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### Abstract

I investigate the relationship between widowhood and the financial situation among women aged 50 and above in Europe. The results of the paper are based on the Survey of Health, Ageing and Retirement in Europe, and its retrospective third wave (SHARELIFE). Using retrospective data makes it possible to analyze the dynamics of the adverse effects of widowhood. I estimate both the short run and long run effects of widowhood on financial circumstances, health, and labor force status. I argue that not only the lack of the deceased husband's income, but also the worse health condition and earlier retirement of widows contribute to the unfavorable financial conditions, although these indirect effects are small. I also analyze the role survivors' pensions have in mitigating the adverse effects of widowhood, and provide evidence for varying compensating effects of survivors' pensions in the European countries analyzed.

**Keywords:** widows, poverty, survivors' pension, SHARE, SHARELIFE
**JEL Classification**: I32, J14

## 1   Introduction

Old-age poverty is strongly associated with the poverty of widowed women. In this paper I analyze the financial situation of widows in Europe. Using a rich set of cross-national household level data, I can provide new evidence on the magnitude and timing of the adverse effects of widowhood. The results of this paper are based on the Survey of Health, Ageing and Retirement in Europe (SHARE).

Based on the second wave of SHARE, half of the widows who are aged 50 and above report financial difficulties, which is around ten percentage points higher than the similar ratio among married women within the same age category. Such difference cannot be seen among men. Apart from the lack of the deceased husband's income, other factors can also contribute to the poverty of widows. Therefore I investigate the short and long run effects of widowhood not only on financial circumstances, but also on health and employment status. Health problems and early exit from the labor market can exacerbate the deprivation in widowhood.

I use the second and third waves of SHARE. The second wave is a cross sectional survey of individuals aged 50 and above, whereas the third wave, which is called SHARELIFE, is a retrospective survey of the same population. The second wave of the survey makes it possible to analyze the persistent effects of widowhood on the living conditions at older ages, whereas the retrospective third wave data provide evidence on the short run and dynamic effects of widowhood. In the empirical analysis I take into account that selection into

widowhood is not random: even before widowhood, widows have on average poorer socioeconomic status than the rest of the female population.

The estimation results indicate that the death of the husband has immediate adverse effects on the financial, health, and labor market status of the widow. These effects are on average long lasting, but are less severe for those widows who were less dependent on the husband's income. I also analyze the cross country differences in the negative effects of widowhood on financial circumstances. This analysis can provide some insights into the efficiency of the various social security systems in preventing widows' poverty. There are cross country differences in these effects, however the variation in the negative effect of widowhood on financial status cannot be explained by the differences in the overall generosity of survivors' pensions. Eligibility rules and differential survivors' pension benefits can help mitigate the adverse effects of widowhood.

The rest of the paper is structured as follows. In section 2 I provide a review of the related literature and discuss my contributions. In section 3 I describe the data, and in section 4 I present the estimation results. I relate the estimation results to the survivors' pension systems of the analyzed countries in section 5. Section 6 concludes.

## 2    Related literature

The death of the spouse is a major life course event with long lasting adverse effects. The effects of widowhood are analyzed by researchers in various disciplines. For example, Umberson et al. (1992) and Bennett et al. (2005) focus on depression related to widowhood, whereas Ferraro et al. (1984) analyze how the death of the spouse influences the health and friendship support of older people. In this paper my focus is on the short run and long run economic consequences of widowhood.

The main contributions of my paper are to provide an international comparison on the financial situation of widows in Europe, and to investigate the influencing role of employment, health, and social security systems on the living conditions of widows. As an additional novelty, I utilize the retrospective nature of the third wave of SHARE, based on which I analyze the dynamics of the adverse effects of widowhood.

The first line of the related literature provides evidence on the relative poverty of widows. My findings on the relative poverty of widows are in line with the facts documented in the related literature. Using the European Community Household Panel data, Ahn (2005) documents that widowers have on average higher income than widows, and the income differences across countries and between genders are larger for those living alone. Due to widowhood the income of women decreases more than of men. According to Ahn, the ratio of household income after and before widowhood ranges between $50 - 90\%$, with substantial variations across the countries in Europe. Using SHARE data, Tinios et al. (2011) provide evidence that widowhood significantly increases the probability of persistent poverty, but they do not investigate how this influencing mechanism works. Thus I extend their analysis by looking at the immediate and also at the indirect effects of widowhood.

The second line of the related literature looks at the factors leading to the poverty of widows. Smith and Zick (1996) analyze the increased mortality risk and worse health status of the surviving spouse. Potential reasons can be the bereavement, stress, and role changes associated with widowhood. Smith and Zick base their empirical analysis on the US based Panel Study of Income Dynamics and death certificate information, and they find an elevated mortality risk among widowers, especially if the death of the spouse was sudden. On the other hand, for widows they do not find a significant increase in mortality, which they explain by the

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lack of need for role changes and by emotional preparedness. In this paper I do not investigate the effect of widowhood on mortality, but present results on its effect on morbidity.

Based on the SHARE data I also provide some evidence on the selection into widowhood. This is important since the poverty of widows might be partly due to non-random selection, and to different economic decisions prior to the death of the husband. These considerations are related to Hurd and Wise (1989), who analyze the circumstances that lead to the disproportionate poverty of widows in the US. They find that one explanatory factor of poverty is the low accumulation of wealth prior to the death of the husband. Hurd and Wise also find that poor widows lose a higher percentage of the household wealth with the death of the husband than those who are better-off, partly because of the absence of life insurance. In a related study, Sevak et al. (2003/2004) claim that the poverty of widows in the US is not only due to the lost income of the husband but also to selection. Based on the Health and Retirement Study, they provide evidence that poor women are more likely to become widow, and a substantial number of widows in poverty were poor also during marriage. They also find positive relationship between poverty and the duration of widowhood, for which based on the SHARE data I find only mixed evidence.

The retrospective SHARELIFE data make it possible to analyze the dynamics of poverty and other adverse effects of widowhood in a cross-country perspective. The related papers in the literature focus either on a single country, or if they compare the dynamic effects of widowhood across countries then the comparison is restricted by the comparability of different data sources (see e.g. Muffels et al. 2000, although their focus is not in particular on the effects of widowhood but more generally on income and poverty dynamics). Smith and Zick (1986) use the Panel Study of Income Dynamics to analyze both the short run and long run effects of widowhood in the US, and Holden et al. (1988) use the Retirement History Study data to analyze the dynamic effects of retirement and widowhood, finding that for widows in the US the high risk of becoming poor is in the first years of widowhood.

In this paper I also analyze to what extent the survivors' pension systems can moderate the adverse effects of widowhood. Survivors' pension benefits are needed to ensure sufficient income for the surviving spouse. However, survivors' pensions can also imply efficiency losses through disincentives to work, and can also lead to unintended redistributions. These issues are discussed in more details by Estelle (2009). My analysis is related to Siegenthaler (1996), who compares five European countries and the US in preventing poverty among widows. Based on this comparison he concludes that those old-age security systems are the most efficient in preventing poverty which provide a minimum income to all. Monticone et al. (2008) give an overview of survivors' pensions in the EU. All countries provide some type of survivors' pension, although the conditions for eligibility are becoming increasingly strict. My analysis on the role of survivors' pensions in mitigating the poverty of widows is also related to Burkhauser et al. (2005). They compare the economic effects of widowhood in Canada, Germany, Great Britain, and the US. Using individual level data from the Cross-National Equivalent File they focus on the size and variation of private and public income sources that can offset the loss of the husband's income. I use country specific indicators of the generosity of the survivors' pensions instead of the individual replacement rates of the pensions, and relate these indicators to the estimated effects of widowhood.

## 3   Descriptive statistics

I use data from SHARE and SHARELIFE. The Survey of Health, Ageing and Retirement in Europe is a multidisciplinary and cross-national panel database. It covers individuals aged 50 and above and their

spouses. The first wave of the SHARE data was collected in 2004-2005, the second wave in 2006-2007. SHARELIFE is the third wave of data collection for SHARE, conducted in 2008-2009. It focuses on the SHARE respondents' life histories.[1]

Based on the second wave of SHARE, 7.3% of men and 25.1% of women in the sample are widowed. Table 1 provides some comparison on the age, economic background, and health status of widows, widowers, and the control group. The control group consists of married individuals, living together with the spouse (analyzing the financial status of single and divorced women is out of the scope of this paper). The binary indicator of financial difficulty is set to one if the household reports to make ends meet with great difficulty or with some difficulty. The consumption, wealth and income indicators are purchasing power parity adjusted, discounted to year 2005, and are divided by the square root of household size. The basic financial variables are measured on the household level, and I use the square root of household size in order to account for the returns to scale within households. In section 4.2 I discuss the robustness of my results with respect to the assumption about household returns to scale. For the sake of simplification, the mean of the five SHARE-imputations is used here. Christelis (2011) provides details on how the missing values of some SHARE variables are imputed. The self-reported health is on the 1-5 scale, with 1 corresponding to excellent, and 5 corresponding to poor health status. The objective health indicators (chronic health conditions, activities of daily living (ADL) difficulties, symptoms) are generated based on the reported health problems of the respondents.[2]

The presented statistics indicate that the widowed are older and in worse health status than those who live with a spouse. The worse health status can be the consequence of higher average age of those who are widowed. There are considerable differences between the two genders in terms of the economic indicators. The gender differences reflect the different position of husbands and wives in the households, husbands being on average less dependent on the wives' income. As for males, the reported (per capita) wealth and income of widowers are smaller than of the control group, but these differences are of moderate magnitude. The subjective indicator of financial difficulties is approximately equal for the two subgroups of males, reporting financial difficulties is slightly less prevalent among the widowers. On the other hand, widowed females report considerably lower income, wealth, and also more severe financial status than those who are married. The difference in consumption expenditures according to marital status is also larger for females than for males. These findings indicate that poverty in widowhood affects the females more than the males in terms of these observed economic indicators. According to the t-test of the equality of means, the subgroup differences are significant at the 1% significance level, with the exception of the reported financial difficulties and wealth indicators for males (the reported p-values refer to two-tailed t-tests, without assuming equal variances across the subgroups).

