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Trends in Disability-free Life Expectancy at age 16 and age 65 in the European Union 1995-2001: a comparison of 13 EU countries

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Summary

Health expectancy, combining information on mortality and disability into a single summary measure, was developed to address the competing theories concerning the relationship between the quality and quantity of remaining life. We use data from the European Community Household Panel and life tables to calculate life expectancy and disability-free life expectancy at ages 16 and 65 over the time period 1995 to 2001 in thirteen countries of the EU. Linear regression models were fitted to estimate the annual change in total life expectancy, disability-free life expectancy and in life expectancy with disability of all levels and with severe disability only, and then to determine the evidence for compression or expansion of disability and dynamic equilibrium in each country.

Significant increases in life expectancy at early (age 16) and late (age 65) adulthood over the period 1995 to 2001 were found but with considerable heterogeneity in the trends in health expectancy. Two countries (Austria and Italy) had strong evidence of compression of disability. Strong evidence of expansion in the majority of age and gender groups was evident in three countries (the Netherlands, Germany and the UK). Only Greece showed a significant increase in the number of years with severe disability in all the age and gender groups.

Our results show consistent increases in life expectancy at age 16 and 65 in all thirteen countries over the period 1995-2001 but in the majority of countries this was not accompanied by a compression of disability.

Introduction

In the past increases in life expectancy at birth were used to infer improvements in the health of populations and this was a plausible assumption whilst infectious diseases were the main cause of death. However, now that chronic diseases have replaced, or are progressively replacing, infectious diseases, and the risk of becoming ill is not solely linked to the risk of dying, monitoring the increase in life expectancy is no longer sufficient to infer population health¹. Thus the prevalence of chronic disease in the population can increase as a result of a lengthening of duration of survival if the decrease in fatality is not compensated for by an equivalent decrease in incidence.

In the absence of pertinent data on change in morbidity, the relationships that can exist between the changes in these risks have been theoretically debated, gradually focusing on three theories. The first anticipates an improvement in the state of health or a '*compression of morbidity*'²⁻⁴, the second a decline or an '*expansion of morbidity*'⁵⁻⁷, and the third, a '*dynamic equilibrium*', a kind of *status quo*⁸, where, though the prevalence increases as mortality falls, the prevalent states are on average less severe.

These three theories require supplementary concepts such as the severity of prevalent states or that of disability. Indeed, chronic diseases have many varied consequences but the international classifications, International Classification of Impairments, Disabilities, and Handicaps (ICIDH) and the International Classification of Functioning, Disability and Health (ICF)^{9 10} place disability at the centre of these consequences. Disability is, at the same time, an indicator of the severity of morbid states and an indicator of the quality of years lived.

Health expectancies, of which disability-free life expectancy (DFLE) is one, provide a means of dividing life expectancy into life spent in various states of good and bad health. These measures represent the increasing focus on indicators of the quality of life lived (life spent in a healthy state) rather than, as previously, on the quantity (life expectancy). Health expectancies address whether or not the lengthening in life expectancy is being accompanied with an increase in time lived in bad health¹¹. Absolute expansion occurs when the years with disability are increasing whilst absolute compression when the years with disability are decreasing. In addition relative expansion occurs when the proportion of remaining life spent free of disability (%DFLE) is decreasing and relative compression when it is increasing.

Dynamic equilibrium occurs when the years with disability (all levels) are increasing but the years with severe disability are not.

Whereas mortality data is fairly readily available, DFLE requires additional data in the form of the age and sex specific prevalence of disability from a population survey. Today, more than 50 countries worldwide have estimates of health expectancy based on these surveys, with a number of European countries having chronological series, attesting to the widespread use and understanding of health expectancies (Euro-REVES, 1998). A major problem in comparing DFLE between countries is the lack of harmonization of methods of calculation as well as the concepts of disability or health used. The EU Statistics of Income and Living Conditions (EU-SILC) survey includes an activity limitation question which permits calculation of a disability-free life expectancy called Healthy Life Years (HLY)¹² in a comparable way, but time series based on this survey are not yet available. The only harmonized data to examine trends in DFLE remain those from the predecessor of EU-SILC, European Community Household Panel (ECHP). This paper therefore presents a comparison of trends in LE, DFLE, life expectancy with disability (DLE) and the proportion of life spent disability-free (%DFLE) in early (age 16) and late (age 65) adulthood in countries contributing to the ECHP over the time period 1995-2001. In addition we compare these four trends with each other to determine whether absolute and/or relative compression or expansion took place over this time period.

