Gendered economic consequences of gray divorces in France

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Abstract

Drawing upon a large administrative database, the Permanent Demographic Sample (EDP), a panel that follows 4.4% of the French population every year, this paper presents new findings on the effects of gray divorce on living standards, labor supply and retirement probability for both women and men, aged 50 years old and over, accounting for public and private transfers. We implement a fixed-effect regression with a control group to assess the causal effects of divorce on both spouses. By doing so, we compare divorced individuals before and after divorce with individuals who remained married over the same period. Results show that women's decrease in living standards is larger, on average, than that of men. This decrease is also larger than that of women divorcing at younger ages. Gray divorce seems more harmful to women and increase gender inequalities following divorce. Public and private transfers mitigate post gray divorce gender inequalities, especially for the poorest women. Recovery mechanisms such as increasing one's labour force participation in the labour market or re-partnering play a role to moderate the negative consequences of divorce, especially for women. Despite the prospect of retirement, divorced men and women over the age of 50 seem to increase their presence in the labor market. This conclusion is still valid when we look at the probability of retirement. The latter decreases significantly in the five years following the divorce, suggesting that individuals remain active for a longer period of time.

Keywords : gray divorce, gender inequalities, living standards, fixed-effect regression

JEL Codes: J12; J14;J16; I38

1 Introduction

After a sharp increase in the recent decades, the risk of divorce is now stabilizing in Northern European countries, and is even declining in some countries, including the United Kingdom and France (Bellamy, 2016). However, the number of divorces continues to increase at older ages, leading to the emergence of the "Gray Divorce Revolution" concept (Brown and Lin, 2012; Kennedy and Ruggles, 2014). Among individuals divorcing in 2010 in the United States, more than a quarter are over the age of 50, compared to only 10% in 1990. This phenomenon partly results from the arrival of the large generation of baby boomers at 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 5 to 10 divorces per 1,000 married individuals aged 50 and over. 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 and Barbieri, 2012) and continues to increase (Solaz, 2021).

Such a strong increase in divorce at advanced ages leads to new research on its determinants and implications (Brown and 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 and al. 2016) to 60 years old (Leopold, 2018; Bröckel and Andreß, 2015), more rarely 65 years old (Uunk, 2004; McManus and al., 2001). Little work focuses on 60 years and older (Lin and al., 2018; Brown, 2016). Those focus on American data and on economic variables other than living standard, which does not allow comparison with the above mentioned-literature. The literature on the economic consequences of divorce on working age individuals unanimously concludes that women's living standard deteriorates after divorce. This decline ranges between 7% and 30% in the most recent works (Leopold, 2018; Le Bourdais and al., 2016; Bröckel and Andreß, 2015; Bayaz-Ozturk and al., 2018). For men, the results differ according to the studies. An increase in living standard is sometimes observed (Finnie, 1993; Bianchi and al., 1999; Smock, 1993; Smock, 1994), or a decrease (Burkhauser and al., 1991; McManus and DiPrete, 2001). The difference in results between existing studies can be explained in different ways, differences in scope,

data used, sample size, and indicators selected. However, when there is a drop in living standard, it is always smaller on average than that observed for women (McManus and DiPrete, 2001), and leading to strong gender inequalities

Several reasons explain that relative lack of work on the consequences of divorce in later life. Until very recently, divorce in later life was a rare event. Therefore, from an empirical point of view, few data were available to analyse that rare phenomenon. The paucity of work on the 50-and-over age group can also be explained by 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 that hypothesis is not credible and that the consequences of divorce after age 50 are more pronounced than those at younger ages, and ultimately generate more inequalities between women and men. In this article, we therefore study the economic consequences of divorce after the age of 50. This approach, the first in a European context, is made possible by a recently opened access to large administrative databases, such as the Permanent Demographic Sample (EDP). It results from the matching of different data sets, in particular fiscal data. It makes possible to measure the impact of divorce on a representative panel of 4.4% of the French population over a period of 7 years.

Four main results stand out from our analysis. First, we find that women's total living standards decrease after divorce, by 24% on average one to two years after divorce, whereas men's living standards slightly decrease by 5%. While this effect is of comparable magnitude for men of all ages, the decline in living standard is much more pronounced for women over 50 than for younger women. Inequalities between women and men are therefore even greater following a late divorce. Second, we highlight the key role of public and private transfers in moderating the decline in women's living standards after divorce. That decline would be 43% on average without the existence of these transfers. Transfers have only a limited impact on men. Third, the effects of divorce are heterogeneous along the distribution of living standards. The decline is more important for divorcees belonging to the upper part of the household's living standard distribution before divorce compared to those at the bottom. Finally, we highlight the recovery mechanisms of older divorced women who adapt their participation in the labour market. Divorce induces for women a

return to employment and for women already in employment an increase in earned income. More specific to older workers, divorce delays retirement.

We first describe the specificity of divorces after 50 years in France (part 1). Then we present our database and our sample (part 2). We will explain our empirical strategy in a third part, then our results (part 4), before concluding and discussing (part 5).

2 Specificity of divorces after 50 years old : some evidence for France

France is concerned by the gray divorce revolution. While the risk of divorce decreases with age, it is at advanced ages that that risk is now on the rise (Solaz, 2021) and has increased the most in the last 40 years (Prioux 54 and Barbieri, 2012). During the 1980s and 1990s, the relative increase in the risk of divorce was greatest at increasingly later ages, and during the 2000s, up to the age of 70, that increase is higher (in relative terms) as age increases.

2.1 A more pronounced marital specialization after the age of 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 standard after divorce (Bonnet, Garbinti, Solaz, 2020; McManus and DiPrete, 2001). The decline in living standard was greater for women the larger the income gap within the couple. However, the income gaps between spouses are more marked 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-cyle effect). Indeed, with longer duration of union the consequences of marital specialization have been developing for longer, with larger consequences on career trajectories. It is also the case for retired couples, as pensions reflect the entire career trajectory, both in terms of wages and labor market participation. A wide gap between men's and women's pensions reflects the wage gap during working life as well as the greater

specialization of women in the domestic sphere (via exit from the labour market or recourse to part-time work) (Geraci and Lavigne, 2017; Bonnet and al., 2020). Stancanelli (2014) also 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 Private and public transfers of different nature and magnitude

The economic consequences of divorce depend crucially on the institutional context (Uunk, 2004). However, after 50 years, 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, they are more often without dependent children or with some of children living outside the home. In addition, part of the aid is conditional on a maximum age for counting these dependent children. It can be 20, 21 according to the aid or 25 years old if the children are studying. It means that family allowances, which are widely used within families, the increase in other benefits (such as social minima or housing allowances) or tax reductions, can be reduced. These subsidies are important financial resources for divorced women, who are more often the custodians of children. Those over 50 years old are less affected by such an aid. On the other hand, certain benefits, which are part of the same objective of social minima, become more accessible or higher with age[1]. In France, divorce can lead to two types of private transfers between former spouses. On the one hand, the payment of child support in the event of divorce, from the non-custodial parent to the custodial parent or parent with dependent child(ren). These transfers are used to compensate for the cost of the residence the parent who has the principal residence of the child(ren) after the divorce. 97% of the alimony debtors are men (Belmokhtar, 2014). These pensions thus tend to reduce their living standard after divorce (McManus and DiPrete, 2001), while they improve the situation of mothers, who have in most cast the custody of children (Bonnet, Garbinti, Solaz,

[1]For instance, ASPA (allocation spécifique pour personnes âgées) is a social benefit one can only apply to after 65 year olds

2020). Because of lower number of children among divorced people aged 50 and over, child support payments may contribute less to improve the divorced mother's living standard (and symmetrically constitute a lower financial burden for the father). It could also be less important because, as children get older, the probability of alternating residence or custody by the father increases, to the detriment of exclusive residence with the mother (Alvaga, 2019).

