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# DUAL RETIREMENT IN ITALY AND EXPECTATIONS

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**Abstract**

We specify and estimate models for married couples in which both spouses work or only one does and estimate these models on data from the Bank of Italy Panel (SHIW). Model estimates are used to decompose the observed differences in retirement trends of the two demographic subgroups into differences in preferences and differences in the access to the retirement options. Within the same subgroup two types of dynamic incentives are used: the one based on seniority pension and the one based on planned retirement. We consider the possible deviations between experience and seniority in our data. We also discuss the accuracy of the planning activity about individual participation and introduce some arguments to support the use of this subjective information.

## 1 Introduction

Understanding the determinants of retirement behaviour of the elderly is crucial to design politics that may affect participation to the labour force.

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The pension system in Italy was recently reformed, but limited attention was dedicated to family oriented considerations. In this study we will pose two main questions. Do husband and wife influence each other in the retirement decision? What do expectations on future retirement tell us about individual retirement plans?

In the retirement literature, household based studies became to play recently a rather prominent role. This means that not only the forward looking optimising individual is taken into account, but also his living circumstances. For the US, for instance, Moffit (1987)estimates that financial incentives can only account for a small fraction of the drop in the participation rate of working females. In Europe, and especially in Italy, this fraction cannot but be smaller given the widespread use of early retirement. Brugiavini and Fornero (1998) have noticed a large diffusion of disability schemes among elderly couples, a factor that increases *de facto* common retirement in Italy. Same finding is common to Miniaci (1998) as well, that finds relevant weight of a dummy related to marital status when describing elderly's disability as a retirement behaviour[1]. Is this phenomenon due to a preference structure of the individuals that is not observed in the data? And can data on expected retirement age account for this unobservability? Looking at the retirement process in a family context may account for some of those characteristics that are ignored when modeling the choice to stop working as an individual choice. This is why to this paper different types of literature are relevant. First the one on individual choice[2], a second and still under development literature about women's retirement choice, the rather new (and barely explored in Europe) field of joint retirement literature and the most recent one focusing on retirement and expectations[3]. Of some inspiration is also the Italian retirement and pension literature, that rarely focused on dual retirement[4]. Some contributions have served as a useful benchmark[5].

We will show how retirement behaviour has much to do with family based

[1]It is generally recognized that in Italy disability schemes have often been misused, and were granted to those in danger of loosing their job or in order to gain political support. Health status was only partially relevant in many cases.

[2]For a Summary look at Lumsdaine and Mitchell (2000).

[3]See for instance (Chan and Stevens 2001) and (Gustman and Steinmeier 2001).

[4]Some preliminary work has been done by Professor Colombino, at Turin University and presented at the conference: *Socio-demographic factors and the future of the welfare state in Italy*, Rome 16 march 2001.

[5]Among those Brugiavini and Fornero (1998)and Brugiavini and Peracchi (2001).

considerations, by describing how heterogeneous is retirement behaviour across different household types. Furthermore the interaction between financial incentives and planned participation will be considered. We specify and estimate models for married couples in which both spouses work or only one does (two earners, TE, or one earner, OE) and estimate these models on data from the Bank of Italy Panel (SHIW). Model estimates are used to decompose the observed differences in retirement trends of the two demographic subgroups into differences in preferences and differences in the access to the retirement options. Within the same subgroup the model estimates for the different dynamic incentives (the one based on seniority pension and the one based on planned retirement) will be decomposed to test the response of the participation rate to these incentives. We think this is important for several reasons. Work outcomes ( which could be the results of decisions regarding work as the outcome of some household bargaining process, or as a result of a demand driven shock) of one member may affect the relative preference for income and leisure of the other member. Work choices of one spouse may affect, through spillover effects (see Coile (1999)) the financial attractiveness of work versus non-work of the other spouse. Assortative matching could drive the household formation by related preferences of family members, other then the other just mentioned causes. Finally the year of planned retirement and the one of completed seniority may diverge and we fill it is important to account for both (see appendix).

That is why this paper shows an analysis of a relatively new sort of information, namely expectations about future retirement age. Given the lack of information about the heterogeneous individual pension schemes, this variable could account for information available to the respondent and not to the econometrician. We will set up an estimation strategy flexible enough to account at the same time for individual expectations and institutional constraints by computing both (option) values of retirement. This might help to question the accuracy of the planning activity engaged by individuals regarding their future retirement. In the literature it is often questioned whether data on expectations are the outcome of a conscious planning activity rather than a guess about the future (Gustman and Steinmeier 2001). We will not focus in our model on the problems that disentangling the two effects might cause, but we will shade some light on the available empirical evidence about this matter. Namely we will question the common approach of using experience as a proxy for seniority rather than the individually reported expectations.

The next section will briefly describe the institutional setting in which households make their retirement choice in Italy. Section 3 describes the data. Section 4 presents our considerations about theory and implementation. The last two sections report our results and conclusions.

# 2 Institutions

The Italian pension system has recently been under substantial reform. The 1992 - 1995 reforms were based on a long lasting PAYG (pay as you go) system set up after the second World War that had several household related provisions. In this article we consider only the pre-90s regime, since the individuals we look at own to an older cohort, that remained untouched by the reforms. The heterogeneity within the system (that the reforms have tried to harmonize) makes it difficult to summarize all provisions below a common definition, though some features were rather widespread. In general the pension formula changed from earnings related to contribution based. The first had been used, virtually unchanged, for more than 4 decades and was used as a redistributive tool thanks to generous replacement rates.

The old system granted a seniority pension that could be collected after 20 years (15 if a married woman) working in the public sector and 35 years working in the private sector. This means that in principle in the data we can observe a married woman already retired at age 31 if she had begun working in the public sector at age 16. An old age pension was also granted to those not entitled to pension after age 65. Other features of the system are a minimum age to collect retirement (60 for men and 55 for women in the private sector). A minimum benefit is also present and is important for its diffusion and for his benchmark function in the economy. After age 65 this benefit is called "old age guarantee" (pensione sociale)[6].

As far as our model is concerned implementing the institutional rules in the computations will need some simplifications. We will circumvent the heterogeneity in the system by assuming that all individuals that exit the

[6] Unemployment benefits are also available in Italy. These are less generous and shorter lasting than in northern European countries. Furthermore we do not have information on eligibility to these schemes, which may vary in Italy depending on characteristics of the working individual that are not reported in the data. Anyway when we observe separation from the current job we do not know whether it is due to a layoff or to a retirement decision, that is why we choose for replacement rate depending benefits.

labour market are retiring and that they expect to do so by using the most financially attractive option available. This means that all possible retirement options (disability scheme, unemployment benefit etc...) are lumped together in one "pre-retirement" provision[7]. The early retiree, that is the retiree stopping with work before the needed seniority is reached, will receive such benefit. The ones stopping with work when their seniority requirement is fulfilled will instead receive the normal seniority pension granted by the social security authority according to the earnings related formula. The "pre-retirement" benefit will be imputed[8] while the retirement benefit will be computed using the institutional rules plus an additional check on the congruence of the replacement rate, as reported in the OECD working papers series (Miniaci 1998).

Some features of the old system that could be relevant to this study where not taken into account. For instance the "pre-90's" scheme provided survivors benefits to spouses. Such benefits could be claimed by divorced wives as well and amounted to 60% of the deceased' income for a single spouse; increased to 80% with a dependent child and to 100% with two. The benefit was subject to an income test for the receiver. Unfortunately we do not have information about re-marrying respondents. Furthermore, family oriented arrangements were also in use for employed individuals, by providing the husband of the household of benefits for depending spouse and children. The age of our respondents allows no treatment of this provision though this could influence the gross salary and the future pension benefit according to the old computation formula. The calculation of the pension benefit was based on the last 5 years of earnings for private sector employees and for some categories on the last salary[9].

