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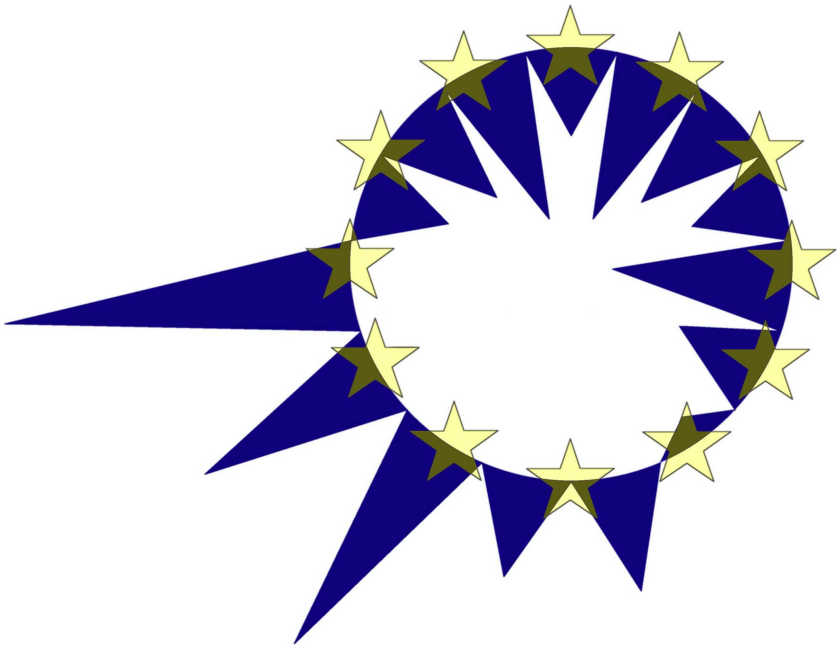

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LABOUR INCENTIVE REFORMS IN PRE-RETIREMENT AGE IN AUSTRIA

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* This paper uses EUROMOD D1. EUROMOD is continually being improved and updated and the results presented here represent the best available at the time of writing. Any remaining errors, results produced, interpretations or views presented are the authors' responsibility. EUROMOD relies on micro-data from twelve different sources for fifteen countries. This paper uses data from the Austrian version of the EU-SILC made available by Statistik Austria.

LABOUR INCENTIVE REFORMS IN PRE-RETIREMENT AGE IN AUSTRIA

Edlira Narazani
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Abstract

In view of the political debate on the future sustainability of pensions system in Austria and given the low participation of older worker in the labour market, in this paper we try to shed light on employment and retirement behaviour while a combination of reduction in pension benefits along with income support is provided. We find out that reforms characterized by moderately generous income support while working along with lower pension entitlement in early retirement yield higher social welfare compared to the current system. The labour supply response signals increase under the proposed reforms among middle-income males, in the age category 55-60, whereas these reforms seem to be ineffective for women. These findings emphasize the importance of introducing pension reforms complemented with tax-benefits policies such that the former remove the disincentives to retire earlier and the later enhance the employment of workers in pre-retirement age.

Keywords: supply, discrete choice models, guaranteed minimum income, retirement, older worker

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1. Introduction

In this paper we focus on the effect of income support schemes on the labour supply decision of older workers including the option to retire. Such a decision is not only limited to the labour market participation and hours of work supplied but also to the option of retirement, especially when early retirement schemes are available. Austria has very low labour market participation among workers close to retirement age[2]. Like in other EU countries, the labour market performance among older workers and the keeping up of their employment is a prominent issue. The ageing of the population and the necessity for reforms in the pension system has important repercussions not only for the individuals who are in the commencement of building up a work history but also for those that are finalizing it. In front of an increase of longevity and the attractiveness of the early retirement schemes the governments are inclined toward the implementation of policies that delay the retirement decision and encourage the labour market performance of older workers.

Hofer and Koman (2006) attempt to analyze the impact of public pension system to the labour market participation and retirement decision of workers close to pre-retirement age, and find that the features of the Austrian pension system provide significant incentives to retire. The continuation of participating in the labour market before retirement age is penalized by high marginal tax rates, which consequently provide significant incentives for early retirement. Keuschnigg and Keuschnigg (2004) using Austrian data show that lowering pension replacement rate and increasing the retirement age have a strong labour market effect. Ichino et al. (2007) use firm closure Austrian data and find that immediately after plant closure the old individuals have lower re-employment probabilities as compared to younger workers but latter they catch up. They conclude that increasing the retirement age does not necessarily yield individuals who are "too old to work but too young to retire".

Concerning the literature on labour supply behaviour of older workers, empirical studies using US data (Munnell et al., 2008) show that the replacement rate has a strong impact on the decision to retire. They argue that not only the availability of benefits plays

[2] According to Hefler G. (2006) in 2005, 43 percent of men and 23.5 percent of women of that age group (combined, 33 percent) were employed. In 2005, only five of the 25 member states of the European Union (EU-25) had lower participation rates.

an important role but also the level of benefit and replacement are determinant factors on the decision to retire or continue the participation in the labour market.

While there is a common agreement and political sustainability in favour of increasing the legal retirement age, other relevant reforms in the pension system, such as reductions in pension level, find more resistance. The reluctance in their implementation has produced a sort of disregard versus empirical analysis of their impact on labour supply decision of older workers.

Employment and labour supply decisions of older workers are not only an issue of participation in the labour market but also are subject to hours of work. Therefore the impact of tax-benefit regimes at the margin of labour supply has to be analyzed simultaneously. According to Saez (2000), potential labour supply responses both at intensive and extensive margin are equally crucial and the analyses of labour market decisions has to be considered at both margins when alternative tax benefits systems are implemented. In addition, he finds that an implementation of a Negative Income Tax (NIT), which is a combination of subsistence guaranteed income level along with the taxation of earnings above this level, has a strong impact on labour supply responses at the intensive margin. Nevertheless, when labour supply responses prevail at the extensive margin, tax-benefit system such as WorkFare (WF), which is basically a NIT conditional on a minimum of working hours, are found to be the proper ones. Moreover, Michaud (2004) sustains that labour market incentives policies such as in-work tax credit, implemented in some countries like UK, Netherlands, Canada and USA have had a positive effect on labour supply decisions while the extensive labour supply elasticity is more significant for low-income earners.

Analysis of tax-benefit policies aiming to maximize the utility of the older worker subject to a budget constraint on available payouts, e.g. labour income, social transfers or pension's entitlement, is the purpose of this research work. Labour supply decisions of older workers are analyzed in a general context of available income support schemes and barriers to retire. We use a micro-econometric model of labour supply to simulate the effect of four policy reforms on labour supply behaviour and income distribution of individuals above the age of 50. In particular, these reforms are based on the combination of a minimum guaranteed income scheme conditional or not in working hours (such as NIT or WF) and a reduction in accrued pensions in line with the pension reforms in 2003 and 2004 and the pension benefit modifications in 2007 which in turn are only related to

corridor pensions.[3] A corridor pension means that the individuals can benefit pension entitlements in an age corridor between 62 and 65 with a discount and between 65 and 68 with increases.

The rest of the paper is organized as follows. The next section shows some statistical background on labour market participation and hours of work decision of older workers and household income composition disaggregated by gender and age. The third section discuses the features of the microeconometric model, the dataset and the simulated reforms. The results are presented in the fourth section. The last section concludes.