A second type of private transfer is also more important after age 50: the compensatory benefit. The latter is paid directly to the former spouse and is explicitly intended to compensate for excessive disparities in the living standard between spouses. It is therefore mainly paid by men and received by women. Length of marriage and age of the former spouses are factors explicitly considered by judges in obtaining it (Jeandidier and al., 2020), so that the average age of individuals in divorces involving compensatory benefits is higher than that of the general population of divorcees. In 2013, one out of five divorces involves a compensatory benefit (Belmokhtar and Mansuy, 2016) but 30% of divorces involving a woman aged 55-64 receive a compensatory benefit (HCFEA, 2019).

2.3 Less effective recovery mechanisms after the age of 50 ?

The literature on the economic consequences of divorce at younger ages has focused on recovery mechanisms. Indeed, re-partnering (Dewilde and Uunk, 2008) or a return to the labour market are two mechanisms that can mitigate or even cancel out the decline in living standards following divorce. Each of these two mechanisms can function differently after the age of 50. The chances of re-forming a couple decrease with age for both men and women. At all ages, women are less likely than men to be in a relationship again, and that gender gap only 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, especially for women who are in a more unfavorable position in the union market (Solaz, 2021). Indeed, women are less likely to remarry or re-couple than men after a grey divorce (Brown and al., 2018; Schimmele and Wu, 2016). The role of the labour market is more ambiguous. The departure of children or their older age can relieve domestic and parental constraints and allow women 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

demonstrated in the North American context (Olivietti and Rotz, 2017). Such an effect has not yet been shown in the case of men. The positive effects on labour force participation may mitigate the decline in living standards following divorce (Tamborini and al., 2015; Bonnet and al., 2010). However, they should be qualified by the possible difficulties in returning to work after age 50 due to the approach of retirement (Beck and al., 2017). Finally, the particularity of the population aged 50 and over compared to younger ages is that they are able to retire. A large proportion of individuals in our sample can retire at a minimum age between 60 and 62 years old [2], with departures generally taking place up to the age of 65 (few individuals retire beyond that age in France). Divorce can have an effect on retirement by delaying or advancing it. Finally, one can also mention a possible reverse causality, if transition to retirement affects the probability of separating (ref).

Divorce has little direct impact on retirement pension in France. There is no division of pension rights between spouses. The pension of a person who has specialized in domestic work rather than salaried work depends on his or her own trajectory in the labor market, a minimum pension mechanism, and the number of children raised, but not on the spouse's characteristics. The increase for raising children is related to parental status, not marital status. That status affects the pension received only at the time of spouse's death, as it entitles to a survivor's pension. In the main retirement system[3], divorce does not cause the loss of that right[4].

Grey divorce thus presents many specific features. Hence it is difficult to generalize the results obtained on the economic consequences of divorce at younger ages. In this article, we therefore study the consequences of divorce for people aged 50 and over. More specifically, this article aims to measure the variation in economic well-being induced by divorce for men and women. That variation in living standard results from the direct effects of divorce (linked to the end of the pooling of expenses and economies of scale characterizing married life) and indirect effects linked to institutional compensation via public transfers (social

[2]Following 2010 pension reform, the minimum legal retirement age gradually increased from 60 to 62 years old from birth cohorts 1951 to 1955

[3]In France the retirement system is segregated by sector. The main retirement system is the one which gather private sector employees

[4]When people divorce, they don't directly lose their right to survivor pension in the main retirement system. Yet that survivor pension is mean tested, and re-cohabiting which can occur after divorce, change the survivor household's income and lead to the pension's suspension.

assistance and taxes) and private transfers between former spouses (alimony, compensatory benefits). In addition, we analyze three types of coping mechanisms that can mitigate losses in living standards: re-partnering, increased work activity and delayed retirement.

3 Data, outcome and variables

3.1 Data and sample

Divorce after age 50 is a "rare" event[5]. A large data-set is necessary to get enough events to analyse the consequences of divorce. We use the Permanent Demographic Sample administrative database. It follows all persons, residing in France, born on the first four days of October, January, April and July. It concerns 4.4% of the population for whom various sources of administrative information (census, civil status, tax data, employer data ...) are gathered within the EDP. Since the date of birth is random, the EDP forms a large database representative of the French population, ideal for studying the dissolution of unions in a sub-population such as the over-50s.

The socio-fiscal data of the EDP being available since 2010, we follow individuals from 2010 to 2016. Those data accurately describe individuals' income and their household's resources. Based on tax returns, those income data are considered more reliable than the ones collected in survey data. It is also possible to identify individuals' marital history and in particular divorce. Finally, the EDP provides information on the composition of the individual's household (number and age of the children in the household). However, the variety of variables present is limited. Indeed, like many administrative databases, the EDP includes many individuals but has a limited number of variables. Our main sample consists of EDP individuals, aged 50 years old and married in the first year of observation (2010). These are the individuals at risk of divorce. They may be in a married couple with a possibly younger person. A person reaching the age of 50 during the observation window joins the panel at that time. Married people who become widowed leave the sample in the year of their widowhood since they are no longer at risk of divorce. We also limit our sample to those under 80 years of age because the number of divorces after 80 years of

[5] 0.8% of married people aged 50 and over in 2015 divorce in 2016 (source : INSEE and Ministry of justice)

age is very low . Our panel is therefore not cylindrical, but is updated as an individual becomes or is no longer at risk. The sample includes married individuals (heterosexual couples) with at least two years of income on their trajectory between 2010 and 2016. We use secondary, a similarly built, sample of EDP individuals aged between 18 and 49 years old as a comparison point to assess that the effect of divorce on living standards are of different magnitude after 50 years old.

Our final main sample is made-up of 615,835 individuals aged 50 years old and over (319,335 men and 296,500 women) including 15,203 divorcing over the period (8,093 men and 5,818 women) (Table 1)[6].

Table 1: Sample sizes according to age and gender, divorcees and control group

		Men	Women
18-49 years old	Control group[(1)]	167,174	189,681
	Divorced	15,587	17,258
50-79 years old	Control group	319,335	296,500
	Divorced	8,093	5,818

Sample : EDP, individuals aged between 18 and 79 years old, married in 2010, with two years of non missing individual and household income income
(1) The control group is composed of married people

3.2 Variable of interest

Our main variable of interest is the living standard. It corresponds to the household's disposable income divided by the number of 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 scale[7].

The household's disposable income includes: labor market income (wages, retirement pensions, annuities, unemployment benefits, income from self-employment (commercial, industrial and agricultural profits)), financial taxable income, as well as net public (welfare

[6]We exclude the first and the last percentile of living standard distribution in 2010. We only keep individuals for whom we have at least two years of income information.

[7]This 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.

and tax) and private transfers. Public transfers include family allowances, minimum benefits and housing allowances received by the household, from which taxes paid are deducted (income tax, housing tax). Private transfers include child support and spousal alimony[8]. Private transfers to young adults in the household are also taken into account because they can affect the living standard of the net payer parent, and create differences between parents according to which of the two pays for the children's education costs. The measure of the living standard and its components are adjusted for inflation, with incomes expressed in constant 2015 euros.

The year of separation is the legal year of divorce[9]. Indeed, to declare a divorce to the tax authorities, the divorce procedure must be completed or an authorization from the family court judge is necessary. In that respect, our study differs from much of the other work on the economic consequences of divorce which uses the date of the de facto separation rather than the date of the divorce (the legal separation). The legal date of divorce is more relevant in our objective to study post-divorce private and public transfers. Indeed, private transfers begin to be paid following the divorce judgment. In particular, compensatory benefits are not visible in private transfers until one year after the divorce because of their tax regime. Public transfers can also be conditional on the legal and not de facto situation of the couple. Information on living standards is available for the years around the divorce, as well as the year of the divorce. The latter is, however, a bit peculiar, and its assessment of living standard must be taken with caution. Indeed, the year of divorce is considered as a year without a spouse from the point of view of the tax authorities (i.e. the individual's living standard is therefore based on his or her sole sources of income) for each of the former spouses regardless of the precise date of the divorce during the year. One part of the year may have been lived as a couple and the other part of the year alone, but that is an unlikely hypothesis, given the average time of divorce proceedings as seen above. Therefore, considering that people live alone for the entire calendar year of the divorce partly compensates for the fact that legal divorce is observed, necessarily later than de facto separation.