Methods

Health expectancy combines information on mortality and morbidity into a single summary measure. Full life and health expectancy tables were downloaded from the EHEMU Information System (www.chemu.eu). Life tables for 13 European Union Member States MS (the EU 15, with the exception of Luxemburg and Sweden) over the period 1995-2001 were supplied by Eurostat.

The country, age and sex specific prevalence of disability was obtained from the European Community Household Panel (ECHP). The ECHP is a longitudinal, multi-subject survey covering many aspects of daily life with the sample covering some 60 000 households (130 000 adults aged 16 or over at 31 December of the previous year). The first wave took place in 1994 although Finland did not join the ECHP until 1996. Although data from the ECHP would theoretically provide harmonized data, changes over time and differences between countries in the survey design and question wording have required some adjustments to be made before calculations. Disability was inferred from the question “*Are you hampered in your daily activities by any physical or mental health problem, illness or disability?*”. After 1997 the ECHP was not run in the UK and Germany but the ECHP data were produced from other existing national surveys. Additionally in Sweden the ECHP sample only covers adults aged 16 to 84, enabling the calculation of partial health expectancies only. We therefore decided to exclude Sweden from this analysis as its health expectancies were not comparable.

Statistical methods

Trends in life expectancy (LE), disability free life expectancy (DFLE), life expectancy with disability (DLE), life expectancy with severe disability (sevDLE) and the proportion of life spent free of disability (%DFLE) at ages 16 and 65 years were analysed by fitting linear regressions separately by country for men and women. Absolute and relative compression or expansion were determined by the relationships between the trends in DLE, %DFLE and sevDLE as defined previously¹³.

Results

Trends in life expectancy at age 16 and age 65

In 1995 the mean life expectancy at age 16 (LE16) for men in the EU13 was 58.3 years with a range of 3.2 years (Portugal: 56.6 years, Greece: 59.8 years) and for women 64.7 years with a range of 4.3 years (Denmark: 62.4 years, France: 66.7 years). By 2001 the mean LE16 for men had risen by 1.7 years to 60.0 years and for women by 1.1 years to 65.8 years. Portugal remained the lowest (58.3 years) but Italy was the highest (61.5 years) for men, the range remaining the same at 3.2 years. For women Denmark remained the lowest (63.8 years) but Spain became the highest LE16 (67.7 years), with a slightly reduced range of 3.9 years.

For life expectancy at age 65 (LE65), the mean for men in 1995 was 15.0 years with a range of 2.7 years (Ireland: 13.5 years, France: 16.2 years) and for women 18.8 years with a range of 3.7 years (Ireland: 17.2 years; France 20.9 years). By 2001 the mean LE65 for men had risen by 1.1 years to 16.1 years and for women by 0.9 years to 19.7 years. Ireland remained the lowest (15.0 years) and France the highest (17.0 years) for men, the range reducing compared to 1995 to 2.0 years. For women Denmark had the lowest LE65 (18.3 years) whilst France retained the highest (21.5 years), with little change in the range (3.2 years) compared to 1995.

Linear trend lines were fitted to the LE16 and LE65 separately for each country and gender and were a good fit with the R^2 values ranging from 76% to 99%. All countries showed a significant increase in LE16 (Table 1) and LE65 (Table 2) for men and women between 1995 and 2001 with the average annual increase for LE16 being 0.27 years per year (or 3 months per year) for men and 0.18 years per year (2 months per year) for women and for LE65 0.17 years per year (2 months per year) for men and 0.13 years per year (1.6 months per year) for women. The largest annual gain in life expectancy at age 16 was in Austria and Germany in both men and women and at age 65 in Germany and the UK for men and Austria and Germany for women.

