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## **Income Risks within Retirement in Great Britain and Germany**

By Asghar Zaidi, Joachim R. Frick und Felix Büchel

### **Abstract**

This study examines income mobility amongst older people in Great Britain and Germany after retirement. The motivation is that older people may be subject to greater income risks in today's environment of early exits from the labour force, rising longevity and increasing reliance on private pension income. Our results provide evidence that income mobility amongst older people is more pronounced in Great Britain than in Germany. In both countries, the probability of downward income mobility is associated with changes in marital status, living arrangements and the employment status of other family members. A first policy conclusion that can be drawn is the need to strengthen further the social safety net in old age against income risks experienced by groups with few or no individual pension rights.

*JEL Classification: D 31, D 63, H 55, I 31, J 14*

### **1. Introduction**

The marked increase in human longevity over recent decades poses challenges for policymakers worldwide. Faced with unprecedented rises in social expenditures and the need to mitigate the income risks associated with old age, policymakers require a holistic understanding of processes that determine the social and economic resources of older people. This paper seeks to contribute to this knowledge by capturing the extent of income mobility experienced by the older population and by identifying the personal attributes and life-course transitions that trigger income mobility during old age.

Some notable limitations in the current empirical literature on this issue provide further motivation for this work. Most cross-national comparisons of the individual welfare of older people are based on annual cross-sectional data providing snapshot analyses only (see, *inter alia*, Torrey / Smeeding 1992, Hagenaaers et al. 1994, Tsakoglou 1996, Förster / Pellizzari 2000, Smeeding 2001, and Disney / Whitehouse 2001). Although these analyses provide interesting insights about how older people fare in comparison to the overall popu-

lation, and how this has changed over the past two decades, they lack information on income dynamics *within* old age.

Comparative studies on income dynamics in old age are beginning to appear (see, *inter alia*, Schwarze/Frick 2000, Burkhauser et al. 2001, Zaidi/De Vos 2002); however, these focus largely on single events of interest, such as the exit from the labour force at retirement. Other cross-national studies on income dynamics focus on the working-age population (Headey et al. 1997 and Muffels et al. 1999). As argued in detail in Zaidi et al. (2001), recent longevity trends, an early exit from the labour force and the nature of recent reforms in pension systems make it important to study income mobility *during* old age. Furthermore, most analyses that provide a cross-national comparison of changes in income in old age focus on changes in only one source of income. Gruber and Wise (1999), for example, provide a comparison of the labour income replacement ratio, and thus draw only a partial picture of income dynamics in old age. This indicator does not capture how other sources of income and the income of other family members change during old age.

These considerations motivate us to address the following research questions in this paper. Firstly, how does the income experience of older people vary across countries that differ in terms of institutional settings in their welfare provisions for old age? Secondly, how do different social security systems mitigate income risks associated with the various life-course transitions experienced by older people?

## 2. Cross-national perspective: Great Britain and Germany

For our cross-national comparison, we chose Great Britain and Germany as the countries to be analysed. In this section, we provide some basic information about the pension systems in these two countries.<sup>1</sup>

An important part of the pension system in Britain is the basic state pension, which is close to being universal and is indexed to inflation. However, because the basic state pension is lower than the minimum subsistence level, pensioners in Great Britain often have to rely on other sources of income (private resources or means-tested benefits) to maintain a minimum standard of living. Entitlements for basic pensions are accumulated mainly by contributions made while participating in the labour market, and thus certain groups may be at a disadvantage. A system of National Insurance credits ensures that most people are in effect covered for the basic state pension, even when they are not work-

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<sup>1</sup> For detailed information on the British pension system, see, e.g., Emmerson and Johnson (2001), Blundell and Johnson (1997), and Dilnot et al. (1994). For corresponding information about Germany, see, e.g., Börsch-Supan (2000, 2001), and Schmähl (1998, 2000).

ing. In Germany, there is no comparable basic state pension. Those who are not entitled to receive earnings-related pensions (see below) are referred to the welfare system if their total income falls below the social assistance minimum.

