The effect of income support policies to labour supply in pre-retirement age in Austria

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Preliminary version

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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 labor market, in this paper we try to shed light on the behavioral and distributional effect of several reforms which consist in a combination of reduction in pension benefits along with the provision of some means-tested schemes. We find out that reforms characterized by higher generosity of income support while working, and lower pension entitlement in case of early retirement yield higher social welfare compared to the current system. Concerning labor supply the results show that it increases for all rules, especially for men while a weaker response in labor supply is noticed in case of women. At the end, a higher response in labor supply is observed for Workfare rather than Negative Income Tax System indicating that in work tax credit would provide higher labour incentives also for older workers.

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

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1. Introduction

In this paper we will focus on the effect of income support schemes on the labour supply decision of older workers including the option to retire. The decision for these workers is not only limited to the participation and hours of work but also to retire or not, especially when early retirement schemes favor such decision.

Austria has a very low participation rate among workers close to retirement age[3]. Like in other EU countries, the labour market performance among older workers and the keeping up of their employment is a questionable 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.

There is a relevant literature focused on pension reforms and its effect on labor supply. Lindbeck and Persoon (2003), Ichino (2007) find that an old unemployed is willing to accept a job at lower reservation age before retirement which would allow him to be employed when reaching the retirement age. This finding goes in favor of increasing the retirement age. Other relevant reforms in the pension system such as reductions in pension level have to be analyzed.

From the literature we also find that labour market incentives policies such as in work tax credits, implemented in some countries like UK, Netherlands, Canada and USA, have a positive effect on the labour supply decision.

Analysis of similar 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 pensions entitlement, is the purpose of this research work.

In the retirement, the pension entitlements are subject to a discount rate. The expected discounted value of pensions benefits are a significant fraction of net outcome value therefore it has a noteworthy impact on the retirement planning and labour supply

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

decision. In this context, providing the possibility of higher income support along with the participation in the labour market for the older workers, especially to the low-income earners getting closer to retirement age, would provide a higher social welfare and make them to end up to a better position than receiving a sort of minimum pension. Under this scenario, the aim of policy makers to prolong the working life of older workers and contribution period to the national insurance system (target of the most governments), is facilitated by making also the individuals better off. This is the hypothesis that we want to test, thus the contribution of this paper is the analysis of labour supply decision of the older worker counting for the option of income support schemes and barriers to retire.

We use a micro econometric model developed in Aaberge et al. (1999) to simulate the effect of four policy reforms on labor supply behaviours and income distribution of individuals after the age of 50. In particular, these reforms are based on the combination of either a negative income tax (NIT) or Workfare (WF) and a reduction of pensions by 5 to15% (by 10%-30%) and according to the age (ranging from 5% for the oldest group (65+) to 15% for the youngest group(55+)).

The rest of the paper is organized as follows. The next section shows some statistical background on labor 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. The data

Empirical evidence shows that many Austrians withdraw from the labour market well before reaching the statutory or even the early retirement age. Consequently, only one in three persons 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[4], since the mid-1990s, even though different measures are undertaken in Austria to improve labour market

[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”

opportunities for older workers, the outcome for this group of population has changed very slowly and existing early retirement schemes are widely still used[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 unemployment benefits, disability pension seem to be the main causes of the early withdrawal of older workers from the labor market. [7] The restriction of the availability of such schemes in Germany and UK did have a positive effect in the participation in labor market of older workers. [8]

If nothing else changes, the low labor market participation 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.[9] 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 EU-SILC data for Austria, 2004. This dataset is further elaborated by means of the Euromod algorithm to incorporate different alternatives of hours of work and the respective budget sets. We have selected only couples with both members aged from 50 to 65 years. None of them are self-employed, employer and disabled.

[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] See Table 1 in the Appendix 1.
[7] See OECD report 2005 "Aging and Employment policies, Austria"
[8] See The OECD Observer No. 212, 1998 "Retire early, stay at work?"
[9] Reductions in pension entitlement would be linked to lower statutory contributions, which imply lower tax rates and therefore fewer disincentives to labor market performance.

