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# The concurrence of retirement and widowhood pensions in Spain: Improving their redistributive effects in times of increasing joint life expectancy

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The views and conclusions cannot be attributed to any institution with which we are associated, and all remaining errors are our responsibility.

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## 1. Introduction

In recent decades, Spanish society has experienced major transformations in the way couples formalize their marriage ties and in the number of years they actually cohabit. The latter is closely linked to increases in life expectancy after the age of 65, which as well as having a direct impact on the duration of a couple's cohabitation has also impacted such critical concerns as pensions, health and long-term care.

This concept of joint life expectancy – closely linked to demographic and actuarial calculations – refers to the average life expectancy of a group of people or, in the case that concerns us here, of a couple. In short, it is a statistical estimate that indicates how many years, on average, both partners are expected to live together from a certain point in time. The group is said to dissolve when the first death occurs and to extinguish when the second death occurs, that is, when both partners have died (Ayuso et al., 2001).

In ageing societies, the number of years people live together is likely to have a direct impact on critical areas of the welfare state. The literature, by adopting a number of different approaches, describes these effects of joint life, which is increasing significantly with rising longevity and having a marked impact on such elements as the concentration of income and wealth in older population intervals, the concurrent receipt of retirement and survivors' public pensions and the design of life insurance products, people's health, and the provision of long-term care, among others (Bravo et al., 2021; Compton and Pollak, 2021; Klerby et al., 2013; Ponthiere, 2007).

Recent studies by the Spanish Central Bank report that households headed by individuals aged 65 or older concentrate wealth most sharply (Banco de España, 2022). Likewise, in the member countries of the Organization for Economic Cooperation and Development (OECD), households headed by partners of pre-retirement or retirement age have, on average, the highest levels of real estate and financial wealth (OECD, 2021).

Actuarial studies conclude that there is a significant relationship between marital status and cohabitation, on the one hand, and probabilities of death and survival, on the other. The findings show, for instance, that the survival prospects of older people living alone, whether single or widowed, tend to be lower than those of people living as a couple (Alaminos and Ayuso, 2019; Hu and Goldman, 1990).

As far as the welfare state is concerned, the analysis of the impact of joint life expectancy has focused on a number of specific areas. For example, in the field of public and private pension schemes, attention has, for some time now, concentrated on the design and reform of survivors' pensions (Alaminos and Ayuso, 2015, 2016; Brown and Poterba, 1999), given their increasing share in total pension expenditure and the arrival at retirement age of cohorts of women with full contribution careers. This applies above all to countries such as Spain or Portugal, where survivors' pensions can be received simultaneously with old-age pensions.

As for health, the mutual help provided by the partners of a couple illustrates how marital closeness can impact both their mental and physical wellbeing. Although challenges may arise when one partner faces health problems, couples' relationships can be leveraged to improve treatment outcomes (Kiecolt-Glaser and Wilson, 2017; Kumar and Williams, 2021; Monden, 2007). Moreover, when faced with the need for help in performing activities of daily living, it is typically the partner that provides this type of support within the framework of informal care (Alemany et al., 2023).

In analyses of long-term care, empirical evidence points to the importance of including gender in both research studies and policy designs, due to the specific preferences of men and women as regards such care services. Carvalho et al. (2019) conclude that people are more prone to institutionalization as the severity of a disorder increases, and when there is no spouse capable of providing aid. It also appears that men prefer to receive care exclusively from their spouse in a home setting, even when faced with increasing levels of disability. In contrast, women are more likely to seek assistance and care from professionals, sheltered homes or institutionalization. There are public policy concerns here related to the adequacy of community support in the case of women, who tend to exhibit higher prevalence rates of disability, and who may be particularly vulnerable and at risk of poverty due to the greater likelihood of their living alone with limited financial resources (Katz et al., 2000). Compared to heterosexual adults, same sex couples are expected to require greater long-term formal care in the future, particularly if they are of similar ages and present similar health conditions. Some studies suggest that homosexual adults may rely more on formal care systems than on traditional family support (Furlotte et al., 2016; Henning-Smith et al., 2015).

A complete analysis of joint life expectancy requires, first and foremost, a study of a couples' makeup, prioritizing analyses of their respective ages and sexes. Age analysis is critical, because the age gap will impact the number of years a couple can be expected to cohabit. Generally, the greater the couple's age gap, the lower their expected joint survivorship is likely to be. Moreover, given the well-documented sex gap in life expectancy, the expected number of years of joint life will differ between heterosexual and same sex couples. To this, recent research has identified a socioeconomic gradient in life expectancy with longevity prospects varying, for instance, according to level of education, occupation, income and wealth (Ayuso et al., 2017a, 2017b).

Thus, it is essential to address the demographic and financial factors associated with the life expectancy of couples in ageing societies, given the likelihood that both partners will survive beyond the age of 65. Given the paucity of studies in the extant literature, here, we specifically seek to measure the effects of joint life expectancy after this age. Indeed, even a small generation gap in this regard may require changes in family and care planning. In financial terms, a couple's age gap can have an impact on their long-term economic and savings needs. Moreover, as far as pensions are concerned – especially in classic defined-benefit, pay-as-you-go (PAYG) systems with concurrence of retirement and survivors' pensions – disparities in age can influence the long-term sustainability of a system, insofar as the younger spouse could potentially be eligible for a widowhood pension for a longer period in the event of the death of an older spouse.