Although a mandatory earnings-related state pension exists in Great Britain, it has lost its relative value over time. In Germany, almost all earnings-related pensions are managed by the state, whereas in Britain these pension schemes are managed largely by the employers. In both countries, a large proportion of older people draw income from these earnings-related occupational pension schemes. These schemes provide a good replacement of earnings (close to 70%) for those who contributed for most of their working life. The German schemes appear to be more generous in terms of replacement of earnings and in the coverage they provide for survivors. In Germany, certain periods where no contributions are made to the system – e.g., time spent in education, child care, military service, illness and unemployment – can be credited with contributions. Since 1992, earnings related pensions in Germany are indexed to net wage growth.

In Great Britain, an increasing number of people are opting for private personal pensions, although these schemes are more recent and more popular amongst the younger cohorts of today's working age population. In 2002, the German government has followed suit and, in line with most other industrialised nations, initiated private retirement schemes to complement the existing pay-as-you-go system.

### 3. The datasets

Our analyses are based on the British Household Panel Survey (BHPS) and the German Socio-economic Panel (GSOEP). Both surveys provide longitudinal information on income and other attributes of private households. The annual income variable in the GSOEP is derived from the average monthly income from a particular source and information on the number of months in which different sources of income were tapped during the previous year.<sup>2</sup> The annual income variable in the BHPS is also defined using a similar projection of current income to annual income.<sup>3</sup> These differences in the income varia-

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<sup>2</sup> The annual income variable was calculated for the GSOEP data as part of a joint project between the DIW Berlin and Cornell University: the Cross-National Equivalent File CNEF (see Burkhauser et al. 2001).

<sup>3</sup> The annual income variable in the BHPS is derived using the information for each respondent adult about current income as well as retrospective information about receipt of various different sources of income over the previous year. We refer to Böheim and Jenkins (2000) for a more elaborate discussion on the derivation of annual income in the BHPS.

bles of the two surveys may affect the comparability of the income results across the two countries. Our analysis covers the period 1990–2000 for Germany and 1991–1999 for Great Britain. We use a sample of unbalanced panels. All those who provide data for four consecutive years form a single observation on income mobility; thus anybody who provides data for all nine years (in the case of the BHPS) provides us with six observations on income mobility. Finally, although we limit the GSOEP analysis to West Germany, the German sample is nevertheless somewhat larger than the British one.

Since individuals share resources with other members of their families and households, the economic resources of older people will not be adequately described by individual or benefit-unit income alone. For this reason, we analyse household income. For the same reason, we prefer net household income (“post-tax post-transfer income”) to gross income. We use annual income, mainly because this variable provides a better measure of households’ general economic resources than monthly income. While short-term variations in income have little or no impact on households’ budgeting and consumption decisions, differences in long-term (annual) income relate more closely to differences in households’ welfare. To make annual incomes comparable over time, all income measures are deflated to the level of 1998.<sup>4</sup>

By examining equivalent income, instead of the total household income, we automatically correct for any changes in family composition that might occur from one year to the next. The equivalence scale we use consists of dividing total household income by the square root of the household size, a scale commonly used in cross-national comparisons (see, e.g., Förster / Pellizzari 2000).

#### 4. Methods

There is no universally accepted age threshold above which a person is considered to be of ‘old age’. At least three definitions of old age are used in the economics-of-ageing literature.<sup>5</sup> The first, very common, definition is based on each individual’s own assessment of his or her labour market status. The second definition uses objective information about the labour market status, such as the number of hours worked and the job search activity of people close to retirement age. Both these definitions approximate entry into old age to the

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<sup>4</sup> One of the main problems with using annual income is linked to the event of widowhood. Since widowhood can happen at any time during the year, the annual income variable may include an income record of the time *before* and *after* the event. It is therefore difficult to single out the effect of widowhood on income mobility. In order to deal with this problem, we omit the year in which widowhood occurred and, as far as possible, compare income before widowhood with income after widowhood to determine whether this event can be linked to downward income mobility.

<sup>5</sup> For a discussion of this issue, see Bardasi et al. (2000).

time of retirement from the labour market. The third definition uses the statutory retirement age (i.e. the age at which an individual becomes entitled to retirement and old-age social benefits) to define the onset of old age. This paper uses a combination of the last two definitions, whereby entry into the old age is approximated by the chronological age at which people become entitled to an old-age pension and by the fact that they are no longer in employment. The statutory retirement age is 65 for men and 60 for women in Great Britain, and 65 for men and 63 for women in Germany.