At the bottom part of Table 1 I report two measures of poverty by marital status and gender. The first

[2] The chronic health conditions include heart attack, high blood pressure, high blood cholesterol, stroke, diabetes, chronic lung disease, asthma, arthritis, osteoporosis, cancer, stomach ulcer, Parkinson disease, cataracts, hip or fremoral fracture.

The ADL difficulties include difficulties with dressing, walking across a room, eating, bathing, getting in or out of bed, and using the toilet.

The health symptoms include pain in a joint, heart trouble, breathlessness, persistent cough, swollen legs, sleeping problems, falling down, fear of falling down, dizziness, stomach problems, and incontinence.

one is a measure of absolute poverty, where I define a respondent to be poor if his or her annual income is below 3,650 Euro (corresponding to a 10 Euro per day poverty line). The second one is a measure of relative poverty, where I categorize a respondent to be poor if his or her annual income is less than 60% of the country specific median income.[3] These indicators also show that widowhood is more likely to imply poverty among women than among men.

| | males | | | females | | |
|---|---|---|---|---|---|---|
| | | | p-value of | | | p-value of the |
| | married | widowed | equality test | married | widowed | equality test |
| age | 65.07 | 75.66 | 0.00 | 61.76 | 74.32 | 0.00 |
| financial difficulty (0-no, 1-yes) | 0.38 | 0.34 | 0.06 | 0.38 | 0.50 | 0.00 |
| net worth (1000 EUR) | 214.66 | 188.82 | 0.09 | 212.92 | 138.75 | 0.01 |
| financial wealth (1000 EUR) | 43.90 | 39.91 | 0.35 | 41.68 | 22.29 | 0.00 |
| income (1000 EUR) | 21.25 | 19.10 | 0.00 | 21.24 | 14.24 | 0.00 |
| monthly expenditures on | | | | | | |
|     food consumption (EUR) | 337.93 | 300.70 | 0.00 | 335.74 | 273.20 | 0.00 |
| self-reported health (from | | | | | | |
|       1-excellent to 5-poor) | 3.02 | 3.38 | 0.00 | 3.05 | 3.47 | 0.00 |
| number of illnesses | 1.28 | 1.72 | 0.00 | 1.30 | 1.99 | 0.00 |
| number of ADL difficulties | 0.17 | 0.42 | 0.00 | 0.16 | 0.53 | 0.00 |
| number of symptoms | 1.24 | 1.80 | 0.00 | 1.58 | 2.37 | 0.00 |
| | | | | | | |
| in absolute poverty (0-no, 1-yes) | 0.045 | 0.038 | 0.32 | 0.047 | 0.077 | 0.00 |
| in relative poverty (0-no, 1-yes) | 0.151 | 0.206 | 0.00 | 0.153 | 0.330 | 0.00 |
| | | | | | | |
| sample size | 11,674 | 926 | | 11,809 | 3,957 | |

Table 1: Descriptive statistics (sample means) based on SHARE wave 2

In Figure 1 I present the ratio of female respondents reporting financial difficulties by marital status and by country. The graph shows that widows are more likely to report financial difficulties than the control group in each country, with the largest difference in Sweden. At the same time, there are large differences across countries in the prevalence of reported difficulties. These differences can be partly due to different financial circumstances, but also due to different reporting behaviors. As the indicator of financial difficulties is based on a subjective measure, this indicator can be strongly influenced by the response patterns of the respondents. Nevertheless, this empirical problem does not invalidate the observed differences between the widows and married female respondents in each of the countries.

The SHARELIFE data also provide information on the financial status, health, and labor force participation of widows. I transform the retrospective SHARELIFE data into a panel structure with observations ranging from 1930 to 2009. I restrict the analysis to those respondents who have married only once (87% of the female SHARELIFE respondents) and who are aged 50 and above in the referred year. Among all these observation points, 4.3% of males and 18.4% of females are widowed. In Table 2 I present some descriptive statistics for those who are widowed or married. These statistics are based on the generated panel dataset, pooling the subsample of individuals aged 50 and above in the referred year. The widowed are older on average by about 10 years. The binary indicator of the start of financial hardship equals one if the respondent reports that there was a distinct period in his or her life of financial hardship, and the starting year of that period equals the referred year. Widowed women are more likely to report the onset of such difficulties than

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[3]The country specific median income measures are generated based on the SHARE data. Due to the age restrictions of the survey the generated poverty lines are necessarily different from the ones based on the median income of the total population.
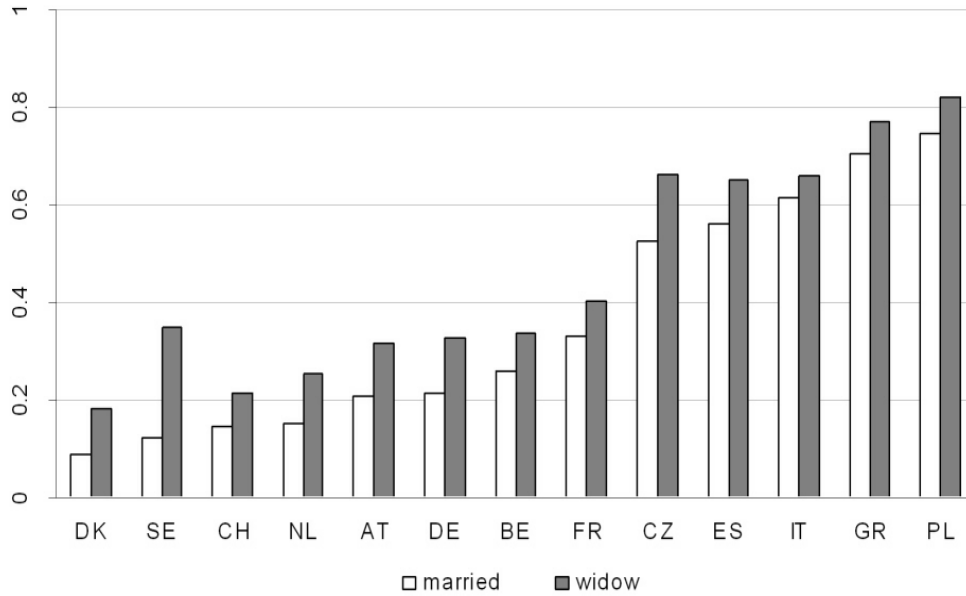
Figure 1: Ratio of female respondents reporting financial difficulties based on SHARE wave 2

those who are married, but similar differences are not observable for men, among whom the widowers are slightly less likely to report the onset of financial hardships. These findings are in line with the statistics related to financial difficulties based on the second wave of SHARE (see Table 1).

The indicator of the start of poor health equals one if the respondent reports a distinct period in his or her life of poor health, and the starting year of that period equals the referred year. The illness indicator equals one if in the given year a period of serious illness started, which lasted for more than a year. These two health indicators show that the widows are on average more likely to experience deteriorating health than the control group. However, based on these statistics it is not possible to disentangle the effect of widowhood on health from the effect of older age. Again, for males these differences are less clear: only the subjective indicator of poor health shows that the widowers experience worse health. The statistics also indicate that the probabilities of leaving a job or retiring in a given year are lower for the widowed respondents. On the one hand, this can be due to the higher motivation of the widowed to stay employed, on the other hand, if the widowed are outside of the labor force already before the death of the spouse that can also contribute to this finding. Similarly to Table 1, I also report the results of the t-tests of the equality of means. These statistics indicate that the statistical significance of the differences by marital status is stronger for females than for males, especially in case of the onset of financial hardship and health problems.

Using generated indicators of ongoing financial hardship, poor health and illness, the conclusions about gender differences and differences along marital status are similar as based on the indicators on the onset of adverse periods. These statistics are also presented in Table 2.

