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Housing Equity Release, Old-Age Income, and Public Finances

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Housing equity release, old-age income, and public finances[1]

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Abstract

Many elderly people could markedly increase they standard of living by releasing housing equity. Purchase of a life annuity would increase the benefits of this release. Focusing on the Finnish case, we analyze the fiscal implications of different forms of housing equity release. We take into account the fact that most households have most of their wealth in the form of owner housing and that housing enjoys a tax-favoured status relative to most other forms of consumption and savings. We find that even tax free life annuities may well increase aggregate tax revenue relative to a situation where private annuities are not available. This is because the possibility to annuitize financial savings increases the opportunity cost of housing wealth inducing households to increase non-housing consumption relative to (tax-favoured) housing consumption. Reverse mortgages, in contrast, are likely to decrease tax revenue. This is because they make housing consumption all the more attractive.

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1 Introduction

In most EU countries, housing is a very significant part of the wealth of middle class households. One explanation for this is that tax systems tend to favour owner housing over rental housing and other forms of saving or investment. This is mainly because the return to owner housing, the imputed rent, goes untaxed while the return to most other assets are taxed at a relatively high effective rate. Many states also provide subsidized savings schemes for first-time home buyers. [4]

Housing wealth is especially important for older households as they have often paid back their mortgages (see e.g. OECD 2013). In particular, their net housing wealth may be quite high relative to their expected remaining lifetime income. This means that many retired households could markedly increase their standard of living for the rest of their lives by releasing housing equity (see Doling 2009 for European data on this issue). A potentially attractive way of releasing housing equity at old age would be to move to a cheaper house (once the kids have left home) and use the difference to a buy a single-payment life-annuity guaranteeing a constant income flow for the remaining lifetime. Another way of releasing housing equity at old age is to take a reverse mortgage.

In this paper, we study the fiscal implications of these different types of housing equity release. In particular, we ask how the introduction of related annuity products or reverse mortgages influences public finances. We also illustrate how different ways of releasing housing equity influence life cycle savings and old age income.

We focus on the case of Finland. In Finland, the tax treatment of single-payment life annuities is currently very severe. Essentially, this is because both yield and capital are taxed without deductibility of premiums. As a result, there is virtually no market for such annuities. So we can ask how a less severe tax treatment of single payment life annuities would change the government tax revenue relative to the status quo. The market for reverse mortgages in Finland is small but growing.

One starting point of our analysis is that since Finnish households currently have most of their net worth tied to housing, single payment life annuities would indeed often be financed by releasing housing equity. Another starting point is the current tax-favoured status of owner housing.

[4] See Hendersott and White (2000) for an international comparison of housing's tax status.

It should be stressed that we do not claim that the tax treatment of single-payment annuities is necessarily the main reason for Finnish households not releasing housing equity at old age. Indeed, there may be many other reasons for that, such as the bequest motive and precautionary savings (see Nakajima and Telyukova (2011) for a life-cycle model featuring both these mechanisms). Related to this, our aim is not to try and predict how popular single-annuities would become, if given a less severe tax treatment. As the literature on the "annuity puzzle" has documented, private annuity markets are relatively small also in many countries where the tax treatment of single-payment annuities is reasonable (see e.g. Paschchenko 2013). Rather, we ask whether the fiscal implications of making single-payment annuities tax free would necessarily be negative.

In order to answer our research questions, we specify a simple life cycle model of household savings that features a tax system reflecting the current tax treatment of housing vis-à-vis other assets and consumption goods.[5] We calibrate the key preference parameters so that household's asset positions are realistic in light of Finnish data. We then introduce tax free annuities that allow for efficient housing equity release at old age as well reverse mortgages and see how they affect household savings behavior and aggregate tax revenue in the model.

We proceed as follows. In the next section, we provide information about the portfolios of the Finnish households. In section 3, we describe the model. In the fourth section we present our main results. Section 4 concludes.

2 On the tax treatment of single-payment life annuities

Taxation of lifetime annuities combines taxation of saving and insurance. Full taxation of the yield of long-term saving is often considered to be especially harmful due to the cumulative distortive effects of taxes on households' timing of consumption. In the same vein, taxation of mortality bonus lowers the expected yield of the insurance to be less than actuarially fair.

It is common that saving for old age is tax-favoured. The aim of tax allowances is partly to avoid the cumulative distortions mentioned above, and also to compensate for the restricted liquidity and to promote long-term saving of short-sighted individuals (see, for instance, Diamond, 2009). The

[5] We abstract from rental housing and consider only owner housing. This is because we take the tax-favoured status of owner housing as given. See Gervais (2002) for a life-cycle model of housing that includes also the tenure choice.

currently most often used rules of long-term saving are based either on the EET (exempt-exempt-taxed) or TEE (taxed-exempt-exempt) principle.