In common with the whole population, the older population is likely to be heterogeneous in the degree of anticipation and planning for events that affect their incomes, and their ability to deal successfully with changes in income will be crucially affected by the size of that change, the size of their incomes overall and their ability to interact with their social and economic networks (e.g. labour and capital market, and friends and relatives). The older population has specific characteristics that lend a unique dimension to their experience of income changes. For instance, older people may not be able to adjust their labour supply, and borrow and lend in the capital market, and may thus suffer more from possible income losses than younger people who experience similar income losses. For these reasons, we identify 'downward' income mobility as associated with income risks.

We begin our analysis of mobility by examining a transition matrix. We define income thresholds by dividing income in the base year into quintiles, and examine transitions across these absolute thresholds between the base year and three years later. We define downward income mobility to be either a transition to a lower income group, or a fall in equivalent income of more than 15 % between the base year and three years later. We test the sensitivity of this arbitrary choice by also using 10 % and 20 % thresholds in descriptive analysis. By focusing on changes in individuals' own incomes, we are using an absolute concept of mobility. This concept is distinct from relative or rank mobility, which tracks changes in the relative ranking of individuals, households or subgroups within a population.<sup>6</sup>

After presenting these descriptive results, we move to regression analysis. We use a logit to model the odds of different income mobility outcomes as a function of several covariates. Because data were pooled over several years of observation, we specify random-effects panel data models to account for the non-independence of individual observations across time.

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<sup>6</sup> See Shorrocks (1993), Jarvis and Jenkins (1995) and Fields and Ok (1999) for a more detailed discussion of the distinction between relative and absolute concepts of income mobility.

## 5. Results

### 5.1 Income status of the elderly: Great Britain and Germany

Table 1 reports on the average (equivalent) income for the elderly and non-elderly population (including children) at two points of time for both countries. In both countries, the elderly have a lower average income than the non-elderly. The relative economic position of elderly people in Great Britain appears to be worse than that of their counterparts in Germany. This can partly be attributed to the fact that, relative to average earnings, the basic state pension is smaller in Great Britain and, because it is linked to inflation only, has lost in relative value. Moreover, it appears that German occupational pensions are more generous in terms of earnings replacement.<sup>7</sup> Similarly, in both countries, elderly people are more likely to be poor than younger people, and the differences were larger in 1990/91 than in 1997/98. In both benchmark years, the poverty differential between the elderly and the non-elderly population was more pronounced in Great Britain than in Germany. Poverty incidence for both the elderly and the non-elderly is clearly higher in Great Britain than in Germany, particularly in 1990/91.

Table 1

#### Relative well-being of the elderly in Great Britain and West Germany

	Elderly		Non-elderly		Elderly/Non-elderly Ratio <sup>a)</sup>	
	Britain	Germany	Britain	Germany	Britain	Germany
<i>Median income (equivalent household income)<sup>b)</sup></i>						
1990/1991	6,022	25,779	9,480	31,669	0.64	0.81
<b>1997/1998</b>	7,696	26,807	10,356	30,948	0.74	0.87
<i>Poverty rate (60% of median poverty line)</i>						
1990/1991	39.3	22.8	17.6	11.1	2.23	2.05
1997/1998	29.2	19.9	18.7	13.8	1.56	1.44
<i>Income inequality (Gini coefficient)</i>						
1990/1991	0.275	0.252	0.302	0.264	0.91	0.95
<b>1997/1998</b>	0.304	0.259	0.306	0.282	0.99	0.92

<sup>a)</sup> Ratio of elderly to non-elderly.

<sup>b)</sup> Income is expressed in real terms in national currency units (pounds sterling and Deutschmarks)

Authors' calculations from BHPS and GSOEP

<sup>7</sup> We refer to Börsch-Supan and Schnabel (1999) and Blundell and Johnson (1999) for comparable figures on replacement ratios in the two countries.

