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Do late-life divorces produce greater gender inequalities?

Evidence from administrative data

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Abstract

Though the number of divorces has stabilized in several European countries at prime age, it continues to increase at older ages. Drawing upon a large French administrative database, the Échantillon Démographique Permanent (Permanent Demographic Sample), a panel study that follows 4.4% of the French population every year, this paper presents new findings on the economic consequences of grey divorces, occurring at age 50 and over. We implement a two-way fixed-effect regression with a control group to assess the causal effects of divorce on men and women. To do so, we compare divorced individuals with people that will divorce but have not done so yet. The results confirm that the decrease in living standards is larger, on average, for women than for men. For the former, this decrease is larger when divorce occurs after 50 (24% one year after the divorce) than before (18%). Thus, grey divorce increases gender inequalities following break-ups. Public and private transfers mitigate post-grey divorce gender inequalities, especially for the poorest women. Recovery through re-partnering plays an important role in moderating the negative consequences of divorce

Keywords : grey divorce, gender inequalities, living standards, public transfer, private transfer, two-way fixed effects

JEL Codes: J12; J14; J16; I38

1 Introduction

After a sharp increase in recent decades, the risk of divorce has now stabilized in Northern European countries, and has even declined in some, including the United Kingdom and France (Fahey, 2020). However, the number of divorces is still increasing at older ages, leading to the emergence of the “Grey Divorce Revolution” concept (Brown and Lin, 2012 ; Kennedy and Ruggles, 2014). Among individuals divorcing in 2010 in the United States, more than a quarter were over the age of 50, compared to only 10% in 1990. This phenomenon partly results from the large generation of baby boomers reaching these ages. Yet that is not the only explanation. The risk of divorce after 50 has also increased significantly. In the United States, the divorce rate has doubled in the last twenty years from almost 5 (in 1990) to 10 (in 2010) divorces per 1,000 married individuals aged 50 and over. In 2019, the divorce rate was a bit lower and reached 9.6% (Brown and Lin, 2022). In France, while the risk of divorce is still low at high ages, it is also at these ages that it has increased the most in the last 40 years (Prioux et al., 2012) and it continues to do so (Solaz, 2021). Such a strong increase in divorce at advanced ages has led to new research on its determinants and implications (Lin et al., 2018). However, work on the economic consequences of divorce at these ages is still underdeveloped. The abundant literature devoted to the economic consequences of divorce mainly focuses on individuals of working age and imposes an upper age limit, which varies, depending on the authors, from 44 years old (Le Bourdais et al., 2016) to 60 years old (Leopold, 2018 ; Andreß et al., 2006), and more rarely 65 years old (Uunk, 2004 ; McManus and DiPrete, 2001). Very few studies tackle the 50 and older, with the exception of Lin and Brown, 2021 et Lin et al., 2018 who focus on American data.

The literature on the economic consequences of divorce on working age individuals concludes that women’s living standards deteriorate after divorce. This decline ranges between 7% and 30% in the most recent works (Leopold, 2018 ; Le Bourdais et al., 2016 ; Andreß et al., 2006 ; Bayaz-Ozturk et al., 2018). For men, the results differ from one study to the other. An increase in living standards is sometimes observed (Finnie, 1993 ; Smock, 1993 ; Smock, 1994 ; Bianchi et al., 1999), or a small decrease is documented (Burkhauser et al., 1991 ; McManus and DiPrete, 2001). The variation in the results between existing studies can be explained by differences in the scope, data used, sample size, and indicators

selected. However, when there is a drop in living standards for men, it is always smaller on average than what is observed for women, which leads to strong gender inequalities.

Several reasons explain the limited literature on the economic consequences of divorce in later life. Until very recently, this type of divorce was a rare event. Therefore, from an empirical point of view, few data were available to analyse it. Another reason may be the implicit assumption that the economic consequences for those aged 50 and over would be similar to those at younger ages. However, several factors lead us to believe that such a hypothesis is not credible and that the consequences of divorce after age 50 might be more pronounced than at younger ages, and ultimately generate more gender inequalities.

In this article, we therefore study the economic consequences of divorce after age 50. This approach, the first using European data, was made possible by large administrative databases, such as the Échantillon Démographique Permanent (Permanent Demographic Sample, henceforth EDP), recently becoming available in France. This database results from the matching of different data sets, in particular fiscal data. The impact of divorce on a representative panel of 4.4% of the French population over a period of 9 years can thus be measured. We implement a two-way fixed-effect regression with a control group (composed of not yet divorced individuals) to assess causal effects.

Three main results stand out from our analysis. First, we find that women's living standards decrease after divorce, and that the decrease is larger for grey divorcees compared to divorces occurring at younger ages. The average decrease reaches 24% one year after the divorce for older divorcees, while it is less than 18% for younger ones. Men also experience a decrease in living standards, but it is far less pronounced than for women. Men's living standards slightly decrease one year after the divorce and this decrease is of comparable magnitude for men of all ages (3% for young and 6% for grey divorced individuals). Economic inequalities between women and men are therefore greater following a late divorce compared to a divorce at younger ages. Second, we highlight the key role of public and private transfers in moderating the decline in women's living standards after a grey divorce. This decline would be much more pronounced (35% on average) for women without the existence of these transfers. Public transfers have a limited but significant negative impact on men. Third, the effects of divorce are heterogeneous along the distribution of living standards. The decline is more important for older divorced

individuals belonging to wealthier households before the divorce.

The paper is organised as follows. We describe the specificity of divorces after age 50 in France in Section 2. Then we present our database and our sample in Section 3. The empirical strategy is presented in Section 4 and the results in Section 5. Section 6 is devoted to a heterogeneity analysis. Section 7 provides the discussion and conclusion.

2 The specific features of grey divorces : evidence from France

2.1 A more pronounced marital specialization after age 50

The literature has highlighted the link between marital specialization within the couple, measured as the income gap between spouses, and the variation in living standards after divorce (Bonnet et al., 2021 ; McManus and DiPrete, 2001). The larger the income gap within the couple, the greatest the decline in living standards for women. The within-couple income gap tends to be more pronounced after the age of 50 than at younger ages (Morin, 2014), both because of the adoption of a more traditional model of conjugal specialization (generation effect) and of the longer marriage duration that characterizes these older couples (life-cycle effect). When the union is longer, marital specialization has been implemented for a longer time and is generally stronger, with greater consequences on career trajectories. It is especially the case for retired couples, as pensions reflect the entire career trajectory, both in terms of wages and labour market participation. A wide gap between men's and women's pensions reflects the gender wage gap during working life, as well as the greater specialization of women in the domestic sphere, as they exit the labour market or frequently use part-time work (Tinios et al., 2015 ; Bonnet et al., 2018). A greater specialization among older couples who divorce may also be found as Stancanelli, 2014 highlights that the most traditional couples in their marital arrangements are those most at risk of late divorce. For all these reasons, it is therefore likely that the economic consequences are more pronounced for women after the age of 50.

2.2 The role of private and public transfers after age 50

The economic consequences of divorce are closely linked to the institutional context (Uunk, 2004). However, when one divorces after 50, the institutional landscape changes significantly, in particular the scale and nature of public and private transfers. Part of the public transfers received by a household are conditioned or depend on the presence of children or young dependent adults in the household. When couples separate late in life, they are more often without dependent children or with children living outside the home. In addition, part of the public transfers are conditional on a maximum age for including these dependent children. It can be 20 or 21 depending on whether they are still studying. This means that family allowances, which are very common transfers toward families, other benefits (such as minimum social benefits or housing allowances) or tax reductions can be less important. These benefits are significant financial resources for divorced women, who are more often than not children’s custodial parent. Those over 50 years old are less likely to benefit from these transfers (Bac et al., 2011). On the other hand, some welfare benefits become more accessible or higher when the person is getting older ¹.

Regarding private transfers, divorce can result in two types of transfers between former spouses in France. On the one hand, child support may be paid in the event of separation, from the non-custodial parent to the custodial parent. These transfers are used to compensate for the additional child cost borne by the custodial parent after the divorce. 97% of child maintenance debtors are men (Belmokhtar, 2014). Child support thus tends mainly to reduce men’s living standards after divorce (McManus and DiPrete, 2001), while it improves the situation of mothers, who are in most cases the custodial parent (Bonnet et al., 2021). Because of a smaller number of children among divorced people aged 50 and over, child support payments may contribute less to improving the divorced mother’s living standards and symmetrically constitute less of a financial burden for the father. Child support could also be less important because, as children get older, the probability of shared physical custody (with no child support transfers generally) or primary custody by the father increases, to the detriment of mothers’ primary custody (Algava et al., 2019).

A second type of private transfer is important after age 50: spousal alimony. The

¹For instance, ASPA (*allocation spécifique pour personnes âgées*) is a social benefit that only people over 65 can apply for.

latter is paid directly to the former spouse and is explicitly intended to compensate for excessive disparities in the living conditions between ex-spouses. It is therefore mainly paid by men and received by women. The length of marriage and the age of the former spouses are explicitly taken into account by the judges to determine the spousal alimony benefit (Jeandidier et al., 2020 ; Bourreau-Dubois and Doriat-Duban, 2012). At the time of divorce, those who ask for a spousal alimony transfer and get it are older on average than the rest of divorced individuals. In 2013, while one out of five divorces resulted in spousal alimony (Belmokhtar and Mansuy, 2016) in the whole population, the figure reached 30% for divorces involving women aged 55-64². Spousal alimony thus aims and tends to reduce gender inequalities after divorce, particularly for late divorces.

2.3 Less effective recovery mechanisms after age 50

The literature on the economic consequences of divorce at younger ages has highlighted the recovery mechanisms at work to compensate for the negative economic shock of divorce. Re-partnering (Dewilde and Uunk, 2008, Lin and Brown, 2021) or an increase in labour market participation are the two main mechanisms that can mitigate or even cancel out a decline in living standards. These two mechanisms may function differently after the age of 50.

First, the chances of re-partnering decrease with age for both men and women (Solaz, 2021). At all ages, divorced women are less likely than divorced men to be in a relationship again, and this gender gap increases with age. Thus, re-partnering as a possible means of recovery is less likely after divorce at older ages than after divorce at younger ages (Brown et al., 2019; Schimmele and Wu, 2016), especially for women who are in a more unfavourable position in the union market because of an unbalanced sex ratio (Solaz, 2021).

