 | 2.72 | -0.0408601 | -2.72 |
| Annual net wages | -0.0184659 | -7.61 | -0.0377942 | -5.67 | 0.0562601 | 7.57 |
| Capital income | 0.0010685 | 0.75 | 0.0065242 | 4.90 | -0.0075927 | -3.74 |
| Part time | -0.0144425 | -4.80 | -0.0096802 | -0.21 | 0.0241227 | 0.52 |
| Self employment status | -0.0129103 | -4.90 | -0.0384198 | -4.98 | 0.0513302 | 6.15 |
| Public employment | -0.0054964 | -1.75 | 0.0019119 | 0.21 | 0.0035845 | 0.36 |
| Firm size < 20 | 0.0024129 | 0.51 | -0.0157704 | -1.80 | 0.0133576 | 1.32 |
| Managers, professionals | -0.002827 | -0.68 | 0.0233218 | 1.59 | -0.0204948 | -1.29 |
| Technicians | -0.0027092 | -0.66 | 0.0032807 | 0.26 | -0.0005716 | -0.04 |
| Clerks, service workers | -0.0071886 | -2.29 | 0.0221194 | 1.34 | -0.0149308 | -0.86 |
| Spouse age difference | -0.0000722 | -0.17 | 0.0004074 | 0.38 | -0.0003353 | -0.27 |
| Spouse capital income | 0.0045654 | 2.07 | -0.0302107 | -0.52 | 0.0256452 | 0.45 |
| Spouse annual net wages | -0.0067104 | -2.46 | -0.004854 | -0.50 | 0.0115644 | 1.11 |
| Sickness-invalidity benefit receiver | 0.0115463 | 1.16 | -0.02188 | -2.47 | 0.0103337 | 0.84 |
| Spouse inpatient at hospital | 0.0016662 | 0.44 | 0.0232261 | 1.73 | -0.0248923 | -1.76 |
| Spouse inactive | -0.0006873 | -0.15 | 0.0162398 | 1.00 | -0.0155525 | -0.87 |
| Spouse unemployed | 0.004478 | 0.72 | 0.0041498 | 0.23 | -0.0086278 | -0.43 |
| Year 1994 | -0.0088694 | -2.40 | 0.03412 | 1.45 | -0.0252507 | -1.07 |
| Year 1995 | -0.0069201 | -1.68 | 0.039249 | 1.80 | -0.0323289 | -1.44 |
| Year 1996 | -0.0032755 | -0.66 | 0.0057169 | 0.37 | -0.0024415 | -0.15 |
| Year 1997 | -0.0051058 | -1.15 | -0.0097715 | -0.77 | 0.0148773 | 1.07 |
| Year 1998 | -0.0034706 | -0.67 | 0.0219758 | 1.15 | -0.0185053 | -0.92 |
| Year 1999 | -0.0056961 | -1.15 | 0.000006 | 0.00 | 0.0056899 | 0.37 |
| Observations | 3632 | 198 | | 299 | | 3135 |
| Percent correctly predicted | 87.44 | | | | | |
| Log likelihood | -1322.2668 | | | | | |
| Pseudo R-squared | 0.2223 | | | | | |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table A.6. Multinomial logit model estimates for female members of elderly two-adult households in Germany*

| | Women | | | | | |
|---|---|---|---|---|---|---|
| | unemployed | | inactive | | employed | |
| | M.E. | z-value | M.E. | z-value | M.E. | z-value |
| Age | -0.0006239 | -0.64 | 0.0044312 | 2.16 | -0.0038074 | -1.47 |
| Married | 0.0030548 | 0.29 | -0.0469918 | -0.88 | 0.043937 | 0.82 |
| Number of children 0-13 | -0.0007902 | -0.07 | -0.0123368 | -0.55 | 0.013127 | 0.44 |
| Tertiary education | 0.0142608 | 1.26 | 0.0128787 | 0.99 | -0.0271394 | -1.51 |
| Inpatient at hospital | 0.0011507 | 0.16 | 0.023257 | 1.36 | -0.0244077 | -1.24 |
| Bad health | 0.0067005 | 0.73 | 0.0336701 | 2.39 | -0.0403706 | -2.28 |
| Annual net wages | -0.0608455 | -3.91 | -0.0995314 | -6.09 | 0.160377 | 6.34 |
| Capital income | 0.0180243 | 1.13 | 0.0666898 | 1.78 | -0.0847141 | -1.75 |
| Part time | -0.0261276 | -3.02 | -0.0013075 | -0.13 | 0.0274351 | 1.95 |
| Self employment status | -0.0176863 | -2.46 | -0.0112088 | -0.40 | 0.0288951 | 0.97 |
| Public employment | 0.0163432 | 1.92 | 0.0178503 | 1.72 | -0.0341935 | -2.63 |
| Firm size < 20 | -0.0129495 | -2.42 | -0.00563 | -0.46 | 0.0185795 | 1.25 |
| Managers, professionals | 0.0272733 | 1.31 | 0.0093263 | 0.31 | -0.0365996 | -0.87 |
| Technicians | 0.0034596 | 0.40 | 0.0432573 | 1.81 | -0.046717 | -1.75 |
| Clerks, service workers | 0.0059465 | 0.87 | 0.0216843 | 1.32 | -0.0276308 | -1.51 |
| Spouse age difference | 0.0005986 | 0.66 | -0.0001056 | -0.07 | -0.000493 | -0.26 |
| Spouse capital income | -0.0452474 | -1.85 | 0.0052376 | 1.81 | 0.0400098 | 1.61 |
| Spouse annual net wages | 0.0002226 | 0.06 | -0.0021522 | -0.58 | 0.0019296 | 0.43 |
| Sickness-invalidity benefit receiver | 0.0122339 | 0.88 | -0.0140121 | -0.97 | 0.0017782 | 0.09 |
| Spouse inpatient at hospital | 0.0019609 | 0.24 | 0.006558 | 0.43 | -0.0085189 | -0.47 |
| Spouse inactive | 0.0212058 | 1.83 | 0.0031933 | 0.23 | -0.0243991 | -1.21 |
| Spouse unemployed | 0.0200562 | 1.20 | 0.0002273 | 0.02 | -0.0202835 | -0.90 |
| Year 1994 | -0.0074483 | -0.94 | 0.0105412 | 0.50 | -0.0030929 | -0.13 |
| Year 1995 | -0.0116749 | -1.92 | 0.0262476 | 1.11 | -0.0145727 | -0.59 |
| Year 1996 | -0.0076368 | -0.85 | 0.0092326 | 0.51 | -0.0015958 | -0.08 |
| Year 1997 | -0.0147547 | -2.47 | 0.0113084 | 0.60 | 0.0034463 | 0.17 |
| Year 1998 | -0.0131342 | -2.05 | 0.0048918 | 0.32 | 0.0082424 | 0.45 |
| Year 1999 | -0.0157989 | -2.21 | 0.0146234 | 0.72 | 0.0011754 | 0.05 |
| Observations | 2217 | 143 | | 185 | | 1889 |
| Percent correctly predicted | 86.94 | | | | | |
| Log likelihood | -864.92889 | | | | | |
| Pseudo R-squared | 0.2847 | | | | | |

*Source:* Author's calculations based on the ECHP (1994-2001).