[8]Spousal alimony can either be a rent, a lump-sum or a transfer spread up to eight years. It will appear on the fiscal statement, only if it is a rent or a transfer taking place in more than one year. The first year of transfer should not be declare anyway.

[9]For more information, see Cimelli (2020)

Table 2: Sample description: divorcees by age group

	Men		Women	
	Less than 50	More than 50	Less than 50	More than 50
Dependent children	1.7	1.1	1.8	0.8
Participation in the labor market	91.7%	73.3%	82.1%	69.8%
Contribution to household income	59.8%	56.6%	33.7%	32%
Living standard (median)	19,782	21,507	19,708	22,589
Individual income (median)	22669	23944	14727	15455
Observations	15,587	8,093	17,258	5,818

Sample : EDP men and women, aged between 17 and 79, married in 2010, divorced before 2017, with non missing individual and household incomes for at least two years. The outcome are measured in 2010.

3.3 Sample description

Our data exhibit some of the specific features that we anticipated would characterized older divorcees (Table 2).

First, divorcee older than 50 tend to have less dependent children or young adult at home. That will have consequences on both private and public transfers after divorce.

The pattern of specialization into domestic labor or in the labor market is ambiguous. Both men and women contributes less to household income in the older divorcee group than in the younger one. Based on that proxy of matrimonial specialization, our hypothesis of higher gendered specialization for older divorcee is not substantiated.

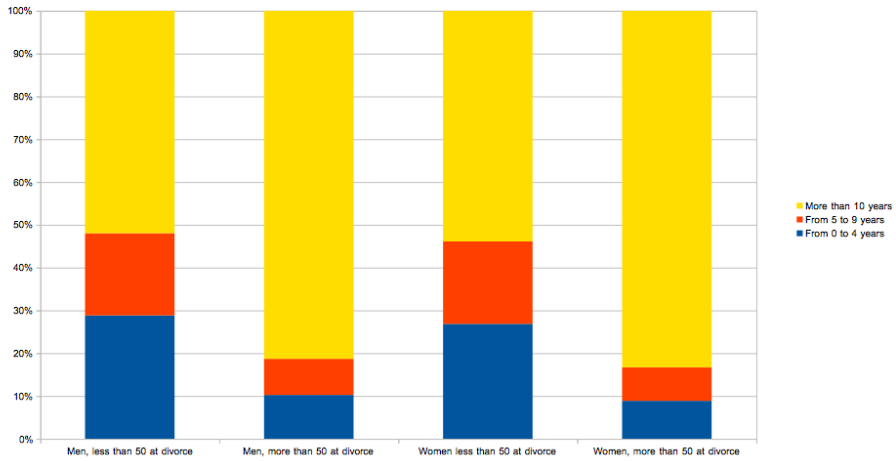
As expected because of retirement, older divorcees are less active on the labor market. For both age group, women are less active than men. The gender gap in participation is smaller for older divorcees than for younger ones. That is an other hint against our hypothesis of higher gendered specialization in the case of gray divorce.

Older divorcees, both men and women, have higher median living standards than younger ones. Their median individual income before divorce is also higher. For age group, men have a higher individual median income than women. The gender gap is

slightly higher in the older group, which gives a hint in favor of the higher specialization hypothesis.

Finally, people who divorce after 50, tend to break marriage with higher duration than before 50 years old (Figure 1). Indeed, older divorcees dissolved union are older than 10 year old in more than 80% of the case for both men and women, while only 53% of the younger divorcees' union have lasted more than 10 years.

Figure 1: Duration of marriage before divorce by sex and age group



4 Empirical strategy

To measure the change in living standard following divorce, we use a fixed-effect regression and a control group.

We use individual fixed effects to get an estimate of divorce's effect on living standards that is unbiased by confounding variables that are constant over time. Indeed, within our research and data framework, it is possible that time-invariant individual characteristics may jointly influence probability of divorce and living standard. For example, a negative relationship has been found between education level and the probability of divorce in some European countries (Van Damme, 2019). Since low education is moreover associated with low living standards, education (a time-constant factor for most people over 50 years) could

have a confounding effect on the relationship between divorce and living standards. Fixed effects avoid bias in estimates because of those omitted variables constant over time. They also exclude the effect of a variable of importance to us: gender. We will therefore work on two samples, one for women and one for men, in order to be able to isolate divorce's effects on living standard by gender.

The individual fixed effects naturally exclude people who do not experience the event of interest, in this case people who remain continuously married. Our control group allows us to compare the living standard trajectory of people who have divorced and those who remain married (Bruderl and Ludwig, 2015). Thus, we are not only comparing points in time for our divorced population, but we also take into account the trajectory of living standards that might have been theirs had they stayed married longer. The addition of a set of year indicators makes it possible to include a control group.

Our empirical strategy relies on two main hypothesis. First, there should be no time-variant unobserved characteristics. Individual event could affect both living standard and divorce, for instance transition in and out of the workforce. Losing one's job has been identified as a risk in relation to divorce (Amato, 2010 ; Solaz and al., 2020). In the same way, retirement is now studied as critical moment in which grey divorce can occur. Each of those transition can affect living standard two as they amount most of the time to decrease in income. Our estimates of the link between divorce and living standards can also be affected by macroeconomic event. That is why we use control for unemployment, retirement and add annual dummies in our specification. We also check for selective attrition[10].

Second, the common trend assumption should be verified. Individuals who are going to divorce and individuals who remain married should follow the same living standards

[10]We find some evidence of attrition. Some individuals lack some years' income information. Yet, when running our model on different samples of individual with no missing data, people with one year missing or people with two years missing, we do not find result significantly different from the ones we present in this paper.

trajectories before divorce[11].

$$Y_{it} = \alpha + \delta^1 D_{it}^1 + \delta^2 D_{it}^2 + \delta^3 D_{it}^3 + \beta R_{it} + \gamma U_{it} + c_i + \sum_{t=2012}^{t=2017} A_t + \epsilon_{it} \quad (1)$$

i identifies individuals, t identifies years.

We note y_{it} the logarithm of living standard, c_i and A_t are respectively individual and years fixed effects, R_{it} and U_{it} stand for retirement and unemployment period. R_{it} (respectively U_{it}) equals one when the individual income is mostly composed of pensions (respectively unemployment benefits).

Divorce is modeled using a dummy impact function[12]. We introduce D_{it}^1, D_{it}^2 and D_{it}^3 as dummies for the year of divorce, one or two years after divorce, three to five years after divorce. δ^j measures the average variation of living standard over post-divorce periods considered.

5 Change in living standard following divorce

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

Following divorce, both men and women aged 50 and over experience a decline in their living standard, but the loss is much more pronounced for women. Thus, women's living standard declines by an average of 32% in the year of divorce (Table 3, col 6 to 7)[13], a loss more than 5 times greater than that of men, who see their living standard decline by an average of 5% (Table 3, col 2 to 3). Women thus lose more than 7300 euros of living standard annually in the year of divorce, compared to the 465 lost by men. The loss of

[11] We test this common trend assumption by introducing dummies for the years before divorce in the estimation of living standard trajectory. We do not find any divergent pre trend.