The outcomes of EET and TEE tax regimes are identical if the tax rate remains constant in time and savings are invested in riskless assets. Yield of saving is not taxed and government receives no tax revenues in present value terms. In case of risky investments the same outcome requires that also the money saved due to tax deduction in EET tax regime is invested in identical risky asset and the yield of this asset does not change due to the additional amount purchased. The saved amount and its yield are equal to the tax to be paid, as in the case of the riskless asset, but the yield risk is now enhanced.

If the initial investment is invested in a risky asset and the deducted amount is invested in a riskless asset in the EET tax regime, government shares the yield risk, and the expected value of tax revenues is positive. The outcome is in this case identical to the one in RRA (Rate of Return Allowance) tax regime, where there is no tax deduction for the initial invested amount but there is tax relief for riskless rate of return. This relief taxes returns higher than the riskless rate and provides a negative tax if the yield is below the riskless rate. Both EET and RRA regimes are neutral from the point of view of saving incentives.

Arguably, taxation of single-payment life annuities should be neutral, if there are not specific reasons to deviate from neutrality. As explained above, neutral taxation of savings can be achieved by introducing either EET or RRA regime[6]. Neutrality of insurance requires that mortality bonus is not taxed[7]. EET regime might run to problems if the deducted amount is higher than the yearly taxable income. Therefore it should be possible to distribute the deduction to several years.

The Finnish tax rules for single-payment life insurances are very specific and in practice prohibitive. The key problem is that the contributions paid are not deductible even though an age-dependent share of the pension (annuity payout) is taxed as wage income. This means that the effective tax rate on the yield and the mortality bonus easily exceeds 100%.

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[6] Optimality of saving taxation may require deviations from neutrality principle. Taxing riskless return can be optimal e.g. if the preference for income redistribution is strong, government cannot tax the earning ability and this ability is correlated with propensity to save. On the other hand, saving should be subsidized, if people are myopic.

[7] Optimality may also here deviate from neutrality. If there is variation in the life expectancy of individuals and asymmetric information, annuities are expensive for those who have low life expectancy. If mortality bonus is taxed, it is these people who are likely to first give up buying annuities.

3 Household portfolios in Finland

Figures 1 and 2 describe household portfolios in different age groups. Figure 1 displays mean values of different asset classes and liabilities while Figure 2 displays corresponding median values. The data source is Statistic Finland's 2009 wealth survey. We consider both renters and homeowners.

The first figure reveals that in all age groups, most household wealth consists of the value of the primary residence. Financial wealth, in particular, makes up a relatively share of all assets. It should be noted that 'other assets' often includes a summer cottage, so a large part of it is housing wealth as well. Moreover, on average, households older than 60 or so have usually already paid back their mortgages.

The role of the primary residence seems even more important in figure 2 than in figure 1. This reflects the fact that financial wealth is much more unevenly distributed than housing wealth.

