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Economic consequences of widowhood:

Evidence from a survivor's benefits
reform in the Netherlands

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Summary

Economic consequences of widowhood: Evidence from a survivor's benefits reform in the Netherlands

This paper studies the impact of widowhood on the income position of surviving spouses, before and after the normal retirement age using rich administrative data covering almost three decades. Moreover, it considers the importance of public survivor benefits and other forms of income to alleviate the financial consequences of widowhood, such as private survivor pensions, labor earnings, or social security income. To understand the degree of income protection provided by public survivor benefits before the normal retirement age, we further analyze the impact of a substantial reform of the survivors' benefits scheme in 1996 that imposed stricter eligibility criteria and reduced the benefit level for cohorts born after 1949.

Our results are as follows: widowhood has the largest financial impact on women of working age: three years after widowhood, they experience an about twenty percent reduction in equivalized disposable household income. Working-age women with and without dependent children experience a similar fall in income. However, women with children substantially reduce their labor supply. Survivor benefits and pensions fully replaced their loss of earnings. In contrast, retired widows maintain their previous standard of living because of social security and pension benefits of about seventy percent of pre-widowhood income. Men experience an increase in their standard of living of eight percent, both before and after retirement.

The survivor's benefit reform resulted in a further reduction in the standard of living of working-age widows, particularly for women with a high pre-widowhood household income, who experienced a further fall in income of more than ten percentage points, adding up to almost forty percent. The fall in income seems mainly the result of a reduction in labor supply, possibly as a response to the introduction of means-testing and their ability to adjust income given their financial situation. It is to a large extent, but not fully, replaced by non-means-tested private survivor pensions. Low-income households experience a nine percentage point further decline in income, totaling almost fifteen percent. For them, survivor pensions also became more important, but to a lesser extent. For men of working age, the reform led to an even larger reduction in the standard of living after widowhood. While they experienced a thirty percent increase in equivalized income before the reform, their standard of living remains fairly constant after the reform. Their reduction in the standard of living is the result a decline in survivor benefits that is not substituted

by other sources of income. Also, their labor supply has not significantly increased, indicating over-compensation for men in the period before the reform.

Overall, our results show that means-tested survivor benefits reduce, but do not eliminate, the financial risk of widowhood for low-income working-age women, but discourage labor supply for women with a high pre-widowhood income. Our results contribute to the public discussion on how to simplify and standardize public and private survivor benefits.

Samenvatting

Financiële gevolgen van verweduwing: Evidentie van een versobering van de publieke nabestaandenuitkering in Nederland

In het kort:

- Het overlijden van de partner zorgt bij vrouwen jonger dan de AOW-leeftijd voor een sterke daling van het huishoudensinkomen. De verandering in inkomen is vergelijkbaar voor nabestaanden met en zonder minderjarige kinderen. Nabestaanden met kinderen gaan minder werken.
- Deze inkomensterugval is sterk toegenomen door de versobering van de publieke nabestaandenuitkering in 1996.
- Vrouwen met een hoog inkomen maken relatief vaker gebruik van nabestaandenpensioenregelingen en andere uitkeringen, en lijken minder te zijn gaan werken, mogelijk doordat de uitkering inkomensafhankelijk is geworden en zij de financiële mogelijkheid hebben om minder te gaan werken.
- Vrouwen met een laag inkomen maken weliswaar meer gebruik van nabestaandenpensioenregelingen, maar dit is onvoldoende om de versobering van de uitkering op te vangen.

Sinds 1996 is de publieke nabestaandenuitkering (Anw) bij verweduwing voor de AOW-leeftijd sterk versoberd. Deze regeling was minder nodig door de toegenomen arbeidsdeelname van vrouwen en de mogelijkheid om te verzekeren tegen inkomensverlies, bijvoorbeeld via een nabestaandenpensioenregeling of levensverzekering. Inmiddels staat de noodzaak van de publieke regeling verder ter discussie.

Deze studie onderzoekt het effect van het overlijden van de partner op de inkomenspositie van nabestaanden, voor-en-ná de AOW-leeftijd. Hierbij wordt gebruik gemaakt van unieke registerdata over een periode van bijna drie decennia. Daarnaast wordt het belang onderzocht van een nabestaandenuitkering door de overheid, dan wel de mogelijkheid van mensen om zelf de inkomensterugval op te vangen, bijvoorbeeld via arbeidsparticipatie of nabestaandepensioenregelingen, zoals een Anw-hiaat verzekering en levensverzekering. Tevens analyseren wij de inkomens- en gedragseffecten van een versobering van nabestaandenuitkeringen als gevolg van de invoering van de Algemene Nabestaandenwet in 1996.

De belangrijkste resultaten zijn als volgt: het overlijden van de partner zorgt voor de grootste daling in het inkomen voor vrouwen voor het bereiken van de AOW-leeftijd: drie jaar na het overlijden van de partner is het besteedbaar

gestandaardiseerd huishoudensinkomen met bijna twintig procent afgenomen. De inkomensterugval is vergelijkbaar voor vrouwen met en zonder minderjarige kinderen. Vrouwen met kinderen gaan echter minder werken. De extra inkomensterugval wordt beperkt door een hogere nabestaandenuitkering of pensioen. Na het bereiken van de AOW-leeftijd behouden vrouwen grotendeels hun levenstandaard doordat AOW en nabestaandenpensioen overeenkomt met ongeveer zeventig procent van het huishoudensinkomen voor verweduwing. Mannen ondervinden een toename in de levenstandaard met ongeveer acht procent, zowel voor-en-ná de AOW-leeftijd.

De versoering van nabestaandenuitkeringen zorgt voor een verdere daling in de levensstandaard na verweduwing. Dit geldt in het bijzonder voor vrouwen met een relatief hoog huishoudensinkomen voor verweduwing. Voor deze groep daalt het besteedbaar gestandaardiseerd huishoudensinkomen met bijna veertig procent. Voor lagere inkomens daalt het met ongeveer vijftien procent. Door de hervorming gaan hogere inkomens substantieel minder werken, mogelijk om aanspraak te maken op een nabestaandenuitkering die nu inkomensafhankelijk is en omdat zij de financiële mogelijkheid hebben om minder te gaan werken. Daarnaast maken zij relatief meer gebruik van nabestaandenpensioenregelingen wat de terugval in inkomen gedeeltelijk opvangt. Voor lagere inkomens neemt het belang van nabestaandenpensioenregelingen minder toe. Voor mannen zorgt de hervorming voor de grootste daling van het inkomen. Voor de hervorming nam hun levenstandaard met ongeveer dertig procent toe, terwijl de levenstandaard ongeveer gelijk blijft na de hervorming. Daarnaast zijn zij niet significant meer gaan werken wat aangeeft dat zij in het verleden werden overgecompenseerd.

Beleidsrelevantie

De versoering van de nabestaandenvoorziening vanuit de overheid (Anw) sinds 1996 heeft met name grote financiële gevolgen voor vrouwen met een laag huishoudensinkomen voor verweduwing. Voor deze groep is het nabestaandenpensioen immers vaak onvoldoende om de levensstandaard te behouden, onder meer omdat het enkel een dekking betreft voor inkomen van de overleden partner dat boven de AOW-franchise ligt van 12 tot 15 duizend euro. Bovendien loopt de dekking vaak niet door bij werkloosheid, arbeidsongeschiktheid, of de overgang naar zelfstandig ondernemerschap. In dit paper zijn de gemiddelde inkomenseffecten van de versoering van de publieke nabestaandenuitkering sinds 1996 weergegeven voor groepen deelnemers, inclusief en exclusief effecten van aanpassing van het aantal gewerkte uren. Uiteraard kunnen in individuele gevallen de effecten groter zijn en de risico's

van inadequate dekking van nabestaandenuitkering kunnen daardoor aanzienlijk zijn (Starink & Visser, 2017).