2. An overview of Austrian Pension System and the data description

Empirical evidences show that many Austrians withdraw from the labour market well before reaching the statutory or even the early retirement age. Consequently, only one in three individuals aged between 55 and 64 participate in the labour market, a level significantly lower than in most other OECD countries. According to the OECD report (2005), since the mid-1990s, even though different measures are undertaken in Austria to improve labour market opportunities for older workers, the outcome for this group of population has changed very slowly and existing early retirement schemes are widely still used.[4], [5] In addition, the causes of low participation rates among older people in Austria and especially women are to be found in the structure of the social protection system in this country. In 2004, social protection expenditures accounted for 29,1% of GDP versus 27,6% in EU15 and especially expenditures in old age account for a large part of social benefits.[6]

Apparently, the experience of Austria and other EU countries indicates that the availability of early retirement schemes, the generosity either in maximum time or in benefits of disability pension seem to be the main causes of the early withdrawal of older workers from the labour market. [7] In effect, the restriction of the availability of such

[3] While, the pension reforms 2003-2004 raised benefit deductions for early retirement to 4,2% per year, the 2007 pension reform halved it to 2,1% despite the OECD policy recommendation. For a comprehensive overview of Austrian Pension system see Hofer & Koman 2006

[4] See OECD report 08/09/2005 "OECD urges Austria to do more to encourage older people to work longer" and also Zaidi, Makovec and Fuchs, 2006 "Transition from work to retirement in EU25"

[5] Even though several political initiatives have been taken to fulfil the Stockholm goals of 50% participation of older employees, the total employment rate has remained almost unchanged in the last decade.

[6] Source Eurostat-Esspros 2004 (see Table 1.1 and 1.2, Appendix 1).

[7] See OECD report 2005 "Aging and Employment policies, Austria"

schemes in Germany and UK did have a positive effect in the labour market participation of older workers. [8]

Since 2000, several pension reforms have been proposed and implemented in Austria with the aim of improving the sustainability and the actuarial fairness of the Austrian pension system. The reform in 2000 led to the abolition of early retirement due to reduced capacity to work, the gradual increase of the early retirement age by 18 months in total, up to 61,5 years for men and 56,5 years for women, the tightening of the eligibility criterion for survivors' pensions and lastly the increase of early retirement discounts to 3 accrual points per year. According to the OECD Economic Survey (2003), the regulations introduced in 2004 allow a combination of a full-time work during the first years covered by the scheme, and a cease in work entirely in the remainder of this period only if another part-time employee is recruited. [9] Also, financial support is halved without a new recruitment. This change makes it more difficult to enter "full-time" early retirement. However, the reform preserves financial incentives for those who have worked full-time to cut down their number of hours worked. Moreover, the regulations of 2003 and 2004 presume the same normal retirement age (65 for men and 60 for women) as before.

Independent from these pension regulations, due to the Austrian Supreme Court decision taken in 1993, the statutory age for women will be raised to 65 between 2023 and 2033 (respectively the corridor solution of the pension reform in 2004). The normal retirement age was 65 for men and 60 for women in 2003 and a corridor between 62 (if at least 37.5 years of insurance) and 68 for men and women. The replacement rates were set at 80% for 40 and 45 years of insurance respectively by the pension reforms of 2003 and 2004. There were also some changes related to the calculation base with the best 40 years (in 2028) of income during the insurance career in 2003 and all years of insurance in 2004. Instead, early retirement due to long insurance duration is abolished gradually until 2017 while the age for early retirement, due to the long insurance period, is increased to 60 for women and 65 for men till 2017.[10]

The pension reforms in 2003 and 2004 increase the pension discount for each year of early retirement to 4.2%, up to a maximum of 15% of the pension entitlement. In 2007, the Austrian Parliament decided to cut the discount rate for early retirement by half (from 4,2% to 2,1% for only corridor pension, for each year of early retirement).

[8] See The OECD Observer No. 212, 1998 "Retire early, stay at work?"
[9] OECD 2003- OECD Economic Surveys: Austria.
[10] See Hefler G. 2006, Labour Market participation of older people (55-64) in Austria – A background Report.

If nothing else changes, low labour market participation among elderly along with early retirement possibilities will contribute in the frailty of the pensions system in Austria. Despite the modifications of the existing pension schemes, Austria's adjustment of pension benefits for early and late retirement is still low.[11] An annual reduction of 4.2% of the access to early retirement schemes is still low compared to other OECD countries while reductions in pension benefits might harm low-income individuals unless an income support is provided by the state.

In this paper we use cross-section data from the second wave of the EU-SILC for Austria, 2004 (with income data from 2003) issued by Statistics Austria. EU-SILC is a survey on income and living conditions and intended to analyse the distributional effects of disposable household incomes and its components. The data is representative for the Austrian population and provides detailed information on income and employment status both at the household and the individual level. We have selected only married couples where both members are aged from 50 to 65 years. None of them are self-employed, employer and disabled.

In this study we have made use of EUROMOD (policy year 2003) simply for decomposing original income, which is a sum of labour income (imputed by us) and non-labour income, into its components such as net disposable income, taxes, social security contributions, family and individual benefits. We have modified the Austrian input database in EUROMOD to incorporate the working hours alternatives and generate their respective gross earnings for each couple. However we must say that in this paper, EUROMOD is used only to calculate budget sets for all the alternatives simultaneously while the tax-benefit reforms are modelled separately.

The figures 1 and 2 show the share of males and females disaggregated by age and employments status (inactive, unemployed, pensioner and employee). In the first age group 50-54, almost 90% of men work and the rest are either retired or unemployed, while 60% of women work and the others are almost inactive and very few retired. In the age group 55-60, the share of those employed decreases but more significantly for females, while the share of those classified as inactive and retired increases. Lastly, in the third age group, almost 85% of males are pensioners while the share of females in retirement is more than 60%. The employment share is respectively 11% for males and less than 4% for females while the inactivity status shows a share of 2% among males and more than 32% among

[11] Reductions in pension entitlement would be linked to lower statutory contributions, which imply lower tax rates and therefore fewer disincentives to labour market performance.

females. These empirical evidences indicate that with the increase of age, while the share of retirement status is dominating both for males and females, the employment spell reaches very low levels and the inactivity spell among females is relatively high compared to males. Eventually, these figures point out the predominance of retirement status for both men and women especially in the oldest group and the inactivity spell for women especially in the second age group (55-60). This evidence is compatible also with the UNECE statistics (Table 1.3, Appendix 1) which shows that in the age group 50-64, 85% of men are economically inactive for retirement reasons while in case of females only 64%.

