

Two decades of the complementary leisure effect in Spain

Carlos Pérez^{a,*}, Ángel Martín-Román^b, Alfonso Moral^c

^a *Facultad de Ciencias Económicas y Empresariales, Universidad de Valladolid, Avenida Valle Esgueva, 6, 47011- Valladolid. SPAIN. Telephone no. +34 983 18 4442. E-mail: carpe@eco.uva.es*

^b *Facultad de Ciencias Sociales, Jurídicas y de la Comunicación, Universidad de Valladolid, Trinidad, 3, 40001 Segovia. SPAIN. Telephone no. +34 921 112334. E-mail: angellm@eco.uva.es*

^c *Facultad de Ciencias Sociales, Jurídicas y de la Comunicación, Universidad de Valladolid, Trinidad, 3, 40001 Segovia. SPAIN. Telephone no. +34 921 112334. E-mail: amoral@eco.uva.es*

This work attempts to gauge the impact of the so-called *complementary leisure effect* (or *shared leisure effect*) on the increase in the labour force participation rates of older males who live with a partner observed in Spain since the mid-1990s. The principal novelty of the work is that the whole the period throughout which said phenomenon has been occurring (1995–2016) is taken into consideration. Another important point of attention related to this effect is that the current analysis spans the years covering the recent global economic and financial crisis (GFC) and those which immediately followed.

Results reveal that the complementary leisure effect has proved to be determinant explaining the behaviour of older male activity rates in Spain since the mid-90s. More concretely, the increases in wives' labour force participation can explain 67% of the total change in husbands' participation rates from 1995 to 2016. Moreover, during the years of the GFC (2008–2013) and without this effect, the participation rate of Spanish older men would have decreased below 57%, almost 8 percentage points less than the value actually reached.

The findings that emerge from our study suggest that economic policy should consider opening up a further avenue of action, one which does not tend to be envisaged, and which, in the case of Spain, is absent from recent legal reform, namely, targeting not only the individual but also the whole family unit of older persons as a legal goal.

*Corresponding author. E-mail: carpe@eco.uva.es

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Two decades of the *complementary leisure effect* in Spain

ABSTRACT:

This work attempts to gauge the impact of the so-called *complementary leisure effect* (or *shared leisure effect*) on the increase in the labour force participation rates of older males who live with a partner observed in Spain since the mid-1990s. The principal novelty of the work is that the whole the period throughout which said phenomenon has been occurring (1995–2016) is taken into consideration. Another important point of attention related to this effect is that the current analysis spans the years covering the recent global economic and financial crisis (GFC) and those which immediately followed.

Results reveal that the complementary leisure effect has proved to be determinant explaining the behaviour of older male activity rates in Spain since the mid-90s. More concretely, the increases in wives' labour force participation can explain 67% of the total change in husbands' participation rates from 1995 to 2016. Moreover, during the years of the GFC (2008–2013) and without this effect, the participation rate of Spanish older men would have decreased below 57%, almost 8 percentage points less than the value actually reached.

The findings that emerge from our study suggest that economic policy should consider opening up a further avenue of action, one which does not tend to be envisaged, and which, in the case of Spain, is absent from recent legal reform, namely, targeting not only the individual but also the whole family unit of older persons as a legal goal.

Keywords: Economic Crisis; Leisure Complementarity; Non-linear Decomposition.; Family Labour Force Participation; Old Males; Spain

JEL CODES: J22, J26, J12, J14, C35

1.- INTRODUCTION

After a lengthy period during which over 54-year-olds in most OECD countries tended to reduce their involvement in the labour market, there has been a significant increase in labour market participation since the mid-late 1990s. This trend has also been evident in Spain and has implications for so-called *active ageing* which, from the sociolabour perspective, involves the capacity of older individuals to remain in the labour market, wherein they offer their key labour and life experience and help to alleviate public rent-sharing systems.

The reasons underlying this shift in older male worker participation have been the focus of much attention in the economic literature, and explanations for said change have been based on the supply and demand side.¹ The former of these two perspectives seems to have emerged as the most relevant and has, in this regard, been the subject of the greatest focus in the literature. More specifically, of all the factors operating from the supply side of the equation, among the group we are concerned with, the following four drivers have played a major role.

First, the change that has taken place in the formative profiles of the older labour force would seem to provide one of the key reasons explaining why the working life of individuals in this group is now longer. The most-trained workers participate more in the labour market because they receive higher emoluments and their jobs tend to demand fewer physical requirements. This phenomenon has been studied by, among others, Goldin and Katz (2007) and Kuhn and Lozano (2008) in the United States and by Pérez and Carrascal (2010) and Pérez et al. (2015, 2016) in Spain. These latter works conclude that for Spanish males aged 55 to 64 years living with a partner, holding a university degree increases their likelihood of remaining in the labour market by 23 percentage points and by over 30 percentage points in the case of individuals with postgraduate studies compared with having only a basic education.

Second, the health status of the group analysed seems to have a critical bearing on their decision either to remain in the labour market or to leave, as highlighted in a studies such as Coile (2004a), Siegel (2006), or Schirle (2007). In Spain, Álvarez, Rodríguez, and Romero (2002) highlighted how leaving employment as a result of illness or disability tends to lead to the decision to retire, to take up another type of inactivity, or to devote oneself to homemaking in the case of women. Nevertheless, as asserted by García-Gómez, Jiménez-Martín et al. (2018), if the purpose is to explain the increase in the participation rates of elderly males after the mid-1990s, there does not seem to have been any substantial change in the health status of the group analysed that would account for such a phenomenon.

¹ A general overview of such factors may be seen in Maestas and Zissimopoulos (2010).

Third, factors are linked to how easier or more difficult the social security system makes it to leave the labour market and how generous pensions are or what reductions may be imposed therein as a result of taking early retirement. Such relations have been widely explored (Gustman and Steinmeier, 2009 and Blau and Goodstein, 2010, the USA; Hanel and Riphahn, 2012, of Switzerland; Queiroz and Souza, 2017, for Brazil; Peracchi et. al., 2002, Cairó-Blanco, 2010, García-Pérez et al., 2013, García-Gómez, Jiménez-Martín et al., 2018 and García-Gómez, García-Mandicó et al., 2018 for Spain).

The public pension system in Spain is a defined-benefit pay-as-you-go system. Although there is no legal retirement age, the 'normal' age in force for most of the period in question was 65 years, although it should be considered that the system has undergone reforms since 1997, which we summarize as follows.² In 1997, there was a gradual increase from 8 to 15 in the number of years used to compute the pension, coupled with a reduction in the amounts paid. However, the penalisation for early retirees aged between 60 and 65 years decreased by 1 percentage point, provided that they had been paying contributions for at least 40 years. In 2002, the possibility of taking early retirement at 61 was made widely available and partial retirement schemes compatible with individuals remaining in employment were promoted. Certain incentives to retire for individuals aged over 65 years were also introduced.

These incentives were intensified in the 2007 reform, when the penalisation for early retirement (i.e., under the normal age of 65 years) was reduced by half of 1 percentage point.

The reform implemented in 2011 was framed within an extremely adverse economic context for the Spanish economy, such that the measures introduced, to a large degree, attempted to alleviate the burden on the system by reducing the generosity of the pension system. A gradual increase in the statutory eligibility age from 65 to 67 years was established, the number of years used to calculate the pension was increased from 15 to 25, and the conditions for early retirement were made stricter. The latest reform took place in 2013. This reform was an effort to introduce a sustainability factor (SF) linking the initial pension level to life expectancy and a pension revaluation index that would separate the automatic revaluation of pensions from the consumer price index (CPI). By 2018, the elements defining this latest reform were suspended: the application of the SF was set at a date no later than 1 January 2023, and the **revalorization index (RI)** was

² For information, see García-Gómez, Jiménez-Martín et al. (2018), García-Gómez, García-Mandicó et al. (2018), and for a detailed explanation of the changes in the old-age pension system in Spain, Boldrin et al. (2010) and García-Gómez et al. (2012).

not applied to pension increases for 2018 and 2019, which reverted to being linked to the CPI.³

Notably, studies carried out in Spain highlight how the reforms undertaken prior to 2011 have, at most, played a marginal role in the shift in the trend in the participation rates of elderly males in Spain.⁴ If we analyse the **effective retirement age** in Spain, we observed how this settled at approximately 64.2 years after 2013.

Fourth and last, one variable that may prove relevant in elderly males' participation decisions is the decision taken by their wives or civil partners⁵ to remain in the labour market. This factor seems to play a particularly prominent role among legally registered older couples and specifically implies that the decision of one member to participate in (retire from) the labour market may lead the other member to reflect on their own situation. Hypothetically, there are two theoretical channels through which this double interaction might operate. That is, using Coile's (2004b) terminology, there are two types of 'spillover effects': an income effect and an effect working through the complementarity between each spouse's leisure time (i.e. the shared leisure effect).

The income effect simply states that if one spouse's labour earnings increase as a consequence of his/her labour market participation, the other spouse will experience an increase in his/her nonlabour income because the household shares both spouses' incomes. If leisure time is assumed a normal 'good', the neoclassical model of labour supply would predict a decline in the labour participation of the latter spouse. Alternatively, the shared leisure effect affirms that one spouse's increase in leisure time will augment the marginal value of leisure for the other partner, making more likely his/her disengagement from the labour market. Thus, if the income effect were stronger than the shared leisure effect, we expect to observe in our data that the likelihood of remaining in the labour market for a husband with a retired wife would be higher than that of a husband with a participating partner. By contrast, if the prevailing effect were the shared leisure effect (as is the case), we should find in our data a higher likelihood of participating in the labour market for husbands with an active spouse compared with that of the husbands with a spouse out of the labour force.

In this regard, international evidence has suggested that the members of a couple prefer to make a joint decision regarding whether to retire (Blau, 1998; Maestas,

³ It should also be pointed out that in addition to the public old-age pension system there are in Spain two other ways that can lead to leaving the labour market: unemployment and disability benefits.

⁴ Cairó-Blanco, 2010, García-Pérez et al., 2013, García-Gómez, Jiménez-Martín et al., 2018 and García-Gómez or García-Mandicó et al., 2018.

⁵ Despite the fact that the bulk of the theoretical literature addressing the issue of family labour supply has been designed taking heterosexual couples as a reference, we are very much aware of the social reality, which embraces the possibility of same-sex couples. Nevertheless, we have opted to continue using the terms 'husband' and 'wife' in order to ensure that the explanations provided throughout the article prove less confusing.

2001; Coile, 2004b; Chalmers and Milan 2005; Stancanelli and van Soest, 2012; Honoré and de Paula, 2013; Hospido and Zamarro, 2014; Syse et al., 2014; Preter et al., 2015; Radl and Himmelreicher, 2015 and Warren, 2015). This phenomenon leads to the predominance of the so-called '*complementarity*' or '*shared leisure effect*', which is particularly noticeable in formally established couples and implies that the labour participation decision (retirement) of one of the members may trigger a mirror effect in the other. The work of Schirle (2008) focused specifically on evaluating this effect in three countries: the United States, the United Kingdom, and Canada. The author stated that it is extremely relevant because it accounts for between one third and one half of the recent increases in participation in these countries in the group of older males living with a partner. In Spain, Pérez et al. (2015, 2016) also contrasted (for the period 2001-2009) the relevance of the *shared leisure effect*, according to which the likelihood of an older male remaining in the labour market increases by between 11 and 17 percentage points, *ceteris paribus*, (depending on the specification) if their partner also remains in the active population⁶.