Figure 2 shows the mean of the indicators of the onset of financial hardship, poor health, and leaving job for females by age categories. It can be seen that the start of financial hardship is more prevalent in the younger age categories (age 50-69), especially among widows. Widows are on average more likely to report worsening health status according to the indicator of poor health, irrespective of the age category. As for

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|  | males | | | females | | |
|---|---|---|---|---|---|---|
|  | married | widowed | p-value of equality test | married | widowed | p-value of equality test |
| age | 60.71 | 70.50 | 0.00 | 59.71 | 68.65 | 0.00 |
| start of financial hardship | 0.29% | 0.24% | 0.45 | 0.27% | 0.37% | 0.00 |
| start of poor health | 1.31% | 1.53% | 0.09 | 1.23% | 1.49% | 0.00 |
| start of illness | 0.77% | 0.69% | 0.43 | 0.78% | 0.86% | 0.10 |
| leave job | 4.38% | 2.40% | 0.00 | 2.82% | 1.46% | 0.00 |
| retire | 3.90% | 2.23% | 0.00 | 2.43% | 1.39% | 0.00 |
| ongoing financial hardship | 4.68% | 3.77% | 0.00 | 5.56% | 7.34% | 0.00 |
| ongoing poor health | 12.23% | 15.41% | 0.00 | 12.75% | 17.13% | 0.00 |
| ongoing illness | 8.73% | 9.98% | 0.00 | 8.97% | 11.47% | 0.00 |
| total nr. of observations points in the panel data | 175,740 | 7,922 |  | 184,075 | 41,435 |  |
| nr. of individuals | 9,837 | 739 |  | 11,897 | 2,969 |  |

Table 2: Descriptive statistics based on SHARELIFE life histories from age 50

leaving a job, the only clear difference can be observed in the age group 60-69: those who are widowed are less likely to leave a job in this age category. This difference is due to the lower rate of retiring. When interpreting this difference it is important to keep in mind that this is a flow indicator of exit from the labor force, which provides little information on the differences between the two groups in terms of the actual labor force status.

# 4 Estimated effects of widowhood

## 4.1 Selection into widowhood and receiving survivors' pension benefits

Before investigating the adverse effects of widowhood, I analyze which individual characteristics increase the likelihood of being widowed. This analysis reveals some differences between the widowed and the control group prior to widowhood. I estimate three linear probability models of widowhood. First, using the second wave of SHARE, I regress the binary indicator of widowhood on the age, years of schooling, and country of residence of the female respondents. Next, using the SHARELIFE data, I estimate a pooled OLS and a random effects (RE) model, where the dependent variable equals one if the respondent becomes widowed in the next year. The sample here is restricted to females who are married in the given year. The explanatory variables in this model are again the age, years of schooling, and country of residence. Because of the time-invariant nature of the regressors, fixed effects models cannot be estimated.

The results presented in Table 3 confirm that the probability of widowhood increases with age, which is a natural consequence of the similar age of the spouses. In addition, these results show that those with higher level of education are less likely to become widowed because the spouses die later. The cross-sectional result indicates that one additional year of schooling decreases the likelihood of being widowed by 0.3 percentage points. The panel results show that at ages 50 and above, one additional year of schooling decreases the probability of becoming widowed by $0.05 - 0.07$ percentage points. The small magnitude of the coefficients under the SHARELIFE estimations is due to the different outcome variable: out of the observations of
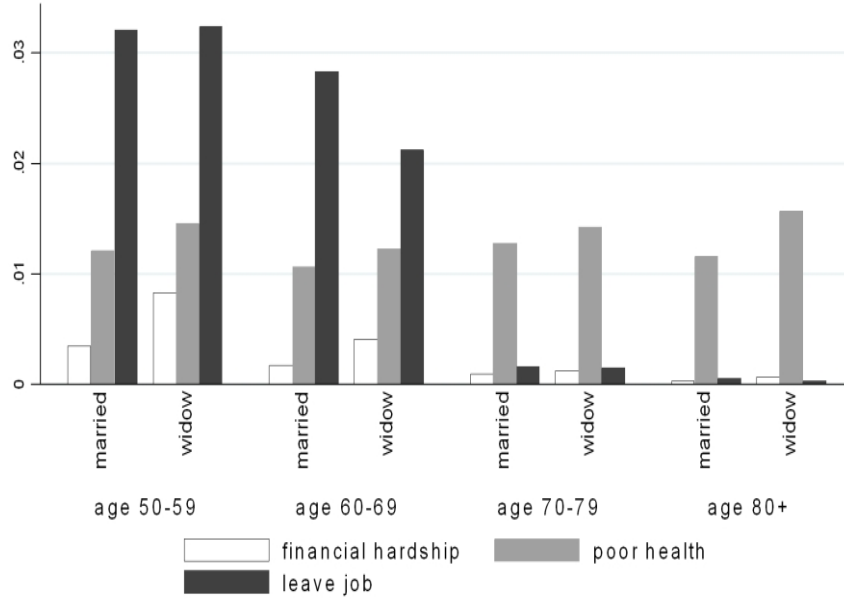
Figure 2: Onset of adverse periods among females by age categories and marital status (SHARELIFE data)

married females, only for around 1.3% is the indicator of becoming widowed equal to one.

The years of schooling are considered to be predetermined in these regression models, since widowhood is typically an old-age phenomenon, whereas education takes place at younger ages. Thus reverse causality is not likely, which would not be true if income or wealth were included as a regressor instead of education. On average, higher education level is associated with better socioeconomic background and with better financial status. As a consequence, those who are widowed are likely to be in worse financial status than the control group even before the widowhood due to the lower education level.

The most likely explanation for the negative effect of schooling on widowhood is based on the analysis of Sevak et al. (2003/2004). They show that the probability of the husband's death at young ages increases if the couple lives in poverty. Thus poorer married women, who are typically less educated are also more likely to become widowed. A second explanatory factor is that the mean age difference between the husband and wife decreases with the education level of the wife. Based on the second wave of SHARE one additional year of schooling is estimated to decrease the age difference by 0.5 year, if age and the country of residence are controlled for. The mean age difference is 2.2 years.

The presented results provide evidence for the selection into widowhood, which can contribute to the association between widowhood and poverty. One could argue that in a similar manner, selection into receiving survivors' benefits could also contribute to this association. Although the aim of various entitlement rules is to ensure that those in need receive survivors' pension benefits, it might still be the case that e.g. the lack of social contributions excludes the poorest widows from the benefits. However, no such evidence can be found based on the second wave of SHARE. Regressing the binary indicator of receiving survivors' pension benefits on age, schooling and country dummies in the subsample of widowed females produces an insignificant and small (−0.003) coefficient of years of schooling. If instead of the years of schooling the binary indicator of having post secondary or tertiary education is used as a regressor then the coefficient of

|  | Widow, SHARE |  | Widow, SHARELIFE | |
|  |  |  | pooled OLS | RE |
| --- | --- | --- | --- | --- |
| age | 0.019*** | age | 0.001*** | 0.002*** |
|  | [66.93] |  | [23.32] | [38.26] |
| schooling | -0.003*** | schooling | -0.00046*** | -0.00066*** |
|  | [3.51] |  | [7.85] | [6.06] |
| constant | -0.875*** | constant | -0.041*** | -0.081*** |
|  | [30.50] |  | [12.77] | [16.98] |
| observation points | 15,489 | observation points | 175,031 | 175,031 |
|  |  | Number of individuals |  | 11,445 |

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Additional controls: country dummies

Table 3: Determinants of widowhood of female respondents

this binary indicator is significantly negative and not negligible ($-0.074$). Thus using schooling as a proxy for the economic status before widowhood indicates that on average there is no regressive selection into receiving survivors' benefits, and there is some evidence for progressive selection. In section 5 I discuss the importance and effects of survivors' pension benefits in more details.

## 4.2    Cross sectional results

In this section I analyze the effects of widowhood on economic status, health and employment, using the second wave of SHARE. This analysis sheds light on the persistent effects of widowhood. I also investigate the cross country differences in these effects.

First, I estimate linear regression models of the logarithm of financial wealth, income, and expenditures on food, and of the binary indicators of financial difficulties and poverty. The definitions of these variables are described in section 3. As the benchmark model I estimate only a single coefficient of widowhood, then I extend the model with interactions with the binary indicators of receiving any survivors' pension benefits (45% of the widows), having received a bequest of 5,000 EUR or more from the deceased husband (7% of the widows), the years spent in widowhood, and the education level and employment status of the widows. These additional regressors shed light on the heterogeneous effects of widowhood. If widowhood had no adverse effects then all the estimated coefficients should be insignificant and close to zero. In each model I also control for age, health status, being employed or self-employed, and I also include binary indicators of post-secondary or tertiary education, having children, and country dummies. If no control variables are included in the regression models then the adverse effects of widowhood are overestimated. This is because without additional controls the widowhood indicator captures the effects of aging and worsening health, among others. The estimated coefficients of the widowhood indicators are reported in Table 4. In Appendix 6 I report all the estimated coefficients of the first set of models.