In this article, we first present an evolutionary analysis of age differences in marriages registered in Spain between 1976 and 2021. Here, we are specifically concerned with measuring the heterogeneity in the age gap of heterosexual couples, considering the age at which marriage occurs and the previous marital status of the partners. It is, undoubtedly, essential to consider this heterogeneity in any analysis of joint survival – a characteristic which, to the best of our knowledge, has been paid little attention to date – as it is likely to have a significant impact on associated estimates. Second, to illustrate the impact of these empirical findings on pension design and reform, we estimate the impact of the age gap presented by couples in Spain on household pension wealth across different age gaps and couple structures. To do so, we jointly model both old-age and survivors' (widowhood) pensions within the framework of the concurrence of pensions in the Spanish PAYG system. Our study also aims to draw comparisons with those individuals that do not have the right to receive a survivor's pension, because they have not formed a couple, and with those individuals that are only entitled to this pension, because they do not have the right to receive a retirement pension.

The rest of this article is structured as follows. The next section presents an evolutionary analysis of age differences in heterosexual marriages registered in Spain between 1976 and 2021. Our main objective here is to find answers to the following questions: How has the age difference between spouses evolved over this period? Is the age gap between spouses affected by their respective ages at the time of marrying? Does their previous marital status affect the age gap between partners? In the third section, we present the statistical methodology used to estimate joint life expectancy until the group is dissolved; that is, we outline the process of calculating the number of years a couple cohabits until one or other of the spouses dies, a process in which the respective ages and sexes of the couple are fundamental. In the fourth section, we present our estimates of joint life expectancy in Spanish couples, based on the proposed actuarial methodology and the gap in the ages of the partners. In this same section, we quantify expected differences in income from retirement and survivors' pensions in Spanish households in which at least one of the partners is aged 65, and compare this outcome with that of single households and households in which only one of the partners has worked. Finally, in the fifth section, we discuss the impact of the heterogeneity in a couple's ages and sex at the time of retirement on their retirement and widowhood pensions, and the impact this can have on the design of public policies that seek equity within and between generations.

## 2. Age gap in Spanish heterosexual couples

In this section, we examine the age gap in couples married in recent decades, drawing on public records, and also analyze the sociodemographic characteristics of the spouses. To do so, we use microdata files containing marriage data from 1976 to 2021 provided by the National Institute of Statistics (INE). These show that, in Spain, between 1976 and 2021, 9,075,739 heterosexual marriages were celebrated and, that between 2005 and 2021, 34,376 gay and 28,177 lesbian couples contracted marriage.

The microdata files contain individual data per marriage without aggregation and duly anonymized, for each year. These microdata constitute ASCII files that collect, for every single record in the survey, the values taken by each variable considering all possible values. The source of information is the Civil Registry, which sends marriage bulletins to the INE every month. The demographic elements used in preparing these publications remained virtually the same across the whole period. However, since the legalization of same-sex marriages in 2005, information on the contracting parties is no longer recorded according to male/female categories, but rather according to the sex of each contracting party.

To determine the age gap in married heterosexual couples, we define the gap value as the difference between the age of the man and the age of the woman. Hence, the gap value shows the age difference between spouses regardless of whether the man is older than the women or vice versa.

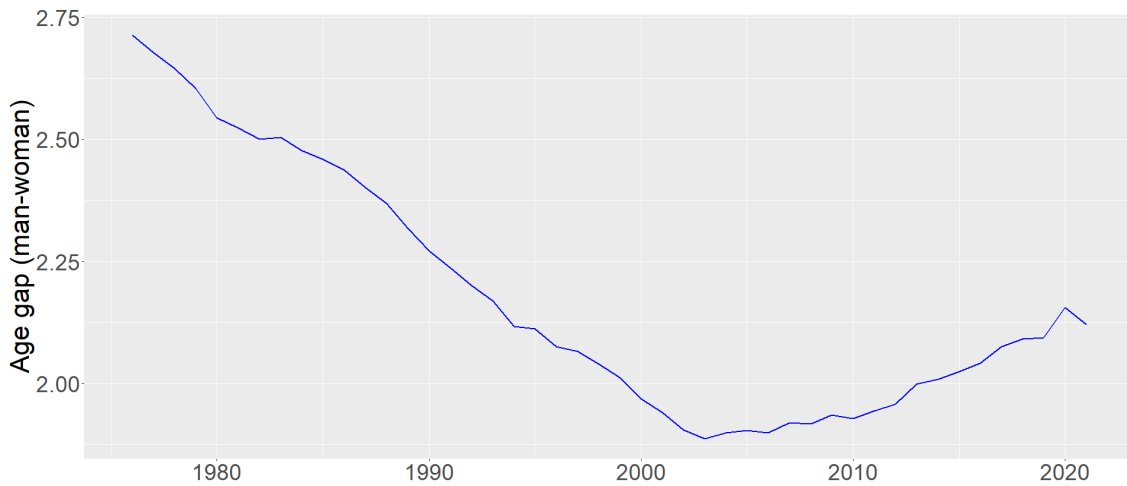
The composition of these heterosexual couples is further examined by relating the gap variable with a marital status variable. The latter can take one of three values:

1. if the partner was single before marriage,
2. if the partner was widowed before marriage, and
3. if the partner was divorced before marriage. Here, 88.5% of heterosexual marriages were between partners that had been single before marriage (i.e. in 88.5% of the cases it was a first marriage). We select this percentage for our research.



Figure 1 illustrates the average age gap at first marriage between heterosexual couples for the period 1976–2021. Specifically, it shows that the average age gap value between men and women for the entire period ranges from 1.89 to 2.71 years with a mean of 2.18 years (median equal to 2.09 years).