In the last decades,though, it was not always the case to complete seniority before retirement. The phenomenon of the so called baby pensioners has

[7]We don't have reliable information about the health status to distinguish between potential disability schemes users and elderly unemployment. Some of them might also be protected by pre-pensoning schemes (cassa integrazione). This scheme allows normally redundant workers to retire early and was used by large companies (like the railways for instance). It granted a full pension for the receiver, given his current status, plus the full accumulation of seniority while laid off.

[8]The imputation is based on the consideration of the residual time to completed seniority. This means that the "pre-retirement" benefit will depend on the last income, the social security rate of return and the remaining tenure necessary to fulfil seniority.

[9]In this paper income is considered constant over time (see appendix), that is why we do not implement two different pension formulas.

been handled by both reforms in the 90's. There are indeed several ways in which one might exit the labour market before reaching seniority. University educated people might agree with the pension authority to consider the year spent at college into their seniority, actually "buying" extra years. This is a case in which experience and seniority do not coincide. Furthermore specific incentives might be offered by different employer to allow earlier retirement of redundant workers. The availability of such special schemes is not observed in the data but may be known to the potential retiree. This is why we also estimate a second model (Model 2) on our data, to see whether planned retirement age might contain this missing information.

Early retirement, finally, is an absorbing state. Indeed in the computations reported below we show that re-entrance in the labour market takes place for less than 3% of those out of the labour force (OLF) in the cohort considered.

In the new system redistribution takes place between spouses in two ways. First survivors benefits will still exist and second the actuarial fairness of the computation allows for transformation coefficients that do not penalize women (that live longer) versus men, nor married individuals (that might leave a survivor) versus singles. The contribution based formula might instead penalize those having an irregular labour market participation, with irregular income flows and long spells of unemployment at younger ages[10]. This is normally the case for married women that exit the labour market for family related issues (child bearing, assistance to elderly parents etc.) and this is of some interest in this study.

This means that pension system and family structure are closely related and might influence the way in which individuals form their expectations about future retirement dates. Though the reform did not actually affect the respondents in our data the announcement of it could have.

[10]The pre-90's pension formula is $I * N * S$ where I is the return for every recognized pension year, N is the number of years up to a maximum of 40 and S is the benchmark income. The new pension formula is $C*R$ where C is the pnv of the individual contributions computed at the 5 years MA of GDP and R is the transformation coefficient that is based on life expectancy of both household members.

# 3 Data, facts and figures

## 3.1 Data

We use the Survey of Italian Households' Income and Wealth (SHIW). It is similar in structure to the Social Economic Panel in Germany and Holland or to the PSID in the US and was not especially designed for retirement studies. Income variables are reported in net terms and used as such along this study[11]. The SHIW is administrated by the Bank of Italy and the panel structure, that begun first in 1989, suffers of strong attrition. The other waves of the panel have been running in 1991, 1993, 1995 and 1998. These are the most used data sources of the paper, together with the waves from 1984, when the analysis can be conducted with repeated cross sections in place of a panel, and only for descriptive purposes. Before 1984 the data suffer a strong limitation since age is registered in cohorts and not per individual, which does not make the data usable for a study about elderly.

All observations (initially every waves contains approximately 24000) are selected according to their marital status and the originally individual-based data set is transformed into a household-based data set, containing information on both husband and wife. The greatest part of the statistics shown are elaborated on repeated cross sections, only household transition studies exploit the panel features of the SHIW.

The original data set is used only to look at the evolution of marital status. When the individual data are transformed into household data, some observations are lost if the position in the household is not reported. Next we select only couples in repeated cross sections (9523 observations) . When the panel is created the high attrition leaves little more than 2000 observations in the sample. Unfortunately the panel is incomplete and some data, like income or planned retirement age, might be missing. This is why we use different definition of the panel, with little more than 2000 observations in each[12].

[11] To be correct we should transform them into gross. The homogeneity in the sample though makes net income a relatively convenient proxy to compute dynamic incentives, since the tax rate is not reported in the data.

[12] Our intention is to exploit all possible observations and drop them only when it is strictly necessary. Indeed the model estimates are based on the smallest sample, in which all important item non responses observations have been cancelled, if no sensible imputation of the missing information was possible.

## 3.2 Facts and figures

Among the different demographic groups, breadwinner husbands are normally the one with the highest labour market participation. To see whether this trend is affected by the evolution of family composition over time and cohorts, we look at table 1. Relevant changes to the share of married elderly individuals in the population do not occur. There is a little decrement when looking, for instance, at the first and the third cohort. Respondents were approximately aged 50 respectively in 1998 and 1989 (89,3% versus 93,4%). Such decrement of 4% is in general to be attributed to the rise in divorce rates (from 1,4% to 3.8%) and widowhood (2.9% to 3.3%). Being the composition of households rather stable it is interesting to observe the allocation of the labour force within married couples.

Table 2 shows that the joint labour market participation is more and more becoming common retirement, mostly because the traditional family setting, with the husband working and the wife not, is decreasing over time. Rather steady indeed the both employed condition and increasing the share of households in which the wife works and the husband does not. Table 3 shows how the labour market participation of the elderly husband (aged 50 to 64) has considerably decreased by 10% in approximately 10 years while the increase in participation of the elderly wife (7%) did not compensate for it, meaning that more and more individuals happen to experience common retirement[13].

Table 4 suggests that there might be a relation between spouse's participation. It shows that husbands with working wives are extremely more inclined to participate in the labour market than husbands whose wives are OLF[14]. At any age there is a difference between groups, that reaches almost

[13]In the literature the definition of joint retirement is rather flexible. Indeed two elderly spouses that are observed out of the labour force at a certain point in time are *de facto* jointly retired; we refer to this phenomenon as common retirement. More strictly defined, joint retirement is the shift of a couple from the employment status "both employed" to "both out of the labour force". This second phenomenon, that turns out to be not usual in Italy, implies the study of the transitions of working individuals in the household, and will be the object of the model and the estimation, though attention will be played to the OE households as well. The occurrence of a joint retirement state might be the result of a decision process as well as of a self-selection process. We do not focus on the second aspect, if not by considering unobserved heterogeneity in our model.

[14]This might be due both to a joint retirement decision, to the dependence from certain initial conditions or to a self selection process that makes individuals marry together because of similar preferences for leisure versus working. These 3 phenomena might be

30% at age 64.

We also use expectations on future retirement dates of currently employed respondents, to see whether there is any joint planning behaviour in the household[15]. Observations are mostly located along the diagonal of figure 1, which means that husband and wife expect to have analogous careers[16]. This might also indicate a relation between family matching and labour market expectations.

Anyway to account for the existence of a joint behaviour of currently retired couples figure 2 has been plotted. The distribution here is more spread, and a little unbalanced on the left side, meaning that despite the age difference there is an observed tendency to retire at shorter distance in time from each other.

Unfortunately we have to be silent concerning the relationship between expectations and realizations for this second figure, since we don't have information about previous expectations of currently retired respondents.

A way to describe the link between planning and realizations is to consider the short run expectations of the respondents in the rotating panel. This is done in table 5 looking at those willing to retire within the next interview (about 2 years time). Only in approximately 60% of the cases husbands are actually observed OLF at the time of the second interview. The figure for wives is even lower, about 40%. This gap in expectations and realizations is also evident in terms of joint participation (see table 7).

In treating expectations we are using the panel features of the SHIW and this also allows the study of the evolution of expectations over time. This is particularly interesting when considering that the implementation of the pension reforms could have modified expectations over time. In table 6 two consecutive waves are considered in each column. During the time span separating the second and the third waves, the first pension reform was passed, which had restricted eligibility criteria for younger generations, but that had also spread discontent and anxiety through imminent potential

into play together at the same time though the different effects are not readable form the data.

[15] The relative question is; "What is your planned retirement age?" and the answer includes the possibility to report yourself unable to give such an answer (for them age 65 is imputed).

[16] This might also be due to a reporting distortion. Individuals tend to think in a discrete way about the future and are more inclined to report retirement ages such as 55, 60 or 65 rather than ages in between.

retirees. The second reform instead was passed between the last two waves. Assessing whether changes in expectations should be ascribed to the pension reforms is beyond the scope of this study. The table nevertheless shows that the share of these expecting to retire later did increase substantially only between the last two waves, after the funded system was instituted. Little sensitive was also the share of wives expecting to retire later between 1991 and 1993 when eligibility criteria for civil servants were restricted[17].