Trends in life expectancy free of disability at age 16 and age 65

The greater variation between countries in DFLE than in LE at each time point, by gender and at both ages can be clearly seen (Figure 1). The variability from year to year was greater for

DFLE than LE and therefore linear trends fitted the DFLE less well than for LE with R^2 values under 50% for five countries (France, Greece, Ireland, Netherlands and Portugal).

The largest gain in DFLE at age 16 was in Austria for both men and women, but 8 countries had significant gains in DFLE at age 16 in men and 4 in women (Table 1). The gain in DFLE at age 65 was greatest in Belgium for men and in Italy for women, and in total 4 countries for men and women showing significant gains in DFLE between 1995 and 2001 (Table 2).

DFLE increased on average by 0.23 years for men age 16 and 0.08 years for women age 16 whilst the average gains at age 65 were 0.10 years for men and 0.04 for women. The proportion of remaining life spent without disability increased on average by 0.03% for men aged 16 and by 0.01% for men aged 65 and decreased by 0.09% for women aged 16 and 0.14% for women aged 65. Only Austria and Italy showed significant increases in the proportion of remaining life spent free of disability at age 16 for both men and women (Table 1), whilst at age 65 only Italy had significant increases (Table 2). Denmark, Ireland, the Netherlands and the UK showed significant decreases at age 16 for men and Finland, the Netherlands and the UK for women. At age 65 the Netherlands and the UK for men and Germany and the Netherlands for women showed significant decreases in the proportion of remaining life spent free of disability.

Trends in life expectancy with disability (all levels) and with severe disability at age 16 and age 65

The annual change in years with disability at age 16 showed a significant increase for five countries in men (Denmark, Ireland, the Netherlands, Portugal and UK) and in women (Finland, France, Germany the Netherlands and the UK) (Table 1). At age 65 again five countries showed a significant increase in years with disability (Denmark, Germany, Ireland, the Netherlands and the UK) in men and in women (Finland, Germany, Greece, the Netherlands and Portugal) (Table 2). A few countries showed a significant decrease in years with disability at age 16 (men and women: Austria and Italy) though only Italian women showed a significant decrease in years with disability at age 65.

With regard to years with severe disability, Greek men and women showed a significant increase in years with severe disability at age 16 and 65 along with women in the Netherlands

age at 16 whilst Italian men and women had a significant decrease in the years with severe disability at age 16 and at age 65 and Austrian women at age 16 (Tables 1 and 2).

Compression or expansion of disability?

In the majority of countries there was a consistent pattern across ages and genders. In the Netherlands there was significant absolute and relative expansion of disability accompanied by a consistent, though non-significant expansion of severe disability and therefore no evidence of dynamic equilibrium (Table 3). In Germany, on the other hand, significant absolute expansion and non-significant relative expansion was evident in all groups apart from men age 16, but this was accompanied by a non-significant decrease in the years with severe disability suggesting dynamic equilibrium. Four further countries, Denmark, Finland, Ireland and Portugal, showed significant absolute expansion in half of the age-sex groups and in all cases was accompanied by no increase in years with severe disability thereby suggesting dynamic equilibrium.

For Greece and France, expansion occurred for both ages and genders though this was non-significant in all but women age 65 in Greece and in all groups in France. However Greece was the only country demonstrating a significant increase in years with severe disability across all the age and gender groups. Of the remaining four countries, two (Austria and Italy) had significant compression of disability in all age and gender groups apart from men age 65. Belgium and Spain had non-significant compression in all age and gender groups.

