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Are the widowed too much insured? Survivor's pensions and living standards upon widowhood in France

Léa Cimelli

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Are the widowed too much insured?

Survivor's pensions and living standards upon widowhood in France*

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Abstract

To investigate compensation through survivor's pensions at widowhood in France, this paper uses an administrative dataset to exploit a large sample of survivors whose income is known several years before and after widowhood. An event study first identifies the effects of widowhood on men's and women's living standards. Then, I measure how much this effect is offset by the survivor's pension. To distinguish between total and partial overcompensation, I analyse the heterogeneous effects of widowhood according to pre-widowhood share of couple income. The results show that both men's and women's living standards tend to increase upon widowhood. For both groups, survivors earning less than 40% of their couple income tend to be fully compensated by a survivor's pension, while those earning more tend to be

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overcompensated. Survivor's pensions largely ensure that women's living standards do not plummet upon widowhood while also helping to prevent them from falling below the poverty threshold.

Keywords : widowhood, survivor pension, living standards, poverty, bread-winner status, gender inequalities

JEL Codes: J12; J14; H55

1 Introduction

An increasing body of literature is finding an apparent link between an overall decrease in the poverty rate of widows¹ and increases in both the education and labour force participation of women, such as a 2018 demographic study of US widows between 1994 and 2014 (Munnell et al., 2020), to name but one example. Those increases have contributed to a trend of women obtaining more individual retirement rights and thereby becoming less destitute upon the deaths of their husbands. Thus, the path to poverty for widows may continue to diminish in the future, a finding that is at odds with the common view of widows forming an economically vulnerable group in need of support. Therefore, it may be time to reassess the support policies aimed at them.

One such support policy is the survivor’s pension. Generally obtained through marriage, this right rewards part of a deceased spouse’s retirement pension to his or her survivor in order to offset the loss in household income upon their death. The policy has historically been justified by the specific risk of poverty faced by women when losing their husbands, which is indeed a peril in the context of a male breadwinner society, as women in such situations have limited access to the labour market and therefore have limited individual retirement rights. Thus, survivor’s pensions were devised as a social insurance mechanism that extended the breadwinner’s support beyond the grave and prevented widowed women from falling into destitution. Because the male-breadwinner model has declined in parallel with the poverty of widows, survivor’s pensions have fallen under scrutiny in recent years. In 2018, for example, an OECD brief titled *Are survivor’s pensions still needed?* questioned not only the viability of survivor’s pensions in light of changes in the socio-economic environment, but also the redistributive effects of taking money from the unmarried and from egalitarian couples in order to redistribute it to highly specialised married couples. The policy brief answers its own question by advocating for a continuation of survivor’s pensions while changing the goal, namely by shifting the focus from poverty alleviation to the so-called living standards-smoothing target, which has long been linked to survivor’s

¹This paper uses the terms widow and widower in reference to legal status and to describe, respectively, the male and female survivors from the formal union of marriage, specifically those whose spouses died before them.

pensions. In essence, this objective seeks to compensate for a loss in living standards regardless of whether or not that loss might drive the widow into poverty; and it appears more consistent with contemporary economic and family realities. Despite a decrease having been identified in widows' poverty in the US, widowhood remains an economic shock for older people, as the death of a spouse cuts off the flow of the deceased's income. The variation in living standards obviously depends on the survivor's share of household income before death, given that the low earner in a couple will experience quite a large drop in living standards upon retirement unless some corrective measure is put in place. Despite all the socio-economic and labour market changes seen in recent decades, women remain the most likely low earners in married couples.

As the smoothing objective has become increasingly relevant, researchers have shifted from analysing poverty and replacement rates to studying the living standards of the widowed. By measuring the variation in living standards, policy-makers can thus better understand widowhood's economic impact and improve survivor's pensions in line with that compensation goal. Studies in Europe show that women tend to have stable living standards despite widowhood and that men's living standards increase after the spouse's death (Choi, 2006; van der Vaart et al., 2020; Burkhauser et al., 2005; Hanemann and Rausch, 2020). One recent development in the literature is the increasing interest in the level of compensation provided by survivor pension systems (Fadlon et al., 2019; Hanemann and Rausch, 2020 ; Bonnet et al., 2020). The smoothing target defines overcompensation in a survivor's pension as a rise in living standards for a beneficiary following widowhood. However, this definition can be improved upon by distinguishing between partial and total overcompensation. Total overcompensation, according to the smoothing target, occurs when every euro of a survivor's pension contributes to increasing the beneficiary's living standards above the pre-widowhood level. Because no drop in living standards needs to be compensated, in compliance with the smoothing target rationale, those people should not be eligible to survivor's pension. Partial overcompensation happens when a survivor's pension compensates for a drop in living standards but provides more than was needed and ultimately increases living standards relative to the reference period, thus making this an issue of compensation level and not eligibility. A key variable that distinguishes between partial and total overcompensation is the couple's pre-widowhood income distri-

bution, which is often neglected because data-sets are incomplete. However, the data-set that I draw from allows me to tackle this issue and distinguish between the two types of overcompensation, which is highly relevant from a policy-making perspective.

This paper focuses on present-day France, which provides us with an interesting case for three main reasons. First, France is a country with little to none of the out-of-pocket medical expenses that constitute an important economic mechanism affecting widowhood in the American literature. Because these expenses are so much more minor in France, we can focus more clearly on other mechanisms at play in the variation of living standards, namely consumption units and intra-household gender income inequality. Second, survivor's pensions are a large public expense that are important at both the macro and micro levels. At the macro level, survivor pension expenditures amounted to 1.6% of GDP in 2020. At the micro level, survivor's pensions for women (who continue to be the main beneficiaries) amounted to 18% of their average retirement pension in 2020. What is more, the survivor's pension constitutes a lifelong monthly income for the widowed. Third, and finally, France has so far not joined in any of the contemporary trends toward survivor pension reform. Indeed, the debates on survivor's pensions have already led to some countries changing their policies in two very different ways. On the one hand, some countries have made the survivor's pension available to unmarried couples while, on the other, other countries have cancelled or rolled back their survivor pension programs. France has seen no public debates on modifying the current system since the 2019 Delevoye Report, whose first main recommendation was to unify France's 42 pension schemes into one universal system. Another was to pursue a simplified smoothing objective, as French survivor's pensions were originally devised to achieve different goals based on various rules. The latter update complies with OECD recommendations to consider how current systems can achieve the goal of compensation by smoothing living standards.

This paper answers the following questions. First, what is widowhood's impact on the living standards of retired men and women relative to their position in the income distribution in modern-day France? This constitutes the present paper's first contribution to the literature, as it updates past assessments of widowhood's impact on living standards in France and reports the novel findings that, on average, the living standards of both men and women have presently increased upon widowhood, although they have risen more for

men than for women. For greater insights into these developments, I look at redistribution within the French system by analysing how the role played by survivor's pensions varies across the pre-widowhood living standard distribution. The second and third questions constitute this paper's main and most compelling contributions. Do survivor's pensions contribute to smoothing living standards following a spouse's death? Which people does the system undercompensate or overcompensate according to the smoothing target? In answering these questions, this is the first paper, to my knowledge, that uses real-world data to look at under- and overcompensation in France. Furthermore, it is also the only paper to assess these issues on the basis of breadwinner status, by which I find that some total overcompensation takes place in the current system because survivor's pensions do not exclude main breadwinners. And, partial overcompensation occurs among survivors of egalitarian couples. Moreover, this work provides some perspective on the future of survivor's pensions. Even though it is expected that heterosexual couples will experience a more egalitarian income distribution, I show that present-day survivors of egalitarian couples face a drop in living standards of about 24% to 30% relative to their pre-widowhood situations. However, that drop is offset by the current survivor pension system. This research program has been implemented using event studies, basing it on a French administrative dataset known as the Permanent Demographic Sample (commonly referred to as EDP for its French name *échantillon Démographique permanent*). That data-set contains two essential features. First, it is a panel that allows me to follow a person's income sources and marital status between 2010 and 2017. Second, the EDP follows 4% of the French population, which is a substantial enough observation for working on a large sample of widows and widowers relative to the sample sizes most commonly found in the literature. This second feature is paramount to studying the heterogeneous effects of widowhood. The article is organised as follows. First, I present the literature on survivor's pensions while simultaneously defining some of the French system's objectives concerning survivor's pensions (Section 2). Next I presents some recent results regarding widowhood's impact on living standards, which is then followed by an introduction to my data-set and the strategy used for illuminating widowhood's impact on living standards (Section 3). The next section show my results separately for women and men, and categorized according to sub-samples based on pre-widowhood distributions in living standards and breadwinner status (Sec-

tion 4). Finally, this paper concludes by highlighting the limits of the results, discussing the concept of overcompensation and offering suggestions for prospective research paths (Section 5).

2 Literature review

2.1 Survivor’s pensions and their goals

2.1.1 Why survivor’s pensions are needed?

The need for survivor’s pensions stems from a particularly serious problem following the death of one’s spouse, which is, namely, that one’s household income and living standards tend to fall. For the lowest earner in the couple, this can result in quite a large drop, which could be privately avoided through life insurance or self-insurance through the labour market. Nevertheless, the state often involves itself with the economic consequences of widowhood, which is justified by the fact that couples are ill-equipped to properly insure against lost income due to a partner’s death. Indeed, from a public economics point of view, the state is motivated to act because of market failures on the demand side. At the individual level, insuring against widowhood is both an inter-temporal and interpersonal issue (James et al., 2009), whereby a worker may take a myopic inter-temporal view that limits their ability to efficiently insure against widowhood because most individuals are unable to correctly estimate the outcomes of negative events like death (Findley and Caliendo, 2008). From an interpersonal angle, the dynamics of bargaining power within the couple may hinder decisions to take up insurance. On the one hand, women tend to survive their husbands and are likely to be the beneficiaries of insurance against widowhood.² On the other hand, though the male breadwinner model is less prevalent than before, men still tend to earn more in heterosexual relationships (Morin, 2014). From a traditional man’s perspective, paying an insurance policy in the present means decreasing current consumption in order to increase the wife’s future consumption, and, since as higher earners they

²In 2019, there were 77,512 new widowers and 146,926 new widows in France, all of whom were 50 years old and older. Widowhood continues to be experienced primarily by women. Source: INSEE, état civil.

hold greater bargaining power, the level of insurance may match the man's preferences rather than the needs of his future widow. To fight myopia and the inherent imbalances in bargaining power, the state thus takes a justified stance in becoming involved with the economic consequences of widowhood. This, however, gives rise to a new question: To what extent should the state compensate lost income due to widowhood?

2.1.2 The philosophy behind the compensation level of retirement pensions

To better calibrate compensation through survivor's pensions, the literature introduces three targets for determining both eligibility and level of compensation (Bonnet and Hourriez, 2012; Sterdyniak, 2019; ApRoberts, 2008; Tréguier, 2022). These targets are as follows.

1. The assistance target. This makes the survivor's pension a poverty alleviation policy. When the drop in income following the death of a spouse is so severe that the survivor is at risk of poverty, compensation should be provided in order to elevate widows above the poverty threshold.
2. The smoothing target. When the drop in income following the death of one's husband diminishes one's living standards, survivor's pensions should provide compensation that smooths those living standards around the time of death.
3. The patrimonial target. The rationale behind the patrimonial target is that a survivor has contributed to the deceased's retirement rights through household production. Therefore, the survivor should be compensated with any pension rights held by the deceased, regardless of any variations in living standards or poverty risk. Because this level of compensation is independent of living standards and poverty risk, it is generally determined as a fixed share of the deceased's pension, which may sometimes depend on the length of marriage but is most often set at 50%.

