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Discussion Paper 04/2011-040

The associations between early life circumstances and later life health and employment in the Netherlands and Spain*

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April 15, 2011

- Preliminary draft -

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***** We wish to thank Rob Alessie, Melchor Fernandez, and the seminar participants at Utrecht University School of Economics (USE) for valuable comments and discussions. Manuel Flores gratefully acknowledges the financial support from Xunta de Galicia and the hospitality of USE where most part of the work has been done.

ABSTRACT

Using data from the Survey of Health, Ageing and Retirement in Europe, this paper provides empirical evidence for the Netherlands and Spain on the associations between individuals' early life circumstances—measured by health and socioeconomic status (SES) during childhood—educational attainment, and later life health and employment (at ages 50–64). We find that for both men and women in the Netherlands and Spain, favorable early life circumstances (i.e., better childhood health and higher SES) are associated with a higher level of education, which is in turn associated with better health later in life. This latter is also linked to early life circumstances conditional on educational attainment. For men only, favorable early life circumstances are associated with a higher incidence of later life employment, primarily because of better later life health. Our findings thus suggest that policies aimed at improving children's health and SES may have long-term benefits through increased individual educational attainment and later life health and employment.

JEL Classification: D00, I10, J10, J20

Keywords: Early life circumstances, health, employment

1. Introduction

A positive association between health and socioeconomic status (SES) in adulthood, often referred to as the SES-health gradient, is widely documented in the literature (e.g., Adler *et al.*, 1994; Marmot and Wilkinson, 1999; Pappas *et al.*, 1993; and Smith, 1999). To identify the origins of this gradient, earlier studies for the U.S. (e.g., Case *et al.*, 2002) and Canada (e.g., Currie and Stabile, 2003) focus on childhood circumstances. Specifically, they pinpoint SES and health in early life—the latter mainly in terms of chronic conditions during childhood—as contributors to this positive association. More recent studies for the U.K. (Case *et al*., 2005) and the U.S. (Case and Paxson, 2008) show that having good health during childhood and growing up in a more comfortable environment result in both good health and higher economic status later in life. All these studies also demonstrate that children in good health achieve more years of education. These findings are important to policymakers because they suggest that policies aimed at improving children's health and SES have long-lasting benefits for both the individual and society because of increased human capital accumulation and better adulthood health.

The extant literature offers three possible theories to explain the relationships between early life events and outcomes in later life, particularly health during adulthood. First, the *fetal-origins hypothesis* (Barker, 1995) suggests a direct link from the prenatal period to adult health that may be independent of social class in adult life and even at birth. Specifically, Barker (1995) shows that undernutrition in utero leads to increased coronary heart disease (CHD) in adulthood, a relationship that, although it can manifest in childhood as raised blood pressure, can remain latent

during adolescence.[1] Second, *life course models* (e.g., Kuh and Wadsworth, 1993) assume that illness and deprivation during childhood may have long-term consequences for health during adulthood, either directly through the illness itself or indirectly by restricting educational achievement and life opportunities. After analyzing a cohort of British, these authors conclude that even when educational attainment, the likelihood of serious illness in early adulthood (albeit insignificantly associated), and a number of socioeconomic factors in adult life (including health-related behaviors like physical activity) are controlled for, a lower childhood SES and a serious illness between ages 5 and 15 affect adult health at age 36 (Kuh and Wadsworth, 1993). Third, and in contrast to the first two theories, *pathways models* emphasize that the observed SES-health gradient in adulthood is not directly attributable to early life events and that the links between early life and later life health are weakened or even disappear once risk factors are adequately taken into account. For instance, using the Whitehall II study of British civil servants aged 35–55 years, Marmot *et al.* (2001) show that, especially for men, current SES is a more important predictor of CHD, chronic bronchitis, and depression in adulthood than father's social class or grade at entry into the civil service.

Our contribution to the research stream on the associations between early life circumstances and later life health and SES is twofold. First, to expand the findings of previous studies for the U.K., U.S., and Canada, we present empirical evidence for the Netherlands and Spain on the extent to which an individual's early life circumstances are associated with educational attainment and, once this latter is controlled for, with their later life health and employment (at ages 50–64). Second, we examine the

[1] The association of low birth weight with CHD and also with stroke is confirmed by recent longitudinal studies on men and women in different countries (Barker, 2007).

association between early life circumstances and later life employment, conditional on later life health status and education. This approach, unlike those taken in previous studies, can provide insights into whether or not the associations between early life circumstances and later life employment operate solely through health and possibly education. If a direct association emerges once education and health are controlled for, it could be interpreted as empirical evidence in favor of a transmission of early life circumstances to employment opportunities.

The remainder of this paper is organized as follows. Section 2 describes the data and the main variables for analysis. Section 3 presents estimates of the associations of early life circumstances with educational attainment, with later life health and employment conditional on educational attainment, and later life employment conditional on later life health and educational attainment. Section 4 presents joint significance tests of these associations between early life circumstances and later life health and employment. Section 5 summarizes the main findings and concludes the paper.

2. Data and descriptive statistics

We use individual-level data from the first three waves of the Survey of Health, Ageing, and Retirement in Europe (SHARE), a multidisciplinary and representative cross-national panel of the European population aged 50 and over.[2] The first two

[2] SHARE data collection in 2004–2009 was primarily funded by the European Commission through its 5th, 6th, and 7th framework programs (project numbers QLK6–CT–2001–00360; RII–CT–2006–062193; CIT5–CT–2005–028857; CIT4–CT–2006–028812; No 211909; No 227822). Additional

waves of SHARE, conducted in 2004/2005 and 2006/2007, respectively, include information on socioeconomic background characteristics as well as current employment and health status. The third wave, carried out in 2008/2009, contains retrospective information on the early life health and SES of individuals who participated in waves one or two.

Our empirical analysis is based on data for Dutch and Spanish respondents aged 50–64 from the first or second wave who also participated in the third wave.[3] This selection yields 953 respondents for the Netherlands and 647 respondents for Spain,[4] but missing values on certain of our analytical variables forces an additional 7 percent reduction in sample size. The result is an unbalanced panel comprising 2,122 total observations for 408 male and 478 female Dutch respondents and 253 male and 342 female Spanish respondents. Table 1 reports the numbers of observations by country, gender, and age.

Following most previous literature, we use self-reported health status (SRH) as a measure for health; however, we combine the usual five SRH categories (from 1 to 5: poor, fair, good, very good, and excellent) into three (from 1 to 3: poor or fair,

funding by the U.S. National Institute on Aging (grant numbers U01 AG09740–13S2; P01 AG005842; P01 AG08291; P30 AG12815; Y1–AG–4553–01; IAG BSR06–11; OGHA 04–064; R21 AG025169) and various national sources is gratefully acknowledged (see http://www.share-project.org for a full list of funding institutions).

[3] Panel attrition between the first/second and third waves is about 7 percent.

[4] Like Smith and Goldman (2007), for example, we exclude respondents' spouses from our sample because their inclusion could result in a nonrepresentative sample.

good, very good or excellent).[5] We also distinguish three employment states: no work, part-time work, and full-time work.[6]

<Insert Table 1 about here>

As table 1 shows, for the Netherlands there is no clear health pattern across age groups, but there is a decrease in full-time work with age for both men and women. For Spain, there is a similar employment pattern by age group but with different levels. That is, Spanish people have a lower incidence of work and on average report worse health than Dutch people at ages 50–64. There is also a stronger health gradient with age for Spain than for the Netherlands. For instance, when the youngest (50–54) and oldest (60–64) age groups are compared, the proportion of Spanish men who report being in poor or fair health more than doubles from 18 to 40 percentage points, whereas for Dutch men it increases only from 19 to 22 percentage points.