Figure 1. Heterosexual couples' average age gap value at first marriage between 1976 and 2021



If we analyze the age gap between heterosexual couples at first marriage for each of the last five decades (see Table 1), the mean for the period 1976–2021 falls, reaching a minimum in the 2010s.

Table 1. Descriptive statistics of heterosexual couples' age gap value at first marriage by decade

	1980	1990	2000	2010	2020	2021
<b>min</b>	-60	-67	-69	-55	-34	-55
<b>Q1</b>	1	0	0	0	0	0
<b>median</b>	2	2	2	2	2	2
<b>mean</b>	2.54	2.27	1.97	1.93	2.16	2.12
<b>Q3</b>	4	4	4	4	4	4
<b>max</b>	61	63	54	52	45	51

However, from this decade on, the gap gradually increases, reaching a maximum mean of 2.16 in 2020. Note, the quartiles remain constant over the period. Thus, in 25% of heterosexual marriages in Spain, there is less than a one-year age difference between spouses, while in another 25%, the age gap is 4 years or more. In the remaining 50%, the age difference ranges between 0 and 4 years, with a median of 2 years.

The average age gaps at first marriage between heterosexual couples by age group and by sex – male and female – are shown in Figures 2 and 3, respectively. Figure 2 shows that men below the age of 20 tend to marry women that are 1.42 years older; however, from this age onwards, they tend to marry younger women (e.g. men aged 20–29 tend to marry women 0.95 years younger, and men aged 30–39 tend to marry women 3.36 years younger than themselves). Table 2 shows this mean age gap value and the number of marriages contracted by men by age range. Note that, in aggregate terms, the most frequent age range among men for contracting marriage is between 20 and 29 years, these marriages accounting for 59% of all marriages celebrated since 1976, while those contracted by men between the ages of 30 and 39 account for 34%.

Figure 3 shows that women below the age of 39 tend to marry men older than themselves (e.g. for women under the age of 20 the gap is up to 5.37 years). However, after the age of 40, the trend reverses as these women tend to marry men younger than themselves (e.g. women over the age of 60 tend to marry men 4.98 years younger, but note that in this case the frequency of outliers is high). Table 3 shows this mean average age gap value and the number of marriages contracted by women by age range. Note that, in aggregate terms, the most frequent age range among women for contracting marriage is between 20 and 29 years, these marriages accounting for 66% of all marriages celebrated since 1976, while those contracted by women between the ages of 30 and 39 represent 24% of the total.

Figure 2. Heterosexual couples' gap value at first marriage by age range (men)

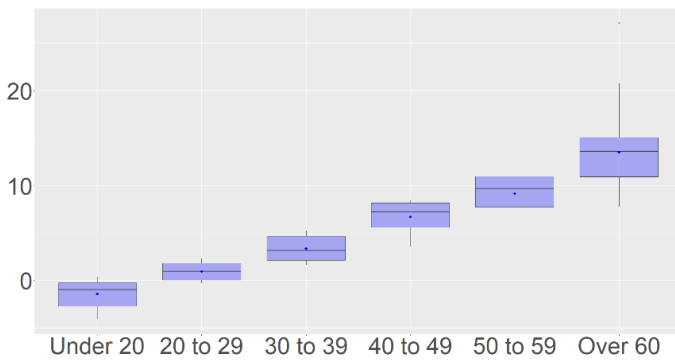


Table 2. Descriptive analysis of heterosexual couples' age gap value at first marriage (men)

Interval	Mean	N	%
Under 20	-1.42	114,397	1.42
From 20 to 29	0.95	4,717,890	58.74
From 30 to 39	3.36	2,726,301	33.94
From 40 to 49	6.69	381,291	4.75
From 50 to 59	9.16	66,312	0.83
Over 60	13.51	26,272	0.33

Figure 3. Heterosexual couples' gap value at first marriage by age range (women)

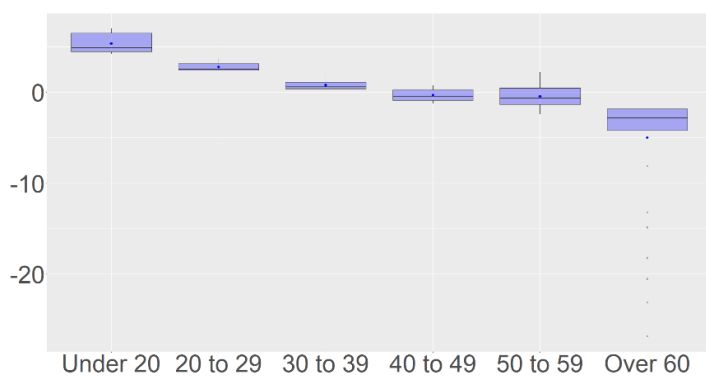
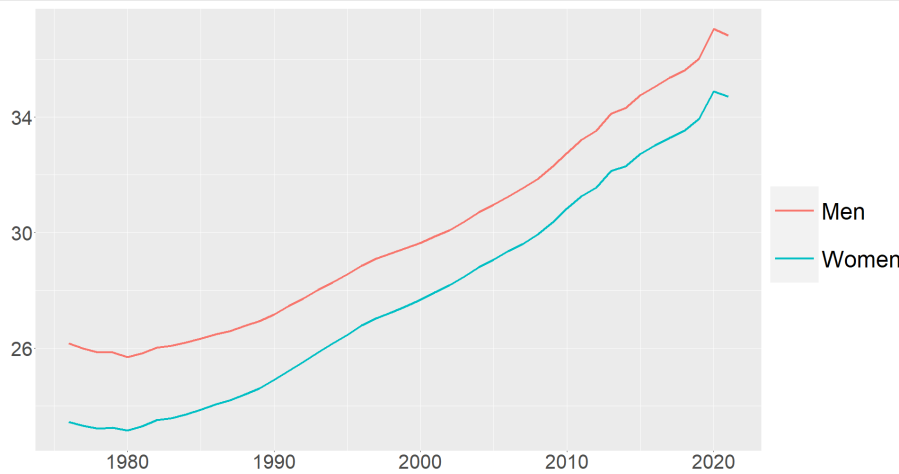