[12] In an alternative model specification, we introduce divorce as a linear impact function. Results of the two specifications are very similar. In the rest of the article, we only present the results for the dummy impact function

[13] With our OLS regression on the logarithm of living standard, we interpret $exp(\hat{\beta}) - 1$ as the expected percentage change in living standard due to a 1-unit increase in a variable X_0

Table 3: Gendered effect of divorce on living standard (log and euros)

	Men				Women			
	Variation		Euros		Variation		Euros	
Year of divorce	-0.051***	-0.052***	-465***	-467***	-0.385***	-0.385***	- 7,335***	-7,347***
One or two years after divorce	-0.055***	-0.055***	-721***	-718***	-0.276***	-0.276***	- 6,041***	-6,069***
Three or five years after divorce	-0.046***	-0.046***	-439**	-432**	-0.237***	-0.237***	-5,322***	-5,362***
Retirement		-0.078***		-3,253***		-0.003**		-955***
Unemployment		-0.077***		-2,489***		-0.0002		-478***
Observations	326,6998	326,699	326,718	326,718	301,690	301,690	301,715	301,715
R-squared	0.0022	0.0095	0.0006	0.0102	0.0136	0.0136	0.0045	0.0054
FE (individual and year)	YES	YES	YES	YES	YES	YES	YES	YES

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

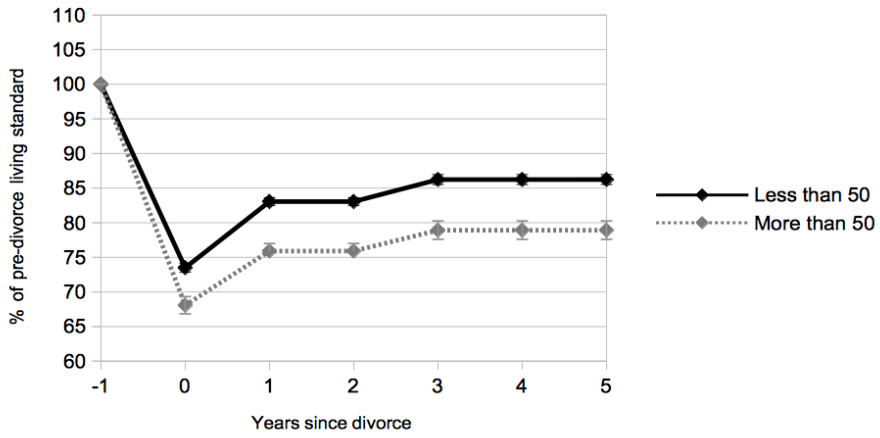
lSample : EDP men and women, aged between 50 and 79, married in 2010, with non missing individual and household incomes for at least two years.

living standard remains almost stable for men over the years following the divorce, while a phenomenon of catch-up is observed for women. Their drop in living standard of nearly 32% in the year of divorce, reduces to 24% one to two years later and is still 21%, 3 to 5 years after the divorce. Women's loss is therefore both more consequent and more lasting than that of men. Moreover, a possible transition to retirement or unemployment, which generally leads to lower incomes, is controlled. We observe that those two variables play in the expected direction, and more so for men, but their introduction has little effect on the results.

These changes in living standards following divorce are more pronounced for women after age 50 than before. Women who divorce at a young age (between 18 and 50 years old) are faced with a smaller decrease in living standards. Thus, one year after the divorce, their drop in living standard is about 17% (Figure 2). Divorced women aged 50 and older are the most economically affected by divorce, in a similar way, with a drop in their living standard of about 24%.

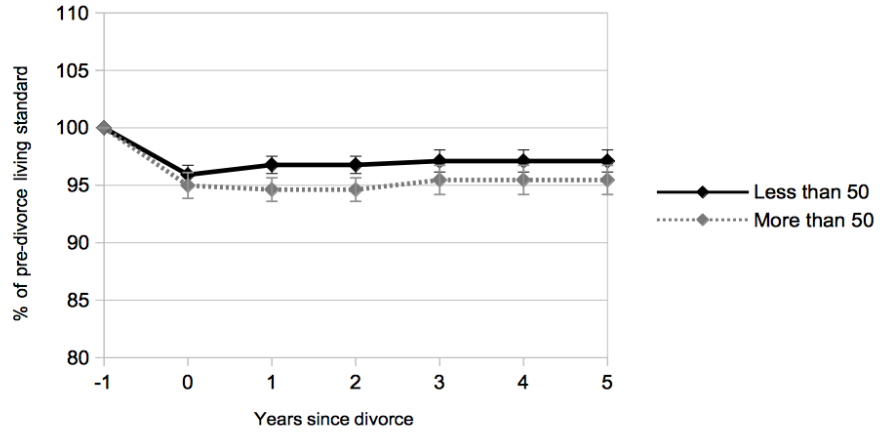
For men, the story is a bit different. During the first two years following divorce, men younger than 50 years old face a lighter decrease in living standard than older men. The former's living standards decrease by 4% on average while the latter decrease by 5% (Figure

Figure 2: Effect of divorce on living standards, women



3). Yet three years after divorce the difference between younger and older men's decrease in living standard is not significant anymore. Moreover, that temporary gap between men less than 50 years old and older than 50 years old is less large than the one between women from the two age group.

Figure 3: Effect of divorce on living standards, men



Thus, this more marked decline for women after age 50 than at younger ages, while the

variations are fairly similar for men, will lead to an increase in post-divorce inequalities between women and men at older ages. Divorcing after age 50 is thus more inequality generating, and the focus thereafter is on these late divorces.

5.2 The role of marital specialization

Marital specialization, approximated by the income gap between spouses within the couple, plays a role in the variation in living standard following divorce. The literature (Bonnet, Garbinti and Solaz, 2020; MacManus DiPrete, 2001) highlights a greater drop in living standard for the second source of income within the couple. In order to study what role this specialization plays for divorces after age 50, we stratify our sample into three according to the distribution of contributions to the couple's income. In half of the couples, the man is the main provider of resources, the woman is in that case in 19% of the couples and 31% of the couples are in an "egalitarian" situation.

Table 4: Type of couples according to resources sharing

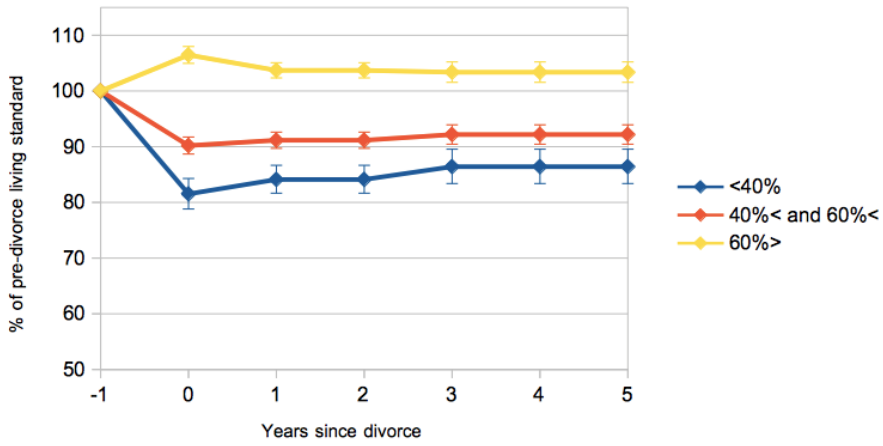
Type of couples	Definition	Proportion in the population
Egalitarian	Man and woman each contribute between 40 and 60% of the household income before divorce	31%
Male Breadwinner	The man contributes more than 60% of the couple resources	50%
Female Breadwinner	The woman contributes more than 60% of the couple resources	19%

Sample : EDP, individuals aged between 18 and 79 years old, married in 2010, with two years of non missing individual and household income income

In line with the existing literature, variations in living standards are very much linked to the economic position of the spouses within the couple. While on average, the living standard of all divorced men declines by about 5% in the year following the divorce, the decline is much greater when they were the second provider of resources, of the order of 16% (Figure 4), a loss that fades little with the years following the divorce. Conversely, the living standard of men who are the main providers of resources increases after divorce by 4%. 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 experienced a 24% drop in their living standard in the year following the divorce, this drop is much more significant when they belonged to a male breadwinner

couple of the order of 31% Figure 5. Being the main provider of resources allows them to maintain their living standard after divorce. When both spouses belonged to an egalitarian couple, the loss of living standard is of the order of 17% for women and 9% for men. Both bear the cost of the loss of economies of scale due to divorce, although the woman bears a little more than the man. It should be noted that within this so-called "egalitarian" class, the man is a little more likely to have more than half of the resources.