The **first** innovation offered in this work is that it considers the whole of the period throughout which this phenomenon took place, namely, the last two decades. To this end, we used a broad sample of microdata spanning every year from 1995 to 2016. As a result, in addition to being able to measure the trend globally, we were also able to ascertain how the *shared leisure effect* behaved during the economic and financial crisis (GFC), which had such a profound impact on our labour market. **In this sense, we found for the whole period that the presence of a wife in the labour force increases the husband's likelihood of participating by between 11 and 20.6 percentage points. That effect not only held firm during the GFC but that it increased, because the corresponding marginal effects for these years fluctuated between 11.4 and 21.8 percentage points. The second innovation of this paper is that we conducted a nonlinear decomposition of the whole effect that allowed us to determine which aspect, the shared leisure effect or the personal characteristics, was more important to explain the participation rate of the older males. We found that the increases in wives' labour force participation explained 67% of the total change in husbands' participation rates from 1995 to 2016.**

The remainder of the paper is organised as follows. Section 2 offers a descriptive approach of how older individuals' participation has evolved in the OECD as a whole, and specifically in Spain. Section 3 discusses the basic lines of labour participation models in the family and presents the empirical strategy. The fourth section describes the sample used. Section 5 presents with the estimations, and section 6 presents the decomposition of the effects. Section 7 discusses economic policy implications. The paper ends with the conclusion section.

⁶ In accordance with the OECD definition, the labour force, or currently active population, comprises all people who fulfil the requirements for inclusion among the employed (civilian employment plus the armed forces) or the unemployed.

2.- EVOLUTION OF THE LABOUR FORCE PARTICIPATION OF OLDER WORKERS: DESCRIPTIVE DATA

The labour force participation of older males (aged 55–64 years) decreased steadily in OECD countries throughout the 20th century. This trend was also common in Spain (*Figure 1*). According to OECD data, the participation rate of older males decreased by 16.6 percentage points in member states as a whole between 1972 and 1995. In Spain, the decrease between those years was a substantial 28.8 percentage points⁷.

After the mid-1990s, however, the reverse trend began to emerge because since then an overall increase in labour participation in said group has occurred. Notably, between 1995 and 2016, the corresponding participation rate increased by 9.1 percentage points in the OECD as a whole and by 11.6 points in the case of Spain⁸.

Notably, during the years of the economic and financial crisis, GFC, (2008–2013) this group's participation rate in Spain stopped increasing and even, compared with the extremes for the period, showed a decrease therein of 1.3 percentage points; nevertheless, after that point, it again showed a clear increase.⁹ In the OECD as a whole, by contrast, no such slowdown was apparent during the years of the GFC.

If we analyse the corresponding rates for women in the oldest group (*Figure 2*), we observe how between 1972 and 1995 they remained quite stable. In the OECD as a whole, the increase was 0.8 percentage points, whereas in Spain the decrease was 2.2 points. After 1995 (and up to 2016), however, the increase was spectacular, increasing by 17.3 points in the OECD and by a substantial 31.9 points in Spain. Notably, during the years of the GFC, the female rate increased at a far more intense rate in Spain (11 percentage points) than it did in the OECD as a whole (4.6 points).

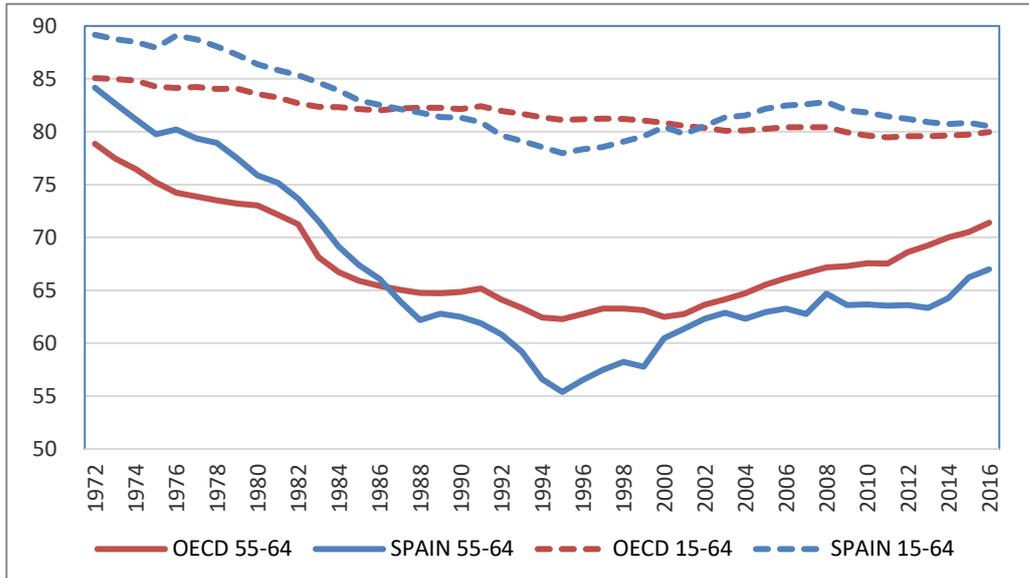
Thus, we may have observed evidence that the upturn in the older male participation rate after 1995 could be related to the increase in the rate for females. Moreover, insofar as this trend was relevant in Spain, it might have prevented a sharp decline in male participation rates during the years of the GFC.

⁷ For the whole working age male population (15–65 years), participation rates decreased by 3.9 percentage points in OECD countries as a whole and by 11.2 points in Spain.

⁸ For the whole working age male, participation rates decreased by 1.1 percentage points in the OECD and increased by 2.5 points in Spain.

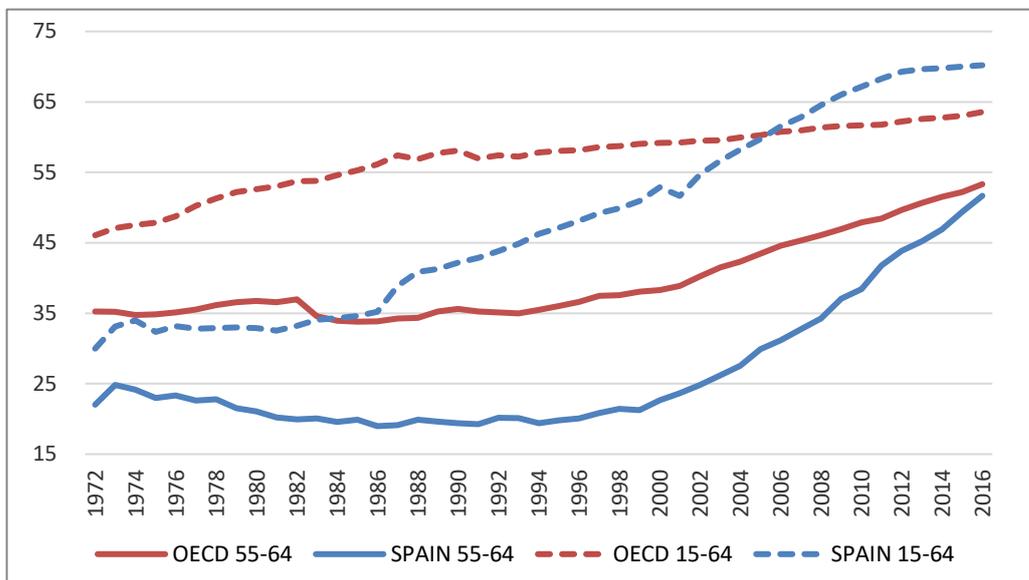
⁹ Notably, 2011 and 2013 saw reforms in Spain aimed at ensuring the sustainability of the pension system and which might have contributed towards individuals in the group in question beginning to delay their decision to exit the labour market. However, it might still be too early to appreciate the results of this phenomenon (García-Gómez *et al.*, 2018).

Figure 1
Participation rates for men aged 15–64 and 55–64 in the OECD and Spain 1972–2016



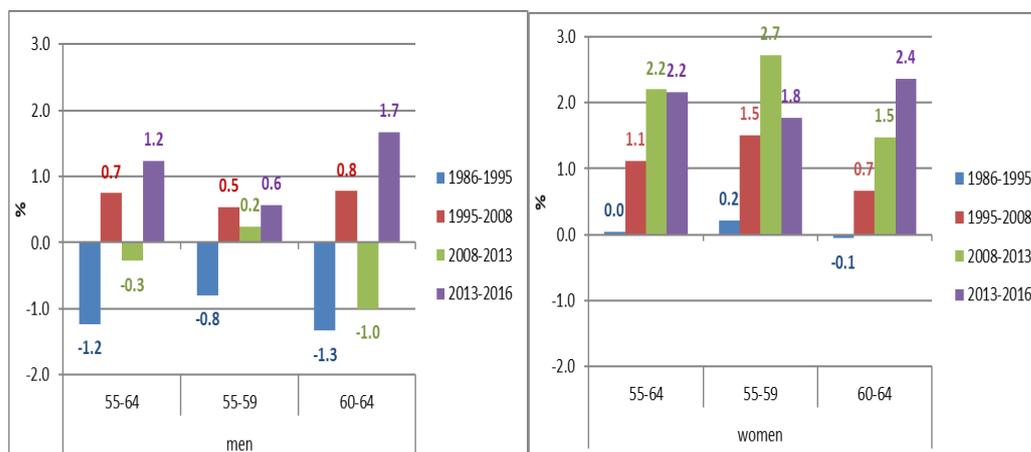
Source: Own calculation based on OECD data

Figure 2
Participation rates for women aged 15–64 and 55–64 in the OECD and Spain 1972–2016



Source: Own calculation based on OECD data

Figure 3
Changes in the participation rates of workers aged 55–64, and 5-year age group decomposition in Spain (mean percentage points per year in the period)



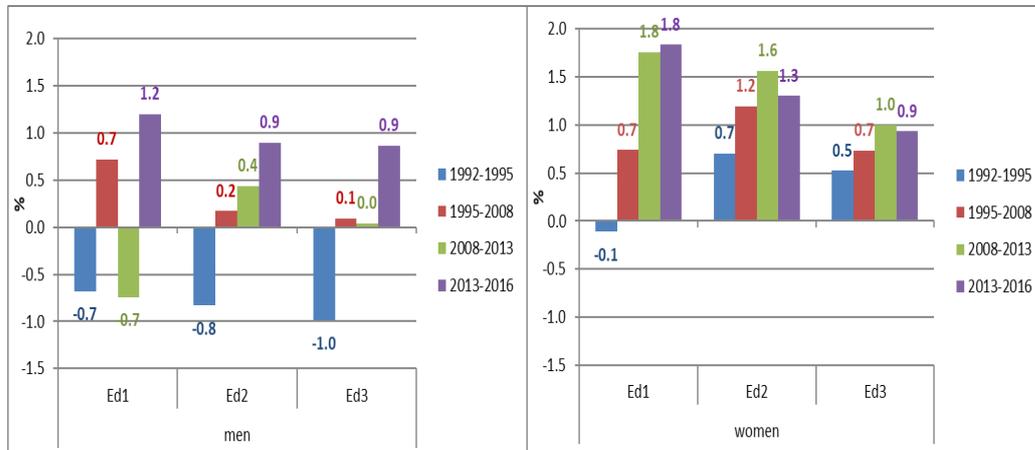
Source: Own calculation based on *EU LFS* data

Figure 3 reflects the differences between the participation rates of the two extremes in each period considered for both sexes and for the two 5-year cohorts that comprise the group in this study. Values have been annualised by dividing this difference between the number of years in each time interval. For the full cohort (55–64 years of age) and for the case of women, the sustained upturn in their participation rate can be observed, a trend that became even more intense during the years of the GFC. Regarding males, their participation ratio decreased slightly during the years of the GFC but sharply increased afterwards. In the case of males, the described trends are far more marked in the older 5-year group (aged 60–64 years).

Figure 4 shows the participation profiles for older males and females in Spain depending on educational attainment. Three groups are detailed (Ed1, Ed2, and Ed3) in ascending order according to the level of formal education attained by the worker.¹⁰ The bars are interpreted in the same manner as in *Figure 3*, that is, they reflect the mean annual changes experienced by participation rates between the extremes of the different periods.