SHARE also provides information on health limitations, which is reported in table 2 under the six health limitation indicators measured. Overall, the age patterns are similar to the patterns for SRH in table 1, although not for all indicators in both countries. For instance, for Dutch men, the incidence of both mild and severe chronic conditions increases with age, while the incidence of other health limitations

[5] This aggregation improves the presentation of our results without affecting the main findings and conclusions.

[6] The first indicator, no work, includes those who are retired; permanently sick, or disabled; homemakers; the unemployed; and other individuals who make a living from owning properties, doing voluntary work, and so forth. Part time (full time) refers to employed or self-employed individuals who report fewer (more) than 20 hours of work per week in their primary and secondary jobs.

decreases or stays equal. For Dutch women, age brings a higher incidence of mild chronic conditions and more limitations in the activities of daily living (ADL) and mobility. For Spanish men and women, in contrast, the incidence of almost all health limitations increases with age, and in many cases this increase is quite large. For example, whereas only 8 percent of Spanish men and women aged 50–54 report having one or more severe chronic conditions, this proportion is more than three (two) times that for men (women) aged 60–64. For the same age groups, the proportion of men and women with mobility limitations increases by about 20 percentage points in Spain, but by only -1 percentage point for men and +8 percentage points for women in the Netherlands. Nonetheless, with the exception of severe chronic conditions and ADL limitations in Spain, women report more health limitations than men in both countries. Moreover, although Dutch men report fewer health limitations than Spanish men, the differences between the women in each country are smaller.

<Insert Table 2 about here>

As table 3 shows, educational attainment increases with birth cohort for both men and women in both countries. Nonetheless, compared to individuals in Spain, individuals in the Netherlands are on average more educated and have fewer children.

<Insert Table 3 about here>

Table 4 reports statistics on the early life circumstances of the birth cohorts in the sample, which, to conform with the studies cited in the introduction, are classified into two categories: those related to childhood SES and those that measure childhood

(and prenatal) health. As in earlier research (e.g., Dutton and Levine, 1989), we treat SES as a composite measure that typically includes parental economic status, social status, and work status, measured by income, education, and occupation, respectively. We thus measure childhood SES based on three variables that refer to the respondent's circumstances at age 10. The first is the number of rooms per person in the household ("rooms"), which proxies for the parents' financial status. The second, meant to capture the parents' cultural background, is an indicator for whether there were enough (25+) books in the parental home to fill one bookcase ("bookcase").[7] The third indicates whether the primary breadwinner for the household worked as a farmer or in an elementary occupation ("breadwinner"), thereby capturing the household work status. Because these three variables measure the family background in which the individual was born and raised, they relate to both the fetal-origins and life course models hypotheses discussed earlier.[8] The variables that measure childhood (and prenatal) health are indicators for whether respondents suffered from chronic conditions during childhood (ages 0–15),[9] whether they spent one month or

[7] Cavapozzi *et al.* (2010) report a (cross-country) correlation of 0.82 between the "rooms" variable and the OECD average disposable income of households with children aged 0–17, and a correlation of 0.66 between the "bookcase" variable and country averages for years of education in the adult population.

[8] Adler *et al.* (1994) suggest the inclusion of other nonstandard SES indicators such as health behaviors, psychological factors, or perceptions of social ordering, and Stokols (1992) proposes the inclusion of physical and social environment-related variables (like crowding, pollution, and access to health care). However, as our data do not include such information, we construct the "rooms" variable using the number of people living in the household when the respondent was 10 (as a proxy for crowding).

[9] In line with Case *et al.* (2005) and the epidemiological literature (e.g., Barker, 1995), we define chronic childhood conditions as having long-lasting effects on health (see the appendix for more details).

more in bed during childhood because of illness, whether they suffered from a period of hunger during childhood, and their height at the time of interview.

<Insert Table 4 about here>

In table 4, the "bookcase" indicator shows that the proportion of men and women who at age 10 lived in households with more than 25 books is substantially higher in the Netherlands than in Spain. This finding suggests a higher parental cultural background for the Dutch respondents. There is also a considerable increase in this indicator for the younger cohorts (with the exception of Dutch women), which points to an important improvement in parental cultural background during 1940–1957. Likewise, the proportion of parents who worked as farmers or in elementary occupations is much lower in the Netherlands than in Spain, whereas the opposite is true for the rooms per person variable. Both variables, "breadwinner" and "rooms," point to a higher work status and income in (the average) Dutch household when the respondents were 10 years old. Across birth cohorts, there is a decline (larger for Spain) in the proportion of individuals who grew up in a household whose primary breadwinner worked as a farmer or in an elementary occupation and an increase in the number of rooms per person (except for Dutch men). Both trends suggest a significant improvement in economic conditions in Spain, while the evidence for the Netherlands, although mixed, also points to an improvement during the 1940–1957 period.

Among the childhood health-related variables, the height variable, besides highlighting country differences for both genders, suggests a general health improvement across birth cohorts for men in both countries, and the hunger period

variable shows a monotonic decrease for Spanish respondents that suggests nutritional improvements in Spain over time.[10] Chronic conditions, however, have a larger incidence among women in both countries, and for both Dutch men and Spanish women, their incidence increases among younger cohorts. Compared to the Dutch, Spanish individuals report a lower incidence of spending one month or more in bed during childhood because of a health condition, although for women, this incidence increases with birth cohort. Although such negative health shocks (e.g., chronic conditions or one month or more spent in bed for illness) might seem more likely for children from poorer (in our sample, Spanish) households, SES may in fact contribute not only to a household's ability to treat and prevent but also to detect a negative health shock (Currie and Stabile, 2003). This ability may thus help to explain the parallel increases in childhood SES and incidence of negative health shocks across birth cohorts, as well as the higher incidence of these negative health shocks among Dutch respondents.

3. Estimates of the associations between early life circumstances, education, and later life health and employment

This section examines the associations of childhood circumstances with educational attainment, later life SRH and employment, and later life employment after SRH is

[10] In the Netherlands, those who reported having suffered from a hunger period during childhood belonged almost exclusively to the 1940–45 birth cohorts. For nearly 60 percent of these individuals, the hunger period started in 1944 and ceased in 1945, which is most probably related to the famine known as the Dutch Hunger Winter of 1944 (see, e.g., Banning, 1946; Roseboom *et al.*, 2001).

controlled for. All analyses are carried out separately for men and women and for Spain and the Netherlands. In the first three subsections, we estimate ordered probit models and report the (average) marginal effects of the explanatory variables on the outcome probabilities in tables 5 to 7. For the last model, we estimate a bivariate ordered probit model and show the results in table 8. All models are estimated by Maximum Likelihood.[11]

We refer to the estimated effects of early life circumstances on later life outcomes as "associations" because of the widely recognized difficulties in identifying causal relationships between the childhood SES and health variables and later life outcomes. The first difficulty is that SES (or factors correlated with it) is likely to affect health during childhood.[12] For instance, Case *et al.* (2002) and Currie and Stabile (2003) show that income buffers children from the negative effects of chronic conditions, which are also more common among low-SES children. In the same vein, Case and Paxson (2008) argue that adult height may be an indicator for a healthier but also financially more comfortable early life environment. The second, and most important difficulty, is that, as these authors and others (e.g., Case *et al.*, 2005; or Smith, 2009) suggest, unobserved "third or confounding factors" may be driving the correlations between early life variables and later life outcomes.[13] Hence, in our analysis, we consider the childhood SES and health variables to be proxies for

[11] We use the *oprobit* command and the *bioprobit* command (Sajaia, 2008) of the software package Stata (www.stata.com). We take into account clustering at the individual level when calculating the standard errors (see, e.g., Greene and Hensher, 2010).

[12] It is reasonable to assume that children's health has little impact on their own SES (Case *et al.*, 2002).