Discussion

Our results show a significant increase in life expectancy at early (age 16) and late (age 65) adulthood over the period 1995 to 2001 in the EU13 countries, but considerable heterogeneity between the countries in the trends in disability-free life expectancy although the patterns were generally very consistent across the age and gender groups within the countries. Austria and Italy had strong evidence of compression of disability with possible (non-significant) compression in two further countries: Belgium and Spain. In the remaining nine countries expansion of disability was the prevailing trend over the time period. In the Netherlands the evidence was strong with significant expansion in all four age and gender groups whilst in the UK and Germany three of the four groups showed significant expansion and half of the age and gender groups in Denmark, Finland, Ireland and Portugal. In the majority of cases this expansion in years with disability was not an increase in years with severe disability and hence these countries exhibited dynamic equilibrium, the exception being women age 16 in the Netherlands where the years of severe disability increased though not significantly. Greece was the only country showing a significant increase in the number of years with severe disability in all the age and gender groups.

This is one of the first cross-national analyses of trends in LE and DFLE and whether they provide evidence for compression or expansion of disability. Lafortune et al.¹⁴ compared trends in the prevalence of severe disability in twelve OECD countries, of which eight were European, and concluded that four European countries (Denmark, Finland, Italy, and the Netherlands) showed clear evidence of a decline in disability, a further two (Belgium and Sweden) showed an increase in the prevalence of severe disability and a further two (France and the UK) differing trends depending on the data source. However the measure of severe disability was not harmonised and indeed the activities of daily living used differed between surveys. Because of this, and the fact that changes in life expectancy over the period were not taken into account whilst they were in our health expectancy measures, it is not surprising that their findings are somewhat at odds with ours, although this cannot explain all discrepancies. Only in the case of Italy, which was reported to have a clear decline in disability, did we find a compression of disability. Denmark, Finland and the Netherlands for which the OECD report also suggested a decline in disability, appeared to demonstrate significant expansion from the ECHP and indeed, an increase in years with severe disability in the case of the Netherlands and Danish men. In the OECD report Belgium and Sweden had clear evidence of

an increase in severe disability but the ECHP data suggest a compression of disability though this was not significant.

Limitations of our study relate mainly to the underlying survey, the European Community Household Panel (ECHP), which provides the disability prevalence, and the analysis of trends in the life and health expectancies, and the selection of countries. One problem with the ECHP, which is in fact a panel survey, is the falling response rate over time. A number of researchers have investigated attrition in the survey ¹⁵⁻¹⁷ but Watson ¹⁷ concludes that gender is not associated with attrition and the fears that attrition has undermined the representativeness of the ECHP are unfounded.

In addition to the response rates, two issues related to using the ECHP that may further affect differences between countries are the underlying disability question and the omission of the population in institutions. First, translation of the ECHP questionnaire into the national languages was left to the national institutes running the survey with no central co-ordination that the same level of disability was being tapped across the countries. This is now being addressed more rigorously in the EU Statistics of Income and Living Conditions (EU-SILC) and the European Health Interview Survey. Second, the trends reported here may not be real due to the omission of those in institutions. Institutionalisation rates greatly differ from one country to another as past and present public health policies in long-term care services widely vary across Europe. Therefore both the distribution of the population between private households and institutions and the level of functional health problems in these two populations may be significantly different from one country to another. We have undertaken some sensitivity analyses for France with the 1999 data to assess the size of the bias introduced in the estimates ¹⁸. However it may be that changes in the threshold for institutionalisation over time in some of the countries may influence our conclusions.

In the interests of parsimony we fitted only linear models to the time trends of DFLE and DLE. Nor did the analysis take into account the uncertainty around the estimates of DFLE and DLE and that the values at neighbouring time points may be correlated. However formal time series analysis is impossible on short time series such as these.