¹⁰ Educational group Ed1 comprises levels 0, 1, and 2 of the UNESCO International Standard Classification of Education (ISCED11) and refers to education prior to primary, primary, and compulsory secondary. Educational group Ed2 corresponds to levels 3 and 4 of the ISCED11, that is, upper secondary and nontertiary post-secondary. Finally, group Ed3 reflects levels 5 to 8 of the ISCED11, namely, tertiary education.

Figure 4
Changes in participation rates of workers aged 55–64 in Spain by educational level and sex
(mean percentage points per year of the period)

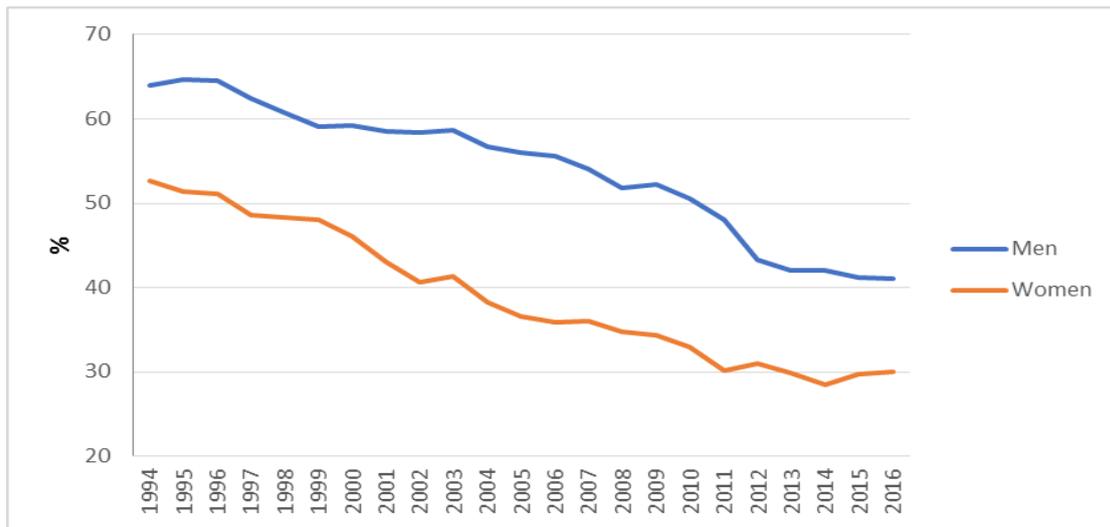


Source: Own calculation based on *EU LFS* data

In general terms, we observe how the decrease in participation prior to 1995 is common to the three male educational groups (particularly for the most highly qualified). Also common to all groups of males was the upturn in participation until 2008, an increase that was greater for the least qualified group. During the years of the GFC, however, the participation of older males with an intermediate education increased the most, whereas this decreased for the lowest level of education and remained virtually unchanged for the most highly educated groups. After that point, male participation once again increased sharply in the three educational levels, especially the lowest. In the case of women, the overall trend was a sustained increase in participation rates in the three educational groups, an increase that became more intense during the GFC.

Figure 5 highlights the major change in the occupational structure of older workers after the mid-1990s and presents the shift in the percentage of persons employed in blue collar jobs compared with the total. A sustained decline is observed over much of the period. In the mid-1990s, approximately 64% of males and 51% of females held this type of job, whereas at the end of the period, the percentage had decreased to approximately 41% for men and approximately 30% for women.

Figure 5
Percentage of workers aged 55–64 in blue collar jobs in Spain by sex



Source: Own calculation based on *EU LFS* data

3.- THEORETICAL FRAMEWORK AND EMPIRICAL APPROACH

To estimate the ‘*shared leisure*’ effect in Spain, our framework is a collective model of family labour supply in which each spouse derives utility from a Hicksian composite commodity consumed collectively, from their own time devoted to leisure and from the leisure time enjoyed by the other spouse; in other words, allowing *complementarity* in the leisure time enjoyed by both spouses. Labour supply decision functions for both spouses are obtained by maximising the corresponding utility functions ¹¹

$$U^H(C, H^H, H^W) \quad (1.a)$$

$$U^W(C, H^W, H^H) \quad (1.b)$$

subject to a common restriction:

$$C \leq w^H H^H + w^W H^W + R^H + R^W \quad (2)$$

where C refers to consumption of a Hicksian composite good, H is hours of work (i.e. *nonleisure*), w is the hourly wage, and R is nonlabour income. Superscripts H and W refer to husband and wife, respectively.

Taking this approach as an analytical reference, we focus on individuals’ labour participation decisions (i.e. leaving aside the decision concerning the number of work hours) and adopt the proposal put forward by Schirle (2008) as a guide for our empirical research. We first assume that decisions concerning husbands and wives’ labour supply are taken jointly. From this standpoint, we accept that

¹¹ This technical approach may be seen, for instance, in Blundell and MaCurdy (1999).

decisions regarding participation for both groups may be summed up through two latent variables H_{it}^{H*} and H_{it}^{W*} , which may be expressed as follows:

$$H_{it}^{H*} = U^H(C_{it}, H_{it}^H, A_{it}^H, H_{it}^W, |H_{it}^H = 1) - U^H(C_{it}, H_{it}^H, A_{it}^H, H_{it}^W, |H_{it}^H = 0) \quad (3.a)$$

$$H_{it}^{W*} = U^W(C_{it}, H_{it}^W, A_{it}^W, H_{it}^H, |H_{it}^W = 1) - U^W(C_{it}, H_{it}^W, A_{it}^W, H_{it}^H, |H_{it}^W = 0) \quad (3.b)$$

where the latent variables reflect the difference in utility between husbands (H) and wives (W) when they participate in the labour market ($H_{it}^H = 1$ and $H_{it}^W = 1$) and when they remain inactive in labour terms ($H_{it}^H = 0$ and $H_{it}^W = 0$). Husbands obviously take the decision to remain active when $H_{it}^{H*} > 0$ and wives when $H_{it}^{W*} > 0$. As observed in the system defined by (3), the husband's utility depends on level of consumption and labour participation (C_{it}, H_{it}^H). The husband's personal characteristics, (A_{it}^H) together with the wife's situation in the labour force (H_{it}^W), may be deemed to act as modifiers affecting the husband's leisure and consumption preferences. The same interpretation proves equally valid for the case of the wives.

Notably, two theoretical effects make husbands' participation depend on the decision of the wives. The first effect is a traditional income effect. If the wife is not active, the husband's nonlabour income is affected and, if leisure is a normal good, the likelihood of the husband participating in the labour market increases. Second, the so-called '*shared leisure*' effect should be mentioned. Said effect predicts that if there is complementarity in both spouses' leisure activities, the wife's nonparticipation decision would increase the marginal utility of the husband's leisure time and would make the husband less likely to participate in the labour market. The two effects are therefore considered to be of opposing signs, and empirical analysis is required to ascertain which prevails.

Prior to performing the empirical analysis, notably, our observational unit was the household. This unit implies that both decisions to participate may be taken jointly and many household variables might be influencing the two. This situation highlights the existence of endogeneity in the model due to the presence of unobservables that affect the two variables, which would lead to the condition of independence between the explanatory variable and error. To overcome these endogeneity problems, a maximum likelihood estimate is proposed where the dependent variable and the endogenous are dummy variables. Specifically, we estimate a bivariate probit model similar to the binary choice with recursive simultaneous equations model presented by Greene (1998).

To estimate the model, we specify an 'empirical' version of the system (3) in line with the following:

$$H_{it}^{H*} = \mu^H H_{it}^W + A_{it} \beta^H + \omega_{it}^H \quad (4.a)$$

$$H_{it}^{W*} = A_{it} \beta^W + D_{it}^W \theta + \omega_{it}^W \quad (4.b)$$

Notably, the empirical version in (4) makes an additional assumption with respect to the theoretical model presented in (3): the wife's labour market status affects the husband's decisions, but the husband's labour market status does not influence the wife's choices. This extra assumption may be justified on the grounds of three arguments. First, the main aim of this research, as aforementioned, is to analyse and understand the underlying factors explaining the evolution of labour force participation of older males. That is, the goal is neither to study the determinant factors behind both household's members' labour supply nor to test the symmetry or asymmetry of such a 'spillover effect', in Coile's (2004b) terminology. Therefore, we align with the empirical strategy followed by Schirle (2008), who had the same objective as ours¹². In this vein, it might be stated that we 'mimic' Schirle's (2008) approach to compare our results to hers. Second, the theoretical channel we explore in this research (i.e. wives' labour market status conditioning husbands' labour supply choices) is supported by a secular upward trend in the labour force participation rate of women, mainly driven by factors different from men's labour market status (e.g. increases in women's human capital attainment, sociological changes in women's attachment to the labour market). Hence, we accept that we are unable to estimate the effect of a husband's participation on the wife's participation decision by means of our empirical strategy (Schirle, 2008) and instead we focus on the dimension we are interested in. Finally, the last line of reasoning for our approach is based on the literature. Notably, there is empirical evidence from Gustman and Steinmeier (2000) and Coile (2004b) indicating that older wives may not be as responsive to husbands' labour supply choices as older husbands are to wives' labour supply decisions. Furthermore, indirect empirical evidence demonstrated that wives have become much less responsive to their husbands' wages over time (Blau and Kahn, 2007).¹³

In the system of equations (4), we use a strategy to identify the effect of a wife's participation decision on the husband's participation decision (the one of interest for the purposes of the present work) based on excluding the variable D_{it}^W . This variable reflects features of the wife that should not affect the husband's decisions. The most notable parameter is μ^H . If the shared leisure effect prevails over the income effect, said parameter should be positive.

¹² Pérez et al. (2015) also adopt a similar approach.

¹³ Hospido and Zamarro (2014) find, within a European context, a significant joint retirement effect for women of 21 percentage points. For men, the estimated effect is insignificant. However, this finding does not invalidate our assumption because of important methodological differences between their research and ours. The most obvious difference is that these authors selected couples in which both members were employed at the time they were observed in the data and then analysed their transitions to retirement. Here, instead, we focus on labour supply decisions by estimating a conventional labour participation framework. Thus, here, we also account for inactive couples making the decision to stay out of the labour force. From a different perspective, Michaud and Vermeulen, (2011) developed a theoretical framework with an empirical application that allows for complementarities in leisure (i.e. individuals may enjoy leisure more in company of their spouse). These authors obtained that the marginal effect of the spouse's leisure is significantly positive for the husband's and the wife's preferences. This finding might be a good starting point for further research.

In addition to this modelling, we must also reflect the interrelation between the errors. In this case, the two errors are assumed to follow a joint normal distribution with zero means, unit variances, and correlations other than zero:

$$\begin{pmatrix} \omega_{it}^H \\ \omega_{it}^W \end{pmatrix} | x_1, x_2 \rightarrow N_2 \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right)$$

where x_1 and x_2 are the explanatory variables of each of the two equations.

The distribution function takes the following form:

$$\Phi(x_1, x_2, \rho) = Prob(X_1 < x_1, X_2 < x_2) = \int_{-\infty}^{x_2} \int_{-\infty}^{x_1} \phi(z_1, z_2, \rho) dz_1 dz_2$$

and the density function is expressed as follows:

$$\phi(z_1, z_2, \rho) = \frac{1}{2\pi(1-\rho^2)^{1/2}} e^{-(1/2)(z_1^2+z_2^2-2\rho z_1 z_2)/(1-\rho^2)}$$

At this point, two further considerations should be made. First, the correlation between the errors of the two estimations must be tested; to do this, a statistical test based on the Lagrange multiplier is used where the null hypothesis is $\rho = 0$. Should this hypothesis be accepted, the model will comprise two independent probit equations that can be estimated separately; otherwise, a joint estimation of the equations must be performed.