Figure 1

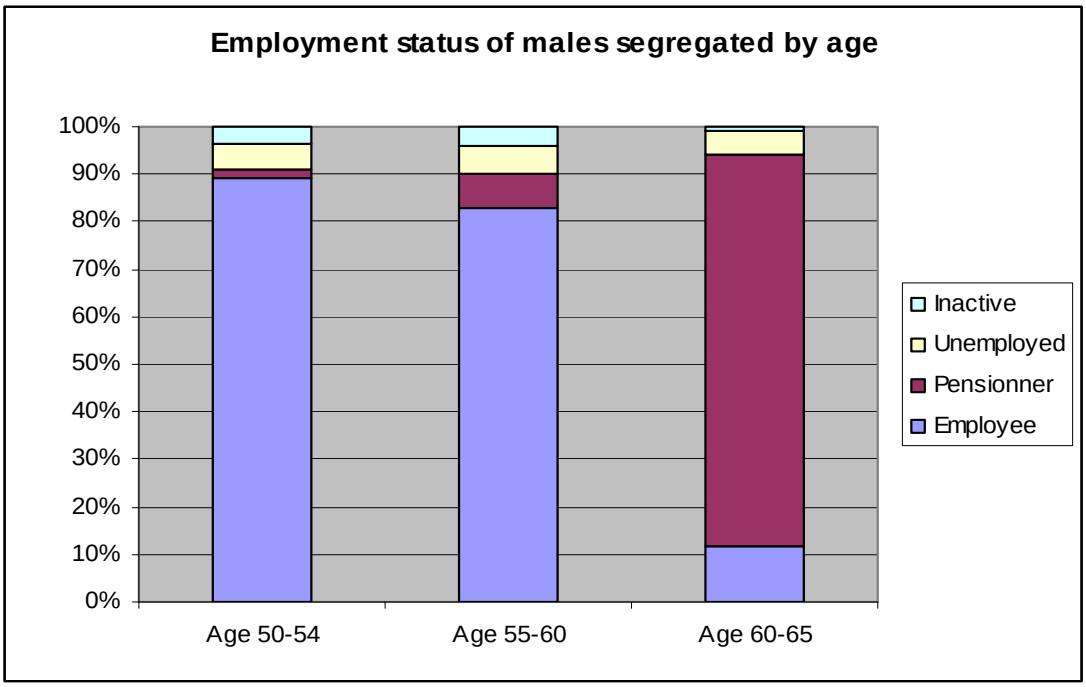
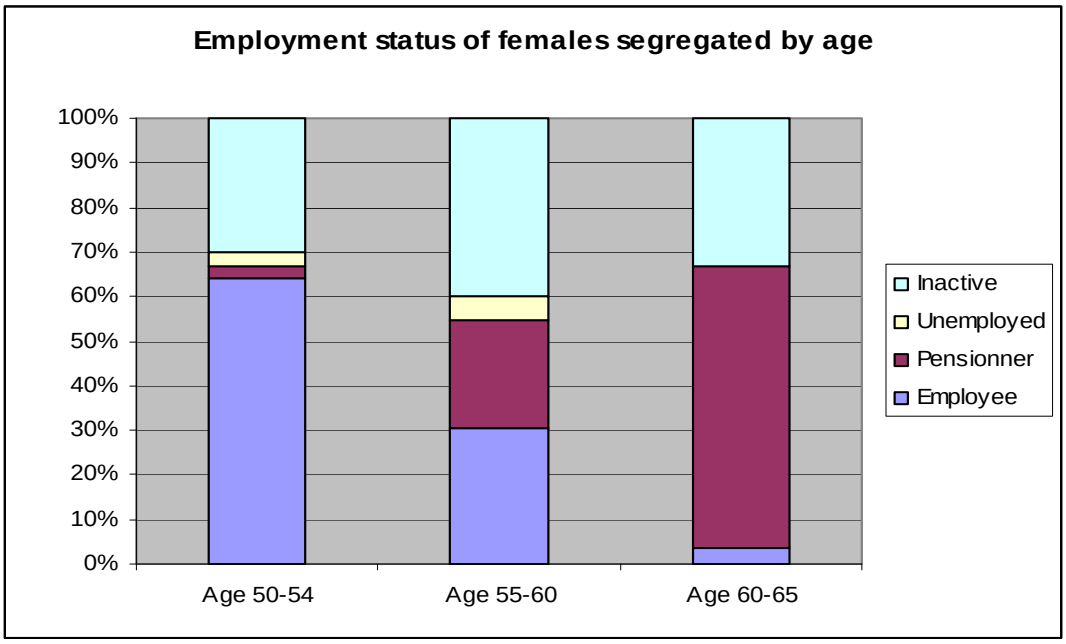


Figure 2



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. 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 percent for females while the inactivety status shows a share of 2 percent among males and more than 32 % among females. These empirical evidence 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.. In the end, 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.