[13] See Case *et al.* (2002) for an extensive analysis of possible "third factor" explanations for the SES-health gradient in childhood.

unobserved early life circumstances.[14]

3.1. Educational attainment

In table 5, we examine the relationship between early life circumstances and educational attainment and identify the same significant and positive association found in previous investigations. For instance, as in the Case *et al.* (2005) and Case and Paxson (2008) studies for the U.K. and the U.S., height appears to be strongly associated with educational attainment. Specifically, a 10 cm increase in height is associated with a 6 (8) percentage point increase in the probability that men (women) will achieve the highest educational (university) degree in the Netherlands and a corresponding 8 (7) percentage point increase in Spain. Childhood SES variables also show a strong association with educational attainment: education levels are significantly higher among individuals whose parents had a bookcase and are positively associated with rooms per person. For a one-room increase, the associated rise in the probability of having a university degree is about 14 (10) percentage points for men (women) in the Netherlands and 24 (10) percentage points for men (women) in Spain. With the exception of Dutch men, educational attainment is significantly lower among individuals raised in households whose main breadwinner worked as a farmer or in an elementary occupation ("breadwinner" = 1).

Among the childhood health-related variables, other than height only the hunger period variable is significantly and negatively associated with education, and only for older Dutch women. For these latter, experiencing a hunger period in childhood is associated with a 14 percentage point lower probability of obtaining a

[14] Studies like Case *et al.* (2005), on the other hand, rely on a large set of early life variables in their analyses to capture all individual heterogeneity.

university degree, a result that may again be attributed to the Dutch Hunger Winter of 1944 (see, e.g., Banning, 1946; Roseboom *et al.*, 2001). However, unlike Case *et al.* (2005), we find no evidence of a significant negative correlation between chronic conditions in childhood and education, observing rather a significant and positive correlation between these two factors among Dutch women, for which we have no explanation.

In sum, for both men and women in both the Netherlands and Spain, we find that childhood SES (as measured by "bookcase" and "rooms") and height (which serves as a proxy for both childhood SES and health) are strongly and positively associated with educational attainment.

<Insert Table 5 about here>

3.2. Later life health

Table 6 shows the associations between childhood circumstances and later life (50–64) SRH, which, as discussed in section 2, is classified into three categories (poor or fair, good, very good or excellent). Here, we condition this association on educational attainment, which reduces the size of the early life variable coefficients but leaves the levels of significance virtually unchanged (we return to this observation in section 4). This outcome stands in stark contrast to the Case and Paxson (2008) finding that for U.S. elderly, the association between childhood SES and SRH at older ages becomes insignificant once education is controlled for.

Overall, the table shows positive and significant associations between educational attainment and SRH for men and women in both Spain and the Netherlands. In line with Case and Paxon (2008), we conclude that education appears

to be *protective* of health. With regard to childhood SES, we find better later life health among Dutch men and Spanish women whose parents had a higher SES (based on the "bookcase" variable). This health difference is only somewhat lower than the health differences between those with the lowest and highest levels of education, which underscores the relative importance of childhood SES for later life health.

Childhood health is also strongly associated with later life SRH. Except for Dutch men, childhood chronic conditions are significantly and negatively associated with later life SRH. For instance, having suffered from chronic conditions during childhood is associated with a 13 percentage point lower probability of reporting very good or excellent health for Dutch women, and an 18 and 12 percentage point lower probability for Spanish men and women, respectively. This evidence resembles that offered by Case *et al.* (2005) for adults aged 33 and 42. In addition, for Dutch women, having spent one month or more in bed during childhood because of illness is associated with a 14 (13) percentage point increase (decrease) in reporting poor or fair (very good or excellent) health at an older age. For Spanish women, experiencing a hunger period during childhood is associated with a 14 percentage point lower probability of reporting better health in later life. Comparing all the (significant) effects of the childhood health variables with the differences in health probabilities between those with the lowest and highest educational levels indicates that the magnitude of their association with reporting very good or excellent health is rather similar for Dutch women, somewhat lower for Spanish men, and somewhat higher for Spanish women. Again, this finding underscores the relative importance of childhood health for later life health.

Overall, the results show that higher levels of education and better childhood circumstances (in terms of SES and health) are significantly associated with better

later life health.

<Insert Table 6 about here>

3.3. Later life employment

Table 7 outlines the marginal effects of early life circumstances and educational attainment on later life employment probabilities, which, as discussed in section 2, is classified into no work, part-time work, and full-time work. As in the previous section, we condition this variable on educational attainment, which changes only the size of the early life variable coefficients and not their levels of significance.

As the table shows, for men and women in both countries, higher educational levels are significantly and positively associated with full-time employment later in life, but educational attainment is positively and significantly associated with part-time work only for Dutch women. For men, childhood SES and health are both positively associated with later life employment. In the Netherlands, parental cultural background ("bookcase") and having spent one month or more in bed during childhood because of illness have separate impacts on employment. As a comparison, for Dutch men, the magnitude of employment's association with "bookcase" is only somewhat lower than the differences in employment probabilities between those with the lowest and highest levels of education. In the Spanish case, however, the reduction (increase) in the probability of full-time (no) work at an older age because of childhood chronic conditions is approximately twice as large as the differences in employment probabilities between those with the lowest and highest levels of education. For Spanish men, we also find a significant association with parental income (the "rooms" variable). Our results are in line with Case *et al.* (2005) who find

that for U.K. men chronic conditions and SES during childhood are significantly associated with occupation in adulthood even when education is controlled for. In contrast, Case and Paxson (2008) report a positive association between SES and health during childhood, and white collar occupations for U.S. individuals above age 50 that becomes insignificant once education is controlled for.

In general, for men, apart from education, both childhood SES and health show significant and positive associations with later life employment. For women, however, we find a positive association only with educational attainment and no significant associations between later life employment and childhood SES and health.

<Insert Table 7 about here>

3.4. Later life employment conditional on later life health

This section estimates the associations between early life circumstances and later life employment once later life health is controlled for. In this way, we obtain insights into possible direct impacts on employment opportunities of early life circumstances that do not operate through health. For this purpose, we estimate an employment equation that—in addition to early life circumstances, educational attainment, and other demographic variables—controls for SRH, which is a potentially endogenous explanatory variable in our employment equation (see, e.g., Bound, 1991). We follow, e.g., Bound *et al.* (1999) and Disney *et al.* (2006) and instrument SRH with objective (self-reported) health limitations (see table 2).[15] The estimation procedure takes into

[15] We thus estimate the employment equation simultaneously with a health equation and assume that the health limitations are contemporaneous exogenous instruments for SRH. Mental health is excluded from our analysis as it turned out not to be a good instrument, which could be due to an impact of non-

account that the endogenous variables (employment and SRH) are categorical and ordered. This model is referred to as a bivariate ordered probit model and the estimation results are given in table 8.

<Insert Table 8 about here>

The test statistics in the bottom part of the table show that the excluding instruments—that is, the health limitation variables—fulfill both the instrument relevance and exogeneity requirements (see, e.g., Bound *et al.*, 1995). The estimates of the correlation coefficient indicate that exogeneity of SRH in the employment equation is rejected for all four groups except Spanish women. The estimated impacts of health on employment indicate that health has a significant and positive effect on employment, except for Spanish women, and that this effect is strongest for Spanish men.