Figure 4: Effect of divorce on living standards, according to marital specialization, men

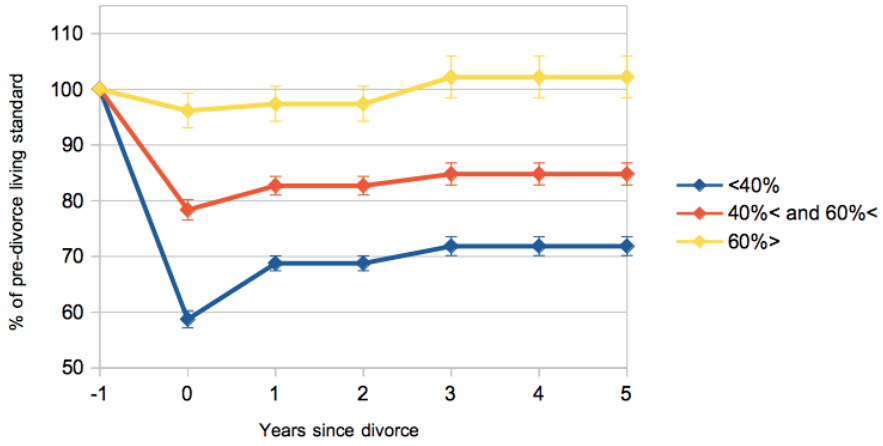


5.3 The role of private and public transfers

5.3.1 Effects of private transfers

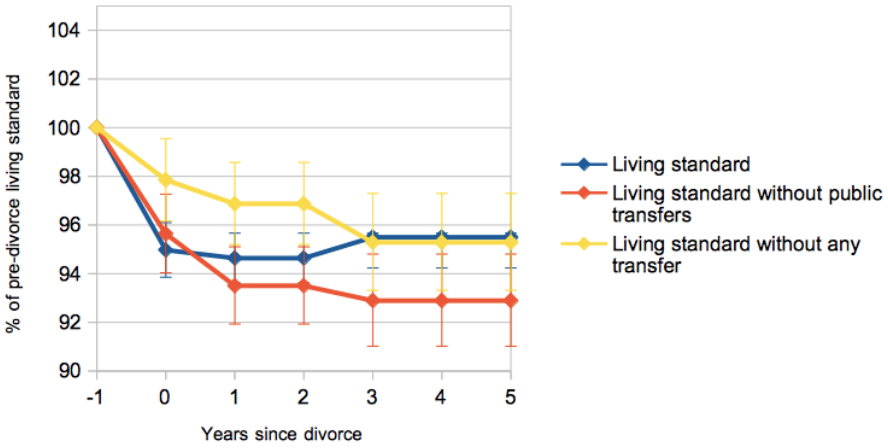
Private transfers are expected to limit the loss of women's living standard. Women are more likely to have custody of children after divorce, when they still have dependent children, and to receive child support payments. They are also more often recipients of the compensatory benefit because of their lower incomes. Symmetrically, private transfers are expected to degrade the living standard of men who are most often in receipt of them and tend to pay more private transfers after divorce. Our hypotheses hold true for women (Figure 7). For women, private transfers reduce the decline in their living standard after divorce. Without any transfers, the average drop in women's living standard would be around 43% one year

Figure 5: Effect of divorce on living standards, according to marital specialization, women



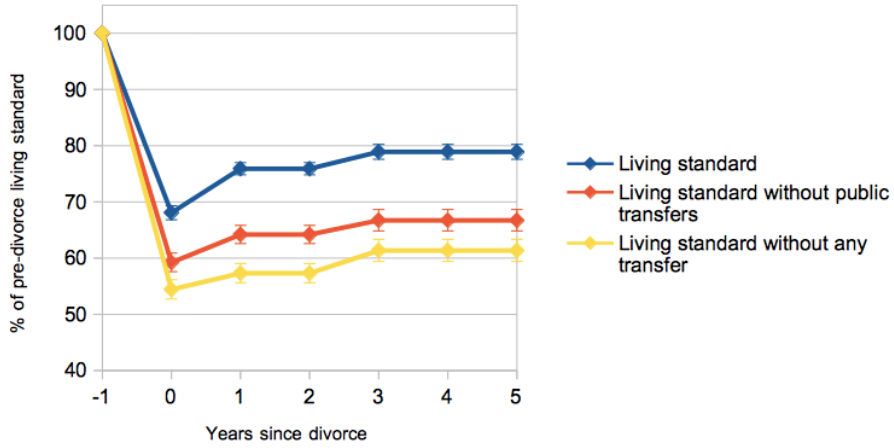
after divorce. With private transfers, this decline is limited to 36%. During the first three years after divorce, it is clear that private transfers improve women's living standard.

Figure 6: Effect of divorce on living standards, whether private and public transfers are included or not, men



Private transfers initially seem to have the expected negative effect on men's living standard (Figure 6). Without any transfers, the drop in living standards would be of the

Figure 7: Effect of divorce on living standards, whether private and public transfers are included or not,women



order of 3% for men in the year following the divorce. Taking private transfers into account increases this loss, which doubles to 6.5%.

The amount of private transfers tends to decrease in the years following divorce for women. It is possible that for some individuals, some transfers may be provided for a short period of time (for example, temporary assistance to a divorced woman), or that the children may become financially independent over time.

5.3.2 Effects of public transfers

It is expected that women with more limited incomes will be able to take advantage of public assistance (family allowance, housing allowance and social minima), thus limiting their post-divorce decline in living standards. Men, whose incomes tend to be higher, are expected to benefit less from this assistance and possibly see their taxes increase because they no longer benefit from the couple's favorable provisions. We find that public transfers do play an important role for women in limiting the post-divorce decline in their living standard ((Figure 7). Without public transfers, the decline in women's living standard is of 36% 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 standard

during the five years following divorce. However, their role diminishes slightly in the 3 to 5 years following the divorce but remains high. We can also observe here a sign of an increase in women's own resources in the years following the divorce (in the form of returning on the labour market or repartnering, for example). Since most social benefits are means-tested, that would lead to a decrease in them.

Public transfers play a much smaller role for men. From 6.5% without public transfers, the decline is 5.5%. Public and private transfers therefore play a very important role in limiting the decline in living standards following women's divorce. The decline they incurred without any transfers is almost halved (from -43% to -24%). The role of these transfers is much weaker for men. Without cancelling them, they limit post-divorce inequalities between women and men. In particular, these transfers will play a very different role depending on the place in the distribution of women's income, since public transfers often act as a buffer against poverty.

5.4 Heterogeneity of divorce effects according to the position in the income distribution

The level variation is different for men depending on their position in the distribution of pre-divorce living standards. Thus, men in the first quartile of living standards see their living standard increase post-divorce by about 5% the following year (Figure 8). The loss then increases with the initial living standard. Men in the second quartile see their living standard decline by about 6%, while men in the top half of the living standard distribution have comparable losses of about 11%.

An important part of the differences in the loss in women's living standard observed between pre-divorce living standard quartiles is explained by the existence of transfers, particularly public transfers, a significant share of which are means-tested. Thus, without any transfers, the loss is almost the same for women in the first, second and last quartile (around 45% in the year following the divorce), and slightly less for the third quartile. Taking into account private and especially public transfers strongly limits the decline in the lower end of the distribution of living standards. Without any transfers, the poorest women would experience a drop in their living standard of more than 45%, that loss is

Figure 8: Effect of divorce on living standards, according to income before divorce, men