Figure 3

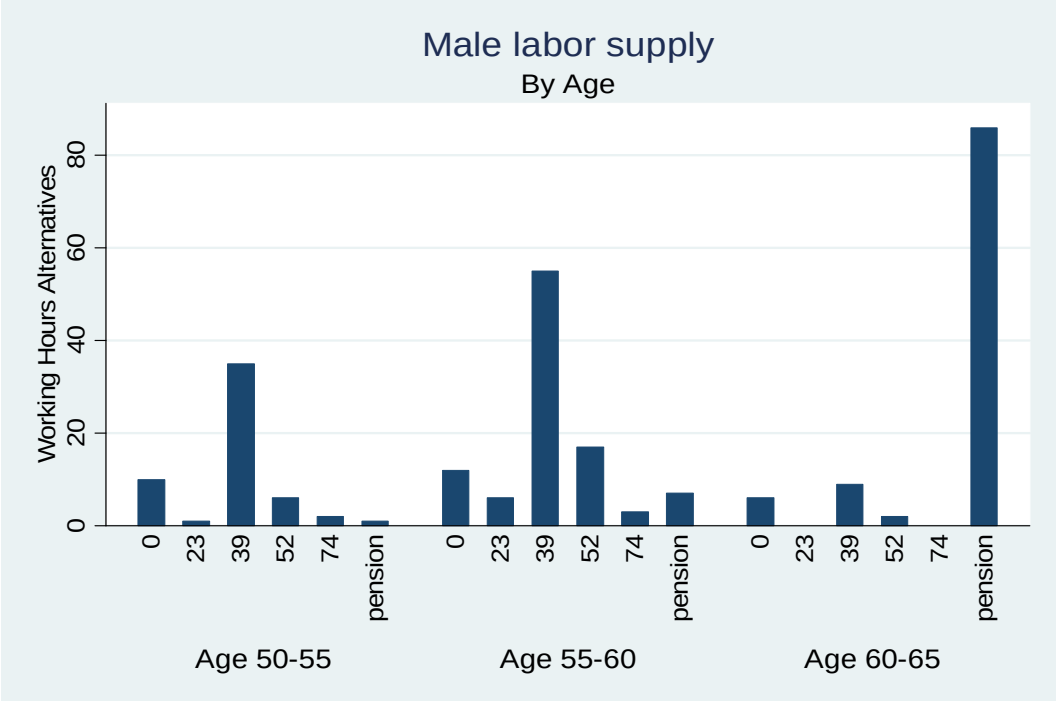
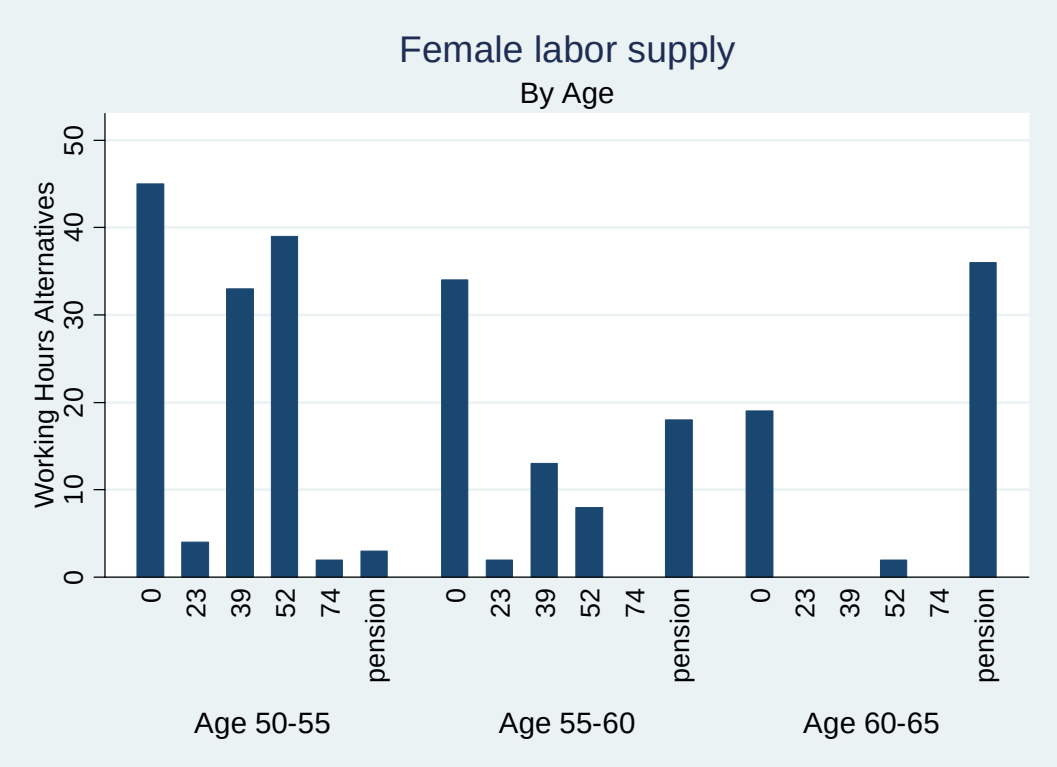