We looked at the relation between the short term expectations and realizations in the household (table 7). This means that we didn't only look at those expecting to retire within next wave but also to these expecting to work. The table shows that in more than 80% of the cases all expectations are fulfilled, with exception of the household in which only the wife is expected to remain employed (64%). In this latter case the discrepancy is due to the continued labour participation of the husband. Same reason explains the deviation from the expected both OLF participation status. Finally only a small fraction of respondents expect to jointly retire in the short run.

The data seem to point to the existence of the phenomenon of common retirement, rather than to the one of joint retirement, and to some kind of coordinated behaviours. To look at the latter consider the transition over time of those households who did participate in the panel, that is with at least two repeated observations.

Four basic joint labour market participation states can be distinguished for husband and wife when both are employed or OLF or when only one spouse is at work.

Such states have been defined in all years of the panel and the transition between subsequent waves[18] is summarized in table 8. The two opposite forces, that make the husband less participating in the labour market and the wife more, show, for instance, that approximately 68% of those who are originally both employed keep on being employed in the subsequent wave (labour market attachment), while not even 5% jointly retires. The quitting rate of husbands is very similar to wives (14,6% versus 12,5%) indicating a pale behaviour of husbands to lead the way out of the labour force when both

[17] The size of the effect might be due to the protection granted to workers with accumulated seniority.

[18] The distance between subsequent waves is at least of 2 years. This us a rather inconvenient limitation for a transition study because what happens in the period not covered by observation could be very informative, mostly if we think that weak subjects on the labour market might shift very often from employment to unemployment.

were employed.

When the wife was already OLF and the husband not (second column of figure 8) the most relevant transition, beside state dependence, is the one that induces the husband to retire (23,3%) rather than the wife to find an employment (4,4%). Analogous is the behaviour of wives when they are the only working member in the household (third column of figure 8), while common retirement (last column) is an absorbing state and few other shifts are observed.

# 4 Theory and Empirical implementation

## 4.1 Theory

Family retirement is viewed as an outcome of a cooperative bargaining process, as in Mastrogiacomo, Alessie, and Lindeboom (2002). The expected present discounted value of life time family utility is maximised subject to a life time budget constraint. More specifically, define $U_t^h = U^h(l_t^h, y_t^h, l_t^p, y_t^p)$ as the per period utility flow of the husband at time $t$. $U_t^h$ depends on his/her own income ($y_t^h$) and labour supply ($l_t^h$) and on the wife's income and the labour supply ($y_t^p$ and $l_t^p$, respectively). Similarly, $U_t^p = U^p(l_t^p, y_t^p, l_t^h, y_t^h)$ can be defined as the per period utility flow of the wife. Wages are denoted by $w_t^k$, whereas retirement benefits are denoted by $b_t^k(R)$, $k = h, p$. In the definition of the retirement benefit, it is reflected that both the level and the time path of the benefit may depend on the time that the benefits are collected for the first time (the retirement date $R$ ). We exclude the possibility of part-time work, so $l_t^k$ is either zero or one, $k = h, p$. Hence $w_t^k$ refer to full-time wages and $y_t^k = w_t^k$ if $l_t^k = 1$ and $y_t^k = b_t^k(R)$, if $l_t^k = 0$, $k = h, p$. We also assume that family utility ( $U_t$) is a weighted average of the individual utility flows, i.e. $U_t = \lambda U_t^h + (1-\lambda)U_t^p, 0 \leq \lambda \leq 1$.

In case we assume absence of savings then the optimal path of family labour supply, $l_t^h, l_t^p, t = 0, .., \max\{T^h, T^p\}$, follows from:

$$E_t \sum_{t=0}^{T_{\max}} \rho^t U\left(l_t^h, y_t^h, l_t^p, y_t^p; \lambda\right) =$$

$$E_t\{\sum_{t=0}^{T^h} \lambda \rho^t U^h(l_t^h, y_t^h, l_t^p, y_t^p) + \sum_{t=0}^{T^p} (1-\lambda)\rho^t U^p(l_t^p, y_t^p, l_t^h, y_t^h)\} \qquad (1)$$

In this expression $\rho$ is a discount factor that is taken as common to the wife and husband. We implicitly substitute the wage and benefit paths associated with optimal paths of family labour supply. In this way the family (life time) budget constraint is acknowledged. Note that non-separability in the lifetime budget constraint between future consumption and current labour supply decisions, which complicates the optimisation problem, is introduced as both the level and the time path of the benefits depend on the timing of retirement. The variable $T_{\max}$ represents the planning horizon and is defined as $\max\{T^h, T^p\}$. $T^h, T^p$ are the individual planning horizons of the husband and the wife respectively. We will take the planning horizon as the number of periods remaining up to the age of retirement. In the next subsection we will show that differences in the planning horizon of husbands and wives can be used to identify the most of the underlying structural parameters of the model.

In the previous section it was concluded that retirement could be viewed as an absorbing state as there is virtually no return to work out of the non-working states. When imposed on our maximisation problem, we can make expression 1 more explicit as a problem for the choice of the optimal date of retirement for husband ($R^h$) and the wife ($R^p$):

$$\underset{R^h,R^p}{Max} E_t\{\sum_{t=0}^{R^h-1}\lambda.\rho^t U^h\left(1,w_t^h,l_t^p,y_t^p\right)+\sum_{t=R^h}^{T^h}\lambda.\rho^t U^h\left(0,b_t^h(R^h),l_t^p,y_t^p\right)+$$
$$\sum_{t=0}^{R^p-1}(1-\lambda).\rho^t U^p\left(1,w_t^p,l_t^h,y_t^h\right)+\sum_{t=R^p}^{T^p}(1-\lambda).\rho^t U^p\left(0,b_t^p(R^p),l_t^h,y_t^h\right)\} \quad (2)$$

The optimisation problem for a OE household follows directly by only modelling the husband labour participation choice[19].

## 4.2 Empirical implementation

To allow for heterogeneity in retirement patterns, observed ( $X_{it}^k$ ) and unobserved characteristics $\mu_{it}^k$ may enter the individual utility functions of both husband and wife, $U^k(l_{it}^h, y_{it}^h, l_{it}^p, y_{it}^p; X_{it}^k, \mu_{it}^k) = \overline{U}^k(l_{it}^h, y_{it}^h, l_{it}^p, y_{it}^p, X_{it}^k) + \mu_{it}^k$. We will assume that $\mu_{it}^k$ can be decomposed in a time constant individual specific

[19] The case where $\lambda = 1$ is used (implicitly or explicitly) in the larger part of the studies on individual retirement behaviour.

term $\pi_i^k$ and an idiosyncratic shock $\varepsilon_{it}^k$, $\mu_{it}^k = \pi_i^k + \varepsilon_{it}^k$, $\pi_i^k \perp \varepsilon_{it}^k$ , $k = h, p$. The time constant individual terms $\pi_i^h$ and $\pi_i^p$ may represent, possibly related, unobserved preferences for work of the husband and wife, respectively. It is reasonable to assume that $\pi_i^h$ and $\pi_i^p$ are known to the individuals but not to researcher. The idiosyncratic shocks $\varepsilon_i^h$ and $\varepsilon_{it}^p$ are independently and identically distributed random variables. They are included to represent uncertainty regarding future retirement options or uncertainty with respect to the time path of other variables that are of relevance for the retirement decision. In line with the literature we assume that the agent knows the value of the current drawings from $\varepsilon_{it}^h$ and $\varepsilon_{it}^p$, but that there is uncertainty regarding future values of these random variables.