The estimation results indicate that widowed women have on average significantly lower financial wealth, income and food expenditures per capita, and around 10 percentage points higher probability of having financial difficulties than those who are married, ceteris paribus. They are also around 4 percentage points more likely to live below the absolute poverty line, and 16 percentage points more likely to be in relative poverty. Receiving survivors' pension is estimated to significantly mitigate the adverse effects of widowhood on all of the poverty indicators. Receiving substantial inheritance from the deceased husband also has a positive effect on the widow's economic status. However, this positive effect is insignificant on the subjective

|  | ln(financial wealth) | ln(income) | ln(food) | financial difficulty | absolute poverty | relative poverty |
|---|---|---|---|---|---|---|
| widow | -0.939*** | -0.306*** | -0.192*** | 0.104*** | 0.044*** | 0.160*** |
|  | [13.30] | [12.99] | [13.55] | [10.96] | [8.83] | [17.31] |
| R-squared | 0.36 | 0.18 | 0.15 | 0.25 | 0.08 | 0.07 |
| sample size | 15,688 | 15,688 | 15,688 | 15,327 | 15,688 | 15,688 |
| widow | -1.283*** | -0.496*** | -0.233*** | 0.130*** | 0.076*** | 0.234*** |
|  | [14.70] | [14.01] | [11.44] | [11.35] | [10.81] | [19.83] |
| survivors' pension (yes/no) · widow | 0.739*** | 0.408*** | 0.090*** | -0.056*** | -0.068*** | -0.160*** |
|  | [6.70] | [11.20] | [3.07] | [3.76] | [8.68] | [10.97] |
| widow | -1.029*** | -0.319*** | -0.200*** | 0.107*** | 0.047*** | 0.167*** |
|  | [14.13] | [13.07] | [13.48] | [10.88] | [8.94] | [17.72] |
| bequest (yes/no) · widow | 1.121*** | 0.155** | 0.109** | -0.031 | -0.030** | -0.084*** |
|  | [5.74] | [2.30] | [1.97] | [1.14] | [2.47] | [3.17] |
| widow | -0.768*** | -0.319*** | -0.175*** | 0.096*** | 0.075*** | 0.159*** |
|  | [5.90] | [7.37] | [6.35] | [5.86] | [6.39] | [9.20] |
| years of widowhood | -0.028*** | 0.003 | -0.000 | 0.000 | -0.000 | 0.000 |
|  | [3.75] | [1.30] | [0.14] | [0.03] | [0.04] | [0.00] |
| widow | -1.003*** | -0.293*** | -0.191*** | 0.101*** | 0.046*** | 0.168*** |
|  | [13.29] | [11.83] | [12.53] | [10.02] | [8.56] | [17.08] |
| secondary or higher edu. · widow | 0.568*** | -0.115* | -0.003 | 0.028 | -0.014 | -0.074*** |
|  | [3.52] | [1.79] | [0.06] | [1.12] | [1.26] | [3.38] |
| secondary or higher education | 0.788*** | 0.362*** | 0.177*** | -0.106*** | -0.011*** | -0.096*** |
|  | [12.27] | [15.63] | [14.05] | [11.16] | [2.93] | [13.59] |
| widow | -1.060*** | -0.320*** | -0.201*** | 0.106*** | 0.048*** | 0.169*** |
|  | [14.18] | [12.71] | [13.26] | [10.65] | [8.86] | [17.26] |
| employed · widow | 1.257*** | 0.147** | 0.093** | -0.024 | -0.033** | -0.099*** |
|  | [6.57] | [2.42] | [2.51] | [0.79] | [2.54] | [4.06] |
| employed | 0.472*** | 0.420*** | 0.048*** | -0.104*** | -0.040*** | -0.105*** |
|  | [6.84] | [15.42] | [3.63] | [10.36] | [8.01] | [12.77] |

Robust t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%. Additional controls: age, number of illnesses, ADL difficulties, symptoms, education, employment, children, country dummies

Table 4: Estimated effects of widowhood on financial situation based on SHARE wave 2

measure of financial difficulties. The length of widowhood is estimated to exacerbate the negative effect of widowhood on financial wealth holdings. This is a reasonable finding as the lack of the second income has a cumulative effect over time. The last two specifications reveal that the estimated adverse effect of widowhood on financial wealth holdings is weaker for those who have post secondary or tertiary education (9% of the widows), and who are still working (6% of the widows). These results are reasonable as those with higher education and who are still working might depend less on the husband's income. As for the other dependent variables, the moderating effect of employment on poverty is clearer than that of higher education level.

These estimation results are based on wealth, income and consumption measures divided by the square root of the household size. Assuming less scope for economies of scale in the household leads to smaller estimated effect of widowhood. The reason for this is that under such assumption the needs of the household decrease considerably with the death of the spouse. To show this, I use here two alternative rules following the OECD equivalence scales, but neglecting the differentiation between adults and children. First, I assign a value of 1 to the first household member and 0.7 to each additional member. Next, I apply the same rule, but use 0.5 instead of 0.7. If the weight of 0.7 is used then the coefficients [and t-statistics] of widowhood in the basic wealth, income and consumption regressions become -0.822 [11.78], -0.172 [7.26] and -0.058 [4.03], respectively. These estimates are smaller than the benchmark results as the weight of 0.7 implies

relatively small scope for economies of scale in the household. On the other hand, using the weight of 0.5 the estimated effects become closer to the benchmark estimates: -0.901 [12.83], -0.263 [11.10] and -0.148 [10.40], respectively.

As the second set of cross-sectional estimations, I estimate the effect of widowhood on the number of reported illnesses, and on the probability of being employed. These are non-financial outcomes which can indirectly exacerbate the adverse financial consequences of widowhood. I report these results in Table 5. The results indicate that widows are ceteris paribus in worse health condition. This finding corresponds to the results of Smith and Zick (1996) for the US. Widows are also estimated to be around 5 percentage points more likely to be employed than the control group, which is reasonable as widows are more dependent on their own sources of income.

|  | number of illnesses | employed |
|---|---|---|
| widow | 0.085*** | 0.053*** |
|  | [2.73] | [8.81] |
| R-squared | 0.17 | 0.34 |
| sample size | 15,694 | 15,688 |

Robust t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%
Additional controls in health model: age, education, employment, children, country dummies
Additional controls in employment model: age, number of illnesses, ADL difficulties,
symptoms, education, children, country dummies

Table 5: Estimated effects of widowhood on health and employment based on SHARE wave 2

I also estimate the models of financial outcomes with allowing for country specific effects of widowhood. The coefficients of interest are reported in Table 6. Results on the poverty indicators are not reported here as those indicators are generated using the income measure, thus these estimates lead to similar conclusions as the results on income. The reported estimation results show that widowhood has negative effect on financial wealth holdings in all countries. This negative effect is the strongest in the two post-socialist countries and Greece, whereas the weakest in Switzerland where the estimated effect is close to zero and statistically insignificant. The estimated average effect of widowhood on income is also negative for all countries. The same holds for consumption expenditures, with the exception of Spain. Finally, widowhood is estimated to exacerbate financial difficulties in all of the countries, with the strongest effect in Sweden. The strong effect for Sweden is in line with Figure 1 but cannot be seen based on the short run effects, as discussed in section 4.3.

A strong negative estimated effect of widowhood on financial circumstances indicates that due to the entitlement rules some widows who are in need do not receive survivors' benefits or the general amount of the survivors' benefits is low. In a country where widowhood does not have adverse financial consequences, the estimated coefficients of widowhood should be zero. I return to these results in section 5, where I also discuss the various survivors' pension systems in the analyzed European countries.

## 4.3  SHARELIFE results

Using the retrospective SHARELIFE data, I estimate linear probability fixed effects models on the effects of widowhood. These estimations extend the previously presented results by focusing here on the short run effects. Thus we can learn if the long run effects are due to long lasting widowhood status or the adverse effects appear soon after the husband's death. I analyze five dependent variables: the onset of periods with financial hardship, poor health, serious illness, leaving job and retiring. The definitions of the analyzed

|  | ln(financial wealth) | ln(income) | ln(food) | financial difficulties |
|---|---|---|---|---|
| | | Coefficients of widowhood | | |
| AT | -1.049*** | -0.232*** | -0.162*** | 0.132*** |
| | [4.23] | [4.35] | [2.89] | [3.64] |
| DE | -0.598*** | -0.192*** | -0.221*** | 0.116*** |
| | [2.86] | [3.13] | [3.40] | [3.32] |
| SE | -0.447** | -0.415*** | -0.503*** | 0.217*** |
| | [2.19] | [7.13] | [6.56] | [5.96] |
| NL | -0.502** | -0.149*** | -0.298*** | 0.119*** |
| | [2.56] | [3.18] | [3.77] | [3.60] |
| ES | -0.366 | -0.209* | 0.007 | 0.099*** |
| | [1.37] | [1.90] | [0.20] | [2.84] |
| IT | -1.188*** | -0.076 | -0.027 | 0.058* |
| | [4.51] | [0.91] | [0.95] | [1.90] |
| FR | -0.193 | -0.232*** | -0.158*** | 0.084*** |
| | [1.42] | [4.84] | [3.46] | [2.85] |
| DK | -1.087*** | -0.367*** | -0.342*** | 0.091*** |
| | [5.82] | [10.54] | [5.46] | [3.56] |
| GR | -1.328*** | -0.174** | -0.084*** | 0.079*** |
| | [5.59] | [2.07] | [3.37] | [3.29] |
| CH | -0.056 | -0.174*** | -0.300*** | 0.087** |
| | [0.26] | [2.96] | [3.57] | [2.31] |
| BE | -0.788*** | -0.251*** | -0.251*** | 0.093*** |
| | [5.30] | [4.39] | [4.71] | [3.33] |
| CZ | -2.088*** | -0.268*** | -0.253*** | 0.143*** |
| | [8.99] | [7.78] | [6.41] | [5.12] |
| PL | -1.262*** | -0.422*** | -0.044 | 0.086*** |
| | [5.31] | [7.74] | [1.61] | [3.42] |

Robust t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%
Additional controls: age, number of illnesses, ADL difficulties, symptoms, education,
employment, children, country dummies

Table 6: Country specific estimated effects of widowhood based on SHARE wave 2

variables are provided in section 3. The generated panel data is restricted to data points at age 50 and above. The estimated results are comparable to the average marginal effects based on random effects probit models. I prefer the linear probability fixed effects model in the current application since that allows the indicator of becoming widowed to be correlated with the unobserved individual characteristics, such as unobserved behaviors and living conditions. Apart from the widowhood indicator, I also include the squared age as regressor in the fixed effects models, to capture potentially non-linear age effects.