Figure 4



Figures 3 and 4 above illustrate the labor supply at the intensive margin for men and women for each age group. Looking at the male labor supply, we notice that there are two peaks, which refer to the full time alternative and the retirement alternative. While in the first alternative (full time) most of men are from the youngest group, in the retirement alternative they come from the oldest group. Whereas the part time alternatives are not preferred by men, the alternative referring to the extraordinary time seems more preferred for the age group 55-60. The female labor supply differs clearly from that of men mainly due to the predominance of more than two peaks and especially that of zero hours alternative which prevails 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. Considering the age segregation, the eldest females are clustered in the no work group while the youngest females are clustered in the full time alternative while part time work is weakly preferred ..

To conclude, men go through a normal transition from employment spell to retirement spell while women drag their inactivity status until the last work age group. Therefore due to their employment history a simple intuition would be that men get richer and then older while women get older and poorer unless they are married to older and richer men.

3 Micro-econometric modeling

We start estimating a conditional logit model of labour supply using EUROMOD dataset for Austria. Using the Euromod, different labor supply alternatives will be specified and the respective gross income will be generated; cash benefits and taxes will be calculated, accounting for the demographic characteristics of individuals and households.[10] One of the advantages of using Euromod is that we can analyse the impact of the MIG schemes not only with respect to their wealth and disposal income but also with respect to labour supply and employment decision. Such analysis has very important policy implications especially for those policies that enhance the social inclusion and policies in the pension system, which emphasizes the increase of the working age for both males and females. Providing empirical evidence on the labour supply response of the group of people close to the retirement in conjunction with the social welfare impact has crucial policy implications.

The utilization of the Euromod support the analysis of the one time choice, made at some point in time, while it is assumed that the rational decision maker maximizes its utility, in our case to work and receive income support, how many hours or to retire.

The microeconometric labour supply model is the one developed by Aaberge et al. (1999, 2004). We will consider households with two decision-makers (couples) while the behaviours of other people that might be in the households is taken as exogenous. Apart the labour supply choice set , participation and hours of work decision we introduce an extra alternative – pension, decision to retire from the labour market. Thus, the opportunity set of households is composed of 49 alternatives (6 alternatives of weekly hours of work and 1 of pension per each partner). The estimated model is used to simulate the optimal choices made by individuals under the constraint of constant net tax revenues when four different tax regimes are applied.

[10] However a static microsimulation model provides the effects of the reforms in one moment in time. The information on the work history of the individuals is not available and this fact limits the interpretation of the results.

Household n is assumed to maximise a utility function $U^i(X^n, P_F^n, P_M^n, h_f, h_m)$ under the constraints:

$$h_F \in \Omega$$
$$h_M \in \Omega$$
$$d_F \in \Omega$$
$$d_M \in \Omega$$
$$P_F = f(Age_F, W_F^n, \#Contributions_F, Z_F)$$
$$P_M = f(Age_M, W_M^n, \#Contributions_M, Z_M)$$
$$X^n = R(w_F^n h_F, w_M^n h_M, d_F P_F, d_M P_M, y^n)$$

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 in case of the pension choice taken from the choice set for 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)

$\Omega =$ set of discrete values (7 alternatives for each household member, 6 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 (.[11] The same holds also for the pension entitlement.

y^n = vector of exogenous household gross incomes

X^n = net household income

[11] We use Heckman procedure to impute the missing values of gross hourly wage. The hourly earnings estimation is available from the authors upon request.