Table 3. Descriptive analysis of heterosexual couples' age gap value at first marriage (women)

Interval	Mean	N	%
Under 20	5.37	524,845	6.53
From 20 to 29	2.77	5,306,465	66.06
From 30 to 39	0.79	1,911,275	23.79
From 40 to 49	-0.31	233,893	2.91
From 50 to 59	-0.46	41,696	0.52
Over 60	-4.98	14,289	0.18

A further point to consider in our analysis is the evolution taken by age at first marriage for both men and women. Figure 4 shows that, at the beginning of the study period, the average age at first marriage for men was three years higher than that for women. This difference was narrowed over the period, reaching an average difference close to two years. However, a notable rise can be observed in the average age at first marriage across the whole period (1976–2021): from 26 to 37 in the case of men and from 23 to 35 in that of women. This has led to a significant increase in the number of marriages being contracted at ages between 30 and 39. Thus, in 1976, while 82% of marriages involved men between the ages of 20 and 29, only 12% involved men between the ages of 30 and 39; whereas, in 2021, this trend had undergone a significant change, as only 12% of marriages involved men between the ages of 20 and 29, while 58% involved men between the ages of 30 and 39.

Figure 4. Evolution of age at first marriage by sex (1976 to 2021)



In the case of women, 77% of marriages in 1976 involved women aged between 20 and 29, while this figure fell to 22% in 2021. As for marriages involving women aged between 30 and 39, only 6% took place in 1976, while this percentage had risen to 57% in 2021.

### 3. Joint life expectancies for Spanish heterosexual couples

Joint life expectancy until dissolution ( $e_{xy}$ ) indicates the average number of years until the first partner in a married couple dies. It is a biometric function calculated on the basis of the joint survival probability: that is, the probability that both partners remain alive at successive points in time (Ayuso et al., 2001). As with the calculation of individual life expectancy, the age of the spouses, the gap between their respective ages, and their sex are fundamental variables for quantifying the number of years that the two are expected to live together, as well as the time that will elapse until the second partner dies. To obtain estimates, we assume that ages  $x$  and  $y$  are integer values, discretizing these ages and using annual survival probabilities. Once the group has dissolved, the individual survival probability of the surviving spouse is calculated, that is, their life expectancy at the age they have at the time of dissolution (Ayuso et al., 2001),

$$e_{xy}(t) = \sum_{t=1}^{\infty} {}_t p_{xy} \tag{1}$$

where  ${}_t p_{xy}$  indicates the temporal probabilities of joint survival.



To obtain an estimation of joint life expectancy, we use the coherent functional demographic model (Hyndman et al., 2012) as our forecasting method, in line with previous reports in Bravo et al. (2023). First, we estimate the individual survival probabilities for both spouses aged  $x$  and  $y$ , then use them to calculate the temporal probabilities of joint survival.

Table 4 presents the estimates of joint life expectancy until dissolution ( $e_{xy}$ ), as well as individual life expectancies from the time of dissolution ( $x + e_{xy}$ ;  $y + e_{xy}$ ), for a heterosexual marriage composed of two individuals of ages  $x$  and  $y$  in Spain, with the requirement that at least one of them reaches the age of 65. The most common age gaps between the partners of couples in Spain (see section 2 above) are taken into consideration.

**Table 4.** Joint (until dissolution) and individual annuities (until extinction) for heterosexual couples at retirement age

Age		Joint status $e_{xy}$	Beneficiary	
Man ( $x$ )	Woman ( $y$ )		$x + e_{xy}$	$y + e_{xy}$
65	65	15.90	2.95	6.89
65	64	16.18	2.68	7.50
65	63	16.43	2.43	8.15
65	62	16.65	2.20	8.82
65	58	17.36	1.49	11.74
65	56	17.62	1.23	13.32
65	51	18.07	0.78	17.54
60	65	17.89	4.95	4.90
62	65	17.15	4.07	5.64
63	65	16.75	3.67	6.04
64	65	16.34	3.29	6.45

As is evident, joint life expectancy increases when one of the spouses is younger than the other. Moreover, the longer life expectancy of women significantly affects the number of years they will live alone following the death of their husband (last column of Table 4, and comparison with previous column, showing the number of years the husband will live alone following the death of his wife). For example, for a couple where both partners are aged 65, it is estimated they will live together for approximately 16 years; if the man dies first, it is estimated that the woman will live almost 2.3 times the number of years that the man will live if the woman dies first (6.89 and 2.95 years, respectively). When one of the spouses is younger than the other (especially when the woman is younger), the differences in how long each partner will live alone once the couple is dissolved increase significantly. The ramifications of these outcomes for social policy design are self-evident and should be given more prominence today at a time when the longevity of individuals is rising systematically.