Figure 1: Employment status of males segregated by age

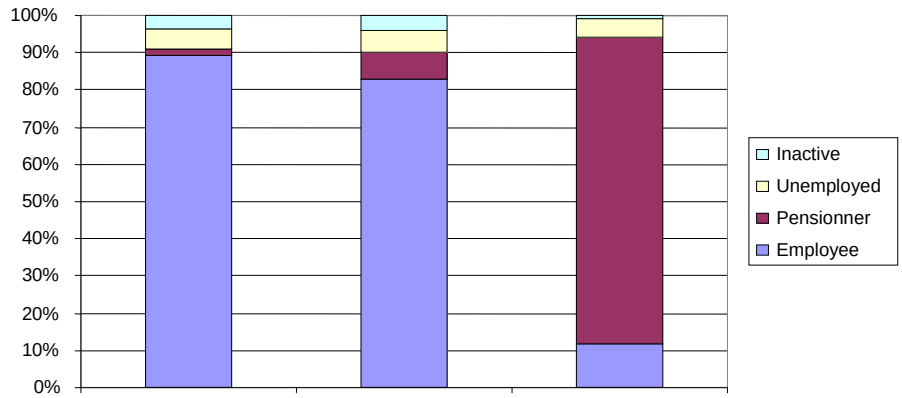
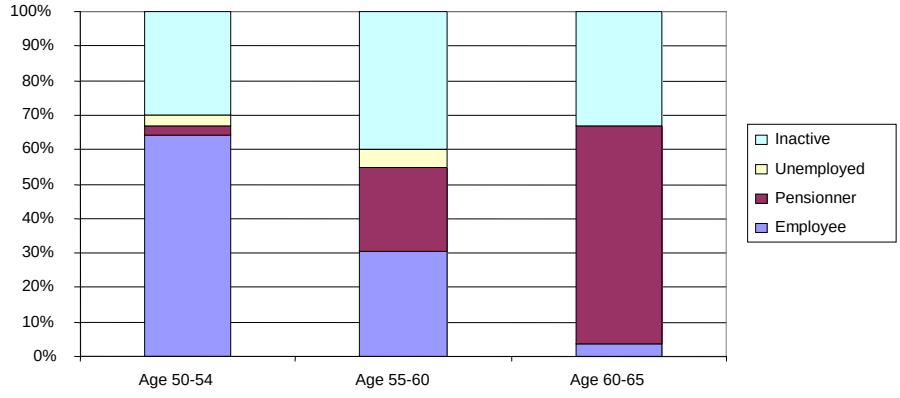
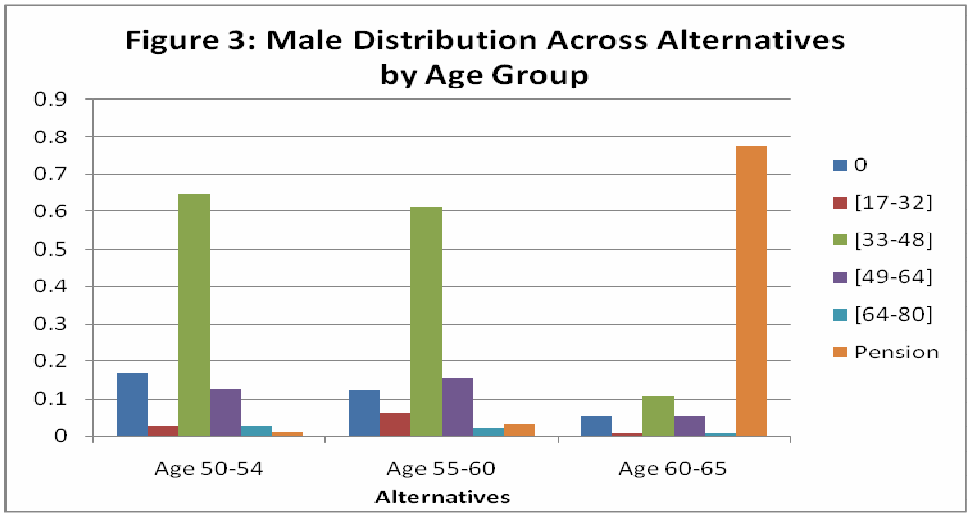


Figure 2: Employment status of females segregated by age

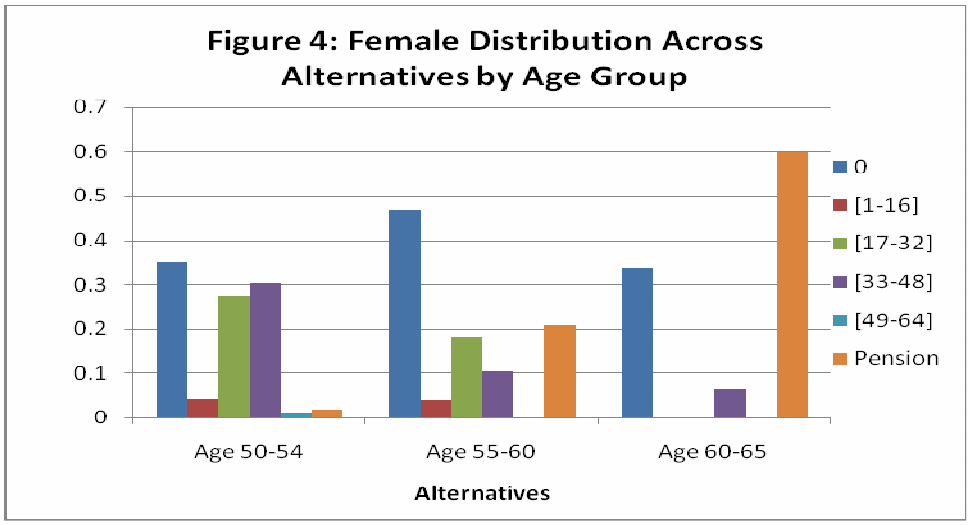


The figures 3 and 4 below illustrate the share of men and women across alternatives (labour supply and pension alternatives) for each age group. Looking at figure 3, it is noticed that there are two peaks, which refer to the full-time alternative and the retirement

alternative. While in the full-time alternative most of men come from the youngest group, in the retirement alternative they come from the oldest group. Whereas men do not prefer the part-time alternatives, the alternative referring to the extra-time seems more preferred for the age group 55-60.



As in the figure 4, the female labour supply differs clearly from that of males due to the predominance of more than two peaks and especially that of zero hour's alternative for each group. In the youngest group, most of women either do not work or do work full-time while in the oldest group most of them either don't work or retire.



To conclude, men go through a normal transition from employment spell to retirement spell while women drag their inactivity status until the last period of their working career. These statistics show the employment feature on the working experience of men and women in the final stage of their working life.

3 Micro-econometric modelling

In this paper we proceed as follow: first we estimate a microeconometric model of labour supply similar to random utility model developed by Van Soest et al. (2002) and Aaberge et al. (2000) and then use the estimated parameters to simulate different tax-benefit reforms which will be explained in the next section.

The EUROMOD tool has enabled to incorporate labour supply and pension alternatives, thus the working hours, the pension choice and the respective generated income. The utilization of the EUROMOD support the analysis of the static choices, made at some point in time, while it is assumed that the rational decision maker maximizes its utility. In our case, we will consider households with two decision-makers (couples) wherein both partners jointly decide to work (and how many hours) or to retire while the behaviour of other people within the household is taken as exogenous. This static modelling called differently myopic does not take into account the future loss in intertemporal utility due to the retirement option in the future.[12] However as Disney (2005) shows, people cannot optimize complex intertemporal problems and in their decisions they collapse the future to a single period. Apart the labour supply choice set, in this study we introduce an extra alternative – pension, which is the decision to retire from the labour market. Thus, the opportunity set of households is composed of 36 alternatives (5 alternatives of weekly working hours and 1 of decision to retire per partner). Then, the estimated parameters of the model are used to simulate the optimal choices made by individuals under the constraint of constant net tax revenues when four different tax regimes are applied.

The main assumptions in our modelling are:

1. First, individuals can choose either working or retiring, only inside the couple and in the simulation scenario they are allowed to mix up the retirement choice with their labour supply.

[12] Colombino (2003) develops and estimates both forward-looking and myopic versions of a structural model of retirement by including or dropping the term measuring the future loss of retiring. We intend to follow this approach in a future study.

2. The pensions are imputed by using a Heckman selection prediction and no market interest rate is used to index the future flows of the pension entitlements.

3. According to the Austrian tax-benefit system, pension entitlements are subject to taxation. In our model we assume to not exert taxes on pension entitlements as we already penalize the future pensioners by introducing pension reductions in case of early retirement.

4. Old workers are treated differently from the others such as to self-sustain their budget constraint. This means that both taxes and benefits are changed only for old workers without affecting the rest of the population. Therefore, these simulation scenarios allow for different tax marginal rates.