R = tax-transfer rule that transforms gross incomes into net available household income. The tax rule is applied on yearly gross income which is generated by multiplying the average weekly income by 52 (number of weeks per year).

The first two constraints say that the hours of work h_i are chosen within a discrete set of values, Ω, including also 0 hours (i.e. non-participation or unemployment). 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 say that the choice set contains a further alternative corresponding to old-age pensions. 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:

$$U^n(X, f, m) = V(X, f, m; Z^n, \vartheta) + \varepsilon$$

where Z^n is a vector of household characteristics, "f" and "m" are vectors containing 6 working hours alternatives and one pension alternative respectively for females and males, "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, f, 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 $R(G(f), G(m), y^n)$ are the net available income when the household choice are (f, m) calculated using the tax/benefit algorithm EUROMOD. Euromod is able to calculate the income composition of households counting for the demographic characteristics and tax-benefit rules of different tax regimes.[12]

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

[12] The database created by the Euromod incorporates different alternatives of hours of work and the respective budget sets and is the input of the simulation exercises of different tax regimes.

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

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

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

4. Simulation of the reforms

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:

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

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 embodies the above criteria. The first simulation is based on the combination of a negative income tax (NIT) (where a flat tax is complemented with a transfer that guarantees households' income up to a basic level) and a reduction of pensions by 5 to 15% according to the age (ranging from 5% for the oldest group to 15% for the youngest group). Thus, taxes, benefits and pension reductions are simulated as follows:

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

and the benefits as below:

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

The pensions are reduced as follows:

$$Pensions^{2}{}_{NIT} = \begin{cases} \max(95\% * Pensions, a * poverty - Y) \rightarrow Pensionner * Age65 \\ \max(90\% * Pensions, a * poverty - Y) \rightarrow Pensionner * Age60 \\ \max(85\% * Pensions, a * poverty - Y) \rightarrow Pensionner * Age55 \\ o \rightarrow otherwise \end{cases}$$

$$Pensions^{2}{}_{NIT} = \begin{cases} \max(90\% * Pensions, a * poverty - Y) \rightarrow Pensionner * Age65 \\ \max(80\% * Pensions, a * poverty - Y) \rightarrow Pensionner * Age60 \\ \max(70\% * Pensions, a * poverty - Y) \rightarrow Pensionner * Age55 \\ o \rightarrow otherwise \end{cases}$$

The poverty line is set equal to the median of gross income 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.[13] The parameter (a) is set equal to 0.25, 0.5. 0.75 and 1 as a standard equivalence scale. This parameter determines the generosity of the tax benefit scheme and goes with the scheme generosity so that the more generous the system the higher is the parameter a. Therefore a*Poverty is guaranteed income level for the household while t_{NIT} is a constant marginal tax rate. The guaranteed income replaces all current family benefits and transfers (see the Appendix).

Then we apply the so-called WorkFare (WF) system, which essentially is a modification of NIT where the transfer is also conditional on a minimum amount of weekly hours of work such as the benefits to low income households are given conditional on the average number of weekly hours worked, e.g a minimum of 20 by one of the household members.

[13] 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.

In all these tax-benefits systems simulations, the disposable income is a function of the wife and husband's earnings, labor and 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. Since the actual basic income support policies are thought to be rather wasteful and occasionally even inequitable, there might be scope for reforms that are able to increase both efficiency and equality.

For each simulation there is a tax rate that is determined by generating the same total tax revenue as of 2004, given the other parameters of the tax-transfer rules. Different tax-benefit rules generate different impacts on the utility of the household, which are reflected by the changes in the level of disposable level of 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 labor supply and hours of work.

5. Results

Here we show the results of the simulations of the above reforms on household labor supply and their welfare measured in terms of expected maximum utility.

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 under a certain poverty threshold therefore with a minimum income. Thus our reform tackles both the pension system sustainability problem and the poverty issue that is so crucial to this age group. In the following paragraph we compare the simulated reforms focusing on the social welfare criteria based on utility and income and the respective percentage of winners.