## 4. Effects of joint life expectancy on pension concurrence in a defined benefit, pay-as-you-go system

The concurrence of retirement and widowhood pensions in a defined benefit, PAYG system, such as those operated by Spain and Portugal, impacts on pension wealth in households whose head is 65 years of age or older. This concurrence refers to the possibility of individuals receiving both pensions simultaneously, with a benefit limit that corresponds, in the case of Spain, to that of the maximum retirement pension. The right to access a widowhood pension is subject to the condition of having contracted marriage or being a de facto partner. The probability of either spouse receiving this pension is dependent on several factors, including the age gap between them, given that this difference influences the probability of survival associated with each age. It is, therefore, critical to undertake a rigorous analysis of pension concurrence and its impact on pension wealth, comparing outcomes with households for which there is no such concurrence, either because individuals have not married or, despite being married, they have not generated the right for their partner to receive a widowhood pension (for example, because they have not contributed to the social security system and are not entitled to a retirement pension).

Estimating differences by household in terms of expected pensions should help in the design of appropriate policies and strategies that promote intra- and intergenerational equity, ensuring the economic security and well-being of households during retirement. In general, and in adherence with Spanish and Portuguese regulations, the widowhood pension corresponds to between approximately 52 and 60% of the retirement pension of the partner that dies.

#### 4.1. Expected pension wealth of couple with concurrence of pensions

We seek to quantify the expected pension wealth of a married couple made up of two individuals aged  $x$  and  $y$ , respectively, from the time of retirement of one or both partners. In this analysis, the concurrence of retirement and widowhood pensions is assumed, as is the fact that both individuals meet the necessary requirements to receive independently a contributory retirement pension, to which the corresponding widowhood pension will be added (up to the maximum limit established) in the event of the death of one or other of the spouses.

In this analysis, we consider the age gap between spouses in Spain as presented in section 2 and Table 4. We assume that this disparity is maintained in those couples who both meet the requirements to access the retirement pension. This age gap is relevant to understanding the dynamics of pensions and their impact on household wealth during retirement. Having defined the ages of man (age  $x$ ) and woman (age  $y$ ), we then use their joint life expectancy until dissolution ( $exy$ ) (Table 4), that is, the number of years the couple will live together until one or other of them dies. Throughout this period, the corresponding retirement pension is allocated to each spouse taking into consideration whether or not his/her age is higher than that of retirement (i.e. 65 years old). In the event that one of the partners is under the age of 65 (i.e. only one has reached retirement age), the calculation is deferred until he or she retires.

In terms of the survivor's pension, we establish two possible scenarios:

- **First**, man dies and the marriage is dissolved. In this case, the individual life expectancy of woman is used (last column Table 4) by assigning her the payments corresponding to the retirement and widowhood pensions for the entire period remaining until her death.
- **Second**, the dissolution of the couple occurs owing to the death of woman. In this case, the individual life expectancy of man is used (penultimate column Table 4) by assigning the corresponding payments to the concurrence of the retirement and widowhood pension until his death.

In completing this analysis, we used the average retirement pension received by a man in Spain in 2022, which amounts to 1,368.77 euros, and the average pension for a woman, which stands at 915.33 euros (Spanish Social Security, 2023). The widowhood pension in the same year is 523.86 euros for a man and 759.21 euros for a woman (that is, as discussed, approximately 55% of the retirement pension of the spouse who dies).

Table 5 presents the expected pension income upon retirement of at least one of the two individuals, considering the age gap between spouses and the corresponding life expectancies until dissolution and extinction of the couple, as detailed in Table 4. Note that if the man (age  $x$ ) dies first, the woman simultaneously receives both the retirement pension and the widow's pension for the entire period until her own death. Conversely, if the woman (age  $y$ ) dies first, the man receives both pensions jointly until his own death. During the years of joint survival ( $exy$ ), both collect their respective contributory retirement pensions. In making these calculations, we assume that the annual pension revaluation rate is equal to the interest rate used in the update process.

**Table 5.** Expected pension wealth for a heterosexual couple (from retirement until death of both partners)

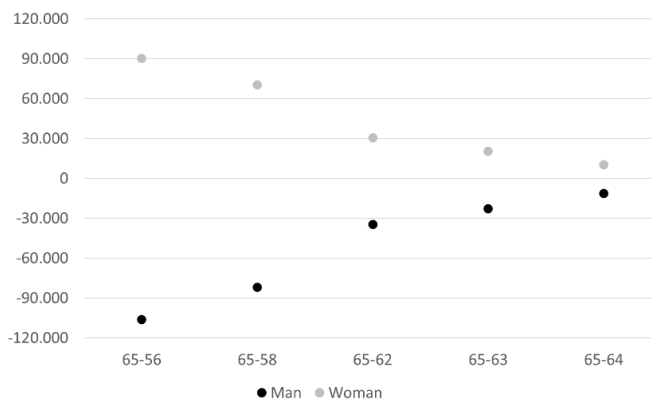
Age		Couple pension wealth (joint status)			Pension wealth until extinction		Home pension wealth	
Man (x)	Woman (y)	$a_x$	$a_y$	$a_{xy}$	$a_x$	$a_y$	PW(x)	PW(y)
65	65	304.706,40	203.764,63	508.471,03	78.180,36	161.472,71	586.651,39	669.943,74
65	64	309.960,04	194.463,24	504.423,28	70.910,59	175.900,96	575.333,87	680.324,25
65	63	314.756,00	184.855,80	499.611,80	64.272,82	190.986,63	563.884,62	690.598,43
65	62	319.114,46	174.955,79	494.070,26	58.239,32	206.699,87	552.309,58	700.770,13
65	58	332.708,48	132.787,96	465.496,44	39.411,39	275.157,33	504.907,84	740.653,77
65	56	337.624,23	110.446,01	448.070,24	32.598,91	312.259,62	480.669,15	760.329,86
65	51	346.221,27	52.121,96	398.343,23	20.680,43	411.276,95	419.023,67	809.620,18
60	65	247.052,15	229.282,92	476.335,07	131.162,50	114.789,40	607.497,57	591.124,48
62	65	271.201,23	219.802,76	491.003,99	107.704,91	132.135,26	598.708,90	623.139,25
63	65	282.728,20	214.696,50	497.424,70	97.116,42	141.476,68	594.541,12	638.901,38
64	65	293.894,37	209.348,98	503.243,36	87.279,40	151.258,53	590.522,75	654.501,88