The above implies that there is room for updating previous decisions regarding retirement and that the optimisation problem 2 can be written as a per period comparison of the value functions associated with the different alternatives. More specifically, for the situation that both family members are employed, the value of continued work for both the wife and the husband, $V_t(l_t^h = 1, l_t^p = 1; \lambda) = V_t(1, 1; \lambda)$, equals:

$$V_t(1,1;\lambda) = U\left(1, w_t^h, 1, w_t^p; \lambda\right) + \rho E_t \max\{V_{t+1}(1,1;\lambda), V_{t+1}(1,0;\lambda), V_{t+1}(0,1;\lambda), V_{t+1}(0,0;\lambda)\} \tag{3}$$

and

$$V_t(1,0;\lambda) = U\left(1, w_t^h, 0, b_t^p; \lambda\right) + \rho E_t \max\{V_{t+1}(1,0;\lambda), V_{t+1}(0,0;\lambda)\} \tag{4}$$

$$V_t(0,1;\lambda) = U\left(0, b_t^h, 1, w_t^p; \lambda\right) + \rho E_t \max\{V_{t+1}(0,1;\lambda), V_{t+1}(0,0;\lambda) \tag{5}$$

$$V_t(0,0;\lambda) = U\left(0, w_t^h, 0, b_t^p; \lambda\right) + \rho E_t\{V_{t+1}(0,0;\lambda) \tag{6}$$

The value function associated with a specific action depends on the current per period utility associated with that action and optimal future behaviour taking uncertainty into account. Note that, in line with the absorbing state assumption, the number of elements in the $E_t max\{.\}$ terms reduce

when one or more of the family members are out of work. A family with a husband and wife both at work at time $t$,remain in their state if $V_t(1,1;\lambda) = \max\{V_t(1,1;\lambda),\ V_t(1,0;\lambda),\ V_t(0,1;\lambda),\ V_t(0,0;\lambda)\}$.The husband stops working and the wife remains at work if $V_t(1,0;\lambda) = \max\{V_t(1,1;\lambda),\ V_t(1,0;\lambda),\ V_t(0,1;\lambda),\ V_t(0,0;\lambda)\}$ etc.

Finally, labour supply choices for families in different situations follow accordingly, for instance, $\max\{V_t(1,0;\lambda),\ V_t(0,0;\lambda)\}$ is of relevance for the labour supply choices of a family with a working husband and a non-working wife. If $\varepsilon_{it}^h$ and $\varepsilon_{it}^p$ are taken as independently and identically distributed extreme value type I distributed random variables, then closed form solutions for the optimisation problem exists.

For instance, if we write $V_t(.,.;\lambda) = \overline{V}_t(.,.;\lambda) + \varepsilon,\ \ \varepsilon \backsim EVI$, [20] then, $E_t \max\{V_{t+1}(1,1;\lambda), V_{t+1}(1,0;\lambda),\ V_{t+1}(0,1;\lambda),\ V_{t+1}(0,0;\lambda)\}$ equals:

$\gamma + \ln\{\overline{V}_{t+1}(1,1;\lambda) + \overline{V}_{t+1}(1,0;\lambda) + \overline{V}_{t+1}(0,1;\lambda) + \overline{V}_{t+1}(0,0;\lambda)\}$, with $\gamma$ as Euler's constant (Rust 1989) and a family with both members at work at time $t$ will still have both members at work at time $t+1$ with probability:

$$\frac{\exp\{\overline{V}_t(1,1;\lambda)\}}{\exp\{\overline{V}_t(1,1;\lambda)\} + \exp\{\overline{V}_t(1,0;\lambda)\} + \exp\{\overline{V}_t(0,1;\lambda)\} + \exp\{\overline{V}_t(0,0;\lambda)\}} \tag{7}$$

Probabilities like these will form the basis of the likelihood function. Identification of the preference parameters in $\overline{V}_t(1,1;\lambda)$ requires us to be more explicit about the specification of the individual utility functions. For a husband of the household we specify:

$$U_t^h = \alpha_{1h}^h y_{it}^h + \alpha_{2h}^h l_{it}^h + \alpha_{2p}^h l_{it}^p + \alpha_{3h}^h l_{it}^h y_{it}^h + \alpha_{3p}^h l_{it}^p y_{it}^p + \alpha_4^h y_{it} + \pi_i^h + \varepsilon_{it}^h \tag{8}$$

The utility function for the wives ($U_t^p$) is specified similarly, with parameters $\alpha_{jp}^p, j = 1,..,4$ and $\alpha_{mh}^p, m = 2,3$ and random variables $\pi^p$ and $\varepsilon_t^p$. The

[20] If both $\varepsilon^h$ and $\varepsilon^h$are independent and identically distributed as an extreme value type I distribution, then so is the weighted sum. Note furthermore that$\overline{V}_t(.,.;\lambda)$ still includes $\mu^h$ and $\mu^p$ and that these random variables need to be integrated out of the likelihood function.

variable $l_{ht}.y_{ht}$ is included to allow for different marginal utility of income for workers and non-workers. $l_{pt}.y_{pt}$ and $l_{pt}$ are included to allow for a direct effect of the spouses labour supply decision. Income or consumption sharing is captured by the effect of $y_t = y_{ht} + y_{pt}$. In the empirical application we will also include a set of taste shifters $X_t^k$ to the specification of $U_t^k$[21].

This specification leads to 13 parameters of interest $\alpha_{jp}^p, j = 1, .., 4$ and $\alpha_{m2}^p, m = 2, 3$ plus $\alpha_{jh}^h, j = 1, .., 4$ and $\alpha_{mh}^h, m = 2, 3$ and the bargaining parameter $\lambda$. It is not possible to identify the bargaining parameter $\lambda$ separately. We can, however, with information on differences in the planning horizon, identify all the $\alpha$ parameters, up to a scale factor $\lambda$. Next, for $t < T_{\min} = \min\{T^p, T^h\}$, the difference between $V_t(1, 1; \lambda)$ and $V_t(1, 0; \lambda)$ identifies $(1 - \lambda)\,\alpha_{1p}^p$, $(1 - \lambda)\,\alpha_{2p}^p$, $(1 - \lambda)\,\alpha_{2p}^p$. The difference between $V_t(1, 1; \lambda)$ and $V_t(0, 1; \lambda)$ identifies $(1 - \lambda)\alpha_4^p$, $(1 - \lambda)\,\alpha_{2h}^p$ and $(1 - \lambda)\,\alpha_{3h}^p$. As such this information alone appears not be sufficient to identify all underlying parameters. Family utility is maximized over the relevant optimization period ( $T^h$ or $T^p$) of the individual members of the family (cf 1). For the case that $T^h > T^p$, $T^p < t < T^h$changes from work to non-work identify $\lambda\alpha_{1h}^h, \lambda\alpha_{2h}^h$ and $\lambda\alpha_{3h}^h$. Similarly, for $T^h < T^p$, $T^h < t < T^p$,changes out of work identify $\lambda\alpha_4^h, \lambda\alpha_{2p}^h$ and $\lambda\alpha_{3p}^h$. Note, that implies that we can not use differences in age (planning horizon) as an additional taste shifter in the family utility function [22].

$\overline{V}_t(i, j; \lambda), i, j \in \{0, 1\}$ is recursively defined and estimation of the full structural model requires calculation of these functions in each step of the optimisation procedure. This may be quite cumbersome in practical situations, even if we take retirement as an absorbing state. Fortunately, specifics of the Dutch institutions allow us to simplify the calculation of $\overline{V}_t(i, j; \lambda), i, j \in \{0, 1\}$ considerably. As documented in section 2, in Italy the age at completed seniority considered the normal retirement age for an average worker. If full seniority is not reached before age 65 than this may be considered a normal retirement age since welfare subsidies might be collected after that age. On the other hand the heterogeneity among employer provided pension regulations might allow for early retirement. This information is not available in our data, i.e. it is unknown to the researcher, but it might be known to the respondent and incorporated in the expected retirement age.

[21] For now one could assume these to be included in $\pi_i^k$.

[22] Alternatively, one could exploit the differences in life expectancy of husbands and wife as the source of identifying information.