Een oplossingsrichting voor inadequate dekking van kortleven risico zou kunnen zijn om de nabestaandenuitkering te integreren met nabestaandenpensioenregelingen. Daarnaast is het belangrijk om de dekking door te laten lopen in het geval van een uitkering of bij overstap naar zelfstandig ondernemerschap. Door de uitkering te baseren op het inkomen voor overlijden wordt arbeidsparticipatie bevorderd ten opzichte van de huidige regeling. Een tijdelijke uitkering van bijvoorbeeld drie tot vijf jaar, in plaats van een levenslange uitkering, zorgt eveneens voor meer prikkels voor nabestaanden om meer te gaan werken, in het bijzonder voor nabestaanden met een lager inkomen of kinderen. In deze periode behouden nabestaanden de levensstandaard voor verweduwing en kunnen zij zich aanpassen aan de nieuwe situatie, waaronder het eventueel zorgen voor een eigen inkomen. Er kan daarnaast voor worden gekozen om nabestaanden de keuze te geven de uitkering uit te ruilen tegen een hoger ouderdomspensioen.

In het recente rapport van de Stichting van de Arbeid (2020) is er voor gekozen om het nabestaandenpensioen weliswaar levenslang te laten blijven maar te baseren op het hele salaris en niet alleen op de pensioengrondslag om rekening te houden met de franchise. Het voorstel is daarbij wel om het mogelijk te maken de levenslange uitkering al binnen enkele jaren geheel op te nemen. Het kabinet heeft inmiddels aangegeven de voorstellen over te nemen maar niet bereid te zijn de dekking van de ANW uit te breiden juist omdat dat strijdig zou zijn met de activeringsdoelstelling (Ministerie van Sociale Zaken en Werkgelegenheid, 2020). De numerieke resultaten in dit paper kunnen worden gebruikt om zicht te krijgen op de inkomensconsequenties van de actuele beleidsopties.

1. Introduction

Losing a spouse could have large financial consequences due to the loss of income and economies of scale in consumption (see Stroebe, Schut, and Stroebe 2007 for a review of the health and emotional consequences). There are several insurance mechanisms through which the financial loss could be alleviated and a reduction in the standard of living prevented. For survivors over the normal retirement age, survivor benefits are particularly important; they often take the form of flat-rate old-age pensions in combination with survivor pensions that together equal about 70 percent of pre-widowhood income. As a result, retired widows can usually maintain their previous standard of living (James, 2009; OECD, 2018). For survivors under the retirement age, survivor benefits are usually less generous and only available for those with dependent children or disabilities. Moreover, in many countries, its generosity has gradually declined over the last decades as a policy response to increasing female labor force participation and the wider availability of (supplementary) insurance, often offered by pension funds. Self-insurance through labor supply or supplementary insurance has, therefore, become more relevant.

In this paper, we study the role of public survivor benefits and other forms of income as insurance mechanisms against the loss of income following widowhood. This paper has four main features. First, to understand the degree of income protection provided by public survivor benefits and its crowding-out effect on self-insurance, we analyze the impact of a substantial reform of the survivors' benefits scheme in the Netherlands: the replacement of the *General Widows' and Orphans' Benefits Law* (AWW – Algemene Weduwen- en Wezenwet) by the *General Survivors' Benefits Law* (ANW – Algemene Nabestaandenwet) on July 1st, 1996. This reform imposed stricter eligibility criteria for survivor benefits and reduced its benefit level for cohorts born after 1949. It also introduced means-testing. Second, we use administrative tax data on disposable income from the Dutch income panel study (IPO) that covers almost three decades from 1989 to 2014 and allows us to distinguish between specific groups (gender, age, income, having dependent children). Third, the detailed breakdown of disposable income allows us to examine the importance of different insurance mechanisms against the financial risks of widowhood, including government insurance via survivor benefits and self-insurance via labor supply or private pension benefits or life insurance. Fourth, the longitudinal structure of the data allows us to examine behavior several years after widowhood but also in anticipation of widowhood.

This paper has three main results: first, we compare the financial situation of retired widow(er)s before and after retirement. Widowhood has the largest financial impact on women of working age. Three years after the death of their spouse, equivalized household disposable income is reduced by 19 percent. Transfers from survivor benefits and pensions to a large extent replace the loss of earnings: without these transfers, equivalized household income would have fallen by about 90 percent. In contrast, retired women experience only a 2 percent drop in equivalized household income, implying that transfers from social security and pensions minimize the financial consequences of widowhood after retirement. For men, equivalized household income increases with 8 percent, both before and after retirement. Widow(er)s with and without dependent children experience a similar fall in income. However, those with children substantially reduce their labor supply, which is compensated by both public survivor benefits and private survivor pensions.

Second, we investigate the income effect and behavioral responses to the 1996-reform that reduced the generosity of public survivors' benefits, including labor supply responses, and increased coverage or uptake of private survivor pensions or life insurance. For women of working age, the decrease in the generosity of public survivor benefits resulted in a 10 percentage point further reduction in their standard of living. As a result, equivalized household income falls by 25 percent after the reform. The additional fall in income seems mainly caused by a reduction in earnings to become eligible for public survivor benefits that became means-tested. Non-means-tested private survivor pensions became twice as important in relative terms and partly reduced the fall in income. For men of working age, the reform led to an even more substantial reduction in the standard of living after widowhood. While they experienced a 30 percent increase in equivalized income before the reform, their standard of living remains fairly constant after the reform. The reduction in the standard of living is caused by a decline in survivor benefits that is not substituted by other sources of income. Also they did not significantly increase their labor supply, indicating over-compensation for men in the period before the reform.

Third, we analyze the impact of the reform for different pre-widowhood household income groups. The reform has the largest impact on the financial situation of high-income working-age widows. They experience a further decline in income of 11 percentage points, adding up to almost 40 percent. Low-income households experience a 9 percentage point further decline in income, totaling 16 percent, diverging the impact of widowhood between high- and low-income women. For high-income women, while imprecisely estimated, the results suggest that they substantially reduce labor supply to become eligible for means-tested public survivor benefits.

Also, after the reform, in relative terms, they rely twice as much on private survivor pensions that are non-means-tested. Low-income groups became also more reliant on survivor pensions, but to a lesser extent, and did not significantly reduce labor supply to remain eligible for means-tested public survivor benefits.

The remainder of the paper proceeds as follows. Section 2 describes the relation to the literature. Section 3 describes the institutional context. Section 4 presents the data and our empirical approach. Section 5 presents the results, after which section 6 concludes and describes policy implications.

2. Related literature

This paper contributes to a recent literature that examines behavioral responses to survivor benefits. Fadlon, Ramnath, and Tong (2019) examine the financial impact of widowhood for women aged 58–61 using US administrative tax records. They find that women of the eligible ages 60–61 for survivor benefits experience a decline of 2 percentage points in equivalized household income upon widowhood, while those of the ineligible ages 58–59 experience a decline of 10 percentage points. Moreover, in contrast to ineligible widows, eligible widows do not increase labor supply, suggesting that survivor benefits provide close-to-full compensation of income loss.¹ However, the lower labor supply effects at age 60–61 might be confounded by the possibility of applying for early retirement around that age. Instead, our paper relies on variation in the generosity of public survivor benefits by exploiting a policy reform across the entire age distribution.