Household n is assumed to maximise a utility function $U^i(X^n, P_F^n, P_M^n, h_F, h_M, d_F, d_M)$ under the constraints:

$$
\begin{aligned}
& h_F \in \Omega \\
& h_M \in \Omega \\
& d_F \in \Omega \\
& d_M \in \Omega \\
& P_F = f(Age_F, W_F^n, \#Contributions_F, Z_F) \\
& P_M = f(Age_M, W_M^n, \#Contributions_M, Z_M) \\
& X^n = R(w_F^n h_F, w_M^n h_M, d_F P_F, d_M P_M, y^n)
\end{aligned}
\qquad (1)
$$

Where:

h_i = average weekly hours of work required by the j-th job in the choice set for partner i (F = female, M = male)

d_i = dummy variable which takes value one when the pension alternative is chosen by the partner i (F = female, M = male)

P_i = average income deriving from the pension alternative for partner i (F = female, M = male) as a function of some individual variables (e.g. age, last average monthly wage, number of years of contributions, other characteristics)

Ω = set of discrete values (6 alternatives for each household member, 5 alternatives of working hours, from 0 to 80 weekly hours and 1 pension alternative)

w_i^n = hourly wage rate of partner *i*. In order to simulate potential in-work disposable income for those who are observed to be out of work in the data, the hourly earnings equation is

estimated after having estimated the inverse Mill's ratio. The same holds also for the pension entitlement.

y^n = vector of exogenous household gross incomes

X^n = net household income

R = tax-transfer rule that transforms gross income into net income. The tax rule is applied on monthly gross income.

The first two constraints state that the working hours h_i are chosen within a discrete set of values Ω including also the choice of 0 hours (i.e. non-participation or unemployment).[13] This discrete set of "h" values can be interpreted as the actual choice set (maybe determined by institutional constraints) or as approximations to the choice set. The second two constraints state that the choice set contains a further alternative corresponding to the retirement decision. The fifth and sixth constraints say that the pension entitlements are derived as a function of a set of monetary and non-monetary variables whereas the last constraint says that net income X is the result of a tax-transfer rule R applied to the gross income.

We write the utility function as the sum of a systematic part and a random component:

$$(2) \qquad U^n(X^n, P_F^n, P_M^n, h_F, h_M, d_F, d_M) = V(X^n, P_F^n, P_M^n, h_F, h_M, d_F, d_M; Z^n, \vartheta) + \varepsilon$$

where Z^n is a vector of household characteristics, ϑ is a vector of parameters to be estimated and ε is a random variable capturing the effect of unobserved variables upon the evaluation of $(X^n, P_F^n, P_M^n, h_F, h_M, d_F, d_M)$ by household n.

Let $G(f) = (1-d_f)w_F^n h_f + d_f P_f$ and $G(m) = (1-d_m)w_m^n h_m + d_m P_m$ be the income generated by each household member. Then $R(G(f), G(m), y^n)$ is the net available income when the household choice are (f, m) calculated using the EUROMOD.

Under the assumption that ε is i.i.d. extreme value of Type I, the probability of a given household choice (f, m) is:

[13] EUROMOD does not simulate the unemployment benefits and for that reason we don't separate the inactive from the unemployed. This is one of the limitations of this model.

$$(3) \qquad P^n(f,m;\vartheta) = \frac{\exp\{V(R(G(f),G(m),y^n),\ f,m;Z^n,\vartheta)\}}{\sum_{f\in\Omega}\sum_{m\in\Omega}\exp\{V(R(G(f),G(m),y^n),\ f,m;Z^n,\vartheta)\}}$$

If (f^n, m^n) is the observed choice for the n-th household, the maximum likelihood estimate of ϑ is:

$$(4) \qquad \vartheta^{ML} = \arg\max_{\vartheta} \sum_{n=1}^{N} \ln P^n(f^n, m^n;\vartheta)$$

4. Simulation of the reforms

Different empirical studies on labour supply have emphasized the importance of focusing on two margins of labour supply responses which is the participation decision in the labour market, the extensive margin, and hours of work decision, the intensive margin (Heckman, 1993).

In front of potential responses both at intensive an extensive margin of older workers, it is crucial to analyze labour market decisions at both margins when alternative tax benefits systems are implemented. Saez (2000) shows that the application of NIT has a strong impact on labour supply responses at the intensive margin while at the extensive margin, tax-benefit system such as in-work tax credit, are found to be the proper ones. Therefore the justification to implement a NIT is because this tax-benefit system is more appropriate when behavioural responses are concentrated along hours of work while in-work tax credit is a more suitable tax-benefit system when participation decisions matters.[14] This approach has very important policy implications because the older workers decision at the extensive margin is persuaded by the decision to retire while the decision at the intensive margin is limited by the lack of flexibility in hours of work. While in USA, the application of NIT has produced adverse effects on labour supply participation decision especially among those who received income support, in Europe the application of NIT had the purpose to redistribute toward zero or low-income earners (Moffit, 2003).

[14] Negative Income Tax is based on the provision of a subsistence income level such that earnings above this level is normally taxed while those below it, are entitled to receive benefits which is differently called a "negative tax". The Negative Income Tax has been largely tested in the United States and for the first time was introduced by Friedman (1962). Such scheme provides the largest transfers to the lowest income earners who are presumably the most in need of support.

The labour supply responses depend on the institutional features of the labour market. A higher flexibility at the intensive margin would allow the older workers to adjust their hours of work and prevent incentives to adjust the labour supply at the extensive margin. The increase of alternative working hours would result in a lower predisposition to shift into retirement because of more flexibility at the intensive margin. Nevertheless, due to fixed costs of work and the requirement to work a minimum number of hours per week, there is resistance toward the flexibility in labour supply.

Let us suppose we are interested in some alternative tax-transfer rule R_A. For a given choice (f,m), it will produce a net available income for the n-th household equal to $R(G(f),G(m),y^n)$. Let $P_A^n(f,m;\vartheta^{ML})$ be the corresponding choice probability computed on the basis of the estimated parameter ϑ^{ML} and of the new tax-transfer rule. If we are interested in simulating the expected value of some function $\varphi^n(f,m)$, we simply compute:

$$(5) \qquad E(\boldsymbol{\varphi}^n(f,m)) = \sum_{f\in\Omega}\sum_{m\in\Omega}\boldsymbol{\varphi}^n(f,m)P_A^n(f,m;\boldsymbol{\vartheta}^{ML})$$

The simulation of different tax regimes consists in finding the tax rate, which equalizes the predicted net tax revenues under these tax regimes with net tax revenues the state recovers from the current system. In what follows, we have simulated 4 different scenarios of tax benefit systems that embody the above criterion. The first two reforms are based on a combination of a NIT (where a flat tax is complemented with a transfer that guarantees households' income up to a basic level) and a reduction in accrued pensions by 2,1% and 4,2% for each year of early retirement before the age of 65. Thus, taxes, benefits and pension reductions are simulated as follows:

$$(6) \qquad Tax_{NIT} = \begin{cases} t_{NIT}(Y - a*Poverty) \rightarrow Y > a*Poverty \\ o \rightarrow otherwise \end{cases}$$

and the benefits as below:

$$(7) \qquad Benefits_{NIT} = \begin{cases} a*Poverty - Y \rightarrow Y \leq a*Poverty \\ o \rightarrow otherwise \end{cases}$$

The poverty line is set equal to the median of gross income at the current system multiplied by a coefficient *k* which takes several values ranging from 0.5 for the households without children to 2.4 for those with no less than 5 children.[15] *Y* refers to the gross income and t_{NIT} is a constant marginal tax rate. The parameter *a* is set equal to 0.5, 0.75, 1 and 1.25 and determines the generosity of the tax- transfer scheme such that the more generous the system the higher is the parameter *a*. The guaranteed income replaces all current family benefits and transfers.

The next simulation is the application of WF, which essentially is a modification of NIT where the transfer is conditional on a minimum amount of weekly hours of work (e.g. a minimum of 20 weekly hours by one of the household members).

In all these simulations, the disposable income is a function of the wife and husband's earnings other income. The system of NIT and WF are interpreted as alternatives that try to compound the criterion of lessening distortions from high marginal tax rates and the criterion of redesigning the basic income support system in a more effective way. Different tax-benefit rules generate different impacts on the utility of the household, which are reflected by the changes in the level of disposable income and leisure. Therefore the change in the disposal income will indicate the change of welfare of the individual in monetary terms and the change in hours of leisure will indicate the effect on the labour supply and hours of work.