*Table A.7. Probit model estimates of the determinants of the outflow from employment of male and female members of elderly two-adult households in Belgium*

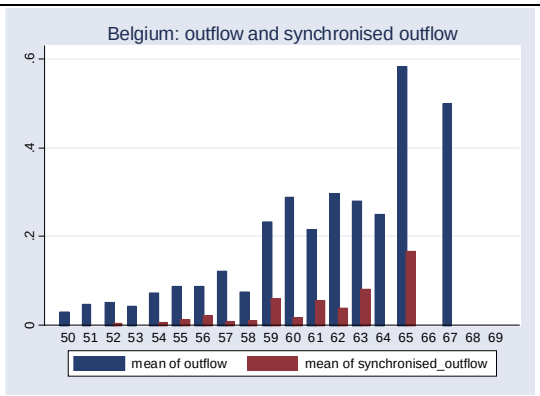
| | Men | | Women | |
|---|---|---|---|---|
| | M.E. | z-value | M.E. | z-value |
| Age | 0.0157052 | 8.60 | 0.0116195 | 3.32 |
| Married | -0.1074019 | -2.23 | -0.0530992 | -0.72 |
| Number of children 0-13 | -0.0090597 | -0.27 | | |
| Tertiary education | -0.0006404 | -0.04 | 0.0937736 | 2.44 |
| Inpatient at hospital | -0.0019337 | -0.11 | 0.0619283 | 1.29 |
| Bad health | -0.0033712 | -0.06 | -0.041541 | -0.82 |
| Annual net wages | -0.0529514 | -2.93 | -0.105082 | -3.91 |
| Capital income | 0.0123591 | 2.22 | -0.0001296 | -0.01 |
| Satisfaction with work | -0.0123736 | -2.41 | -0.0191479 | -2.93 |
| Satisfaction with leisure | 0.0051204 | 0.97 | 0.0118374 | 1.57 |
| Supervisory job status | 0.0053513 | 0.25 | 0.1236832 | 1.58 |
| Part time | 0.0136584 | 0.33 | -0.0270052 | -1.21 |
| Self employment status | -0.0732105 | -4.78 | -0.0235071 | -0.59 |
| Public employment | -0.0163961 | -1.14 | -0.0357231 | -1.53 |
| Firm size < 20 | -0.0302968 | -1.88 | -0.0001182 | -0.00 |
| Managers, professionals | -0.0186661 | -1.00 | -0.0405894 | -1.25 |
| Technicians | -0.017942 | -0.90 | -0.0581662 | -2.36 |
| Clerks, service workers | -0.031151 | -1.83 | -0.0512308 | -2.10 |
| Spouse age difference | -0.0014225 | -0.61 | -0.0031216 | -0.84 |
| Spouse capital income | -0.0207268 | -0.87 | -0.0099949 | -1.40 |
| Spouse annual net wages | 0.0017559 | 0.14 | 0.001104 | 0.13 |
| Sickness-invalidity benefit receiver | 0.0030577 | 0.12 | -0.0067334 | -0.21 |
| Spouse inpatient at hospital | 0.0020888 | 0.10 | 0.0320663 | 0.91 |
| Spouse inactive | 0.0433715 | 2.16 | -0.0149681 | -0.42 |
| Spouse unemployed | 0-.0088371 | -0.31 | 0.1280286 | 1.99 |
| Year 1994 | 0.020296 | 0.60 | 0.0886269 | 1.32 |
| Year 1995 | -0.0018015 | -0.08 | 0.0879575 | 1.26 |
| Year 1996 | 0.0323635 | 0.96 | 0.0644971 | 0.99 |
| Year 1997 | 0.0648588 | 1.67 | 0.0609431 | 0.98 |
| Year 1998 | 0.0502341 | 1.28 | 0.1544637 | 1.91 |
| Year 1999 | 0.0180968 | 0.51 | -0.0271042 | -0.83 |
| Observations | 1186 | | 493 | |
| Percent correctly predicted | 89.93 | | 86.96 | |
| Log likelihood | -308.38704 | | -131.87271 | |
| Pseudo R-squared | 0.2685 | | 0.2290 | |

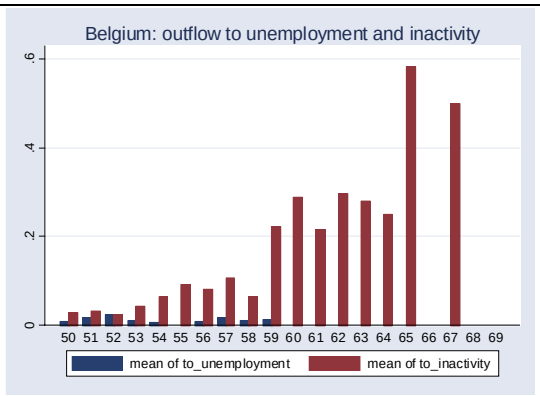
*Source:* Author's calculations based on the ECHP (1994-2001).

# Appendix B
# Figures

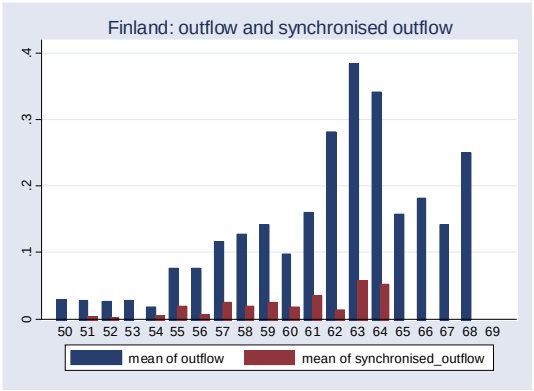
*Figure A.1. Age profile of the outflow and synchronised outflow from employment per country (left) and age profile of the outflow to inactivity and unemployment*

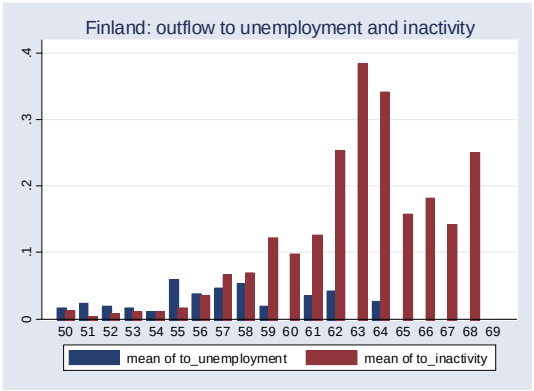
Belgium



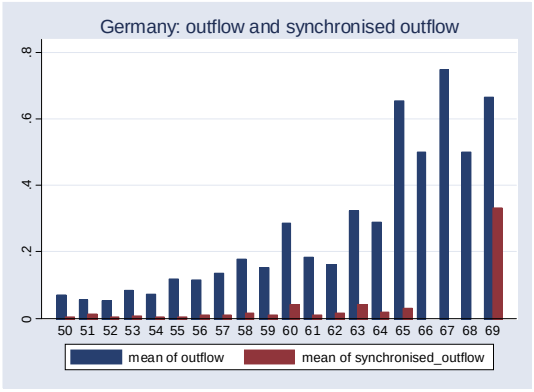




Finland




Germany



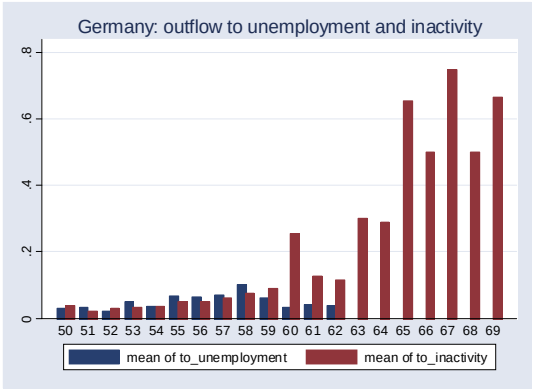



*Figure A.2. Kaplan-Meier survivor functions per country: A comparison of men and women, and tertiary education versus lower education levels*