Our approach is similar to Giupponi (2019), who uses Italian administrative data to examine the effects of a 1995-reform of the public survivor benefit scheme. The reform imposes an about 20 percentage points reduction in benefits for newly widowed persons with no dependent children and an accumulated pension income of the deceased person that exceeds three times the annual minimum pension (20.000 euros in 2019 prices). She finds that labor earnings almost fully replace the reduction in survivor benefits. Labor force participation increases with 4.5 percentage points for men and 10 percentage points for women. She furthermore shows that a reduction in the generosity of survivor benefits increase the take-up of family leave and unemployment insurance benefits. In contrast, our paper finds that the reduction in the generosity of public survivor benefits in the Netherlands, has led to a lower labor force participation rate of women with a high household income prior to widowhood. The different response can be explained by the introduction of means-testing based on the survivors income (instead of the income of the deceased partner) in combination with a high reliance on private survivor pensions after the reform in the Netherlands. In other words, self-insurance via private survivor pensions mitigates the need for self-insurance via labor supply in the Netherlands.

The different behavioral responses to survivor benefits in the three countries (US, Italy, and the Netherlands) are in line with the conclusions of Burkhauser et al.

1 The sharp labor supply response to survivor benefits and pensions in the United States is also found in several recent studies that examine responses over the full life-cycle (Borella et al., 2019; Groneck & Wallenius, 2020; Kaygusuz, 2015; Knapp, 2013; Nishiyama, 2019; Sánchez-Marcos & Bethencourt, 2018).

(2005). They provide a cross-country comparison of government programs to prevent an income fall after widowhood, and find important differences across countries in the degree to which government programs replace lost earnings following a husband's death. Irrespectively of the degree of income replacement provided by the government, the country pattern of total income replacement rates were remarkably similar across age and husbands income prior to death. These results thus suggest a substantial crowding-out effect of public insurance on self-insurance. In this context, the survivor's benefit reform in the Netherlands provides an ideal setting for studying the economic consequences of widowhood, especially because of the introduction of means-testing and increased availability of private survivor pensions that make people less reliant on public survivor benefits alone. Consequently, our estimates provide insight into the insurance value of survivor benefits and the crowding-out effect on self-insurance that are key for the design of survivor's benefits schemes.

For the Netherlands, Kalmijn and Alessie (2008) used the same administrative sample (IPO) to study the financial impact of widowhood on the income position of working-age and retired widows over the period 1989–2004. They find limited effects on disposable income. Their estimates are, however, averaged over two periods of generous and non-generous survivor benefits as well as over low- and high-income groups. Our study documents substantial heterogeneity by age, income, and gender, and also documents important behavioral effects imposed by the reduction in public survivor benefits after 1996. We also extend the sample period up to 2014. Goudswaard and Caminada (2003) also use IPO to explore the financial implications of the reform by comparing widow(er)s in the two years surrounding the reform. Their computations are mainly based on persons who became widowed before the implementation of the law, who were still covered by the new, but less generous, system of survivor benefits. Cherchye, De Rock, and Vermeulen (2012) use the Dutch Consumption Expenditure Survey between 1978–2004 to study the economic consequences of widowhood accounting for economies in scale and a sharing rule. They also find that the drop in economic well-being is rather substantial for women, while the pattern is reversed for men.

Our study contributes to recent policy discussions about first and second pillar survivor programs in the Netherlands. Previous policy reports by Netspar expressed concerns about the adequacy of second pillar survivor pensions for persons who become widowed before the normal retirement age but are not eligible for public survivor benefits (Starink & Visser, 2017; van Everdingen et al., 2017). Also, few people seem aware of offered alternatives by pension funds to supplement survivor pensions; see e.g. De Grip, Fouarge, and Montizaan (2019) for people's interest in supplementing

their survivor pension. As a result, on request of the government, the Labour Foundation wrote a report on how to simplify and standardize public and private survivor benefits (Stichting van de Arbeid, 2020). To date, there is, however, no evidence about the financial risk of widowhood and people's reliance on public survivor benefits or private survivor pensions. Our results can be used to provide insights in income effects of proposed policy options.

3. Survivor benefits in the Netherlands

The initial survivors' benefits scheme for widows and orphans (Aww) was introduced in 1959 to prevent widows from financial distress and poverty (Pennings, 2002). Survivors qualify for benefits if at least aged 40 and married, or if they fit one of the criteria: (i) have an unmarried child, (ii) being more than 45% incapacitated to work, (iii) or pregnant when becoming widowed. Those who not qualify can obtain temporary benefits with a maximum duration of nineteen months. Benefits are non-means-tested, are equal to 70% of the minimum wage (100% when having children under 18), and end upon age 65 or remarriage. The Aww-scheme thus had rather generous coverage and eligibility requirements.

As its name suggests, the Aww-scheme initially only covered women. When Aww-benefits were established, the workforce was traditionally occupied by men who were assumed to be able to manage the financial consequences of widowhood. As a result, benefits were relatively generous and non-means-tested. From 1988 onwards, men also became eligible to comply with anti-discrimination legislation, putting a large fiscal burden on the Aww-scheme. At that moment, the Aww-scheme was already outdated because of large societal changes, such as a rise in female labor force participation and unmarried couples. As a result, women were less dependent on survivor benefits, while unmarried survivors were left uninsured. For these reasons, the government drastically reformed the Aww-scheme and replaced it by the National Survivor Benefits Act (Anw) on July 1st, 1996.

The Anw-scheme has more stringent eligibility criteria. While married individuals aged 40 and older were always eligible under the old-scheme, survivors now only qualify if they fit one of the following criteria: (i) having an unmarried child under 18, (ii) being more than 45% incapacitated to work, (iii) or pregnant when becoming widowed. Under the new scheme, the registered partner or cohabitant is also eligible. Also, survivor benefits became means-tested: income from work (incl. early retirement income) is partly deducted, social insurance benefits are fully deducted. Only private survivor pensions/life insurance are not deducted. Individuals born before 1950 (above age 45) were exempted, as well as those born between 1950 and 1956 who became widowed in the period July 1996-1999, or thereafter if they were unable to take out private insurance, for example, because of medical underwriting.

4. Methods

Data

We use administrative tax records on income from the Dutch Income Panel Study (IPO) for the period 1990–2014 provided by Statistics Netherlands. The IPO data set is a one percent random sample of the Dutch population that is followed over time. The IPO data is sampled at the individual level. The sampled key-person is followed over the whole life course. Emigration or death are the only sources of attrition. New panel members consisting of newborns and immigrants (who enter the Dutch population in the given year) are added every year to keep the sample representative. In addition to the key-person, all other household members are observed including the spouse and cohabiting children.

For all household members, the IPO data contains detailed information on income as well as on gender, year of birth, marital status, and labor market status, amongst others. The income and demographic variables are measured at the end of the calendar year. The IPO data set contains income components both measured at the individual level and household level. Deceased individuals are included in the data set until the year of death. Since income is a flow variable, household income may still include income from the deceased household member in that year. For this reason, we exclude the year of widowhood from the analysis.

Dependent variable. Our variable of interest is disposable household income (in 2015 prices) excluding the incomes of cohabiting children. To understand the extent to which widow(er)s can cover the loss of household income, we examine the change in gross personal income and its breakdown into distinct measures of income. Personal gross income consists of the following components: earnings (from labor income and self-employment), social insurance benefits (e.g. unemployment, disability, welfare), pension benefits (incl. private survivor pensions/life insurance), public survivor benefits, and social security benefits. Labor force participation is defined as receiving income from labor.

Equivalence scales. When we compare households over time that differ in size due to widowhood, we have to account for forgone economies of scale. Widowed single-person households generally need more than half as much disposable income as married two-person households because many consumption goods are, to some extent, shared within the household, so-called economies of scale (Chiappori, 2016).