The assistance and smoothing objectives can be traced back to the foundation of France's modern social security system. In most systems abroad, the main goal for survivor's pensions is currently generally considered to be the smoothing objective.³ As

³See: "Are the survivor's pensions still needed?", OECD Policy Brief on Pensions (2018).

women’s personal pension rights have increased over recent decades (Bonnet, Hourriez, et al., 2012; Albouy et al., 2012), old age poverty risk seems to be less specific to widowhood as French society experiences a rise in single and divorced retirees (Arnold and Lelièvre, 2015). Still, a decrease in living standards can still be expected without survivor’s pensions, due to continuing gender inequalities and the mere existence of scale economies. Though the gender gap in pay has been decreasing, it is now expected to stagnate (Albouy et al., 2012; Gadrey and Gadrey, 2017). What is more, the gender pay gap has been calculated to be higher within couples than in the general population (Morin, 2014); and, to make matters worse, the gender pension gap remains higher than the gender wage gap (Bonnet, Hourriez, et al., 2012; Geraci and Lavigne, 2016). This situation is unlikely to change, considering that retirement pension reforms increasingly link contributions to benefits and that women are still more likely than men to put their careers on pause (Collet and Rioux, 2017; Meurs et al., 2010). For all these reasons, a future drop in living standards can still be anticipated upon the death of one’s spouse, and the drop is likely to be higher for women than men. Thus, survivor’s pensions take on the added burden of serving as a potent safeguard against gendered income inequality in old age.

2.1.3 The French survivor pension system

The intricacies of the French system are the result of it having drawn inspiration from all three of the targets mentioned above. Survivor’s pensions in France form part of the social security system and they are called “derived rights”, meaning that a person’s contributions to the system generate both personal pension rights and a survivor’s pension rights for that person’s married partner after death. Hence, survivor’s pensions are managed by retirement schemes,⁴ to which one’s affiliation is determined by their sector of activity. Although the main scheme is for private sector employees, these employees can also rely on a complementary scheme. Another important scheme is the public sector scheme,⁵ whose rules differ not only for regulating retirement, but also for survivor benefits. In each case,

⁴France has 42 distinct retirement schemes.

⁵In 2019, 83% of retirees received a personal retirement pension from the private sector employees’ scheme. 71% received a retirement pension from the private sector complementary scheme. 9% received a pension from the public sector scheme. Proportions do not add up to 100% because some retirees receive pensions from several schemes. Source: Panorama des retraités, DREES 2021.

one's survivor's pension is determined by the retirement scheme of their partner, which is subject to various rules and though the three targets are theoretically distinct, they may actually overlap in practice.

Three types of rules regulate eligibility and compensation level:

1. Rules relating to the deceased, mainly duration of contribution.
2. Rules relating to union. Survivor's pensions in France are limited to married couples.
3. Rules relating to the survivor.

Regarding the third type of rules, those relating to the survivor are numerous. The most important ones focus on age, post-bereavement matrimonial trajectory, and the survivor's income stream, as detailed below.

- Most retirement schemes have a minimum age requirement, based on the underlying principle that survivor's pensions should help women at ages that impede their access to self-insurance in the labour market. In the private sector scheme, the minimum age to claim a survivor's pension is 55 years old. Before that age, widows can claim widowhood benefits.⁶ After exhausting their widowhood benefits, most widows claim survivor's pensions on their 55th birthday. The private sector complementary pension scheme has a minimum age of 60 years. The civil servant scheme has no minimum age requirement.
- Most retirement schemes have a kind of no-remarriage rule, based on the underlying principle that the survivor's drop in living standards upon bereavement may reverse upon forming a new union. In the private sector scheme, a strict no remarriage rule has been suppressed by a 2004 reform by which new unions are still taken into account through a means test that includes the new partner's income. In 2022, the means tested yearly income threshold for a couple is 35,176.96 euros. Survivor's pensions can either be suspended or partially paid, depending on the means test.

⁶Widowhood benefits are temporary benefits aimed at the young widows of contributors to the private sector scheme. This is a means tested monthly payment that can last up to two years after the spouse's death.

In the private sector complementary pension scheme, a new marriage annuls the previous pension rights of the survivor, while civil partnerships or informal unions do not. In the civil servant scheme, both informal and formal new unions suspend survivor's pensions.

- Replacement rates differ between schemes. A replacement rate is the ratio of the derived pension right (the widow's survivor's pension) and the original right it stems from (the deceased's pension). The private sector scheme offers a 54% replacement rate, although survivor's pensions can be inferior to 54% of the deceased's pension because of the means test. In 2022, the means tested income threshold for one person is 21,985.60 euros a year, which is around 1,832 euros per month. In that scheme, the survivor's pension is a differential pension. Above 1,832 euros per month, no survivor's pension is paid; while, below that amount, a survivor's pension is paid until reaching either 54% of the deceased's pension or the 1,832-euro threshold. The means test is implemented at the time of claiming the pension. If the pension is claimed before the survivor begins receiving his or her own retirement pension, then a second means test takes place upon claiming their personal pension. No means test occurs for either the private sector complementary pension scheme or the civil servant scheme. The replacement rates are still different, being 60% in the former and 50% in the latter.

Through those rules, the private sector scheme tends to draw more from the smoothing and assistance targets, while the two other schemes are oriented more towards the patrimonial target. No schemes are based solely on only one target.

2.2 The economic consequences of widowhood

2.2.1 Widowhood's theoretical impact on living standards

When one's spouse dies, the decrease in household income matches the lost earnings of the deceased. However, because the household expenses also decrease, the global effect on living standards can be rather obscure and is perhaps best understood by looking at consumption unit value and the earnings ratio of the deceased and survivor.

Living standards are aggregated household incomes divided by consumption units. Consumption units are used to compare different household sizes and take into account scale economies. The equivalence scale used in the present paper is the OECD-modified equivalence scale,⁷ which is based on the hypothesis that income and consumption are equally divided within a household. That assumption, however, cannot be tested here because our data provide information on income and not on consumption.

Let us schematise the impact of widowhood on the survivor's living standards, beginning with a couple living together and no other individuals in the household. To simplify, I will consider only the personal incomes of both members of the couple, which are mainly pensions when we are dealing with older people. At time t , one of them dies. The living standards one year before are:

$$LS_{t-1} = \frac{I_{t-1}^d + I_{t-1}^s}{UC_{t-1}} \quad (1)$$

- I_{t-1}^d : the deceased's income, one year before spouse's death
- I_{t-1}^s : the survivor's income, one year before spouse's death
- UC_{t-1} : consumption units, one year before spouse's death

If the survivor continues to live alone, the living standards one year into widowhood are:

⁷Because the OECD-modified equivalence scale is widely used, it has the advantage of allowing for comparisons with other research works. The scale associates 1 consumption unit to the first adult in the household and 0.5 to the second adult, by which an adult couple needs 1.5 times a single person's income to maintain the same consumption level. This measure of consumption units has been criticised in relation to widowhood because the widowed are often old persons who may have a different consumption structure than the general population. Hence, they should have different scale economies. After having tested that criticism, it was shown that the OECD-modified equivalence scale in fact matches the consumption structure of older people quite well. Nevertheless, scale economies may be underestimated in the specific cases of widows not moving out of the house upon bereavement (Bonnet and Hourriez, 2008b). I use that alternative equivalence scale by Hourriez and Olier, 1998 as a robustness test in Appendix 2.

$$LS_{t+1} = \frac{I_{t+1}^s}{UC_{t-1}} \quad (2)$$

- I_{t+1}^s : the survivor's income, one year after spouse's death
- UC_{t+1} : consumption units, one year after spouse's death

Upon widowhood, three major changes occur:

1. The partner's income disappears, which will negatively affect the survivor's living standards. The negative effect will be larger if the deceased contributed greatly to the couple's income.
2. The survivor's individual income can vary, for example the survivor's pension is added to the initial pension, which tends to have a positive effect.
3. The consumption unit varies. In the OECD-modified equivalence scale, it goes from 1.5 to 1, which has a positive effect on the survivor's living standards.

This simplified framework can be used to calculate the necessary level of income for achieving a constant living standard upon widowhood. With the survivor's personal income being constant:

$$\frac{I_{t+1}^s}{I_{t-1}^d + I_{t-1}^s} = \frac{2}{3} \quad (3)$$

Where $\frac{I_{t+1}^s}{I_{t-1}^d + I_{t-1}^s}$ is the survivor's share of the couple's pre-widowhood income.

Using the OECD-modified equivalence scale gives the result that a survivor must earn 67% (2/3) of the couple's combined pensions in order to maintain a constant living standard upon widowhood. Survivors earning less than 67% percent of the household income will face a drop in living standards. The consequences of this are twofold. First, this means that even couples who contribute equally to the household income will experience a 25% fall in living standards upon widowhood. Second, in order to reach the insurance target, a

survivor’s pension should bring the survivor’s income to 67% of the couple’s pre-widowhood aggregated income.

In this simplified framework, survivors who consistently earn more than 67% of the household income will experience an increase in living standards, an automatic rise that is called a unit consumption effect. In the context of an insurance target, those individuals should not be eligible for survivor’s pensions from the smoothing target point of view. What is more, this framework explains the differences often observed in widowhood’s economic impact on men and women, showing that men indeed often earn more than 67% of the couple’s income while women mainly earn less than 67%⁸.

2.2.2 Widowhood’s empirical impact on living standards

I will now focus on the consumption-smoothing objective, which is a compensation level that is often studied through living standards. The literature’s results on the variation in income and living standards caused by widowhood can be divided by geographical areas. One can distinguish Northern-American and European results. The review will then shed some light on past French estimations.

North American results looking at variation in income have shown that widowhood negatively impacts women and not men (Streeter, 2020; Hungerford, 2001; LaRochelle-Côté et al., 2012; Gillen and Kim, 2009 ; Li, 2004; Fadlon et al., 2019). Streeter, 2020 shows that women’s living standards in the U.S. fall by 22% percent after their spouse’s death while men experience a briefer and smaller drop. In Canada, LaRochelle-Côté et al., 2012 looked at the labour market income replacement rate during retirement and found that widowhood causes the replacement rate to decrease for women and increase for men. Neither women’s nor men’s living standards are smooth around widowhood, though the sign of variation is more ambiguous for men.

European results paint a different picture. In most European cases, the living stan-

⁸This small model seems to provide a simple rule of thumb for calculating the level of pension needed to fully compensate for the drop in living standards following widowhood. However, the model is limited by its assumptions, and cannot be used to guide public policy choices. As a reminder, assumptions are as follows: individual incomes are assumed to be constant, only income from work and retirement is considered (this excludes household income, such as public and private transfers and wealth income), household size is set at two persons before widowhood and one after (this excludes cases of inter-generational cohabitation)

dards of women remain stable despite widowhood while they increase for men after their spouse’s death (Choi, 2006; Burkhauser et al., 2005; Hanemann and Rausch, 2020). In the Netherlands, van der Vaart et al., 2020 show that, three years after widowhood begins, the living standards of women decrease by 1.5% and increase for men by 8%. Overall, women’s living standards appear to be smooth around widowhood while this is not the case for men, who experience an increase. In France, Bonnet and Hourriez, 2008a show that women’s living standards decrease by 3% after widowhood while men see an increase of 14% to 22%. Although the authors of this paper predicted that women’s losses in living standards would disappear and in fact increase in the near future, those results are now over 10 years old and should be updated.