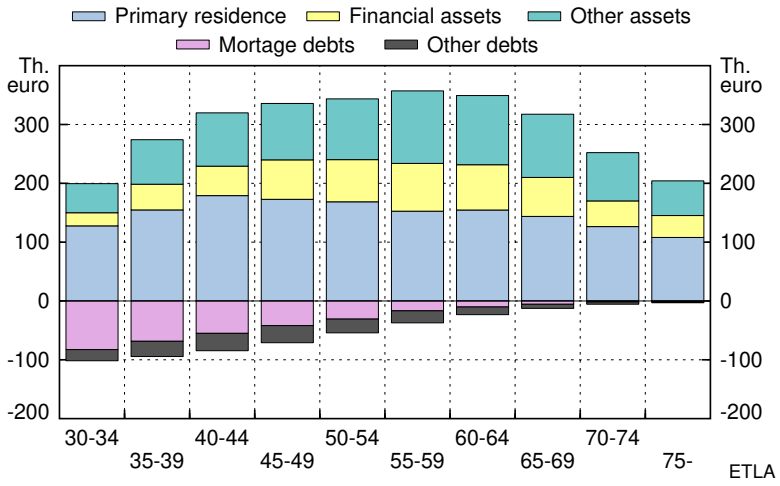

Figure 1: Household portfolios by age group, mean values

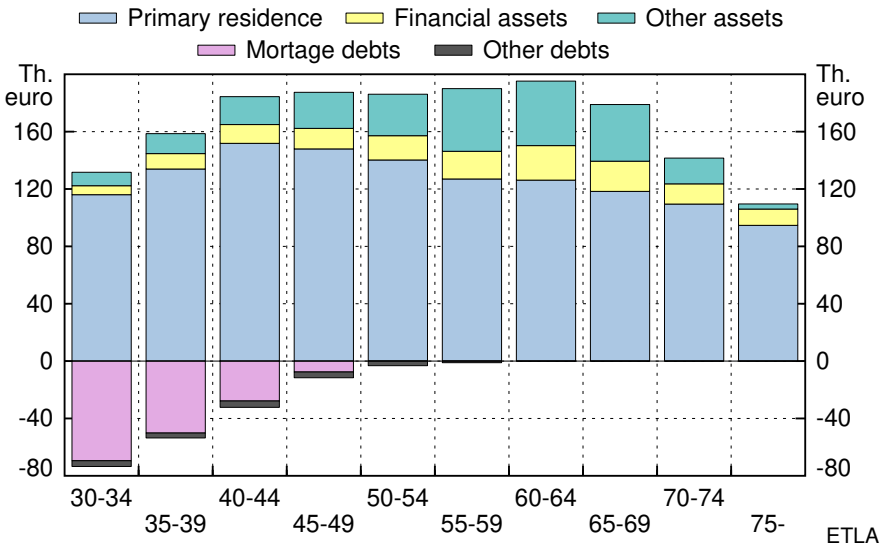

Figure 2: Household portfolios by age group, median values.

4 Model

4.1 Set-up

We consider the steady state of a discrete time OLG model where there is a continuum of households that live at most J periods. Household age is denoted by $j = 1, 2, ..., J$. Households retire at age $1 < j^r < J$. They face lifetime uncertainty. The probability of surviving from age j to age $j+1$, conditional on being alive in age j, is denoted by S_{j+1}.

Households of age j receive after-tax earnings e_j. Households derive utility from owner housing and non-housing consumption. Housing is both an asset and consumption good. The amount of quality adjusted housing is denoted by h and that of non-housing consumption by c. Preferences are time-separable and the periodic utility function is $u(c,h)$. Households discount future utilities with a discount rate β.

In age 1, households make a consumption and savings plan for all periods $j \le J$ (conditional on surviving). They maximize their expected lifetime utility given by

$$\sum_{j=1}^{J} \beta^{j-1} \prod_{i=1}^{j} S_i u(c_j, h_j) \ , \qquad (1)$$

subject to the following constraints:

$$(1+\tau^c)c_j + h_j + a_{j+1} = h_{j-1} - (1+\tau^c)\delta h_{j-1} + R_j a_j + e_j + (1-\tau^b)\bar{b} \qquad (2)$$

$$a_{j+1} \geq -(1-\gamma_j)h_j \qquad (3)$$

The first constraint is the periodic budget constraint, τ^c denotes consumption tax, a financial savings, δ direct maintenance costs, R the after-tax return to financial savings, e after-tax earnings, τ^b bequest tax, and $\bar{b}$ a periodic bequest received by the household. Notice that we are assuming that maintenance costs are subject to consumption taxation while the imputed rent of owner housing goes untaxed.

The second constraint is a borrowing constraint. It reflects the assumption that households can only borrow against their housing. Parameter γ_j is the maximum borrowing as a share of housing wealth. We assume that it may vary by household age. We further assume that households start their lives with zero assets.

In the absence of life annuities, the return to financial assets is determined as

$$R_j = 1 + (1-\tau^a)r \, , \qquad (4)$$

where τ^a denotes capital income tax and r before-tax return to financial assets. In this case, we set $R^b = 1 + r$.

The bequest that a household leaves in case it dies in age j are determined as follows

$$b_{j+1} = h_j - (1+\tau^c)\delta h_j + R^b_{j+1} a_{j+1} \ , \qquad (5)$$

where R^b defines how financial savings contribute to the bequest. Every period, these bequests are distributed lump-sum to all agents alive. The periodic bequest transfer that households receive ($\bar{b}$) is determined endogenously so that its aggregate value corresponds to the aggregate bequests left.

There are two reasons why households may leave bequests in the model. First, because of lifetime uncertainty and imperfect annuitization, households leave "accidental" bequest. Second, the borrowing constraint may force household to have strictly positive housing equity.

For simplicity, we don't impose a government budget constraint. Instead, we keep all tax rates fixed and simply compute the change in aggregate tax revenue following certain reforms. When computing aggregate tax revenue, we obviously need to take into account that different age groups are of different size due to mortality.

4.2 Calibration

The model period corresponds to 4 years and that households live at most 16 periods. We assume that the first model age corresponds to real age 25-28. The last model period then corresponds to real age 85-88. The first retirement period is $j^r = 10$, which corresponds to real age 61-64. We determine the survival probabilities $\{S_j\}_{j=1}^{J}$ from Statistics Finland's life tables. We use the average survival probabilities for men and women.