To convert household income into individual standardized income, we equivalized disposable household income.

Different types of equivalence scales have been proposed in the literature. We use equivalence scales determined by Statistics Netherlands using a large budget survey. Their scales imply that a single-person household requires 31% less household income to have the same standard of living as an otherwise comparable couple without children, and 22% less when having one child (Siermann, 2004). These traditional equivalence scales are very similar to the modified OECD scales and assume that resources are equally shared within the household. The literature demonstrates that there might be inequality in the share of resources consumed by each member of the couple. For example, Cherchye, De Rock & Vermeulen (2012) show for elderly couples in the Netherlands (using the same budget data as Statistics Netherlands used to compute equivalence scales) that women in lower-income households consume a smaller share of total household expenditures compared to those in higher-income households. These results imply that women in high pre-widowhood income households need somewhat more income to maintain their standard of living compared to traditional equivalence scales, and vice versa. Given the fact that the scales of Cherchye et al. (2012) are not informative for younger households, we have decided not to use them in our analysis (see also Kalmijn and Alessie (2008) for an in-depth discussion).

Subgroups. In the analysis, we distinguish between different subgroups. Low/high pre-widowhood households refer to widow(er)s with the 50 percent lowest and 50 percent highest disposable household incomes three years before widowhood. The threshold for the income groups depends on gender, age, marital status, and year of widowhood. Average disposable household income for each income group is provided in Table 1. Men/women below and above age 65 refers to widow(er)s who are below/above age 65 three years before widowhood. We stop following people below 65 from the moment they turn 65 years and are entitled to social security benefits. Children/no children refer to households with cohabiting children below age 18 three years before widowhood. Similarly, we stop following these individuals from the moment all cohabiting children below age 18 have left the household.

Sample selection. Our sample includes individuals (key-persons) aged 25 and older that are married or were married in the period of observation. Married individuals also include cohabitants (non-married couples). We exclude married individuals once they divorce and exclude widowed individuals once they remarry. Our sample

includes approximately 41,000 observations in each wave. In total, we observe 5,488 individuals who become widowed in our sample period and stay in the sample for at least three years after widowhood, and 625,616 individuals who remain married over the same period.

Descriptive statistics. Table 1 documents differences in the composition of the widowed sample and the married sample three years before widowhood. Panel A shows that women are about three times more likely to become widowed compared to men, both before and after the normal retirement age. For our sample, about 0.6 percent of women become widowed before age 65 and 9 percent after age 65, indicating that widowhood is a relatively small risk factor for women of working age. Pre-widowhood disposable household income (non-equivalized) does not significantly differ between men and women who become widowed, both below and above age 65. In contrast, household income is much lower in the widowed sample compared to the married sample, particularly in case of widowhood before age 65. Similarly, Panel B shows that low-income households are much more likely to become widowed compared to high-income households. See also Figure 1 for the risk of widowhood for different age and income groups after the normal retirement age (based on Van der Vaart et al., 2020). In the empirical analysis, we will address the systematic differences in the age, gender, and income composition between both samples.

Table 2 shows the (unconditional) level of personal income three years before widowhood for different subgroups. Personal income of women who become widowed is significantly lower compared to men who are usually the primary earner. Before age 65, women have 10,300 euros in personal income compared to 45,500 euros for men. The differences are smaller after age 65 when receiving social security and pension benefits. The same pattern is visible across household income groups, with low-income women below the age of 65 having 4,900 euro in personal gross income compared to 18,700 euro for high-income women. This difference in personal income is reflected by the low labor force participation rate (LFPR) of women in low-income households. In sum, women below age 65 in low-income households are most vulnerable in case of widowhood.

Empirical model

To analyze the financial consequences of widowhood, we would ideally like to compare the financial situation of a widowed individual and its counterfactual situation where the individual would remain married. Since the counterfactual situation cannot be observed, we will compare the financial situation of an individual

Table 1: Average disposable household income three years before widowhood by subgroups

	Become widowed (N=5488)		Remain married (N=625616)	
	Fraction (%)	Income (,000s)	Fraction (%)	Income (,000s)
Panel A. Gender and age groups				
Aged 65-				
Women	0.6	34.9	99.4	45.5
Men	0.2	36.5	99.8	45.7
Aged 65+				
Women	9.0	25.0	91.0	29.9
Men	1.9	26.1	98.1	29.2
Panel B. Gender, age and income groups				
Aged 65-				
Women				
Low-income	0.7	24.5	99.3	30.3
High-income	0.4	51.7	99.6	59.9
Men				
Low-income	0.3	26.0	99.7	30.5
High-income	0.2	53.4	99.8	60.2
Aged 65+				
Women				
Low-income	11.2	17.9	88.8	18.7
High-income	7.1	34.4	92.9	38.8
Men				
Low-income	2.2	18.7	97.8	18.8
High-income	1.6	35.2	98.4	38.2

Figure 1. Risk of widowhood for different age and income groups

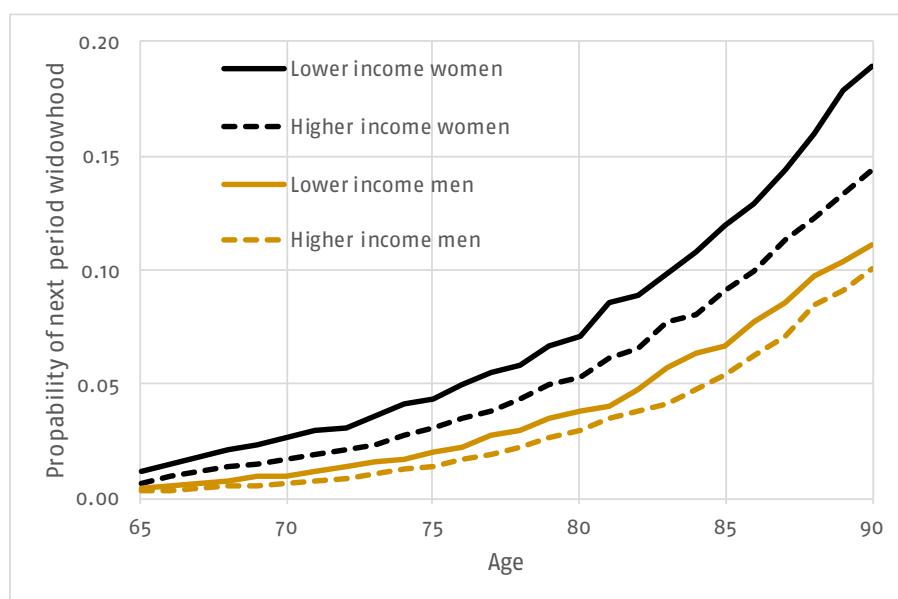


Table 2: Average personal income three years before widowhood by subgroups (N=5488)

	Personal income (,000s)	Earnings (,000s)	Social insurance benefits (,000s)	Pension benefits (,000s)	Social security benefits (,000s)	LFPR
Panel A. Gender and age groups						
Aged 65-						
Women	10.3	7.4	1.9	1.0	-	31.2
Men	45.5	34.2	5.8	5.5	-	59.7
Aged 65+						
Women	10.0	0.2	0.1	0.8	8.9	4.4
Men	23.0	1.3	0.2	11.7	9.8	10.5
Panel B. Gender, age and income groups						
Aged 65-						
Women						
Low-income	4.9	2.8	1.6	0.5	-	22.3
High-income	18.7	14.8	2.2	1.7	-	45.7
Men						
Low-income	31.7	18.7	7.7	5.3	-	48.9
High-income	67.7	59.2	2.7	5.8	-	77.1
Aged 65+						
Women						
Low-income	9.3	0.0	0.1	0.3	8.9	2.3
High-income	10.8	0.4	0.1	1.5	8.8	7.0
Men						
Low-income	14.0	0.1	0.1	4.1	9.7	6.7
High-income	33.8	2.8	0.3	20.9	9.8	15.1