One notable result is that the poverty incidence amongst the elderly has declined rather sharply (from 39.3 % to 29.2 %) in Great Britain, whereas the corresponding temporal decline in Germany is close to being insignificant (from 22.8 % to 19.9 %). The marked decline in Great Britain can largely be attributed to the fact that later cohorts not only are more likely to have occupational pension coverage, but also receive higher average amounts from occupational pensions (Johnson/Stears 1995). Consistent with this phenomenon, results show that income inequality, as reflected by the Gini coefficient, has increased amongst older people in Great Britain and is now equivalent to the degree of inequality among the non-elderly. In contrast, we observe no change in the income inequality of the older population in Germany over the 1990s.

### 5.2 Income mobility in old age: descriptive results

The transition matrix in Table 2 provides the first results on mobility, the focus of this study. The matrix illustrates a number of points. First, compared with their British counterparts, a greater proportion of German elderly people

Table 2

#### Income mobility measured using an absolute transition matrix

<i>Britain</i>						
	$Y_{t+3}$					
$Y_t$	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	
<i>I</i>	62.28	20.14	12.01	4.49	1.08	
<i>II</i>	25.87	48.49	16.29	6.18	3.17	
<i>III</i>	11.61	26.55	45.55	13.2	3.09	
<i>IV</i>	5.29	9.52	28.87	42.71	13.61	
<i>V</i>	2.05	2.89	6.08	18.48	70.49	
<i>West Germany</i>						
	$Y_{t+3}$					
$Y_t$	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	
<i>I</i>	73.00	15.79	6.88	2.66	1.67	
<i>II</i>	14.93	58.02	19.48	4.82	2.74	
<i>III</i>	6.06	16.50	52.74	20.21	4.48	
<i>IV</i>	2.46	6.92	19.06	54.16	17.40	
<i>V</i>	1.88	1.93	3.92	15.79	76.48	

*Notes:*

(1) Income quintiles are defined on the basis of the net equivalent household income for the older population in the base year ( $Y_t$ ).

(2) Income classes I, II, III, IV and V refer to the lowest to highest income quintiles, respectively. Authors' calculations from BHPS and GSOEP



remain in the same income group in year  $t+3$  as in year  $t$ . For example, 73 % and 76 % of Germans in the bottom and top income groups, respectively, remain in these groups, whereas the equivalent numbers for Britain are 63% and 70%. This can be interpreted as indicating greater overall mobility in Britain.

Second, since the proportion of elderly in Britain who fall one or more income groups (an average of about 34 %), is greater than the corresponding proportion in Germany (about 22 %), downward mobility is higher in Britain than in Germany.

Third, in both countries, there are significant differences across income quintiles in the degree of income mobility experienced by the older population, with close to one-third of those in the bottom and top quintiles changing their income position, compared to approximately one-half in the second, third and fourth income quintiles. In part, this can be explained by censorship, with those at the top and bottom of the income distribution having restricted opportunities for change.

Table 3 presents the incidence of our second measure of downward income mobility for three different thresholds of change in income. The table reveals that for all three thresholds – 10 %, 15 % and 20 % – there is greater downward income mobility in Great Britain than in Germany.

*Table 3*

**Downward income mobility across various thresholds**

Incidence of downward mobility between year $t$ and $t + 3$ (%)		
	Britain	West Germany
– 10 % fall in income	25.5	22.3
– 15 % fall in income	20.4	16.5
– 20 % fall in income	16.0	12.6

Authors' calculations from BHPS and GSOEP

**5.3 Downward income mobility: regression results**

Random effects binary logit models are applied to analyse the risk of downward income mobility (Table 4). Overall, results for the two countries are surprisingly similar in terms of the magnitude, direction and statistical significance of the various coefficients. Most notably, all explanatory variables derived from (changes in) the marital status of older people indicate the same risks of downward income mobility in both countries. In both countries, women who have recently been widowed are significantly more likely to