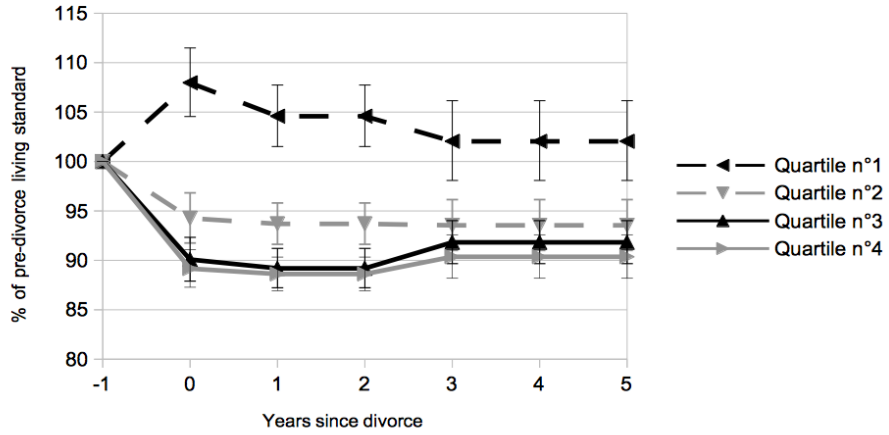
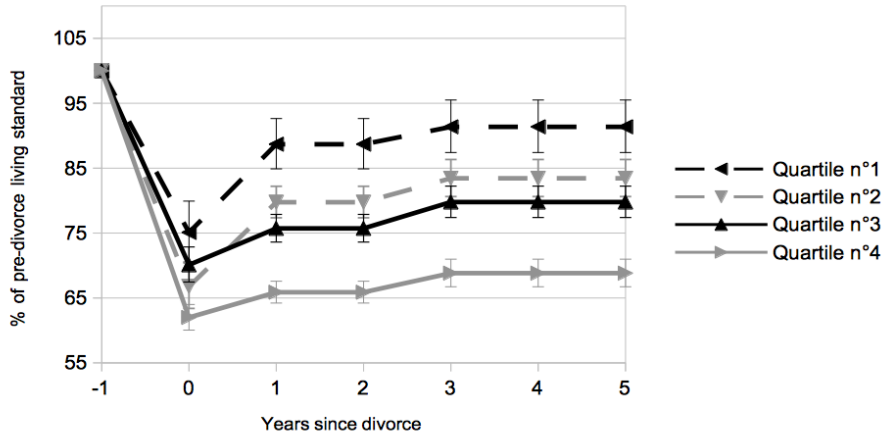
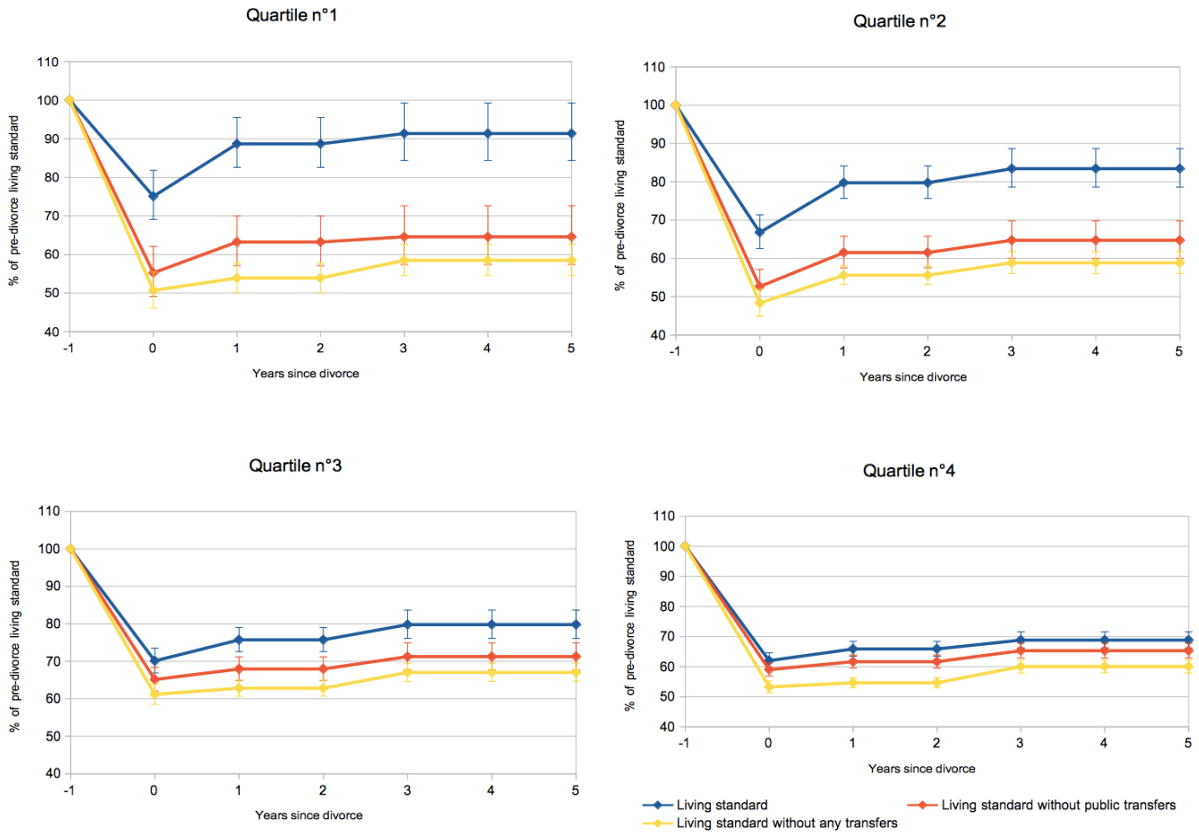


Figure 9: Effect of divorce on living standards, according to income before divorce, women



being divided by nearly 4, to reach 11% once all transfers are taken into account. The effect of transfers remains significant, even if slightly less for the second quartile (from -44% to -20%) and is gradually diminishing. In the last quartile, the loss in women's living standard is much less cushioned by transfers (from 45% to 34%) (Figure 10). For the latter, public transfers play only a very small role; it is private transfers that moderate the decline in living standards following divorce .

Figure 10: Effect of divorce on living standards, with and without transfers, according to income before divorce, women