The estimation results of the employment equation (lower panel) show that once later life health is controlled for, there are no associations between educational attainment and later life employment, except for Dutch women. This finding suggests that the positive effect of education on later life employment operates mainly through better health. Nor are there are any significant associations between early life circumstances and later life employment except for Spanish men. For these latter, we find a direct association between childhood SES ("breadwinner" and "rooms") and

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employment on mental health as, for instance, reported by Rohwedder and Willis (2010) and Llena-Nozal *et al.* (2004).

later life employment, which could suggest a long-term impact of early life circumstance on employment opportunities.[16]

4. A summary of results

To facilitate an overall interpretation of our empirical results, table 9 presents the results of joint significance tests on the associations of early life circumstances and education variables with later life health and employment in the various models estimated (tables 6, 7 and 8). In this way, we test for the existence of pathways through which early life circumstances may affect later life health and employment. In doing so, we exclude stepwise the demographic variables marital status and children, as well as the educational attainment variables from the models in section 3, which were already shown to be significantly associated with childhood circumstances (see bottom part of table 5). Overall, and taking into account that early life SES may influence early life health but not vice versa, these associations occur mainly with the SES-related variables and height.

As table 9 shows, after controlling for education, we find significant associations between childhood circumstances and later life health (see columns (2)). For Spanish men, these associations are jointly insignificant, but the chronic conditions variable is significantly associated with later life health. For Dutch men, childhood SES links early life circumstances to later life health; but for Dutch women

[16] Two further points need to be clarified. For Spanish men, ISCED 2 is significant but negatively associated with employment; for Dutch women, chronic conditions is significant but positively associated with employment.

and Spanish men, it is childhood health that does so, and for Spanish women, a combination of childhood SES and health.

After controlling for education but not later life health, we find significant associations between early life circumstances and later life employment for men but not for women (see columns (2)). For women, the associations between early life circumstances and later life employment remain insignificant once the demographic and education variables are excluded from the employment equation (see columns (2)-(4)). For men, however, the story is slightly different. For Dutch men, the associations between early life circumstances and later life employment disappear once later life health is taken into account (see columns (1)), implying that early life circumstances are associated with later life employment through health. For Spanish men, the associations with childhood SES remain once later life health is controlled for (see columns (1)), suggesting a long-lasting positive impact of childhood SES on employment opportunities.

As also discussed in section 3, with regard to educational effects, we find that education is health protective for both men and women in Spain and in the Netherlands (see columns (2)). However, with the exception of Dutch women, after controlling for later life health, we find no significant associations between education and employment (see columns (1)). These results suggest that the positive association between education and later life employment operates mainly through better health.

<Insert Table 9 about here>

5. Conclusions

We use data from the Survey of Health, Ageing, and Retirement in Europe (SHARE) and (bivariate) ordered probit models to examine the associations between individuals' early life circumstances (specifically, childhood SES and childhood health) and later life health and employment in the Netherlands and Spain. Childhood SES is approximated by three variables pertaining to the parental home when the respondent was 10: enough books to fill one bookcase, a main breadwinner working as a farmer or in an elementary occupation, and the number of rooms per person. Childhood health is measured based on chronic conditions during childhood, experience of a hunger period, or lengthy confinement to bed because of illness. We also control for the individual's height at the time of interview as a proxy for both childhood SES and childhood health.

Our main empirical results can be summarized as follows. Both childhood SES and childhood health are significantly associated with educational attainment. Favorable early life circumstances—that is, a higher childhood SES and better childhood health—are associated with higher levels of education. Once educational attainment is controlled for, we find strong empirical support that favorable early life circumstances are associated with better later life health. These results hold for men and women in both Spain and the Netherlands. For men in both Spain and the Netherlands, we also find indirect associations between childhood circumstances and later life employment that operate through later life health. For Spanish men, we identify a significant direct association between childhood SES and later life employment (conditional on later life health). This latter may suggest a long-term association between childhood SES and the employment opportunities available

between schooling completion and the interview date.[17]

Our empirical findings also suggest that public policies which invest in children's SES and health may benefit individuals in terms of better education and (later life) health, both of which in turn yield better employment opportunities. Such policies are exemplified by (means tested) income support programs that seek to improve children's SES and (indirect) subsidies for children's health care and schooling.

One caution is warranted, however, concerning the causal relationships implied within such policy recommendations. More research is needed to obtain insights into the causal relationships between early life circumstances and later life health and employment, as well as the mechanisms that drive these relationships. Nonetheless, important advances have been made in this area. For instance, van den Berg and Gupta (2011) find a causal effect of economic circumstances at birth—measured by the business cycle—on mortality later in life and that operates for women (but not for men) through marriage, and Smith (2009), using sibling fixed effects strategies, reports that poor childhood health has a quantitatively large effect on household and individual income—among others—in adulthood that is larger when unobserved family effects are controlled for.[18]

[17] Recent evidence from the Spanish Labor Force Survey suggests that people aged 16–34 primarily find a job through a relative or friend (almost 50 percent), and that only 27 percent find a position by sending out their CVs or answering job advertisements (see Labor Force Survey, 2009).

[18] This perhaps counterintuitive finding of Smith (2009) could be explained by an attenuation bias due to measurement error in retrospective self-reported childhood health measure).

REFERENCES

Adler, N.E., Boyce, T., Chesney, M.A., Cohen, S., Kahn, R.L., Syme, S.L., 1994. Socioeconomic status and health: The challenge of the gradient. American Psychologist 49 (1), 15–24.

Banning, C., 1946. Food shortage and public health, first half of 1945. Annals of the American Academy of Political Social Science 245, 93–110.

Barker, D.J.P., 1995. Fetal origins of coronary heart disease. British Medical Journal 311 (6998), 171–174.

Barker, D.J.P., 2007. The origins of the developmental origins theory. Journal of Internal Medicine 261, 412–417.

van den Berg, G.J., Gupta, S., 2011. The role of marriage in the causal pathway from economic conditions early in life to mortality. IZA Discussion Paper No. 5454.

Bound, J., 1991. Self-reported versus objective measures of health in retirement models. Journal of Human Resources 26 (1), 106–138.

Bound, J., Jaeger, D.A., Baker, R.M., 1995. Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak. Journal of the American Statistical Association 90 (430), 443–450.

Bound, J., Schoenbaum, M., Stinebrickner, T., Waidmann T. 1999. The dynamic effects of health on the labor force transitions of older workers. Labour Economics 6 (2), 179–202.

Case, A., Fertig, A., Paxson, C., 2005. The lasting impact of childhood health and circumstance. Journal of Health Economics 24 (2), 365–389.

Case, A., Lubotsky, D., Paxson, C., 2002. Economic status and health in childhood: The origins of the gradient. American Economic Review 92 (5), 1308–1334.

Case, A., Paxson, C., 2008. Height, health and cognitive function at older ages. American Economic Review: Papers & Proceedings 98 (2), 463–467.

Cavapozzi, D., Garrouste, C., Paccagnella, O., 2010. Childhood, schooling and income inequality. MEA Discussion Paper No. 212.

Currie, J., Stabile, M., 2003. Socioeconomic status and health: Why is the relationship stronger for older children? American Economic Review 93 (5), 1813–1823.

Disney, R., Emmerson, C., Wakefield, M., 2006. Ill health and retirement in Britain: A panel data based analysis. Journal of Health Economics 25 (4), 621–649.

Dutton, D.B., Levine, S., 1989. Overview, methodological critique, and reformulation. In: Bunker, J.P., Gomby, D.S., Kehrer, B.H. (Eds.), Pathways to health, Menlo Park, CA: Henry J. Kaiser Family Foundation, pp. 29–69.

Greene, W., Hensher, D., 2010. Modeling ordered choices, Cambridge University Press.

Kuh, D.J.L., Wadsworth, M.E.J., 1993. Physical health status at 36 years in a British national birth cohort. Social Science and Medicine 37 (7), 905–916.

Labor Force Survey (Encuesta de Población Activa), Instituto Nacional de Estadística, Madrid, 2009.

Llena-Nozal, A., Lindeboom, M., Portrait, F., 2004. The effect of work on mental health: Does occupation matter? Health Economics 13 (10), 1045–1062.