Table 4

## Cross-national comparison of effects on downward income mobility

	Britain			West Germany		
	Coeff.	std. error	Sample means	Coeff.	std. error	Sample means
Sex = Male	-0.107	0.125	0.329	-0.354**	0.134	0.304
Aged 60–65 (Britain), 63–65 Germany	-0.029	0.160	0.122	0.045	0.127	0.202
Aged 70–79	0.191	0.111	0.443	-0.030	0.108	0.350
Aged 80+	0.440**	0.164	0.144	0.423*	0.169	0.102
Immigrant	-0.338	0.308	0.030	0.622**	0.171	0.110
Became widow(er)	0.637	0.334	0.045	-0.561	0.559	0.043
Remained widow(er)	0.849**	0.140	0.372	0.335*	0.133	0.302
Other	0.768**	0.173	0.134	0.550**	0.172	0.104
Female + became widow	1.487**	0.396	0.032	2.142**	0.590	0.034
Became independent, lost earner(s)	3.998**	0.659	0.008	2.813**	0.305	0.020
Became independent, no earners	3.161**	0.528	0.006	1.876**	0.272	0.015
Became dependent, no earners	-0.663	0.807	0.003	0.476	0.622	0.004
Remained independent, lost earner(s)	1.653**	0.280	0.017	1.154**	0.236	0.025
Remained independent, earner(s)	-0.551	0.348	0.017	-2.721**	0.840	0.006
Remained dependent, earner(s)	-2.209**	0.321	0.036	-1.748**	0.293	0.035
Remained dependent, no earners	-0.154	0.294	0.026	-0.073	0.263	0.033
Others	0.352	0.265	0.025	-0.861**	0.197	0.089
Poor health status in base year	0.033	0.131	0.133	0.280*	0.112	0.183
Deteriorating health	0.128	0.172	0.055	0.254**	0.088	0.258
2 <sup>nd</sup> income quintile	2.142**	0.190	0.187	0.634**	0.169	0.179
3 <sup>rd</sup> income quintile	2.952**	0.212	0.215	0.947**	0.176	0.196
4 <sup>th</sup> income quintile	3.900**	0.244	0.201	1.825**	0.188	0.223
5 <sup>th</sup> income quintile	4.698**	0.276	0.220	2.284**	0.217	0.225
Home-owner	-0.389**	0.126	0.646	0.179	0.105	0.514
Private income >20%	-0.509**	0.134	0.660	1.109**	0.159	0.163
In sample whole period	-0.098	0.114	0.602	-0.427**	0.114	0.499
Constant	-4.891**	0.289		-4.276**	0.258	
Number of observations (groups)	6580 (1610)			7783 (1639)		
Log Likelihood	-2802.89			-2982.78		
Pseudo-R <sup>2</sup>	0.1688			0.1638		

*Notes:* The dependent variable is 1 when an income fall of 15% or more is observed between the base year and three years later, 0 otherwise. Dummy variables controlling for the year of observation are also included. A respondent is independent if he or she lives alone or with his or her partner only; the reference group is a person who was independent and had no earner in the household in both the initial and final year. “No earners” indicates that the respondent’s household had no earners in either the initial or final year, while “earner(s)” indicates that the respondent’s household had at least one earner in both years.

\* = significant at  $p > 0.05$ ; \*\* = significant at  $p > 0.01$ .

Authors’ calculations from BHPS and GSOEP

experience downward income mobility than those who remained living as a couple (the reference group). The effect is the sum of the coefficient on being widowed and the coefficient on the interaction of being female and widowed:  $0.637 + 1.487 = 2.124$  for Britain, and  $-0.561 + 2.142 = 1.581$  for Germany. The coefficients are most easily interpreted when exponentiated, which yields the odds ratio: widowed British women are about 8 times more likely ( $e^{2.124}$ ) than those who remained living as a couple (the reference group) to have downward mobility, while widowed German women are almost 5 times more likely ( $e^{1.581}$ ). These effects are very large. Those who remained widowed, as well as 'others' (constituted mainly by those who were divorced or who were never married), are also more likely to experience downward income mobility than those who remained living as a couple. The coefficients for these two groups are smaller than that observed for widows.

Moreover, changes in the living arrangements and employment status of other members of the household also correlate with the likelihood of downward income mobility. Since these two attributes largely overlap with each other, we combine these two variables and thus show the interacting effect of changes in living arrangements and changes in employment status of other members of the household. The reference group is the most typical group of older people who live independently (alone or with their partner only) and are no longer active in the formal labour market. A household can lose an earner either because that earner left the household or because the person stopped working.