5. Simulation Results

Here we show the results of the simulations of the above reforms on household labour supply and their welfare measured in terms of expected maximum utility. The discussion is concentrated on the following variables: average values of weekly working hours, top marginal tax rates, average tax rates and we compare the simulated reforms focusing on the social welfare criterion based on utility and income and the respective percentage of winners. The welfare reforms proposed in this study are intended to reduce the pension entitlement with a certain percentage and in the same time to provide all individuals in pre-retirement age with income up to a certain poverty threshold. Thus our reform tackles both the pension system sustainability and the poverty issue.

[15] The coefficient *k* is set equal to 1.33, 1.63, 1.90, 2.16 and 2.40 respectively for the households with 1, 2, 3, 4 and 5 (or more) children.

As regards the feasibility of tax system, most of the reforms perform better than the current one by yielding a marginal tax rate lower than 50% and an average tax rate lower than the current of 20%.[16] We have experimented four different levels of generosity level but our comments will disregard the highest level (1.25) as the simulated marginal tax rates exceeds the 50% which is the top marginal rate, actually applied in Austria. As shown in Table 2, most of the reforms perform better than the current system in terms of social welfare and percentage of households. According to social welfare criterion (both utility and income-based), the WF yields a higher value of welfare compared to the baseline scenario and NIT by applying a generosity of income support of above 50% of the poverty line while working and a reduction in pension entitlement in case of early retirement by 4.2%.

Looking at the number of winners and losers (see Table 3), there are more winners than losers for all reforms (especially for the WF rule with 4.2% reduction per year) except NIT. [17] The losers from these reforms come mainly from the upper and the lower quintile respectively for the highest and the lowest generosity level. However the "winners" are highly concentrated among the middle quintiles. This is due to their higher labour supply elasticity and lower marginal tax rates. The distribution of winner across income quintiles is quite similar for both social welfare measures (utility and net income) but with a difference in their magnitude. [18]

Table 4 and 5 illustrate the impact of the above reforms on labour supply at the intensive and extensive margin (average weekly hours and participation rates). In table 4 we observe a clear increasing trend of male labour supply for all rules except for NIT where the highest generosity level applies. A slight increase of less than one hour is observed for female labour supply, which however remains almost insignificant to catch any particular trend. Thus, the moderate generosity of the welfare system would bring a higher response in labour supply at the intensive margin both under tax benefit system of WF and NIT. In addition in Table 5, we find that WF rather than NIT provides the higher response at the extensive margin. Hence, when the participation decision in the labour market is a concern, the WF, which is a combination of moderate-income support along with lower replacement

[16] In 2005, an average tax rate system was introduced while the number of tax brackets was reduced from five to four, with statutory marginal rates of 0%, 38.33%, 43.6% and 50%.

[17] An exception is the NIT, which is a combination of the lowest penalties in pension entitlement with the generosity level not less than 1 (or 1130 Euro of income support).

[18] This difference is obviously due to their construction (one is based only on changes in net income while the other also on leisure).

rates in early retirement, provide significant incentives for older workers to participate in the labour market. However, we acknowledge that differences across the reforms are rather small to produce a definite ranking of scenarios.

Point estimates of labour supply do not help to get a complete picture of labour supply behaviour. Therefore we disaggregate by age category and income deciles and show the estimates of the distribution of labour supply in the Tables 6 and 7. Table 6 shows that the positive effect on labour supply appears to be higher for males at the age category 55-60 while, as regards women, the increase in hours of work is almost insignificant. The lack of reaction among males younger than 55 is due to their high labour supply (close to full time employment) compared to other age categories (close to part time) whereas the lower labour response among the oldest individuals (60+) is due to their higher preference for leisure while reaching the official retirement age.[19] The disaggregation of labour supply by income deciles, as in Table 7, indicates that the best performers are males belonging to the middle income group succeeded by the last income deciles group. Concerning low-income earners, they supply more hours of work with the increase in generosity level. A similar trend is observed also for women but at a smaller magnitude. To summarize, while among mid and top deciles income earners an increase in generosity level of income support is accompanied with labour disincentives a reverse pattern is observed for low-income earners. These findings indicate that the labour supply response at the intensive margin increases with the rise of generosity level for those older workers clustered in the low-income deciles.

An interpretation of the above result is that lower average and marginal tax rates, available in-work benefits conditional on hours of work and low expected returns from the early retirement due to the penalty cause a higher substitution effect among middle and low income earners compared to high income deciles due to their higher labour supply elasticity.

As it concerns women, their labour supply remains unaffected by the proposed reforms as a result of the impassivity showed by their net income notwithstanding the favourable marginal tax rates. Also, the estimates of the utility function (as in Table 10) imply a stronger preference of women for leisure underlying a separability feature of leisure activities between men and women.

[19] This finding holds for both ranges of pension reductions (2,1% and 4,2%).

6. Conclusion

By the means of a micro-econometric model of household labour supply, we have simulated the ex-ante effect of some reforms, which are a mixture of a future prospect on pension reductions and an income support for the low-income households in Austria. In particular, these reforms are based on the combination of either a NIT or WF and a reduction of pensions by 4,2% and 2,1% in line with the pension reforms 2003-2004 and 2007. We find that most of these reforms bring to higher social welfare compared to the baseline system, especially WF which is characterized by an approach of moderate generosity of income support while working and lower pension entitlement in case of early retirement. The reductions in pensions along with stricter rules on eligibility for income support bring to a higher social welfare and an increasing number of winners.

Concerning labour supply, the results show that individuals whose labour supply increases under the proposed reforms are mainly men, in the age category 55-60 and belonging to middle income group. This trend might be justified by their higher elasticity of labour supply with respect to income and lower marginal tax rates which guarantee the budget neutrality. On the other hand, reforms aimed at creating labour incentives among older individuals living in couple do not appear to be very effective for women.

At the end, a higher response in labour supply is observed for WF rather than NIT indicating that in-work tax credit provides higher labour incentives for older workers. This is in line also with the literature, which supports the application of in-work tax credit in combination of subsistence guaranteed income level while certain hours of work are provided. These reforms are of greater importance if we consider also the budgetary costs, which, under these simulations, are fully covered by this population group.

Thus, applying elevated benefit reductions for early retirement, exercising tax-benefit regimes that reduce the marginal tax rates on earned income and allowing more flexibility in working hours will encourage labour supply among older workers.

References

Aaberge, R., Colombino U. (2000): "Equality of Opportunity versus Equality of Outcome as a basis for Evaluating Tax regimes: Empirical Evidence based on Italian data" CHILD working paper n.11.

Aaberge, R., J.K. Dagsvik and S. Strøm (1995): "Labor Supply Responses and Welfare Effects of Tax Reforms", Scandinavian Journal of Economics 4, 635-659.

Aaberge, R., Colombino U. and S. Strøm (1999): "Labor Supply in Italy: An Empirical Analysis of Joint Household Decisions with Taxes and Quantity Constraints", Journal of Applied Econometrics, 14, 403-422.

Colombino, A. (2003): "A Simple Intertemporal Model of Retirement Estimated on Italian Cross-section Data", Labour, 17, 115-137.

Duncan, A. and C. Giles (1996): "Labour supply incentives and recent Family Credit reforms", Economic Journal, 106, 142-157.

Friedman, M., (1962): Capitalism and freedom, Chicago University Press, Chicago.

Heckman, (1993): "What Has Been Learned about Labor Supply in the Past Twenty Years? ",
American Economic Review, American Economic Association, vol. 83(2), pages 116-21, May.