Marmot, M.G., Brunner, S., Hemingway, S., 2001. Relative contributions of early life and adult socioeconomic factors to adult morbidity in the Whitehall II study. Journal of Epidemiology and Community Health 55 (5), 301–307.

Marmot, M.G., Wilkinson, R.G., 1999. Social determinants of health. Oxford

University Press, Oxford.

Pappas, G., Queen, S., Hadden, W., Fisher, G., 1993. The increasing disparity in mortality between socioeconomic groups in the United States, 1960 and 1986. New England Journal of Medicine 329 (2), 103–109.

Rohwedder, S., Willis, R.J., 2010. Mental retirement. Journal of Economic Perspectives 24 (1), 119–138.

Roseboom, T.J., van der Meulen, J.H.P., Ravelli, A.C.J., Osmond, C., Barker, D.J.P., Bleker, O.P., 2001. Effects of prenatal exposure to the Dutch famine on adult disease in later life: An overview. Molecular and Cellular Endocrinology 185, 93–98.

Sajaia, Z., 2008. Maximum likelihood estimation of a bivariate ordered probit model: Implementation and Monte Carlo simulations. Stata Journal 4 (2), 1–18.

Smith, K.V., Goldman, N., 2007. Socioeconomic differences in health among older adults in Mexico. Social Science and Medicine 65 (7), 1372–1385.

Smith, J.P., 1999. Healthy bodies and thick wallets: The dual relation between health and economic status. Journal of Economic Perspectives 13 (2), 145–166.

Smith, J.P., 2009. The impact of childhood health on adult labor market outcomes. Review of Economics and Statistics 91 (3), 478–489.

Stokols, D., 1992. Establishing and maintaining healthy environments: Toward a social ecology of health promotion. American Psychologist 47 (1), 6–22.

APPENDIX

Table A1 Variable definitions

Variable	Definition
Respondent's Socioeconomic Characteristics	
Education	Includes four levels of education defined from the ISCED Code 1997: no education or primary education (ISCED 0–1), lower secondary education (ISCED 2), upper secondary and postsecondary nontertiary education (ISCED 3–4), and tertiary education (ISCED 5–6).
Marital status	Marital status is 1 if married or cohabiting, 0 otherwise (single or widowed).
Number of children	Includes biological children. Four intervals are considered: no children, 1 child, 2 children, and 3 or more children.
Age	Includes dummy variables for each age year.
Regions	Includes regional dummies for NUTS 1
Respondent's Health Limitations	
MILD	MILD refers to mild chronic diseases; it is equal to 1 if a respondent has one or more mild conditions, 0 otherwise. Mild conditions are defined as hypertension, high blood cholesterol, diabetes, asthma, arthritis, osteoporosis, stomach condition, cataracts, and other conditions.
SEVERE	SEVERE refers to severe chronic diseases; it is equal to 1 if a respondent has one or more severe conditions, 0 otherwise. Severe conditions are cancer, heart condition, stroke, Parkinson's disease, hip problems, and lung disease.
ADL	ADL refers to limitations in the activities of daily living; it is equal to 1 when the respondent suffers one or more limitations, 0 if none. ADL includes six activities: (i) dressing, including putting on shoes and socks; (ii) walking across a room; (iii) bathing or showering; (iv) eating, such as cutting up one's food; (v) getting in and out of bed; and (vi) using the toilet, including getting up and down.
IADL	IADL refers to limitations in the instrumental activities of daily living; it is equal to 1 if the respondent has one or more limitations, 0 if none. IADL includes seven activities: (i) using a map to figure out how to get around in a strange place; (ii) preparing a hot meal; (iii) shopping or buying groceries; (iv) making telephone calls; (v) taking medications; (vi) working around the house or garden; and (vii) managing money, such as paying bills and keeping track of expenses.
MOBILITY	MOBILITY is equal to 1 if the respondent has any mobility limitations, 0 if none. Assessment of these limitations is based on the following activities: (i) walking 100 meters; (ii) sitting for about 2 hours; (iii) getting up from chairs after sitting for long periods; (iv) climbing one (several) flight(s) of stairs without resting; (v) stooping, kneeling, or crouching; (vi) reaching or extending one's arms above shoulder level; (vii) pulling or pushing large objects like a living room chair; (viii) lifting or carrying weights over 5 kilos, like a heavy bag of groceries; and (ix) picking up a small coin off a table.
MENTAL	MENTAL is equal to 1 if the respondent suffers from more than three depression symptoms from the so-called EURO-D scale (a mental health measure), and 0 otherwise. The following twelve variables form the EURO-D scale: depression, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, tearfulness.

Table A1 Continued

Respondent's Early Life Circumstances	
More than 25 books at home when 10 years old ("bookcase")	Is equal to 1 if there were more than 25 books (at least enough to fill one bookcase) in the household when the person was 10 years old, 0 if less. Magazines, newspapers, and school books are not considered.
Breadwinner farmer or elementary occupation when respondent was 10 years old ("breadwinner")	Is equal to 1 if the main household breadwinner worked as an agricultural-fishery worker or in an elementary occupation when the respondent was 10 years old, 0 otherwise.
Rooms per person when 10 years old ("rooms")	Includes the number of rooms per person in the household when the respondent was 10 years old. Includes bedrooms, but excludes kitchen, bathrooms, and hallways.
Chronic conditions during childhood (0–15 years)	Is equal to 1 if a respondent suffered from one or more chronic conditions during his childhood (0–15 years), 0 otherwise. Includes the following chronic conditions: severe headaches or migraines; epilepsy, fits, or seizures; emotional, nervous, or psychiatric problem; childhood diabetes or high blood sugar; heart trouble; and other serious health conditions
One month or more in bed during childhood (0–15 years)	Is equal to 1 if during childhood (0–15 years) and because of a health condition, the respondent was confined to bed or home for one month or more, 0 otherwise.
Hunger period during childhood (0–15 years)	Is equal to 1 if the respondent suffered from hunger during childhood (0–15 years), 0 otherwise.
Height (in centimeters)	Adult height (in centimeters)

Table 1 Number of observations, SRH and employment status by gender, age, and country

			Self-reported health status			Employment status		
			Poor or fair	Good	Very good or excellent	No work	Part-time work	Full-time work
	Age	N	%	%	%	%	%	%
The Netherlands								
Men	50-54	186	19	47	34	14	4	82
	55-59	203	18	50	32	20	10	69
	60-64	201	22	43	35	54	17	29
Women	50-54	202	22	42	36	32	25	43
	55-59	257	25	46	30	47	25	28
	60-64	231	26	41	34	73	17	10
Spain								
Men	50-54	115	18	43	38	20	8	72
	55-59	122	24	49	27	33	10	57
	60-64	116	40	41	20	61	9	29
Women	50-54	169	27	50	23	54	11	36
	55-59	169	43	39	18	65	9	25
	60-64	151	46	44	10	82	7	11

Table 2 Objective self-reported health limitations by gender, age, and country*

Health limitations		Mild chronic conditions (Mild)	Severe chronic conditions (Severe)	Limitations in activities of daily living (ADL)	Limitations in instrumental activities of daily living (IADL)	Mobility limitations (Mobility)	Mental problems (Mental)
	Age	%	%	%	%	%	%
The Netherlands							
Men	50-54	49	12	3	5	25	15
	55-59	50	14	2	6	19	10
	60-64	58	22	3	5	24	13
Women	50-54	45	16	3	13	35	24
	55-59	60	19	4	16	41	23
	60-64	65	17	5	16	43	20
Spain							
Men	50-54	55	8	6	6	19	14
	55-59	69	15	7	5	24	16
	60-64	77	26	7	13	41	19
Women	50-54	57	8	3	8	40	38
	55-59	76	9	5	9	45	37
	60-64	83	16	11	18	61	46

*Definitions of health limitation are in the appendix. A respondent can report more than one health limitation.