The second consideration involves calculating the marginal effects. In probit type estimations, the estimated coefficients show the significance and direction of the effect but not the scale of the response of the dependent variable because in maximum likelihood estimates, the marginal effects are not constant but depend on the values taken for the remaining explanatory variables. Moreover, the marginal effect is also shaped by the likelihood that is finally estimated, and in the case of a bivariate probit, four possible probabilities result from matching the possible outcomes of the dependent variables.

Regarding the effect linked to the endogenous variable, as the central variable in the model, this is obtained through the difference of the conditional probabilities when the partner is involved in the labour market and when they are not. In formal terms, this marginal effect responds to what is reflected in the following expression:

$$M(H_{it}^W) = Prob(H_{it}^H = 1/X_1, X_2, H_{it}^W = 1) - Prob(H_{it}^H = 1/X_1, X_2, H_{it}^W = 0)$$

4.- DATA AND DESCRIPTIVE STATISTICS

The database used in our estimations is the Spanish Labour Force Survey (Spanish acronym EPA) published by the National Statistics Institute (Spanish acronym is INE). Specifically, we draw on microdata corresponding to the second quarters of years between 1995 and 2016—both inclusive—(a total of 22 years). Said database provides information concerning personal characteristics, demographic features, educational attainment, and the relation with the economic activity of all the workers surveyed and allows members of the same household and the relationship between them to be identified. Unfortunately, the survey does not provide information on the health status of individuals or on old-age social security system benefits. Nevertheless, as asserted in the introduction and highlighted in García-Gómez, Jiménez-Martín et al. (2018), if our aim is to explain the change in trend of elderly male participation rates since the mid-1990s, it seems plausible to state that neither of these two reasons has played a key role when seeking to explain said phenomenon. Macroeconomic effects may also be a critical issue to consider. As a result, all of the estimations we carry out include a time dummy-variable set which enables us to describe, for example, the outcomes corresponding to the years of the recession (GFC).

Given the purpose of this paper, we use households in which there is a male aged between 55 and 64 who lives with a legal partner. In this regard, over the period considered, 85% of all elderly males lived within a couple and, of these, 97.4% were married.

The labour status of both members of the couple (employed, unemployed, and economically inactive) is shown in *Table 1*. We observe how a high percentage of wives (62%) are economically inactive, a figure which decreases to 36.2% in the case of husbands. In 26.6% of cases, both members of the couple are outside the active population and in 22% of cases both are employed.

Table 2 offers descriptive data concerning the basic variables used in the estimations for four selected years. Notably, the participation rate of men in the sample increased 12.7 percentage points between 1995 and 2016. The female partners of the men in the sample increased their participation rate by over 35.8 percentage points in that period. Other findings from the remaining variables in the sample are as follows: a clear trend among the men and their partners towards higher educational attainment levels; no significant change in the mean age of men and women or in the age difference; a slight decrease in the number of Spanish; and a decrease in the mean number of descendants (-0.103) and ascendants (-0.024) who live in the couple's household.

Table 1
Labour status of both members of the couple

		Wife			
		Employed	Unemployed	Econ. Inactive	Total
Husband	Employed	22.0%	2.7%	32.5%	57.2%
	Unemployed	2.2%	1.5%	2.9%	6.5%
	Econ. Inactive	8.2%	1.5%	26.6%	36.2%
	Total	32.3%	5.7%	62.0%	100.0%

Source: Own calculation based on microdata from the Spanish Labour Force Survey

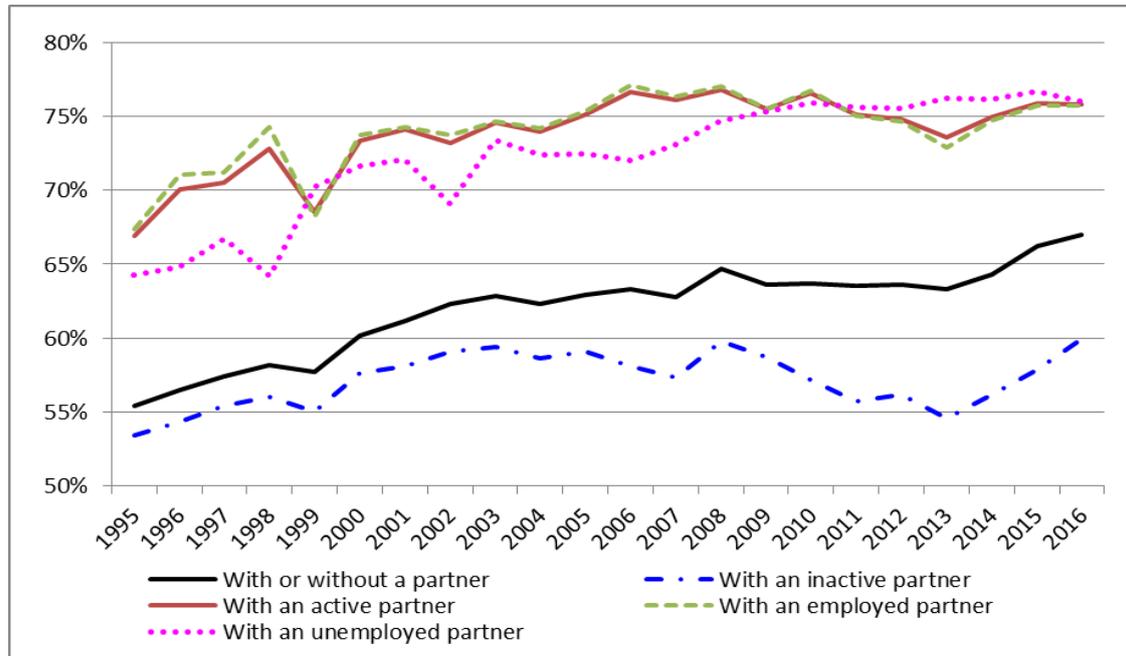
Table 2
Descriptive statistics of the sample

Variable	1995		2008		2013		2016	
	Mean	Std. Dev.						
HUSBAND								
Participation rate	0.563	0.496	0.666	0.472	0.646	0.478	0.690	0.463
Upper secondary (not university)	0.053	0.223	0.144	0.351	0.176	0.380	0.195	0.396
University	0.067	0.250	0.209	0.406	0.238	0.426	0.253	0.435
Age	59.639	2.828	59.365	2.839	59.349	2.904	59.248	2.864
Spanish	0.996	0.061	0.953	0.212	0.941	0.236	0.946	0.225
WIFE								
Participation rate	0.214	0.410	0.402	0.490	0.524	0.499	0.572	0.495
Upper secondary (not university)	0.026	0.158	0.142	0.349	0.182	0.386	0.205	0.404
University	0.033	0.180	0.129	0.335	0.180	0.384	0.224	0.417
Age	56.534	5.207	56.118	5.121	56.150	5.205	56.246	4.963
Spanish	0.994	0.077	0.944	0.230	0.923	0.266	0.926	0.262
HOUSEHOLD								
No. children in the household	1.432	1.239	1.041	0.957	0.955	0.937	0.938	0.925
Age difference (Husband–Wife)	3.105	4.351	3.247	4.345	3.199	4.455	3.002	4.160
No. of ascendants	0.076	0.280	0.072	0.275	0.065	0.267	0.051	0.246
No. of couples per wave⁽¹⁾	8890		8187		8550		8491	

Source: Own calculation based on microdata from the Spanish Labour Force Survey

(1) The number of observations per wave varies between 7307 (in 2005) and 8733 in 2015

Figure 6
Evolution of the participation rate of older males in Spain by type of cohabitation and partner's labour situation, 1995–2016

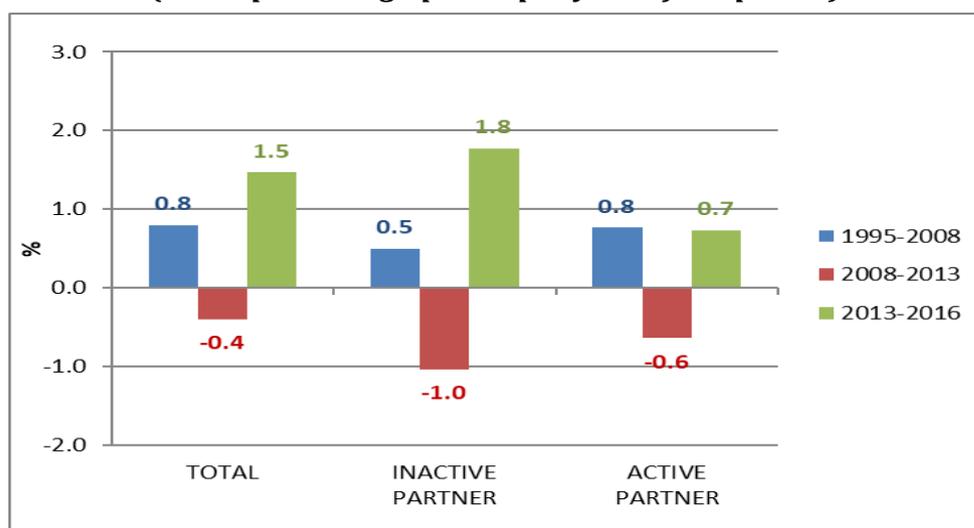


Source: Own, based on microdata from microdata from the Spanish Labour Force Survey

In addition, *Figure 6* displays the observed trend of the participation rates of males in the 55- to 64-year-old age group in four situations: for the whole of this age group (i.e. with or without a partner), for males who live with an inactive partner, and for males who live with a partner in the labour force (active partner). In this last case, we also disaggregated between males with an employed or an unemployed wife. Males of this age who live with a partner engage more in the labour market, and this effect is linked to males whose partner is active. Males with an inactive partner have a much lower participation rate than the mean for the whole cohort.

Figure 7 shows the increases in the participation rate that occur before and after the years of the GFC, and the decrease in the rate during the recession. Notably, it was among males whose partner was inactive that the participation rate fluctuated most during the GFC (downwards) and, particularly, after it (upwards).

Figure 7
Changes in participation rates for males aged between 55–64 years who live with a partner in terms of the partner's labour situation (mean percentage points per year of the period)



Source: Own, based on microdata from microdata from the Spanish Labour Force Survey

5. ESTIMATING THE *COMPLEMENTARY LEISURE EFFECT*

To gauge how the labour situation of the female spouse affects the decision to participate of their partners, we conducted a two-fold analysis by applying a simple probit model and a bivariate probit model. The former is only a reference model to be compared with the more elaborate bivariate probit framework, which constitutes our benchmark model in the remainder of the paper.

In the basic probit model, we consider a binary dependent variable which takes the value 1 when the male who has a partner and is between 55 and 64 years of age participates in the labour market. In addition to the variable which considers whether the man's partner is active or not in the labour market, to obtain the estimation, a set of regressors is also included to measure workers' qualifications, their age and the age squared¹⁴, the age difference with the wife¹⁵, whether or not

¹⁴ Including age as a linear regressor might be too restrictive given that there is a lot of bunching around the statutory early retirement age. An alternative specification, including a set of age dummy variables, has been estimated, but the regression outcomes were quite similar to those using the age and the age squared.

¹⁵ The total effect of a greater age difference between a husband and his partner concerning the latter's labour participation decision remains ambiguous. On the one hand, a greater age difference between

they are Spanish¹⁶, the number of children in the household¹⁷, and a series of year dummy variables.

In the case of the bivariate model, the participation equations for males and their partners are estimated simultaneously. In this regard, notably, when estimations are carried out using the bivariate, it is necessary to identify the model, which may be performed using one of two methods. First, the nonlinearity of the probit estimation may allow the model to be identified; to assess whether this is so, a two-stage least squares estimation is applied, and the value and significance of the female participation variable are compared with the one obtained in the bivariate probit estimation. Should these values be statistically similar, nonlinearity is not sufficient to identify the model, and exclusion variables must be used. In our case, both the coefficients and their level of significance have sufficiently similar values to warrant the need for such exclusion restrictions to be introduced. The variable we use (as do Pérez et al., 2015) is the number of ascendants living in the household. This variable influences the woman's decision to participate but does not affect male participation¹⁸.