Hefler G. (2006): "Labor Market participation of older people (55-64) in Austria –
A background Report".

Hofer, H. and Koman, R. (2006):" Social security and retirement incentives in Austria" Empirica 33:285-313

Keuschnigg, Ch. And Keuschnigg, M. (2004): "Ageing, labour markets and pension reforms in Austria" . Discussion paper - Department of Economics. University of St. Gallen January.

Lindbeck, A. (2001): "Pensions and Contemporary Socioeconomic Change", The Research Institute of Industrial Economics

Ichino, A., Schwerdt, G, Winter-Ebmer, R., Zweimüller, J. (2007): "Too Old to Work, Too Young to Retire?" Institute for Advanced Studies, Vienna.

McHale J. (1999): "The Risk of Social Security Benefit Rule Changes: Some International Evidence." NBER Working Paper No. 7031

Michaud M-L (2004): "Welfare and the Labour Market in the EU", CIREM Report – June 2004

Moffit, R. (2003): "The negative income tax and the evolution of U.S welfare Policy," Journal of Economic Perspectives, American Economic Association, vol. 17(3), pages 119-140.

Munnell, A., Soto, M., Zhivan, N. (2008): "Why do more older men work in some states?" Center for Retirement Research Working Paper No.8-6.

OECD (2003)- Economic Surveys: Austria.

OECD report (2005) "OECD urges Austria to do more to encourage older people to work longer".

OECD report (2005): "Aging and Employment policies, Austria"

OECD Observer (1998): "Retire early, stay at work?"

Saez, E. (2000): "Optimal Income Transfer Programs: Intensive versus Extensive Labor Supply Responses," NBER Working Paper No. 7708.

Zaidi, A. Makovec M. and Fuchs, M. (2006): "Transition from work to retirement in EU25"

Van Soest, A, Das, M. and Gong, X., (2002): A structural labour supply with flexible preferences, Journal of Econometrics, 107, 345-374

Van Soest, A. and M. Das (2001): "Family labor supply and proposed tax reforms in the Netherlands", Journal of Human Resources.

Appendix 1

A. Utility function specification

The specification is linear-in-parameters, which allows the use of potential estimation procedures available in most econometric or statistical packages. We choose a quadratic specification since it represents a good compromise between flexibility and ease of estimation:

$$V(X, h_{F,} h_{M;} b) = b_x X + b_F (T - h_F) + b_M (T - h_M) + b_{xx} X^2 + b_{FF} (T - h_F)^2 + b_{MM} (T - h_M)^2 + \\ + b_{xF} X (T - h_F) + b_{xM} X (T - h_M)$$

Some of the above parameters b_s may depend on household or individual characteristics Z. A convenient choice might be to interact the disposable income and the leisure variables with the individual characteristics as follows:

$$b_F = b_{F1}(G\_60_{wife}) + b_{F2} b_{F1}(G\_65_{wife})$$
$$b_M = b_{M1}(G\_60_{husband}) + b_{M2}(G\_65)$$
$$b_x = b_{x1}(Age_{husband}) + b_{x2}(Age_{wife}))$$

B. Choice set specification and hours distribution

The choice set is composed of 6 alternatives for each individual by specifying the interval of hours of work and sample randomly within this interval which has a length of 16 hours. The first alternative refers to zero hours of work, and the last to the pension choice. The actual observed hours will be rounded to the closest discrete value. The basic idea can be appropriately modified when one observes directly annual hours or weeks worked.

To capture the effect of each alternative on the utility, we use some alternative dummies and calling them with a common variable A, we express the probability function as follows:

$$P^n(f,m;\vartheta) = \frac{\exp\left\{\Psi^n(f,m;\vartheta) + \gamma A\right\}}{\sum_{f\in\Omega}\sum_{m\in\Omega}\exp\left\{\Psi^n(f,m;\vartheta) + \gamma A\right\}}$$

where the γs are parameters to be estimates

The dummies can be interpreted as reflecting quantity constraints on the labour market (as in Aaberge et al. 1995, 1999), or specific utility of full-time, part time, extra time jobs, or maybe both (as in Van Soest et al, 2001, 2002)[20].

The simulations are run under a neutral budget provided that this age group is treated differently from the others in terms of tax rates.

[20] Van Soest and Das (2001) use a different mechanism to account for "peaks and holes" in observed hour distribution, namely fixed cost of working. This leads, however, to a more complicated estimation and therefore we would not advise the adoption of this procedure in the basic model estimation.

Appendix 2

Table1.1: Pensions as Percentage of GDP in 2004

	EU15	Austria
Total	12.03	14.03
Old age pension	9.04	11.02
Anticipated old age pension	0.05	1
Partial pension	0	0
Disability pension	1.02	1.04
Early retirement benefit due to reduced capacity to work	0	0.03
Survivors pension	1.01	0.04
Early retirement benefit for labour market reasons	0.01	0.01

Table 1.2: Expenditures as Percentage of GDP in 2004

	EU15	Austria
Total expenditure	27.06.00	29.01.00
Social protection benefits	26.06.00	28.03.00
Administration costs	0.09	0.05
Other expenditure	0.02	0.04
Sickness/Health care	7.05	7.01
Disability	2.01	2.03
Old age	10.09	13.03
Survivors	1.02	0.04
Family/Children	2.01	3
Unemployment	1.08	1.07
Housing	0.05	0.01
Social exclusion	0.04	0.04
Sickness and disability	9.07	9.04
Old age and survivors	12.02	13.06
Housing and Social exclusion	0.09	0.05

Source: Eurostat-Esspros 2004

Table 1.3

Economically Austrian Inactive Population by Reason for Inactivity in 2006

		All reasons	Retirement
Both sexes	**50 - 64**	685100	495900
	65+	1272600	1183500
Female	**50 - 64**	415200	267100
	65+	759700	674400
Male	**50 - 64**	269900	228800
	65+	512800	509000

Source: UNECE Statistical Division Database, compiled from national official sources.

Table 2: Behavioural and welfare effects of the simulated reforms

	Average Utility	Average Net Income	Gini Income Based	Taxes	Benefits	Social Welfare Utility Based	Social Welfare Income based	Winner by Utility	Winner by Income	Top Marginal tax	Average Tax
Current	51,107	2121	0,20	424	762	45,414	1689				0,20
WF+ Flat(2,1% per year)											
a=0,50	51,247	2297	0,24	292	653	45,512	1737	77,74	67,71	0,18	0,13
a=0,75	51,234	2263	0,24	307	664	45,506	1727	78,06	64,89	0,23	0,14
a=1,00	51,210	2202	0,22	336	683	45,490	1709	75,86	58,62	0,31	0,15
a=1,25	51,148	2072	0,20	401	728	45,440	1666	58,31	36,36	0,50	0,19
WF+ Flat(4,2% per year)											
a=0,50	51,309	2334	0,25	212	580	45,578	1747	80,56	69,59	0,13	0,09
a=0,75	51,303	2311	0,25	222	586	45,572	1742	81,50	68,97	0,16	0,10
a=1,00	51,292	2274	0,24	240	599	45,568	1736	84,01	67,08	0,21	0,11
a=1,25	51,274	2211	0,22	274	623	45,552	1727	84,95	60,82	0,32	0,12
NIT+ Flat(2,1% per year)											
a=0,50	51,229	2262	0,24	322	678	45,502	1716	73,04	60,82	0,20	0,14
a=0,75	51,200	2196	0,23	361	707	45,476	1691	66,46	54,23	0,27	0,16
a=1,00	51,135	2067	0,21	433	760	45,418	1640	47,96	31,35	0,41	0,21
a=1,25	50,472	1194	0,12	819	1014	44,875	1054	15,05	13,48	1,65	0,69
NIT+ Flat(4,2% per year)											
a=0,50	51,297	2303	0,25	237	600	45,567	1730	78,99	66,14	0,14	0,10
a=0,75	51,280	2257	0,24	266	622	45,552	1714	79,31	62,38	0,19	0,12
a=1,00	51,248	2178	0,22	313	656	45,524	1689	77,12	52,98	0,29	0,14
a=1,25	51,169	2006	0,19	406	725	45,459	1629	62,38	28,84	0,51	0,20

Note: The gini index is calculated using the Stata command relsgini and computes the Donaldson-Weymark relative S-Gini using the distributional sensitivity parameters specified in the parameter list. The average net income is calculated subtracting from the sum of gross income and benefits the taxes and social insurance contributions. The average tax rate is calculated as the ratio between average taxes and average net income. The social welfare function utility (income)-based is equal to the product of the average utility (income) and the respective (1- Gini index). As winners according

to utility (income) criterion we define all households with a post-reform utility (income) higher than that of the pre-reform.