Table 3 Number of individuals, educational attainment and household composition by gender, birth cohort, and country

			Educational attainment*				Household composition				
	Birth cohort	Number of individuals	ISCED 0-1	ISCED 2	ISCED 3	ISCED 4-6	Married (0-1)	No children	One child	Two children	Three or more children
			%	%	%	%	%	%	%	%	%
The Netherlands											
Men	1940-45	118	9	33	32	25	89	10	14	45	31
	1946-51	170	6	28	34	32	86	20	9	51	21
	1952-57	120	6	28	34	32	83	25	8	40	28
Women	1940-45	130	9	52	17	22	73	11	10	44	35
	1946-51	223	5	46	20	29	78	13	15	46	26
	1952-57	125	9	28	34	30	79	18	10	38	34
Spain											
Men	1940-45	79	52	28	9	11	92	11	6	33	49
	1946-51	96	41	27	17	16	81	23	8	35	33
	1952-57	78	35	26	15	24	73	27	19	27	27
Women	1940-45	97	65	21	6	8	75	15	4	27	54
	1946-51	135	51	27	13	10	81	12	13	36	39
	1952-57	110	37	27	22	14	83	15	12	44	30

*1997 International Standard Classification of Education (ISCED, http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm)

Level 0 = Preprimary education; Level 1 = Primary education or first stage of basic education; Level 2 = Lower secondary or second stage of basic education

Level 3 = (Upper) secondary education; Level 4 = Postsecondary non-tertiary education; Level 5 = First stage of tertiary education; Level 6 = Second stage of tertiary education

Table 4 Early life circumstances by gender, birth cohort, and country*

		Socioeconomic status (SES) at age 10			Health conditions during childhood			
	Birth cohort	More than 25 books at home ("bookcase")	Breadwinner is a farmer or has an elementary occupation ("breadwinner")	Number of rooms per household member ("rooms")	Chronic conditions	One month or more in bed	Experienced a hunger period	Height (in cm)
		%	%	average	%	%	%	average
The Netherlands								
Men	1940-45	42	25	0.82	8	15	5	177
	1946-51	52	22	0.81	11	16	0	179
	1952-57	53	23	0.80	16	13	0	181
Women	1940-45	55	27	0.81	15	14	5	167
	1946-51	49	29	0.83	15	16	0	167
	1952-57	56	22	0.84	15	21	1	167
Spain								
Men	1940-45	19	68	0.58	8	6	6	169
	1946-51	19	49	0.70	7	14	5	170
	1952-57	27	51	0.70	8	5	4	172
Women	1940-45	19	62	0.61	10	4	8	159
	1946-51	24	51	0.63	16	5	4	159
	1952-57	27	46	0.65	14	7	1	159

*More details on the definitions of early life circumstance variables are in text and in the appendix.

Table 5 Marginal effects of early life circumstances on educational attainment probabilities by gender and country[a]

	The Netherlands								Spain							
	Men				Women				Men				Women			
Early life circumstances	ISCED 0-1	ISCED 2	ISCED 3	ISCED 4-6	ISCED 0-1	ISCED 2	ISCED 3	ISCED 4-6	ISCED 0-1	ISCED 2	ISCED 3	ISCED 4-6	ISCED 0-1	ISCED 2	ISCED 3	ISCED 4-6
Childhood SES																
"Bookcase" (0-1) (1 = >25 books)	-0.112*	-0.104*	0.066*	0.150*	-0.081*	-0.159*	0.041*	0.198*	-0.152*	-0.024	0.028*	0.148*	-0.248*	-0.060	0.066*	0.241*
	(0.023)	(0.034)	(0.012)	(0.038)	(0.015)	(0.035)	(0.010)	(0.039)	(0.049)	(0.027)	(0.011)	(0.069)	(0.037)	(0.039)	(0.026)	(0.067)
"Breadwinner" (0-1) (1 = farmer/elementary occupation)	0.031	0.020	-0.016	-0.034	0.048*	0.064*	-0.023*	-0.088*	0.158*	0.007	-0.033	-0.133*	0.126*	0.010	-0.034*	-0.103*
	(0.031)	(0.017)	(0.017)	(0.030)	(0.020)	(0.021)	(0.011)	(0.029)	(0.057)	(0.016)	(0.019)	(0.034)	(0.041)	(0.010)	(0.016)	(0.028)
"Rooms" (an increase of one room)	-0.119*	-0.080*	0.060*	0.138*	-0.050*	-0.067*	0.021*	0.097*	-0.256*	-0.026	0.043*	0.240*	-0.115*	-0.013	0.025	0.103*
	(0.038)	(0.030)	(0.019)	(0.042)	(0.023)	(0.028)	(0.010)	(0.040)	(0.061)	(0.022)	(0.018)	(0.063)	(0.050)	(0.010)	(0.015)	(0.043)
Childhood health																
Chronic conditions (0-1)	0.021	0.013	-0.011	-0.023	-0.040*	-0.068	0.014*	0.094*	-0.083	-0.015	0.011	0.086	0.034	0.003	-0.008	-0.029
	(0.043)	(0.024)	(0.023)	(0.044)	(0.017)	(0.035)	(0.005)	(0.047)	(0.073)	(0.023)	(0.008)	(0.089)	(0.053)	(0.004)	(0.013)	(0.044)
One month or more in bed (0-1)	0.030	0.018	-0.016	-0.032	0.030	0.034	-0.013	-0.051	0.032	0.003	-0.006	-0.029	-0.022	-0.003	0.005	0.020
	(0.037)	(0.019)	(0.020)	(0.035)	(0.026)	(0.025)	(0.012)	(0.039)	(0.062)	(0.004)	(0.012)	(0.053)	(0.057)	(0.009)	(0.012)	(0.055)
Experienced a hunger period (0-1)	0.067	0.031	-0.036	-0.062	0.120	0.075*	-0.055	-0.141*	0.135	-0.003	-0.028	-0.104	0.078	0.003	-0.019	-0.062
	(0.159)	(0.046)	(0.087)	(0.116)	(0.088)	(0.020)	(0.038)	(0.062)	(0.110)	(0.017)	(0.027)	(0.072)	(0.086)	(0.006)	(0.024)	(0.060)
Height (a 10 cm increase)[b]	-0.049*	-0.033*	0.025*	0.057*	-0.043*	-0.057*	0.018*	0.082*	-0.090*	-0.009	0.015*	0.084*	-0.080*	-0.009	0.017*	0.072*
	(0.021)	(0.009)	(0.011)	(0.017)	(0.012)	(0.014)	(0.004)	(0.020)	(0.033)	(0.007)	(0.008)	(0.030)	(0.026)	(0.008)	(0.007)	(0.030)
Joint significance childhood SES (p-value)	0.0000				0.0000				0.0000				0.0000			
Joint significance childhood health (p-value)	0.0393				0.0002				0.0596				0.0620			
Pseudo R-squared	0.069				0.095				0.171				0.183			
Log-likelihood value	-696.55				-773.40				-373.44				-484.26			
Number of observations	590				690				353				489			

[a]Based on the estimation of an ordered probit model, which includes controls for regions, age, and survey year. Robust standard errors in parentheses. Significance level: * p<0.05

[b]The marginal effect of height corresponds to a 10 cm increase, which is approximately equivalent to move an individual from the 50th beyond the 75th percentile.