Given the differing behaviour found in the participation series during the years of the GFC (2008–2013) referred to in the section 4, two further estimations, in addition to the whole period, are included: one corresponding only to the years outside the period of the crisis and another to the years it occurred. After these two estimates, we run a Hausman test to confirm that there are differences between coefficients in the two periods.

husband and wife would complicate any joint retirement decision from the labour market (shared leisure). On the other hand, however, as pointed out by Schrire (2008), an income effect would also come into play, given that if a husband is significantly older than his wife, he can expect his wife to be able to support his retirement longer.

¹⁶ Being an immigrant worker should not, in principle, have any bearing on the likelihood of participation, once the remainder of the determinants of said likelihood have been controlled for. Nevertheless, certain recent works (Hilgenstock and Kóczán, 2018) have highlighted how merely being a foreign worker, as opposed to being a national, leads to a slightly different response to the various determinants involved in labour participation.

¹⁷ The presence of children in the household may trigger a reduction or an increase in labour participation. The component associated with a reduction is linked to the presence of young children or individuals who are strongly dependent and who require the care of their parents, which might lead one of the two members of the couple to leave the labour market, which is generally the mother. However, it is quite unlikely that the couples in our study would have young children, such that for them the most likely would be to consider the component that would increase the likelihood of participation: the need to boost the family income, insofar as the children in question do not contribute with any income.

¹⁸ It is not possible to carry out a formal test to verify whether the restriction exclusion is a good choice. The best means to address this issue is to tell a compelling story about why the researcher should believe the exclusion restriction is a good decision and, if possible, to provide indirect empirical evidence supporting that election. In this vein, prior to selecting this variable, we have considered that approximately 40% of the inactive women declare not to be seeking employment because of family caring responsibilities. This percentage is barely 3% in the case of men.

Table A1 (in the Appendix) shows the coefficients and the marginal effects in the basic probit. In general, the coefficients estimated are highly significant. The first block of three columns provides the results for the whole period. The most noticeable result concerns how older males participate more if their partner also does so, supporting the importance of the *shared leisure effect*. More specifically, the likelihood of an older male participating in the labour market increases, *ceteris paribus*, 11 percentage points if his partner also participates.

Together with the shared leisure effect, also evident is the importance which having further qualifications (tertiary education) exerts on the likelihood of male participation. Indeed, when compared with having completed only basic education, holding a university degree increases the likelihood by 9 percentage points. In accordance with the coefficients estimated for age and age squared, each additional year after 55 increasingly reduces the likelihood of male labour participation the closer the age becomes to 65. In this manner, the marginal effect would shift from negative values of nearly 6 percentage points to almost 10 percentage points for older workers. Also significant is the age difference between the spouses; however, the reported marginal effect is small, with each year of age difference increasing the likelihood of male participation by 0.2 percentage points. This result underlines how the effect of joint retirement for couples of a similar age exceeds the rent effect that having a younger wife would have. Being Spanish increases the likelihood of male participation by almost 5 percentage points, which reveals that, in addition to the determinants of labour participation considered in the estimation, the worker's nationality implies a different pattern of participation. Finally, each child in the household increases the likelihood of male participation (as it had been assumed) by nearly 4 points.

The second and third block of the columns, respectively, show the results of the estimations for the years outside the GFC period (1996–2007 and 2014–2016) and for the actual years of the GFC (2008–2013). The results of the Hausman test indicated significant differences in the estimated coefficients of the two models. Notably, in both cases, the *complementary leisure effect* has proven relevant. Additionally, during the years of the GFC, this effect has been more intense. An increase can thus be observed in the likelihood of male participation by 11.4 percentage points if the partner is active during the years of the GFC and 10.7 points outside these years.

These initial estimations should be approached with a certain degree of caution because the possible presence of endogeneity in the model has not been considered. As aforementioned mentioned, the two decisions are taken in the family nucleus, and there might be unobservable factors that affect them. To manage this problem, a bivariate probit estimation is used, although the possible correlation of the residuals must be tested first. At the bottom of Table 3, we report information about the Wald test and the ρ coefficient with the standard error. On the one hand, the Wald test rejects the null hypothesis of independence in the residuals. On the other hand, the ρ parameter is significantly different from zero. This finding confirms that bivariate estimation is the most appropriate for gauging the effect of the female participation rate on older male participation in the labour market. Finally, the negative sign of ρ indicates that the unobservables not included in the model increase the participation of men and reduce that of their spouses.

Taking this bivariate estimation (*Table 3*) as a reference, the importance of the *shared leisure effect* remains robust. Moreover, the marginal effects found for this effect are noticeably higher than those in the uniequational model, without significant changes emerging in the size of the marginal effects in the other regressors.

Taking the period as a whole, the likelihood of an older male participating in the labour market increases, *ceteris paribus*, by 20.6 percentage points if his partner is active rather than inactive. For the years of the GFC, the estimated effect is 21.8 percentage points, and for the years outside, the estimated effect is 19.7 points.

Regarding the regression on the activity of the female member of the couple, the variables included are the same as for the male participation equation except for the exclusion variable, which is the number of ascendants living in the household and which proves to be highly significant. The other signs of this estimation are also in line with what is to be expected. Wives increase their participation in the labour market when they are younger, when their educational qualifications are higher, and when there is less of an age gap with the partner in question. By way of a difference, the presence of children in the household reduces the likelihood that wives of older workers will engage in the labour market. Again, the Hausman test confirms the difference between coefficients in the expansion period and in the GFC.

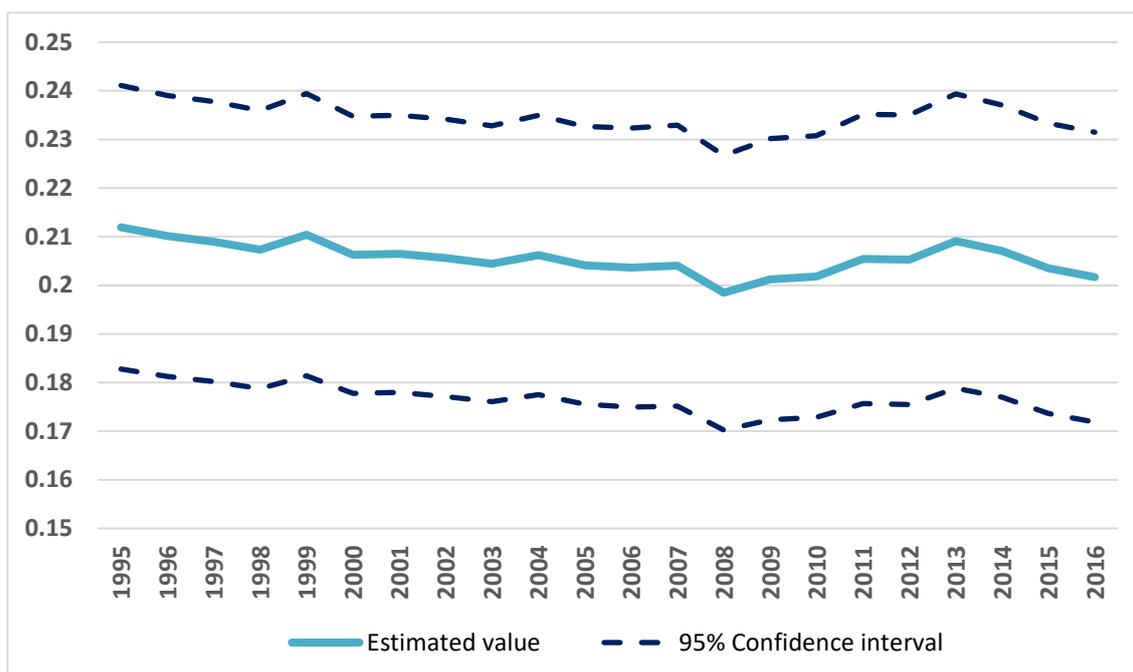
Table 3
Estimation of the shared leisure effect (biprobit model)

	<i>Whole period</i>			<i>Expansion period</i>			<i>GFC period</i>		
<i>HUSBAND'S EQUATION</i>	<i>Coef.</i>		<i>Marg.</i>	<i>Coef.</i>		<i>Marg.</i>	<i>Coef.</i>		<i>Marg.</i>
<i>Wife participation</i>	0.558***	0.040	0.206	0.531***	0.047	0.197	0.606***	0.074	0.218
<i>Education (ref. < Upper secondary)</i>									
<i>Upper secondary (not university)</i>	0.031**	0.013	0.012	0.051***	0.016	0.019	-0.006	0.023	-0.002
<i>University</i>	0.210***	0.013	0.075	0.233***	0.016	0.084	0.165***	0.024	0.058
<i>Age</i>	0.444***	0.064	0.164	0.444***	0.074	0.165	0.428***	0.128	0.154
<i>Age Squared</i>	-0.005***	0.001	-0.002	-0.005***	0.001	-0.002	-0.005***	0.001	-0.002
<i>Age difference</i>	0.001	0.001	0.000	0.003*	0.002	0.001	-0.004	0.003	-0.001
<i>Spanish</i>	0.129***	0.034	0.047	0.141***	0.043	0.052	0.116**	0.054	0.042
<i>No. of children in the household</i>	0.081***	0.004	0.030	0.076***	0.004	0.028	0.095***	0.009	0.034
<i>Year (ref. 1995/2008 GFC)</i>									
1996	0.026	0.024	0.010	0.026	0.024	0.010			
1997	0.042**	0.024	0.016	0.042*	0.024	0.016			
1998	0.064***	0.024	0.024	0.064***	0.024	0.024			
1999	0.022	0.024	0.008	0.022	0.024	0.008			
2000	0.077***	0.025	0.029	0.077***	0.025	0.029			
2001	0.075***	0.025	0.028	0.073***	0.025	0.028			
2002	0.085***	0.025	0.032	0.084***	0.025	0.032			
2003	0.100***	0.025	0.037	0.099***	0.025	0.037			
2004	0.078***	0.025	0.029	0.077***	0.025	0.029			
2005	0.103***	0.026	0.039	0.101***	0.026	0.038			
2006	0.109***	0.025	0.041	0.107***	0.026	0.040			
2007	0.104***	0.025	0.039	0.103***	0.026	0.038			
2008	0.166***	0.026	0.061						
2009	0.136***	0.026	0.051				-0.031	0.027	-0.011
2010	0.130***	0.026	0.048				-0.037	0.026	-0.013
2011	0.088***	0.027	0.033				-0.081***	0.027	-0.029
2012	0.090***	0.027	0.034				-0.079***	0.027	-0.028
2013	0.041	0.028	0.015				-0.128***	0.029	-0.046
2014	0.067**	0.028	0.025	0.068**	0.029	0.026			
2015	0.110***	0.028	0.041	0.111***	0.029	0.041			
2016	0.132***	0.028	0.049	0.132***	0.029	0.049			
<i>Constant</i>	-8.887***	1.918		-8.903***	2.216		-8.206**	3.794	
<i>WIFE'S EQUATION</i>									
<i>No. of ascendants</i>	0.055***	0.013		0.068***	0.015		0.026	0.025	
<i>Education (ref. < Upper secondary)</i>									
<i>Upper secondary (not university)</i>	0.421***	0.013		0.408***	0.016		0.441***	0.021	
<i>University</i>	0.932***	0.013		0.964***	0.017		0.880***	0.023	
<i>Age</i>	0.162***	0.011		0.137***	0.013		0.217***	0.021	
<i>Age Squared</i>	-0.002***	0.000		-0.002***	0.000		-0.003***	0.000	
<i>Spanish</i>	0.080***	0.030		0.134***	0.039		0.009	0.049	
<i>No. of children in the household</i>	-0.039***	0.004		-0.044***	0.005		-0.023***	0.009	
<i>Age difference(Husband-Wife)</i>	-0.010***	0.002		-0.007***	0.002		-0.016***	0.003	
<i>Year (ref. 1995/2008 GFC)</i>									
1996	0.003	0.026		0.004	0.026				
1997	0.050*	0.026		0.051*	0.026				
1998	0.071***	0.026		0.072***	0.026				
1999	0.055**	0.026		0.056**	0.026				
2000	0.071***	0.027		0.073***	0.026				
2001	0.061**	0.027		0.063**	0.027				
2002	0.132***	0.027		0.134***	0.027				
2003	0.161***	0.026		0.162***	0.026				
2004	0.209***	0.026		0.210***	0.026				
2005	0.227***	0.027		0.228***	0.027				
2006	0.292***	0.026		0.292***	0.026				
2007	0.358***	0.026		0.357***	0.026				
2008	0.395***	0.026							
2009	0.499***	0.026					0.107***	0.026	
2010	0.493***	0.026					0.101***	0.026	
2011	0.602***	0.027					0.211***	0.026	
2012	0.642***	0.027					0.251***	0.026	
2013	0.681***	0.026					0.290***	0.026	
2014	0.701***	0.026		0.700***	0.026				
2015	0.712***	0.026		0.709***	0.026				
2016	0.768***	0.026		0.765***	0.026				
<i>Constant</i>	-2.982***	0.308		-2.515***	0.358		-3.715***	0.585	
<i>Rho</i>	-0.164***	0.025		-0.152***	0.029		-0.187***	0.047	
<i>Wald test</i>	Prob > chi2 = 0.0000			Prob > chi2 = 0.0000			Prob > chi2 = 0.0001		
<i>No.</i>	182120			131739			50381		