Full seniority age and planned retirement age are both benchmark ages that we will test on our model. Given the above, family retirement probabilities are simple (multinomial) logits, like 7, where the (utility) value of continued work for the family members is replaced by the (utility) value of working up to the benchmark age. The preference parameters follow from straightforward maximisation of the likelihood function. Results of the model are in the next section. We first have to make a couple of additional remarks before we return to the results.

Firstly, we observe four different retirement states for a two person household (dually employed) at the initial wave of our sample. Both the husband and the wife could be at work, one of them could be out of work and the other at work and both could be out of work. We view retirement as an absorbing state which makes the latter case as the least interesting[23]. Furthermore, with respect to families where only one member is at work, the typical traditional Italian elderly household consist of a working husband and a non-working wife. As a consequence we observe only a few households (about 180), where the wife is at work and the husband not. We will therefore pool these groups together in our empirical analyses, thereby allowing for some flexibility in the specification to distinguish between the two different types of households.

A natural way to deal with this kind of information in the likelihood function is to model the probability that the household is observed in a particular state at the date of selection along with the process of transitions between alternative states. We choose to condition on the labour market state that a family was observed to be in at the initial wave and estimate separate models for different types of household (i.e. a different model for two member households where both are at work, and a model for two member households where only one member is at work). It is clear that we have to interpret the results, taking this conditioning into account[24].

Secondly, wage and benefit information is required to calculate the ex-

[23]This is supported by the data (see section 3).

[24]We feel that it is less stringent as it may appear at first. A substantial part of the elderly household is of the traditional type, where the man works and the female wife does not work and has never worked. One may argue that this is a behaviorally very distinct from the family where both male and female have a career. Furthermore, in the alternative case, where we explicitly take account of the initial condition problem, results will still depend on assumptions required to justify this approach (see for instance Heckman, Manski, and McFadden (1981)). Finally, note that it is not uncommon to follow such a procedure. Many studies condition on families where both are at work (e.g. Gustman and Steinmeier (2000), Christensen and Gupta (1994)).

pected utility streams associated with the different retirement ages. We used the SHIW sample to estimate earning profiles for workers aged 50 years and older. After correction for cohort effects, no additional time effect remained. We therefore used the wage observed at the first wave as the individual wage measure and assumed it to be constant (in real terms) thereafter[25]. Pension at the retirement full seniority age is calculated on the basis of the observed wage and experience and are calculated for each individual in the sample. With respect to the benefit variables, the SHIW data consist of a random sample from Italian households. Therefore it is not specifically designed for the analyses of labour market behaviour of the elderly (such as for instance the HRS survey). As a consequence of this, the data set lacks specific information on the details of the firm specific early retirement schemes.

# 5 Results

The estimation results for the one earner couples (OE) and the two earners couples (TE) are presented respectively in tables 9 and 10. In this section we discuss these tables by showing the most relevant outcomes of our models.

In table 9 the reference case is non-participation. It is organized as follows. Two models are estimated, Model 1 (on the left panel) includes all the parameters described in section 4, that are pertinent for OE households, when retirement will occur at the age of completed seniority. In the panel on the right we report Model 2, based on planned retirement age. The table lists in the upper panel the taste shifters and in the lower panel the preference parameters and other variables, like the variance of the random effect.

As already noted in section 4, the seven preference parameters $\alpha^h_{1h}$, $\alpha^h_{2h}$, $a^h_{3h}$, $\alpha^p_4$, $\alpha^p_{2h}$, $\alpha^p_{3h}$ and $\lambda$ are identified up to a scale (bargaining) factor $\lambda$. The parameters with superscript "$h$" ("$p$") appear in the utility function of the husband (wife) (cf. equation 8)[26]. The parameter $\alpha^h_{1h}$ represents the husband's marginal utility of his own income and $\alpha^p_4$ the marginal utility of household income as perceived by the wife. The parameter $\alpha^h_{2h}$ measures the

[25] This is very much in line with the Italian context, where severe wage cuts are very uncommon at the advanced ages. See appendix.

[26] In section 4 it is noted that the TE model contains 13 preference parameters and not 7 parameters as in the OE model. In the OE model, the wife is out of the labour force (OLF). Since OLF is an absorbing state, the 6 remaining preference parameters are not identified in the OE model.

marginal husband's disutility of work whereas $\alpha^p_{2h}$ is the wife's utility of the husband's participation. We expect that $\alpha^h_{1h} > 0$,$\alpha^h_{2h} < 0$,$\alpha^p_4 > 0$,$\alpha^p_{2h} < 0$ and $0 \leq \lambda \leq 1$ and,consequently,$(1-\lambda)\,\alpha^p_4 > 0$, $(1-\lambda)\,\alpha^p_{2h} < 0$, $(1-\lambda)\,\alpha^p_{3h} > 0$, $\lambda\alpha^h_{1h} > 0$, $\lambda\alpha^h_{2h} < 0$, $\lambda\alpha^h_{3h} > 0$. Without any differences in the planning horizon, only $(1-\lambda)\,\alpha^p_4$, $(1-\lambda)\,\alpha^p_{2h}$ and $(1-\lambda)\,\alpha^p_{3h}$ are identified. The variation in planning horizon allows us in addition to identify the remaining parameters of the model ($\lambda\alpha^h_{1h}$, $\lambda\alpha^h_{2h}$, $\lambda\alpha^h_{3h}$).

As it is evident the most significant results are obtained using the model with planned retirement age. In the left panel all preference parameters have the expected sign beside $(1-\lambda)\,\alpha^p_{2h}$. Among them $(1-\lambda)\,\alpha^p_{3h}$ and $\lambda\alpha^h_{1h}$ are significantly different from zero. This is the case also for Model 2. In the right panel all the signs follow our expectations.

The estimation results of the TE model are discussed in table 10. There the reference case is the both employed status[27]. Again, the left hand panel presents the parameter estimates of the model with completed seniority, while the right hand panel contains results for the model with planned retirement age. In line with the OE model, table 10 suggests that Model 2 has a better fir than Model 1. Indeed all preference parameters in Model 1 are not significantly different from zero. We therefore discuss only the estimation results of the model with planned retirement age. The parameters $(1-\lambda)\,\alpha^p_{1p}$ , $\lambda\alpha^h_4$, $(1-\lambda)\,\alpha^p_{2p}$, $\lambda\alpha^h_{2p}$, $(1-\lambda)\,\alpha^p_{3p}$ and $\lambda\alpha^h_{2p}$ do not appear in the OE model but they do in the TE model. Together with the parameters already introduced in the previous table, they describe the preference structure of the household. Seven parameters have the correct sign namely $(1-\lambda)\,\alpha^p_{2h}$, $(1-\lambda)\,\alpha^p_{3h}$, $\lambda\alpha^h_{3h}$, $\lambda\alpha^h_{4h}$, $\lambda\alpha^h_{3p}$, $(1-\lambda)\,\alpha^p_{2p}$, $(1-\lambda)\,\alpha^p_{3p}$. Of these only the last two are also significant. They both refer to the utility function if the wife; $(1-\lambda)\,\alpha^p_{2p}$ represents the utility she derives from leisure while $(1-\lambda)\,\alpha^p_{3p}$ represents the non separability between income and leisure in her utility function. What is interesting to notice is that no one of the parameters describing the interaction between the utility function of one spouse and the underlying parameter of the other, is actually significant.

Among the taste shifters we see that the presence of dependent children increases the probability of employment in OE households, as well as the presence of a wife with intermediate education in the TE household. This indicates that, *ceteris paribus*, educated women tend to have husbands that

[27] In tables 9 and 10 we took care of making the signs of the taste shifters comparable though the reference cases are different.

are employed at older ages. The other taste shifters do not contribute significantly to the explanation of the labour participation decision of the couples.

Given the above, we feel confident to use the estimation results of our models, for both groups, to perform some simulations. Especially for Model 2 that had a better fir for both household types. We aim to decompose the observed differences in retirement trends of husbands of the different demographic subgroups into differences in preferences and differences in the availability and generosity of the retirement options. We report an Oaxaca decomposition (see table 11) of the hazard rate for the husband across the different household types[28] and model incentives. The table confronts the effects of parameters and characteristics in the hazard.