A part of the differences in results can be explained by the different sample sizes and definitions. To begin, age is especially important, as papers looking at younger widows find harsher consequences of widowhood⁹ (van der Vaart et al., 2020; Fadlon et al., 2019). Second, selection into widowhood is a key factor, as shown by Holden and Brand, 2017, who find that more selection into widowhood occurs in the U.S. than in Germany or the U.K., with widows in the U.S. more often being from deprived households than those in the two studied European countries. Lastly, outcomes can differ because some papers use living standards and others use per capita household income. Because of the prevalence of out-of-pocket medical expenses in the U.S., most American papers subtract those expenses from household earnings. Nevertheless, the main differences between the North American and European results can be ascribed to institutional differences regarding retirement and survivor’s pensions.

Survivor’s pensions are an important compensation mechanism studied in the literature. With regards to assistance targets, the literature shows that survivor’s pensions limit transitions to poverty after a spouse’s death (Sevak et al., 2003; Gillen and Kim, 2009). Choi, 2006 finds a positive link between the generosity of survivor’s pensions and poverty prevention in OECD countries.

⁹Survivor pensions often impose minimum age requirements in order to increase younger women’s incentives to participate in the labour market and generate their own pension benefits. Moreover, a young widow’s deceased husband may also have been young and unable to fulfil the minimum contribution requirements to social security.

The research mainly explores insurance targets by measuring the offset of drops in living standards due to survivor’s pensions,¹⁰ an issue that can only be addressed by distinguishing between different income sources. These papers show how much survivor’s pensions contribute to the smoothing of living standards (Burkhauser et al., 2005 ; van der Vaart et al., 2020). Fadlon et al., 2019 use U.S. data to show that insurance mechanisms offset women’s decrease in per capita income by 70%, with 38% of that insurance offset being due to survivor’s pensions. The authors also find through regression discontinuity analysis that widows who receive a survivor’s pension experience a drop in household income compatible with constant living standards (34%), while women who are ineligible for a survivor’s pension face a higher loss (41%) and thus a reduction in living standards. The literature shows a growing interest in the degree of compensation as well as mapping patterns of under- and overcompensation. Bonnet et al., 2020 used micro-simulation to find zones of undercompensation and overcompensation in the french survivor pension system, namely by cross-referencing survivors’ retirement schemes and personal pension levels. They show that undercompensation in the public sector scheme happens at the tail of the pension distribution, while overcompensation occurs at the top. No such pattern occurs in the private sector employees’ scheme because of means testing. In most papers, under and overcompensation are measured comparing pre-widowhood and post-widowhood living standards for survivor’s pension beneficiaries. Yet, an increase in living standards can still result from a unit consumption effect or an increase in other income sources. The former is a case of total overcompensation, in line with the smoothing target that survivor should be ineligible to survivor’s pension. Identifying such cases requires data on the deceased’s contribution to household income prior to widowhood. To my knowledge, no papers to date have identified under- and overcompensation based on real-world data, nor have any considered pre-widowhood income distribution within the household.

¹⁰Another approach to compensation compares post-widowhood income to pre-widowhood consumption needs Hanemann and Rausch, 2020.

3 Data and empirical strategy

3.1 Data

My empirical work draws on a French administrative panel called the Continuous Demographic Sample (*Échantillon Démographique Permanent*, EDP). The EDP is a representative sample that covers 4% of the French population chosen in a quasi-random way,¹¹ and it collects their administrative information since birth. Not only does such a large dataset provide a larger sample of widowed persons than the datasets used by most other papers,¹² but it also allows taking into account heterogeneous effects and stratifying the sample accordingly. This paper relies on a specific section of the EDP, namely data on individual and household tax returns filed annually from 2010 to 2017. The EDP's fiscal records contain information on matrimonial status, demographics, and income. Matrimonial status is used to track the beginning of widowhood each year, while the panel's other characteristics are essential to this paper's interest in following the evolution of widowed people's living standards. The fact that the data are administrative provide a significant advantage in that the income information is more reliable than survey data. Another advantage is that the dataset has very low attrition, which is caused mainly by death and institutionalisation. Attrition is addressed in Appendix 7.1.

3.2 Sample

The final sample contains 9,882 men and 23,670 women, with 72,412 individual/year male observations and 178,927 individual/year female observations. These samples are relatively large compared to other papers in the literature.

These EDP individuals were already married in 2010 and their spouses died between 2011 and 2016, and thus these people entered and experienced widowhood during the observation period. Only the treatment on the treated effect is estimated. There are initially 20,396 men and 49,339 women matching that initial condition.

¹¹A person's birth date determines their inclusion in the EDP, which gathers information on people born the four first days of April, July, and October, and on January 2nd, 3rd, 4th and 5th.

¹²The previously cited papers are based on the following sample sizes of widowed: 5,799 women (Gillen and Kim, 2009); 1,402 men and 3,744 women (Streeter, 2020); 1,681 individuals (Hanemann and Rausch, 2020); 2,504 women and 851 men older than 65 years (van der Vaart et al., 2020).

For individuals to be included in the final sample, I also set the following other conditions, which allow calculating the survivor’s pension.

- The widowed must be retired at least one year before widowhood. Being retired is defined as a retirement pension representing one’s main source of income, a condition that allows distinguishing the survivor’s pension from the personal pension. Our sample now comprises 16,532 men and 35,859 women.
- The sample is limited to widows and widowers 55 years old and older. This is not unusual, as the literature considers younger survivors to be going through “premature widowhood” and usually excludes them due to the particular features of their situation. I also exclude younger survivors because 55 years is the minimum age to claim a survivor’s pension in the private sector employees scheme. This condition changes our sample size very little, as retiring before 55 years of age is uncommon in France. We now have 16,506 men and 35,780 women.
- Household and individual income information must be available for one year before entering widowhood and the first year following the spouse’s death, two conditions that are paramount for identifying the survivor’s pension. From our initial sample, 9,902 men and 23,690 women now remain.
- Finally, in order to study heterogeneous effects, the sample must include information on quartile of living standards and share of the couple’s pre-widowhood income. Our final sample thus comprises 9,882 men and 23,670 women.

3.3 Variables

The main variable of interest is household living standards, which is calculated on the basis of aggregated household income (labour market income, retirement pension, public transfer, taxes, private transfer, and patrimonial income) and the OECD-modified equivalence scale. A robustness check was conducted by means of an alternative equivalence scale, which is presented in Appendix 7.2. Living standards are measured in 2015 euros. The second main variable is living standard without a survivor’s pension, and this variable

must be calculated by isolating the survivor's pension.

Table 1 shows that the average yearly living standards of men and women are similar at, respectively, 24,119 euros and 23,549 euros. Annual individual income comprises mainly the retirement pension, which is noticeably much higher for men (22,810 euros) than for women (10,295 euros). This is consistent with the enduringly large societal pension gap,¹³ which is linked to men and women contributing to household income in strikingly different magnitudes prior to widowhood. On average, men contribute 73% of the couple's aggregated income and women 33%¹⁴ which likely influences on variations in living standards after a spouse's death, as explained earlier.

Because the survivor's pension is mixed with other retirement pensions indicated in the tax returns' pension section, I isolate it by calculating the difference between retirement pensions one year after widowhood and one year before widowhood, thereby creating a fixed differential survivor's pension. My measure of the survivor's pension relies on the hypothesis that the above-mentioned difference is not influenced by anything other than widowhood and the survivor's pension. The conditions for creating this sample give credibility to this hypothesis because, first, two years' worth of income information allows calculating the survivor's pension; and, second, the widows in this sample are already retired and therefore cannot simultaneously enter retirement and widowhood. Thus, any large changes in their retirement pensions can be attributed to the survivor's pension. Although pensions are usually revised once a year in order to follow consumer price indicators, this is not an issue for this study as our differential survivor's pension is measured in 2015-euros. Pensions can also be revised following wage trend indicators, though this is rare. Nevertheless, I take this into account and associate a survivor's pension only to an increase of more than 100 euros a year.

Table 1 provides some descriptive statistics on the survivor's pensions in our sample, which contains more women than men due to the fact that widowhood is more likely for women than men. Although widowers are slightly older than widows, both tend to lose

¹³The 2014 gender pension gap in France was around 42%, after excluding derived rights. Source: "Femmes et Hommes, l'égalité en question", Insee Référence (2017).

¹⁴The two figures do not add up to 100% because the men observed are not the husbands of the women observed. Both groups are indeed widowed.

their spouses in their late seventies. Widows also represent a larger share of survivor's pension beneficiaries than widowers, which is consistent with the means test implemented in some retirement schemes,¹⁵ by which men tend to be excluded *de facto* due to their higher personal income. The share of women among all beneficiaries is 75%, which is lower than the 88% share calculated by the French administration for the 2019 stock of widows.¹⁶ This gap may be explained, on the one hand, by the fact that we are dealing with new widows from 2011 to 2016 and not the general stock of existing widows. On the other hand, by imposing the condition of a pre-widowhood retirement pension income, the sample excludes women receiving no retirement pension because they have no labour market activity prior to reaching the age of retirement. Though uncommon, those women are more likely to be eligible for a survivor's pension.¹⁷ The monthly value of a survivor's pension is higher for women than for men, which might be explained by both means testing and the fact that the pensions of deceased women are smaller than those of deceased men. The amounts are slightly higher for men and significantly higher for women than the mean monthly survivor's pensions reported for the 2016 stock of widowed people by the French administration, which is 345 euros for men and 775 euros for women.

To create sub-samples, I use two variables (see Table 2) :

- Quartiles of the distribution of living standards one year before the spouse's death, which are based on the global French population's distribution of living standards. The first quartile is at the bottom of the distribution, the fourth at the top.
- Breadwinner status. This is the ratio of the survivor's income to the aggregated incomes of the survivor and deceased one year before death. This categorical variable determines breadwinner status and distinguishes three groups of people: those earning less than 40% of aggregate couple income (smaller contributors); those earning between 40% and 60% (egalitarian contributors); and those earning more than 60%

¹⁵In the private sector employees scheme, the means test for a single person in 2015 is 1,665.70 euros a month and 2,665.20 euros for a couple.

¹⁶Source: Panorama des retraités, DREES (2021).

¹⁷Among people becoming widowed between 2011 and 2016, there are 373 women and 291 men who are not retired and have no income from the labour market or unemployment.

Table 1: Descriptive statistics

	Men	Women
Mean yearly living standards (euros)	24,119	23,549
Mean annual individual income (euros)	22,810	10,295
Contribution to household income (%)	73%	33%
Age at widowhood	78	77
Share of survivor's pension beneficiaries (%)	79%	98%
Mean monthly survivor's pension (euros) per beneficiaries	369	23,944
Observations	9,882	23,670

Sample: retired widows and widowers, 55 years old and older, EDP (2019 edition).

Note: means are calculated one year before spouse's death, except for outcomes relating to survivor's pension, which are measured one year following spouse's death.

Table 2: Sample size with stratification

	Men	Women
Quartile 1	1,738	3,954
Quartile 2	2,931	7,406
Quartile 3	2,554	6,468
Quartile 4	2,659	5,842
Higher contributors	289	15,028
Egalitarian contributors	2,499	7,454
Smaller contributors	7,094	1,188

Sample: retired widows and widowers, 55 years old and older, EDP (2019 edition).

Note: headcount by quartile is different because quartile are not based on the sample's distribution of living standards but on the distribution in living standards in the general french population.

(larger contributors). This variable can be considered a proxy for couple specialisation.

3.4 Empirical strategy

The goal of this research is to estimate widowhood's effect on living standards and evaluate the survivor pension's impact on smoothing those living standards. In order to do so, the explained variables will be living standards pre- and post-survivor's pension. Living standards pre-survivor's pension (without survivor's pension) are not a counterfactual for a world without survivor pensions. In such a world, smaller contributors would have to adapt their labour market participation before retirement; private insurance might be more prominent; and a person's public transfers would be different because means testing usually takes into account the survivor's pension. By assessing living standards without this pension, we gain insight into how the survivor's pension presently contributes to smoothing

living standards.