Source: Own, based on microdata from the Spanish Labour Force Survey

Notes: Marginal effects are calculated in mean values of the variables. Significant at the *10%, ** 5% and *** 1% level

Figure 8
Evolution of the marginal effect of the partner's participation rate



Source: Own, based on microdata from microdata from the Spanish Labour Force Survey

Another step in this marginal analysis involves ascertaining the temporal progression of the effect of the partner's activity on the labour market participation of older workers. This effect is obtained as the average marginal effect of the wife's participation when each time the dummy takes a unitary value. We posit that *Figure 8* seems to indicate that the shared leisure effect displays a downward trend which, although not particularly sharp (the overall reduction is one percentage point), reverts with the onset of the GFC and picks up after 2013. Thus, we observe how the greater marginal effect of shared leisure evident during the GFC in the previous estimations gradually accumulated over the years spanning the GFC.

6.- DECOMPOSING THE EFFECTS

Having observed the significant effect that the partner's participation rate and the personal traits of older males have on the older males' participation, we next disaggregate the differential effect of each of these two components. Following the line adopted by Schirle (2008), the approach used here is based on the decomposition of nonlinear models posited by Di Nardo, et al. (1996). These works state that the likelihood of a male with a partner engaging in the labour market in the initial year may be set as follows:

$$\begin{aligned}
P_0(L^M = 1) &= \sum_{X^M} \sum_{L^F} P_0(L^M = 1, X^M = x^M, L^F = l^F) = \\
&= \sum_{X^M} \sum_{L^F} P_0(L^M = 1 / X^M = x^M, L^F = l^F) \times P_0(X^M = x^M / L^F = l^F) \times P_0(L^F = l^F)
\end{aligned}$$

where the superscripts M and F indicate that the data refer to the male or female, respectively. X reflects the set of characteristics of labour included in the equation. L is a dichotomous variable that takes the value 1 if the interviewee participates in the labour market. The subscripts represent the year in question.

In accordance with this notation, and based on the work of Di Nardo, et al. (1996), male participation conditional on a set of individual attributes can be identified in the first year assuming that the characteristics of the labour force are those existing in the following years (t).

$$\begin{aligned}
P_0^{x^i}(L^M = 1) &= \sum_{X^M} \sum_{L^F} P_0(L^M = 1 / X^M = x^M, L^F = l^F) \times P_t(X^M = x^M / L^F = l^F) \times P_0(L^F = l^F) \\
&= \sum_{X^M} \sum_{L^F} P_0(L^M = 1 / X^M = x^M, L^F = l^F) \times \delta_{x^M/l^F} P_0(X^M = x^M / L^F = l^F) \times P_0(L^F = l^F)
\end{aligned}$$

where:

$$\begin{aligned}
\delta_{x^M/l^F} &= \frac{P_t(X^M = x^M / L^F = l^F)}{P_0(X^M = x^M / L^F = l^F)} = \frac{P(X^M = x^M / L^F = l^F, T = t)}{P(X^M = x^M / L^F = l^F, T = 0)} \\
&= \frac{P(T = t / X^M = x^M, L^F = l^F) / P(T = t / L^F = l^F)}{P(T = 0 / X^M = x^M, L^F = l^F) / P(T = 0 / L^F = l^F)}
\end{aligned}$$

We thus obtain a counterfactual distribution provided by the activity of males who are close to retirement in the first year of the sample, if the characteristics of the workers were those of the final year and the female participation rate were also that of the first year studied.

The term $P(T = i / X^M = x^M, L^F = l^F)$ can be obtained through a logit or probit carried out for a pool of data made up of the two years involved, where the dependent variable takes the value 1 in the year calculated and the explanatory variables are age, age difference between the spouses, number of children in the household, and dichotomous variables that indicate nationality, education, and the relation with the partner's activity. $P(T = i / L^F = l^F)$ is obtained through a probit similar to the previous one, where the only explanatory variable is the relation with the partner's activity.

Likewise, older male participation can be estimated when the partner's characteristics are considered and participation in the labour market is changed for the values of the final year in the sample.

$$\begin{aligned}
P_0^{X^M L^F}(L^M = 1) &= \sum_{X^M} \sum_{L^F} P_0(L^M = 1 / X^M = x^M, L^F = l^F) \times P_t(X^M = x^M / L^F = l^F) \times P_t(L^F = l^F) \\
&= \sum_{X^M} \sum_{L^F} P_0(L^M = 1 / X^M = x^M, L^F = l^F) \times \delta_{X^M / L^F} P_0(X^M = x^M / L^F = l^F) \times \delta_{L^F} P_0(L^F = l^F)
\end{aligned}$$

where:

$$\delta_{L^F} = \frac{P_t(L^F = l^F)}{P_0(L^F = l^F)} = \begin{cases} P_t(L^F = 1) / P_0(L^F = 1) & \text{if } L^F = 1 \\ P_t(L^F = 0) / P_0(L^F = 0) & \text{if } L^F = 0 \end{cases}$$

The counterfactual distribution of the activity conditional to the variables employed for males aged between 55 and 65 is obtained in 1995 when both the characteristics and the partner's participation rate refer to the values shown in the final year considered.

As a result, our goal is to obtain the values of the weights (δ_{X^M / L^F} and δ_{L^F}) to calculate weighted averages of these counterfactual distributions.

$$\begin{aligned}
\hat{P}_0(L^M = 1) &= \frac{\sum_i \omega_{it} f(X_{it}^M \hat{\beta} + \hat{\phi} L_{it}^F)}{\sum_i \omega_{it}} & \hat{P}_0^{X^M}(L^M = 1) &= \frac{\sum_i \omega_{it} \hat{\delta}_{X^M / L^F} f(X_{it}^M \hat{\beta} + \hat{\phi} L_{it}^F)}{\sum_i \omega_{it} \hat{\delta}_{X^M / L^F}} \\
\hat{P}_0^{X^M L^F}(L^M = 1) &= \frac{\sum_i \omega_{it} \hat{\delta}_{X^M / L^F} \hat{\delta}_{L^F} f(X_{it}^M \hat{\beta} + \hat{\phi} L_{it}^F)}{\sum_i \omega_{it} \hat{\delta}_{X^M / L^F} \hat{\delta}_{L^F}}
\end{aligned}$$

where f is the function of a normal distribution and ω_{it} are the weights provided by the sample. By comparing these distributions, we can pinpoint which part of the change in the participation rate is due to differences in labour characteristics and which part is driven by the increase in female partner participation.

Before continuing, the following clarification is necessary. This decomposition ignores general equilibrium effects and is conditioned by the ordering of the explanatory variables (Dinardo, 1996). Therefore, we ignore the impact of changes in the distribution of the variables on the structure of the participation rate in general equilibrium. This method follows the standard partial equilibrium approach where observed outcomes for one group can be used to construct various counterfactual scenarios for the other group, and the invariance of the conditional distribution is assumed (Fortin et al., 2011).

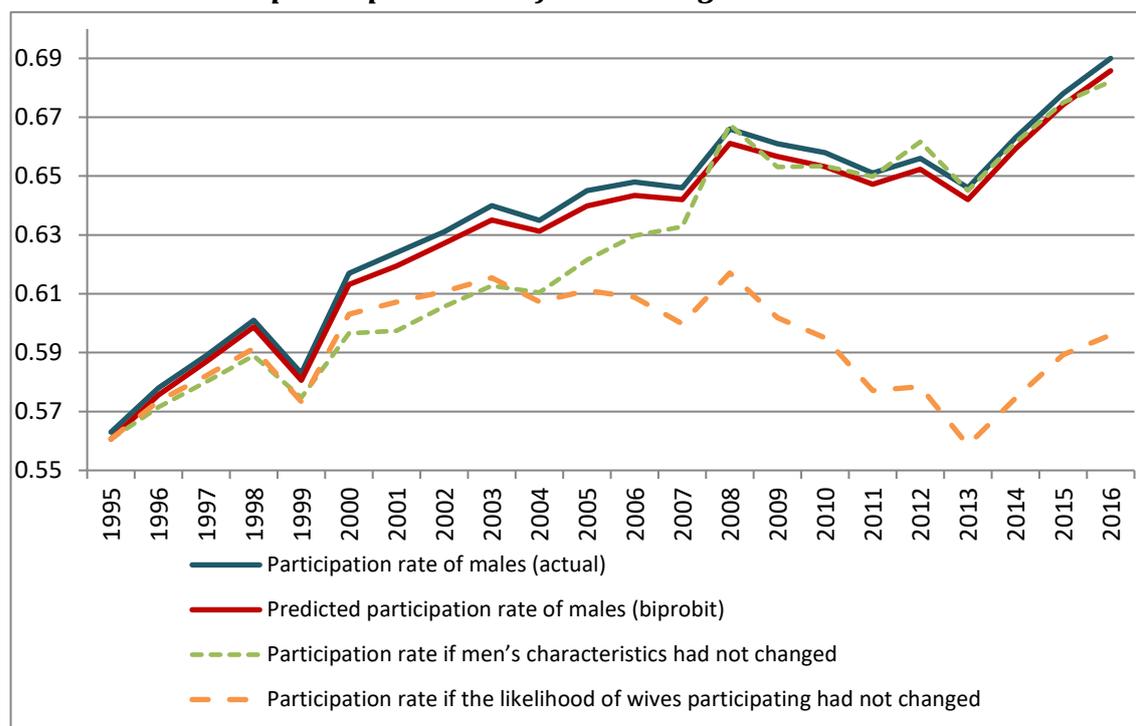
Table 5 shows the decomposition results for the difference in the mean participation forecast for males aged between 55 and 64 years. For the calculations, we referred to the estimations of the biprobit model and used the initial year of the sample (1995) as a reference.