Table 3: Percentage of Winners by Deciles

	Utility based			Net Income based		
Deciles	***I-II***	***III-VIII***	***IX-X***	***I-II***	***III-VIII***	***IX-X***
Current						
WF+ Flat(2,1% per year)						
a=0,50	45.31	92.06	83.85	35.94	98.41	68.23
a=0,75	59.38	92.06	79.69	48.44	98.41	59.37
a=1,00	76.56	87.30	71.88	62.51	93.65	45.83
a=1,25	89.06	58.73	47.92	81.25	30.16	23.44
WF+ Flat(4,2% per year)						
a=0,50	50.00	92.06	86.97	34.37	98.41	71.87
a=0,75	57.81	92.06	85.94	43.75	98.41	67.71
a=1,00	73.44	90.48	85.42	56.25	98.41	60.42
a=1,25	87.50	90.47	82.29	75.00	92.06	45.83
NIT+ Flat(2,1% per year)						
a=0,50	46.85	92.06	75.52	25.00	98.41	60.41
a=0,75	53.12	88.89	63.54	35.94	93.65	47.39
a=1,00	71.87	69.84	32.81	57.81	39.68	19.79
a=1,25	71.88	1.00	0.01	65.62	1.11	0.01
NIT+ Flat(4,2% per year)						
a=0,50	51.56	92.06	83.85	32.81	98.41	66.66
a=0,75	62.50	92.06	80.79	39.06	98.41	58.33
a=1,00	75.00	90.47	73.44	53.12	88.88	41.14
a=1,25	89.06	60.32	54.16	76.56	22.22	15.10

Table 4: Labour Supply behaviour

	(average hours)	
	Male	Female
Current		
	24.06	13.06
WF+ Flat(2,1% per year)		
a=0,50	26.42	13.53
a=0,75	26.07	13.32
a=1,00	25.44	12.96
a=1,25	24.12	12.15
WF+ Flat(4,2% per year)		
a=0,50	26.94	13.79
a=0,75	26.73	13.65
a=1,00	26.36	13.43
a=1,25	25.83	13.02
NIT+ Flat(2,1% per year)		
a=0,50	25.90	13.36
a=0,75	25.13	12.99
a=1,00	23.64	12.28
a=1,25	13.91	7.44
NIT+ Flat(4,2% per year)		
a=0,50	26.49	13.65
a=0,75	25.94	13.39
a=1,00	25.04	12.95
a=1,25	23.19	11.93

Note: Changes in labor supply are calculated on a weekly basis

Table 5: Labour Supply Behaviour

(average participation rates)

	Male	Female
Current		
	58.83	50.55
WF+ Flat(2,1% per year)		
a=0,50	60.41	50.59
a=0,75	60.14	50.33
a=1,00	59.63	49.84
a=1,25	58.56	48.72
WF+ Flat(4,2% per year)		
a=0,50	60.93	51.04
a=0,75	60.81	50.88
a=1,00	60.61	50.62
a=1,25	60.59	50.18
NIT+ Flat(2,1% per year)		
a=0,50	59.47	50.15
a=0,75	58.53	49.58
a=1,00	56.75	48.52
a=1,25	41.49	40.93
NIT+ Flat(4,2% per year)		
a=0,50	60.09	50.65
a=0,75	59.44	50.25
a=1,00	58.48	49.65
a=1,25	56.69	48.38

Table 6: Change in Labour Supply Disaggregated by Age

	Male			**Female**		
Age	*50-55*	*56-59*	*60-65*	*50-55*	*56-59*	*60-65*
Current Hours						
	35,28	18,29	2,29	19,41	5,46	1,5
WF+ Flat(2,1% per year)						
a=0,50	0,95	4,17	1,56	0,46	0,68	0,21
a=0,75	0,83	3,56	1,23	0,22	0,48	0,12
a=1,00	0,52	2,52	0,77	-0,23	0,16	0
a=1,25	-0,44	0,52	0,29	-1,33	-0,39	-0,16
WF+ Flat(4,2% per year)						
a=0,50	0,42	5,84	2,23	0,59	1,31	0,47
a=0,75	0,36	5,45	1,99	0,44	1,17	0,39
a=1,00	0,21	4,85	1,65	0,18	0,95	0,29
a=1,25	-0,13	4,03	1,33	-0,35	0,61	0,16
NIT+ Flat(2,1% per year)						
a=0,50	0,75	3,28	1,08	0,31	0,41	0,1
a=0,75	0,45	1,93	0,51	-0,1	0,02	-0,04
a=1,00	-0,38	-0,52	-0,27	-1,02	-0,58	-0,24
a=1,25	-12	-10	-1,2	-8,3	-2,4	-0,47
NIT+ Flat(4,2% per year)						
a=0,50	0,26	5,05	1,76	0,48	1,06	0,36
a=0,75	0,09	4,07	1,28	0,21	0,74	0,22
a=1,00	-0,3	2,52	0,61	-0,31	0,28	0,004
a=1,25	-1,56	-0,29	-0,18	-1,66	-0,49	-0,17

Table 7: Changes in Labour Supply Hours by Deciles

	Male			Female		
Deciles	***I-II***	***III-VIII***	***IX-X***	***I-II***	***III-VIII***	***IX-X***
Current						
	8,75	36,72	25,01	5,44	17,51	14,14
WF+ Flat(2,1% per year)						
a=0,50	0,488	5,27	2,01	-0,05	1,15	0,41
a=0,75	0,78	4,49	1,59	-0,05	0,87	0,16
a=1,00	1,26	3,04	0,86	-0,025	0,33	-0,27
a=1,25	2,48	-0,47	-0,59	0,039	-0,98	-1,2
WF+ Flat(4,2% per year)						
a=0,50	1,01	5,71	2,57	0,07	1,37	0,73
a=0,75	1,28	5,21	2,28	0,08	1,19	0,56
a=1,00	1,72	4,34	1,82	0,13	0,88	0,28
a=1,25	2,94	2,62	1,09	0,24	0,24	-0,24
NIT+ Flat(2,1% per year)						
a=0,50	-0,26	4,77	1,57	-0,28	1,02	0,24
a=0,75	-0,31	3,4	0,76	-0,36	0,56	-0,17
a=1,00	-0,15	0,38	-0,78	-0,46	-0,5	-0,98
a=1,25	0,003	-21,42	-9,83	-0,92	-9,04	-6,07
NIT+ Flat(4,2% per year)						
a=0,50	0,23	5,32	2,2	-0,14	1,27	0,59
a=0,75	0,16	4,41	1,62	-0,22	0,98	0,29
a=1,00	0,29	2,65	0,65	-0,29	0,38	-0,23
a=1,25	1,16	-1,74	-1,25	-0,29	-1,24	-1,38

Table 8: Earning Equation for Men and Women
(regression model with sample selection)