In Table 7 I report the estimated coefficients of becoming widowed in the given year, and one or two years before. The coefficients of the lagged indicators can reveal if the adverse effect typically begins only one or two years after the husband's death. In the models of leaving job and retiring I also include the indicator of becoming widowed in the next year. The reason for this extension is that if the husband needs personal care near the end of his life then the wife might choose to exit the labor market so as to provide care. The results indicate that if a woman leaves her job due to (or prior to) widowhood then that happens predominantly via retiring.

The models of all five outcome variables indicate that the adverse effects of the husband's death appear already within the same year, and these effects are weaker one or two years after. However, this finding can

be due to measurement error following from the survey method. Since it is a retrospective survey, the widows might recall the negative life experiences as related to the event of the husband's death. For example, if the period of financial hardship started one year after the death of the husband then that might still be reported as starting in the same year. Thus the immediate adverse effects can be overestimated and the lagged (and lead) effects underestimated.[4]

Becoming widowed increases the likelihood of reporting an onset of financial hardship or poor health in the same year by around 3 percentage points, ceteris paribus, and these effects are significant. The likelihood of becoming seriously ill also increases due to widowhood, but this is less prevalent than reporting poor health status. Women are also more likely to retire in the year of the death of the husband. An explanation for this finding can be that after retirement the wives can devote more time to the needs of the husband. This explanation is supported by the positive coefficient of becoming widowed in the next year: the worsening health of the husband might induce the wife to retire. This lead effect of one year is weaker than the effect estimated for the year of the husband's death. At first sight the higher likelihood of retirement due to the husband's death ("flow" SHARELIFE results) and the higher probability of employment status of widows ("stock" SHARE results) seem to contradict each other. However, the early retirement of some widows and the postponed retirement of others are compatible, and can explain both the cross sectional and panel results.

If I interact the indicator of the husband's death in the current year with the age of the widow then these extended estimations indicate that the effect of widowhood on financial hardship and leaving job decreases with age. Thus the immediate detrimental effects on the economic status of the widow are estimated to be more severe if the widow is younger.

Finally, I reestimate the model of the onset of financial hardship with the inclusion of the indicators of the onset of poor health and leaving job as explanatory variables. These estimation results are reported in the last column of Table 7. Under this specification the estimated effect of becoming widowed is close to the results of the first specification, although both poor health and leaving job significantly increase the probability of reporting financial hardship. These results imply that widowhood has a direct effect on the financial circumstances, and the indirect effects through health and changing employment status are relatively minor, although significant.

Simple descriptive (unconditional) analysis of the data also indicates that the adverse effects of widowhood commence already in the year of the husband's death. In Figure 3 I depict the frequency of the onset of financial hardship, poor health, illness, and retirement indicators as a function of years in widowhood. The graph clearly shows an increase in these indicators around the husband's death. The propensity to retire starts to increase already before widowhood. Although these statistics cannot filter out the age effect, there is no clear long run increasing pattern in the indicators of the onset of health problems or financial difficulties. However, these statistics overestimate the immediate adverse effects of widowhood, as compared to the fixed effects results. It is important to keep in mind that the financial and health indicators do not show the current state of the respondent but if a period of adverse circumstances starts in the given year. The graph only indicates that new periods of difficulties are more likely to start at the year of the husband's death, but it might be that the financial hardships remain throughout the entire period of widowhood. Figure 4 provides evidence for this hypothesis. This graph shows the ratio of widowed respondents who experience financial hardship, poor health or serious illness and who are retired in the given year before or after the

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[4]Garrouste and Paccagnella (2011) and Havari and Mazzonna (2011) investigate the accuracy of retrospective assessments in the SHARELIFE data. They analyze the recall bias in childhood health, demographics, employment, and social networks. Their general conclusion is that overall the SHARELIFE data are reliable.

|  | start of financial hardship | start of poor health | start of illness | leave job | retire | start of financial hardship |
|---|---|---|---|---|---|---|
| become widow | 0.032*** | 0.033*** | 0.007*** | 0.015*** | 0.015*** | 0.031*** |
| the current year | [8.46] | [7.53] | [2.84] | [4.01] | [4.09] | [8.35] |
| become widow | 0.002* | 0.005* | 0.000 | 0.000 | -0.001 | 0.002* |
| the previous year | [1.74] | [1.76] | [0.11] | [0.04] | [0.40] | [1.71] |
| become widow | -0.001 | -0.002 | -0.001 | -0.004* | -0.005* | -0.001 |
| 2 years before | [0.69] | [0.46] | [0.54] | [1.73] | [1.97] | [0.63] |
| become widow |  |  |  | 0.006* | 0.007** |  |
| the next year |  |  |  | [1.91] | [2.03] |  |
| start of poor health |  |  |  |  |  | 0.008*** |
|  |  |  |  |  |  | [3.70] |
| leave job |  |  |  |  |  | 0.011*** |
|  |  |  |  |  |  | [6.71] |
| age$^2$/10,000 | -0.005*** | 0.018*** | 0.007*** | -0.105*** | -0.095*** | -0.004*** |
|  | [5.89] | [8.35] | [3.65] | [37.18] | [35.77] | [4.67] |
| constant | 0.004*** | 0.004*** | 0.004*** | 0.067*** | 0.061*** | 0.003*** |
|  | [12.30] | [4.72] | [5.37] | [59.68] | [57.25] | [9.88] |
| observation points | 212,534 | 212,534 | 212,534 | 200,116 | 200,116 | 212,534 |
| individuals | 12,418 | 12,418 | 12,418 | 12,270 | 12,270 | 12,418 |

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Estimated effects of becoming widowed at age 50 or above based on SHARELIFE

husband's death. These "stock" indicators equal one in a given year if the onset of the difficulties occurred in an earlier year and the difficulties are still ongoing in the particular year. As it can be seen, there is an increase in the occurrence of adverse circumstances the year after widowhood, but afterwards the average probabilities of difficulties remain approximately constant. The probability of being retired also increases before and around the death of the husband, but flattens out afterwards.

The SHARELIFE survey asks not only the beginning year of financial hardship, poor health and illness periods, but also the ending year of those. Based on these details the length of the adverse periods can be calculated. If the period of financial hardship or bad health is still ongoing at the time of the interview, I define the ending year as 2009. According to the SHARELIFE statistics, if a period of financial hardship starts at the year of widowhood then that lasts on average for 6.6 years, with a median of 5 years. The length of reported poor health is of similar magnitude, whereas the mean and median length of a serious illness are longer by $1.5 - 2.5$ years. Thus the estimated adverse effects of widowhood are not transient, but typically last for several years. Considering the censoring of these variables at year 2009 the actual length of the adverse circumstances can even be longer. Estimating zero-inflated negative binomial regressions on the pooled SHARELIFE data indicates that the death of the husband increases the expected length of financial hardship, poor health and illness at the average by around 2, 3 and 1 months, respectively. These estimated effects refer to difficulties starting at the year of the husband's death.[5]

I re-estimate the fixed effects models of the onset of financial hardship, poor health, illness, and retirement with allowing the immediate, lagged, and lead effects of widowhood to vary across countries. Since the