Table 5
Mean annual values of the actual, forecasts and the counterfactuals of the participation rate of males aged 55–64

YEAR	Actual participation rate of males	Predicted participation rate of males (biprobit)	Participation rate if men's characteristics had not changed since 1995	Participation rate if the men's characteristics and the likelihood of wives participating had not changed since 1995	Participation rate if the likelihood of wives participating had not changed since 1995
1995	0.563	0.561	0.561	0.561	0.561
1996	0.578	0.576	0.571	0.569	0.574
1997	0.589	0.587	0.580	0.575	0.582
1998	0.601	0.599	0.589	0.582	0.591
1999	0.583	0.581	0.575	0.568	0.573
2000	0.617	0.613	0.597	0.587	0.603
2001	0.624	0.619	0.597	0.585	0.607
2002	0.631	0.627	0.606	0.590	0.611
2003	0.640	0.635	0.613	0.593	0.615
2004	0.635	0.631	0.610	0.587	0.607
2005	0.645	0.640	0.621	0.593	0.611
2006	0.648	0.643	0.630	0.596	0.609
2007	0.646	0.642	0.633	0.592	0.600
2008	0.666	0.661	0.667	0.620	0.617
2009	0.661	0.657	0.653	0.603	0.602
2010	0.658	0.653	0.653	0.597	0.595
2011	0.651	0.647	0.650	0.584	0.577
2012	0.656	0.652	0.662	0.598	0.578
2013	0.646	0.642	0.645	0.569	0.559
2014	0.663	0.659	0.661	0.584	0.575
2015	0.678	0.674	0.675	0.593	0.589
2016	0.690	0.686	0.682	0.594	0.596
2016–1995	0.127	0.125	0.122	0.033	0.035

Source: Own, based on microdata from the Spanish Labour Force Survey

Figure 9
Mean annual values of the actual, forecasts and counterfactuals of the participation rate for males aged 55–64.



Source: Own, based on microdata from microdata from the Spanish Labour Force Survey

By comparing the extremes of the period (2016 with 1995), we observe how the biprobit model forecasts an increase of 12.5 percentage points in the participation rate for the group of older males who live with a partner. The sample increase that actually occurred was 12.7 points. Maintaining all the personal and family characteristics of these males constant at their 1995 values, except for the participation or not of their female partner, would have led to an increase of 12.2 percentage points in this participation rate. However, if we maintain constant the likelihood of wives participating, the participation rate of the older males only increases 3.5 percentage points. Thus, the complementary leisure effect is the most important determinant of the labour participation of the aged men¹⁹.

¹⁹ In Schirle (2008), the complementary leisure effect can explain one-fourth, one-half, and one-third of the increase in older married men's participation rates in the United States, Canada, and the United Kingdom, respectively, between 1994–1995 and 2005. In the same period, in Spain, the aforementioned effect explains one-third of the increase in older married men's participation rates. However, in Spain, the magnitude of the effect continues to increase until the end of the analysed period (2016), explaining 72% of the total change.

Figure 9 displays the year-by-year evolution of the actual and forecast participation rate, the rate that would have been recorded if their personal characteristics had remained constant at the 1995 level, and the rate that would have occurred if their partner's participation had not changed since the initial years. Notable data that emerged include the following: between 2000 and 2007, the participation rate of the group would have stabilised by approximately 60% had it not been for the role played by the *shared leisure effect*. Likewise, during the years of the GFC (2008–2013) and without this effect, the participation rate would have decreased below 57%, almost 9 percentage points less than the value actually reached.

7.- POLICY IMPLICATIONS

There is a clear-cut connection between older couples' labour supply choices and retirement decisions. Additionally, the retirement decisions analysis is closely related to a significant political topic: public pension system sustainability, and that is why the main economic policy implications of this study are related to the social security old-age pension system.

The Spanish government has recently reformed its pension system twice, in 2011 and 2013.²⁰ As Díaz-Giménez and Díaz-Saavedra (2017) have asserted, '*These reforms delay the legal retirement ages, increase the contributiveness of the system, and effectively transform the Spanish traditional defined-benefit pay-as-you-go pension system into a defined-contribution pay-as-you-go pension system*'.²¹ More specifically, the preamble to the 2011 reform expressly highlights the need to encourage older individuals to remain in the labour force.

Indeed, this international strategy has been adopted at several European Council meetings,²² in which prolonging an active working life and discouraging early retirement have been urged as priorities. Similarly, Syse et al. (2014) stated, '*Increasing life expectancies and recent crises in public finances have led to profound pension reforms throughout Europe (...). One aim of this reform is to encourage workers to postpone work exits*.' The aforementioned Spanish legal provisions attempt to address the issue from a two-fold perspective; on the one hand,

²⁰ Law 27/2011, of 1 August, addressing the updating, adaptation, and modernisation of the social security system; and Royal Decree-Law 5/2013, of 15 March, on measures to promote the continuity of the working life of older workers and promote active aging.

²¹ García-Gómez, Jiménez-Martín et al. (2018) and García-Gómez, García-Mandicó et al. (2018) provide more details concerning the scope of the reforms together with an initial appraisal thereof.

²² Lisbon, Stockholm, Gothenburg, Barcelona, Brussels.

delaying the normal retirement age from 65 to 67, and on the other hand, by raising the actual retirement age closer to the legal limit.²³

Focusing on the latter of these two questions, notably, although the current legal limit for retirement in Spain up to the time of the aforementioned law (65 years of age) ranks among the highest in OECD countries²⁴, the same cannot be said of the actual retirement age, which is considerably below the average. Furthermore, this phenomenon has been caused by men taking early retirement²⁵.

Spanish legal reform in the matter of early retirement was first enforced in 2012. On the one hand, it has not succeeded in clearly increasing the actual mean retirement age;²⁶ on the other hand, it has also had the negative effect of leading to an increase in the number of workers retiring before the legal limit.²⁷ As a result, the problem of early retirement from the Spanish labour market continues to particularly pertain to males, and the solution has not been to merely pass laws.

The findings from our study suggest that economic policy should consider opening up a further avenue of action that does not tend to be envisaged and which in the case of Spain is absent from recent legal reform, namely, targeting the individual and the whole family unit of older individuals as a legal goal. This goal has been the case in most European countries. For example, Syse et al. (2014), regarding the Norwegian case, affirmed: *'The reform focuses, however, solely on senior workers and their situations at work and their relations to employers. Household considerations are virtually nonexistent'*.

Such a recommendation is justified because an extremely high percentage of men in the latter stages of their working lives are living with a partner and this group (where the problem of early retirement is most evident) is extremely sensitive to their female partner's employment status. Here, we align ourselves with the view expressed by Preter et al. (2015): *'As research results are used to inform and evaluate policy measures such as those aimed at extending working life, it is important that research-based policy measures acknowledge the impact of family-level influence on labour market exit.'*

²³ For which a period of adaptation is established, stretching from 2013 to 2027.

²⁴ In agreement with the Spanish Social Observatory, OECD data for 2009 indicated that only the USA (66 years of age) together with Iceland and Norway (67) had older legal retirement age limits.

²⁵ Using the same source of data, the effective retirement age for males in Spain in 2009 was 61.8 compared to a mean of 63.9 for males in OECD countries. In the case of women, the mean retirement age for Spanish females was 63.4, the OECD mean for females in this case being 62.4.

²⁶ The mean retirement age was 63.73 in 2009, reached a maximum of 64.3 in 2013, and settled at around 64.2 years after then.

²⁷ Using data from the Ministry of Labour, Migrations and Social Security, we see how in 2010 the percentage of retired workers under the legal age in Spain reached a minimum of 40.1%, in December 2012 it stood at 46.8%, and in February 2019 this percentage was around 50%.

To be more precise, and following this line of reasoning, we may state that, according to our estimates, all those economic policy measures aiming to increasing wives' participation in the labour market should produce a positive spillover effect on husbands' labour supply. In other words (Coile, 2004b) *'The failure to consider spillover effects from the wife's changing incentives results in a significant bias in the estimate of men's response to a policy change because of the strong effect of wives' incentives on husband's retirement'*. Moreover, in mainstream economic theory, the notion of 'positive externality' refers to spillover benefits that result from a certain individual's decision that he/she does not take into account when making the choice (Mas-Collel, et al., 1995). Hence, if the shared leisure effect is considered a positive externality, government intervention subsidising wives' to remain in the labour force would be justified from an efficiency-enhancing perspective.

Here, we could differentiate between political initiatives that affect older couples immediately, so-called 'short-run' measures, and other political proposals affecting younger couples aimed at increasing women's labour force participation, so-called 'long-run' policies. Evidently, the full set of political measures addressing the 'short run' and 'long run' is enormous and out of the scope of this research. However, we provide some examples to improve the understanding of the significance of the potential implications of the outcomes associated with the estimates obtained in this paper.

First, regarding short-run measures, economic authorities might implement public health policies targeting older women. To the extent that these policies improve older women's health status and, as a consequence, reinforce their labour market attachment, the shared leisure effect will reduce their husbands' likelihood of leaving the labour force. Another political intervention to raise total labour force participation by exploiting leisure complementarities might be to implement financial incentives for 'late joint retirement'. The complete set of short-run economic policies could be large, but with these two types of specific measures it is easy to understand political action from different perspectives. Here, the Health Administration or the Ministry of Labour may cause relevant effects, according to our estimates.

Regarding long-run proposals, policymakers ought to promote young women's engagement in the labour market in general terms. For instance, policies devised to reconcile work and family life might avoid some transitions from work to out of the labour force of some young women bearing children, which increases the likelihood of being in the labour force for them in their adult age. Other obvious candidates are policies fostering human capital attainment among young women. Highly skilled women tend to develop more stable professional careers, and the engagement in the labour market intensifies when they are older. These two examples are not an exhaustive list of the long-run policies available in the

policymakers' toolbox. Instead, they are only two simple examples about how broad-spectrum policies may have significant long-run effects on male labour force participation rates through the shared leisure effect identified in this research.

8.- CONCLUSIONS

We examined the role played by the *shared leisure effect* in Spain from when it first emerged (in the mid-1990s) up to the present time. This effect leads older males who live with a partner to extend their involvement in the labour market inasmuch as their partner also does so.

Drawing on a broad sample of microdata from the Labour Force Survey (comprising the second quarters of the years 1995 to 2016), we estimate uniequational and bivariate probit models to determine the relevance and size of this effect.

Results reveal that the *shared leisure effect* is determinant vis-à-vis explaining the recent behaviour of older male participation rates. More specifically, the likelihood of an older male participating in the labour market increases, *ceteris paribus*, between 11 and 20.6 percentage points (depending on the specification) if their partner also remains in the active population.

One notable offshoot of our study involved testing whether the *shared leisure effect* continued to operate or not during the years of the last economic GFC in which older Spanish male participation rates stagnated. Our results show that said effect not only held firm during the GFC but that it increased. The corresponding marginal effects for these years fluctuated between 11.4 and 21.8 percentage points (depending on the specification). Moreover, if we analyse the time evolution of this shared leisure effect, we observe how the slight downward trend that had remained in the years leading up to the GFC is reverted and even becomes more intense throughout the whole GFC.

We also conducted a nonlinear decomposition of how their partner remaining active, on the one hand, and the male's other personal and family characteristics, on the other hand, have affected older male participation rates. We find that keeping all these males' personal and family characteristics constant at their 1995 values, with the exception of their female partner's participation would have led to an increase in male participation of 12.2 percentage points, an extremely relevant figure because the total increase forecast by our model was 12.5 points. Other notable results from this decomposition are as follows. First, between 2000 and 2007, the participation rate of the male group would have stabilised at approximately 60% (rather than increase to 64%) had it not been for the role played by the *shared leisure effect*. In addition, during the GFC years (2008–2013),

and in the absence of said effect, this participation rate would have decreased to below 57%, almost 9 percentage points less than the figure actually reached.

The results from this research suggest that policymakers should target family units of older people instead of adopting measures at the individual level as it has been the case in Spain up to now.