Note:  $a_{xy}$  represents the sum of the expected retirement pension for the man and woman during the years they are expected to live together;  $a_x$  represents the pension if the man survives (retirement + widowhood), while  $a_y$  the pension if the woman survives (retirement + widowhood). The last two columns represent the total pension wealth for the couple assuming, in the first case, that the woman dies first and, in the second, that the man dies first.

As can be seen, in the case of a marriage between a man and a woman both aged 65, for whom joint life expectancy is estimated at approximately 16 years, the total retirement payments to both spouses (considering the average pensions mentioned at the beginning of this section) amounts to approximately 508 thousand euros. Once this period has elapsed, and considering the dissolution of the group as being due to the death of the woman, it is estimated that the man's individual life expectancy is 3 years, and the aggregate cost of his retirement and widower's pensions reaches approximately 78 thousand euros. This brings the total amount received until the group's extinction to approximately 586 thousand euros. On the other hand, in a second scenario, if the dissolution of the group occurs due to the death of the man, the individual life expectancy of the woman is higher, at an estimated 7 years. During this period, payments related to the retirement and widow's pensions are projected to amount to approximately 161 thousand euros, bringing the total amount of pension payments until the couple's extinction to approximately 670 thousand euros, that is, 14.3% more than in the previous scenario. An analogous interpretation can be provided for the other scenarios, which cover various age gaps between spouses.

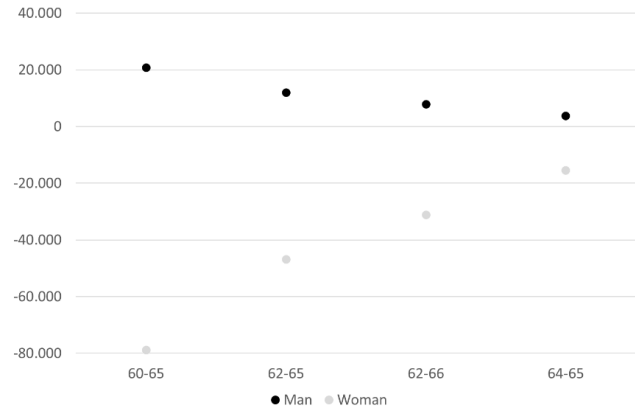
To facilitate our analysis of how the age gap in a couple impacts total couple wealth derived from pensions, the relative differences between the estimated amounts attributed to each of the scenarios are shown graphically (Figures 5 and 6) when varying the age of one of the spouses compared to our reference, that is, a couple comprising a 65-year-old man and woman. The results in Figure 5 correspond to couples in which the man is 65 years old, while those in Figure 6 correspond to couples in which the woman is of that age.

**Figure 5.** Relative difference in total pension wealth for heterosexual couples compared to a couple formed by a 65-year-old man and woman (male age = 65 years; female age variable)



Note: Based on composition of marriages by age in Spain during period 1976-2021. Reference category (value 0 in ordinates): 65-year-old man and woman. Black dots: male beneficiary of widower's pension (the woman dies first); grey dots: female beneficiary of widow's pension (the man dies first). Pension benefits from the age of 65 and onwards for both partners.

**Figure 6.** Relative difference in total pension wealth for heterosexual couples compared to a couple formed by a 65-year-old man and woman (female age = 65 years; male age variable)



Note: Based on composition of marriages by age in Spain during period 1976-2021. Reference category (value 0 in ordinates): 65-year-old man and woman. Black dots: male beneficiary of widower's pension (the woman dies first); grey dots: female beneficiary of widow's pension (the man dies first). Pension benefits from the age of 65 and onwards for both partners.

As can be seen in Figure 5, as the age gap between the partners at the time of retirement narrows, total pension wealth converges more closely with that of the reference couple (65, 65). Specifically, when the wife is younger than the husband, if the dissolution of the marriage is caused by the death of the woman, the cost to the social security system falls. In contrast, if the dissolution is a consequence of the husband's death, the cost is higher due to the woman's greater life expectancy and the increase in the reversion obtained from the widow's pension. For example, in the case of a couple formed by a 65-year-old man and a 56-year-old woman, if the dissolution of the marriage is caused by the death of the wife, total pension wealth until the death of both partners suffers a decrease of 105,982€ compared to that of the reference couple (65, 65). In contrast, if the dissolution is the result of the man's death, total pension wealth increases by 90,386€ in relation to that of the reference.