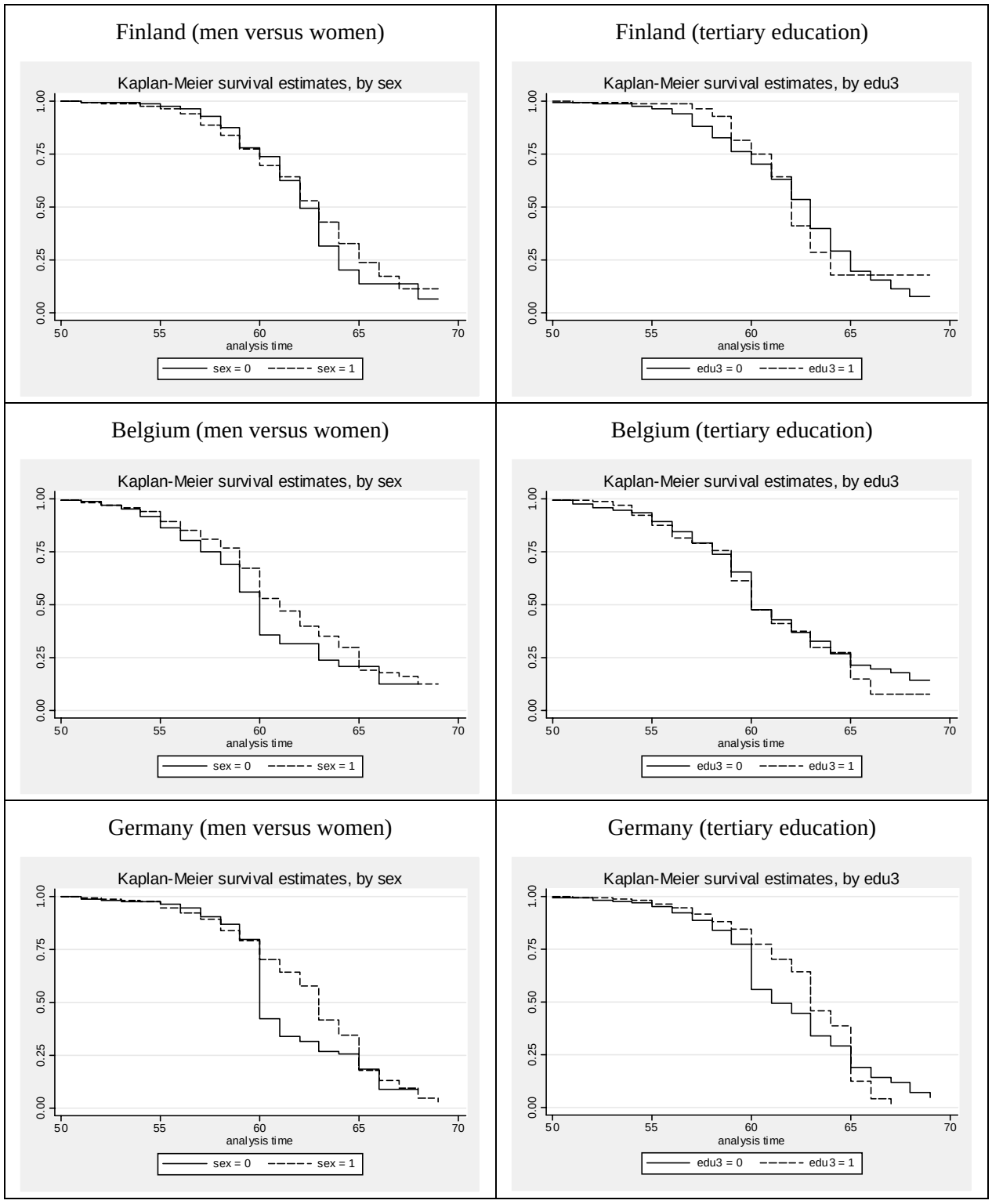


*Figure A.3. Kaplan-Meier survivor functions per country: A comparison of bad health with good and fair health and limitation versus non-limitation*