We consider a relatively general CES-CRRA utility function:

$$u(c,h) = \begin{cases} \dfrac{[\varphi(c,h)]^{1-\sigma}}{1-\sigma}, \text{ for } \sigma > 0, \sigma \neq 1 \\ \log \varphi(c,h), \text{ for } \sigma = 1 \end{cases} \tag{6}$$

where

$$\varphi(c,h) = \begin{cases} \left(\alpha c^{\rho} + (1-\alpha)h^{\rho}\right)^{1/\rho}, \text{ for } \rho \leq 1, \rho \neq 0 \\ c^{\alpha} h^{1-\alpha}, \text{ for } \rho = 0 \end{cases} \tag{7}$$

Parameter σ determines the inverse of the intertemporal elasticity of substitution and parameter ρ the intratemporal elasticity of substitution between non-housing and housing consumption. We will vary these two parameter to see how sensitive our results to changes in household preferences. Varying these two parameters changes the life cycle housing and net wealth profiles.

We set the (real) interest rate at $r = 8\%$, which corresponds to an annual return of (approx.) 2%. We think of this as a reasonable estimate of the average rate of return to relatively risk free investments in the long run. In the baseline calibration we set the borrowing constraint as follows:

$$\gamma_j = \begin{cases} 0.2, j < 10 \\ 1.0, j \geq 10 \end{cases} \tag{8}$$

That is, before retirement households can borrow up to 80% of the value of their house. After retirement, they cannot borrow at all. This assumption is meant to capture the situation where reverse mortgages are not available. We will also consider relaxing the borrowing at retirement age and interpret that as reverse mortgages becoming available.

We set the tax rates as follows: $\tau^c = 0.20$, $\tau^a = 0.30$, and $\tau^b = 0.10$. These correspond, at least approximately, to the effective tax rates of consumption, interest income, and bequests in Finland.

Eerola and Määttänen (2012) have calibrated a similar OLG model using Finnish household wealth data. We take the net earnings profile $\{e_j\}_{j=1}^{J}$ directly from their paper. They also estimated that direct housing costs (including maintenance but excluding capital costs) are on average 2.5 % of the market value of the house. Based on that, we set δ so that $(1+\tau^c)\delta = 0.1$. This implies δ=0.0833.

We consider different values for the preference parameters σ and ρ. For each combination of them, we choose the remaining preference parameters β and α so that relative to average income, the average net wealth and average housing wealth are realistic. In Statistics Finland's 2009 wealth survey, the ratio of the average net wealth to the average net annual monetary income is 5.56. The ratio of the average house value to the average net annual monetary income in turn is 3.92. (We consider only households that are homeowners and where the household head is at least 25 years old.) As the model period is four years, we need to divide these figures by four to get the corresponding ratios relative to periodic income. Hence, we choose β and α so that the average net wealth and average housing wealth are 1.39 and 0.98 times the average periodic income (including positive interest income). For instance, in the case where $\sigma = 0$ and $\rho = 1$ (logarithmic utility), the resulting parameter values are $\beta = 0.972$ and $\alpha = 0.820$

Figures 3 and 4 display household portfolios for two different parameterizations (in the case without annuities). ‘Mortgages’ refer to negative financial assets and ‘Savings’ to positive financial assets. In figure 4, where both inter- and intratemporal elasticities are relatively low, the housing profile is much smoother than in figure 3.