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[5] The dependent variable is the length of the analyzed adverse period starting in the given year. Apart from the indicators of the husband's death, I also control for age and age squared in these pooled estimations. In the financial hardship model I also include the binary indicators of poor health and leaving job as control variables. The estimated effects are not conditional on reporting a period of financial hardship, poor health or illness, thus if someone does not report such condition then the dependent variable in these zero-inflated negative binomial regression models is set to zero.
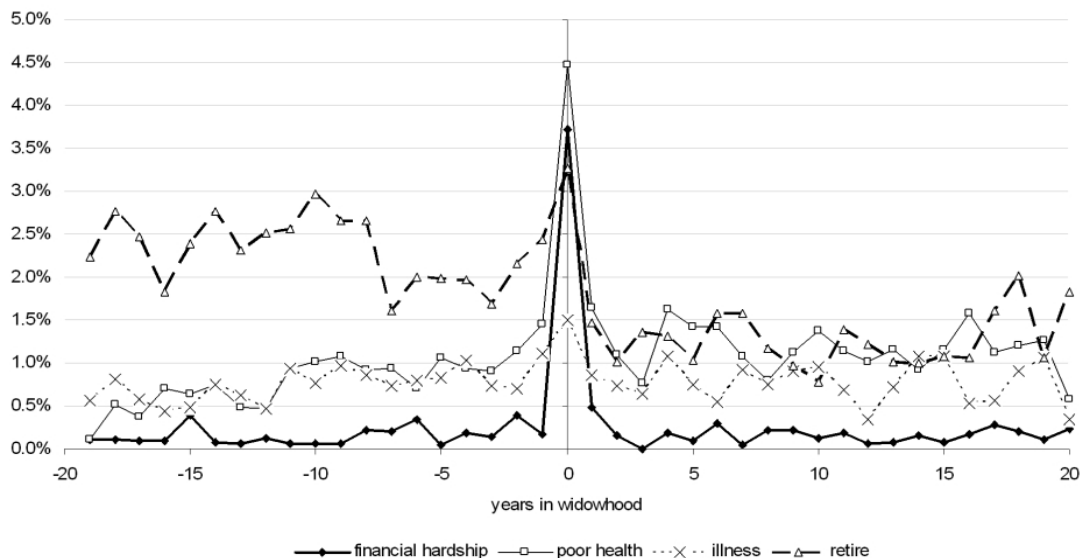
Figure 3: Dynamics of the onset of financial hardship, health problems, and retirement before and after the husband's death, based on SHARELIFE (females becoming widowed at age 50+)

strongest effects are observed in the same year of becoming widowed, I report only these effects in Table 8.

The country specific effects of widowhood on illness and retiring are significant only for few of the countries. The average effect is small on these outcome variables, and due to the smaller country specific sample sizes the standard errors of the country specific coefficients are relatively large. As for the indicators of financial hardship and poor health, the differences in the effect of widowhood across countries are clearer. Sweden, Denmark, and Switzerland are estimated to fare the best in these aspects: financial hardship and poor health status do not become significantly more likely in the year of becoming widowed in these countries. The most severe estimated immediate effects of widowhood are observed in Italy, France, and Poland. In these countries the death of the husband is estimated to immediately increase the probability of reporting financial difficulties and poor health status, these effects are strongly significant, and are around 5 percentage points in magnitude.[6]

The cross-country variations in the short run (Table 8) and long run (Table 6) effects of widowhood show some different patterns. For example, in Italy the immediate strong effect of widowhood on financial hardships seems to subside over the years, according to the cross-sectional results on financial difficulties. In some other countries, like in Germany and Sweden the immediate effects of widowhood on financial problems are insignificant, whereas in the long run these effects become significantly positive. The differences in the adverse effects of widowhood can be partly due to differences in the survivors' pension systems (e.g. in Sweden the survivors' pension is generally paid only for 12 months, which might cause the weak short run but strong long run estimated effects).

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[6]One of the anonymous referees pointed out that age differences between couples can also influence the financial status of the widows. Using the SHARELIFE estimation results and average age differences based on the second wave of SHARE, the estimated immediate effect of widowhood on financial hardship is stronger in countries where the average age differences are higher. However, no clear relations are found between the average age differences and the long run estimated effects of widowhood, as presented in Table 6.
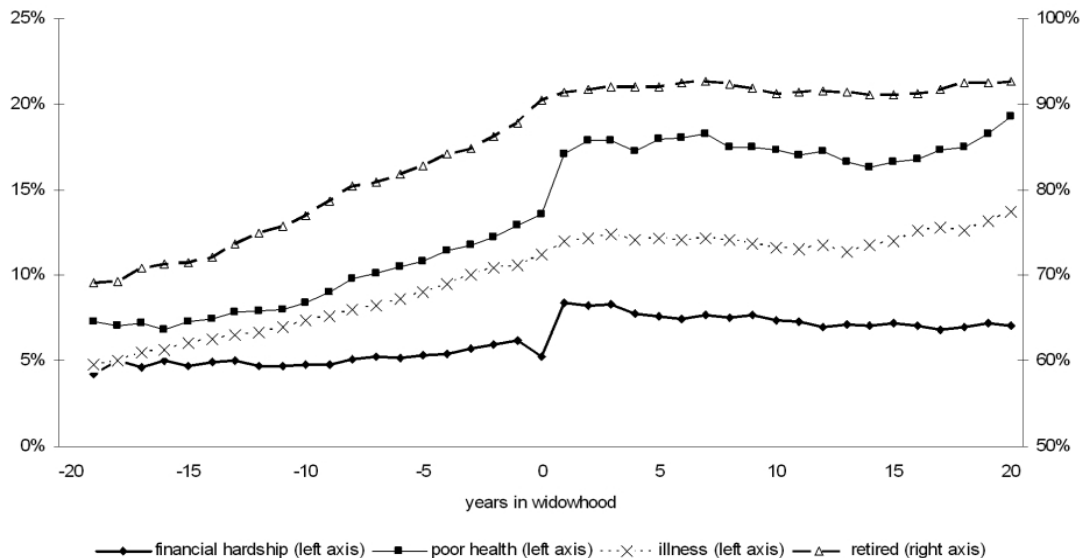
Figure 4: Dynamics of the financial, health and retirement status before and after the husband's death, based on SHARELIFE (females becoming widowed at age 50+)

# 5 Survivors' pensions

## 5.1 Institutions

Survivors' pensions can mitigate the poverty of widows, as these can partly compensate for the loss of the husband's income. By the middle of the 20th century, some type of survivors' pension benefit was provided in all of the analyzed countries.[7] There are differences across the analyzed European countries with respect to the entitlement rules and benefit levels of the survivors' pensions. Details of these country specific characteristics are provided by Monticone et al. (2008) and MISSOC (2010).

In all countries the entitlement to survivors' pension is conditioned. The conditions are often related to the insurance status of the deceased spouse and to the age of the widow. The benefits are typically defined as a percentage of the pension benefits to which the deceased spouse would have been entitled to. The Netherlands is an exception with this respect, where the basic survivors' benefit is a flat-rate amount. The survivors' pension is typically an annuity type benefit, but in the Netherlands and Sweden the widows cannot receive this type of benefit after reaching retirement age, and in Denmark the benefit is a lump sum payment. In the first column of Table 9 I present the basic magnitude of the survivors' pensions. The second column shows the percentage of widowed respondents in the second wave of SHARE who report receiving survivors' pension benefits. The cross country variation in this ratio reflects the different entitlement rules. For example, the low ratio of recipients in the Netherlands and Sweden corresponds to the age restriction of recipients, i.e. the surviving spouse is aged less than 65.

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[7]The International Labour Organization (2012) provides information on the date of the first laws related to survivors' pension.

|  | Coefficients of becoming widowed | | |
|  | start of financial | start of | start of |  |
|  | hardship | poor health | illness | retire |
| AT | 0.041** | 0.033 | -0.006*** | 0.014 |
|  | [1.97] | [1.53] | [3.13] | [0.75] |
| DE | 0.015 | 0.050** | 0.012 | -0.009 |
|  | [1.28] | [2.15] | [0.96] | [0.93] |
| SE | 0.007 | 0.016 | 0.021 | 0.025 |
|  | [0.91] | [1.12] | [1.46] | [1.31] |
| NL | 0.035** | 0.027* | 0.016 | 0.022 |
|  | [2.21] | [1.66] | [1.28] | [1.46] |
| ES | 0.024** | 0.050*** | 0.015 | -0.005** |
|  | [2.14] | [2.75] | [1.34] | [2.55] |
| IT | 0.051*** | 0.043*** | -0.004 | 0.009 |
|  | [3.20] | [2.66] | [0.71] | [0.85] |
| FR | 0.026** | 0.049*** | 0.003 | 0.011 |
|  | [2.30] | [2.99] | [0.42] | [0.93] |
| DK | 0.011 | -0.003 | 0.008 | 0.023 |
|  | [1.29] | [0.59] | [0.88] | [1.31] |
| GR | 0.052*** | 0.017* | -0.003 | 0.035*** |
|  | [4.11] | [1.79] | [0.65] | [3.09] |
| CH | 0.019 | 0.034 | -0.002** | 0.025 |
|  | [1.32] | [1.60] | [2.14] | [1.19] |
| BE | 0.021** | 0.048*** | 0.008 | 0.018* |
|  | [2.44] | [3.46] | [1.11] | [1.83] |
| CZ | 0.048*** | 0.008 | 0.022 | 0.005 |
|  | [3.18] | [0.83] | [1.64] | [0.31] |
| PL | 0.065*** | 0.056*** | 0.01 | 0.012 |
|  | [3.35] | [2.84] | [0.92] | [0.83] |

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Additional controls: age squared, country specific lagged effects
and lead effects (retirement model) of widowhood

Table 8: Country specific estimated immediate effects of becoming widowed at age 50 or above, based on SHARELIFE

## 5.2   Relation to the adverse effects of widowhood

There is no clear relationship between the estimated adverse effects of widowhood on income, wealth and consumption expenditures, and the basic replacement rate of the survivors' pension benefits.