Our study only included 13 of the 'old' Member States, as the ECHP survey did not include more countries. We found that during the period 1995 to 2001 all countries of the EU13

showed a significant increase in life expectancy at both age 16 and age 65 and in men and women with an average annual increase of 3 months per year for men and 2 months per year for women at age 16 and 2 months per year for men and 1.6 months per year for women at age 65. Previous studies have shown that life expectancy at birth has steadily increased by 3 months per year since the 1970s in high-income countries and there are no signs that the trend is slowing ¹⁹⁻²², leading to a widening of the gap in life expectancy between the EU-15 and the central and eastern European countries over the period 1970 to 1995. The situation was emphasized by the Regional Office for Europe of the World Health Organization (WHO) in its health report of 1997²³. In 1970, the difference between the average life expectancy for the EU and that for the 12 countries of the formerly centrally planned economies of Central and Eastern Europe (CCEE) and the 15 newly independent states after the dissolution of the USSR (NIS) was around 2.5 years. By 1995, NIS countries lagged behind the EU average by over 10 years whilst the difference between CCEE and the EU average was over 5 years. The gap between the countries with the lowest and the highest life expectancies in the Region was about 15 years in 1995 compared to about 7 years in 1970 ²³. We have recently shown that inequalities in both life and health expectancy still exist between the established EU member States (EU15) and the newly joined countries (EU10) many of whom are countries of eastern and central Europe¹² but were unable to include the new member states in this trend analysis.

Conclusion

We have shown that health expectancy can provide a ready way to monitor population health throughout Europe in the general context of population ageing, differentiating between countries where the years with disability are decreasing thus demonstrating a compression of disability, and those where years with disability are increasing with a resulting expansion of disability. This analysis should be repeated when sufficient values from the more harmonised EU-SILC are available and on the whole EU-27, particularly since the newer countries to the EU have already been shown to have lower life expectancies and greater levels of disability.

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Table 1: Annual change in life expectancy (LE), disability-free life expectancy (DFLE), proportion of life expectancy spent free of disability (%DFLE/LE), years with disability (DLE) and years with severe disability (sevDLE) at age 16 in the EU13 between 1995 and 2001 for men and women, 95% CI in parentheses