Second, the role of the labour market is more ambiguous. On the one hand, children leaving home or becoming older can relieve women from domestic and parental constraints and allow them to return to work or increase their working hours (Goldin and Mitchell, 2017). A positive effect of divorce on women's activity after the age of 50 has already been shown in the North American context (Olivetti and Rotz, 2017). Such an effect has not yet been established for men. The positive effects on labour force participation may mitigate

²Source: "Rapport du conseil de l'âge sur les femmes seniors", 2019, HCFEA.

the decline in living standards following divorce (Couch et al., 2011 ; Bonnet et al., 2021). However, on the other hand, late divorced individuals could face difficulties in returning to work after age 50 as retirement approaches (Beck et al., 2017). The labour market may discriminate against older workers and those who have interrupted their careers.

Finally, compared to younger ages, the specificity of the population aged 50 and over is the ability to retire. A large proportion of individuals in our sample can retire at a minimum age between 60 and 62 years old,³ with people generally retiring no later than age 65 (few individuals retire later in France). Divorce can affect retirement by delaying it or hastening it. Finally, a possible reverse causality should be mentioned, if the transition to retirement affects the probability of separating (Doorley and Stancanelli, 2019). For those already retired at the time of divorce, the chances of recovering are much more limited since working when retired is not very common in the French context.

Divorce has little direct impact on retirement pension in France. There is no division of pension rights between spouses. An individual's pension depends on their own trajectory on the labour market, a minimum pension mechanism, and the number of children raised, but not on the spouse's characteristics. In the main retirement system of private sector employees, divorce does not cause the loss of the right to a survivor's pension. Yet, that survivor's pension is means tested, and re-cohabiting after divorce changes the income of the survivor's household, thus leading to the suspension of the pension.

Grey divorces thus present many specificities that make it difficult to generalize the results obtained on the economic consequences of divorce at younger ages. This article aims to measure the variation in economic living standards induced by divorce for men and women aged 50 and over. That variation in living standards results from the direct effects of divorce (linked to the end of the pooling of expenses and economies of scale that characterize married life) and the indirect effects linked to institutional compensation via public transfers (social assistance and taxes) and private transfers between former spouses (child support and spousal alimony).

³Following the 2010 pension reform, the minimum legal retirement age gradually increased from 60 to 62 years old for the 1951 to 1955 birth cohorts.

3 Data, outcome and variables

3.1 Data and sample

Although divorce after 50 has been increasing (30% of divorces in 2010 involved an individual over 50, 36% in 2020 in France), it is still a “rare” event in the general population⁴. A large data set is required to get enough events to analyse the consequences of late divorces. We use the Permanent Demographic Sample (Échantillon Démographique Permanent, henceforth EDP) administrative database. It follows all the individuals born on the first four days of January⁵, April, July and October who reside in France. The database includes 4.4% of the French population and gathers various sources of administrative information (census, civil status, tax data, employer data, etc.) concerning them. Since the date of birth is random, the EDP is a large database that is representative of the French population, which is ideal for studying the dissolution of unions in a sub-population such as the over-50s.

As the EDP socio-fiscal data starts in 2010, we follow married people who divorced over the 2010-2018 period. These data accurately describe the composition of the household (number and age of children), as well as the individuals’ income and the household resources. Since these data are based on tax returns, they are considered more reliable than survey data. It is also possible to identify individuals’ marital history and divorce in particular.

To implement our empirical strategy (see Section 4), we focus on divorces between 2012 and 2014. We select individuals and households for whom household income information is available at least one of the two years before divorce. The sample size respectively includes 7,533 men and 7,829 women aged between 30 and 49 years old⁶ and 3,937 men and 2,742 women over 50 years old⁷ (Table 1). There are fewer women than men among grey divorced

⁴0.8% of married people aged 50 and over in 2015 divorce in 2016 (source: Insee and Ministry of Justice)

⁵For January, to avoid a “new year effect,” the sampled individuals are those born on January 2, 3, 4 and 5.

⁶Individuals are observed for 5 years. The individuals selected into the 30-49 group are aged between 30 and 49 years old during the five years of observations.

⁷In the rest of the article, for the sake of simplicity, we will refer to individuals aged between 30 and 49 years old as “younger than 50” and to individuals aged between 50 and 89 years old as

individuals because of the age gap and the age structure of grey divorces⁸. Finally, when we introduce marital specialization, we need information on both spouses' individual income in 2010 and not only on household income. This subsample includes 7,158 men and 7,475 women younger than 50, and 3,736 men and 2,631 women older than 50 (Table 5).

3.2 Variables of interest

Our main variable of interest is the living standard. It is defined as a household's disposable income divided by consumption units in order to take into account the size of the household and the economies of scale generated by living together. We use the OECD modified equivalence scale⁹. The measure of the living standard and its components is adjusted for inflation, with income expressed in constant 2015 euros.

A household's disposable income includes labour market or replacement income (wages, retirement pensions, unemployment benefits, and income from self-employment (commercial, industrial and agricultural profits)), and financial taxable asset income, as well as net public and net taxable private transfers. Net public transfers include family allowances, minimum benefits and housing allowances, from which taxes paid are deducted (income tax and housing tax). Private transfers include the child support and spousal alimony received, less the private transfers paid. Spousal alimony¹⁰ is only partially collected in the data. Only the spousal alimony whose payment continues a year after a divorce appears in our data. The spousal alimony paid before the one-year mark is therefore unknown¹¹. Yet, it can be argued that such one-shot transfers are related to wealth rather than income. They impact living standards in a similar way as wealth, which is not included in the scope of

“older than 50.”

⁸Among heterosexual couples, there is a 2.5-year age gap between men and women. Men grey divorced tend to have been married to younger women who could belong to a younger age group, around the lower age limit in our sample.

⁹This scale assigns a value of 1 to the household head, 0.5 to each additional adult member or child aged 14 and over, and 0.3 to each younger child.

¹⁰It can be a lump sum transfer (one-shot or staggered for up to 8 years) or an annuity (temporary or life-long)

¹¹These one-shot payments are much less common among grey divorced individuals, while annuities are frequent. Among new divorced in 2013, the average age of the beneficiaries of life annuities was 63 Belmokhtar and Mansuy, 2016).

our analysis. Private transfers to children¹² and young adults in the household are also taken into account because they can affect the living standards of the net payer parent, and create differences between parents according to which of the two pays the children's education costs.

We will extend our results by considering two sources of heterogeneity in the last part of the results section. First, we use quartiles of living standards. Quartiles are measured one year before the divorce with respect to the distribution of living standards in the whole population. Second, we approximate marital specialization by the share of the household resources that one spouse provides.

The year of separation is the legal divorce year, since a divorce can only be declared to the tax authorities once the divorce proceedings have been completed or the divorce has been allowed by the family court judge. Considering the aim of this paper, the legal divorce year (or judge authorization) is more relevant than the date of *de facto* separation (which could have occurred the same calendar year or the previous year) to study post-divorce private and public transfers. Indeed, private transfers are paid only following the divorce judgment. In particular, spousal alimony is not visible in private transfers until one year after divorce because of tax rules. Information on living standards is available for the years around the divorce, as well as for the divorce year. However, the assessment of living standards for the latter should be taken with caution. Indeed, the tax authorities consider it as a year without a spouse (i.e. the individual's living standard is therefore based on his or her sole sources of income), regardless of the precise date of the divorce during the year. A part of the year may have been spent as a couple and the other part of the year alone. But that is an unlikely hypothesis, given the average duration of divorce proceedings. Therefore, considering that people live alone for the entire calendar year of the divorce partly compensates for the fact that legal divorce is necessarily observed later than *de facto* separation.

¹²From a fiscal point view, child alimony is mixed with spousal alimony.

Table 1: Sample description by age group at the time of divorce

| Age group | Men | | Women | |
|-------------------------------------|-----------|-------------|-----------|-------------|
| | Before 50 | 50 or after | Before 50 | 50 or after |
| Age at divorce | 39.5 | 58.3 | 38.9 | 57.4 |
| Household with children (%) | 89 | 57 | 92 | 45 |
| Participation in labour market (%) | 95 | 68 | 86 | 61 |
| Retired (%) | 1 | 33 | 1 | 29 |
| Contribution to couple's income (%) | 64 | 66 | 38 | 36 |
| Living standards (median - 2015 €) | 19,968 | 22,303 | 19,947 | 22,995 |
| Individual income (median - 2015 €) | 23,632 | 23,537 | 16,950 | 14,339 |
| <hr/> | | | | |
| Marriage duration (%) | | | | |
| 0 to 4 years | 27 | 11 | 22 | 9 |
| 5 to 9 years | 22 | 8 | 22 | 7 |
| 10 years and more | 51 | 81 | 56 | 84 |
| <hr/> | | | | |
| Sample size | 7,533 | 3,937 | 7,829 | 2,742 |

Source: EDP individuals divorced between 2012 and 2014 (EDP, 2019).

Note: each variable is measured one year before divorce, except contribution to couple's income which is measured in 2010.

3.3 Sample description

Table 1 illustrates the specific features of divorces after age 50 (see section 2), with the differences between the characteristics of older and younger divorced individuals.

First, people who divorce after 50 tend to end marriages that lasted longer than those who divorce before 50. Indeed, for more than eight out of ten older divorced individuals, the divorce occurs after more than 10 years of marriage, while it is only the case for 51%-56% among younger individuals. Longer marriages among older divorced individuals may result in higher levels of spousal alimony as suggested in Section 2.2. On average, men provide two thirds of the household income. Specialization, measured as the contribution of a man's individual income to the total household income, is only slightly more pronounced among older divorced individuals (66% instead of 64%). Our hypothesis of higher gendered specialization for older divorced individuals is only partially confirmed. Those who divorce

after age 50 tend to have fewer children at home (before divorce), resulting in fewer public transfers associated with their presence. Finally, as expected because of the possibility of retirement (see section 2.3), older divorced individuals are less likely to participate in the labour market at the time of divorce (68% are active). Returning to the labour market may be more difficult for many of them. However, men aged 50 and older are slightly more active in the labour market than women. All these elements will have consequences on the magnitude of the living standard changes and the private and public transfers after divorce.