Notes: Column 1 reports personal gross income three years before widowhood. Personal gross income consists of the following components: earnings from labor income and self-employment, social insurance benefits (unemployment, disability, and welfare), pension benefits (incl. private survivor pensions/life insurance), and social security benefits (AOW). Column 2–6 decompose personal income in different income sources. Column 7 reports the labor force participation rate (LFPR).

that becomes widowed and a similar individual that does not become widowed. There are, however, several empirical challenges when using this approach. First, individuals that become widowed could systematically differ from those who remain married. Household socioeconomic position may, for instance, influence the risk of widowhood but also the labor market prospects of the surviving spouse resulting in biased estimates. Indeed, Bound et al. (1991) and Sevak, Weir and Willis (2003) show that individuals with low socioeconomic status are more likely to become widowed. Second, household labor supply and earnings may already reduce in the period before

widowhood for several reasons, such as sickness, caring for the partner, stress or depression, or spending more time together when it becomes known that one spouse is nearing the end of life (Siflinger, 2016; van den Berg et al., 2011).

We address potential confounding by time constant unobservable variables such as a household's socioeconomic position by estimating a fixed-effects model. We further account for observable characteristics by using nearest neighbor matching that links a treated household with the closest possible untreated household three years before widowhood. By matching individuals well in advance of widowhood, we deal with anticipation effects. Furthermore, in the analysis, we can test whether household income starts to decline before widowhood. We follow people for three years after widowhood to examine both the immediate effects as well as the long-run effects, allowing us to see whether people adapt and adjust to their new situation. By comparing the effects of widowhood of the treatment group and control group that does not become widowed, we also account for age and year effects in income that would otherwise be attributed to widowhood. Similar procedures have been applied by French et al. (2006) and van den Berg, Lundborg, and Vikström (2017).

Our estimation proceeds in two steps: first, to make both groups comparable, we match individuals in the 'widowed group' (i.e. treated group) to a similar individual in the 'married group' (i.e. control group). We use nearest neighbor matching based on observed characteristics three years before widowhood, using the following characteristics: gender, age, income, retirement status, having children, and the sample year. The matched individual in the 'married group' is used as a comparison group as its income is not affected by widowhood. Second, we pool the 'widowed group' and 'married group' together and estimate a fixed-effects model to explore the economic effects of widowhood. We computed bootstrapped standard errors using 500 replications.

We estimate the following fixed-effects model for individual i in control- or treatment-group $d = 0, 1$ who becomes widowed in year $t = T$:

$$y_{idt} = \gamma_t + \sum_{s=-2}^3 \beta_s \text{widow}_{id(T+s)} + c_{id} + u_{idt},$$

where y_{idt} is the dependent variable. Our main dependent variable is disposable income (both the level and logarithm). The indicator variable '*widow*' equals one if an individual is observed in year $T + s$ and experienced widowhood and zero otherwise, with s is between -2 and 3 . Its associated vector of β -parameters measures the financial impact of widowhood between two years before and three years after widowhood. The 'married group' and 'widowed group' are affected by common time effects γ_t , because income definitions may slightly vary over the years due to reforms of the tax and benefit system. The common time effects furthermore mitigate potential bias in the estimated widowhood effects because of age effects in the analysis. The estimated time trend can resolve part of this bias. The parameter c_{id} is an individual specific time-invariant effect to address confounding. Finally, u_{idt} is an error term that is assumed to be uncorrelated with the regressors across all periods (i.e., strict exogeneity assumption).

While the assumption of strict exogeneity rules out the presence of anticipation effects, in the analysis, we can formally test for its existence. Identifying the presence of anticipation effects is also relevant by itself as a drop in income preceding widowhood has important policy implications, particularly if this drop in income is persistent in the period after widowhood. As a complementary approach, which we leave for future work, we can compare survivors whose spouse had an anticipated death to those whose spouse had a sudden death or only a short sickbed. This approach is used by Suari-Andreu et al. (2019) to study wealth deaccumulation at the end of life.

We use the same specification to measure the relative contribution of income sources in explaining personal income changes in the periods before and after widowhood. The income sources that we consider are earnings (i), social insurance benefits (ii), private survivor pension benefits/life insurance (iii), public survivor benefits (iv), and social security benefits (v).

We first estimate the model separately for all of the income sources in levels. For every period s surrounding widowhood we have an estimate on the level change for any income source: $\beta_{s,inc}$. These level changes at any period s add up to the total personal income change in period s . Subsequently dividing the level change of the income source at period s with the personal income change in that period leaves us with the relative contribution of the specific income source at time s (measured in percentages):

$$\pi_{s,inc} = \beta_{s,inc} / \sum_{inc=i}^v \beta_{s,inc} * 100\%.$$

5. Results

Financial consequences of widowhood 1989–2014

We first document the impact of widowhood for survivors before and after the age of 65, when they start receiving social security income. Figure 2 provides a visual representation of the evolution of equivalized and non-equivalized household income starting three years before the onset of widowhood. The change in income is normalized to the period three years before widowhood.

Widowhood has the largest financial impact on women of working age: three years after the death of their spouse, household disposable income falls by 50 percent. Assuming that household expenditures needed to maintain the previous standard of living fall only by 31 percent (when using traditional equivalence scales computed by Statistics Netherlands), they experience a 19 percent reduction in equivalized disposable household income. After the statutory retirement age, equivalized income remains fairly constant, implying that transfers from social security and pensions minimize the financial consequences of widowhood. In contrast, men experience an 8 percent increase in equivalized income after widowhood, both before and after retirement (the exact numbers are provided in Table 3). There is limited evidence of anticipation effects: for those before the age of 65, we notice a slight decline in income before widowhood: this might be due to reduced labor supply due to sickness

Figure 2: Change in disposable household income upon widowhood

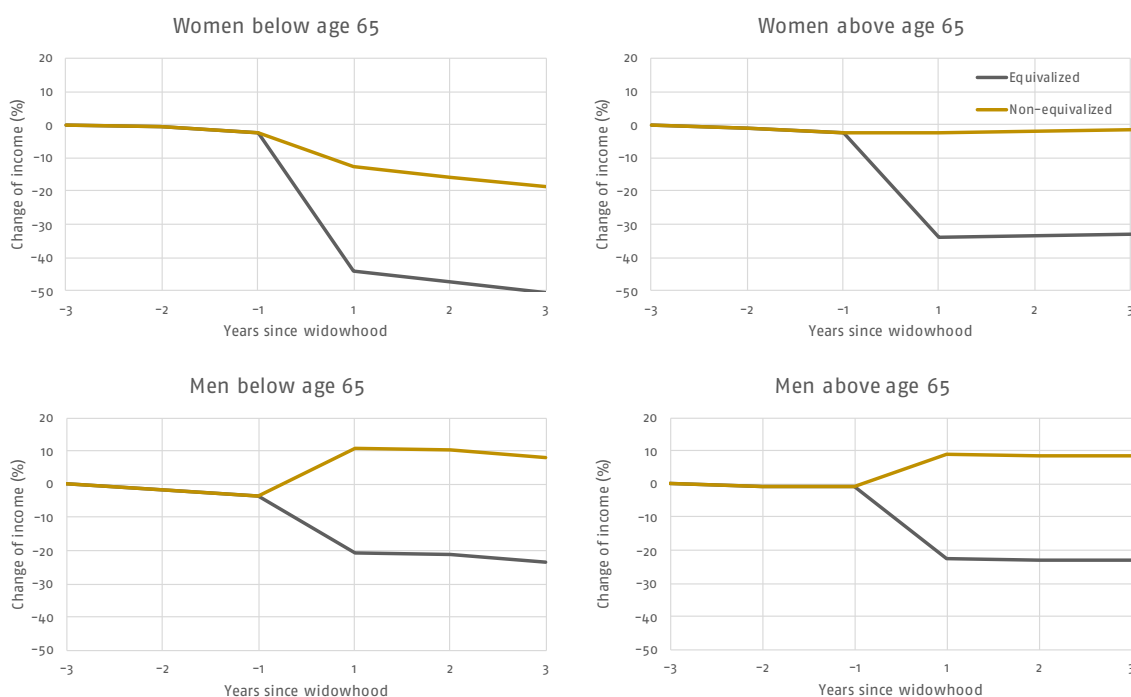


Table 3: Response in disposable household income three years after widowhood by subgroups