| | Annual change in | | | | | | | | | |
|--------------------|---------------------|---------------------|-----------------------|---------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | LE | | DFLE | | %DFLE/LE | | DLE | | Severe DLE | |
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| Austria | 0.37 (0.34-0.39) | 0.23 (0.19-0.28) | 0.68 (0.44-0.91) | 0.19 (0.17-0.22) | 0.64 (0.24-1.05) | 0.49 (0.29-0.68) | -0.31 (-0.55--0.07) | -0.27 (-0.40--0.14) | -0.10 (-0.21-0.02) | -0.16 (-0.30--0.02) |
| Belgium | 0.20 (0.17-0.23) | 0.12 (0.10-0.13) | 0.47 (0.06-0.88) | 0.09 (0.07-0.10) | 0.51 (-0.19-1.21) | 0.35 (-0.33-1.03) | -0.27 (-0.68-0.14) | -0.21 (-0.65-0.24) | -0.15 (-0.31-0.01) | -0.19 (-0.33--0.06) |
| Denmark | 0.32 (0.28-0.36) | 0.22 (0.16-0.29) | 0.12 (0.03-0.21) | 0.11 (0.06-0.16) | -0.24 (-0.39--0.08) | -0.10 (-0.37-0.16) | 0.20 (0.11-0.29) | 0.12 (-0.05-0.29) | 0.02 (-0.07-0.11) | -0.11 (-0.23-0.00) |
| Finland | 0.27 (0.21-0.33) | 0.16 (0.11-0.22) | 0.3 (0.17-0.44) | 0.17 (0.15-0.20) | 0.20 (-0.06-0.45) | -0.46 (-0.71--0.21) | -0.03 (-0.19-0.12) | 0.36 (0.20-0.52) | -0.11 (-0.33-0.11) | -0.18 (-0.37-0.00) |
| France | 0.26 (0.23-0.29) | 0.14 (0.11-0.16) | 0.13 (-0.01-0.26) | 0.09 (0.08-0.11) | -0.11 (-0.34-0.11) | -0.02 (-0.11-0.06) | 0.13 (-0.01-0.27) | 0.05 (0.00-0.11) | -0.03 (-0.13-0.08) | 0.04 (-0.06-0.14) |
| Germany | 0.36 (0.34-0.38) | 0.25 (0.22-0.27) | 0.28 (0.16-0.39) | 0.19 (0.17-0.21) | 0.08 (-0.12-0.29) | -0.18 (-0.47-0.10) | 0.08 (-0.04-0.21) | 0.23 (0.04-0.42) | 0.02 (-0.13-0.17) | -0.03 (-0.25-0.20) |
| Greece | 0.10 (0.05-0.15) | 0.10 (0.05-0.15) | 0.08 (-0.08-0.23) | 0.07 (0.03-0.11) | -0.02 (-0.27-0.23) | -0.23 (-0.53-0.06) | 0.02 (-0.13-0.18) | 0.17 (-0.02-0.36) | 0.12 (0.01-0.22) | 0.13 (0.02-0.25) |
| Ireland | 0.25 (0.18-0.32) | 0.21 (0.13-0.29) | -0.03 (-0.13-0.08) | 0.18 (0.10-0.25) | -0.41 (-0.63--0.18) | -0.02 (-0.36-0.32) | 0.28 (0.14-0.42) | 0.05 (-0.18-0.28) | 0.02 (-0.11-0.14) | -0.05 (-0.28-0.17) |
| Italy | 0.29 (0.26-0.33) | 0.22 (0.18-0.26) | 0.50 (0.39-0.6) | 0.16 (0.12-0.21) | 0.40 (0.27-0.52) | 0.42 (0.30-0.54) | -0.20 (-0.28--0.13) | -0.25 (-0.33--0.17) | -0.15 (-0.26--0.04) | -0.20 (-0.36--0.03) |
| Netherlands | 0.19 (0.15-0.22) | 0.04 (0.01-0.07) | -0.02 (-0.18-0.14) | 0.03 (0.0-0.05) | -0.27 (-0.53--0.02) | -0.72 (-0.92--0.52) | 0.21 (0.05-0.36) | 0.48 (0.35-0.61) | 0.02 (-0.02-0.05) | 0.21 (0.06-0.36) |
| Portugal | 0.30 (0.24-0.37) | 0.23 (0.18-0.28) | 0.07 (-0.16-0.31) | 0.18 (0.14-0.22) | -0.28 (-0.62-0.05) | -0.20 (-0.88-0.48) | 0.23 (0.05-0.41) | 0.19 (-0.23-0.62) | 0.09 (-0.01-0.19) | -0.01 (-0.3-0.28) |
| Spain | 0.26 (0.20-0.31) | 0.19 (0.13-0.24) | 0.28 (0.15-0.41) | 0.13 (0.06-0.19) | 0.11 (-0.11-0.33) | 0.17 (-0.07-0.41) | -0.03 (-0.16-0.11) | -0.08 (-0.24-0.09) | -0.04 (-0.13-0.06) | -0.04 (-0.21-0.13) |
| UK | 0.28 (0.24-0.31) | 0.18 (0.14-0.22) | 0.10 (0.01-0.18) | 0.15 (0.11-0.19) | -0.24 (-0.37--0.12) | -0.60 (-1.17--0.04) | 0.18 (0.11-0.26) | 0.42 (0.06-0.78) | 0.00 (-0.76-0.76) | 0.15 (-0.67-0.97) |

Table 2: Annual change in life expectancy (LE), disability-free life expectancy (DFLE), proportion of life expectancy spent free of disability (%DFLE/LE), years with disability (DLE) and years with severe disability (sevDLE) at age 65 in the EU13 between 1995 and 2001 for men and women, 95% CI in parentheses