In the first two columns, that is the left panel of the table, we use the results of the two models for TE households. The combination of model results and incentive variables for both models returns, obviously, the same results with a participation probability for the husband of 83%. When we combine the estimates of Model 2 with the incentive variables generated by full seniority (Model 1) the participation probability decreases to 81%. This increment in the hazard (1- 83%) for the husband in TE households indicates that, given the preferences described by their expectations, they would be more incline to retire if they were offered the retirement options available at full seniority. The other combination, in the lower cell of the first column, describes properly the hazard of the wife (10%) but transforms completely the picture for the husband, with a participation probability of 39%. This is possibly due to the lower significance of Model 1 preference parameters.

The last two columns, the right panel, referring to the OE household, only describe the participation probability of the husband. Again the upper left and the lower right cell produce the participation probability, while the off diagonal cells contain the combinations. When the prediction of Model 2 are combined with the incentive variables of model one the hazard rate diminishes from 24% to 17%. The opposite combination instead returns an hazard increasing to 32%. This means that the combination of the preferences described by the planned retirement age and the options at full seniority make the OE husband more likely to participate. The contrary happens when the outcomes of Model 1 are used.

[28] Random components are set to zero for the computations in this table.

# 6 Summary and Conclusions

Large variations are observed in the retirement patterns of different types of married households in Italy. In addition planned retirement age and age of completed seniority (approximated by experience) diverge considerably. We have shown that it may be wrong to consider this divergence exclusively as the result of individual poor planning. This paper focussed on the relative importance of differences in behavioural responses of the different types of households to financial incentives, when those are built on two different planning horizons. The first is the institutional-based age of completed seniority, the second is the individual based retirement age. We specify dynamic models for family retirement behaviour that acknowledge the institutional features of the Italian social security and the pension system. We show that all model parameters are identified up to a scale factor. The models are estimated on the Bank of Italy panel. We find that the model with expectations of future retirement age have a better fit in our simulated maximum likelihood analysis. Model estimates are used to decompose the observed differences in retirement trends of heads of the different subgroups into differences in preferences and differences in the availability and generosity of the retirement options.

The empirical results can be summarised as follows:

- In general, we have obtained rather plausible estimation results for the most interesting parameters.
- There is considerable differences in the retirement behaviour of husband and wife. Namely non separability of income and leisure is a significant element in the utility function of wives.
- The husband of OE and TE couples show heterogeneous behavioural responses. Namely the hazard rate of TE husbands increases when using the model with expectations and the institutional incentives and decreases when combining the model with seniority and the expected incentives. For the OE head the opposite worth.
- Differences in incentive variables across household types mainly contribute in the explanation of observed differences in retirement behaviour.

- Variation in preference parameters also clearly contributes to the explanation of differences in retirement behaviour within the household and across different household types.

This may contribute to show how family circumstances are related to retirement behaviour. Though not all parameters describing the interaction between spouses were significant, our strategy has relied on an underlying bargain process to identify all parameters. The recent pension reforms in Italy have tried to harmonize the institutional rules across sectors and genders. This paper tries to bring about an argument to show how differences in household arrangements might also generate heterogeneous behaviours towards retirement.

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# Appendix

The Italian pension formula used in this paper refers to the earnings related system. It is based on 3 main elements: seniority, the rate of return and income.

*Seniority and planned retirement age*

Experience is used as a proxy for seniority. It is derived form the question "at what age did you start working?". There are a number of circumstances that might make this information a bad proxy of seniority. Seniority could indeed be over estimated if the individual experienced some spells of unemployment. Experience could also account for spells of work in the irregular sector, that do not increase seniority. On the other hand seniority could also be underestimated, and this is mostly the case for those exchanging part of their education with seniority in their social security files, against payment of some pension premiums. This is why in this paper we do not only use full seniority as a benchmark for the individual but also his planned retirement age[29], that might include information about the deviations between experience and seniority. The distribution of their difference is depicted in figure A1.

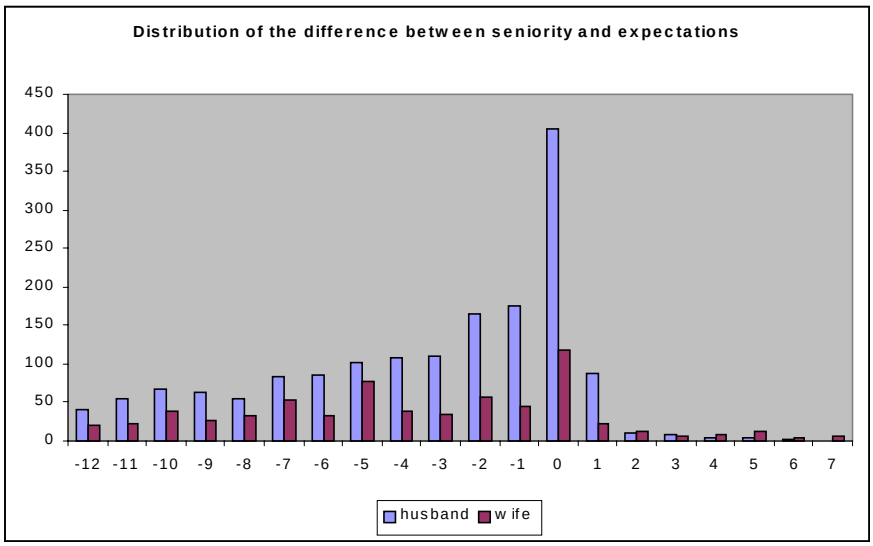


Figure A1

[29] This derived from the question: "at what age do you expect to retire?"

Approximately 50% of the husbands participating into the panel and 40% of the wives, report a difference of up to two years. If we think that the distance between seniority and expectations may depend on a bad planning activity, it is hard to apply this explanation to the 50% of the sample that reports a distance of 3 years or larger. Furthermore the vast majority of those missing the correspondence between the year in which they are planning to retire and in which they "should" retire according to seniority rules reports an age of planned retirement larger than seniority age[30].

*Rate of return*

The rate of return used in our computations follows the scheme below.

Table A1: Rate of return in the pension formula.

| Rate of return | If yearly wage |
|---|---|
| 2% | <33714.31 Euro |
| 1,5% | >33714.31 and <44840.03 Euro |
| 1,25% | >44840.03 and <55965.75 Euro |
| 1% | >55965.75 Euro |

The combination between seniority and the rate of return determines the replacement rate. To check the consistency of the imputation of the replacement rates we use the ones computed by Miniaci (1998) as a lower bound.

*Income*

Income is considered constant over time. This is supported by the empirical analysis of income for different cohort of individuals in the sample.

[30]If we eliminate the "bad planners" and look at the evolution of expectations over time we see that these are less stable over time. This means that "bad planners" are more likely to report the same expected retirement age over time. Computations are available on request.


Figure A2: Income over age for different cohorts. Average cohort year of birth is reported for each segment. Observations 2075. Source: SHIW, own computations.

Each cohort shows no clear cut income profile. This analysis supports our assumption of constant earnings.