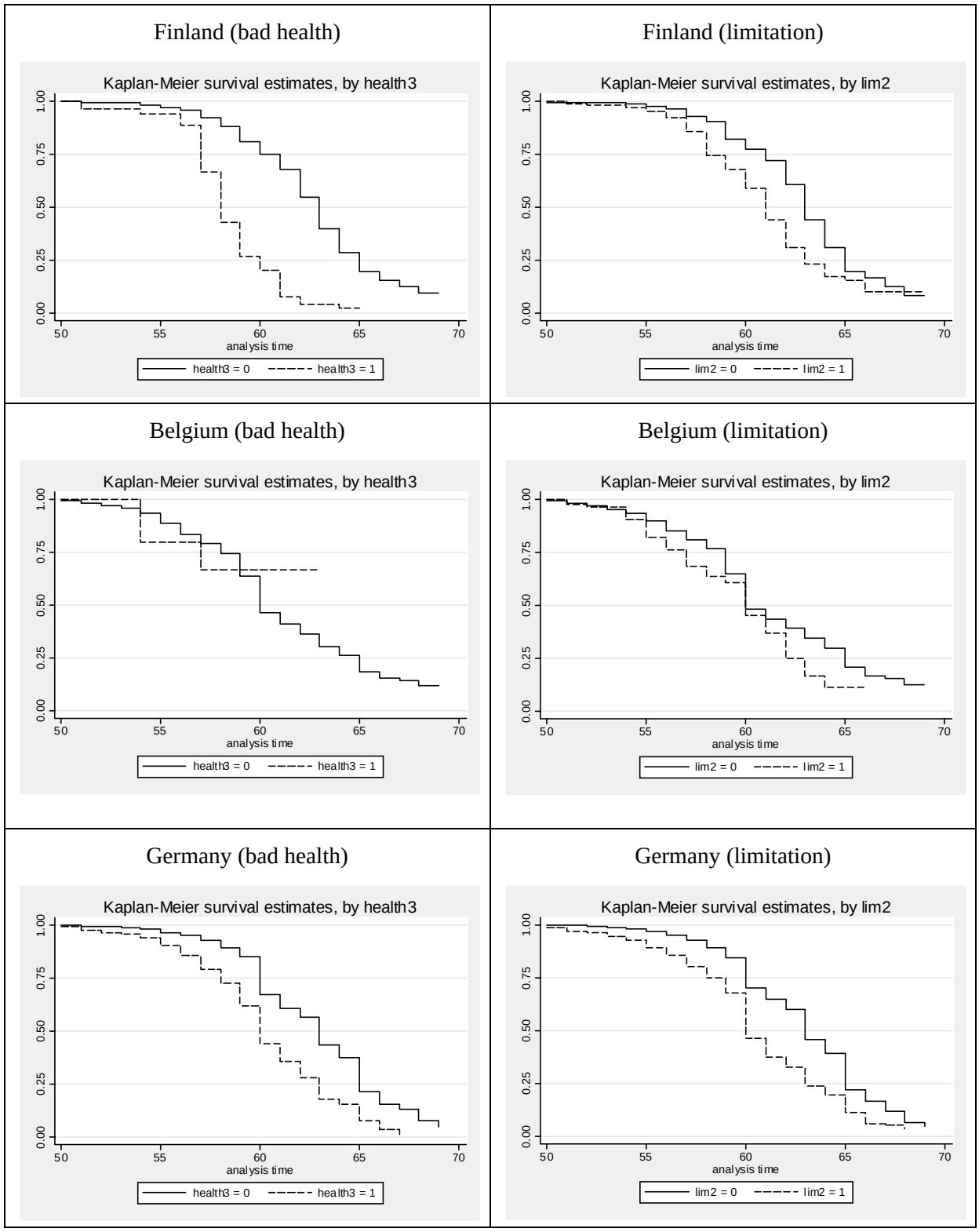
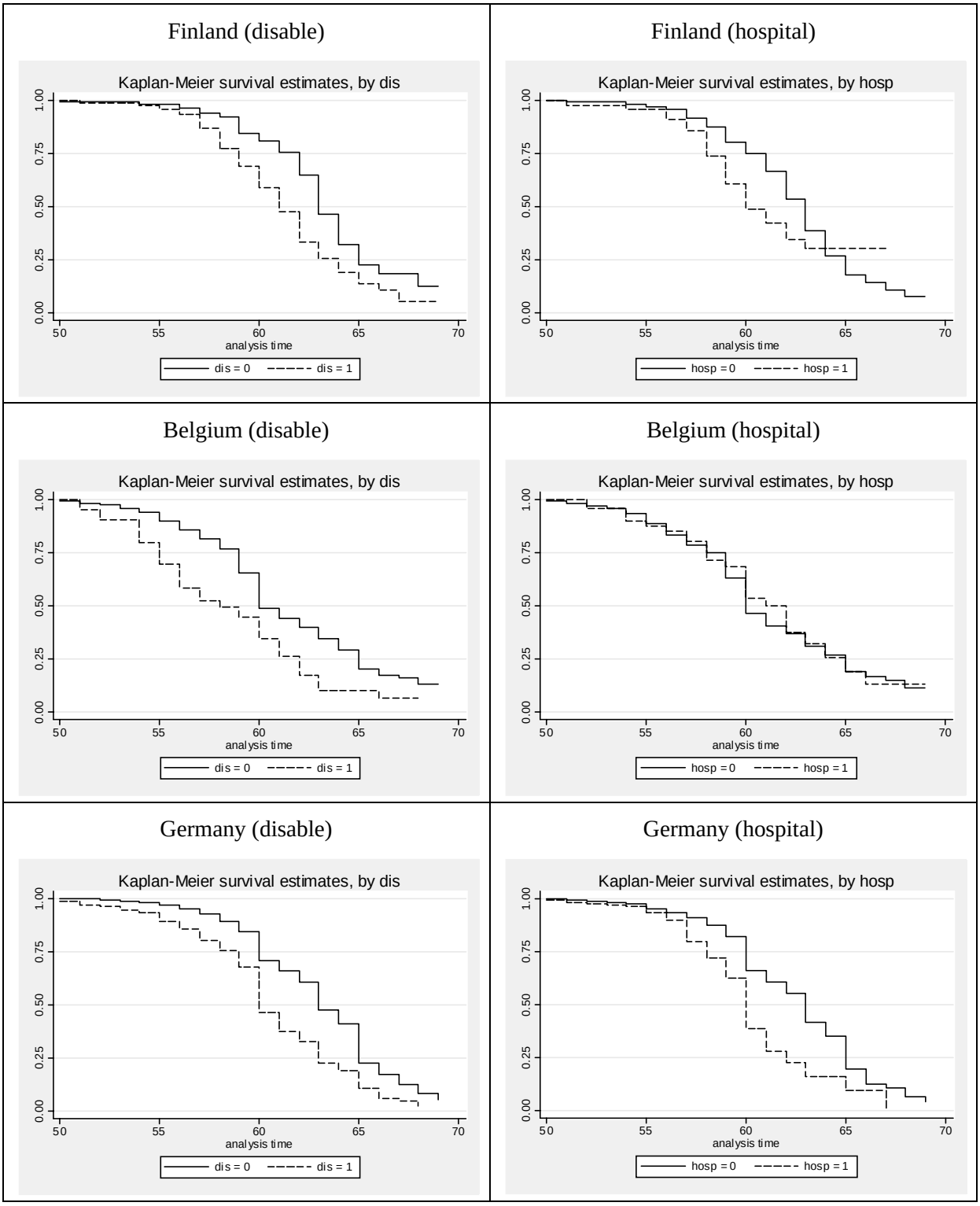


*Figure A.4. Kaplan-Meier survivor functions per country: A comparison between persons who are disabled vs. non-disabled and between persons who have been hospitalised vs. not hospitalised*



# Appendix C
# Description of the Belgian, Finnish and German Pension Systems

Pension systems are dynamic. The summary of the pension systems of our sample countries concentrates on a brief description of the systems during the sample period years of 4 to 2000. Since 1994 different pension reforms have taken place, along with those after the year 2000. For a more detailed description and updates of the most recent changes, see the Bibliography.

## C.1. The pension system in Belgium

### C.1.1. Structure

The Belgian pension system consists of three pillars. The **first pillar** unites social security pensions and is compulsory for all employees, civil servants and self-employed persons. It is financed by current income (pay-as-you-go or PAYG). The **second pillar** is employer-employee funded and embraces non-compulsory occupational schemes covering about 31% of the working population of the private sector in 1997.[1] The **third pillar** includes private-funded pension schemes and was in 2000 used by 44% of Flemish private-sector workers (OECD, 2003). Further description of the system concentrates on this most important first pillar. Civil servants are covered by a special state scheme and private-sector employees and self-employed persons by two different social security schemes. Private-sector employees account for 58% of all compulsory schemes, civil servants for 32% and the self-employed for 9%, along with a guaranteed minimum pension system for the elderly accounting for 1%. All three major groups have their own pension rules. A brief description of basic characteristics per group follows.

### C.1.2. Employees (private sector)

The conditions for obtaining a full pension for men is being the minimum age of 65 and having a working career of at least 45 years. Women can obtain a full pension after a career of 42 years from the age of 62 onwards. In 1997 men and women could go on their pension from age 60 if their career had reached a minimum of 20 years. It is notable that the gross replacement rate of the average worker in the private sector amounted to 29.9% in 2000. The calculation of pension benefits is based on the following formula:

$$\text{Benefit} = r^{*}\text{average wage}^{*}\min[d/(42 \text{ or } 45),1]$$

and consequently depends on 1) the replacement rate r depending on the reported type of household – 0.6 for singles and 0.75 for a one-earner couple; 2) average earnings based on periods of affiliation; and 3) the share of years completed of the full career (42 years for women and 45 years for men). The average wage corresponds to the price-indexed average wages over the period of affiliation. An important characteristic of this scheme is that periods spent in unemployment, inactivity due to sickness and disability, or early retirement also counts as affiliation years in the computation of the average wage and hence of the pension benefit. All benefits in this scheme are consumer price-indexed.

In this system pension benefits are limited at both ends: for a complete career the minimum annual pension was €11,794 for a one-earner couple or €9,438 for individuals in February 2002 (about 56% of average net wages). The earnings entering the above pension formula had a ceiling of €38,678 (120% of the average gross wage) in 2001. If the ceiling is adapted for the whole career the maximum annual pension amounted to €20,894 for a one-earner couple and €16,715 for an individual in 2001.

[1] Information in this section draws from the European Commission's website on pension matters (http://europa.eu.int/comm/employment_social/social_protection/pensions_en.htm).