4 Empirical strategy

4.1 Estimation of the causal effect of divorce

Estimating the effect of divorce generates two challenges. As any research looking into the causal effect of an event, the evolution of divorced individuals' living standards can only be observed before and after divorce. The evolution of living standards after the divorce date in the absence of a break-up cannot be observed. In a difference-in-difference framework, a control group is needed. Contrary to many difference-in-difference treatments, divorce is not a random event. It certainly results from a selection process that affects income trends. As a result, the control group should be chosen carefully to find individuals whose living standard evolution accurately reflects what it would have been if the divorced had remained married. One rather natural and often used control group would be individuals who remained married over the period considered. However, the continuously married are a bit different from the divorced at these advanced ages. Moreover, the former may have unobserved characteristics that differentiate them from the latter.¹³ For all these reasons, we follow Fadlon and Nielsen, 2021¹⁴. We create a control group composed of people who were to divorce later in the period considered, but had not yet (referred to as "later-treated"). Our treated group includes men and women who divorced between 2012

¹³As a robustness check, we build this group over the period. The results using the continuously married as a control group in Appendix 9.1 are however similar to our main specification

¹⁴We draw from Fadlon and Nielsen, 2021 only with regard to the choice of the control group. The present paper does not implement matching to choose the control group.

and 2014. Our control group includes men and women who divorced in 2015 and 2016¹⁵. Our initial control group includes 4,978 men and 5,258 women younger than 50, and 2,390 men and 1,449 women older than 50 (Table 5).

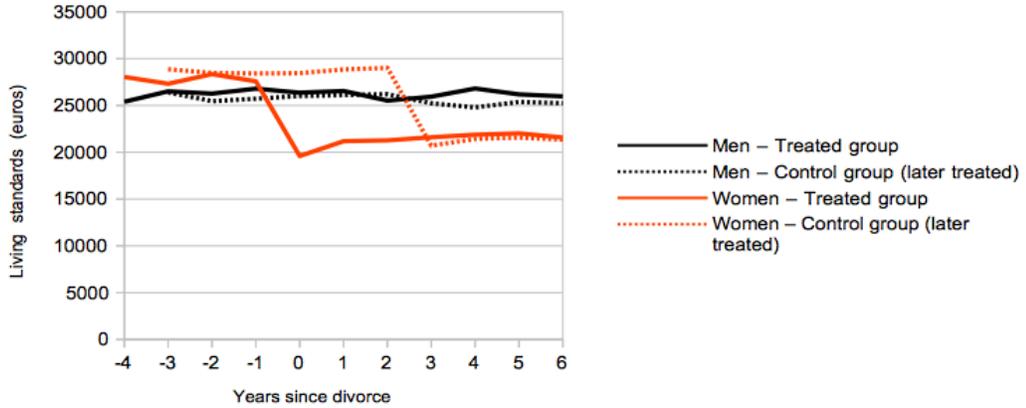
The control and treated groups are separated into sex and age groups. Both the treated and control groups are observed over five years. The treated group is observed two years before divorce and two years after divorce. The control group is observed in the five years preceding divorce. A maximum of four calendar years separate two cohorts of divorced individuals. To compare both groups at the beginning of their trajectories, a baseline period is chosen. It is the second year of observation for both groups. The second year is the year before divorce for the treated. The treated and control groups are very similar (Table 5), regarding most of the characteristics: age, participation in the labour market and contribution to the couple's income. The living standards are slightly higher for the control group among young divorced individuals. Yet the differences are not significant or small: they amount to around 500 euros a year (around 2% or 3%). No such differences arise for individual income, except for women above 50. In this case, the treated have a lower income by roughly 1,500 euros.

The comparison between the groups using a two-way fixed effect estimation is unbiased as long as the control group's living standard evolution is similar to that of the treated group's, had they not divorced in the observation period. The main assumption is that of a parallel trend. To assess the credibility of such an assumption, most papers check whether trends in outcome are parallel (Huntington-Klein, 2021 ; Roth et al., 2023) for the treated and control groups before treatment. Figure 1 shows a very similar evolution in living standards among the treated and control groups for men and women aged 50 and over. If we assume that divorce conditions did not change between 2012 and 2016, we can compare both groups. From a theoretical point of view, both the treated and control groups are undergoing the same selection process. If the selection process impacts income and thus the living standard trend, both groups should be on the same path. Anticipation effects may make that point invalid. However, our sample description does not show such anticipation, as there is no differences between the two groups of divorced individuals.

¹⁵We do not use the whole period available up to 2018. Indeed, a divorce reform was implemented in 2017 making consensual divorce quicker. It may have changed the composition of the divorced.

Trends in pre-divorce living standards for the treated and the control groups of future divorced individuals are very similar whatever the sex and age group (Figure 1).

Figure 1: Descriptive trend of living standards among individuals aged 50 and older



Source: EDP individuals divorced between 2012 and 2016 (EDP, 2019).

Note: average living standards by year relative to divorce. For the control group, an alternative year of divorce is defined, which is three years before the actual divorce date.

4.2 Specification

We use a two-way fixed effect regression model on four different groups, men and women, young and old at divorce (or hypothetical date of divorce for controls).

$$Y_{it} = a_i + \sum_{\substack{j=-2 \\ j \neq -1}}^2 (b^j \times B_{it}^j \times T_i) + c_t + d \times D_{it} + e_{it} \quad (1)$$

i identifies individuals, while t identifies time (here years).

The outcome variable Y_{it} is either living standards in 2015 euros¹⁶ or the log of living standards. B_{it}^j are a set of indicators coding the distance to divorce (in years). T_i is a dummy variable equal to 1 if the individual belongs to the treated group and to 0 otherwise.

¹⁶The analysis on public and private transfers use pre-transfers living standards.

As divorce could be associated to a risk of unemployment and could affect the retirement behaviour, we control for these two variables D_{it} (two dummy variables indicating whether the individual is unemployed and retired). The model also includes a_i , an individual fixed effect, and c_t , a year fixed effect, as well as e_{it} , the idiosyncratic error term.

For the treated, the reference year is the year before divorce. Even if the results for the year of the divorce are displayed, they have to be taken with caution as explained earlier. Our analysis of the effects of divorce relies on the two years following the event. The parameter of interest is b^j . Before divorce, b^j can be interpreted as an anticipation effect or a pre-trend. After divorce, b^j is the effect of divorce, the absolute variation in living standards. When the outcome is the log of living standards, $\exp(b^j) \times 100$ can also be interpreted as the effect of divorce. It is the relative variation in living standards with respect to the reference year, one year before divorce.¹⁷.

5 Main results

5.1 A more pronounced decline in living standards for women over 50

Following divorce, both men and women experience a decline in their living standard, but the loss is much more pronounced for women than men, and among the former, for older women compared with younger ones. Young female divorcees' living standard decreases by 18% ($\exp(-0.198)$) one year after divorce compared to one year before. It falls by 24% ($\exp(-0.278)$) for the grey divorcees. Men's living standards decrease by 3% for the 30-49 group and by 6% for the 50 and over (Table 2 and Figure 2). We cannot conclude that there is a significant difference in the effect of divorce on men depending on their age. The loss for women is roughly 5 times greater than that for men. The year after divorce, women incur a yearly loss in living standard ranging from 4,522 to 6,761 euros, compared to one between 154 and 849 euros for men (Table 2 and Figure3). The recovery after divorce is slow. Two years after divorce, older women's living standard is still 23% lower than before

¹⁷TWFE as a way to implement difference-in-difference and measure a treatment on the treated effect is currently under criticism (Roth et al., 2023 ; Sun and Abraham, 2021). Appendix 9.2 provides a robustness check in line with the current econometric literature.

Table 2: The gendered effect of divorce on living standards

| | Men | | | | Women | | | |
|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | 30-49 | | 50-89 | | 30-49 | | 50-89 | |
| | Variation | Euros | Variation | Euros | Variation | Euros | Variation | Euros |
| 2 years before | -0.002 (0.619) | -121 (0.153) | -0.004 (0.379) | -173 (0.591) | -0.007** (0.032) | -58 (0.53) | -0.003 (0.633) | 271 (0.363) |
| Year of divorce | -0.021*** (0.000) | 27 (0.829) | -0.034*** (0.000) | -909* (0.051) | -0.297*** (0.000) | -5,913*** (0.000) | -0.368*** (0.000) | -8,436*** (0.000) |
| 1 year after | -0.031*** (0.000) | -154 (0.271) | -0.058*** (0.000) | -849 (0.109) | -0.198*** (0.000) | -4,522*** (0.000) | -0.278*** (0.000) | -6,761*** (0.000) |
| 2 years after | -0.023*** (0.001) | 3 (0.984) | -0.056*** (0.000) | -2,434*** (0.000) | -0.173*** (0.000) | -4,134*** (0.000) | -0.259*** (0.000) | -6,245*** (0.000) |
| Retirement | -0.098*** (0.000) | -1,060 (0.133) | -0.087*** (0.000) | -1,858*** (0.005) | -0.114*** (0.000) | -4,148*** (0.000) | -0.006 (0.63) | -1,225** (0.033) |
| Unemployment | -0.076*** (0.000) | -1,706*** (0.000) | -0.071*** (0.000) | -2,012*** (0.007) | -0.023*** (0.006) | -501*** (0.002) | -0.008 (0.613) | -867 (0.19) |
| Observation | 12,098 | 12,098 | 6,033 | 6,033 | 12,326 | 12,326 | 3,830 | 3,830 |
| R-square within | 0.0052 | 0.0046 | 0.0085 | 0.0016 | 0.1342 | 0.0718 | 0.1626 | 0.0585 |

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

Source: EDP individuals divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. The reference year is one year before divorce.

it. For men, the economic situation remains almost unchanged in the years after divorce. Being retired or unemployed play in the expected way: both imply a decrease in household living standards. Their inclusion in the specification does not change the main results on the living standard evolution following divorce (Table 6 and Table 7).

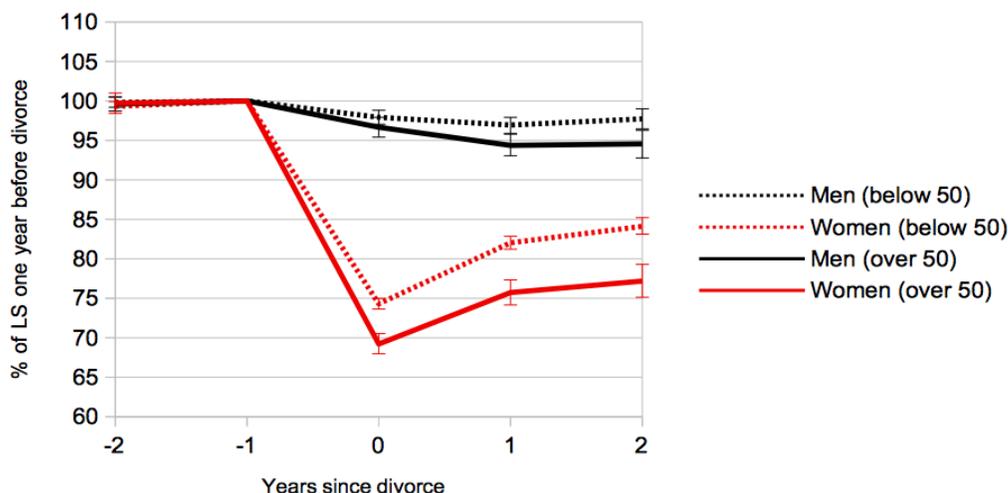
Thus, this more marked decline for women after age 50 compared to younger women, while the variations are fairly similar for men, means that post-divorce inequalities between women and men are greater at older ages. Divorcing after age 50 results in slightly greater gender inequalities.