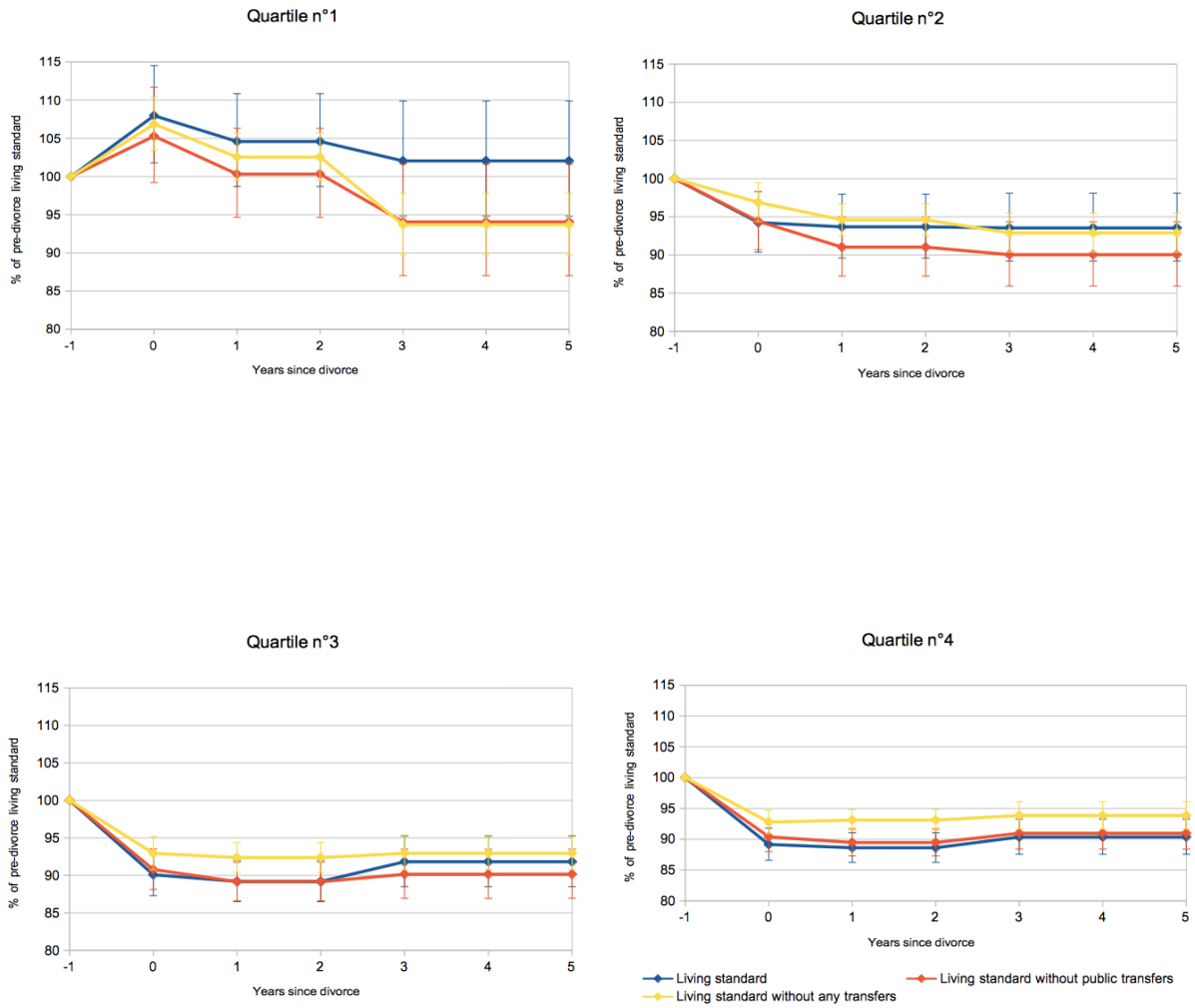


Transfers, particularly public transfers, strongly offset the decline in the living standard of the least well-off women. That important role of public transfers can also be observed in other countries where the welfare state is important. For example, in the Netherlands, Hogendoorn (2020) highlights that "dissolution prompted income convergence, as women from high-income unions experienced sizeable losses yet women from low-income unions actually gained". "At the same time, aggregate inequality increased somewhat, due to a combination of downward mobility by most women and strong upward mobility by some". In our context, the convergence can be seen to though we identify no quartile of women gaining from divorce.

For men, public transfers play a role mainly for men in the first quartile and private

transfers from the second quartile onwards (Figure 11). It is possible that men in the first quartile are not creditworthy in a number of cases, which would not allow them to pay alimony.

Figure 11: Effect of divorce on living standards, with and without transfers, according to income before divorce, men



6 Recovering mechanisms : Re-partnering, labour market participation and delayed retirement age

6.1 Re-partnering

Re-partnering is one way to moderate the decline in women's living standard. Following divorce, 23% of divorced men and 17% of divorced women in our sample returned to a relationship (within 6 years after the divorce) (Table 5). Divorced women who repartner after divorce almost maintain the living standard they had when they were married, thus avoiding a decline of more than 20% that they would have experienced if they had remained alone after the divorce. Re-partnering also have a positive effect on the living standard of divorced men compared to remaining alone, although to a much lesser extent. Re-partnering allows them to maintain their living standard, which would otherwise have decreased by 5%.

Table 5: Re-partnering after divorce

	Not re-partnered	Re-partnered	Total	Share of re-partnered
Men	6,244	1,890	8,134	23.2%
Women	4,825	1,022	5,847	17.4%
Total	11,0695	2,912	13,981	20.8%

Source : EDP, individuals aged between 18 and 79 years old, married in 2010, with two years of non missing individual and household income income

It is likely that the difference between women and men reflects very heterogeneous situations in terms of choice of spouse and the characteristics of women and men reforming a couple.

6.2 Evolution of labour income

Another way to moderate the negative effects of divorce for individuals may be to increase their labour supply at the extensive margin (whether or not they participate in the labour market) or intensive margin (increasing their labour income for those who were already

participating in the labour market by increasing their working hours).

Our data do not include information on working hours. To understand labor market participation's evolution after divorce through income data we use several variables.

- We characterize the extensive marge through two dummy variables. First, a dummy equal to one when the person has a salary. It is indicating whether the individual is employed. Second, a dummy equal to one when the person received work earning being a wage or unemployment benefits. That variables identifies people that are active on the labor market. When dealing with the extensive margin, we consider our full sample of EDP individuals over 50.

- The intensive margin is considered first through the lens of annual wage in 2015 constant euros. Then we tackle it through work earning (annual wage and unemployment benefits). When studying the intensive marge, we use a smaller sample. We focus on EDP individual more than 50 and less than 65 years old. Those persons should moreover be active on the labor market in the opening year of our observation window (2010).

For men, little or no effect of divorce is expected, with most men working full time. However, divorced men are two to four percentage points more likely to participate in the labour market than married men. This may be due, for example, to a more rapid recovery from a period of unemployment: unemployed men who just divorced may have a lower reservation wage than unemployed men still married. Yet, that kind of exit from unemployment should not register on the variable indicating whether people are active on the labor market as it encompasses unemployment and employment. One should think of competing hypotheses. On the one hand, active divorced men may delay their retirement. On the other hand, retired divorced men may resume working activities after divorce for economic or social purposes. The former hypothesis is tested in the next section. There is also an effect on the intensive margin, with divorced men's labour incomes being somewhat higher than those of married men after divorce (Table 6).

For women, one would expect a positive effect of divorce on labor force participation, as observed at younger ages. A proportion of women may indeed return to work after divorce, although that effect of returning to the labour market is less likely at older ages than at

Table 6: Effect of divorce on labour market participation for men

	Extensive margin				Intensive margin			
	In the labour market		Employed		Labor market earning		Wage	
Year of divorce	-0.002	-0.002	-0.002	-0.002	676,5***	672,9***	647,4***	642,4***
One or two years after divorce	0.041***	0.029***	0.031***	0.022***	709,8***	863***	552,7***	771***
Three or five years after divorce	0.045***	0.028***	0.036***	0.023***	768,9***	999,1***	686,2***	1014,3***
Re-partnering		0.076***		0.060***		-919,3***		-1310***
Observations	226,187	226,187	226,187	226,187	157,230	157,230	157,230	157,230
R-squared	0.0103	0.0103	0.099	0.0993	0.0374	0.0374	0.0398	0.039
FE (individual and year)	YES	YES	YES	YES	YES	YES	YES	YES

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

lSample : from column (1) to (4), EDP men aged over 50 married in 2010, with non missing individual and household incomes for at least two years. From column (5) to (8), EDP men between 50 and 65, married in 2010, with non missing individual and household incomes for at least two years, and active on the labor market in 2010.

Table 7: Effect of divorce on labour market participation for women

	Extensive margin				Intensive margin			
	In the labour market		Employed		Labor market earning		Wage	
Year of divorce	-0.013**	-0.013**	-0.011**	-0.011**	878,7***	874,6***	895,6***	890,6***
One or two years after divorce	0.076***	0.074***	0.067***	0.066***	1278,9***	1383,7***	1321,5***	1443,5***
Three or five years after divorce	0.094***	0.091***	0.078***	0.077***	1463,7***	1591,8***	1558,6***	1707,7***
Re-partnering		0.018		0.006		-830,3***		-965,9***
Observations	217,790	217,790	217,790	217,790	133,732	133,732	133,732	133,732
R-squared	0.0813	0.0813	0.0789	0.0789	0.0350	0.0351	0.0392	0.0393
FE (individual and year)	YES	YES	YES	YES	YES	YES	YES	YES

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

lSample : from column (1) to (4), EDP women aged over 50 married in 2010, with non missing individual and household incomes for at least two years. From column (5) to (8), EDP women between 50 and 65, married in 2010, with non missing individual and household incomes for at least two years, and active on the labor market in 2010.

younger ages, because of the labour market difficulties of those aged 50 and over. This is the case. Women's labour force participation increases by about 7 to 9 percentage points after divorce, more than double the effect for men, and increases in the years following divorce (Table 7). There is also an increase in labour income (intensive margin) for those who were already participate in the labour market, and in higher proportions than for men (table not shown). Re-partnering is associated to a smaller increase in labour earnings than for divorced women who remained single. We likely observe a trade-off between different recovery mechanisms.