	Non-equivalized (,000s)	Non-equivalized (%)	Equivalized (%)	Observations
Panel A. Gender and age groups				
Aged 65-				
Women	-15.2*** (0.8)	-50.3*** (2.0)	-18.8*** (2.0)	1565
Men	-7.9*** (1.3)	-23.6*** (3.0)	7.9*** (3.0)	568
Aged 65+				
Women	-7.1*** (0.3)	-33.0*** (0.9)	-1.5* (0.9)	2504
Men	-4.7*** (0.4)	-23.1*** (1.2)	8.4*** (1.2)	851
Panel B. Gender, age, and income groups				
Aged 65-				
Women				
Low-Income	-9.4*** (0.6)	-41.1*** (2.5)	-9.6*** (2.5)	967
High-Income	-23.4*** (1.6)	-63.3*** (2.9)	-31.8*** (2.9)	598
Men				
Low-Income	-5.4*** (1.5)	-21.5*** (3.6)	9.9*** (3.6)	350
High-Income	-11.6*** (2.3)	-27.0*** (4.6)	4.4 (4.6)	218
Aged 65+				
Women				
Low-income	-5.0*** (0.3)	-30.2*** (1.0)	1.3 (1.0)	1425
High-income	-9.9*** (0.4)	-36.5*** (1.2)	-5.0*** (1.2)	1079
Men				
Low-income	-4.4*** (0.3)	-27.4*** (1.7)	4.1*** (1.7)	466
High-income	-5.0*** (0.6)	-17.8*** (1.7)	13.6*** (1.7)	385
Panel C. Cohabiting children below age 18				
Women aged 65-				
No children	-13.8*** (1.0)	-49.8*** (2.2)	-18.3*** (2.2)	1309
Children	-19.9*** (1.5)	-53.1*** (4.4)	-21.6*** (4.4)	256
Men aged 65-				
No children	-8.1*** (1.5)	-25.2*** (3.8)	6.3* (3.8)	436
Children	-8.5*** (2.7)	-22.1*** (4.1)	9.4** (4.1)	132

Notes: Standard errors in parentheses. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.

Table 4: Response in personal income and its breakdown three years after widowhood by subgroups

	Personal income (,000s)	Earnings (%)	Social insurance benefits (%)	Pension benefits (%)	Survivor benefits (%)	Social security benefits (%)	LFPR
Panel A. Gender and age groups							
Aged 65- Women	19.9*** (0.9)	-11.2** (5.1)	1.2 (1.1)	59.9*** (3.1)	50.2*** (2.6)	-	-0.6 (1.9)
Men	0.9 (2.3)	-	-	-	-	-	-5.1 (3.3)
Aged 65+ Women	12.0*** (0.2)	2.1*** (0.8)	0.6*** (0.3)	60.5*** (0.9)	-	36.7*** (0.8)	-
Men	5.5*** (0.4)	-5.5 (6.2)	1.4 (1.4)	23.2*** (4.4)	-	80.9*** (5.1)	-
Panel B. Gender, age, and income groups							
Aged 65- Women							
Low-income	18.8*** (0.6)	0.1 (2.6)	0.1 (1.2)	40.5*** (2.0)	59.4*** (2.4)	-	0.7 (2.3)
High-income	21.4*** (2.1)	-25.0* (12.8)	2.4 (1.9)	83.6*** (8.8)	39.0*** (4.4)	-	-2.1 (3.3)
Men							
Low-income	-0.7 (1.9)	-	-	-	-	-	-14.5*** (4.1)
High-income	2.9 (4.9)	-	-	-	-	-	7.5 (5.1)
Aged 65+ Women							
Low-income	7.5*** (0.1)	2.1*** (0.8)	0.6* (0.3)	36.2*** (1.1)	-	61.2*** (1.1)	-
High-income	17.7*** (0.4)	2.2** (1.0)	0.7* (0.4)	72.6*** (1.1)	-	24.5*** (0.7)	-
Men							
Low-income	5.1*** (0.3)	5.5 (4.6)	3.6** (1.8)	3.8 (3.4)	-	87.1*** (4.6)	-
High-income	6.0*** (0.7)	-17.2 (13.4)	-1.0 (2.4)	43.8*** (8.9)	-	74.4*** (9.4)	-
Panel C. Cohabiting children below age 18[#]							
Women aged 65- No children	20.0*** (1.1)	-6.4 (6.0)	0.3 (1.1)	58.4*** (3.8)	47.8*** (3.1)	-	1.3 (2.1)
Children	19.0*** (1.4)	-30.3*** (9.7)	4.4 (2.8)	66.6*** (5.1)	59.3*** (5.6)	-	-8.0* (4.4)

Notes: Standard errors in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Column 1 reports the change in personal income upon widowhood in ,000 euro. Column 2–6 decompose the change in personal income in percentage points that add up to 100 percent (c.f. the definition of Tt,inc). Column 7 reports the change in the labor force participation rate (LFPR). Pension benefits include private survivor benefits/life insurance. For working age men, the drop in personal income is too small to derive consistent estimates of its breakdown.

[#] Results for men are not reported but available upon request.

or caregiving. Also, for women below the age of 65, we notice that income slightly declines in the years immediately after widowhood, while for the other groups, the income effect is fairly constant.

Next, we consider the importance of public survivor benefits and other forms of income to alleviate the financial consequences of widowhood, such as private survivor pensions or life insurance, and labor earnings. Table 4 shows the change in personal income three years after widowhood and its breakdown. The breakdown in separate income sources adds up to 100 percent. Women of working age experience an increase of 20 thousand euro in personal income. Without the increase in personal income due to transfers, equalized household income would have fallen by 91 percent instead of 19 percent. The increase is mainly due to public survivor benefits and private survivor pensions/life insurance. On the other hand, there is a slight decrease in earnings of about 2,200 euros (-11.2 percent of the change in personal income). Public survivor benefits account for 50.2 percent of the change in personal income (about 10 thousand euro), private survivor pensions for 59.9 percent (about 12 thousand euro), and social insurance only for 1.2 percent. While earnings slightly reduce upon widowhood, there is no significant change in the labor force participation rate, indicating that some women reduce their number of hours worked. For men of working age, there is no significant change in personal income three years after widowhood; the estimates of its breakdown are, therefore, rather imprecise. For retired women, personal income increases with about 12 thousand euros, mainly due to private survivor pensions (60.5 percent) and also due to higher social security benefits (36.7 percent). In contrast, for males, most of the increase in personal income of 5.5 thousand euros is due to higher social security income (80.9%), while private survivor pensions are of minor importance.