5.2 The role of public and private transfers after 50

5.2.1 Effects of public transfers

We expect women, who have a lower income than men on average, to benefit more from public welfare (family allowance, housing allowance and minimum social benefits), thus limiting their post-divorce decline in living standards. Men, whose incomes tend to be higher, should benefit less from these public transfers and possibly experience an increase in their taxes because they no longer benefit from deductions linked to their marital status and

Figure 2: The effect of divorce on living standards relative to one year before divorce



Source: EDP individuals, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

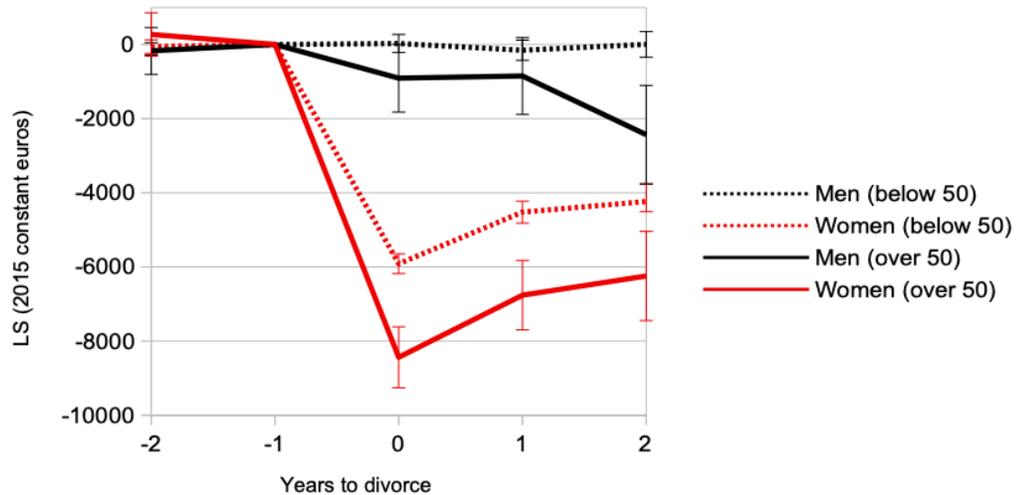
Lecture: one year after divorce, the living standards of women over 50 are 76% of what they were one year before divorce. Their living standards have decreased by 24% between the two periods.

parental status¹⁸. One year after divorce, 25% of men receive public transfers, compared to 49% one year before divorce. About 43% of women received public transfers before and 40% still do after divorce. The average amounts for the beneficiaries are larger after than before divorce. We find that public transfers do play an important role for women in limiting the post-divorce decline in their living standards (Figure 4). Without public transfers, women's living standard decrease by 30% one year after their divorce. With public transfers, this decline is limited to 24%. Public transfers thus contribute to a significant improvement in women's living standards during the years following divorce. Social welfare benefits appear to play a larger role than family or housing benefits.

Public transfers play differently for men. From -3% without public transfers, the decline is -6% when they are included (Figure 5). The difference between those two coefficients is only significant one year after divorce.

¹⁸In the French income tax system, married couples and parents of co-resident children benefit from fiscal gains.

Figure 3: The effect of divorce on living standards (LS), absolute values



Source: EDP individuals divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

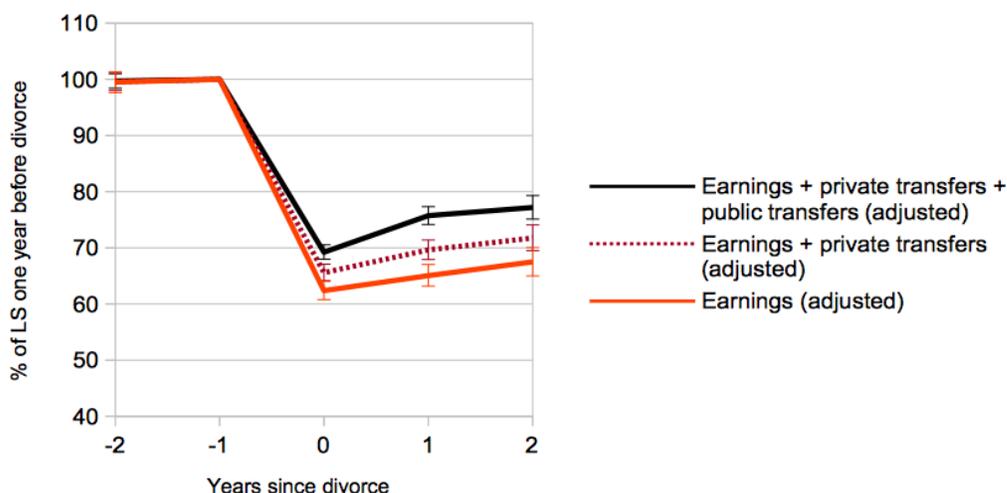
Lecture: one year after divorce, the living standards of women over 50 have decreased by an average of 6,761 euros compared to the reference year, one year before divorce.

5.2.2 The effects of private transfers

We expect private transfers to limit the decrease in women's living standard. Women are more likely to have custody of children after divorce, when they still have dependent children, and as a result to receive child support payments. They are also more often recipients of spousal alimony because of their lower incomes. Symmetrically, private transfers should degrade the living standards of men who are most often the net payers of post-divorce private transfers. In the divorced sample, one year after divorce, 30% of men pay more private transfers than what they receive, compared with 10% one year before divorce. One year after divorce, 19% of women receive more private transfers than what they pay, compared with none one year before divorce. Our hypotheses hold true for women (Figure 4). For them, private transfers reduce the decline in their living standard after divorce. Without any transfers (public and private), the average drop in women's living standard would be around 35% one year after divorce. With private transfers, this decline is lim-

ited to 30%. Without any transfers, men’s living standards are quite stable one year into divorce compared to one year before (Figure 5). As expected, private transfers degrade their income position after divorce. Their living standards increase by roughly 2% one year after divorce without any transfers, while they decrease by 3% when taking private transfers into account.

Figure 4: The effect of divorce on women’s living standards, with private and public transfers included or not



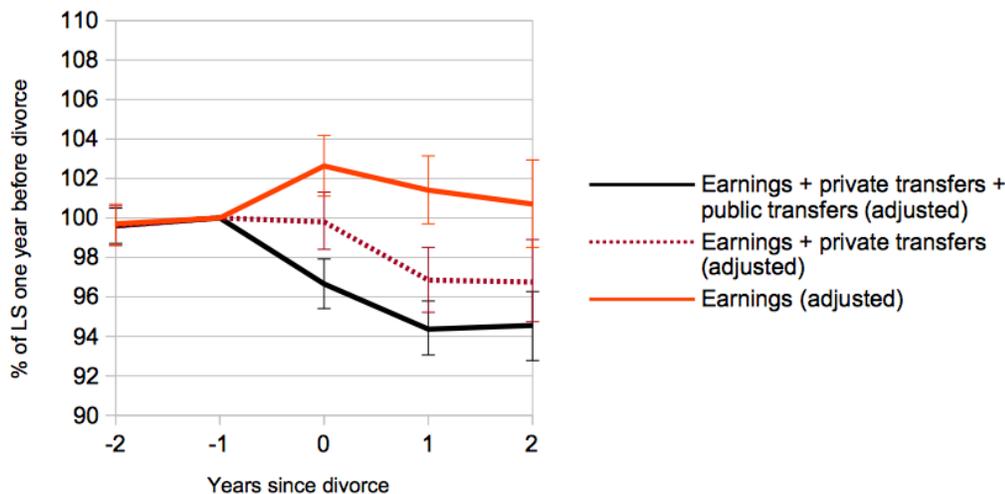
Source: EDP women over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, women’s living standards are 76% of what they were one year before divorce. Their pre-public transfer living standards are 70%, and their pre-transfer living standards are 65% of their reference period level..

Public and private transfers thus play an important role in mitigating the decline in living standards following women’s divorce. The decline incurred without any transfers is reduced by 11 percentage points (from -35% to -24%). The role of these transfers is weaker for men and they play the other way round. Transfers turn a slight increase in living standards for men into a moderate decline one year after divorce. Overall, transfers limit post-divorce inequalities between women and men, at a small cost for men compared to their pre-divorce living standards. Yet, these transfers may play a different role depending

Figure 5: The effect of divorce on men’s living standards, with private and public transfers included or not



Source: EDP men over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, men’s living standards are 94% of what they were one year before divorce. Their pre-public transfer living standards are 97%, and their pre-transfer living standards are 101.5% of their reference period level.

on the position in the distribution of income, since public transfers often act as a buffer against poverty (see our analysis of heterogeneity below).

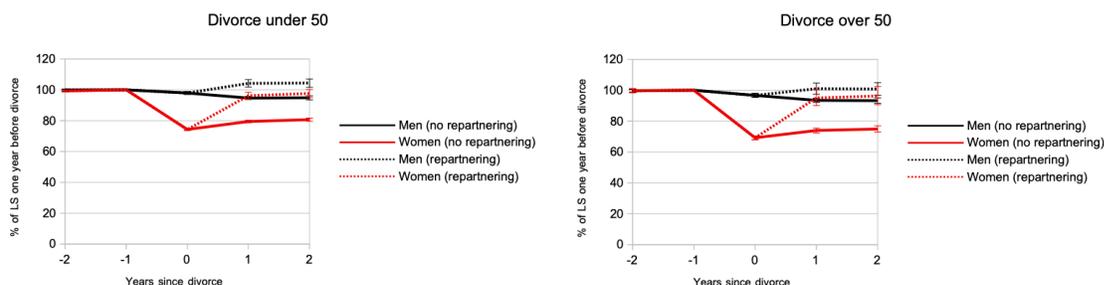
5.3 Re-partnering as a recovery mechanism

Re-partnering is one way to mitigate the decline in living standards. It can be seen as a recovery mechanism. Re-partnering is defined as living as a couple in the same housing after divorce¹⁹. Following divorce, more men than women re-partner. 30% of men aged 30-49 years old and 17% of men aged 50 and over, who divorced in 2012, 2013 or 2014, re-partner within the observed years after the divorce. This phenomenon concerns respectively

¹⁹We checked whether when there is a partner, she is different from the former spouse. Indeed, even in cases of divorce, the two ex-spouses may continue to live in the same home (the so-called Living Together Apart).