6.3 Evolution of retirement decision

The particularity of the population aged 50 and over compared to younger ages is that they can retire. It is interesting to study how divorce affects this probability of withdrawing from the labour market. We considered two definitions of retirement transition year. First, it is the year when individuals start receiving any amount of retirement pension. Second, we consider it as the year when retirement pension becomes the main income source, that is to say the amount is higher than other incomes.

Whatever the definition used, it appears that men and women who were still working before the divorce delay their retirement after the divorce compared to individuals who remain married. Divorce decreases the probability of retirement for men and women in the year of the divorce and even more so in the years that follow. The magnitude of the effect of divorce is comparable for women and men. It means that divorcees stay longer on the labour market. This result is confirmed by their higher level of pension once retired, in line with their longer accumulation during their active life. While the woman's repartnering has no effect of retirement timing for women, it accelerates slightly the likelihood of retiring for men.

7 Conclusion

This article is the first to measure the causal effect of divorce on the living standard trajectory of individuals over 50 years old in a European country. Our approach is motivated

Table 8: Effect of divorce on the probability of retirement

	Men				Women			
	(1)		(2)		(1)		(2)	
Year of divorce	-0.045***	-0.045***	-0.049***	-0.049***	-0.050***	-0.050***	-0.045***	-0.045***
One or two years after divorce	-0.074***	-0.078***	-0.080***	-0.084***	-0.079***	-0.081***	-0.064***	-0.065***
Three or five years after divorce	-0.111***	-0.116***	-0.124***	-0.130***	-0.118***	-0.120***	-0.099***	-0.100***
Repartnering		0.021***		0.023***		0.017		0.009
Observations	161,647	161,647	161,647	161,647	137,645	137,645	137,645	137,645
R-squared	0.1580	0.1581	0.1564	0.1564	0.1407	0.1407	0.01328	0.01328
FE (individual and year)	YES	YES	YES	YES	YES	YES	YES	YES

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

Sample : EDP men and women, aged between 50 and 65, married in 2010, with non missing individual and household incomes for at least two years, and active on the labor market in 2010.

(1) dummy equals to one if pensions are the major part of individual income (2) dummy equals to one if pension income is positive

by the lack of work on the economic consequences of divorce of seniors even though these divorces are on the rise (grey divorce revolution) in many countries.

First, we find that one year after divorce, men's living standard is 5% lower than the average pre-divorce living standard, while women's is 24% lower. We find that economic consequences of divorce are similar before and after age 50 for men. On the contrary, the living standard of women aged over 50 decreases more after divorce than that of younger women. Our initial hypothesis that the gendered effect of divorce increases in the case of grey divorces is thus verified. Gender inequalities are higher following grey divorce compared to divorces at younger ages.

Second, we find that public and private transfers play a big role to moderate the negative economic consequences of divorce, especially for women. Public and private transfers reduce the loss by almost half (from 43% - in the absence of transfers - to 24%). For men, public and private transfers only play a smaller role. Changes in their living standard (a slight decrease) are rather similar whether these transfers are taken into account or not.

The third contribution of our paper is to highlight the heterogeneity of the effect of divorce according to the position of individuals in the household income distribution before

separation. We find that the impact of divorce on women's loss of living standard increases with their position in this distribution: greater at the top of the income distribution than at the bottom. That gradient is less clear for men, except for those in the first quartile who stand out clearly, as not experiencing a decline in living standard following divorce, but an increase. Looking at the composition of this living standard, we find that in the first three quartiles, transfers have almost no impact on men's living standard, while private transfers (generally paid by men) reduce the post-divorce living standard. For women, public transfers, on the contrary, play a role to mitigate the loss of living standard in all quartiles, but their impact decreases as one moves up the income distribution. It is consistent with the fact that a large number of welfare benefits are means-tested. Those results suggest that the public divorce framework in France succeeds in moderating the decline in women's living standard after divorce, and does so particularly effectivelyfo the poorest. That role of public transfer is supplanted by private transfers for households in the fourth quartile.

Fourth, we find that mechanisms of recovery such as re-partnering or increasing one's presence in the labour market play a big role. Repartnering is associated for both men and women with a recovery in terms of living standard. In terms of labour market participation, those over 50 years old have the particular characteristic of approaching retirement age or being already retired. At the extensive margin, there is an increase in female and male labour market activity in the years following the divorce. That increase is greater for women than for men, which is consistent with the fact that men have a smaller loss to mitigate and women have a lower initial level of participation on the labour market in average. The conclusion is the same when considering the probability of being employed or participating in the labour market. At the intensive margin, we find that men and women receive significantly higher wages and earnings from work as early as the year of divorce. Again, the effect is greater for women than for men. We do not have access to working hours, our results nevertheless suggest an increase in participation in the labour market that may contribute to limiting the decline in living standard after divorce by increasing one's own resources. Despite the prospect of retirement, divorced men and women over the age of 50 seem to increase their presence in the labor market. This conclusion is still valid when we look at the probability of retirement. The latter decreases significantly in the five

years following the divorce, suggesting that individuals remain active for a longer period of time. If those results can be explained by the desire to accumulate higher retirement entitlements, they may also connote a desire to maintain the social ties associated with a professional activity.

The main limitation of this article is that it deals only with current income and leaves aside the question of wealth, not available in our database. Divorce affects divorcee's wealth. It is particularly the case for those over 50 years of age who have had more time to accumulate during their personal and marital life, which is associated with longer union durations than young divorced people. In France, the over-50s hold more assets than younger age groups (Gleizes and al., 2018). The question of the consequences of divorce on the wealth of older divorcees is therefore important. Our results should be read in conjunction with the results of the literature on the impact of divorce on household wealth. Kapelle and Baxter (2019) show in Germany 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. Home ownership may also be modified following 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 differences in economic status between age groups (Baclet, 2006). This element can lead to both a nuanced reading of our results in terms of gender inequality and the dynamics of the economic consequences of divorce over the life cycle. Future researches should include this dimension to give a broader picture of the economic consequences of gray divorces. Beyond the inclusion of changes in housing ownership after divorce, we may also think about including a measure of imputed rent in the calculation of the living standard.

In a similar way, our database only collects a part of spousal alimonies paid and received. They indeed can be made in the form of a capital transfer and in some cases, they do not have to be tax decalred Since those benefits explicitly aim to compensate for the gendered inequalities resulting from marital life and divorce, one can only call here for the constitution of a database that would make it possible to assess their role in the economic consequences of divorce.

Taking the previous remarks into account, our currently gendered gaps may be up-

ward estimated.Including wealth and spousal alimony would rather tend to reduce these observed gaps in living standards. Despite these limitations, our contribution sheds new and necessary light on the impact of divorce on the trajectory of living standards after age 50. With the arrival of the large baby boom generation at this age, it was important to measure such consequences and the role of current public policies.

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Table A1: Testing the pretrend hypothesis

	Men		Women	
5 years before divorce	-0.005	-0.005	0.003	0.003
4 years before divorce	-0.006	-0.006	-0.01	-0.011
3 years before divorce	-0.002	-0.003	-0.005	-0.005
2 years before divorce	0.003	0.003	-0.006	-0.007
Year of divorce	-0.052***	-0.052***	-0.388***	-0.386***
1 years after divorce	-0.058***	-0.066***	-0.291***	-0.318***
2 years after divorce	-0.052***	-0.063***	-0.262***	-0.294***
3 years after divorce	-0.049***	-0.061***	-0.239***	-0.275***
4 years after divorce	-0.039***	-0.053***	-0.239***	-0.276***
5 years after divorce	-0.051***	-0.066***	-0.234***	-0.274***
Retirement		-0.078***		-0.003**
Unemployment		-0.078***		-0.0003
Re-partnering		0.057***		0.254***
Observations	326,699	326,699	301,690	301,690
R-squared	0.0022	0.0096	0.0136	0.0149
FE (individual and year)	YES	YES	YES	YES

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

Sample : EDP men and women, aged between 50 and 79, married in 2010, with non missing individual and household incomes for at least two years.