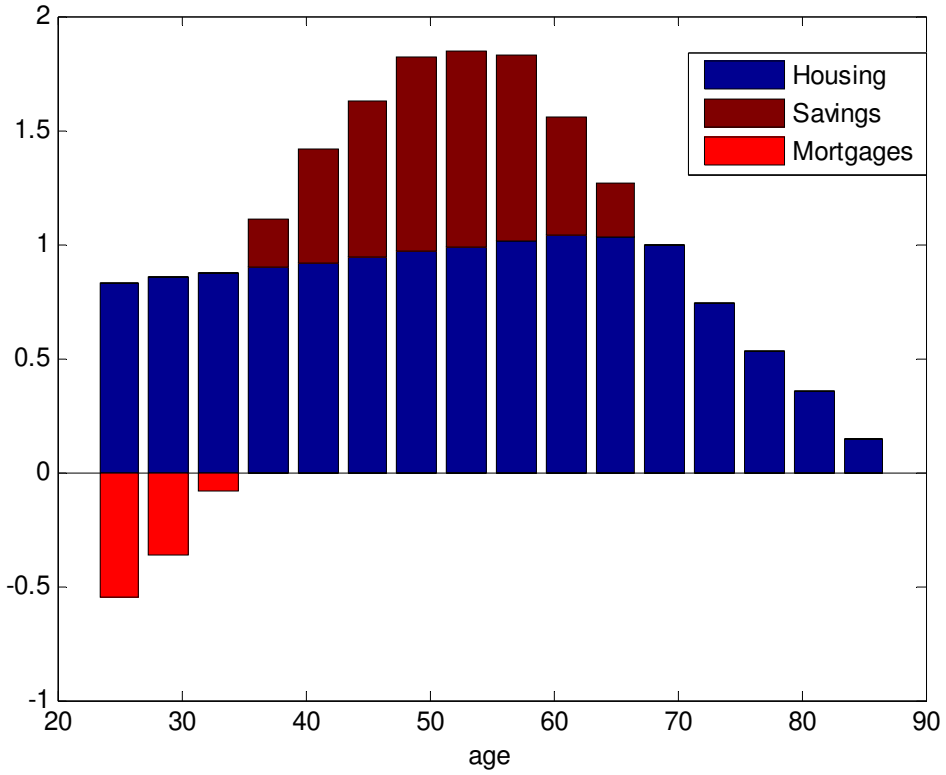

Figure 3: Household wealth over the lifecyle in the model, logarithmic utility.

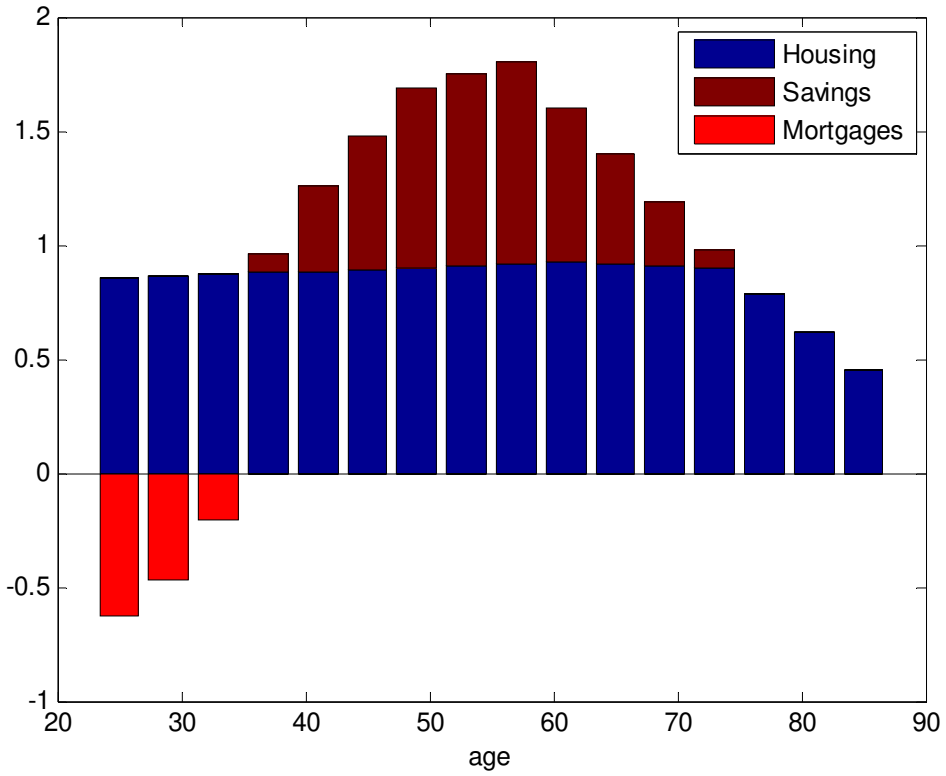

Figure 4: Household wealth over the lifecycle in the model, $\sigma = 3, \rho = -1$.

5 Results

In this section, we use the model to analyze the fiscal implications of different ways of releasing housing equity.

5.1 Tax free single-payment life annuities

We first consider single-payment life annuities. Specifically, we compare the baseline model to a model where retired households can annuitize their financial savings. The idea is that since there is currently no market for single-payment life annuities, it makes sense to compare an economy without annuities to an economy where annuities are available.

We model the annuities as period-by-period bonds which include an actuarially fair mortality premium. We also assume that annuities are tax-free. Together with the assumption that households do not have a bequest motive, these assumptions imply that households want to annuitize all their

financial savings. We can then incorporate annuities into the model simply by redefining the return to financial savings as follows:

$$R_j = \begin{cases} 1 + (1-\tau^a)r, j \le j^r \\ \dfrac{1+r}{S_j}, j > j^r \end{cases} . \qquad (9)$$

As the above formula for $j > j^r$ shows, the periodic return to annuitized savings is the higher the lower is the survival probability. This reflects the idea that the savings are pooled among annuitants so the survivors receive the savings of the deceased. As a result, by annuitizing their savings, household avoid leaving financial savings as accidental bequests. So the average bequest will be smaller than in the baseline case without annuities. So in this case we also have

$$R_j^b = 0 \text{ for } j > j^r \qquad (10)$$

It should be noted that we are still assuming that retired households cannot borrow. Hence, the mortality premium related to annuities only applies to positive financial savings.