# Figures and Tables

Table 1. Marital status over time per cohort

| Year of | Married | | | | (Obs = 19120) | Singles | | | | (Obs = 738) |
|---|---|---|---|---|---|---|---|---|---|---|
| birth | 1989 | 1991 | 1993 | 1995 | 1998 | 1989 | 1991 | 1993 | 1995 | 1998 |
| 1949 | | | | | 89.3% | | | | | 3.5% |
| 1944 | | | 91.4% | 92.5% | 91.0% | | | 3.5% | 2.8% | 2.9% |
| 1939 | 93.4% | 90.0% | 89.3% | 88.8% | 87.7% | 2.3% | 3.8% | 3.2% | 3.2% | 2.9% |
| 1934 | 91.9% | 87.9% | 83.0% | 82.8% | 82.6% | 2.6% | 3.5% | 3.8% | 3.3% | 3.9% |
| 1929 | 86.5% | 83.1% | 77.6% | 79.9% | | 3.8% | 4.2% | 5.3% | 1.9% | |
| 1924 | 80.6% | | | | | 3.2% | | | | |
| | Divorced | | | | (Obs = 306) | Widow | | | | (Obs = 1701) |
| | 1989 | 1991 | 1993 | 1995 | 1998 | 1989 | 1991 | 1993 | 1995 | 1998 |
| 1949 | | | | | 3.8% | | | | | 3.3% |
| 1944 | | | 2.6% | 1.8% | 2.2% | | | 2.5% | 2.9% | 3.8% |
| 1939 | 1.4% | 1.4% | 2.1% | 1.3% | 2.1% | 2.9% | 4.8% | 5.5% | 6.8% | 7.3% |
| 1934 | 1.1% | 0.7% | 0.7% | 0.9% | 1.2% | 4.4% | 7.9% | 12.5% | 13.1% | 12.4% |
| 1929 | 0.7% | 1.3% | 1.2% | 0.1% | | 8.9% | 11.5% | 15.8% | 18.2% | |
| 1924 | 0.2% | | | | | 16.0% | | | | |

Table 1: All households with husband aged 50 to 64. Repeated cross sections, period 1984-1998. Source: SHIW, own computations.

Table2. Joint participation over time

| Year | Both employed | Only husband employed | Only wife employed | Both out of the labour force | Observations |
|---|---|---|---|---|---|
| 1989 | 20% | 46% | 4% | 30% | 2054 |
| 1991 | 19% | 42% | 5% | 33% | 1992 |
| 1993 | 18% | 41% | 8% | 33% | 1863 |
| 1995 | 19% | 37% | 8% | 35% | 1872 |
| 1998 | 22% | 34% | 9% | 35% | 1742 |
| Observations | | | 9523 | | |

Table 2: Repeated cross sections, period 1989-1998. Source: SHIW, own computations.

| Table3. Household Labour Participation | | |
|---|---|---|
| Year | Husband | Wife |
| 1989 | 66.2% | 24.3% |
| 1991 | 61.6% | 24.4% |
| 1993 | 58.8% | 26.1% |
| 1995 | 56.2% | 27.4% |
| 1998 | 55.9% | 31.2% |
| Observations | 9523 | |

Table 3: Repeated cross sections period 1989-1998. Source: SHIW, own computations.

| Table 4. Husband labour participation conditional on wife participation | | | |
|---|---|---|---|
| Age of the husband | If wife employed | If wife out of the labour force | Obs |
| 50 | 92% | 89% | 713 |
| 51 | 94% | 87% | 722 |
| 52 | 84% | 81% | 750 |
| 53 | 81% | 80% | 678 |
| 54 | 78% | 76% | 714 |
| 55 | 74% | 71% | 677 |
| 56 | 69% | 64% | 671 |
| 57 | 66% | 55% | 607 |
| 58 | 62% | 50% | 619 |
| 59 | 61% | 46% | 581 |
| 60 | 55% | 36% | 590 |
| 61 | 50% | 25% | 621 |
| 62 | 51% | 29% | 520 |
| 63 | 38% | 19% | 546 |
| 64 | 52% | 20% | 514 |
| Observations | 2529 | 6994 | 9523 |

Table 4: Repeated cross section period 1989-1998. Source: SHIW, own computations.

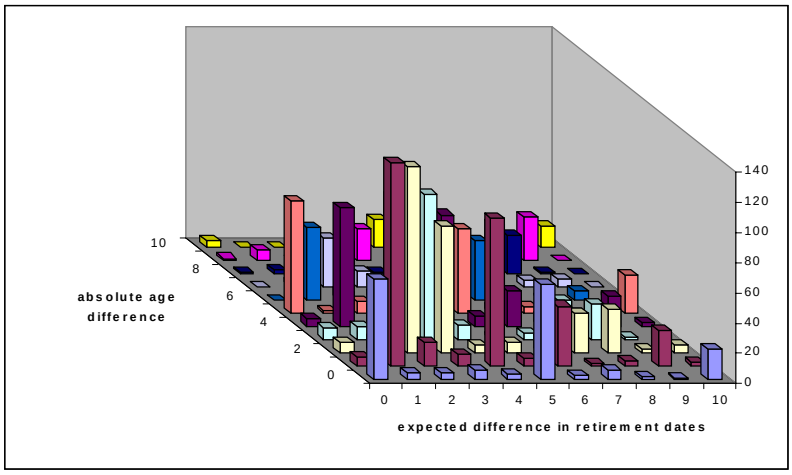


Figure 1: Distribution of expected time to joint retirement for couples with husband and wife employed. Period 1989-1998, repeated cross sections. Source: SHIW, own computations.

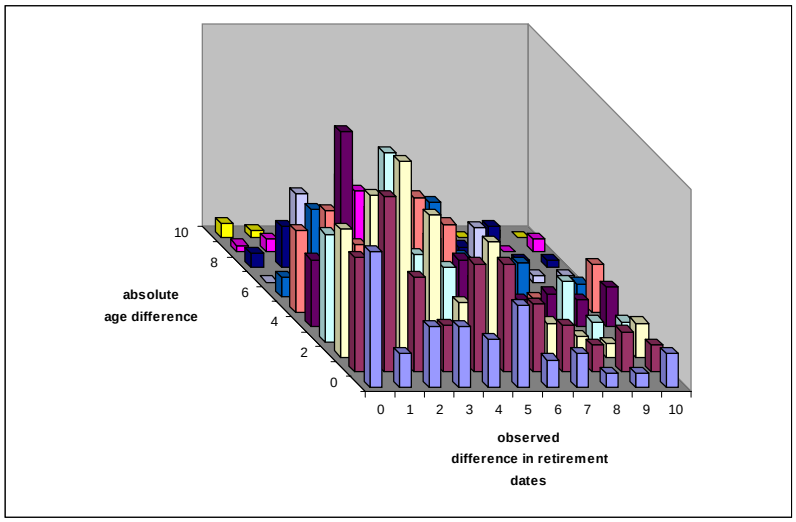


Figure 2: Distribution of observed differences in retirement dates and age difference. Observations: 978, repeated cross sections. Source: SHIW, own computations.

| Table 5: Share of actual retires on the total of expected | |
|---|---|
| Husband | 60% |
| Wife | 41% |
| Obs | 231 |

Table 5: Panel data with short run retirement expectations (within following wave). Source: SHIW, own computations.

| Table 6. Change in expectations between waves | | | | |
|---|---|---|---|---|
| | Husband | | | |
| | 1989-1991 | 1991-1993 | 1993-1995 | 1995-1998 |
| Expect to retire earlier | 20% | 21% | 25% | 16% |
| Expect to retire at the same time | 51% | 48% | 41% | 36% |
| Expect to retire later | 29% | 30% | 34% | 48% |
| Obs | 319 | 468 | 401 | 330 |
| | Wife | | | |
| | 1989-1991 | 1991-1993 | 1993-1995 | 1995-1998 |
| Expect to retire earlier | 29% | 16% | 25% | 13% |
| Expect to retire at the same time | 48% | 47% | 45% | 46% |
| Expect to retire later | 24% | 37% | 30% | 40% |
| Obs | 101 | 206 | 196 | 178 |

Table 6: Panel data period 1989-1998. Source: SHIW, own computations.

Table 7. Expected versus actual joint participation

| Actual joint participation | Expected joint labour participation: Both employed | Only husband employed | Only Wife employed | Both out of the labour force |
|---|---|---|---|---|
| Both employed | 82% | 5% | 24% | 1% |
| Only husband employed | 11% | 83% | 1% | 14% |
| Only wife employed | 6% | - | 64% | 3% |
| Both OLF | 1% | 11% | 10% | 81% |
| Total | 331 | 809 | 227 | 907 |

Table 7: Repeated cross sections, period 1989-1998. Source: SHIW, own computations.