Figure 6 illustrates notably divergent behavior in this regard. Generally, a woman's advanced age results in a decrease in pension wealth compared to that of the reference couple (65, 65). For example, in a marriage in which the man is 62 and the woman is 65 years old, if the marriage is dissolved as a consequence of the death of the wife, the total pension wealth accumulated until extinction is just 12,058€ higher than that of the reference couple. In contrast, if the dissolution occurs as a result of the husband's death, total pension wealth is 46,804€ lower than that of the reference couple.

## 4.2. Comparison with non-concurrence of pensions (I): Single people

To analyze the impact of the widowhood pension on the system, it is especially insightful to compare the expected pension wealth of individuals who form a couple and have the right to a survivor's pension with that of pensioners who are single and, therefore, not entitled to a widowhood pension.

To make this comparison, the part corresponding to each individual in relation to the retirement and widowhood pensions is computed individually, considering them as a whole. Subsequently, this result is compared with the total pension wealth of an individual that shares the same characteristics but has single marital status.

Table 6 shows that for a couple in which both spouses are aged 65, the expected pension wealth of the married man is 5% higher than that of a single man, thanks to the income from the widower's pension<sup>1</sup>. In the case of a 65-year-old married woman, when performing a similar exercise, we find that the total pension expected is significantly higher (24%) than that of a single woman. When examining the other scenarios in which the man's age is kept constant at 65, our results continue to show that the total pension wealth of the married man is higher than that of a single man of the same age. However, the respective amounts tend to be more similar because the influence of the widowhood pension is not so great. However, in the case of women, the impact of the widow's pension becomes increasingly more evident: the younger the wife of a 65-year-old man, the greater is the difference (up to 66%) in the expected retirement pension with that of a single woman of the same age.

When analyzing scenarios in which the woman's age remains constant at 65 and her husband is younger (bottom of Table 6), our results show that the difference between the total pension wealth of married and single men is about 10%. In the case of women, the impact of the widow's pension, although significant, is not as great as when allowing the woman's age to vary, with increases just over 22% (as opposed to the 66% observed in the scenarios in which the woman's age was not constant). Note that in these calculations, we use the most frequent age gaps between Spanish couples (see section 2). If we select, for example, a 62-year-old woman with a positive gap of 3 years with her husband – i.e. couple (62, 65), we find that her total pension wealth is 19% higher than that of a single 62-year-old woman.

**Table 6.** Total pension wealth for a married individual compared to that of a single individual by gender and age

Age		Individual pension wealth (A)		Single's pension wealth (B)		Comparison ((A-B)/B)	
Man (x)	Woman (y)	PW(x)	PW(y)	PW(x)	PW(y)	PW(x)	PW(y)
65	65	382.886,77	365.237,34	364.700,36	295.641,83	5%	24%
65	64	380.870,62	370.364,21	364.700,36	294.102,85	4%	26%
65	63	379.028,82	375.842,43	364.700,36	292.549,65	4%	28%
65	62	377.353,78	381.655,67	364.700,36	291.135,98	3%	31%
65	58	372.119,87	407.945,29	364.700,36	286.071,59	2%	43%
65	56	370.223,14	422.705,63	364.700,36	283.964,50	2%	49%
65	51	366.901,71	463.398,91	364.700,36	279.695,98	1%	66%
60	65	378.214,65	344.072,32	344.628,07	295.641,83	10%	16%
62	65	378.906,14	351.938,02	351.973,09	295.641,83	8%	19%
63	65	379.844,62	356.173,18	355.986,96	295.641,83	7%	20%
64	65	381.173,77	360.607,51	360.323,33	295.641,83	6%	22%

Note: "A" represents the individual pension wealth for each partner making up the couple. "B" represents the expected pension of an unattached individual (therefore, ineligible for a widowhood pension) computed from age of reference (x=65 or y=65).

<sup>1</sup> Note that in this case we do not include considerations of the longer life expectancy expected for married people, as reported in the literature (Alaminos and Ayuso, 2016).

### 4.3. Comparison with non-concurrence of pensions (II): Only one partner has the right to a retirement pension

In what follows, we compare the pension wealth of a married couple in which both spouses have made the necessary contributions to the social security system to entitle them both to a retirement pension with that of a couple in which one of the two partners has not earned this right (Table 7).

An initial analysis comparing the joint pension in a couple (65, 65) in which both spouses have had a full working career with that of a couple in which only the wife has earned this right shows that total pension wealth on dissolution as a consequence of the wife's death is 160% higher for the first couple. When the dissolution is a consequence of the husband's death, total pension wealth is 77% higher for the first couple than for a couple in which only the man has paid his contributions to the social security system. The last column in Table 7 highlights a situation that is still very common in Spain: that is, many women are entitled solely to a widow's pension, because they do not meet the necessary requirements to access a retirement pension. As a result, differences in total pension wealth of these couples compared to that of couples in which both partners are entitled to a retirement pension are marked. Indeed, the former's total lifetime pension wealth can be between 52 and 98% lower, depending on the age gap with their husband.