| | Annual change in | | | | | | | | | |
|--------------------|---------------------|---------------------|-----------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|------------------------|
| | LE | | DFLE | | %DFLE/LE | | DLE | | Severe DLE | |
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| Austria | 0.22 (0.17-0.27) | 0.19 (0.17-0.22) | 0.25 (0.10-0.4) | 0.23 (0.06-0.40) | 0.79 (-0.16-1.74) | 0.63 (-0.22-1.47) | -0.03 (-0.18-0.12) | -0.03 (-0.20-0.13) | 0.01 (-0.05-0.08) | -0.04 (-0.16-0.07) |
| Belgium | 0.17 (0.15-0.19) | 0.09 (0.07-0.10) | 0.27 (0.05-0.48) | 0.16 (-0.07-0.40) | 1.00 (-0.39-2.39) | 0.56 (-0.62-1.74) | -0.10 (-0.31-0.11) | -0.08 (-0.31-0.15) | -0.06 (-0.15-0.03) | -0.13 (-0.24--0.03) |
| Denmark | 0.19 (0.16-0.22) | 0.11 (0.06-0.16) | -0.05 (-0.23-0.14) | 0.14 (0.03-0.26) | -1.09 (-2.38-0.20) | 0.46 (-0.17-1.09) | 0.24 (0.04-0.44) | -0.03 (-0.15-0.09) | 0.09 (-0.05-0.23) | -0.11 (-0.22-0.00) |
| Finland | 0.20 (0.16-0.25) | 0.17 (0.15-0.20) | 0.19 (-0.02-0.39) | 0.01 (-0.09-0.11) | 0.74 (-0.7-2.18) | -0.27 (-0.77-0.22) | 0.01 (-0.22-0.25) | 0.16 (0.07-0.26) | -0.06 (-0.28-0.16) | -0.19 (-0.42-0.04) |
| France | 0.13 (0.11-0.15) | 0.09 (0.08-0.11) | 0.11 (0.00-0.22) | 0.05 (-0.08-0.18) | 0.28 (-0.31-0.88) | 0.05 (-0.55-0.64) | 0.02 (-0.07-0.11) | 0.04 (-0.08-0.16) | -0.05 (-0.10-0.00) | 0.03 (-0.06-0.12) |
| Germany | 0.23 (0.21-0.24) | 0.19 (0.17-0.21) | 0.06 (-0.05-0.17) | -0.07 (-0.19-0.04) | -0.02 (-0.74-0.71) | -0.62 (-1.20--0.04) | 0.17 (0.05-0.28) | 0.26 (0.15-0.37) | -0.01 (-0.16-0.15) | -0.06 (-0.17-0.05) |
| Greece | 0.08 (0.03-0.12) | 0.07 (0.03-0.11) | 0.04 (-0.09-0.16) | -0.10 (-0.23-0.04) | -0.07 (-0.76-0.61) | -0.75 (-1.51-0.01) | 0.04 (-0.07-0.15) | 0.17 (0.02-0.31) | 0.09 (0.00-0.19) | 0.12 (0.04-0.19) |
| Ireland | 0.21 (0.15-0.28) | 0.18 (0.10-0.25) | 0.08 (-0.02-0.18) | 0.10 (-0.04-0.23) | -0.43 (-1.02-0.16) | -0.06 (-0.99-0.88) | 0.13 (0.05-0.22) | 0.08 (-0.10-0.27) | -0.01 (-0.09-0.07) | -0.04 (-0.24-0.17) |
| Italy | 0.16 (0.12-0.21) | 0.16 (0.12-0.21) | 0.25 (0.14-0.36) | 0.30 (0.22-0.37) | 0.83 (0.28-1.39) | 0.95 (0.54-1.36) | -0.08 (-0.17-0.00) | -0.13 (-0.22--0.04) | -0.10 (-0.14--0.05) | -0.13 (-0.24--0.02) |
| Netherlands | 0.13 (0.11-0.16) | 0.03 (0.0-0.05) | -0.02 (-0.10-0.05) | -0.16 (-0.28--0.04) | -0.71 (-1.22--0.20) | -0.91 (-1.55--0.26) | 0.16 (0.08-0.24) | 0.19 (0.06-0.31) | 0.03 (-0.03-0.09) | 0.08 (-0.01-0.18) |
| Portugal | 0.17 (0.12-0.22) | 0.18 (0.14-0.22) | 0.06 (-0.07-0.18) | -0.11 (-0.37-0.15) | -0.21 (-1.01-0.58) | -1.08 (-2.45-0.28) | 0.11 (-0.01-0.23) | 0.29 (0.06-0.53) | -0.01 (-0.07-0.06) | 0.13 (-0.05-0.31) |
| Spain | 0.11 (0.04-0.17) | 0.13 (0.06-0.19) | 0.16 (0.05-0.27) | 0.16 (0.06-0.27) | 0.57 (-0.16-1.29) | 0.44 (-0.17-1.05) | -0.06 (-0.19-0.07) | -0.04 (-0.18-0.11) | -0.06 (-0.13-0.02) | -0.02 (-0.15-0.10) |
| UK | 0.23 (0.20-0.26) | 0.15 (0.11-0.19) | -0.06 (-0.24-0.13) | -0.13 (-0.56-0.29) | -1.49 (-2.58--0.41) | -1.25 (-3.41-0.9) | 0.29 (0.13-0.44) | 0.29 (-0.10-0.67) | 0.17 (-0.17-0.52) | 0.12 (-0.18-0.43) |