APPENDIX

Table A1
Estimation of the shared leisure effect (uniequational model)

	<i>Whole period</i>			<i>Period of expansion</i>			<i>Period of GFC</i>		
<u>HUSBAND'S PARTICIPATION</u>	<i>Coef.</i>	<i>SD</i>	<i>Marg.</i>	<i>Coef.</i>	<i>SD</i>	<i>Marg.</i>	<i>Coef.</i>	<i>SD</i>	<i>Marg.</i>
<i>Wife participates</i>	0.298***	0.009	0.110	0.288***	0.010	0.107	0.317***	0.016	0.114
<i>Education (ref. < Upper sec.)</i>									
<i>Upper secondary (not univ.)</i>	0.049***	0.013	0.018	0.066***	0.015	0.025	0.016	0.022	0.006
<i>University</i>	0.249***	0.012	0.089	0.270***	0.014	0.097	0.210***	0.020	0.073
<i>Age</i>									
<i>Age</i>	0.441***	0.065	0.162	0.437***	0.075	0.163	0.435***	0.129	0.156
<i>Age squared</i>	-0.005***	0.001	-0.002	-0.005***	0.001	-0.002	-0.005***	0.001	-0.002
<i>Age difference</i>	0.006***	0.001	0.002	0.008***	0.001	0.003	0.004*	0.002	0.001
<i>Spanish</i>	0.129***	0.035	0.047	0.143***	0.044	0.053	0.114**	0.055	0.041
<i>No. of children in the household</i>	0.078***	0.004	0.029	0.074***	0.004	0.027	0.094***	0.009	0.034
<i>Year (ref. 1995/2008 GFC)</i>									
<i>1996</i>	0.027	0.024	0.010	0.027	0.024	0.010			
<i>1997</i>	0.046*	0.024	0.017	0.046*	0.024	0.017			
<i>1998</i>	0.069***	0.024	0.026	0.069***	0.024	0.026			
<i>1999</i>	0.027	0.024	0.010	0.026	0.024	0.010			
<i>2000</i>	0.083***	0.025	0.032	0.083***	0.025	0.031			
<i>2001</i>	0.081***	0.025	0.031	0.079***	0.025	0.030			
<i>2002</i>	0.098***	0.025	0.037	0.096***	0.025	0.036			
<i>2003</i>	0.115***	0.025	0.043	0.114***	0.025	0.043			
<i>2004</i>	0.096***	0.025	0.036	0.094***	0.025	0.036			
<i>2005</i>	0.125***	0.026	0.047	0.122***	0.026	0.046			
<i>2006</i>	0.137***	0.025	0.051	0.133***	0.025	0.050			
<i>2007</i>	0.139***	0.025	0.052	0.135***	0.025	0.051			
<i>2008</i>	0.205***	0.025	0.076						
<i>2009</i>	0.185***	0.025	0.069				-0.020	0.026	-0.007
<i>2010</i>	0.179***	0.025	0.067				-0.025	0.026	-0.009
<i>2011</i>	0.147***	0.025	0.055				-0.058**	0.027	-0.021
<i>2012</i>	0.154***	0.025	0.058				-0.050*	0.027	-0.018
<i>2013</i>	0.109***	0.026	0.041				-0.096***	0.027	-0.034
<i>2014</i>	0.138***	0.026	0.052	0.134***	0.026	0.050			
<i>2015</i>	0.184***	0.025	0.069	0.180***	0.025	0.067			
<i>2016</i>	0.212***	0.025	0.079	0.208***	0.025	0.077			
<i>Constant</i>	-8.481***	1.931		-8.453***	2.228		-7.960**	3.833	
<i>No.</i>	182120			131739			50381		
<i>Pseudo R2</i>	0.125			0.121			0.132		

Source: Own, based on microdata from the Spanish Labour Force Survey

Notes: Marginal effects are calculated in mean values of the variables. Significant at the *10%, ** 5% and *** 1% level

REFERENCES

- Álvarez, S., J. Prieto, and D. Romero (2002): 'Estado de salud y participación laboral de las personas mayores'. *Cuadernos aragoneses de economía* 12(2): 271-292.
- Blau, D.M. (1998): 'Labor force dynamics of older married couples'. *Journal of Labor Economics* 16(3): 595-629.
- Blau, D.M., and R.M. Goodstein (2010): 'Can Social Security Explain Trends in Labor Force Participation of Older Men in the United States?'. *Journal of Human Resources* 45(2): 328-363.
- Blau, F.D., and L.M. Kahn (2007): 'Changes in the labor supply behavior of married women, 1980-2000', *Journal of Labor Economics* 25(3):393-438.
- Blundel, R. and MaCurdy, T. (1999): 'Labor supply: a review of alternative approaches' in Ashenfelter, O. and Card, D. (eds.), *Handbook of Labor Economics*, vol. 3A , cap. 27, Amsterdam: Elsevier Science.
- Boldrin, M., García-Gómez, P. and S. Jiménez-Martín (2010): 'Social security incentives, exit from the workforce and entry of the young', in *Social Security Programs and Retirement around the World: Historical Trends in Mortality and Health, Employment, and Disability Insurance Participation and Reforms*, University of Chicago Press: 261-294.
- Cairó Blanco, I. (2010): 'An empirical analysis of retirement behaviour in Spain: partial versus full retirement Labor supply', *SERIEs* 1(3): 325-356.
- Chalmers, L., and A. Milan (2005): 'Marital satisfaction during the retirement years'. *Canadian Social Trends*, 76 (Statistics Canada Catalogue no. 11-008): 14-17.
- Coile, C. (2004a): *Health shocks and couples' labor supply decisions. NBER Working Paper no. 10810, National Bureau of Economic Research, Cambridge, MA.*
- Coile, C. (2004b): 'Retirement incentives and couples' retirement decisions'. *Topics in Economic Analysis and Policy* 4(1): 1-28.
- DiNardo, J., N. Fortin, y T. Lemieux. (1996): 'Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach'. *Econometrica*, 64: 1001-1044.

- Fortin, N., T. Lemieux & S. Firpo (2011): 'Decomposition methods in economics' in *Handbook of Labor Economics*, vol. 4, 1-102, Amsterdam: Elsevier Science.
- Goldin, C., and L.F. Katz (2007): 'Long-Run Changes in the Wage Structure: Narrowing, Widening, Polarizing'. *Brookings Papers on Economic Activity*, 2: 135-167.
- García-Gómez, P., S. Jiménez-Martín and J. Vall Castelló (2012): 'Health, disability, and pathways into retirement in Spain', in *Social Security Programs and Retirement around the World: Historical Trends in Mortality and Health, Employment, and Disability Insurance Participation and Reforms*, University of Chicago Press: 127-174.
- García-Gómez, P., S. Jiménez-Martín and J. Vall Castelló (2018): 'Trends in Labor Force Participation of Older Workers in Spain 1980–2015', No. w24637. *National Bureau of Economic Research*.
- García-Gómez, P., S. Garcia-Mandicó, S. Jimenez-Martin and J. Vall-Castelló (2018): 'Trends in Employment and Social Security Incentives in the Spanish Pension System: 1980–2016', No. w25367, *National Bureau of Economic Research*.
- García-Pérez, P., S. Jiménez-Martín and A.R. Sánchez-Martín (2013): 'Retirement incentives, individual heterogeneity and labor transitions of employed and unemployed workers, *Labour Economics*, 20: 106-120
- Greene, W. H., (1998) 'Gender Economics Course in Liberal Arts College: Further Results'. *The Journal of Economic Education*, 29(4), 291-300
- Gustman, A., and T.L. Steinmeier (2000): 'Retirement in dual career families: A structural model'. *Journal of Labor Economics* 18(3): 503–45.
- Gustman, A., and T.L. Steinmeier (2009). 'How Changes in Social Security Affect Recent Retirement Trends'. *Research on Aging* 31(2): 261-290.
- Hanel B. and R.T. Riphahn (2012): 'The timing of retirement. New evidence from Swiss female workers'. *Labour Economics*, 19: 718–728.
- Hilgenstock, B. and Z.Kóczán (2018): *Storm Clouds Ahead? Migration and Labor Force Participation Rates in Europe*, *IMF Working Papers*, WP/18/148, *International Monetary Fund*.
- Honoré, B. and A. de Paula (2013): *Interdependent durations in joint retirement*, *CEMMAP Working Paper CWP05/13*.
- Hospido. L. and G. Zamarro (2014): 'Retirement patterns of couples in Europe', *IZA Journal of European Labor Studies*, 3:12

- Kuhn, P., and F. Lozano (2008): 'The expanding workweek? Understanding trends in long work hours among U.S. men, 1979–2004'. *Journal of Labor Economics* 26(2): 39–57.
- Maestas, N. (2001): *Labor, Love & Leisure: Complementarity and the Timing of Retirement by Working Couples*. UC Berkeley, Department of Economics. Mimeo.
- Maestas, N. and J. Zissimopoulos (2010): 'How Longer Work Lives Ease the Crunch of Population Aging', *Journal of Economic Perspectives*, 24(1): 139–160.
- Mas-Collel, A., M.D. Whinston, and J.R. Green (1995): *Microeconomic Theory*, New York: Oxford University Press.
- Michaud, P.C., and F. Vermeulen (2011): 'A collective labor supply model with complementarities in leisure: Identification and estimation by means of panel data'. *Labour Economics*, 18: 159–67.
- Peracchi, F., M. Boldrin, and S. Jiménez-Martín (2002). 'Micro-Modelling of retirement behavior in Spain'. *Papeles de trabajo del Instituto de Estudios Fiscales*. Serie economía, no 14: 7-86.
- Pérez, C., and U. Carrascal. (2010). *Determinantes de la participación laboral de los hombres mayores en Castilla y León. III Congreso Nacional sobre Mercado de Trabajo y Relaciones Laborales*, Palencia. Mimeo.
- Pérez, C., A. Martín-Román and A. Moral (2015): 'The impact of leisure complementarity on the labour force participation of older males in Spain'. *Applied Economics Letters* 22(3): 214-217.
- Pérez, C., A. Martín-Román and A. Moral (2016): 'Nivel formativo, ocio complementario y participación laboral de las parejas de mayor edad en España'. *Revista del Ministerio de Empleo y Seguridad Social. Economía y Sociología* 126: 15-30.
- Preter H., D. Looy and D. Mortelmans (2015): 'Retirement Timing of Dual-Earner Couples in 11 European Countries? A Comparison of Cox and Shared Frailty Models', *Journal of Family and Economic Issues*, September, 36(3): 396-407.
- Queiroz B.L. and L.R. Souza (2017): 'Retirement incentives and couple's retirement decisions in Brazil', *The Journal of the Economics of Ageing*, 9: 1-13.
- Radl J. and R.K. Himmelreicher (2015): 'The influence of marital status and spousal employment on retirement behavior in Germany and Spain', *Research on Aging*, May, 37(4):361-87.

- Michele J.S. (2006): 'Measuring the effect of husband's health on wife's labor supply', *Health Economics*, 15: 579-601
- Schirle, T. (2007): *Health, pensions, and the retirement decision: Evidence from Canada. Working Paper no. 2007-02 EC*, Department of Economics, Wilfrid Laurier University.
- Schirle, T. (2008): 'Why Have the Labor Force Participation Rates of Older Men Increased since the Mid-1990s?' *Journal of Labor Economics* 26(4): 549-594.
- Stancanelli, E. and A. van Soest (2012): 'Retirement and Home Production: A Regression Discontinuity Approach', *American Economic Review*, 102(3): 600-605.
- Syse, A., Solem, P.E., Ugreninov, E., Mykletun, R. and Furunes, T. (2014): 'Do spouses coordinate their work exits? A combined survey and register analysis from Norway', *Research on Aging*, 36(5): 625-650.
- Warren D.A. (2015): 'Retirement decisions of couples in Australia: The impact of spousal characteristics and preferences', *The Journal of the Economics of Ageing*, 6: 149-162.