23% and 13% of divorced women of the same ages. Re-partnering among older divorced individuals is less frequent than among younger ones. We do not consider the possible endogeneity of re-partnering. However, we know that the characteristics of individuals who re-partner and the partner choice differ between women and men (Bonnet et al., 2019; Brown et al., 2019; Vespa, 2012). Divorced women who re-partner after divorce almost maintain their pre-divorce living standard, thus avoiding the large decline that they would have experienced if they had remained alone after the divorce (Figure 6). For women over 50, the decrease is 26% one year after divorce for those remaining alone, but only 5% for those re-partnering. The compensatory effect of re-partnering is huge, in line with the results of Brown and Lin, 2012. The compensatory effect is even somewhat larger for women divorcing between age 30 and 49. Re-partnering also has a positive effect on the living standard of divorced men compared to those remaining alone. When re-partnered, the living standard of the youngest divorced men is even higher than it was before the divorce. For those 50 and over, re-partnering allows them to maintain their living standards (Figure 6).

Figure 6: The effect of divorce on living standards, according to re-partnering



Source: EDP individuals, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, the living standard of men under 50 who did not re-partner is 95% of what it was one year before divorce. The living standard of the men who re-partnered is 104% of what it was one year before divorce.

Table 3: Sample size by quartile (individuals aged 50 and over)

| Quartile | Men | | Women | |
|----------|---------|---------|---------|---------|
| | Treated | Control | Treated | Control |
| First | 852 | 519 | 482 | 219 |
| Second | 808 | 427 | 555 | 237 |
| Third | 930 | 515 | 707 | 343 |
| Fourth | 1,347 | 759 | 998 | 542 |
| Total | 3,937 | 2,220 | 2,742 | 1,341 |

Source: EDP individuals, divorced between 2012 and 2016 (EDP, 2019).

6 Results: Heterogeneity analysis

6.1 Heterogeneity according to the position in the income distribution

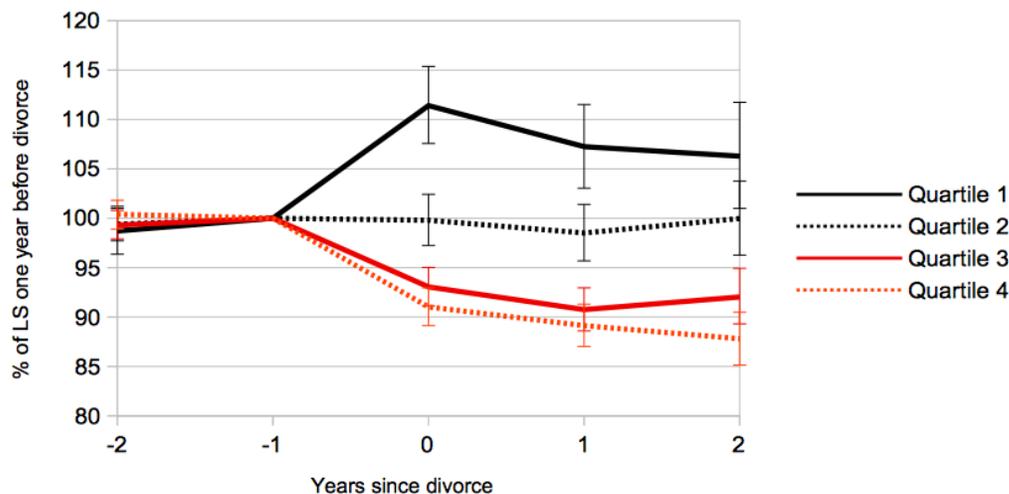
To study the heterogeneous effects of divorce depending on the position in the living standard distribution, we stratify our sample by living standard quartiles. We compute quartiles in the reference period across the whole population (one year before divorce for the treated group and four years before actual divorce for the control group) (table 3).

The variation in living standards is different for men depending on their position in the living standard distribution. The living standard of the poorest men (in the bottom quartile) increases by about 7% one year after divorce (Figure 7), while it remains almost stable in the second quartile. Men in the third and fourth quartiles experience a decline in their living standards by respectively 9% and 11%

A similar pattern emerges for women, but more pronounced along the living standard distribution. The higher the position in the income distribution before divorce, the greater the fall in living standards. The living standards of the richest women (fourth quartile) before divorce decrease by 32%, and by respectively 24% and 19% in the third and second quartiles (Figure 8). The living standard of the poorest women before divorce (first quartile) decreases by "only" 9%.

Figures 9 and 10 highlight the role played by private and public transfers along the living standard distribution. Without any transfers, the decrease in living standards ranges

Figure 7: The effect of divorce on men’s living standards, according to living standards before divorce



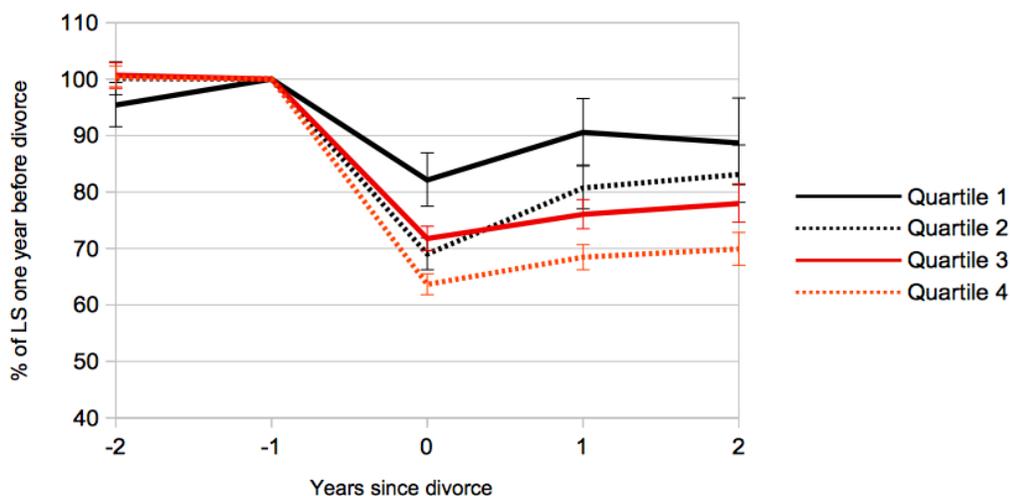
Source: EDP men over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, the living standards of men in the first quartile (at the bottom of the pre-divorce living standard distribution) are 107% of what they were one year before divorce. Their living standards increased by 7%.

from 28% to 40%, respectively for the women at the bottom of the distribution and those at the top. Transfers widen the gradient in the living standard loss. For women at the bottom of the living standard distribution before divorce, the decrease in their living standard without any transfers would be 28% but 9% when they are included. For the richest women, including transfers reduces their loss from 40% to 32%. Public and private transfers reduce the dramatic decrease in living standard by almost two-thirds for the poorest women. Because of small sample sizes (Table 3), we are not always able to significantly distinguish the role played by these two types of transfers along the income distribution. It seems that public transfers, mainly means-tested, play the bigger role, especially for the poorest women. The role of public transfers diminishes as women move up the living standard distribution. For the richest women, their role is practically null. Such a role for public transfers has been observed in other countries where the welfare state is im-

Figure 8: The effect of divorce on women’s living standards, according to living standards before divorce



Source: EDP women over 50, divorced between 2012 and 2016 (EDP, 2019).

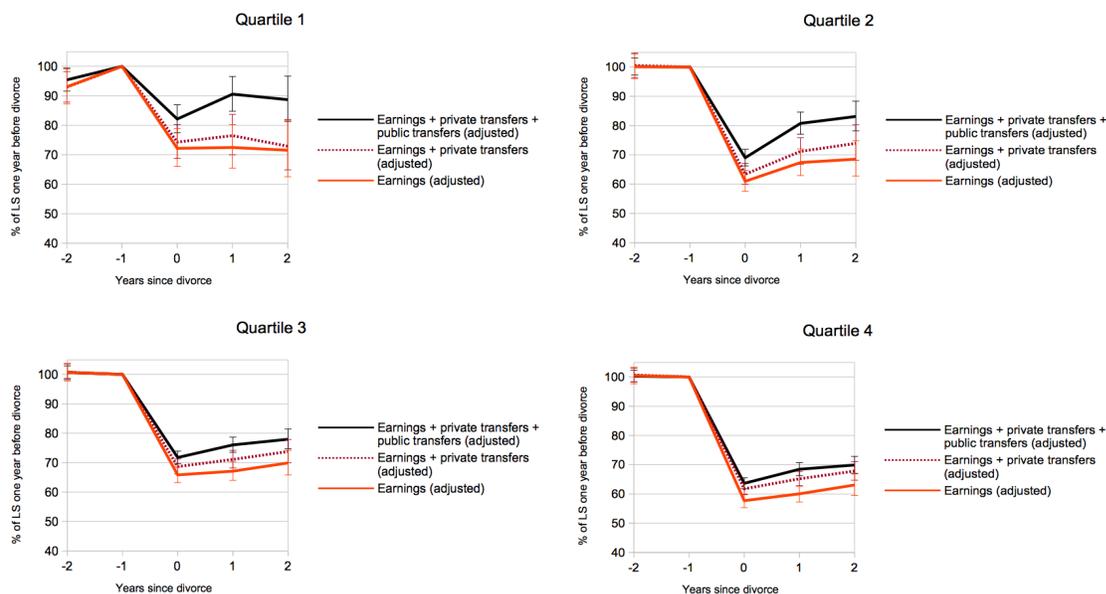
Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, the living standards of women in the first quartile (at the bottom of the pre-divorce living standard distribution) are 91% of what they were one year before divorce. Their living standards decreased by 9%.

portant. For instance, in the Netherlands, Hogendoorn, 2022 concludes that “dissolution prompted income convergence, as women from high-income unions experienced sizeable losses yet women from low-income unions actually gained.” Private transfers also play a role, although to a lesser extent. Their effect on living standards is quite similar along the income distribution, except for the richest women before divorce for whom the effect of private transfers is more pronounced. Among them, the decline in living standard drops from 40% (without any transfers) to 35% when including private transfers.