Figures 5 and 6 display household portfolios after the introduction of annuities. These figures are comparable with figures 3 and 4 above in that, apart from the return to financial savings, all parameter values are the same. Tax free annuities induce household to have much more financial savings at old age. Also the lifecycle housing profile changes somewhat.

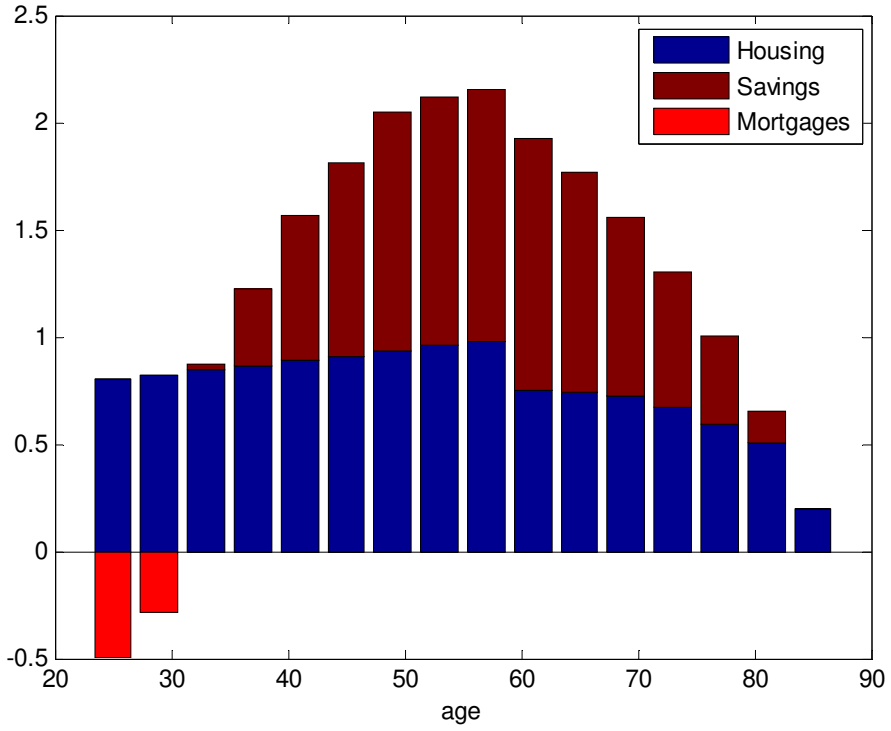

Figure 5: Household wealth over the lifecyle with annuities, logarithmic utility,

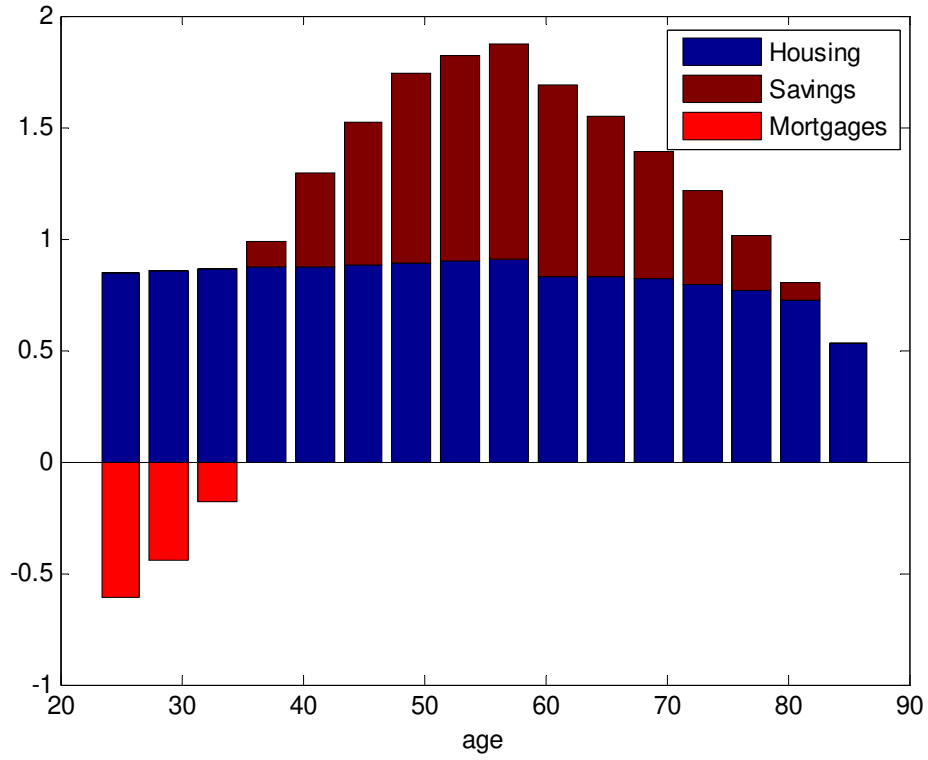

Figure 6: Household wealth over the lifecycle with annuities, $\sigma = 3, \rho = -1$.