Zooming in on different subgroups (Table 3, Panel B), we find that women with a high pre-widowhood household income experienced a relatively large drop in their standard of living of 32 percent, compared to those with a low income who experienced a 10 percent drop. Low-income women rely more on public survivor benefits, and less on private survivor pensions/life insurance compared to high-income women. Contrary to low-income women, high-income women seem to reduce their labor supply (hours worked), possibly to become eligible for public survivor benefits that became means tested after the 1996-reform (Table 4, Panel B). For surviving males, the differences between income groups are much smaller, given that they are often the prime earner. Interestingly, low-income males significantly reduce their labor supply three years after widowhood, which we do not observe for women. The discrepancy may be explained by the fact that men are often the prime earner in the

household. Even though they belong to a low-income household, the level of their personal income, which matters for eligibility for survivor benefits, is higher than that of high-income women.

When comparing widow(er)s with or without dependent children, both groups experience a similar fall in equivalized household income (Table 3, Panel C). However, widow(er)s with children substantially reduce their labor supply. The loss of earnings is fully replaced by both public survivor benefits and private survivor pensions/life insurance (Table 4, Panel C).

Financial consequences of the survivor benefits reform

To understand the degree of income protection provided by public survivor benefits, we next analyze the impact of a policy reform in the Netherlands: the replacement of the Aww (National Widows' and Orphans' Pensions Act) by the Anw (National Survivor Benefits Act) on July 1st, 1996. This reform imposed stricter eligibility criteria for survivor benefits, reduced its benefit level, and introduced means-testing.

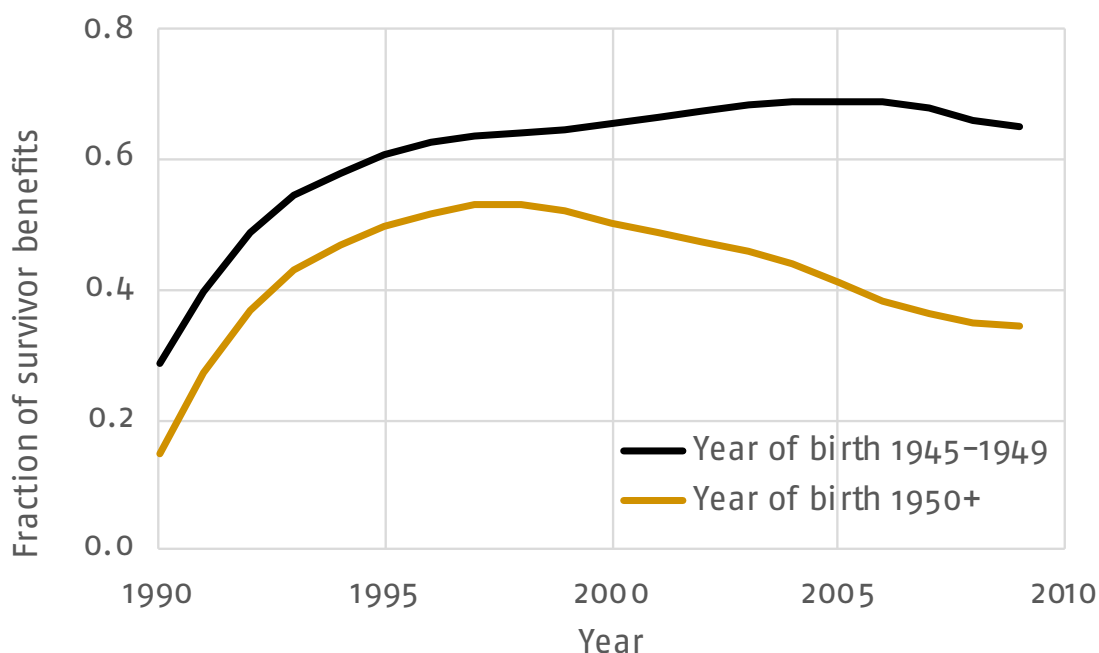
As explained in the section about survivor benefits in the Netherlands, the impact of the policy reform differs between year-of-birth cohorts and the year of widowhood. We can distinguish between three groups:

- Pre-reform group (widowed before July 1st, 1996): entitled to generous Aww-benefits as long as they do not remarry;
- Post-reform group born before 1950 (widowed after July 1st, 1996): always entitled to less generous Anw-benefits;
- Post-reform group born after 1949 (widowed after July 1st, 1996): only entitled to less generous Anw-benefits when meeting stringent eligibility criteria.

Figure 3 shows the fraction of survivors that are eligible for survivor benefits in the year after the death of their spouse for the different groups. We excluded survivors born before 1945 because they turned 65 in or before 2009 and became entitled to social security. In the pre-reform period (before 1996) for both cohorts, an increase in eligibility rate is noticeable, reflecting the increasing burden on the old Aww-system over time. Both cohorts show parallel trends. The small difference in the eligibility rate between both groups reflects age differences as the Aww-scheme pays out when being at least 40 years old. After 1996, the eligibility benefit rate remains rather stable for the 'before 1950 group' but declines for the 'after 1949 group' because of stricter eligibility criteria.

In our difference-in-difference analysis, we combine both cohorts (before 1950 and after 1949) in the period before the reform (before 1996) to increase the precision

Figure 3: Fraction of survivor benefits for those born after 1944 one year after widowhood



of our estimates. We refer to this group as the 'pre-reform' group. Before the reform, the same survivor benefit policy applies to all individuals in both cohorts. Differences in the pre-reform period between both cohorts are due to age/year of birth differences that we have accounted for in our fixed effects regressions. After having controlled for these observable differences in age and year of birth, it seems justified that we combine both pre-reform groups. So, to explore the impact of the policy reform, our estimate of interest is the difference in widowhood effects between the 'pre-reform' and the 'post-reform after 1949' group, which we labeled as 'Pre-post 1950+ differences' in Tables 5 and 6. The estimate reflects a total effect of the reform, thus both the effects of stricter eligibility criteria, reduced benefit level, and introduction of means-testing.

Table 5 reports the response in disposable household income three years after widowhood for the three different groups. For women of working age, the decrease in the generosity of public survivor benefits resulted in a 9.7 percentage point further reduction in their standard of living. As a result, after the reform, equalized household income falls by 25 percent compared to 15.3 percent before the reform. The additional fall in income seems mainly caused by a reduction in earnings to become eligible for public survivor benefits that became means-tested (Table 6). Similarly, the increase in social insurance benefits might reflect increased incentives to apply for disability benefits to meet the eligibility criteria. In relative terms, non-means-tested

Table 5: Response in disposable household income three years after widowhood: pre- and post reform estimates by subgroups

	Non-equivalized (‘000s)	Non-equivalized (%)	Equivalentized (%)	Observations
Panel A. Gender and age groups				
Women				
Pre	-12.8*** (1.2)	-46.8*** (3.5)	-15.3*** (3.5)	466
Post 1950-	-12.4*** (1.4)	-48.0*** (3.3)	-16.6*** (3.3)	791
Post 1950+	-20.7*** (1.9)	-56.5*** (3.5)	-25.0*** (3.5)	308
Pre-Post 1950+ difference	-7.8*** (2.1)	-9.7* (5.1)	-9.7* (5.1)	
Men				
Pre	-1.9 (2.8)	-2.1 (4.4)	29.4*** (4.4)	140
Post 1950-	-8.8*** (1.6)	-28.8*** (4.4)	2.6 (4.4)	300
Post 1950+	-10.5*** (26.9)	-30.1*** (5.5)	1.4 (5.5)	128
Pre-Post 1950+ difference	-8.7** (3.9)	-28.0*** (6.8)	-28.0*** (6.8)	
Panel B. Gender, age, and income groups				
Women				
Low-Income				
Pre-Reform	-6.7*** (1.3)	-38.2*** (4.7)	-6.7 (4.7)	283
Post 1950-	-8.2*** (0.9)	-38.3*** (4.2)	-6.9 (4.2)	500
Post 1950+	-12.9*** (1.3)	-47.6*** (4.1)	-16.1*** (4.1)	184
Pre-Post 1950+ difference	-6.2*** (1.8)	-9.4 (6.4)	-9.4 (6.4)	
High-Income				
Pre	-21.0*** (1.8)	-58.0*** (4.6)	-26.5*** (4.6)	183
Post 1950-	-17.6*** (3.2)	-61.3*** (4.5)	-29.8*** (4.5)	291
Post 1950+	-32.5*** (3.6)	-69.7*** (5.9)	-38.2*** (5.9)	124
Pre-Post 1950+ difference	-11.6*** (4.0)	-11.7 (7.6)	-11.7 (7.6)	

Notes: Standard errors in parentheses. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. Pre-treatment (before 1996) and post-treatment (after 1995).