Among men, we do not observe significant effects of transfers on living standards, except for the richest men before divorce (Figure 10). Among them, without any transfers, the decrease in living standards would have reached 4%. As they are more likely to pay private transfers and less likely to receive net public transfers (receiving fewer welfare benefits or paying more income taxes), including transfers worsens their situation. The

Figure 9: The effect of divorce on women’s living standards, with and without transfers, according to income before divorce



Source: EDP women over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

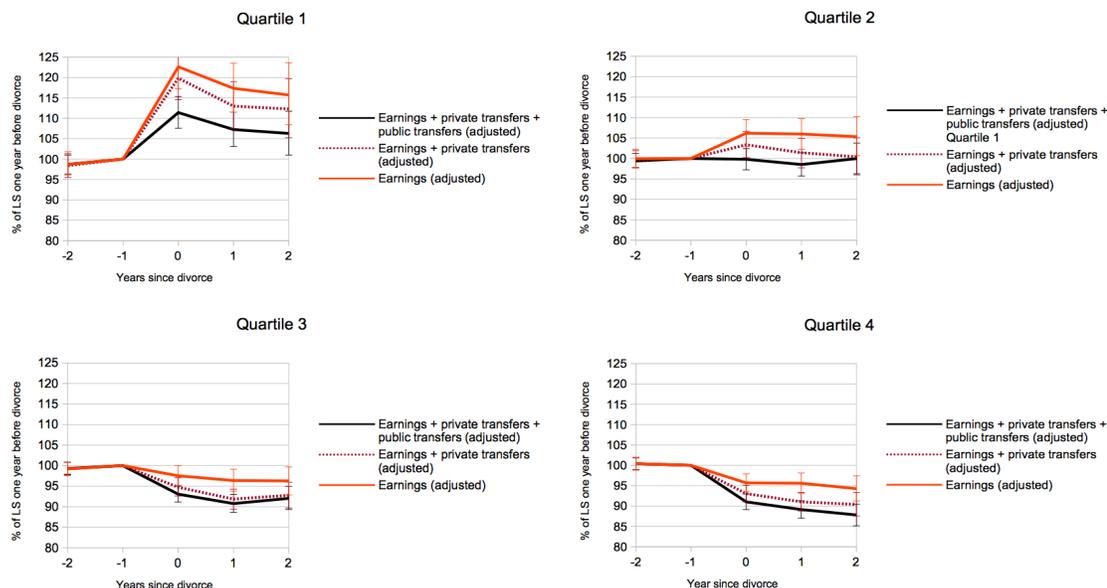
Lecture: one year after divorce, the living standards of women in the first quartile are 91% of what they were one year before divorce. Their pre-public transfer living standards are 76%, and their pre-transfer living standards are 72% of their reference period level.

decrease in living standards is accentuated by 7% extra percentage points, reaching 11%. Yet, disentangling the effect of public and private transfers is not possible (overlapping confidence intervals).

6.2 Heterogeneity by marital specialization

Marital specialization, approximated by the share of household resources that one spouse provides, plays a role in the variation in living standards following divorce. The literature (Bonnet et al., 2021 ; McManus and DiPrete, 2001) highlights a greater drop in living standards for the secondary provider of income within the couple. To study the role of this specialization, we stratify our sample into three groups according to the distribution of the

Figure 10: The effect of divorce on men’s living standards, with and without transfers, according to income before divorce



Source: EDP men over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, the living standards of men in the first quartile are 107% of what they were one year before divorce. Their pre-public transfer living standards are 113%, and their pre-transfer living standards are 117% of their reference period level.

contributions to the couple’s income. We define individuals who contribute less than 40% of the couple’s total income as “smaller contributors” (secondary provider), and those who contribute more than 60% as “higher contributors” (main provider). The other individuals are classified as “egalitarian,” with each spouse contributing between 40% and 60% of the couple’s income.

Men are more often the main providers, or “higher contributors” (about 58% among individuals 50 and over), while women are more often secondary providers, or “smaller contributors” (about 55% of them). The male breadwinner model is still prevalent (Table 4).

In line with the existing literature, variations in living standards are closely linked to the spouse’s economic position within the couple. While on average the living standard of all

Table 4: Sample size by marital specialization (individuals aged 50 and over)

| | Men | | Women | |
|-------------------------|---------|---------|---------|---------|
| | Treated | Control | Treated | Control |
| Sample size | | | | |
| Smaller contributor | 443 | 230 | 1,436 | 674 |
| Egalitarian contributor | 1,128 | 621 | 799 | 417 |
| Higher contributor | 2,165 | 1,234 | 396 | 192 |
| Total | 3,736 | 2,085 | 2,631 | 1,283 |
| Composition (%) | | | | |
| Smaller contributor | 12 | 11 | 55 | 53 |
| Egalitarian contributor | 30 | 34 | 30 | 33 |
| Higher contributor | 58 | 59 | 15 | 15 |

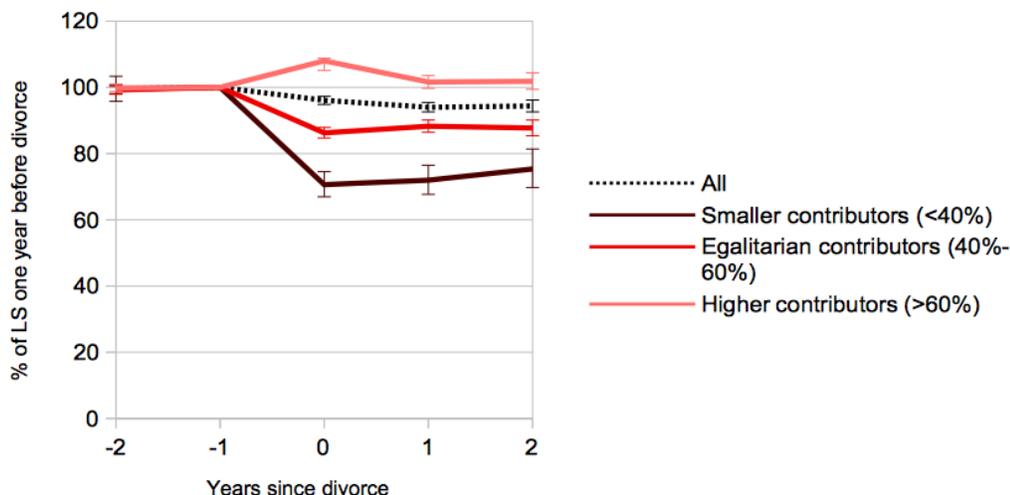
Source: EDP individuals, divorced between 2012 and 2016 (EDP, 2019).

Sample: information on the partner's income, which is necessary to evaluate the contribution to the couple's income, is not available for all individuals. The analysis on the role of marital specialization is thus produced on a sub-sample of the previously used sample.

divorced men declines by about 6% in the year following divorce, the decline is much greater (28%) when they were secondary providers/smaller contributors (Figure 11), a loss that is scarcely attenuated in the years following the divorce. Conversely, the living standard of men who were main providers/higher contributors increases by 2% after divorce. The differences in the economic consequences of divorce according to the degree of marital specialization within the couple are even more marked for women. While on average, they experience a 24% drop in their living standard in the year following divorce, this drop is much more significant, roughly 33%, when they are secondary providers/smaller contributors (Figure 12). Being the main provider/higher contributor protects from a drop in living standard, since breadwinner women maintain their living standard after divorce (only a 3% decrease one year after divorce). In cases of egalitarian contribution, the loss of living standard reaches 20% for women and 12% for men. Both men and women bear the cost of the loss of economies of scale due to divorce, although that cost appears somewhat heavier for women. It should be noted that within this so-called "egalitarian" class, men are slightly likelier to earn more.²⁰

²⁰On average, women above 50 contribute 18% when they are secondary providers, 49% when they are egalitarian providers and 78% when they are main providers. On average, men contribute 23% when they are secondary providers, 51% when they are egalitarian providers and 82% when

Figure 11: The effect of divorce for men according to the degree of marital specialization



Source: EDP men over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, higher contributor men's living standards are 102% of what they were one year before divorce. Their living standards increased by 2%.

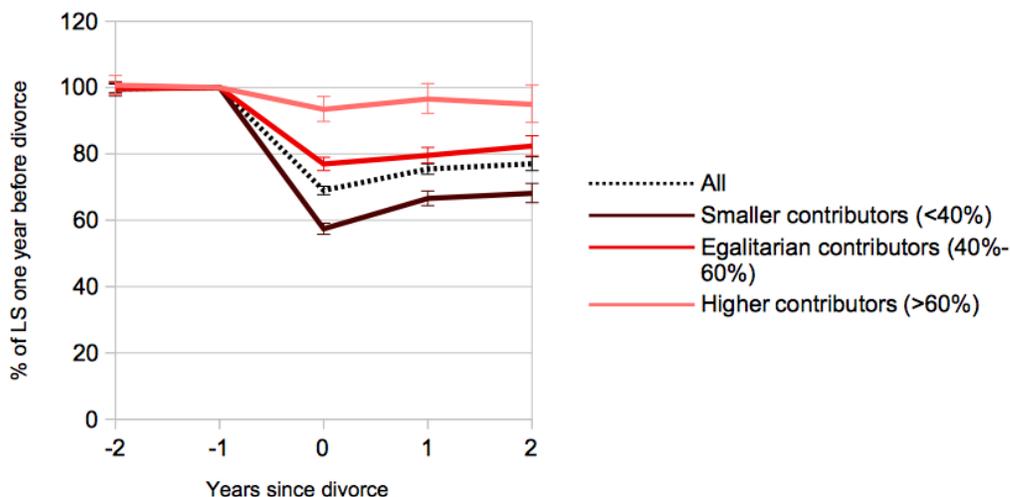
7 Conclusion

This article documents the economic consequences of grey divorces. The literature on this issue is relatively scarce although grey divorces have increased dramatically over the two last decades. Our first contribution is measuring the causal effect of divorce on the standard of living of people divorcing after age 50. We find that men's living standards decline by 6% on average between the year before and the year after divorce. The decline is more dramatic for women by around 24%. When comparing this with individuals divorcing before age 50, the magnitude of this negative effect is similar for men in both age groups, while it is not for women, since the standard of living decreases more for grey divorcees than for younger divorcees. The result is a greater gender gap in the variation in living standards for older divorced people than for younger ones.