Table 3: Evidence for absolute and relative compression/expansion and dynamic equilibrium for men and women at age 16 and 65

| | Age 16 | | | Age 65 | | |
|--------------------|-----------------------------------|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|------------------------|
| | Absolute compression/expansion | Relative compression/expansion | Dynamic equilibrium | Absolute compression/expansion | Relative compression/expansion | Dynamic equilibrium |
| Men | | | | | | |
| Austria | Compression** | Compression** | | Compression* | Compression* | |
| Belgium | Compression* | Compression* | | Compression* | Compression* | |
| Denmark | Expansion** | Expansion** | Yes | Expansion** | Expansion* | Yes |
| Finland | Compression* | Compression* | | Expansion* | Compression* | |
| France | Expansion* | Expansion* | | Expansion* | Compression* | |
| Germany | Expansion* | Compression* | | Expansion** | Expansion* | Yes |
| Greece | Expansion* | Expansion* | | Expansion* | Expansion* | |
| Ireland | Expansion** | Expansion** | Yes | Expansion** | Expansion* | Yes |
| Italy | Compression** | Compression** | | Compression* | Compression** | |
| Netherlands | Expansion** | Expansion** | Yes | Expansion** | Expansion** | Yes |
| Portugal | Expansion** | Expansion* | Yes | Expansion* | Expansion* | |
| Spain | Compression* | Compression* | | Compression* | Compression* | |
| UK | Expansion** | Expansion** | Yes | Expansion** | Expansion** | Yes |
| Women | | | | | | |
| Austria | Compression** | Compression** | | Compression* | Compression* | |
| Belgium | Compression* | Compression* | | Compression* | Compression* | |
| Denmark | Expansion* | Expansion* | | Compression* | Compression* | |
| Finland | Expansion** | Expansion** | Yes | Expansion** | Expansion* | Yes |
| France | Expansion* | Expansion* | | Expansion* | Compression* | |
| Germany | Expansion** | Expansion* | Yes | Expansion** | Expansion** | Yes |
| Greece | Expansion* | Expansion* | | Expansion** | Expansion* | |
| Ireland | Expansion* | Expansion* | | Expansion* | Expansion* | |
| Italy | Compression** | Compression** | | Compression** | Compression** | |
| Netherlands | Expansion** | Expansion** | | Expansion** | Expansion** | Yes |
| Portugal | Expansion* | Expansion* | | Expansion** | Expansion* | Yes |
| Spain | Compression* | Compression* | | Compression* | Compression* | |
| UK | Expansion** | Expansion** | Yes | Expansion* | Expansion* | Yes |

**significant increase/decrease * non-significant increase/decrease

Figure 1: Trend in LE and DFLE at ages 16 and 65 years for EU13, 1995-2001 by gender