Table 6: Response in personal income and its breakdown three years after widowhood: pre-and post reform estimates by subgroups

	Personal income (,000s)	Earnings (%)	Social insurance benefits (%)	Pension benefits (%)	Survivor benefits (%)	Social security benefits (%)	LFPR
Panel A. Gender and age groups							
Women							
Pre	23.8*** (0.9)	0.5 (3.8)	-0.8 (1.6)	50.0*** (3.4)	50.4*** (2.6)	-	-1.9 (3.7)
Post 1950-	21.2*** (0.9)	-3.6 (3.8)	0.5 (1.6)	48.4*** (3.1)	54.7*** (2.7)	-	2.3 (3.0)
Post 1950+	14.8*** (2.7)	-43.3 (39.1)	5.4* (3.2)	95.6*** (26.4)	42.4*** (12.1)	-	-1.8 (3.4)
Pre-Post 1950+ difference	-9.1*** (2.8)	-43.9 (39.1)	6.2* (3.5)	45.6* (26.5)	-8.0 (12.4)	-	0.0 (5.0)
Men							
Pre	9.2*** (3.0)	-	-	-	-	-	-10.1 (6.7)
Post 1950-	-3.3 (2.5)	-	-	-	-	-	-0.9 (6.1)
Post 1950+	1.2 (5.5)	-	-	-	-	-	-5.6 (4.2)
Pre-Post 1950+ difference	-8.0 (6.3)	-	-	-	-	-	4.5 (7.8)
Panel B. Gender, age and income groups							
Women							
Low-income							
Pre	20.8*** (0.9)	4.8 (4.0)	-2.5 (1.9)	33.5*** (3.5)	64.2*** (3.9)	-	-5.8 (4.7)
Post 1950-	19.8*** (0.7)	3.5 (2.8)	0.7 (2.1)	31.4*** (2.5)	64.4*** (2.6)	-	6.1* (3.4)
Post 1950+	16.1*** (1.4)	-10.5 (8.4)	2.7 (2.4)	62.3*** (5.3)	45.5*** (5.6)	-	0.4 (4.4)
Pre-Post 1950+ difference	-4.7*** (1.7)	-15.3 (9.5)	5.2* (3.1)	28.8*** (6.3)	-18.7*** (6.9)	-	6.2 (6.5)
High-income							
Pre	28.0*** (1.7)	-3.4 (6.1)	0.7 (2.7)	65.9*** (5.3)	36.7*** (3.1)	-	4.1 (6.0)
Post 1950-	23.1*** (2.0)	-11.8 (8.4)	0.3 (2.5)	68.6*** (6.0)	42.9*** (4.3)	-	-2.9 (5.6)
Post 1950+	12.5* (6.5)	-108.7 (2396.0)	10.5 (116.7)	160.9 (1870.1)	37.4 (418.4)	-	-5.1 (5.2)
Pre-Post 1950+ difference	-15.4** (6.8)	-105.4 (2396.1)	9.8 (116.7)	95.0 (1870.2)	0.6 (418.4)	-	-9.2 (7.8)

Notes: Standard errors in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Column 1 reports the change in personal income upon widowhood in ,000 euro. Column 2-6 decompose the change in personal income in percentage points that add up to 100 percent (c.f. the definition of TIs,inc). Column 7 reports the change in the labor force participation rate (LFPR). Pension benefits include private survivor benefits/life insurance. For working age men, the drop in personal income is too small to derive consistent estimates of its breakdown.

private survivor pensions/life insurance became twice as important and partly reduced the fall in income.

For men of working age, the 1996-reform led to a more substantial reduction in the standard of living upon widowhood of 28 percent (Table 5). While they experienced a 29.4 percent increase in equivalized income before the reform, their standard of living remains fairly constant after the reform. When we focus on the change in personal income, it is noticeable that personal income stays fairly constant after the reform, while it substantially increased before the reform, with 9.2 thousand euros. This suggests that the decline in survivor benefits is not substituted by other sources of income, indicating over-compensation in the period before the reform for men.

Finally, zooming in on different pre-widowhood income groups, we find that high-income women experienced an 11.7 percentage point additional drop in equivalized household income, which is only slightly higher than the additional drop for low-income groups of 9.4 percent (Panel B of Table 5). The reform is diverging the impact of widowhood between high- and low-income women: after the reform, high-income women experience a 38.2 percent decline compared to a 16.1 percent decline for low-income households. Panel B of Table 6 shows that low-income groups became more reliant on survivor pensions but did not significantly reduce labor supply to remain eligible for means-tested public survivor benefits. For high-income women, while imprecisely estimated, the results suggest that they substantially reduce labor supply, potentially to become eligible for means-tested public survivor benefits, which is possible given their financial situation. The reduction in earnings is only partly replaced by transfers from private survivor pensions/life insurance that is not means-tested.

6. Conclusion and policy recommendations

This paper examined the impact of widowhood on the income position of surviving spouses, and the importance of public survivor benefits and other forms of income to alleviate the financial consequences of widowhood. Widowhood has the largest financial impact on women of working age: three years after the death of their spouse, they experience an almost 20 percent reduction in equivalized disposable household income, particularly affecting those with a high pre-widowhood income. In contrast, for retired women, transfers from social security and pensions minimize the financial consequences of widowhood. Widow(er)s with and without dependent children experience a similar fall in income. However, those with children substantially reduce their labor supply, which is compensated by both public survivor benefits and private survivor pensions.

The decline in the generosity of public survivor benefits after the 1996-reform resulted in a further reduction in the standard of living of women of working-age. After the reform, equivalized household income falls by 25 percent compared to 15 percent before the reform. The additional fall in income seems mainly caused by a reduction in earnings to become eligible for public survivor benefits that became means-tested. Also, an increase in income from social insurances (e.g. disability benefits) is noticeable, potentially to become eligible for public survivor benefits. In relative terms, non-means-tested private survivor pensions/life insurance became twice as important but only partly replaced the fall in income. Thus, the means-tested system and eligibility criteria that depend on the degree of work disability seems to discourage working, particularly for women with a high pre-widowhood income who benefit more from reducing their labor supply and also have more financial possibilities to reduce labor supply.

For men of working age, the 1996-reform led to an even more substantial reduction in the standard of living after widowhood. While they experienced a 30 percent increase in equivalized income before the reform, their standard of living remains fairly constant after the reform. The reduction in the standard of living is caused by a decline in survivor benefits that is not substituted by other sources of income, indicating over-compensation in the period before the reform.

These results are important for policymakers as they provide insight into the insurance value of public survivor benefits and its crowding-out effect on self-insurance, and the labor supply responses to means-testing. Our results contribute to the public discussion on how to simplify and standardize public and private survivor benefits.

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