One issue that arises when considering causality between living standards and widowhood is that the two may be influenced by some unobserved confounding variables creating a bias. For instance, a spouse's past work history can influence living standards and widowhood because it determines retirement pension. What is more, past work history has also been shown to be correlated with mortality (Blanpain, 2016), because harder and more physical jobs tend to increase the risk of early death, thus increasing the risk of widowhood for the spouses of such laborers. Birth cohorts are also a confounding factor, as women in older cohorts are more likely to be widowed and have smaller retirement pensions than women in younger cohorts.

I solve this issue by using an event studies model, which is based on fixed effects regressions. In a fixed effects regression model, the OLS outcome is the difference between the living standards of a given individual at time t and the mean of those standards for the entire time period. It is a within estimation that uses variations in widowhood status each year. As a result, all time-constant confounders are excluded and cannot bias the correlation between living standard and widowhood.

A fixed effects regression model can estimate widowhood's causal impact on living standards in the absence of any unobserved time variant variables that may influence both widowhood and living standards. Because the income of retirees is very stable thanks to retirement pensions and most of our sample is composed of retired couples, there is little reason for any individual time-changing variable to impact both living standards and widowhood. On a macro level, survivor's pensions were not subject to any reforms affecting those who were already retired between 2010 and 2017. Nevertheless, to take into account any macro-economic changes that could impact the flow of wealth and income, year fixed effects have been added.

$$Y_{it} = a_i + \sum_{j=-6}^{-2} (b^j \times B_{it}^j) + \sum_{j=0}^6 (b^j \times B_{it}^j) + c_t + e_{it} \quad (4)$$

i identifies individuals; t identifies years

- Y_{it} : living standards (with or without survivor's pension) in 2015 euros

- B_{it}^j : distance in year to spouse death
- a_i : individual fixed effect
- c_t : year fixed effect
- e_{it} : idiosyncratic error term

Year of death is often excluded in the literature and it is unclear in our data-set how living standards are calculated for that year. For those two reasons, I do not report the results for the year of death, even though it is included in the estimate. The reference year is the year preceding widowhood. The parameter of interest is b^j . Before widowhood, b^j can be interpreted as an anticipation effect or a pre-trend. After widowhood, b^j can be interpreted as a living standard variation induced by widowhood relative to mean living standard one year before widowhood¹⁸. To take into account intra-individual observations auto-correlation, standard-errors are corrected using individual level clusters.

4 Results

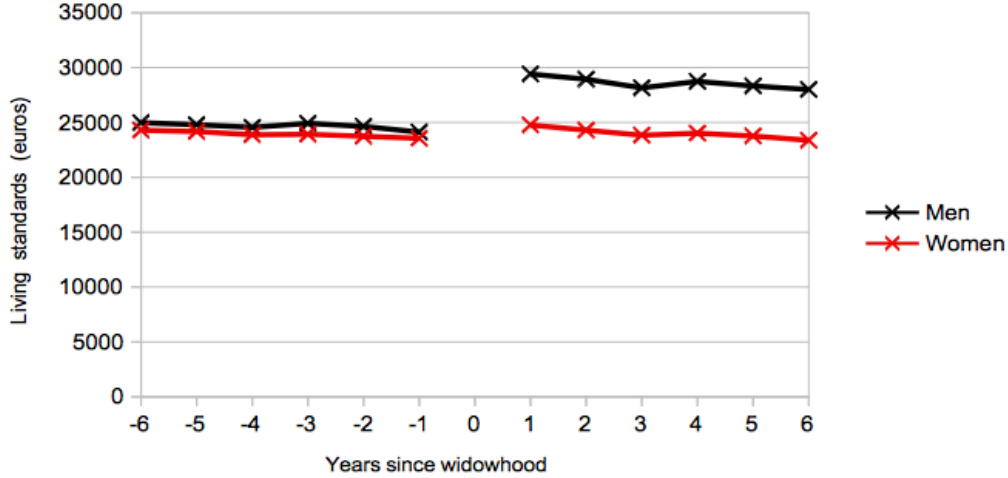
4.1 Descriptive results

Figure 1 shows that living standards before widowhood are quasi-constant at a mean of, respectively, 24,119 euros and 23,549 euros for men and women one year before their spouse's death. This supports my hypothesis that time varying confounders are unlikely. There are no signs of any specific changes in the year preceding widowhood, which implies no anticipatory behaviour and, therefore, the year preceding widowhood can serve as an accurate benchmark of pre-widowhood living standards. The literature often finds anticipation effects or pre-trends that are caused by out-of-pocket medical expenses, which are deducted from income and tend to increase up to the point of death. The absence of pre-trends underscores the fact that in France few out-of-pocket medical expenses are incurred before death. These descriptive results suggest that living standards increase for both men and

¹⁸Both those interpretations of TWFE coefficients are currently being reassessed (Roth et al., 2023 ; Sun and Abraham, 2021), appendix 27.3 provides a robustness check in line with the current econometric literature.

women following the spouse's death, indicating that Bonnet and Hourriez's 2008 hypothesis may be correct about women's living standards quickly rising upon entering widowhood.

Figure 1: Evolution of mean living standards, by gender



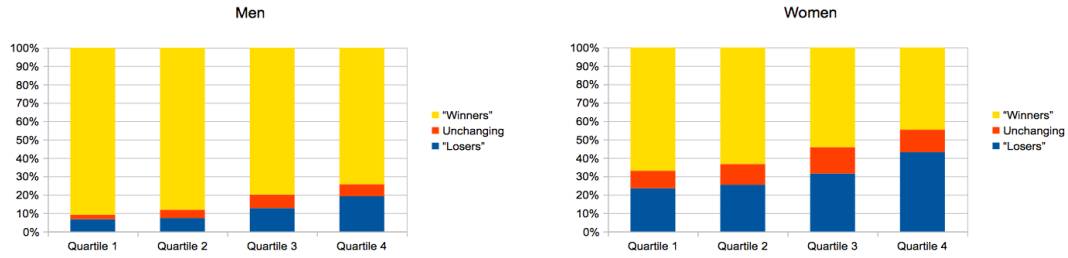
Sample: retired widows and widowers, 55 years old and older. N = 9,882 men and 23,670 women. EDP (2019 edition).

Although the descriptive results show a mean increase in living standards after the spouse's death, this mean may be hiding some winners and losers. To disentangle those individuals, I divide my sample into three groups that are defined by variations in living standards occurring between one year before and one year after the spouse's death.

- The *winners* are those whose living standards increase by more than 2.5% upon entering widowhood. This group contains 8,174 men and 13,446 women.
- The *unchanging* are those whose living standards vary between -2.5% and +2.5% relative to pre-widowhood. This category has 540 men and 2,849 women.
- The *losers* see their living standards decrease by more than 2.5%. Here, we have 1,168 men and 7,375 women.

After calculating the share of individuals in each group according to the pre-widowhood quartile distribution of living standards (Figure 2), I find that a majority of people belong to the winner and unchanging groups, with a higher share of men being winners and a higher share of women in the unchanging group. When considering the initial quartile in the distribution of living standards, a similar pattern emerges for men and women, with a higher share of both being winners in the bottom quartiles rather than in the top quartiles. This may be explained by means testing for survivor's pensions or by the top quartiles having more egalitarian contribution to household income.

Figure 2: Types of variation in living standards following widowhood



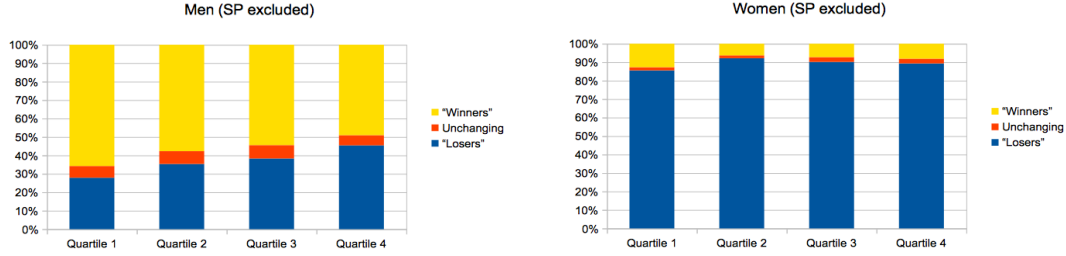
Sample: retired widows and widowers, 55 years old and older. N = 9,882 men and 23,670 women. EDP (2019 edition)

Figure 3 shows that the share of losers increases for both men and women when we exclude the survivor's pensions from the groups in Figure 2, with 30% of men in the first quartile becoming losers upon widowhood and 45% in the fourth quartile. The change is even greater for women, as 80% to 90% experience a loss in living standards when not taking into account the survivor's pension.

One question arises: Are the winners overcompensated by their survivor's pension? Not all those who were winners in Figure 2 are winners in Figure 3. So, to answer the question, one should take into account the fact that the winners fall into three categories when taking into account the survivor's pension:

- Group 1 – partial overcompensation: These people experience an increase in living standard upon widowhood only because the survivor's pension increases their income. From the smoothing target point of view, these survivors are partially overcompensated.

Figure 3: Types of variation in living standards following widowhood (excluding survivor's pensions)

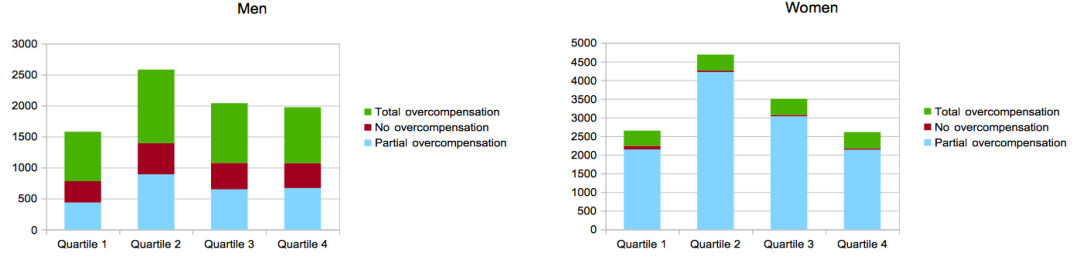


Sample: retired widows and widowers, 55 years old and older. N = 9,882 men and 23,670 women. EDP (2019 edition).

- Group 2 – no overcompensation: These people experience an increase in living standard upon widowhood but receive no survivor's pension. Thus, they are not overcompensated by the survivor's pension because it does not cover them at all.
- Group 3 – total overcompensation: These people receive a survivor's pension but would experience an increase in living standard upon widowhood even without the pension. From the smoothing target perspective, the survivor's pension compensates them unnecessarily and this is a total overcompensation related to a failure in eligibility criteria.

Figure 4 presents the breakdown of these three groups who were winners in figure 2. Among men, 20% of the winners are not beneficiaries of the survivor's pension; 50% are beneficiaries even though their living standards would increase without taking the survivor's pension; and only 30% are partially overcompensated. Among women, most of the winners are overcompensated, but they become losers when not taking into account their survivor's pension. They constitute between 80% and 95%, depending on the initial quartile. Another 10% to 15% receive a survivor's pension though it could be deemed unnecessary, and a minority are winners that receive no survivor's pensions. Thus, according to the smoothing objective, membership in the winners' category appears to be linked mainly to partial overcompensation for women and to overall poor targeting of the survivor's pension for men.

Figure 4: Types of winners after widowhood (headcount)



Sample: retired widows and widowers, 55 years old and older, who belong to the winner category after widowhood. $N = 8,174$ men and 13,446 women. EDP (2019 edition).