**Table 7.** Total pension wealth according to contributions to the social security system by both or just one of the partners in a couple

Age		Home pension wealth (C)		Home pension wealth (D)		Comparison ((C-D)/D)	
Men (x)	Women (y)	PW(x)	PW(y)	PW(x)	PW(y)	PW(x)	PW(y)
65	65	586.651,39	669.943,74	225.404,13	377.915,58	160%	77%
65	64	575.333,87	680.324,25	214.090,55	389.710,76	169%	75%
65	63	563.884,62	690.598,43	202.645,84	401.346,32	178%	72%
65	62	552.309,58	700.770,13	191.075,82	412.828,92	189%	70%
65	58	504.907,84	740.653,77	143.696,62	457.460,47	251%	62%
65	56	480.669,15	760.329,86	119.469,04	479.197,81	302%	59%
65	51	419.023,67	809.620,18	57.846,09	532.687,75	624%	52%
60	65	607.497,57	591.124,48	265.587,32	299.095,86	129%	98%
62	65	598.708,90	623.139,25	249.614,34	331.109,27	140%	88%
63	65	594.541,12	638.901,38	241.577,30	346.871,49	146%	84%
64	65	590.522,75	654.501,88	233.507,00	362.472,60	153%	81%

Note: "C" represents total pension wealth for a couple in which both spouses have the right to a retirement pension. "D" represents total pension wealth for a couple in which one of the two partners does not have access to a retirement pension. Computed from age of reference (x=65 or y=65).



## 5. Discussion

Survivors' pensions, i.e. widowhood pensions, were adopted in countries such as Spain and Portugal when women had not yet entered the labor market, as a way of guaranteeing them some income on the death of their husbands, typically recipients of contributory retirement pensions. Today, increasing numbers of women have accessed the labor market, which means they generate their own retirement pensions. In Spain, contributory widow's pensions currently represent 24% of total pensions, and while the number of recipients of both a retirement and widowhood pension is not that high (concurrency of pensions being permissible), an increase is expected due to the greater longevity of married partners and both members generating the right to a retirement pension (Alaminos and Ayuso, 2016). The question that needs to be addressed here is whether it continues to be necessary to retain the widowhood pension in cases in which an individual already receives a retirement pension. What is clear, however, is that the name "survivor's pension" should no longer be deemed appropriate, insofar as it represents a supplementary pension. A further concern is the extent to which the widowhood pension is a factor that undermines the equity of Spain's pension system. Consider, for example, two individuals accessing the pension system at the same time with similar contributory histories, one with the right to receive two benefits (retirement and widowhood) because they married or formed a de facto couple, the other without this entitlement because they remained single. The current state of affairs, moreover, aggravates other situations that are becoming increasingly evident in ageing societies such as Spain's, including the need for resources to provide long-term care, a need that is often more marked in singletons and the childless.

A survival pension policy that is better adapted to current reality is therefore persuasive both in terms of reducing public expenditure on pensions and providing more equitable pensions for all, especially those disadvantaged groups characterized by lower pensions, as is the case of women, who, moreover, tend to live more time alone. Below we summarize various possible lines of action for advancing in the design of equitable pension policies that should, moreover, act in favour of a reorganization of available pension resources and guarantee the system's sufficiency and sustainability. The technical development and analysis of each of them constitutes our future lines of research.

### 1. Using men's widowhood pensions (in full or a percentage thereof), when they have concurrent pensions, to increase the sufficiency of women's pensions

The action would involve creating a mutual fund from the surplus obtained by reducing the percentage of the widowhood pension received by those men that have a retirement pension and who are entitled to a widowhood pension because their wives have also worked. The action is underpinned by the higher average amount of men's retirement pensions, which would be further increased by the receipt of the widowhood pension generated on the death of their wives. To evaluate this proposal, its impact on specific groups of individuals needs to be analysed, taking into consideration any deviations from average values and making the required corrections. We would need to work with the differences highlighted in the current study between the total pension wealth of couples in which both partners are entitled to a retirement pension, the corresponding wealth in couples in which only the man is entitled to such a pension (and, as such, is not entitled to a widower's pension), and total pension wealth when the man receiving the retirement pension is a singleton. These calculations would also need to take into consideration the impact of age heterogeneity, as discussed herein. The mutual fund could be destined for use as follows:

### 1.1. For women that only receive a widow's pension

One option resulting from a possible consolidation of men's widowhood pensions into a common mutual fund would be to direct the resources thus generated to those women who have the widowhood pension as their sole source of income. This would not only help alleviate pension gender inequality, but would also recognize the value of the unpaid work that many women provide as caregivers and homemakers, a role that often leaves them in a more precarious financial situation in retirement. Specifically, the proposal would see the surplus resources of those households in which both partners of the couple have worked being redirected to more vulnerable households in which the woman has not had a paid career.

### 1.2. For single women

A second option would be to use the mutual fund to increase the pensions of single women, thereby addressing a notorious inequality within the pension system. Single women, who depend exclusively on their own retirement pension, may find themselves in a more vulnerable financial position in retirement than married women, whose widow's pension provides an additional source of income on the death of their husbands. If opting for this action, the pension calculation would have to be optimized by correcting the inequalities apparent in total pension wealth depending on whether or not the married woman has generated the right to a retirement pension.

## 2. Reducing the percentage of the widowhood pension with respect to the retirement pension of the person who dies

The action would involve reducing the percentage that the widowhood pension represents with respect to the regulatory base of the retirement pension of the person that dies, both for men and women (although not necessarily by the same percentage). Such an action would usher in more equitable levels of total pension wealth than those associated with the retirement pension received by single men and women, who are not entitled to a widowhood pension.

## 3. Financing the payment of widowhood pensions from the General State Budget

Here, the proposal would be to use the estimates obtained to quantify the monetary needs were the social security fund to be freed from its obligations to pay widowhood pensions, while working to design equitable policies for the redistribution of spending.

## 4. Combining redistributive pension policies

The objective sought here would be a general advance in the combination of the various policies outlined in the previous points by optimizing the specific advantages that each might offer. This would mean generating socially acceptable designs that might promote the sustainability of the pension system and equality for all citizens.

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