**Unemployment pension**. Next to the official wage-earner scheme, several forms of early retirement programmes have recently developed, some being official early retirement schemes, others (unemployment, disability and sickness) being unofficial. These schemes can be broadly divided into two groups, mandatory collective retirement and individual retirement. Individual early retirement differentiates itself from its collective counterpart by the fact that it is based on an individual's decision to retire from work. The most prevalent way to exercise this option is to pass through the unemployment system, in which people aged 50 or more are considered 'aged unemployed', and are not being required to actively seek work.

**Disability pension**. Some individuals also attempt to proceed to retirement through the disability insurance scheme. In the Belgian context this channel is not very prominent for private-sector workers as control is fierce and benefits are rather limited.

### C.1.3. Civil servants (public sector)

The conditions for obtaining a full pension for civil servants (both men and women) is being the minimum age of 65 and having a working career of at least 45 years. Men and women can obtain a pension from the age of 60 if they contributed to the pension system for at least five years. The gross replacement rate of the average worker in the public sector was 65.4% in 2000. Benefits are computed according to a rather complicated formula:

Benefit = average gross wage over last five years of career*min[fraction,0.75].

Pension benefits are based on the average gross wages of the last five years of the career and can never exceed 75% of that average wage. The 'fraction' variable in the benefit formula has a numerator consisting of the number of years the person worked in the public sector and a denominator that is the benefit accrual factor. This latter benefit-accrual factor, also called '*tantième*', depends on the rank occupied in the hierarchy.

For a complete career the minimum annual pension was €14,344 for one-earner couples (70% of average wages) or €11,475 for individuals (56% of average wages) in February 2002. The maximum pension amounted to 75% of the five-year average wage. The annual ceiling of the gross pension was €61,000 in 2002 (about three times the average gross wage in the economy). Public pensions are indexed to the average wages (*prérégulation*).

Aside from the official route of retirement, public servants can quit work early through disability protection. This early retirement route seems to be much more plausible for employees from the public sector than for those of the private sector as the screening is less stringent. The calculation of invalidity pension is based on foregone earnings with a ceiling of €2,480 per month (January 2001) and a rate of 65% for a single-earner couple, 45% for an individual and 40% for a cohabitant.

### C.1.4. Self-employed persons

The self-employed retirement scheme is less generous than those of the public and private sectors. The conditions for obtaining a full pension are the same as in the private sector. In 1997 men and women can go on their pension from age 60 if their career had reached 20 years. The pension is reduced, however, by 5% for each year of anticipation. The net replacement rate of an average self-employed person was 23.6% in 2000.

Since 1984 the pension has depended on net profits and the duration of the career. A full career is defined the same way as in the private sector. For a complete career the minimum annual pension was €9,401 for one-earner couples or €7,051 for individuals in February 2002. The annual ceiling of income that enters the benefit formula was €49,077 for 2001.

Self-employed persons do not have access to the unemployment insurance system and there is no other special regime they could use to retire early. Although there is a public disability system, the

application of more stringent criteria than that applied in the private sector prevents it from becoming a 'well-loved' early retirement channel. As Dellis et al. (2001) note, self-employed persons wishing to retire early are somehow forced to exercise this option through some private transit retirement-income arrangement.

## C.2. The pension system in Finland

### C.2.1. Structure

The three pillars of the Finnish pension system include the following provisions. In the **first pillar,** every citizen resident in Finland is compulsorily insured under the basic state pension scheme (the so-called 'national' pension) from the age of 16. This pension is means-tested against the occupational pension. In Finland the first pillar consists of both the statuary occupational scheme and the national pension scheme.

In the **second pillar** it is possible for the employer to set up voluntary, occupational pension schemes. As regards voluntary pensions, the employer is responsible for at least 50% of the contributions. The additional pension systems play a minor role in Finland. Voluntary occupational schemes may be arranged in pension funds, foundations and in life insurance companies. An employer may set up a fund of its own if the scheme has at least 300 members or a foundation if the scheme has at least 30 members. In the **third pillar,** individuals can arrange for private pensions, which are administered by insurance companies. Private pension schemes are operated on a funded basis.

In what follows we concentrate on pillar 1 – first on the state pension scheme but mainly on the compulsory occupational scheme.

#### *The state pension scheme*

The state pension scheme is funded on a PAYG basis. As of 2000 the employer contributed from 2.4 to 4.9% of the salary. There is no maximum salary up to which contributions must be paid. The retirement age for men and women is 65. If the pension is deferred, it increases by 0.6% per month. Early retirement is possible from the age of 60. The pension is reduced by 0.4% per month before the age of 65. A full pension is received when the pensioner has been resident for 40 years. The pension will be reduced for every year of residence less than 40 years. The amount of pension does not only depend on the years of residence, but also on the place of residence, family status and income from occupational pension schemes.

#### *The compulsory occupational scheme*

The compulsory occupational pension system is a defined-benefit scheme. Different schemes apply to different categories of persons. There are occupational pension schemes on both a PAYG and a funded basis. The financing of the occupational scheme for employees is a mixture of both. Occupational pensions for self-employed persons and agricultural workers are financed on a PAYG basis. As of 2000, the total contribution of the employee and the employer to the compulsory pension was on average 21.5% of the salary. The employee contributed 4.7% of the salary. There is no maximum up to which contributions must be paid.

The retirement age for men and women is 65. Early retirement is possible, and the pension is reduced accordingly. In voluntary occupational schemes the employer may reduce the retirement age from 65 to 55. Compulsory occupational schemes (pillar 1) must be arranged in one of the following pension institutions: pension insurance companies (6), pension funds (8) and pension foundations (about 40).

### C.2.2. Employees (private sector)

**Old-age pensions**. Earning-related pensions depend on accrued pension rights during (self-) employment. Benefits from this type of pension are based upon three main factors:

1) the number of years in employment;

2) the accrual rate (the pension starts growing from the age of 23) – for the years prior to 1962 an employee has acquired a pension rate of 0.5% per year and for the years following 1962 the pension rate has been 1.5% per year. From the age of 60 onwards an employee acquires a pension rate of 2.5%. Thus, the maximum pension is 60% of the highest wage; and

3) the principle that pensionable salary is the gross income net of an employee's pension contributions and corresponds to the average salary of the last 10 years of occupation. Although the maximum pension is 60% of the highest income during the career, there is no upper limit for the amount of pension received. Indexation to the current date of the pension rights at the end of the career is 50% wages and 50% inflation.

If an individual works beyond age 65 no pension rights can be accrued on this income but this gives rise to an increase of pension entitlements of 0.6% per month. It is possible to retire completely from the age of 60. Then the level of pension payments is subject to an actuarial reduction of 0.4% for every month below age 65. The calculation is as follows:

Benefit= pensionable salary*years of employment*accrual rate.

For the average Finnish worker incentives to continue working are low and the net replacement rates are flat. From the age of 63 the replacement rate of 62% increases only 2 percentage points at the age of 65 and 3 percentage points at the age of 70. So working seven years longer only brings a rise of 5 percentage points. Similarly the Finnish pension wealth-accrual turns negative at age 63 (-20%) and is stabilised after -70%. For the average Finnish worker the net replacement rates for the disability pension are very flat at around 65% and the net replacement rates for the unemployment benefits have a similar flat pattern at around 65%.