Based on the first part of Table 6, widowhood has the most detrimental effect on the objective indicators of economic status in Denmark, Sweden, the Czech Republic, and Poland. These countries have various policies of survivors' pensions, and in Poland the basic benefits are among the most generous ones. A strong adverse effect of widowhood can indicate strong reliance on the deceased husband's income, low amounts of survivors' pension benefits, and bad targeting of the benefits.

Similar conclusions can be drawn based on the SHARELIFE estimates of Table 8. The death of the husband is the least likely to lead immediately to financial hardships in Denmark, Germany, Sweden, and Switzerland. However, these countries - especially Denmark from 1992 on - are not the ones that provide the most generous survivors' pension benefits according to the basic replacement rates. On the other hand, in the Czech Republic, Greece, Italy, and Poland the death of the husband significantly increases the probability of

| | % deceased spouse's pension and lump sum benefits | % widowed receiving survivors' pension | Survivors' pension/ GDP (%), 2007 | Survivors' pension/old-age pension (%), 2007 |
|---|---|---|---|---|
| AT | 0-60% | 45.57 | 1.95 | 22.02 |
| BE | 80% | 41.91 | 1.84 | 27.37 |
| CZ | 50% + 84 EUR/month | 42.15 | 0.73 | 11.84 |
| DK | 50% of capitalized value + + 6,700 EUR lump sum | 15.49 | 0.00 | 0.00 |
| FR | 54% (60% in the complementary schemes) | 55.24 | 1.78 | 17.04 |
| DE | 25% | 52.88 | 2.03 | 25.63 |
| GR | 50% | 35.07 | 1.96 | 28.84 |
| IT | 60% | 57.94 | 2.43 | 21.62 |
| NL | Basic monthly benefit: 1,100 EUR | 20.96 | 0.25 | 5.68 |
| PL | 85% | 22.49 | 1.73 | 26.99 |
| ES | 52% | 60.40 | 1.90 | 35.64 |
| SE | 55% | 11.66 | 0.51 | 7.92 |
| CH | 80% | 27.50 | 0.97 | 10.54 |
| Source | Monticone et al. (2008) and MISSOC (2010) | SHARE wave 2 | OECD (2012) | OECD (2012) |

Table 9: Indicators of the generosity of survivors' pension systems

financial difficulties by about 5 percentage points, although in these countries the survivors' pension system is relatively generous. These results point out the importance of entitlement rules and deviations from the basic replacement rates in mitigating the adverse financial effects of widowhood.

Apart from the official replacement rates, the aggregate expenditures on survivors' pensions can also capture the generosity of survivors' benefits. Such indicators are reported in the last two columns of Table 9, based on OECD statistics. These statistics refer to public and mandatory private benefits.[8] A potential caveat of the analysis based on these statistics is that the generosity of the survivors' pension systems might change throughout time due to pension reforms. If this is the case then the observed poverty of widows in the SHARE and SHARELIFE data might for example be the consequence of the low level of pension benefits during the earlier years of widowhood. However, the general pattern across the countries is that the relative expenditures on survivors' benefits have decreased or remained stable since 1990.[9] In Germany the relative expenditures changed considerably after the reunification, when the aggregate relative expenditures on survivors' pensions increased. In Greece and Spain the OECD indicators show considerable increase in the relative expenditures in year 2006. For the rest of the countries the country specific characteristics around years 2007-2009 can capture well the generosity of the survivors' pension benefits through the period when the majority of widowhood occurred among the SHARE respondents. Based on the SHARELIFE data, only around 20% of the widows report that the death of the husband happened before 1990.

Figure 5 illustrates how the estimated effects of widowhood (as presented in Table 6, columns 3 and 4) are related to the indicators of the generosity of survivors' pension benefits. In order to simplify the analysis, I focus here only on the effects of widowhood on food consumption expenditures and financial difficulties, as two representative variables for the financial status of widows. The fitted linear regression lines visualize the patterns of the relations.[10] The basic replacement rate of survivors' pensions is only weakly related to

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[8]In these OECD statisitcs the lump sum benefits in the Danish system are not counted as pension benefits.

[9]Although for most of the countries the OECD provides statistics on survivors' pensions expenditures also for years before 1990, due to a break in methodology from 1990 onwards those earlier statistics are not comparable to the later ones.

[10]Austria, the Czech Republic, Denmark, and the Netherlands are excluded from the first panel of Figure 5 since in these countries the basic magnitude of the survivor's pension benefits relative to the deceased spouse's pension cannot be determined.

the estimated adverse effects of widowhood, and these relations are insignificant. Therefore, the estimation results suggest that a higher official replacement rate of survivors' pensions in itself cannot avoid widowhood poverty. However, as expected, the magnitude of aggregate survivors' pension benefits relative to GDP is in a significantly positive relation with the estimated long run effect of widowhood on consumption, and in a significant negative relation with the estimated effect on financial difficulties. These results imply that eligibility rules and conditional deviations from the basic replacement rates can partly achieve that survivors' pension benefits mitigate the adverse effects of widowhood on the economic status. Finally, the adverse effects of widowhood on consumption expenditures and financial difficulties are less severe in countries with higher ratio of survivors' pension relative to old-age pension expenditures. This is an intuitive result - wider coverage and higher amount of survivors' benefits help avoid poverty in widowhood. However, aiming for universal coverage and high survivors' benefits might contradict the efficiency goal of pension systems and take away resources from old-age pension benefits.

As there is no perfect measure for the generosity of survivors' benefits, the presented results should be interpreted carefully. The aggregate statistics on survivors' pension expenditures are subject to measurement difficulties - due to differences in the pension systems it is impossible to make the statistics perfectly comparative across countries, and these simple statistics also cannot capture the complexity of the pension systems. Therefore the results can reveal only some basic patterns of the relation between the economic consequences of widowhood and the coarsely measured generosity of the survivors' pension systems.

## 5.3  Discussion

Is the poverty of widows due to the lack of adequate level of survivors' benefits? Or is it rather due to myopic decisions of couples? If there were perfect insurance markets then individuals could take insurance against the loss of income if outliving their spouses. In addition, privately purchased annuity and life insurance contracts can be preferable as these do not have such distortive implications as mandatory social security systems have. The main arguments for the provision of public survivors' benefits can be based not on efficiency but on equity. It can avoid grievous poverty of widows, but an equitable system should provide only limited benefits to those who are relatively well-off. In this aspect the Dutch system can be a good example since there the payable amount of survivors' benefits is reduced by the income of the surviving spouse.

Joint annuities (survivor annuities) could mitigate the negative financial consequences of widowhood through providing retirement income to the surviving partner. As for the US, Hurd and Wise (1989) point out that the absence of life insurance is an important explanatory factor of the widows' poverty. Yermo (2000) reports that except for the United Kingdom, in the OECD countries the private annuity markets are in an incipient stage. According to Yermo, potential explanatory factors for the underdevelopment of annuity markets are myopic behavior, bequest motives, and the prevalence of defined benefit pension plans. The SHARE data also provide information if the respondents receive income from regular life insurance payments, private annuity or private personal pension payments. Based on the second survey wave, only 3% of the widows report receiving such income, it is the most widespread in Denmark, Sweden and Switzerland. Brown and Poterba (2000) provide some explanation for the limited demand for joint life annuities. They show that the utility gain from annuitization is smaller for couples than for single individuals, partly due to

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Denmark is also excluded in the second and third panel.

The significance levels of the coefficients of the fitted regression lines neglect the two-stage estimation, i.e. that the dependent variables here are estimated coefficients from the regressions on the effects of widowhood.
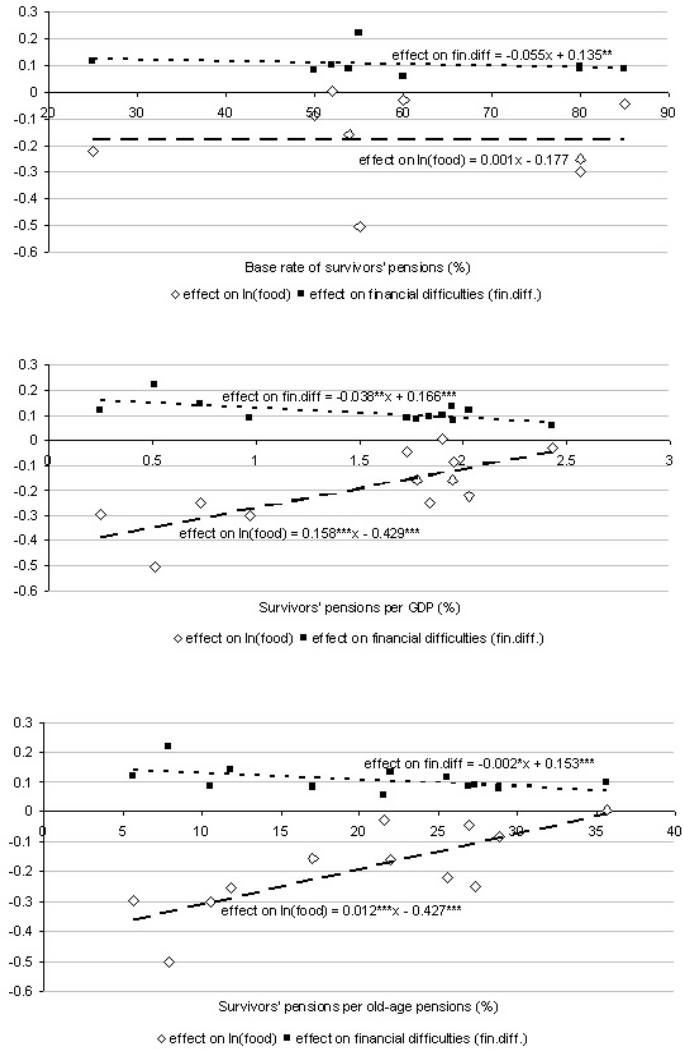
Figure 5: Relation between the estimated effects of widowhood (y-axis) and indicators of the survivors' pension systems (fitted regression coefficients: * significant at 10%, ** at 5%, *** at 1%)

the risk sharing (bequests) between couples. In addition, bequest motives towards the children and medical expenditure uncertainties can further reduce the demand for joint life annuities.