Table 6 Marginal effects of early life circumstances and education on SRH status probabilities by gender and country*

	The Netherlands						Spain					
	Men			Women			Men			Women		
Early life circumstances and educational attainment	Poor or fair	Good	Very good or excellent	Poor or fair	Good	Very good or excellent	Poor or fair	Good	Very good or excellent	Poor or fair	Good	Very good or excellent
Childhood SES												
"Bookcase" (0-1) (1 = >25 books)	-0.124*	-0.024	0.148*	-0.005	-0.000	0.006	0.019	-0.001	-0.017	-0.142*	0.026	0.116*
	(0.027)	(0.025)	(0.041)	(0.032)	(0.002)	(0.034)	(0.062)	(0.007)	(0.055)	(0.048)	(0.024)	(0.053)
"Breadwinner" (0-1)												
(1 = farmer/elementary occupation)	-0.067*	-0.010	0.078	-0.007	-0.000	0.007	-0.055	0.003	0.053	-0.004	0.001	0.003
	(0.034)	(0.016)	(0.046)	(0.033)	(0.002)	(0.036)	(0.047)	(0.008)	(0.050)	(0.041)	(0.009)	(0.033)
"Rooms" (an increase of one room)	0.007	0.001	-0.008	0.021	0.001	-0.022	0.029	-0.002	-0.027	0.047	-0.010	-0.037
	(0.044)	(0.005)	(0.050)	(0.045)	(0.003)	(0.047)	(0.060)	(0.006)	(0.056)	(0.067)	(0.017)	(0.053)
Childhood health												
Chronic conditions (0-1)	0.068	0.000	-0.069	0.154*	-0.020	-0.134*	0.264*	-0.085	-0.179*	0.190*	-0.073	-0.117*
	(0.053)	(0.011)	(0.047)	(0.056)	(0.020)	(0.038)	(0.110)	(0.071)	(0.047)	(0.072)	(0.048)	(0.035)
One month or more in bed (0-1)	0.073	0.000	-0.073	0.141*	-0.016	-0.125*	-0.053	0.000	0.052	-0.004	0.001	0.003
	(0.045)	(0.011)	(0.039)	(0.050)	(0.017)	(0.036)	(0.079)	(0.010)	(0.086)	(0.096)	(0.020)	(0.076)
Experienced a hunger period (0-1)	-0.081	-0.027	0.108	0.022	0.000	-0.022	-0.081	-0.005	0.087	0.266	-0.126	-0.139*
	(0.106)	(0.066)	(0.170)	(0.116)	(0.004)	(0.113)	(0.105)	(0.027)	(0.130)	(0.169)	(0.118)	(0.059)
Height (a 10 cm increase)	-0.014	-0.002	0.015	-0.019	-0.001	0.019	-0.029	0.002	0.027	0.007	-0.002	-0.006
	(0.024)	(0.002)	(0.025)	(0.023)	(0.002)	(0.025)	(0.038)	(0.005)	(0.035)	(0.034)	(0.008)	(0.026)
Education level (relative to ISCED 0-1)												
ISCED 2	-0.064	-0.010	0.074	-0.169*	-0.021	0.190*	-0.116*	0.001	0.115	-0.068	0.012	0.056
	(0.061)	(0.020)	(0.079)	(0.046)	(0.022)	(0.064)	(0.049)	(0.017)	(0.060)	(0.046)	(0.011)	(0.043)
ISCED 3	-0.112*	-0.031	0.143	-0.149*	-0.029	0.178*	-0.179*	-0.020	0.199*	-0.196*	0.008	0.188*
	(0.054)	(0.035)	(0.083)	(0.048)	(0.027)	(0.072)	(0.055)	(0.040)	(0.086)	(0.053)	(0.041)	(0.076)
ISCED 4-6	-0.145*	-0.049	0.194*	-0.218*	-0.063	0.281*	-0.230*	-0.040	0.270*	-0.168*	0.015	0.153
	(0.051)	(0.045)	(0.088)	(0.042)	(0.038)	(0.074)	(0.053)	(0.054)	(0.097)	(0.061)	(0.035)	(0.083)
Pseudo R-squared	0.075			0.056			0.085			0.100		
Log-likelihood value	-567.50			-697.88			-346.37			-453.55		
Number of observations	590			690			353			489		

*Based on the estimation of an ordered probit model, which includes controls for regions, age, survey year, partner, and number of children.
Robust standard errors in parentheses. Significance level: * $p<0.05$

Table 7 Marginal effects of early life circumstances and education on employment probabilities by gender and country*

	The Netherlands						Spain					
	Men			Women			Men			Women		
Early life circumstances and educational attainment	No work	Part-time work	Full-time work	No work	Part-time work	Full-time work	No work	Part-time work	Full-time work	No work	Part-time work	Full-time work
Childhood SES												
"Bookcase" (0-1) (1 = >25 books)	-0.116*	-0.009	0.126*	0.019	-0.004	-0.015	0.114	0.006	-0.120	-0.044	0.003	0.041
	(0.034)	(0.006)	(0.039)	(0.039)	(0.009)	(0.030)	(0.077)	(0.003)	(0.077)	(0.069)	(0.005)	(0.065)
"Breadwinner" (0-1)												
(1 = farmer/elementary occupation)	-0.013	-0.001	0.014	0.051	-0.011	-0.039	0.088	0.005	-0.093	0.032	-0.003	-0.029
	(0.042)	(0.003)	(0.045)	(0.044)	(0.011)	(0.032)	(0.055)	(0.003)	(0.056)	(0.052)	(0.005)	(0.047)
"Rooms" (an increase of one room)	-0.041	-0.003	0.044	-0.011	0.002	0.008	-0.264*	-0.016	0.279*	0.084	-0.007	-0.077
	(0.041)	(0.003)	(0.043)	(0.063)	(0.013)	(0.050)	(0.083)	(0.009)	(0.087)	(0.084)	(0.008)	(0.078)
Childhood health												
Chronic conditions (0-1)	0.097	0.004	-0.101	-0.053	0.010	0.043	0.285*	-0.001	-0.284*	-0.075	0.005	0.070
	(0.066)	(0.003)	(0.066)	(0.053)	(0.008)	(0.045)	(0.094)	(0.012)	(0.085)	(0.069)	(0.005)	(0.066)
One month or more in bed (0-1)	0.099	0.004	-0.104*	-0.015	0.003	0.012	0.052	0.002	-0.054	-0.087	0.005	0.082
	(0.052)	(0.003)	(0.053)	(0.050)	(0.010)	(0.040)	(0.076)	(0.003)	(0.079)	(0.102)	(0.005)	(0.099)
Experienced a hunger period (0-1)	0.040	0.002	-0.042	0.121	-0.034	-0.086	-0.089	-0.008	0.097	0.008	-0.001	-0.008
	(0.128)	(0.005)	(0.133)	(0.139)	(0.049)	(0.090)	(0.104)	(0.012)	(0.117)	(0.147)	(0.012)	(0.134)
Height (a 10 cm increase)	-0.027	-0.002	0.029	0.031	-0.007	-0.024	-0.002	-0.000	0.002	-0.048	0.004	0.044
	(0.027)	(0.001)	(0.028)	(0.027)	(0.006)	(0.021)	(0.036)	(0.002)	(0.038)	(0.041)	(0.003)	(0.039)
Education level (relative to ISCED 0-1)												
ISCED 2	-0.112	-0.008	0.120	-0.143*	0.025*	0.118*	0.037	0.002	-0.040	-0.055	0.004	0.051
	(0.068)	(0.008)	(0.075)	(0.065)	(0.008)	(0.058)	(0.064)	(0.003)	(0.066)	(0.061)	(0.004)	(0.057)
ISCED 3	-0.121	-0.011	0.132	-0.229*	0.031*	0.198*	-0.153*	-0.014	0.167*	-0.145	0.008	0.137
	(0.068)	(0.010)	(0.077)	(0.067)	(0.007)	(0.067)	(0.071)	(0.013)	(0.083)	(0.079)	(0.007)	(0.079)
ISCED 4-6	-0.156*	-0.016	0.172*	-0.358*	0.032*	0.326*	-0.138*	-0.012	0.149*	-0.214*	0.010	0.204*
	(0.065)	(0.011)	(0.075)	(0.062)	(0.016)	(0.072)	(0.066)	(0.011)	(0.076)	(0.094)	(0.011)	(0.098)
Pseudo R-squared	0.220			0.148			0.211			0.130		
Log-likelihood value	-416.21			-605.44			-256.71			-355.32		
Number of observations	590			690			353			489		