Table 1 reports some results related to the introduction of annuities. It displays the change in the average non-housing consumption, housing, net wealth, bequest and taxes paid, for different combination of the preference parameters. As can be seen from the table, the introduction of annuities leads in all cases to an increase in average non-housing consumption and a decrease in housing consumption. This change in the consumption structure relates to the fact that the introduction of annuities effectively increases the user cost of housing. The higher return to annuitized savings relative to ordinary financial savings increases the opportunity cost of housing wealth relative to the baseline case without annuities.

Interestingly, the introduction of annuities does not necessarily decrease the average bequest. In the case where the intertemporal elasticity is relatively high ($\sigma = 1$) and intratemporal elasticity relatively low ($\rho = -2$), the average bequests increases by 7.3%. Because of the high intratemporal elasticity, the higher return to financial savings at old age leads households to postpone much of their non-housing consumption towards the end of their lifecycle. However, because of the low intratemporal elasticity, they also want to postpone their housing consumption so as to keep the ratio of non-housing-to-housing consumption roughly constant over the lifecycle. As a result, they have relatively large houses at old age, which implies relatively large bequests as well.

Table 1 also suggests that the introduction of tax free annuities does not necessarily reduce tax revenue. In fact, the opposite may well be the more likely outcome. While the tax revenue decreases slightly in the last case, it increases in other cases. The reason why the tax revenue may increase relates partly to the fact that housing is taxed very lightly relative to both non-housing consumption and ordinary (non-annuitized) financial savings. The introduction of annuities leads households to increase their non-housing consumption relative to housing consumption. This increases consumption tax revenues.

At the same time, the introduction of annuities increases aggregate savings in the long run, which works to increase aggregate consumption and tax revenue in the long run. For sure, a comprehensive analysis of the fiscal effects should take transitionary dynamics into account. The fact that long run savings increases implies that consumption tax revenue decreases in the short run.

On the other hand, bequest tax and capital income tax revenue are likely to decrease. However, except for the last calibration considered in Table 1, the mechanisms that work to increase long run tax revenue dominate.

Table 1: Introducing annuities, change in mean values, %.

	Non-housing consumption	Housing	Net financial savings	Bequests	Taxes paid
$\sigma = 1, \rho = 0$	4.2	-7.6	135	-5.4	3.6
$\sigma = 3, \rho = 0$	3.2	-10.2	61	-29	0.0
$\sigma = 1, \rho = -2$	2.9	-1.6	65	2.4	2.7
$\sigma = 3, \rho = -2$	1.8	-2.8	41	-8.7	-0.2

As we discussed in the Introduction, it is hard to predict how many households would actually to choose to annuitize their financial savings even such products became available (following the kind of tax treatment considered here). The results in Table 1 should be understood as being relative to the popularity of annuities. If households choose not to annuitize their wealth, there cannot be fiscal implications either. In our view, the results in Table 1 are policy relevant because they indicate that even the introduction of fully tax free single-payment annuities may well increase, rather than decrease, aggregate tax revenue.

5.2 Reverse mortgages

Finally, we consider reverse mortgages (while ruling out annuities again). We model them by setting $\gamma_j = 0.5$ for $j \geq 10$. That is, we allow retired households to borrow up to 50% of the value of their housing. Table 2 displays the main changes in household savings and consumption decisions relative to the baseline case without reverse mortgages.

Not surprisingly, reverse mortgages reduce net financial savings as well as bequests and increase housing consumption. By the same token, non-housing consumption decreases. As a result, government tax revenue decreases. These results are robust across the utility specifications considered.

Table 2: Introducing reverse mortgages, change in mean values, %.

	Non-housing consumption	Housing	Net financial savings	Bequests	Taxes paid
$\sigma = 1, \rho = 0$	-1.3	4.6	-45	-26	-3.0
$\sigma = 3, \rho = 0$	-0.9	3.3	-30	-18	-2.2
$\sigma = 1, \rho = -2$	-0.7	1.7	-21	-36	-3.0
$\sigma = 3, \rho = -2$	-0.7	1.3	-38	-34	-3.4

5.3 The role of the tax treatment of owner housing

We argued above that the fiscal implications of tax free annuities or reverse mortgages are related to the tax-favoured status of owner housing. In order to verify this, we re-evaluate the fiscal implications of tax free annuities and reverse mortgages in a situation where owner housing is not tax-favoured.