The results presented in section 4.2, Table 4 show that the adverse effects of widowhood on financial circumstances are less severe for working and more educated women. Thus the negative financial consequences of widowhood can be at least partly due to the lack of independence of women in the household. Gender differences in career patterns contribute to the poverty among widows.

A potential pitfall of the empirical analysis of this paper is that bequests from the deceased husband and support received from the children cannot be fully taken into account, thus the adverse effects of widowhood might be overestimated. If the children inherit a substantial part of their father's wealth then even though the wealth of the widow decreases, her actual economic situation should worsen to a less extent due to the likely financial support from the children. The support received from children might increase after the death of the husband even in the absence of bequests - to check this hypotheses we would need sufficiently long panel

observations on widowhood and support. Based on these considerations the negative effect of widowhood on financial status can be overestimated, as the financial wealth, income and consumption variables do not capture the help received from children. However, the estimated effects of widowhood on the indicators of financial difficulties and hardships are not subject to such bias.

Cohabitation (with the children) can mitigate the adverse financial consequences of widowhood. Specification checks indicate that living alone has negative effect on financial status, when measured by consumption expenditures and reported financial difficulties. Based on the SHARE wave 2 data, widows are the least likely to live alone in Italy, Poland and Spain, which can contribute to the relatively mild long run effect of widowhood on consumption expenditures and financial difficulties in these countries (as reported in Table 6).

# 6 Conclusions

In this paper I analyze how and to what extent widowhood contributes to the adverse financial circumstances of women at age 50 and above. I compare these effects across 13 European countries, using SHARE and SHARELIFE data.

The descriptive statistics show that widows have on average lower wealth holdings, income and food expenditures, and worse health status than married women within the same age category. These differences are more robust for women than for men. However, the observed differences can be partly due to the different average age of widows and married women. I also provide evidence that widowhood is not random in the sense that the earlier death of the husband is more likely in households with worse socioeconomic background.

I estimate the effects of widowhood by multiple cross-sectional regressions, and also by fixed effects regressions. The cross-sectional estimations are based on the second wave of SHARE, whereas the panel estimations are based on the third, retrospective wave, the so-called SHARELIFE.

The cross-sectional results indicate that widows are ceteris paribus in worse health condition, and in worse financial status than married women. However, the financial conditions are estimated to be relatively better if the widow receives survivors' pension, or if the deceased husband left bequest on her. The negative effect of widowhood on financial wealth holdings is stronger if the widowhood lasted longer. According to the SHARELIFE estimations, the death of the husband increases the likelihood of reporting financial difficulties and poor health status in the same year by around 3 percentage points. These increasing effects are significant. In addition, women are ceteris paribus 1.5 percentage points more likely to retire in the year of the husbands' death, which can contribute to the negative effect on financial status.

The cross-country differences in the effect of widowhood on financial difficulties cannot be explained by the differences in the generosity of survivors' pensions, but in countries with higher aggregate expenditures on survivors' pension benefits the adverse financial effects of widowhood are less severe. Cross-country differences in the support provided by children can contribute to the varying effect of widowhood.

The results of the paper show that although the death of the husband directly increases the likelihood of poverty, there are also significant albeit relatively small indirect effects through the deteriorated health and earlier retirement of the widows. In this paper I provide some results on the short run dynamics of adverse circumstances after the death of the husband in addition to the long run effects. More detailed analysis of the long run poverty dynamics in widowhood in Europe remains for further research.

# Appendix

## Estimation results: cross-sectional models

| | ln(financial wealth) | ln(income) | ln(food) | financial difficulty | absolute poverty | relative poverty |
|---|---|---|---|---|---|---|
| widow | -0.939*** | -0.306*** | -0.192*** | 0.104*** | 0.044*** | 0.160*** |
| | [13.30] | [12.99] | [13.55] | [10.96] | [8.83] | [17.31] |
| age | -0.008** | 0.007*** | -0.008*** | -0.006*** | -0.002*** | -0.001*** |
| | [2.37] | [5.28] | [9.76] | [13.14] | [8.84] | [2.86] |
| nr. of illnesses | -0.035 | 0.005 | 0.005 | 0.013*** | -0.003 | -0.001 |
| | [1.53] | [0.54] | [0.93] | [4.23] | [1.60] | [0.48] |
| nr. of ADL difficulties | -0.195*** | -0.025** | -0.064*** | 0.017*** | 0.006** | 0.006 |
| | [5.46] | [1.97] | [5.14] | [3.85] | [2.31] | [1.40] |
| nr. of symptoms | -0.087*** | -0.020*** | -0.009** | 0.026*** | 0.002* | 0.006*** |
| | [4.77] | [3.01] | [2.07] | [10.22] | [1.72] | [2.67] |
| post secondary or | 0.875*** | 0.344*** | 0.176*** | -0.100*** | -0.014*** | -0.107*** |
| tertiary edu. | [14.61] | [15.78] | [12.74] | [11.21] | [3.66] | [15.52] |
| employed | 0.562*** | 0.431*** | 0.055*** | -0.102*** | -0.042*** | -0.112*** |
| | [8.24] | [16.06] | [4.20] | [10.32] | [8.53] | [13.61] |
| has child | -0.078 | -0.068* | -0.027 | 0.020 | 0.001 | 0.046*** |
| | [0.77] | [1.77] | [1.09] | [1.36] | [0.16] | [3.70] |
| DE | 0.681*** | -0.015 | -0.116*** | 0.022 | 0.020*** | 0.049** |
| | [5.14] | [0.36] | [3.32] | [1.06] | [2.61] | [2.57] |
| SE | 1.351*** | -0.026 | -0.375*** | -0.025 | 0.006 | 0.051*** |
| | [10.38] | [0.68] | [10.10] | [1.20] | [0.92] | [2.69] |
| NL | 0.983*** | 0.220*** | -0.182*** | -0.040* | 0.002 | 0.036* |
| | [7.62] | [5.75] | [5.20] | [1.96] | [0.32] | [1.92] |
| ES | -1.068*** | -0.731*** | 0.112*** | 0.325*** | 0.076*** | 0.054*** |
| | [6.85] | [12.58] | [3.50] | [14.32] | [7.38] | [2.72] |
| IT | -1.335*** | -0.500*** | -0.006 | 0.364*** | 0.051*** | 0.051*** |
| | [9.07] | [9.50] | [0.20] | [17.22] | [5.92] | [2.73] |
| FR | 0.667*** | 0.079** | 0.052 | 0.116*** | 0.011 | 0.072*** |
| | [5.19] | [1.98] | [1.51] | [5.41] | [1.51] | [3.80] |
| DK | 1.261*** | -0.056 | -0.477*** | -0.084*** | 0.007 | 0.125*** |
| | [9.46] | [1.55] | [12.90] | [4.27] | [1.06] | [6.39] |
| GR | -3.919*** | -0.740*** | -0.008 | 0.468*** | 0.073*** | 0.055*** |
| | [24.87] | [13.56] | [0.26] | [22.98] | [8.07] | [2.96] |
| CH | 1.813*** | 0.199*** | -0.015 | -0.034 | 0.009 | 0.077*** |
| | [12.61] | [4.49] | [0.39] | [1.49] | [1.14] | [3.49] |
| BE | 1.326*** | -0.075* | 0.060* | 0.046** | 0.015** | 0.008 |
| | [10.44] | [1.82] | [1.76] | [2.22] | [2.04] | [0.43] |
| CZ | -2.170*** | -0.585*** | -0.192*** | 0.312*** | 0.009 | -0.078*** |
| | [14.01] | [16.08] | [5.77] | [14.46] | [1.24] | [4.41] |
| PL | -4.366*** | -1.092*** | -0.421*** | 0.473*** | 0.210*** | 0.035* |
| | [27.39] | [25.42] | [12.82] | [22.60] | [15.99] | [1.79] |
| constant | 9.252*** | 9.344*** | 6.270*** | 0.553*** | 0.160*** | 0.195*** |
| | [34.65] | [91.11] | [100.37] | [14.89] | [8.15] | [5.66] |
| sample size | 15,688 | 15,688 | 15,688 | 15,327 | 15,688 | 15,688 |
| R-squared | 0.36 | 0.18 | 0.15 | 0.25 | 0.08 | 0.07 |

Robust t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%

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