**Unemployment pension**. In Finland (2001) the unemployment pension (at 20%) is together with disability pension (at 33%) the most common way to exit the labour market for the age category of 60 to 64. The basic unemployment allowance was €115 per week in 2003 and is means-tested against spouse income over a certain limit. The earnings-related unemployment allowance equals 45% (+ 20%) of the difference between the former income up to a ceiling (over the ceiling) and the basic allowance. We see much higher unemployment rates for people over age 55 in the administrative data than in the labour force survey; this is an effect of the so-called ‘unemployment tunnel’, which leads to the unemployment pension at the age of 60 for persons in the age group of 60-64 who have received unemployment allowances for a maximum of 500 days and have been employed at least five years during the previous 15 years and are eligible for the ‘unemployment’ pension. This pension is received up to the age of 65 when an old age pension is then received. In practice, persons aged 57, after being on ordinary unemployment benefits for two years, can have their benefits extended to age 60. Thus the unemployment pension effectively starts at age 55. This explains the sharp drop in unemployment rates between ages 59 and 61. Recipients of unemployment pensions (as a percentage of the population aged 60-64) varied from 18% in 1994 to 21% in 2000.

**Disability pension.** Ordinary disability pensions in Finland can be applied for by persons aged between 16 and 65 and can be granted for long or short periods. A special pension in this category is called the ‘individual early retirement pension’ and is payable to persons aged 60 to 64 whose capacity has been permanently reduced (awarded on less-stringent medical criteria). In 2001, 11%of those aged 50-54 received a disability pension, as did 20% of those aged 55-59 and 33% of those aged 60-64. Finland has one of the highest incidences of disability among older persons. Therefore it seems plausible that this is partly an unofficial retirement channel.

### C.2.3. Public sector

As to their main provisions, the public-sector pension acts conform to the private-sector TEL (compulsory) scheme. In 1993-95 major changes to the pension acts were implemented in all public-sector pension schemes, with the aim of harmonising the pension legislation with the private-sector TEL scheme. The full effect of the changes only concerns persons who have come into public-sector employment for the first time after 1992. The changes take effect gradually. Before the reform the public-sector pension clearly accrued faster than that of the private sector. A pension has been able to accrue at a rate of 2.2% of the wage, with the target level of 66% achievable in 30 years. Also the retirement age (63 years) has been lower than in the private sector. In addition, the public sector has had numerous industry- and occupation-specific retirement ages that are lower. Thus, insured individuals who were in public-sector employment before the legislative changes, depending on their age and the duration of the employment contract, either retained all or part of their previous pension benefits (at the 2.2% accrual rate, lower retirement age and a maximum level of 66%) or at least their higher accrual rates up to the legislative changes.

### C.2.4. Self-employed persons

The national pension scheme is valid for the self-employed in the same way as for all other population groups. For the earnings-related pension scheme special pension provisions apply to self-employed persons (Self-Employed Persons' Pensions Act or YEL) and farmers (MYEL, the Farmers' Pensions Act). The insured are self-employed persons aged 18 to 64. The higher age limit for self-employed persons is due to the fact that only a person who has come of age can take out a self-employed person's pension insurance. Entrepreneurs other than farmers can choose the pension provider with which they take out pension insurance. Personal pension schemes are typically more frequent among self-employed persons than among employees. According to a study carried out in 2001, 25% of self-employed persons had a personal pension scheme, whereas not quite 10% of employees had such insurance.

## C.3. The pension system in Germany

### C.3.1. Structure

The German pension system consists of three pillars: 1) public retirement insurance, 2) occupational schemes and 3) individual provisions. The German system is very dependent on the first pillar and pension reforms in 2001 aimed at expanding the second and third pillars. Major pension reform had also occurred in 1992, followed by minor reform in 1999. In 1995 the benefit shares per pillar of the total benefits were as follows: 71% from the first pillar, 7% from the second pillar and 22% from the third pillar. We briefly describe the three pillars and then go into more detail about the first pillar. Under the **first pillar**, the public retirement insurance is PAYG-funded and compulsory for a vast majority of the people (except for self-employed persons and until 1998 for workers with earnings below the official minimum earnings threshold, which is 15% of the average monthly gross wage). This first pillar covers about 85% of the German workforce. Most of those covered work in the private sector, although some are public-sector workers who are not civil servants. Civil servants (about 7% of the workforce) have their own pension system. The self-employed (about 9% of the work force) are mainly self-insured although some of them participate in the public retirement-insurance system. For the **second pillar**, there are four different forms of occupational pension provision: 1) direct entitlements, 2) pension funds, 3) support funds and 4) direct insurance. Direct entitlements – a form of direct benefit schemes – are the main way of financing pension schemes in large firms. Direct insurance is becoming popular in small firms. About 50% of the labour force is covered by occupational pension schemes. As far as employees are concerned, the larger the company, the more likely you are to receive a supplementary pension. In the **third pillar**, the individual provisions involve the principle that any form of private assets may be used to secure a reasonable standard of

living in old age. Property is by far the most important form of private provision. Real estate represents two-thirds of private assets, compared with life insurance, for example, which represents only 7% (European Commission, 2000).

### C.3.2. Employees (private sector)

**Old-age pensions**. The legal retirement age is 65. Nevertheless, German public-retirement insurance provides old-age pensions for workers aged 60 and older (the law allows certain groups to draw a pension early: women, the unemployed, the seriously disabled and persons who have paid contributions for many years). It also provides disability benefits for workers below the age of 60, which are converted to old-age pensions by age 65, and survivor benefits for spouses and children. In addition, pre-retirement (retirement before age 60) is possible through several mechanisms using the public transfer system, mainly unemployment compensation. A reduction in the pension if it is drawn early is being gradually introduced. The possibility of early retirement is being standardised for men and women in the long term.

Eligibility for benefits and the minimum retirement age depend on the type of pension the worker chooses. Public retirement insurance in Germany distinguishes between five types of old-age pensions, corresponding to normal retirement and four types of early retirement:

1) normal retirement is possible at age 65 after five years of service;
2) flexible retirement is possible at age 63 if there have been at least 35 years of service;
3) women can retire at age 60 if they have worked at least 15 years;
4) older disabled persons can retire at age 60 if they have worked at least 35 years; and
5) unemployed persons can retire at age 60 if they have worked at least 15 years and have been unemployed for one and a half to three years.

As opposed to the disability insurance for workers younger than 60, full benefits are paid in all five of the above pension schemes.

**Disability and survivor's pensions**. Disability pension benefits can be received if a person passes a strict earnings test (full benefits) or a weaker earnings test (before age 60 it is 60% of the applicable old-age pension). In addition to the above benefits, transfer payments enable what is referred to as 'pre-retirement'. Labour force exit before the age of 60 is frequent – about 45% of all men call themselves retired at age 59. Only half of them retire because of disability; the other half made use of the many official and unofficial pre-retirement schemes. Survivor pensions are 60% of the husband's applicable pension for spouses who are 45 and older or if children are in the household, otherwise it is 25%. Survivor benefits are a large part of the public pension budget and of total pension wealth.

**Unemployment pension**. Unemployment compensation has been used as pre-retirement income in an unofficial scheme that induced very early retirement from age 56 as unemployment compensation is paid up to three years for elderly workers and is followed by the lower unemployment aid before an unemployment pension could start at age 60. In addition, early retirement at age 58 was made possible in an official (less popular) pre-retirement scheme, in which the employer received a subsidy if a younger employee was hired.

**Replacement rates and benefits**. For the average German worker the net replacement rates are 68% at age 63, 73% at age 64, 78% at age 65, 82% at age 66, 86% at age 67, 91% at age 68, 96% at age 69 and 100% at age 70. For the average German worker the net replacement rates for the disability pension are 60% at age 55 and rise stepwise to 76% at age 64; the net replacement rates for the unemployment benefits are 60% to age 63, 68% at age 63 and 72% at age 64 (OECD, 2004). The fraction of those who enter retirement through a disability pension has declined and was 29% in 1998. Only about 20% of all entrants used the normal pathway of an old-age pension at age 65. The most popular retirement age is 60.