4.2 Regression results

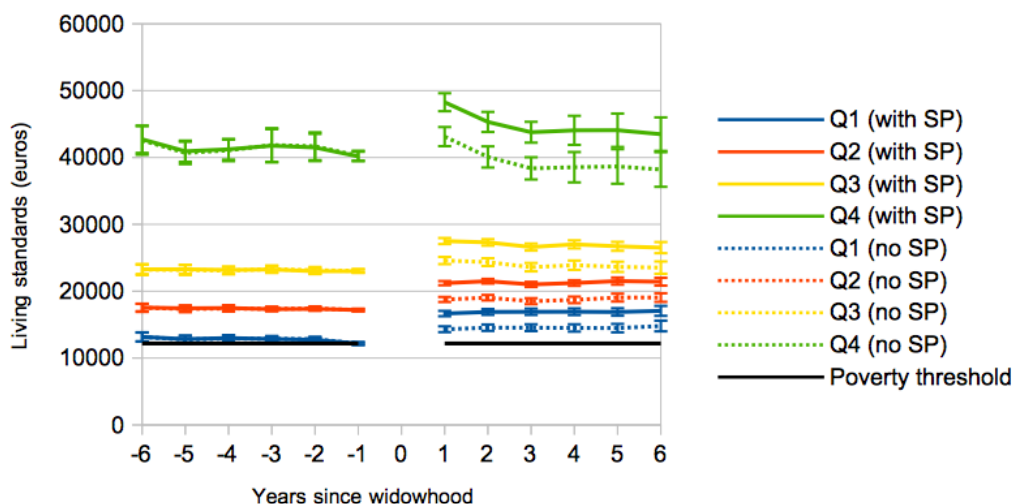
4.2.1 Regression with heterogeneity from position in the living standard's distribution

Although men's living standards increase after spousal death in all quartiles (Figure 5), the greatest relative increase occurs at the bottom of the living standard distribution, at 37% of pre-widowhood living standards in the first quartile compared to 23% in the second and 20% in the third and fourth. After widowhood, living standards remain constant over time, except at the top of the distribution. Men in the fourth quartile see a small continuous decrease in living standards in the six years following spousal death, a trend that seems to be linked with wealth income. In our sample, wealth income decreases from the beginning of the observation period to the end, which is consistent with the de-accumulation of wealth in old-age.

The smoothing target is exceeded in the case of men. Is this due to the survivor's pension or just a consequence of the unit consumption effect? To understand this, Figure 5 also plots the evolution of living standards when excluding the survivor's pension, showing that men experience higher living standards upon widowhood even considering only pre-survivor's pension living standards. The rise ranges from 7% in the fourth quartile to 18% in the first. This may be attributed to the unit consumption effect and the fact that men are more often the main earners in couples. The men in my sample contributed an average of 73% to the couple's pre-widowhood income. Although survivor's pensions are not the

main driver of men becoming winners upon widowhood, it certainly adds to it by increasing the rise by 19 percentage points in the first quartile and 13 percentage points in the last.

Figure 5: Evolution in men's living standards by quartile upon widowhood



Source: EDP men widowed between 2011 and 2016, EDP (2019 edition). N = 1,738 in quartile 1; 2,931 in quartile 2; 2,554 in quartile 3; and 2,659 in quartile 4.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals. The poverty threshold is set at 60% of the mean living standard in 2015 (source: INSEE).

Lecture: one year into widowhood, quartile 1 men's living standards are 4,480 euros more annually than their level one year before bereavement. When survivor's pension are excluded from the measure of living standards, their living standards increase by 2,141 euros.

Women's living standards increase moderately after spousal death, except in the fourth quartile (Figure 6). Relative to pre-widowhood living standards, one year into widowhood women's living standards increase by 16% in the first quartile, 8% in the second, 5% in the third, and remaining constant in the fourth quartile. Looking at women in the fourth quartile, their living standards tend to trend backward in the year following spousal death, which, again, may be linked to wealth income. Living standards remain mostly constant in the other quartiles over the six years for which I can observe individuals.

The smoothing target is met in the first three quartiles, and temporarily in the last one. Overcompensation occurs since living standards are not constant but increase in the three bottom quartiles. To what extent does the survivor's pension contribute to that result?

Figure 6 answers that question by showing that women experience a large decrease in living standards in all four quartiles when not taking into account their survivor's pension. Relative to one year before spousal death, the drop one year after is 36% in the first quartile, 42% in the second, and 39% in the third and fourth. The average effects by quartile show that the survivor's pension prevents a drop in living standards due to losing one spouse's earnings. This corrects women's living standards by 52 percentage points in the first quartile, 50 in the second, 43 in the third, and 36 in the fourth. Though the top of the distribution is compensated less as a percentage of past living standards, its survivor's pensions are far higher in value than in other quartiles, at about 15,000 euros a year in the fourth quartile, and between 6,000 and 10,000 euros a year in the other quartiles. Thus, the system has an ambiguous character in terms of redistribution, whereby overcompensation occurs in the lower quartiles while more money is spent in the upper ones. Survivor's pension schemes have been criticised for redistributing wealth by taking it from single people and giving it to the married. We can see here that, in relative terms, redistribution indeed occurs in the upper quartiles for married couples.

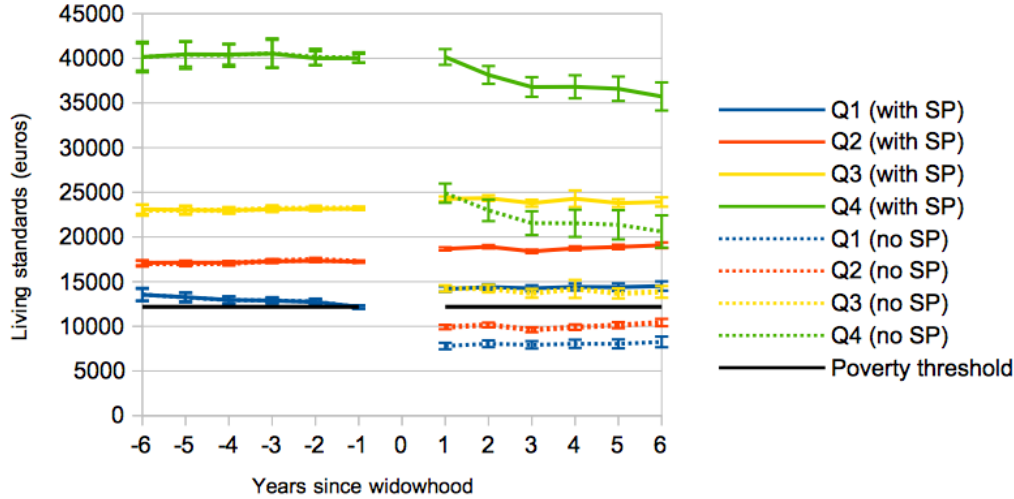
Between 2011 and 2016 in France, average living standards appear to be smoothed or increased upon widowhood in all four quartiles for men and women. This is consistent with other European results, which find that women tend to see a moderate rise in living standards upon widowhood. Another important result here concerns the assistance target. Figures 5 and 6 show a convergence in the smoothing and assistance targets. When excluding the survivor's pension, men's living standards remain above the poverty threshold while women fall under it in the two bottom quartiles. Thus, the survivor's pensions allow women, on average, to rise back above the poverty threshold and thereby satisfy both the insurance and assistance objectives.

4.2.2 Regression with heterogeneity from breadwinner status

Breadwinner status is determined by the ratio of the survivor's income to the couple's income¹⁹ one year before widowhood. It can be viewed as a proxy for marital speciali-

¹⁹"Couple income" is the sum of each member of the couple's individual income. Individual income encompasses labor market income, unemployment benefits, retirement pensions, private transfers received.

Figure 6: Evolution in women's living standards by quartile upon widowhood



Source: EDP women widowed between 2011 and 2016, EDP (2019 edition). N = 3,954 in quartile 1; 7,406 in quartile 2; 6,468 in quartile 3; and 5,842 in quartile 4.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals. The poverty threshold is set at 60% of the mean living standard in 2015 (source: INSEE).

Lecture: one year into widowhood, quartile 1 women's living standards are 1,984 euros more annually than their level one year before bereavement. When survivor's pension are excluded from the measure of living standards, their living standards decrease by 4,345 euros.

sation, whereby the person specialising less in labour market activity will tend to have a lower ratio. Figures 7 and 8 show that the variation in living standards upon widowhood is similar for men and women when accounting for breadwinner status. The smaller contributors group remains stable one year after spousal death. The egalitarian contributors experience an increase of 11% and 9% in living standards for, respectively, men and women one year after widowhood. Men and women in the larger contributors group also see a rise of, respectively, 27% and 19%, which is higher than the rise for egalitarian individuals. Clearly, men still tend to fare better than women across all breadwinner statuses, likely because their average contribution to household income is higher than women in the same category.²⁰

²⁰Among higher contributors, men's average share of the couple income is 82%, while women's is 76%. Among egalitarian contributors and smaller contributors, the figures are respectively 53%

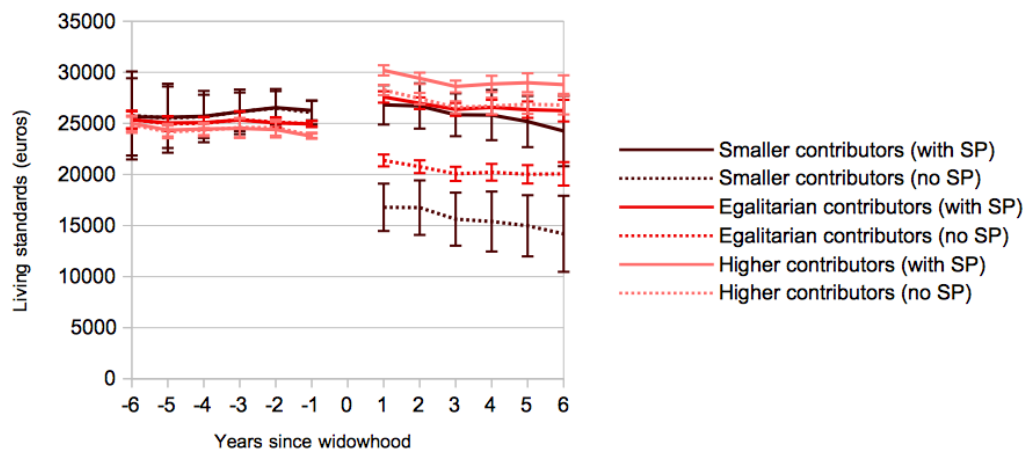
Figures 7 and 8 emphasise the impact of survivor’s pensions. In all groups, the survivor’s pension contributes to increasing living standards. Without taking into account the survivor’s pension, the variation in living standards is clearly linked to breadwinner status, that is, pre-widowhood contribution to household earnings. It is only the larger contributors who experience an increase in living standards (of 19% for men and 5% for women), while egalitarian couples and smaller contributors experience a drop in living standards. The greatest drop occurs for the smaller contributors group, where the decreases are 36% for men and 52% for women. The egalitarian group’s living standards drop by 24% for men and by 31% for women. All of these results are consistent with my analysis of the underlying mechanisms driving the variation in living standards upon widowhood. When not taking into account corrective factors, the variation is determined mainly by past contribution to household income. How does the survivor’s pension impact the initial situation when the spouse dies? For smaller contributors, survivor’s pensions enable a smoothing of living standards around the time of spousal death, which thereby achieves the smoothing target. For egalitarian contributors, survivor’s pensions slightly overcompensate both men and women on average, which thus qualifies as partial overcompensation. In the case of higher contributors, the survivor’s pension increases their initial standard of living and thus qualifies as total overcompensation. These results show that even though survivor’s pensions achieve their objective, they could be calculated better for egalitarian couples and reduced for larger contributors.