	Men			Women		
	Coef.	**Std.**		**Coef.**	**Std.**	
Wage equation						
Education	0.0407	0.0094	***	0.0293	0.0121	*
Experience	0.0307	0.0045	***	0.0321	0.0057	***
Experience^2	-0.0002	0.0001		-0.0002	0.0001	
region2	-0.0269	0.0522	*	-0.0573	0.0721	
region3	-0.1032	0.0474		-0.0085	0.0689	
region4	-0.0237	0.0617		-0.0746	0.0920	
region5	-0.0163	0.0480		0.0327	0.0691	
region6	0.0290	0.0612		0.0165	0.0822	*
region7	0.0157	0.0557		0.0909	0.0813	
region8	0.0175	0.0673		0.0149	0.0892	
region9	-0.0867	0.0482		-0.0085	0.0707	
Armed forces	0.2699	0.1146	*	-0.0272	0.3971	
Senior officials and management	0.3837	0.0700	***	0.2295	0.1479	
Professionals	0.3163	0.0667	***	0.3230	0.0971	***
Technicians and associate professionals	0.3978	0.0516	***	0.1721	0.1026	
Clerks	0.3279	0.0505	***	0.0792	0.0826	
Service and sales workers	0.1195	0.0484	*	-0.0909	0.0816	
Skilled agricultural	-0.4179	0.1080	***	-0.7700	0.1601	***
Craft and trades workers	0.1401	0.0478	**	0.0106	0.1147	
Plant and machine operators	0.1777	0.0582	**	0.0832	0.1695	
Cohabitating	0.3778	0.0739	***	0.0921	0.0321	**
Constant	1.6135	0.1268	***	1.8927	0.1781	***
Selection Equation						
Married	-0.0288	0.0757		-0.1100	0.0673	
Cohabitating	0.1958	0.0785	*	0.0514	0.0697	
Years of contributions	-0.0312	0.0020	***	-0.0187	0.0019	***
Education	0.0547	0.0132	***	0.0496	0.0120	***
Regional Unemployment	-4.0340	0.9466	***	1.6381	1.3752	
Constant	0.5566	0.1651	***	-0.1500	0.1627	***
/athrho	-1.6204	0.0523	***	-1.7237	0.0502	***
/lnsigma	-0.3637	0.0191	***	-0.0649	0.0223	**
Rho	-0.9247	0.0076		-0.9383	0.0060	
Sigma	0.6951	0.0133		0.9372	0.0209	
Lambda	-0.6427	0.0158		-0.8794	0.0234	
Number of observations	3320			3349		
Censored	1250			1714		
Uncensored	2070			1635		
Log likelihood	-3419.2			-3580.56		
LR test of independent equations chi2(1)=	349.32			390.83		
Wald chi2(21)	609.86			325.88		

Note: * p<0.05; ** p<0.01; *** p<0.001

Looking at the Table 8, labour market participation is lower for males with longer contributory period and residing in regions with high unemployment rates, while is higher for those who are more educated and cohabitates. As regards females, labour market participation is lower for those women with more years of contribution and is higher for the more educated once. These features of labour supply behaviour reflect the attitudes of the working force close to the retirement phase.
The estimates of earning equation show a significant and positive effect of education, experience and cohabitating status for both men and women pointing out that earnings possibilities improve with the increase of experience and higher education as shown in the human capital theory and labour market signalling.

Table 9: Pension Entitlement Equation for Men and Women
(regression model with sample selection)

	Men			Women		
	Coef.	**Std.**		**Coef.**	**Std.**	
Pension entitlement						
Wage	2.9894	0.5019	***	0.7050	0.3771	
Education	-0.0542	0.0364		0.1074	0.0338	**
Region1	0.8384	0.2056	***	-0.0429	0.1904	
Region2	0.5805	0.1932	**	-0.1492	0.1759	
Region3	0.4074	0.2533		-0.5460	0.2943	
Region4	0.3497	0.1927		-0.0602	0.1875	
Region5	0.3326	0.3212		-0.1152	0.2967	
Region6	0.3336	0.2155		-0.1452	0.2083	
region7	0.1421	0.2709		-0.5372	0.2548	*
region8	0.6445	0.2027	**	-0.1263	0.1952	
Constant	1.1226	0.9936		5.3299	0.8121	***
Retirement Equation						
Years of Contributions	0.0786	0.0110	***	0.0336	0.0039	***
Married	-0.2365	0.2199		-0.3763	0.1681	*
Property Income	-0.0006	0.0004		0.0001	0.0002	
Education	-0.0115	0.0306		-0.0570	0.0238	*
Regional Unemployment	4.8272	2.1841	*	3.8275	2.7239	
Size of household	0.0002	0.0016		-0.0022	0.0011	*
Constant	-3.8475	0.6036	***	-0.8231	0.3341	*
/athrho	-1.6278	0.2450	***	-1.8944	0.1761	***
/lnsigma	-0.3475	0.0921	***	0.1582	0.0634	*
Rho	-0.9257	0.0350		-0.9558	0.0152	
Sigma	0.7064	0.0650		1.1713	0.0742	
Lambda	-0.6540	0.0808		-1.1195	0.0843	
Number of observations	1,004			961		
Censored	844			691		
Uncensored	160			270		
Log likelihood	-462.121			-792.861		
LR test of independent equations chi2(1)=	15.77			65.12		
Wald chi2(10)	70.12			35.45		

Note: * p<0.05; ** p<0.01; *** p<0.001

The Table 9 shows the estimates of the pension entitlement counting for the Heckman selectivity. Men opt to the retirement option as in case of more years of contributions and lower level of education. In addition, the lack of job possibilities (signalled by a high unemployment rate) makes more attractive the retirement option. Also for women, the possibility to opt to the retirement decision is also more likely for higher years of contributions and lower years of education, but less likely for married women and for those living in households with higher size. The pension entitlements increase with wages both for men and women (but especially for men) while the education effect is positively significant only for women.

Table 10: Conditional logit estimation

Number of observations	11484
LR chi2(36)	714
Prob>chi2	0
Log likelihood	-545,67456
Pseudo R2	0,3123

	Coefficient	Std. Err.	t value	Significance
Income				
Constant	0.00625	0.00111	5.74	***
Square	-3.18E-07	8.34E-08	-3.81	***
Age 55-60 Female	0.00049	0.00029	1.69	
Age 60-65 Female	0.00105	0.00037	2.81	**
Age 55-60 Male	0.00128	0.00023	5.16	***
Age 60-65 Male	0.00268	0.00058	4.63	***
Leisure Female				
Constant	0.30982	0.07057	4.39	***
Square	-0.00117	0.00032	-3.69	***
Income	-1.8E-05	6.33E-06	-2.9	***
Age 55-60	0.07843	0.01378	5.69	***
Age 60-65	0.14778	0.02617	5.65	**
Leisure male				
Constant	0.57822	0.06319	9.15	***
Square	-0.00298	0.00027	-10.89	***
Income	-4.6E-05	6.19E-06	-7.39	**
Leisure female	-0.00095	0.00031	-3.03	**
Age 55-60	0.06463	0.00953	6.78	***
Age 60-65	0.14008	0.02356	5.94	***

* p<0.05, ** p<0.01, *** p<0.001

The Conditional logit estimates (Table 10) indicate that the marginal utility of income is positive and decreasing either for leisure or income (the negative sign of the squared leisure and income). We also checked for the global concavity character of the utility function by calculating the first derivative of utility with respect to net income and it is found that almost 88% of the sample satisfies the quasi-concavity conditions. The interaction term between income and leisure is negative and significant different from zero implying that income is not separable from leisure. The preference for leisure significantly increases with age for both males and females. The interacted coefficient leisure time of women and men is significantly negative implying that couples are more likely to share less free time together probably due to the separability of responsibilities and rights in the households (such as taking care for grandchildren or separate hobbies).