Second, we find that public and private transfers play a big role in mitigating the

they are main providers.

Figure 12: The effect of divorce for women according to the degree of marital specialization



Source: EDP women over 50, divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, higher contributor women's living standards are 97% of what they were one year before divorce. Their living standards decreased by 3%.

negative economic consequences of divorce among women aged 50 and over. Public and private transfers reduce the loss by about one third (from 35% in the absence of transfers to 24% when including them). For men, transfers play the other way around, worsening their living standard situation after divorce.

The third contribution of our paper is highlighting the heterogeneity of the effect of divorce according to the position of the spouses in the pre-divorce household income distribution. We find that the loss in living standard increases with the position in this distribution. The decrease in living standard is greater for the richest individuals before divorce. Looking at the composition of this living standard, we do not observe any significant effects of transfers on living standards, except for the richest men before divorce: private and public transfers worsen their economic position after divorce. For women, public transfers mitigate the loss of living standard for the two bottom quartiles, but their impact decreases as one moves up the income distribution. This is consistent with the fact that a large number of welfare benefits are means-tested. These results suggest that

French welfare benefits provide an important protection against a significant drop in the post-divorce living standard for low-income women, thus preventing them from becoming poor. Yet, large gender differences in post-divorce economic standing remain, and the effect of private transfers is limited or even absent for most quartiles of the household income distribution, which suggests that the economic cost of divorce is borne by public policy rather than by the former spouse. However, this observation should be taken with caution since we were not able to take all private transfers into account in this paper, in particular a part of spousal alimony. The fourth contribution is confirming the importance of marital specialization. The main earner always suffers less from a late divorce shock than the secondary earner, whatever their sex. These results by specialization also provide information about the way this gender gap is likely to evolve in the future. A society with more egalitarian couples should lead to spouses better sharing the cost of divorce.

The present paper has two limitations that future research will have to overcome. First, to implement the causal estimation strategy, we had to limit our analysis of the economic consequences of divorce to two years after divorce. We observe that recovery is slow when it comes to living standards. Studying the years that follow would help understand whether the effect of divorce can be permanent and lead to a deterioration in the economic situation of older divorced women. On U.S. data, Lin and Brown, 2021 highlight that the decrease following divorce persists in the years that follow, concluding that there is a *chronic economic strain*. Similarly, when we conclude that there is a more pronounced negative effect for people divorcing after the age of 50 than for those divorcing before that age, we only take the 2010-2016 period into account, which probably mixes a life cycle effect and a cohort effect. It would be of great interest for public policies to disentangle these two mechanisms to be able to infer the evolution of the economic consequences of late divorces in the future.

Second, it deals only with current income and leaves aside the question of wealth, which was not available in our database. Divorce affects a household's net worth. It is likely the case for those over 50 who have had more time to accumulate wealth during their personal and marital lives as their marriages have lasted longer than those of young divorced individuals. In France, the over-50 hold more assets than younger age groups (Arrondel and Coffinet, 2018). The question of the consequences of divorce on the wealth

of older divorced individuals is therefore important. A better inclusion of wealth variables would also allow us to better understand how spousal alimony in the form of capital transfers plays a role in the living conditions of older divorced individuals. Our results should be read in conjunction with the results of the literature on the impact of divorce on household wealth. Lin and Brown, 2021 observe a dramatic decrease in wealth following divorce. Kapelle and Baxter, 2021 reach the same conclusion for Germany and show that separation implies a decrease in wealth for both men and women mainly driven by housing. Men continue to have more wealth than women, but there is no clear gendered dynamic in the loss induced by divorce. On the contrary, Zilincikova and Schnor, 2021 show for Belgium that women are more likely to retain ownership of the couple's home after a grey divorce. A decline in living standards does not cover the same economic reality whether or not one owns one's home and may lead to reconsidering the differences in economic status between age groups. This element can contribute to both a nuanced reading of our results in terms of gender inequality and of the dynamics of the economic consequences of divorce over the life cycle.

Despite these limitations, we show that divorce at an advanced age has very negative economic consequences for women, at a time when recovery mechanisms such as re-partnering or returning to the labour market are not so easy to put in place. While so far it is widowhood that has drawn the attention of the literature on marital events and their implications at older ages, it is important to examine divorce now, since it is becoming increasingly common among the elderly. What is more, recent studies have shown that widows are relatively well protected from the drop in resources following the death of their husbands thanks to the survivor's pension, at least in France (Cimelli, 2023). There is therefore a risk that late divorcees will constitute a new population at risk of poverty in retirement, which requires attention.

8 Tables

Table 5: Sample description by age group

| | Men | | | | Women | | | |
|---|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|
| | 30-49 years old | | 50-59 years old | | 30-49 years old | | 50-59 years old | |
| | Treated | Control | Treated | Control | Treated | Control | Treated | Control |
| Age at divorce | 39.5* | 39.3 | 58.3 | 58.4 | 38.9* | 38.8 | 57.4 | 57.3 |
| Household with children (%) | 89*** | 92 | 57 | 58 | 92*** | 94 | 45 | 47 |
| Participation in labour market (%) | 95* | 96 | 68 | 66 | 86** | 84 | 61 | 63 |
| Retired (%) | 1** | 0 | 33 | 34 | 1 | 1 | 29 | 27 |
| Contribution to couple's income (%) | 64 | 65 | 66** | 68 | 38 | 36 | 36 | 37 |
| Living standards (median - 2015 €) | 19,968*** | 20,377 | 22,303 | 21,668 | 19,947** | 20,452 | 22,995 | 23,625 |
| Individual income (median - 2015 €) | 23,632*** | 23,981 | 23,537 | 22,887 | 16,950 | 16,771 | 14,339** | 15,904 |
| Marriage duration | | | | | | | | |
| 0 to 4 years | 27 | 26 | 11 | 10 | 22 | 22 | 9 | 10 |
| 5 to 9 years | 22 | 20 | 8 | 9 | 22 | 20 | 7 | 8 |
| 10 years and more | 51 | 54 | 81 | 81 | 56 | 58 | 84 | 82 |
| Sample size | | | | | | | | |
| Initial sample | 7,824 | 4,978 | 4,177 | 2,390 | 8,120 | 5,258 | 2,880 | 1,449 |
| Sample with information on income 1 to 3 years into observation | 7,533 | 4,744 | 3,937 | 2,220 | 7,829 | 5,038 | 2,742 | 1,341 |
| Sub-sample with breadwinner status information | 7,158 | 4,546 | 3,736 | 2,085 | 7,475 | 4,853 | 2,631 | 1,283 |

Source: EDP (2019 edition).

Note: Each variable is measured the second year of the five years observation window. For the treated, it corresponds to the year before divorce. An asterisk (*, **, ***) in the "control" column identifies the variables for which significant differences in the mean values are found between the treatment and control groups at respectively 10%, 5% or 1%.

Table 7: The effect of divorce on women's living standards

| | 30-49 | | | 50-59 | | | | | |
|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Variation (1) | (2) | (3) | Euros (1) | (2) | (3) | | | |
| 2 years before | -0.006* (0.072) | -0.007** (0.032) | -0.007** (0.029) | -0.006 (0.436) | -0.003 (0.633) | -0.003 (0.658) | 381 (0.309) | 271 (0.363) | 279 (0.348) |
| Year of divorce | -0.306*** (0.000) | -0.297*** (0.000) | -0.297*** (0.000) | -5.760*** (0.000) | -0.403*** (0.000) | -0.368*** (0.000) | -8.580*** (0.000) | -8.436*** (0.000) | -8.441*** (0.000) |
| 1 year after | -0.198*** (0.000) | -0.198*** (0.000) | -0.23*** (0.000) | -4.371*** (0.000) | -0.278*** (0.000) | -0.302*** (0.000) | -7.005*** (0.000) | -6.761*** (0.000) | -7.459*** (0.000) |
| 2 years after | -0.17*** (0.000) | -0.173*** (0.000) | -0.215*** (0.000) | -4.018*** (0.000) | -0.275*** (0.000) | -0.259*** (0.000) | -6.817*** (0.000) | -6.245*** (0.000) | -7.140*** (0.000) |
| Retirement | | -0.114*** (0.000) | -0.116*** (0.000) | -4.148*** (0.000) | -0.006 (0.63) | -0.007 (0.58) | | -1.225*** (0.033) | -1.251*** (0.029) |
| Unemployment | | -0.023*** (0.000) | -0.024*** (0.000) | -5.27*** (0.001) | -0.008 (0.613) | -0.006 (0.684) | | -822 (0.19) | -822 (0.212) |
| Re-partnered | | | 0.191*** (0.000) | 4.640*** (0.000) | | 0.251*** (0.000) | | | 7.432*** (0.000) |
| Observation | 12,867 | 12,326 | 12,326 | 12,867 | 12,326 | 12,326 | 4,083 | 3,830 | 3,830 |
| R-square within | 0.1 | 0.1342 | 0.1494 | 0.0637 | 0.0718 | 0.0826 | 0.1305 | 0.1626 | 0.0585 |

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

Source: EDP women, divorced between 2012 and 2016, EDP (2019 edition).

Note: regression results.

9 Appendix

9.1 Alternative control group

In this appendix, we present our results when using an alternative control group. The literature often uses continuously married people as a control group for people undergoing a marital dissolution. In the wake of the literature, the continuously married (“never-treated”²¹) are the alternative control group.

The control group is made up of individuals married in 2010 who did not divorce and were not widowed before the end of the observation period. A counter-factual divorce date is created randomly. With that counter-factual divorce year, the age condition defined for the divorced is applied. Moreover, we only keep the individuals whose counter-factual divorce years match those of our treated group: 2012, 2013 or 2014. The control group is observed over five years: two years before the counter-factual divorce and two years after it. The sample size of the control groups is 39,430 for men between 30 and 49, and 95,908 for those over 50. There are 43,886 women under 50 and 79,048 over 50.

The treated and alternative control groups differ in many respects. A t-test comparison of means between the treated and never treated with a 0.05 p-value confirms this observation. In figure 8, an asterisk in the “control” column identifies the variables for which significant differences in the means are found between the treatment and control groups. There are more differences between the treated and never treated than between the treated and the “later-treated”. This was to be expected and is one of the reasons why we chose the “later-treated” as the main control group. Yet, figure 13 shows no clear difference in pre-trends between the treatment group and the never treated.