5 Conclusion and limitations

The two main contributions of this paper are as follows. First, in quantifying the economic consequences of spousal death across the income distribution in France between 2011 and 2016, I find that living standards increase on average for both men and women. The increase is greater in average for men than women (17% v. 2%). The average increase is negatively linked to the pre-widowhood quartile. Even after excluding survivor’s pensions from the measure, my results show that living standards still increase for men while they

and 27% for men and 47% and 22% for women.

Figure 7: Evolution in men's living standards by breadwinner status upon widowhood



Source: EDP men widowed between 2011 and 2016, EDP (2019 edition). N = 289 smaller contributors; 2,499 egalitarian contributors; and 7,094 larger contributors.

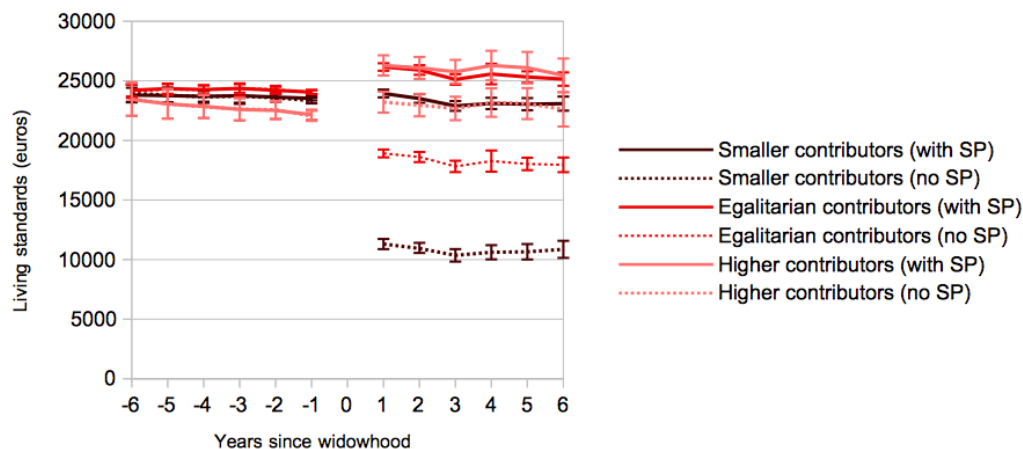
Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, smaller contributors men's living standards are 553 euros more annually than their level one year before bereavement. When survivor's pension are excluded from the measure of living standards, their living standards decrease by 9,282 euros.

decrease for women, although this decrease for women disappears when taking into account survivor's pensions. The French system achieves the smoothing objective while also alleviating poverty. Absent any other changes in sources of income, this implies that the increase in men's living standards is first due to a unit consumption effect, an interpretation that is supported by descriptive statistics and our evidence on breadwinner status. Survivor's pensions tend to add to this effect.

My second main contribution lies in providing empirical evidence that the survivor's pension exceeds the smoothing objective prioritized by the contemporaneous analysis on survivor's pension. I show that over-compensation, defined by the smoothing target, is closely related to breadwinner status, as the secondary providers in couples are, on average, adequately compensated in accordance with the survivor pension smoothing objective; while, on the other hand, egalitarian contributors are partially overcompensated (by 11 and 9 percentage points for, respectively, men and women) and the primary providers are totally overcompensated (by 8 and 14 percentage points for, respectively, men and women).

Figure 8: Evolution in women's living standards by breadwinner status upon widowhood



Source: EDP women widowed between 2011 and 2016, EDP (2019 edition). N = 15,028 smaller contributors; 7,454 egalitarian contributors; and 1,188 larger contributors.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, smaller contributors women's living standards are 413 euros more annually than their level one year before bereavement. When survivor's pension are excluded from the measure of living standards, their living standards decrease by 12,030 euros.

One way to avoid such a pattern would be to take into account past contributions to the couple's income in order to more closely link compensation to anticipated variations in living standards upon the death of a partner.

All in all, between 94% and 80% of men are overcompensated (depending on the quartile), and between 83% and 60% of women. At 1.6% of GDP in 2020, survivor's pensions are such a large social security expenditure in France that the budgetary consequences of overcompensation are likely to be notable. The question naturally arises: In the interests of reforming the French retirement system, should survivor's pensions also be reformed?

In such a case, a cautious approach should be taken to minimising or eliminating overcompensation. The share of overcompensated widows and the monetary amounts are determined by how living standards are defined for assessing the smoothing objective. First, it depends on the consumption unit used to measure living standards. Using a robustness check based on an alternative equivalence scale (Hourriez and Olier, 1998), I still find that survivor's pension alleviates the shock of widowhood to a great degree. Yet, on average,

women's living standards do not increase upon widowhood, which suggests that they are less overcompensated than the first results indicate. Second, smoothing living standards has different meaning depending on the kind of income included. In the present paper, standards of living include income derived from wealth. However, it is not obvious that the social system should compensate for the decline in this type of income. Excluding this income source would alter our results differently depending on the initial living standard quartile, and may change some conclusion on under- and overcompensation.

Another aspect to consider is that the level of compensation – which is defined through income and living standards – represents just one aspect of the economic welfare of the widowed. For similar income levels, the experience of widowhood is not the same for two people with different levels of wealth. Taking into account wealth and income, a more holistic approach to the economic consequences widowhood, is all the more needed as older couple have more wealth than younger ones. Looking more closely at the de-accumulation and inheritance of wealth in old age may change our understanding of the economic welfare of widows, because focusing on such dynamics may confirm or elaborate on the common perception that the widowed are well off.

Eventually, overcompensation according to the smoothing objective is not necessarily a problem when the system has to cope with a redistributive imperative. My descriptive results find that redistribution indeed occurs and that undercompensation is more frequent among women who are higher up in the income distribution. More specifically, 27% of women in the bottom quartile are undercompensated, while this is the case for 45% of them in the top quartile. The regression results show that overcompensation is higher in the bottom quartile. For women, survivor's pension increases living standards from -36% +16% (overcompensation by 16 percentage points) in the bottom quartile, while it increases from -39% to 0% in the top quartile. Overcompensation in the bottom quartiles moreover allows women to remain above the poverty threshold, thereby contributing to redistribution as well as to the assistance goal of the survivor's pension. The French survivor's pension is not unified under one overarching scheme but has, instead, been historically shaped by different schemes pursuing different goals. In order to improve survivor's pensions, it is first necessary to redefine those goals.

6 Tables

Table 3: The effect of widowhood on living standard, men

	Pre-Survivor's Pension Living Standards				Post-Survivor's Pension Living Standards					
	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4
6 years before event	968*** (0.000)	984*** (0.000)	341 (0.113)	186 (0.499)	2,299*** (0.001)	1,040*** (0.000)	987*** (0.000)	361* (0.068)	279 (0.249)	2,563*** (0.000)
5 years before event	330*** (0.031)	597*** (0.001)	165 (0.273)	126 (0.593)	417 (0.376)	480*** (0.001)	663*** (0.000)	251* (0.068)	289 (0.187)	773* (0.086)
4 years before event	461*** (0.001)	770*** (0.000)	239* (0.077)	44 (0.764)	803* (0.068)	566*** (0.000)	818*** (0.000)	290** (0.023)	178 (0.172)	1,062** (0.014)
3 years before event	714*** (0.006)	721*** (0.000)	176** (0.015)	261** (0.048)	1,601* (0.078)	671*** (0.009)	682*** (0.000)	127* (0.06)	255** (0.044)	1,600* (0.077)
2 years before event	619*** (0.001)	665*** (0.000)	245*** (0.000)	91 (0.381)	1,421** (0.037)	514*** (0.007)	550*** (0.000)	164*** (0.002)	-5 (0.958)	1,336** (0.05)
Year of spouse's death	-527*** (0.002)	335 (0.107)	134 (0.509)	-422 (0.151)	-1,937*** (0.000)	2,797*** (0.000)	2,715*** (0.000)	2,600*** (0.000)	2,526*** (0.000)	3,353*** (0.000)
1 year after event	2,018*** (0.000)	2,141*** (0.000)	1,582*** (0.000)	1,547*** (0.000)	2,867*** (0.000)	5,323*** (0.000)	4,480*** (0.000)	4,012*** (0.000)	4,507*** (0.000)	8,109*** (0.000)
2 years after event	1,249*** (0.000)	2,370*** (0.000)	1,854*** (0.000)	1,308*** (0.000)	-178 (0.677)	4,599*** (0.000)	4,723*** (0.000)	4,302*** (0.000)	4,304*** (0.000)	5,155*** (0.000)
3 years after event	431*** (0.003)	2,372*** (0.000)	1,328*** (0.000)	552*** (0.002)	-1,887*** (0.000)	3,859*** (0.000)	4,743*** (0.000)	3,821*** (0.000)	3,605*** (0.000)	3,617*** (0.000)
4 years after event	601*** (0.008)	2,333*** (0.000)	1,520*** (0.000)	847*** (0.000)	-1,716** (0.027)	4,099*** (0.000)	4,750*** (0.000)	4,032*** (0.000)	4,014*** (0.000)	3,900*** (0.000)
5 years after event	688** (0.011)	2,311*** (0.000)	1,871*** (0.000)	600** (0.015)	-1,607* (0.087)	4,120*** (0.000)	4,716*** (0.000)	4,321*** (0.000)	3,722*** (0.000)	3,914*** (0.000)
6 years after event	618** (0.026)	2,626*** (0.000)	1,870*** (0.000)	485 (0.139)	-2,056** (0.029)	3,927*** (0.000)	4,882*** (0.000)	4,229*** (0.000)	3,524*** (0.000)	3,328*** (0.000)
Observation	9,882	1,738	2,931	2,554	2,659	9,882	1,738	2,931	2,554	2,659
R-square within	0.0058	0.0702	0.0349	0.0137	0.0084	0.0375	0.2418	0.1715	0.106	0.0196

*** p<0.01, ** p<0.05, * p<0.1

*** p<0.01, ** p<0.05, * p<0.1

Source: EDP men widowed between 2011 and 2016, EDP (2019 edition).
Note: regression results.