As shown in Table 2, all reforms perform better than the current system in terms of social welfare and percentage of households with an increased welfare. The best performer among the reforms, according to the criteria of social welfare utility based (net income), is the

WF (NIT) which is characterized by an approach of higher generosity of income support while working and lower pension entitlement in case of early retirement. [14]

Table 3 shed some light on the impact of the above reforms on labor supply showing the point estimates of working hours and their distribution across income deciles, age group and eligibility criteria. There is a clear increasing trend of labor supply for all rules and especially for men (more than 5 hours per week for males while only an increase of one hour for females). In spite of this, the generosity of welfare system would encourage labor supply alongside the pension reductions and, a higher response in labor supply is noticed for workfare than NIT and this is in line with the empirical literature.

However, point estimates of labour supply do not help out to get a complete picture of labor supply behavior. For that reason, we evaluate the distribution of labor supply across age and income deciles as in the following two tables.

Table 4 shows that the positive effect on labor supply appears to be higher for males at above the age of 55 (by more than 4 hours) while as regards women, the increase in hours of work is higher for those in the age group 56 59. This finding holds also for under different ranges of pension reductions.

The disaggregation of labor supply by income deciles, as in Table 5, indicates that the best performers are males belonging to the last income group succeeded by the middle income individuals. Notwithstanding the smaller positive response for low income men, at least no encouragement is given to the hypothesis of disincentives. A similar trend is observed also for women but at a smaller magnitude.

Lastly we categorize the households into income support receivers, pensioners and others (still working). Table 6 shows that the highest response in labor supply for males is observed for those households which belonging to the category of income support receivers and pensioners. Concerning females the response is almost negligible expect for an increase of almost one hour for pensioners and under the WF tax-benefit system.

[14] WF works better than NIT in terms of utility while NIT works better in terms of disposable income.

6. Conclusion

By the means of a micro econometric model of household labor 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 poor households in Austria. In particular, these reforms are based on the combination of either a negative income tax (NIT) or Workfare (WF) and a reduction of pensions by 5 to 15% (by 10% to 30%) and according to the age (ranging from 5% for the oldest group to 15% for the youngest group).

We find out that all welfare reforms bring to higher social welfare compared to the baseline system. The best performer among the reforms, according to the criteria of social welfare utility based (net income), is the WF (NIT) which is characterized by an approach of higher generosity of income support while working and lower pension entitlement in case of early retirement. The reductions in pensions long with higher benefits for households living under the poverty threshold bring to a higher social welfare and an increasing number of winners. Concerning labor supply the results show that it increases for all rules, especially for men, by more than 5 hours. A weaker response in labor supply is noticed in case of females. At the end, a higher response in labor supply is observed for Workfare rather than Negative Income Tax system indicating that in work tax credit provide higher labour incentives also for older workers.

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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.

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

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 7 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, 1995)[15].

Appendix 2

[15] 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.

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 2: Behavioural and welfare effects of the simulated reforms

	Average Utility	Gini Utility based	Average Net Income	Gini Income Based	Benefits	Social Welfare Utility Based	Social Welfare Income based	Winner by Utility	Winner by Income
Current									
	39,46	0,114	2219	0,197	903	34,96	1782		
NIT + Flat(10-30%)									
a=1,00	39,707	0,113	2538	0,245	675	35,22	1916	74,01	73,62
a=0,75	39,711	0,113	2548	0,253	658	35,22	1903	74,43	72,13
a=0,50	39,719	0,113	2554	0,258	645	35,23	1895	74,41	72,13
a=0,25	39,725	0,113	2555	0,262	639	35,23	1886	73,62	71,32
NIT+ Flat(5-15%)									
a=1,00	39,688	0,113	2503	0,237	746	35,20	1910	71,32	71,31
a=0,75	39,669	0,113	2510	0,246	738	35,18	1893	70,93	70,15
a=0,50	39,674	0,113	2512	0,252	732	35,19	1879	71,33	70,92
a=0,25	39,679	0,113	2512	0,256	728	35,19	1869	71,32	70,51
WF + Flat (10-30%)									
a=1,00	39,732	0,113	2548	0,253	651	35,24	1903	76,21	74,34
a=0,75	39,731	0,113	2553	0,257	643	35,24	1897	75,89	72,34
a=0,50	39,733	0,113	2556	0,262	635	35,23	1886	75,31	71,72
a=0,25	39,732	0,113	2556	0,263	634	35,23	1884	74,23	71,31
WF + Flat (5-15%)									
a=1,00	39,692	0,113	2511	0,245	723	35,21	1896	74,81	74,11
a=0,75	39,689	0,113	2513	0,251	722	35,20	1882	74,22	72,41
a=0,50	39,688	0,113	2515	0,255	721	35,20	1874	72,82	71,72
a=0,25	39,685	0,113	2514	0,258	723	35,20	1865	71,73	71,31