*Based on the estimation of an ordered probit model. The model includes controls for regions, age, survey year, partner and number of children.
Robust standard errors in parentheses. Significance level: * $p<0.05$

Table 8 Estimation results of equations (1)-(2) by gender and country[a]

	The Netherlands				Spain			
	Men		Women		Men		Women	
	parameter estimate	(standard error)	parameter estimate	(standard error)	parameter estimate	(standard error)	parameter estimate	(standard error)
Self-reported health equation								
Mild	-0.502*	(0.104)	-0.603*	(0.107)	-0.495*	(0.141)	-0.692*	(0.136)
Severe	-0.671*	(0.166)	-0.736*	(0.133)	-0.939*	(0.201)	-0.566*	(0.244)
Mobility	-0.840*	(0.146)	-0.683*	(0.110)	-0.939*	(0.168)	-0.647*	(0.132)
IADL	-0.677*	(0.344)	-0.374*	(0.163)	-0.167	(0.256)	-0.289	(0.250)
ADL	-1.189*	(0.498)	-1.901*	(0.451)			-0.826	(0.425)
ISCED 2	0.076	(0.238)	0.617*	(0.208)	0.208	(0.194)	0.183	(0.152)
ISCED 3	0.354	(0.240)	0.632*	(0.228)	0.504*	(0.255)	0.472*	(0.222)
ISCED 4-6	0.453	(0.247)	0.834*	(0.227)	0.621*	(0.275)	0.589*	(0.237)
“Bookcase” (0-1)	0.388*	(0.114)	0.069	(0.109)	-0.012	(0.221)	0.399*	(0.174)
“Breadwinner” (0-1)	0.225	(0.138)	-0.033	(0.112)	0.165	(0.170)	0.110	(0.130)
“Rooms”	-0.087	(0.155)	-0.003	(0.157)	-0.220	(0.199)	-0.079	(0.220)
Chronic conditions (0-1)	-0.170	(0.164)	-0.357*	(0.149)	-0.752*	(0.262)	-0.285	(0.204)
One month or more in bed (0-1)	-0.045	(0.131)	-0.176	(0.153)	0.331	(0.249)	-0.031	(0.301)
Experienced a hunger period (0-1)	0.501	(0.476)	0.078	(0.302)	0.262	(0.375)	-0.464	(0.520)
Height	0.021	(0.086)	-0.011	(0.074)	0.117	(0.118)	-0.030	(0.108)

Table 8 Continued

Employment equation								
ISCED 2	0.335	(0.294)	0.157	(0.252)	-0.453*	(0.215)	0.125	(0.186)
ISCED 3	0.296	(0.305)	0.466	(0.263)	0.054	(0.308)	0.300	(0.249)
ISCED 4-6	0.347	(0.315)	0.710*	(0.274)	-0.098	(0.328)	0.528	(0.288)
"Bookcase" (0-1)	0.208	(0.151)	-0.080	(0.127)	-0.394	(0.246)	0.036	(0.214)
"Breadwinner" (0-1)	-0.075	(0.158)	-0.189	(0.144)	-0.427*	(0.189)	-0.089	(0.160)
"Rooms"	0.149	(0.171)	0.040	(0.213)	0.979*	(0.306)	-0.216	(0.265)
Chronic conditions (0-1)	-0.255	(0.225)	0.415*	(0.166)	-0.504	(0.307)	0.373	(0.218)
One month or more in bed (0-1)	-0.235	(0.178)	0.283	(0.156)	-0.278	(0.230)	0.259	(0.307)
Experienced a hunger period (0-1)	-0.342	(0.402)	-0.171	(0.496)	0.098	(0.500)	0.151	(0.538)
Height	0.085	(0.103)	-0.131	(0.084)	-0.053	(0.122)	0.149	(0.127)
Correlation coefficient[b]	-0.255*	(0.106)	-0.356*	(0.085)	-0.484*	(0.112)	0.014	(0.133)
Impact of (latent) health on employment	0.437*	(0.083)	0.424*	(0.064)	0.573*	(0.096)	0.208	(0.111)
Joint significance of health limitations (χ^2/df)[c]	26.928		30.736		20.318		23.032	
Overidentification test (p-value)[d]	0.142		0.108		0.119		0.139	
Number of observation	590		690		353		489	

[a]The model includes controls for regions, age, survey year, partner, and number of children. Robust standard errors are in parentheses. Significance level: * p<0.05.
[b]The correlation coefficient between the error terms of the health and employment equations.
[c]The chi-square test statistic over the number of restrictions (degrees of freedom, df).
The null hypothesis is that the health limitations (Mild, Severe, Mobility, IADL and ADL) have no joint impact on self-reported health.
Following Bound *et al.* (1995), empirical studies often apply a critical value of 10.
[d]The null hypothesis is that the instruments (e.g., health limitations variables) are orthogonal to the error term in the employment equation.

Table 9 Joint significance tests of early life circumstances on self-reported health and employment by gender and country

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Cells: p-values	**The Netherlands Men**				**The Netherlands Women**			
Self-reported health		*Table 6 results*	*Excluding demographics*	*Excluding education*		*Table 6 results*	*Excluding demographics*	*Excluding education*
Education		0.023	0.006			0.001	0.005	
Early life circumstances		0.002	0.002	0.000		0.001	0.001	0.001
Childhood SES		0.001	0.002	0.000		0.960	0.968	0.815
Childhood health		0.277	0.155	0.073		0.000	0.000	0.000
Employment	*Table 8 results*	*Excluding health (table 7)*	*Excluding demographics*	*Excluding education*	*Table 8 results*	*Excluding health (table 7)*	*Excluding demographics*	*Excluding education*
Education	0.707	0.203	0.147		0.002	0.000	0.000	
Early life circumstances	0.336	0.004	0.003	0.000	0.027	0.703	0.635	0.252
Childhood SES	0.303	0.007	0.014	0.001	0.550	0.678	0.646	0.149
Childhood health	0.295	0.091	0.061	0.031	0.007	0.512	0.466	0.367

Table 9 Continued	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Spain Men				**Spain Women**			
Self-reported health		*Table 6 results*	*Excluding demographics*	*Excluding education*		*Table 6 results*	*Excluding demographics*	*Excluding education*
Education		0.008	0.007			0.009	0.009	
Early life circumstances		0.246	0.237	0.345		0.022	0.040	0.001
Childhood SES		0.614	0.607	0.915		0.062	0.079	0.002
Childhood health		0.1039[a]	0.103[a]	0.144[a]		0.061	0.090	0.104
Employment	*Table 8 results*	*Excluding health (table 7)*	*Excluding demographics*	*Excluding education*	*Table 8 results*	*Excluding health (table 7)*	*Excluding demographics*	*Excluding education*
Education	0.123	0.049	0.028		0.306	0.100	0.052	
Early life circumstances	0.004	0.001	0.001	0.001	0.401	0.546	0.570	0.109
Childhood SES	0.002	0.003	0.003	0.002	0.820	0.676	0.590	0.114
Childhood health	0.433	0.030	0.039	0.134	0.195	0.379	0.501	0.375

[a]For Spanish men, however, chronic conditions are significantly (and negatively) associated with later life health (see table 6).