Table 4: The effect of widowhood on living standard, women

	Pre-Survivor's Pension Living Standards					Post-Survivor's Pension Living Standards				
	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4
6 years before event	338** (0.049)	1,419*** (0.000)	-220** (0.049)	-231 (0.297)	53 (0.926)	253* (0.098)	-120 (0.195)	-43 (0.829)	133 (0.8)	
5 years before event	301** (0.037)	1,088*** (0.000)	-242*** (0.004)	-225 (0.178)	281 (0.571)	263*** (0.043)	-100 (0.144)	-129 (0.392)	435 (0.343)	
4 years before event	219** (0.031)	779*** (0.000)	-212*** (0.001)	-253*** (0.01)	248 (0.485)	189** (0.042)	-111** (0.03)	-178** (0.035)	408 (0.223)	
3 years before event	352** (0.014)	766*** (0.000)	70 (0.123)	-42 (0.644)	483 (0.377)	262* (0.06)	31 (0.432)	-54 (0.524)	507 (0.346)	
2 years before event	229*** (0.000)	636*** (0.000)	212*** (0.000)	-14 (0.796)	72 (0.664)	133*** (0.002)	112*** (0.001)	-3 (0.949)	-13 (0.935)	
Year of spouse's death	-14,704*** (0.000)	-8,502*** (0.000)	-12,431*** (0.000)	-14,420*** (0.000)	-22,712*** (0.000)	-4,320*** (0.000)	-3,588*** (0.000)	-4,267*** (0.000)	-6,846*** (0.000)	
1 year after event	-9,207*** (0.000)	-4,345*** (0.000)	-7,331*** (0.000)	-8,993*** (0.000)	-15,183*** (0.000)	1,131*** (0.000)	1,435*** (0.000)	1,126*** (0.000)	133 (0.513)	
2 years after event	-9,562*** (0.000)	-4,091*** (0.000)	-7,103*** (0.000)	-9,002*** (0.000)	-17,105*** (0.000)	769*** (0.000)	1,681*** (0.000)	1,194*** (0.000)	-1,874*** (0.000)	
3 years after event	-10,210*** (0.000)	-4,214*** (0.000)	-7,636*** (0.000)	-9,533*** (0.000)	-18,536*** (0.000)	104 (0.246)	2,075*** (0.000)	633*** (0.000)	-3,227*** (0.000)	
4 years after event	-9,909*** (0.000)	-4,099*** (0.000)	-7,348*** (0.000)	-9,041*** (0.000)	-18,554*** (0.000)	394*** (0.009)	2,228*** (0.000)	1,130*** (0.006)	-3,207*** (0.000)	
5 years after event	-9,977*** (0.000)	-4,106*** (0.000)	-7,128*** (0.000)	-9,542*** (0.000)	-18,721*** (0.000)	268** (0.029)	2,201*** (0.000)	639*** (0.000)	-3,423*** (0.000)	
6 years after event	-9,922*** (0.000)	-3,883*** (0.000)	-6,830*** (0.000)	-9,373*** (0.000)	-19,473*** (0.000)	204 (0.181)	2,331*** (0.000)	764*** (0.000)	-4,287*** (0.000)	
Observation	23,670	3,954	7,406	6,468	5,842	23,670	7,406	6,468	5,842	
R-square within	0.2498	0.3934	0.5702	0.3790	0.2271	0.0381	0.1646	0.0759	0.0236	

*** p<0.01, ** p<0.05, * p<0.1

Source: EDP women widowed between 2011 and 2016, EDP (2019 edition).
Note: regression results.

7 Appendix

7.1 Attrition due to mortality

Attrition happens when individuals exit a data-set for one or more years during the observation period. The EDP is an administrative panel, which has lower attrition than a non-administrative panel. Nevertheless, people can still temporarily or permanently disappear from the EDP. The most common types of exits from the EDP are death or entering a collective living facility such as a nursing home. Attrition is very likely in our sample because it comprises individuals over 55 years old, with an average age of 77.5 years. In our sample, 3,018 men and 3,817 women died between their spouse's death and 2017 (end of observation period).

If attrition is selective, it can be a problem for estimating the impact of widowhood because bias may arise if the poorer widows and widowers die first and exit the data-set while the richer stay until the end of the observation period. Considering that richer widows face a larger drop in living standard, I may be overestimating the overall decrease in living standards after spousal death. To assess whether attrition has generated bias in my estimates, I use descriptive statistics to ascertain whether the sub-sample of deceased widows is similar to that of widows surviving until the end of the observation period (see table 5).

The deceased widows and widowers are older than those who survived. They also appear to be slightly less well off, having 1,000 euros less than survivors both in living standards and in retirement pensions before the spouse's death. What is more, the poverty rate of the deceased is 2 percentage points higher. Differences in the shares of household income and property owners are small and appear negligible. Finally, there is a moderate difference in monthly survivor's pensions, which are slightly less for deceased widows and widowers. The deceased groups appear to be less well off than the survivors. Though the differences are small (with the exception of age at spousal death), selective attrition is a legitimate concern that could affect my result.

To assess if bias is caused by these moderate differences in economic status, I run my fixed effects specification on both groups (see figures 9 and 10). Descriptive statistics show that pre-widowhood living standard levels are slightly different, but the trends and coeffi-

Table 5: Descriptive statistics according to gender and mortality

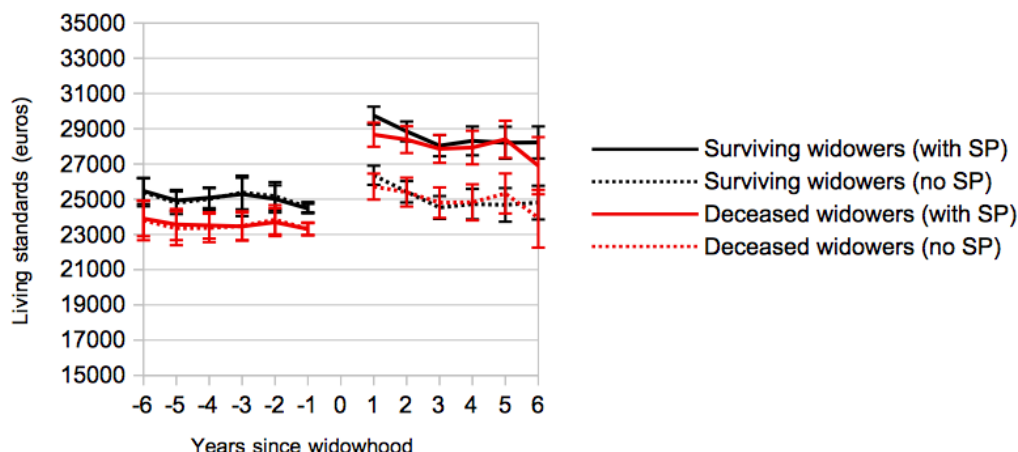
	Men		Women	
	Deceased widower	Surviving widower	Deceased widower	Surviving widow
Average age at widowhood	83	76	82	76
Mean yearly living standards (euros)	23,404	24,433	22,606	23,730
Mean annual individual income (euros)	22,136	23,107	9,073	10,530
Share of survivor's pension beneficiaries (%)	78	80	98	98
Mean monthly survivor's pension (euros)	338	383	907	929
Rate of poverty (at 60% of median income)	8.58	6.6	8.54	5.85
Contribution to household income (%)	74	72	31	32
Share of landowners (%)	82	83	82	83
Observations	3,018	6,864	3,817	19,853

Source: EDP (2019 edition).

Sample: Retired widows and widowers, 55 years old and older. The deceased widowed groups comprise individuals who died between their spouse's death and 2017. The widowed individuals in the other groups survived until the end of the observation period.

cient after spousal death are similar. Bearing in mind both this and that the coefficient's confidence interval overlaps, we cannot conclude to different effect of widowhood for the two groups. Upon widowhood, the deceased widower's living standards increase by 23%; and they still increase by 10% even after excluding the survivor's pension, which therefore means that the pension adds a 13 percentage-point increase to their living standards. The picture is similar for the sample of surviving widowers, whose living standards increase by 22% with a survivor's pension and by 7% without it. The survivor's pension thus adds 15 percentage points to the living standards of these men. Both samples are equally similar for the women, as the living standards of the widows increase by 5% with a survivor's pension and they decrease by 39% when excluding it. Thus, survivor's pensions offset the drop in living standards by 44 percentage points for women. Attrition through death does not significantly change the results.

Figure 9: Evolution in living standards among men according to attrition groups



Source: EDP men widowed between 2011 and 2016, EDP (2019 edition). N = 3,018 deceased widowers and 6,864 surviving widowers.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

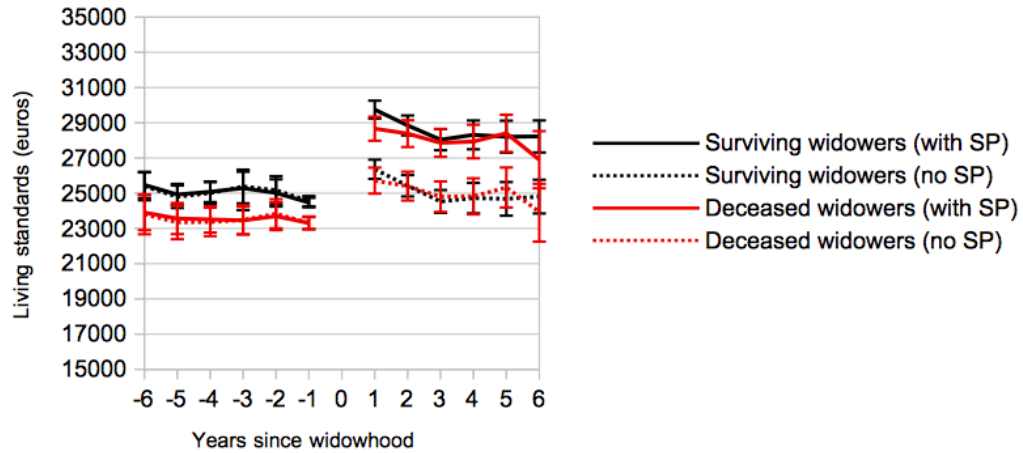
Lecture: one year into widowhood, surviving widowers' living standards are 5,278 euros more annually than their level one year before bereavement. When survivor's pension are excluded from the measure of living standards, their living standards increase by 1,811 euros.

7.2 Sensitivity to equivalence scales

Living standards are a common measure that the literature uses to estimate how the survivor's pension achieve the smoothing target. A living standards measure is based on aggregating income and by adjusting for household size using consumption units. Any estimate based on living standards is thus sensitive to the choice of equivalence scale. My previous regression used the OECD-modified equivalence scale, which I chose because it allows for international comparisons and adequately matches the consumption structure of older people.

However, using that scale in the context of widowhood studies has been criticised because it assumes residential mobility. That is, people will change homes in cases of economic or household shock. Although it has been shown that widows tend to move after widowhood, moving is less likely for homeowners than tenants (Bonnet et al., 2007). In my

Figure 10: Evolution in living standards among women according to attrition groups



Source: EDP women widowed between 2011 and 2016, EDP (2019 edition). N = 3,817 deceased widows and 19,853 surviving widows.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, surviving widows' living standards are 1,132 euros more annually than their level one year before bereavement. When survivor's pension are excluded from the measure of living standards, their living standards decrease by 9,281 euros.

sample, 83% of individuals are home owners one year before widowhood. As a response to that criticism, Hourriez and Olier, 1998 calculated an alternative equivalence scale. Table 6 summarises some important differences between that scale and the OECD-modified scale.

In some ways, the alternative scale takes into account more economies of scale than the original OECD-modified scale. Given that consumption units for a couple are between 1 and 2, the closer a couple is to 1, the greater their scale economies. This has two implications with regard to my research. First, the same income will be subject to higher pre-widowhood living standards with the alternative scale than with the original one. Second, a higher income is needed to compensate widows upon widowhood. Under conditions of residential mobility, the survivor now needs 72% of his or her pre-widowhood couple income to maintain constant living standards. This is likely to affect some of my results regarding the compensation level of survivor's pensions.

Table 6: Comparison of equivalence scales

	Original Scale	Alternative Scale
Consumption unit for a two-adult household	1.5	1.39
Consumption unit for a one-adult household	1	1
Income level needed to maintain living standards (as % of couple's pre-widowhood income)	67	72

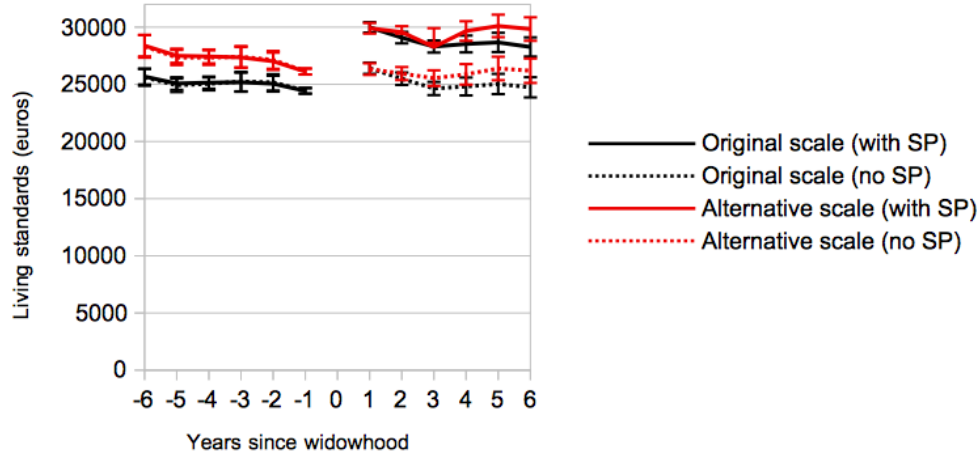
Note: the original scale is the OECD-modified equivalence scale. The alternative scale is the Hourriez and Olier scale.