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

Table 3: Labour supply changes

	Hours Male	Hours Female
Current		
	23,16	12,96
WF + Flat (10-30%)		
a=1,00	28,53	13,95
a=0,75	28,46	14,02
a=0,50	28,41	14,09
a=0,25	28,35	14,12
WF + Flat (5-15%)		
a=1,00	27,97	13,71
a=0,75	27,87	13,75
a=0,50	27,79	13,79
a=0,25	27,71	13,81
NIT + Flat(10-30%)		
a=1,00	28,43	13,94
a=0,75	28,44	14,05
a=0,50	28,40	14,11
a=0,25	28,34	14,13
NIT+ Flat(5-15%)		
a=1,00	27,90	13,71
a=0,75	27,86	13,78
a=0,50	27,79	13,82
a=0,25	27,71	13,82

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

Table 4: Change in Labor Supply Disaggregated by Age

	Male			**Female**		
Age	*50-55*	*56-59*	*60-65*	*50-55*	*56-59*	*60-65*
Current Hours						
	36,12	34,58	4,71	19,89	6,67	1,49
WF + Flat (10-30%)						
a=1,00	2,32	4,06	4,14	0,48	1,33	0,61
a=0,75	1,96	4,14	4,06	0,55	1,32	0,64
a=0,50	1,62	4,19	4,03	0,53	1,36	0,65
a=0,25	1,29	4,24	3,99	0,52	1,38	0,66
WF + Flat (5-15%)						
a=1,00	2,32	4,06	4,14	0,48	1,33	0,61
a=0,75	1,96	4,14	4,06	0,55	1,32	0,64
a=0,50	1,62	4,19	4,03	0,53	1,36	0,66
a=0,25	1,29	4,24	3,99	0,52	1,38	0,66
NIT + Flat(10-30%)						
a=1,00	2,48	4,01	4,02	0,49	1,15	0,59
a=0,75	2,06	4,12	4,01	0,55	1,25	0,64
a=0,50	1,63	4,19	4,03	0,53	1,36	0,66
a=0,25	1,29	4,24	3,99	0,52	1,38	0,66
NIT+ Flat(5-15%)						
a=1,00	2,48	4,03	4,02	0,49	1,15	0,59
a=0,75	2,06	4,12	4,01	0,55	1,25	0,64
a=0,50	1,62	4,18	4,03	0,53	1,36	0,66
a=0,25	1,29	4,24	3,99	5,17	1,38	0,66

Table 5: Changes in Labor Supply Hours by deciles

	Male			Female		
Deciles	***I-II***	***III-VIII***	***IX-X***	***I-II***	***III-VIII***	***IX-X***
Current						
	1,53	***24,29***	***31,79***	***3,42***	***15,02***	***16,43***
WF + Flat (10-30%)						
a=1,00	1,97	3,24	5,93	0,46	0,75	0,78
a=0,75	1,64	3,07	6,13	0,39	0,81	0,87
a=0,50	1,45	2,91	6,24	0,28	0,83	0,91
a=0,25	1,32	2,76	6,32	0,28	0,83	0,92
WF + Flat (5-15%)						
a=1,00	1,71	3,07	5,61	0,31	0,56	0,63
a=0,75	1,36	2,85	5,83	0,26	0,22	0,72
a=0,50	1,14	2,63	5,94	0,19	0,64	0,76
a=0,25	0,96	2,46	6,01	0,19	0,64	0,79
NIT + Flat(10-30%)						
a=1,00	1,89	3,27	5,91	0,29	0,74	0,79
a=0,75	1,61	3,09	6,16	0,29	0,81	0,89
a=0,50	1,45	2,91	6,24	0,28	0,83	0,92
a=0,25	1,3	2,76	6,3	0,28	0,83	0,92
NIT+ Flat(5-15%)						
a=1,00	1,68	3,09	5,59	0,23	0,56	0,64
a=0,75	1,34	2,86	5,84	0,21	0,63	0,74
a=0,50	1,14	2,63	5,94	0,19	0,65	0,76
a=0,25	0,96	2,46	6,01	0,19	0,64	0,79