Table 8. Transition rates trough household labour participation states

| *Participation after one year* | *Original labour market status of couples*: Both employed | Only husband employed | Only wife employed | Both out of the labour force |
|---|---|---|---|---|
| Both employed | 68.4% | 3.2% | 4.4% | 0.2% |
| Only husband employed | 12.5% | 72.8% | 0.6% | 4.2% |
| Only wife employed | 14.6% | 0.6% | 71.7% | 1.1% |
| Both OLF | 4.5% | 23.4% | 23.3% | 94.5% |
| Obs | 554 | 1088 | 180 | 620 |

Table 8: Legend: OLF= out of the labour force. Panel data analysis period 1989-1998. Source: SHIW, own computations.

Table 9. Estimation results for One Earner couples

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | estim | t-values | estim | t-values |
| Constant term | -0.50 | -1.45 | -0.29 | -0.92 |
| *Taste shifters* | | | | |
| Year 93 | -0.19 | -0.79 | -0.19 | -0.86 |
| Year 95 | -0.58 | -2.36 | -0.68 | -3.14 |
| Year 98 | -0.68 | -2.59 | -0.85 | -3.60 |
| Dependent children | 0.20 | 2.53 | 0.18 | 2.60 |
| Head intermediate education | -0.10 | -0.50 | 0.19 | 0.99 |
| Head secondary education | 0.21 | 0.83 | -0.22 | -0.95 |
| Head higher education | 0.37 | 0.83 | 0.09 | 0.20 |
| Partner intermediate education | 0.27 | 1.27 | 0.13 | 0.66 |
| Partner secondary education | 0.14 | 0.45 | 0.48 | 1.64 |
| Partner higher education | 0.21 | 0.37 | 0.47 | 0.93 |
| *Preference Parameters* | | | | |
| $(1-\lambda)\,\alpha_4^p$ | 0.06 | 0.61 | 0.01 | -0.04 |
| $(1-\lambda)\,\alpha_{2h}^p$ | 0.05 | 0.13 | -0.20 | -0.17 |
| $(1-\lambda)\,\alpha_{3h}^p$ | 0.08 | 3.82 | 0.09 | 4.76 |
| $\lambda\alpha_{1h}^h$ | 0.65 | 2.65 | 0.77 | 2.91 |
| $\lambda\alpha_{2h}^h$ | -0.71 | -1.52 | -0.53 | -0.46 |
| $\lambda\alpha_{3h}^h$ | 0.07 | 1.58 | 0.06 | 0.52 |
| $\sigma_\pi^2$ | 0.29 | 0.28 | 0.01 | 0.10 |
| Log likelihood | -597.089 | | -590.28 | |
| Observations | 1214 | | | |

Table 9: Reference case : out of the labour force. For the time dummies the reference case is year 1989. For education the reference case is elementary education. Simulated maximum likelihood with 150 random draws. The random effect has variance sigma square. Source: SHIW, own computations.

Table 10. Estimation results for two earners couples

| | Model 1 | | | | Model 2 | | | |
|---|---|---|---|---|---|---|---|---|
| | Only husband employed | | Only wife employed | | Only husband employed | | Only wife employed | |
| | estim | t-value | estim | t-value | estim | t-value | estim | t-value |
| Constant term | 0.35 | 0.4 | -1.07 | -0.9 | -1.07 | -1.28 | -3.34 | -1.1 |
| Taste shifters | | | | | | | | |
| Year 93 | 0.36 | 0.8 | 0.30 | 0.5 | 0.19 | 0.38 | 0.08 | 0.1 |
| Year 95 | 0.25 | 0.5 | 0.68 | 1.1 | -0.08 | -0.15 | 0.70 | 0.6 |
| Year 98 | 0.62 | 1.0 | 1.42 | 1.7 | 0.68 | 1.10 | 2.02 | 1.2 |
| Family Size | -0.02 | -0.1 | -0.19 | -0.9 | -0.06 | -0.31 | -0.28 | -0.7 |
| Husband intermediate education | 0.59 | 1.3 | 0.18 | 0.3 | 0.60 | 1.26 | 0.36 | 0.4 |
| Husband secondary education | 0.79 | 1.4 | -0.13 | -0.2 | 0.81 | 1.42 | 0.23 | 0.2 |
| Husband higher education | 0.84 | 1.0 | -2.07 | -1.6 | 0.82 | 0.88 | -3.07 | -1.0 |
| Wife intermediate education | -0.91 | -1.7 | 0.09 | 0.1 | -1.04 | -1.95 | 0.30 | 0.3 |
| Wife secondary education | -0.40 | -0.7 | 0.48 | 0.7 | -0.42 | -0.72 | 0.92 | 0.6 |
| Wife higher education | -1.21 | -1.2 | 0.66 | 0.7 | -0.94 | -0.97 | 0.86 | 0.5 |
| Preference parameters | | | | | | | | |
| $(1-\lambda)\,\alpha_4^p$ | 0.10 | | 0.4 | | -0.01 | | -0.35 | |
| $\lambda\alpha_{1h}^h$ | -0.31 | | -0.9 | | -0.71 | | -1.18 | |
| $(1-\lambda)\,\alpha_{2h}^p$ | -10.42 | | -0.7 | | -1.69 | | -0.71 | |
| $\lambda\alpha_{2h}^h$ | 10.08 | | 0.7 | | 0.23 | | 0.13 | |
| $(1-\lambda)\,\alpha_{3h}^p$ | 1.00 | | 0.7 | | 0.14 | | 0.62 | |
| $\lambda\alpha_{3h}^h$ | -0.95 | | -0.6 | | 0.04 | | 0.21 | |
| $(1-\lambda)\,\alpha_{1p}^p$ | 0.03 | | 0.15 | | -0.09 | | -0.91 | |
| $\lambda\alpha_4^h$ | -0.24 | | -0.74 | | 0.02 | | 0.93 | |
| $(1-\lambda)\,\alpha_{2p}^p$ | -0.84 | | -0.79 | | -2.16 | | -1.81 | |
| $\lambda\alpha_{2p}^h$ | 0.17 | | 0.22 | | 0.51 | | 0.61 | |
| $(1-\lambda)\,\alpha_{3p}^p$ | 0.07 | | 1.31 | | 0.13 | | 2.05 | |
| $\lambda\alpha_{3p}^h$ | 0.03 | | 0.35 | | 0.06 | | 0.68 | |
| $\sigma^2_{\pi 1,1}$ | 0.02 | | 0.1 | | 0.03 | | 0.15 | |
| $\sigma_{\pi 2,1}$ | -0.11 | | -0.2 | | -0.27 | | -0.27 | |
| $\sigma^2_{\pi 2,2}$ | 1.84 | | 0.7 | | 9.98 | | 0.57 | |
| Log likelihood | -247.81 | | | | -244.82 | | | |
| Observations | 435 | | | | | | | |

Table 10: Reference case: both employed. For the time dummies the reference case is year 1989. For education the reference case is elementary education. Simulated maximum likelihood with 70 random draws. The random effect has variance sigma square. Decomposition by delta method. Source: SHIW, own computations.

| Table 11. Oaxaca decomposition of the participation probabilities | | | | |
|---|---|---|---|---|
| | Parameters and taste shifters Model 1 TE | Parameters and taste shifters Model 2 TE | Parameters and taste shifters Model 1 OE | Parameters and taste shifters Model 2 OE |
| Incentive Variables Model 1 | $p_{1,1}$=69% $p_{1,0}$=13% $p_{0,1}$=17% | $p_{1,1}$=72% $p_{1,0}$=9% $p_{0,1}$=19% | 76% | 83% |
| Incentive Variables Model 2 | $p_{1,1}$=29% $p_{1,0}$=10% $p_{0,1}$=61% | $p_{1,1}$=69% $p_{1,0}$=13% $p_{0,1}$=17% | 68% | 76% |

Table 11: Legend:p1,1=Both employed; p1,0=Only husband employed; p0,1=Only wife employed; TE= two earners; OE= one earner. Source: SHIW, own computations.

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