Benefits are strictly work-related. The German system does not have benefits for spouses as in the US but has survivor benefits. Benefits are computed on a lifetime basis and adjusted according to the type of pension and retirement age. They are the product of four elements: 1) the earnings point (EP) – the employee's relative earnings position; 2) the years of service life (YS); 3) adjustment factors for pension type and (since the 1992 reform) retirement age (AF); and 4) a reference pension value, the 'current pension value' (PV). The first three factors make up the 'personal pension base' while the fourth factor determines the income distribution between workers and pensioners in general. The benefits are calculated as follows:

$$\text{Benefit} = EP*YS*AF*PV$$

The employee's relative contribution position (EP) is computed by averaging her or his annual relative contribution positions over the entire earnings history. In each year, the relative contribution position is expressed as a multiple (minimum 75%) of the average annual contribution (roughly speaking, the relative income position).

Years of service life (YS) are years of active contributions plus years of contribution on behalf of the employee and years that are counted as service years, even when no contributions were made at all (e.g. years of unemployment, military service, three years for each child's education for one of the parents and some allowance for advanced education). The official government computations such as the official replacement rate assume a 45-year contribution history for what is deemed a 'normal earnings history'. In fact, the average number of contributions is about 38 years. There is neither an upper limit of years entering the benefit calculation, nor can workers choose certain years in their earnings history and drop others.

Depending on the pension type, different adjustment factors (AF) with values between 0.25 and 1 apply. Between 1992 and 1998, the pension value (PV) was determined by indexation to the average net wages before it was indexed to gross wages. In 1999 and 2000, pensions were indexed to the respective previous year's rate of inflation. The average pension has provided a generous pension provision for middle-income earners. The net replacement rate for a worker with a 45-year contribution history was 70.5% in 1998. For an average worker with 38 years of contributions, it is reduced in proportion to 59.5%.

The 1992 social security reform and its subsequent modifications decided to raise the age limits of the early retirement routes gradually to age 65. Before 1992, adjustment of benefits to retirement age was only implicit through years of service. With a constant income profile and 40 years of service, each year of earlier retirement decreased pension benefits by 2.5%. From 2004, the age of 65 has acted as the pivotal age for benefit computations. For each year of earlier retirement (up to five years) benefits will be reduced by 3.6% (in addition to the effect of fewer service years). Rewards for later retirement increase the pension by 6% in addition to the increase by the number of service years.

### C.3.3. Public sector

There are two types of workers in the public sector: civil servants and other public-sector workers. Civil servants do not pay explicit contributions for their pensions. Civil servants acquire pension rights that are very generous compared with workers in the private sector and receive about 75% of their last contributory gross salary. There are three pathways to retirement for civil servants:

1) retiring at the standard retirement at age 65;
2) taking early retirement before 1 July 1997 from age 62 (63 after 1 July 1997); discount factors for early retirement were phased in linearly between 1998 and 2003 and to reach 0.3 percentage points per month of early retirement as in the private sector;
3) applying for a disability pension, which is based on the previous salary. The replacement rate for those exercising this option depends on the number of years the individual worked prior to disability retirement and the number of working years that could potentially have been accumulated by the age

of 60. For those persons who did not reach the maximum replacement rate before disability, one additional year of working raises the replacement rate by only 0.33 percentage points per year.

The standard pension for civil servants is the product of three elements, being 1) the last gross earnings level, 2) the replacement rate as a function of service years (includes also high school, college education [three years after 1997] and military service), and 3) the new adjustment factors for early retirement. The three important differences with private sector benefits are: the benefit base is gross and not net income as it was in the private sector between 1992 and 1998; civil servants' pensions are taxed like any other income; and the benefit base is the last salary, not the life-time average.

Benefits are calculated as follows:

Benefit = r(service years)*last gross wage*adjustment factors if not retiring at age 65.

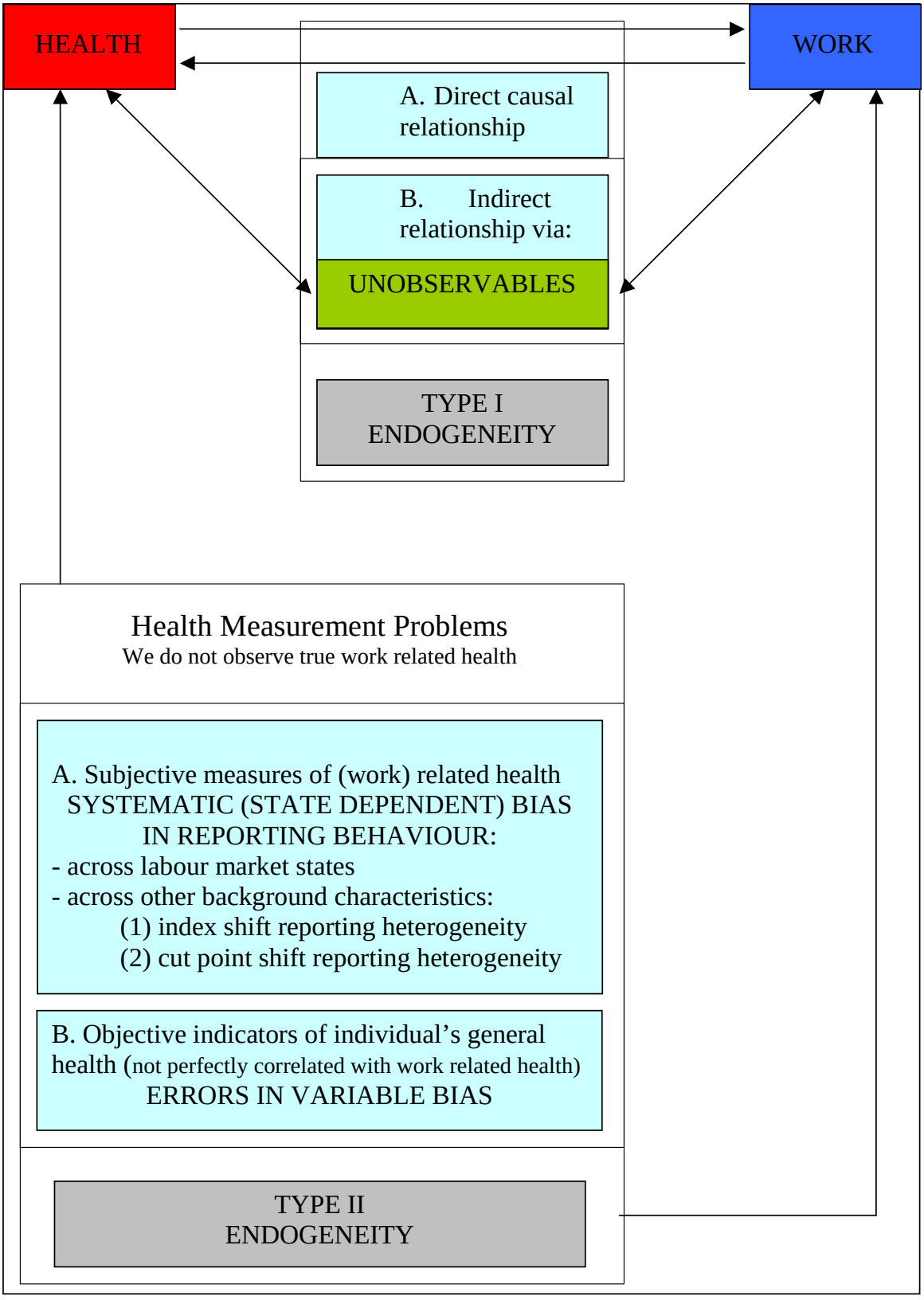
For persons retiring after 1 January 1992 the replacement rate grows by 1.875 percentage points for each year of service. Maximum value is reached after 40 years of service. Nevertheless, there are transitional modifications to that simple rule. Benefits are indexed to the growth rate of the net earnings of active civil servants. Owing to the difference in the benefit base, gross pensions of civil servants are *ceteris paribus* about 25% higher than in the private sector. The maximum replacement rate is 75% (higher than 75%) of gross-earnings (of net-earnings), which is considerably higher than the official replacement rate of the private-sector system at around 70% of net earnings. The average retirement age in the public sector is about one year less than in the private sector. Disability is the most important pathway to retirement for civil servants (about 40% in 1993). About one-third used the early retirement channel at age 62. Only about 20% retired at the regular retirement age of 65.