To assess the sensitivity of my results to the equivalence scale, I use both the OECD and alternative equivalence scales to measure the living standards on a sample of widowed individuals transitioning from a two-adult household one year before the spouse's death to a single-adult household one year after. When reduced to that specific household trajectory, our sample contains 7,976 men and 19,732 women.

Figure 11, shows the influence of the equivalence scales on the sample of men. As expected, average pre-widowhood living standards are higher when using the alternative scale rather than the original one. Our baseline OECD-modified scale shows that, one year after widowhood, living standards increase by 23% when including survivor's pensions and 8% without them, thus demonstrating a 15-percentage point contribution of survivor's pensions to that gain. Gains are smaller with the alternative baseline: 15% with survivor's pensions and 1% without them. Though the estimates of the gains are lower, survivor's pensions still increase living standards by 14 percentage points. Regression results on men are very similar with both equivalence scales.

Figure 12, shows the influence of the equivalence scales on the sample of women. Although the same mechanisms are at play in both samples of men and women, the impact on women is more notable. The baseline living standards of women increase by 4% when including survivor's pensions, and they decline by 47% without them. Survivor's pensions offset the drop in living standards by 51 percentage points. With the alternative equiva-

Figure 11: Influence of both equivalence scales on men



Source: EDP men widowed between 2011 and 2016, EDP (2019 edition). N = 7,976 men and 19,732 women. SP = survivor's pension.

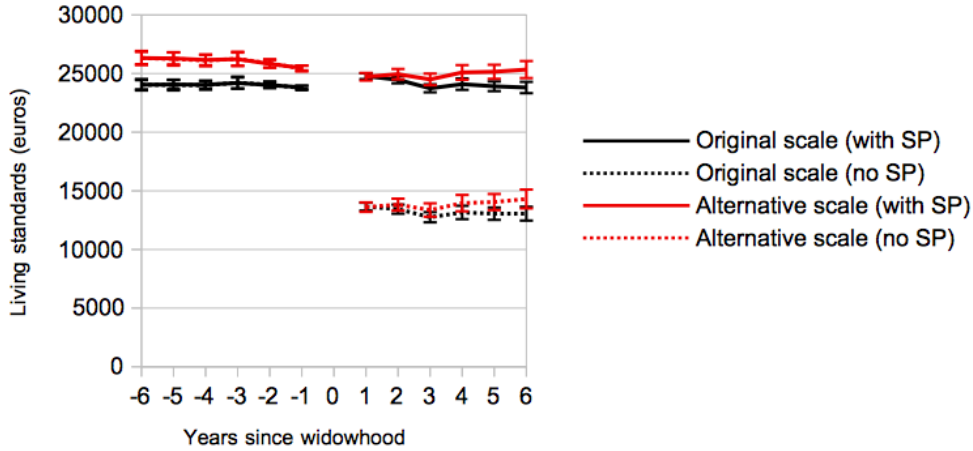
Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, widowers' living standards are 5,556 euros more annually than their level one year before bereavement with the original scale. When survivor's pension are excluded from the measure of living standards, their living standards increase by 1,967 euros.

lence scale, women's living standards decrease regardless of whether or not the survivor's pension is included (by 3% with it and 46% without it). Survivor's pensions still offset the drop by 43 percentage points. The alternative equivalence scale shows that the living standards of women in our sample no longer increase but instead experience a moderate and temporary drop; as, four years into widowhood, they are not significantly distinct from the year preceding it.

Given that the results show a moderate difference between the two equivalence scales, one may reasonably ask which scale should be employed. From the perspective of a positive comparison over time and of countries, it is better to use the OECD-modified equivalence scale used by most papers on living standards. However, taking a normative viewpoint, using the present results on survivor's pensions in order to guide policy-making requires first answering the following question: Is it better for the widowed to change homes after

Figure 12: Influence of both equivalence scales on women



Source: EDP women widowed between 2011 and 2016, EDP (2019 edition). $N = 7,976$ men and 19,732 women. SP = survivor's pension.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, widows' living standards are 949 euros more annually than their level one year before bereavement with the original scale. When survivor's pension are excluded from the measure of living standards, their living standards decrease by 10,115 euros.

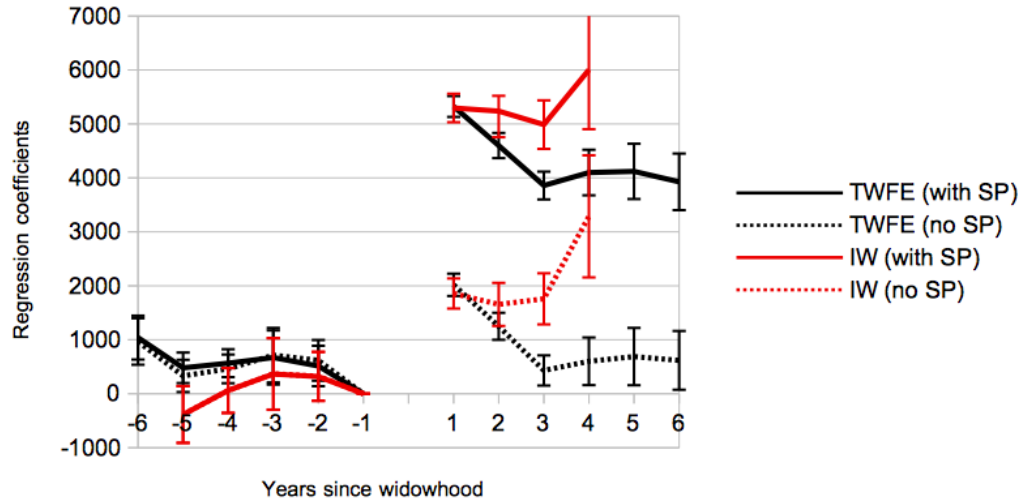
a spouse's death? All in all, the results are similar with both equivalence scales. Men's living standards increase upon widowhood, thus showing an evident overcompensation due to the survivor's pension. Women's average living standards either rise moderately or fall moderately, then stabilise at pre-widowhood levels. The survivor's pension thus offsets a large drop in living standards for women.

7.3 Alternative method for treatment estimation

Two-way fixed effects regression have been widely used to estimate difference-in-differences designs with panel data. Yet the use of those models with a staggered treatment has been questioned in recent years (Roth et al., 2023). Our sample is composed of individuals who are widowed in different years, which mean that treatment is staggered. Our data include 6 treatment cohorts (one for each year of spouse death between 2011 and 2016). In the case

of specifications with event studies (with indicators coding time-periods relative to treatment), Sun and Abraham, 2021 criticized the classical two-way fixed effects. First, their paper highlights the difficulty to interpret the TWFE coefficient as an average treatment effect because of the weights it uses to aggregate cohort-specific treatment effects. Second, the paper shows that TWFE coefficients are at risk of being biased when the treatment effect homogeneity assumption is breached. Contamination arises between different period coefficients. To solve these problems they propose an alternative estimation method of treatment effect with DID design, event studies specification and staggered treatment. It relies on measuring cohort-specific average treatment effects and aggregating them with easily understandable weights: the cohorts' shares of the sample for the period in which effect is estimated. We use Sun and Abraham's method as a robustness test for our TWFE regression.

Figure 13: TWFE and Sun-Abraham's estimators, men sample



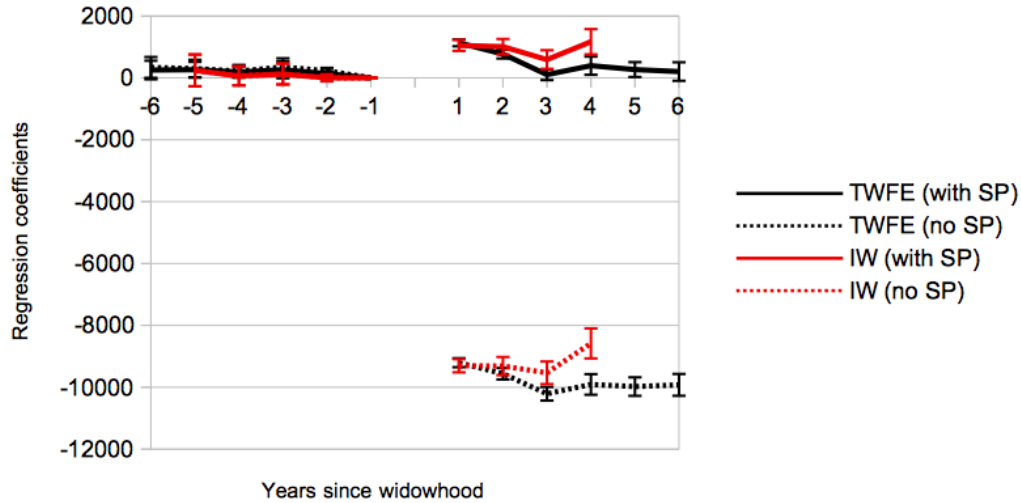
Source: EDP men widowed between 2011 and 2016, EDP (2019 edition). N = 9,882.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, men's living standards are 5,323 euros more annually than their pre-bereavement level according to TWFE, they are 5,323 euros less according to Sun and Abraham's IW estimator.

The Sun and Abraham's estimator (also called "interaction-weighted estimator" or IW

Figure 14: TWFE and Sun-Abraham's estimators, women sample



Source: EDP women widowed between 2011 and 2016, EDP (2019 edition). N = 23,670.

Note: the figure plots the regression coefficients and model intercept at 95% confidence intervals.

Lecture: one year into widowhood, men's living standards are 1,131 euros more annually than their pre-bereavement level according to TWFE, they are 1,131 euros less according to Sun and Abraham's IW estimator.

estimator) uses a control group. In the present settings, the last cohorts of widowed is used as a control group. To implement it, years 2016 and 2017 are dropped from the sample. As a result, the Sun and Abraham estimator cannot evaluate effects more than 4 years away from widowhood.

Figures 13 and 14 show results obtained by TWFE and Sun and Abraham's IW estimators. On both men and women's samples, results are similar between the two estimators before widowhood and up to two years following spouse's death.

Before widowhood, confidence intervals overlap. Results cannot be said to be significantly different. IW coefficients are non-significant. Sun and Abraham's method can also be used as a test of the absence of pre-trend. The fact that coefficients before widowhood are not significantly different from zero implies that there is no pre-trend on average in the two samples.

After widowhood, confidence intervals overlap up to two year after bereavement for

men and up to three years for women. Coefficients more remote from spouse death significantly differ between the two methods. Sun and Abraham's IW estimator's coefficients are significantly higher than the TWFE's. There may be some contamination of the TWFE's coefficients happening on the medium run. By comparing our result with TWFE to the Sun and Abraham estimator, it can be concluded that on the short run (two first years following widowhood) our result are unbiased. On the medium run, they are biased downward. Only short run result should be used.

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