The regression results are very similar when using the never treated or the “later-treated” as control groups (figure 14). One year after divorce, living standards decrease with respect to the reference period by 3% for young divorced men, 6% for grey divorced men, 18% for young divorced women and 24% for grey divorced women. The results are almost identical whatever the control group chosen.

²¹Referring to people who were continuously married during a specific time period as “never treated” is an approximation. Some of them may have divorced in the year following the observation.

Table 8: Sample description by age group, divorced with married as a control group

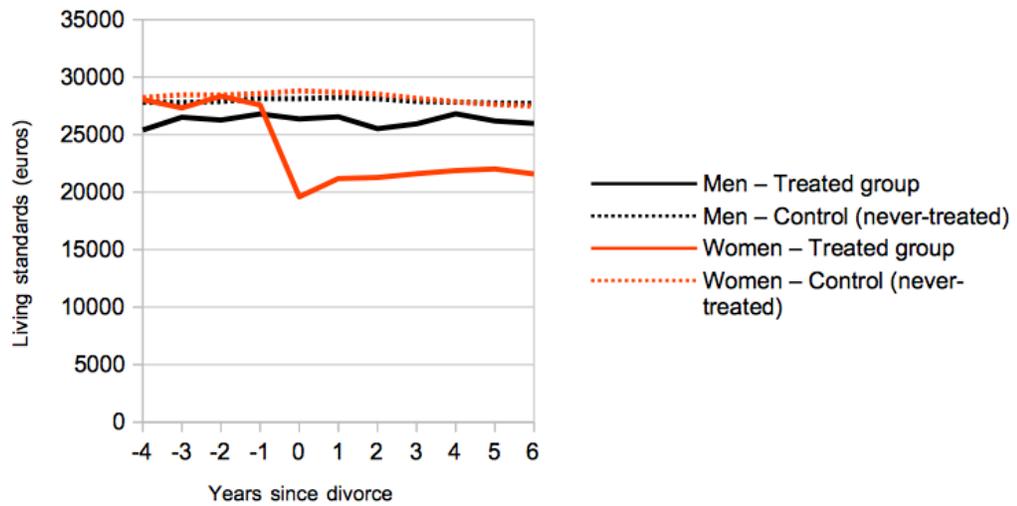
| | Men | | | | Women | | | |
|---|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|
| | 30-49 years old | | 50-89 years old | | 30-49 years old | | 50-89 years old | |
| | T | C | T | C | T | C | T | C |
| Age | 39.5 | 39.7* | 58.3 | 64.2* | 38.9 | 39.3* | 57.4 | 62.7* |
| Household with children (%) | 89 | 94* | 57 | 31* | 92 | 94* | 45 | 26* |
| Participation in labour market (%) | 95 | 96* | 68 | 42* | 86 | 81* | 61 | 37* |
| Retired (%) | 1 | 0* | 33 | 62* | 1 | 1 | 29 | 55* |
| Contribution to couple income (%) | 64 | 67* | 66 | 68 | 38 | 33* | 36 | 36 |
| Living standards (median - 2015 €) | 19,968 | 20,792* | 22,303 | 23,493* | 19,947 | 20,495 | 22,995 | 24,120* |
| Individual income (median - 2015 €) | 23,632 | 25,422* | 23,537 | 22,704* | 16,950 | 16,520* | 14,339 | 11,750* |
| Marriage duration (%) | | | | | | | | |
| 0 to 4 years | 27 | 22 | 11 | 3 | 22 | 18 | 9 | 2 |
| 5 to 9 years | 22 | 21 | 8 | 3 | 22 | 19 | 7 | 2 |
| 10 years and more | 51 | 57 | 81 | 95 | 56 | 63 | 84 | 96 |
| N | | | | | | | | |
| Initial sample | 7,824 | 40,877 | 4,177 | 98,860 | 8,120 | 45,544 | 2,880 | 81,038 |
| Sample with information on income 1 to 3 years into observation | 7,533 | 39,430 | 3,937 | 95,908 | 7,829 | 43,886 | 2,742 | 79,048 |
| Sub-sample on breadwinner status | 7,158 | 37,913 | 3,736 | 94,036 | 7,475 | 42,438 | 2,631 | 77,695 |

Source: EDP (2019 edition).

Note: Each variable is measured the second year of the five years observation window. For the treated, it corresponds to the year before divorce. "T" stands for "treated group" and "C" stands for "control group."

Note: an asterisk (*) in the "control" column identifies the variables for which significant differences in the mean values are found between the treatment and control groups.

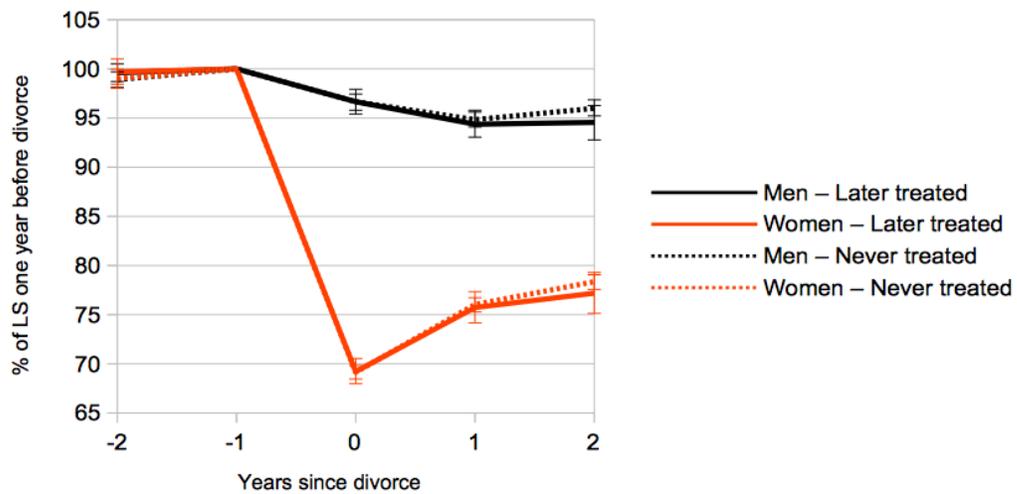
Figure 13: Descriptive trend of living standards among individuals aged 50 and older (divorced and control group)



Source: EDP individuals (EDP, 2019).

Note: mean living standards by year relative to divorce. An alternate divorce year is defined randomly for the control group.

Figure 14: The effect of divorce on living standards relative to one year before divorce (divorce over 50)



Source: EDP individuals (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level.

Lecture: one year after divorce, the living standards of women over 50 are 76% of what they were one year before divorce. Their living standards have decreased by 24% between the two periods.

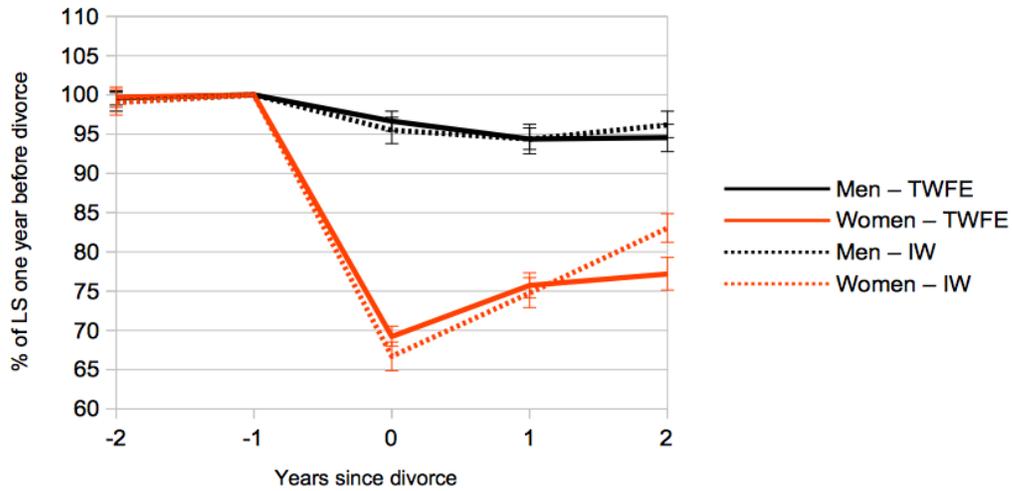
9.2 Alternative method for treatment estimation

Two-way fixed effect regressions have been widely used to estimate difference-in-difference designs with panel data. Yet the use of these models with a staggered treatment has been questioned in recent years (Roth et al., 2023). Our sample is composed of individuals who divorced in different years, which means that the treatment is staggered. Our data include 5 treatment cohorts (one for each year of divorce between 2011 and 2016, though two of them act as controls). In the case of specifications with event studies (with indicators coding time periods relative to treatment), Sun and Abraham, 2021 criticizes classical two-way fixed effects (henceforth, TWFE). First, their paper highlights the difficulty in interpreting 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 may be 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 for treatment effect with a difference-in-difference 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 the effect is estimated. In the present paper, the 2017 and 2018 divorce cohorts were excluded in order to strengthen the "effect homogeneity" assumption. Indeed, in 2017, a reform made it easier to divorce. This likely changed the selection process into divorce. Yet, no further proof of homogeneity was given. We use Sun and Abraham's method as a robustness test for our TWFE regression.

Figure 15 shows the results obtained with TWFE and Sun and Abraham's IW estimator when the control group is made up of the "later-treated"²². The Sun and Abraham average treatment effect estimator is the same as with our TWFE coefficient. This is consistent with the comparability that we tried to establish between the control and treatment groups with the 2017 exclusion. The Sun and Abraham estimator can act as a control of pre-treatment parallel trends. It confirms that there were no pre-trends in the two years before the treatment groups faced divorce. Yet, this is too small a temporal horizon to conclude that there is no pre-trend at all. The only difference between the two estimators appears two

²²Similar conclusions were reached comparing TWFE and IW estimators, when the control group was made up of the never treated.

Figure 15: TWFE and Sun-Abraham estimators



Source: EDP individuals divorced between 2012 and 2016 (EDP, 2019).

Note: regression results. Confidence intervals are at the 95% level. No control variables are used.

Lecture: one year after divorce, according to TWFE, women over 50's living standards are 76% of what they were one year before divorce. Their living standards have decreased by 24% between the two periods. According to Sun and Abraham's IW estimator, they living standards, one year into divorce, is 75% of what they were one year before divorce.

years after divorce. For women, the TWFE estimator seems to underestimate the recovery effect.

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