Specifically, we assume that the imputed rent of owner housing is taxed. We define the imputed rent as the user cost of housing net of maintenance costs and taxes. The imputed rent is then simply the capital cost of housing, or rh.[8] When the imputed rent is taxed, the periodic budget constrained becomes

$$(1+\tau^c)c_j + h_j + a_{j+1} = h_{j-1} - (1+\tau^c)\delta h_{j-1} - \tau^h r h_{j-1} + R_j a_j + e_j + (1-\tau^b)\bar{b} \ , \qquad (11)$$

where τ^h denotes the tax rate on the imputed rent.

We recalibrate the preference parameters β and α so as to match, for each combination of the preference parameters σ and ρ , the same targets as in the baseline case where the imputed rent goes untaxed. Otherwise the calibration is the same.

[8] The imputed rent can also be derived as the rental rate of housing, net of maintenance costs, that would prevail if perfect rental markets existed in this economy. This hypothetical rental rate is determined by an arbitrage condition which states that the return to financial savings and the return rental housing are the same. Assuming that the return to financial savings and the return to rental housing (net of maintenance costs) are taxed at the same rate, all this implies that the competitive rental rate is $r + \tau^c \delta$.

Tables 3 presents the results regarding the introduction of tax-free annuities. One difference between the results in Tables 1 (baseline case) and 3 is that in all calibrations considered, aggregate housing consumption now falls less relative to the case where the imputed rent goes untaxed. As for the fiscal effects, they are systematically less positive. The differences in the effects on taxes paid are the largest in the first two cases, where aggregate housing consumption falls the most. In first case, the increase in aggregate tax revenue falls from 3.6 % in Table 1 to 2.5% in Table 2. In the second case, it falls from 0.0% in Table 1 to -0.9% in Table 2. In other words, the tax treatment of housing is indeed a relevant issue here.

Table 2: Introducing annuities when the imputed rent is taxed, change in mean values, %.

	Non-housing consumption	Housing	Net financial savings	Bequests	Taxes paid
$\sigma = 1, \rho = 0$	4.1	-6.5	127	-3.2	2.5
$\sigma = 3, \rho = 0$	3.3	-8.9	58	-25	-0.9
$\sigma = 1, \rho = -2$	2.5	-0.8	92	6.7	2.5
$\sigma = 3, \rho = -2$	1.8	-2.3	40	-7.8	-0.4

Tables 4 presents the results regarding the introduction of reverse mortgages in the case where the imputed rent is taxed. Comparing it with Table 2 reveals that again, most of the effects are very similar relative to the case where the imputed rent goes untaxed. However, for the first two preference parameter combinations, the negative fiscal effect is now substantially smaller in absolute terms. Intuitively, the fact that introducing reverse mortgages shifts overall consumption from non-housing to housing consumption is less of a problem for public finances when (owner) housing does not enjoy a tax-favoured status.

Table 4: Introducing reverse mortgages when the imputed rent is taxed, change in mean values, %.

	Non-housing consumption	Housing	Net financial savings	Bequests	Taxes paid
$\sigma = 1, \rho = 0$	-1.3	4.1	-42	-27	-2.2
$\sigma = 3, \rho = 0$	-1.0	3.1	-31	-20	-1.8

$\sigma = 1, \rho = -2$	-0.9	1.6	-41	-41	-3.2
$\sigma = 3, \rho = -2$	-0.8	1.1	-39	-35	-3.1

6 Discussion

We have analyzed the fiscal effects of housing equity withdrawal taking into account the current tax treatment of owner housing and life annuities in Finland. We first considered a reform that would allow individuals to buy tax-free, single-payment life annuities. We argued that such annuities would encourage individuals to use their housing wealth to supplement pension income at old age. Currently, the tax treatment of single payment life annuities is confiscatory and so it is not surprising that a market for such products does not really exist.

Our results suggests that allowing for tax free single-payment life annuities are very unlikely to generate large tax revenue losses and may in fact even improve public finances, at least in the long-run. At the same time, it is clear that the possibility to annuitize financial savings would increase household welfare.

One reason why the introduction of even fully tax free annuities may improve public finances is that the possibility to annuitize financial savings induces households to reduce their housing consumption and increase non-housing consumption. Since (owner) housing enjoys are tax-favoured status relative to non-housing consumption, this increases overall tax revenue. Another reason why life annuities increase tax revenue in the long run relates is that they increase aggregate household savings. This generates higher tax revenue in the long run.

In contrast to life annuities, reverse mortgages are likely to decrease tax revenue. One reason is that they encourage households to further increase their housing consumption, thereby increases the loss in tax revenue associated with the tax-favoured status of owner housing. In addition, reverse mortgages naturally decreases aggregate household savings.

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