Table 6: Hours change for different types of individuals

		Male			Female	
Status	**Receiver**	**Pensioner**	**Other**	**Receiver**	**Pensioner**	**Other**
WF + Flat (10-30%)						
a=1.00	5.58(24.07)	3.95(10.03)	3.05(33.72)	0.05(14.32)	0.98(7.55)	0.49(17.25)
a=0.75	5.84(19.14)	3.87(10.03)	2.93(33.64)	0.4(11.66)	0.99(7.55)	0.56(17.26)
a=0.50	4.50(14.49)	3.84(10.03)	2.81(33.55)	0.18(9.99)	0.97(7.55)	0.56(17.23)
a=0.25	2.03(13.19)	3.81(10.03)	2.68(33.42)	0.09(11.09)	0.98(7.55)	0.55(17.16)
WF + Flat (5-15%)						
a=1.00	5.79(24.07)	3.35(10.03)	3.12(33.72)	0.07(14.32)	0.68(7.55)	0.43(17.25)
a=0.75	5.95(19.14)	3.24(10.03)	2.98(33.63)	0.07(11.66)	0.68(7.55)	0.49(17.26)
a=0.50	4.61(14.49)	3.18(10.03)	2.81(33.56)	0.19(9.99)	0.68(7.55)	0.50(17.23)
a=0.25	2.06(13.19)	3.12(10.03)	2.65(33.42)	0.11(11.09)	0.69(7.55)	0.50(17.16)
NIT + Flat(10-30%)						
a=1.00	4.26(29.40)	3.84(10.03)	3.06(33.93)	0.36(16.26)	0.84(7.55)	0.55(17.25)
a=0.75	4.01(27.48)	3.83(10.03)	2.97(33.83)	0.34(15.28)	0.91(7.55)	0.59(17.29)
a=0.50	3.32(20.99)	3.84(10.03)	2.81(33.72)	0.29(12.89)	0.97(7.55)	0.57(17.27)
a=0.25	1.58(20.88)	3.81(10.03)	2.70(33.52)	0.21(13.47)	0.98(7.55)	0.56(17.19)
NIT+ Flat(5-15%)						
a=1.00	4.37(29.40)	3.30(10.03)	3.10(33.94)	0.30(16.26)	0.60(7.55)	0.46(17.26)
a=0.75	4.09(27.48)	3.22(10.03)	2.98(33.83)	0.32(15.28)	0.65(7.55)	0.52(17.29)
a=0.50	3.49(20.99)	3.18(10.03)	2.81(33.72)	0.31(12.89)	0.68(7.55)	0.51(17.27)
a=0.25	1.68(20.88)	3.12(10.03)	2.68(33.52)	0.22(13.47)	0.69(7.55)	0.50(17.19)

Table 7: Conditinal logit estimation

Number of observations	12642
LR chi2(67)	916,83
Prob>chi2	0
Log likelihood	-545,67456
Pseudo R2	0,4565

	Coefficient	Std. Err.	t value	Significance
Income				
Constant	0,0043	0,0013	3,42	**
Square	-1.29e-07	1.04e-07	-1,24	
Age 55-60 Female	0,0004	0,0003	1,33	
Age 60-65 Female	0,0012	0,000	2,75	*
Age 55-60 Male	0,0012	0,000	4,42	**
Age 60-65 Male	0,0030	0,001	4,28	**
Leisure Female				
Constant	0,2675	0,177	1,51	
Square	0,0000	0,001	0,03	
Income	-0,0010	0,000	-0,75	
Age 55-60	0,0649	0,013	4,82	***
Age 60-65	0,1398	0,024	5,76	**
Leisure male				
Constant	0,7358	0,159	4,64	***
Square	-0,0025	0,001	-2,22	*
Income	-0,0001	0,000	-6,21	***
Leisure female	-0,0040	0,001	-4,82	***
Age 55-60	0,0624	0,010	6,11	***
Age 60-65	0,1161	0,022	5,32	***

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

Only the significant estimates of alternative dummies are shown in the table.