### C.3.4. Self-employed persons

The self-employed, about 9% of the work force, are mainly self-insured, although some of them participate voluntarily in the public retirement-insurance system.

## Appendix D

## Relation between Health and Labour Force Participation



# **AGIR –** Ageing, Health and Retirement in Europe

**AGIR** is the title of a major study on the process of population ageing in Europe and its future economic consequences. This project was motivated by an interest in verifying whether people are not only living longer but also in better health. It aims at analysing how the economic impact of population ageing could vary when not only demographic factors, but also health developments are taken into consideration. The project started in January 2002 for a period of three years.

The **principal objectives** of the study are to:

- document developments in the health of the elderly, ideally since 1950, based on a systematic collection of existing national data on the health and morbidity of different cohorts of the population;
- analyse retirement decisions and the demand for health care as a function of age, health and the utility of work and leisure;
- combine these results, and on that basis to elaborate scenarios for the future evolution of expenditure on health care and pensions; and
- analyse the potential macroeconomic consequences of different measures aiming at improving the sustainability of the European pension systems.

The **AGIR** project is carried out by a consortium of nine European research institutes, most of which are members of ENEPRI:

- **CEPS** (Centre for European Policy Studies), Brussels
- **CEPII** (Centre d'Etudes Prospectives et d'Informations Internationales), Paris
- **CPB** (Netherlands Bureau for Economic Policy Analysis), The Hague
- **DIW** (Deutsches Institut für Wirtschaftsforschung), Berlin
- **ETLA** (the Research Institute of the Finnish Economy), Helsinki
- **FEDEA** (Fundación de Estudios de Economía Aplicada), Madrid
- **FPB** (Belgian Federal Planning Bureau), Brussels
- **NIESR** (National Institute for Economic and Social Research), London
- **LEGOS** (Laboratoire d'Economie et de Gestion des Organisations de Santé, Université de Paris-Dauphine), Paris

It has received finance from the European Commission, under the Quality of Life Programme of the 5th EU Research Framework Programme. The project is coordinated by Jorgen Mortensen, Associate Senior Research Fellow at CEPS. For further information, contact him at: jorgen.mortensen@ceps.be.

# **REVISER –** Research Training Network on Health, Ageing and Retirement

**REVISER** was launched by several members of the ENEPRI network in August 2003. The project was financed under the programme on Improving the Human Research Potential & the Socio-Economic Knowledge Base of the 5th EU Research Framework Programme.

The **REVISER** project finances training stays for young researchers in the following six research institutes:

- **CEPS** (Centre for European Policy Studies), Brussels
- **CPB** (Netherlands Bureau for Economic Policy Analysis), The Hague
- **DIW** (Deutsches Institut für Wirtschaftsforschung), Berlin
- **ETLA** (the Research Institute of the Finnish Economy), Helsinki
- **FEDEA** (Fundación de Estudios de Economía Aplicada), Madrid
- **LEGOS** (Laboratoire d'Economie et de Gestion des Organisations de Santé, Université de Paris-Dauphine), Paris

Trainees participate in research conducted in the areas of population ageing, health and retirement in the institutes in which they are placed, often in the context of common research projects developed by consortiums of ENEPRI partners. Trainees must be nationals of an EU member state or associated state, or must have resided in the EU for at least five years immediately prior to their appointment. This network aims at fostering the mobility of researchers. Thus, trainees must not be nationals of the state in which the institute appointing them is located and must not have carried out their normal activities in that state for more than 12 of the 24 months prior to the appointment.

This project is coordinated by Jorgen Mortensen, Associate Senior Research Fellow at CEPS. For further information, contact him at: jorgen.mortensen@ceps.be.

# About ENEPRI

The European Network of Economic Policy Research Institutes (**ENEPRI**) is composed of leading socio-economic research institutes in practically all EU member states and candidate countries that are committed to working together to develop and consolidate a European agenda of research. **ENEPRI** was launched in 2000 by the Brussels-based Centre for European Policy Studies (CEPS), which provides overall coordination for the initiative.

While the European construction has made gigantic steps forward in the recent past, the European dimension of research seems to have been overlooked. The provision of economic analysis at the European level, however, is a fundamental prerequisite to the successful understanding of the achievements and challenges that lie ahead. **ENEPRI** aims to fill this gap by pooling the research efforts of its different member institutes in their respective areas of specialisation and to encourage an explicit European-wide approach.

**ENEPRI** is composed of the following member institutes:

| | |
|---|---|
| CASE | Center for Social and Economic Research, Warsaw, Poland |
| CEPII | Centre d'Études Prospectives et d'Informations Internationales, Paris, France |
| CEPS | Centre for European Policy Studies, Brussels, Belgium |
| CERGE-EI | Centre for Economic Research and Graduated Education, Charles University, Prague, Czech Republic |
| CPB | Netherlands Bureau for Economic Policy Analysis, The Hague, The Netherlands |
| DIW | Deutsches Institut für Wirtschaftsforschung, Berlin, Germany |
| ESRI | Economic and Social Research Institute, Dublin, Ireland |
| ETLA | Research Institute for the Finnish Economy, Helsinki, Finland |
| FEDEA | Fundación de Estudios de Economía Aplicada, Madrid, Spain |
| FPB | Federal Planning Bureau, Brussels, Belgium |
| IE-BAS | Institute of Economics, Bulgarian Academy of Sciences, Sofia, Bulgaria |
| IER | Institute for Economic Research, Ljubljana, Slovenia |
| IHS | Institute for Advanced Studies, Vienna, Austria |
| ISAE | Istituto di Studi e Analisi Economica, Rome, Italy |
| ISWE-SAS | Institute for Slovak and World Economy, Bratislava, Slovakia |
| NIER | National Institute of Economic Research, Stockholm, Sweden |
| NIESR | National Institute of Economic and Social Research, London, UK |
| NOBE | Niezalezny Osrodek Bana Ekonomicznych, Lodz, Poland |
| PRAXIS | Center for Policy Studies, Tallinn, Estonia |
| RCEP | Romanian Centre for Economic Policies, Bucharest, Romania |
| TÁRKI | Social Research Centre Inc., Budapest, Hungary |

**ENEPRI Research Reports** are designed to make the results of research projects undertaken within the **ENEPRI** framework publicly available. The findings and conclusions should be attributed to the author and not to the ENEPRI network as such.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