The first two coefficients (3.998 and 3.161 for Britain, and 2.813 and 1.876 for Germany) show that in both countries all those who started to live independently are more likely to experience an income loss. These coefficients capture the effect of loss of income from offspring who move out of older people's households. Although the odds ratios seem much larger for the case where the household lost an earner than where it did not (55 versus 24 for Britain, and 17 versus 7 for Germany), the coefficients are not significantly different in either country.

By contrast, the loss of employment has a significant impact on those who remained independent: this result is shown by the fourth coefficient, which is 1.653 for Britain, and 1.154 for Germany. Since our sample includes only those who were already retired, these positive coefficients show that when an older person's partner stops work, the person is five times more likely to have downward mobility in Britain, and three times more likely in Germany. The next group, those remaining independent with at least one household earner in both the initial and final year, has a significant coefficient only for Germany (-2.721), and it reflects changes in partners' earnings. This group is only 6 % as likely to experience downward mobility as the reference group. The group of those remaining dependent and with at least one earner has a significant

coefficient which is negative in both countries (-2.209 in Britain and -1.748 in Germany), implying that in both countries this group has a significantly lower risk of downward income mobility in comparison to the reference group (i.e. pensioners who live independently and nobody in their family is in employment). This effect can be attributed to stable or rising earnings of partners and/or other members of the household who live with older people.

Next, we control for the income location by using dummy variables defined on the basis of income quintile groups. Here, the bottom income group is defined as the reference category. The coefficients for all four groups (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> income quintile groups) are significant and positive in both countries, implying that all income groups have a higher likelihood of observing falling income as compared to those who are in the bottom income group.

The significance of the income composition is captured with the help of the dummy variable which identifies those who draw more than 20 % of their post-tax, post-transfer household income from private sources (including income from personal private pensions as well as capital income and labour earnings). This variable provides us with the most notable difference in the cross-national results: older people in Great Britain are about two times less likely to experience downward income mobility if they draw more than 20 % of their pension income from private sources, whereas in Germany this group is about 3 times more likely to observe downward income mobility. This contrasting result may be partly because in Germany occupational pensions are mostly managed by the state, and private income in old age is thus constituted by either the investment income, capital income or labour earnings, which can be expected to be more volatile than the income from occupational pensions which is included in the private income of older people in Britain.

The variables associated with health status and its deterioration are significantly positive for Germany, whereas the same variables are insignificant in Great Britain. This differential may be due to additional health-related benefits in Great Britain for people whose health status is poor and/or has deteriorated from one year to the next. In Great Britain, home-owners are less likely to experience downward income mobility, but this coefficient is not significant for Germany.

The coefficient for 'in panel whole period' tests whether those who survived in the panel for the whole period have a differential income experience in comparison to those who dropped out from the panel. The coefficient is significant only for Germany (-0.427), implying that those who survived are significantly less likely to observe falling income. This phenomenon points towards a possible selective attrition in the German panel of older people. However, a more formal test may be required to draw conclusions about the impact of the attrition in the two panels which is beyond the scope of the analysis performed in this paper.

## 6. Conclusions

We found that in both Great Britain and Germany, the death of a spouse is associated with an increased likelihood of downward income mobility. However, largely due to differential labour market experience and the ensuing differences in individual pension entitlements, this risk is highly gender-specific. Older women are more likely to observe downward income mobility after the death of a spouse, whereas the same event does not generate any additional income risk when experienced by men. Changes in the living arrangements and employment status of household members have a significant impact on income mobility: both men and women are more likely to observe downward income mobility when they start living independently, and when nobody in the household is employed.

Perhaps the most important policy implication arising from these longitudinal analyses is related to the overall extent to which people in Great Britain and Germany are exposed to income risks in their old age. One policy conclusion is the need to further strengthen the social safety net in old age to safeguard women against the hazard of downward income mobility after the death of their husband – by providing better opportunities towards acquiring individual pension rights for women. Although individuals and governments already safeguard against such income risks in old age, these measures may need to be strengthened in view of the increasing life expectancy and the growing reliance of older people on private sources of income. The research carried out in this paper can be seen as a first attempt to outline the phenomenon of income risks during retirement in these countries. Additional sensitivity analyses (e.g., with respect to the choice of the equivalence scale and the threshold to determine a significant income loss) as well as some methodological improvements will follow, thus improving the empirical basis for clear scientific and policy conclusions.

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