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# Projecting the inter- and intra-generational distribution of income in Belgium.

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**Abstract**

The goal of this paper is to make a stylized projection of the distribution of income in 2021 in Belgium, concentrating on inequality and poverty among the elderly, as well as their income position vis-à-vis the non-elderly. For this purpose, we use data from the Survey of Income and Living Conditions (SILC) and a two-step ’hybrid’ micro-simulation model. This involves a dynamic simulation of household positions using the LIPRO classification of age and household position based on administrative data. A static ageing technique reweighs the survey data to match the sample to the projected composition of the population in terms of age and household position. Reweighting is also used to simulate the effects of the projected increases in labour market participation among women and those aged between 50 to 64. Wages, pensions, benefits and other incomes are adjusted through uprating, in line with the projections of the Belgian Planning Bureau. We simulate the effect of one policy change, viz. uprating of the minimum pension in line with wages. The results show that under the most likely scenario, poverty among the 75+, will increase dramatically; this is much less true for those aged between 65 and 74. The results are most sensitive to the assumptions regarding the future uprating of incomes; the direct impact of socio-demographic changes is rather limited.

# 1. Introduction

In view of the ageing of the population in many OECD countries, much attention has been focused on the sustainability of public pension systems and the need for reform of these (e.g. European Commission 2006). For Belgium, official projections indicate that the 'cost of the ageing population' (i.e. the increase in public expenditure due to ageing, mainly on pensions and health care) in 2030 will amount to 4.4 percent of gross national product, rising to 6.2 percent in 2050 (Studiecommissie voor de Vergrijzing 2007). The cost of ageing therefore seems sustainable, partly due to conservative pension policies. However, much less is known about the future income position of the cohorts which will retire between now and 2050, and the impact of past and possible future pension reforms on future income positions. Recent research has shown that in Belgium – in contrast to most other EU countries – the standard of living of the elderly over the last two decades has not improved, relative to the non-elderly (Van den Bosch et al. 2007). This raises the suspicion that the public pension system will only be sustainable at the cost of a substantial erosion of the income position of future pensioners. The goal of this paper is to make a (rather stylized) projection of the distribution of income among pensioners, and between the elderly and the non-elderly, starting from the main assumptions used in the official projections of the 'cost of ageing'.

In order to realistically project the income distribution, we need to take into account the fact that the socio-demographic composition of future retirees will be different from what it is now. First, greater longevity will lead to a smaller proportion of widows; on the other hand the proportion of single persons will be pushed upwards due to the larger number of divorcees and persons who never married among the future elderly. We use projections of the household composition of the Flemish population that have recently become available. Secondly, as the proportion of persons at active ages (18-64) falls, labour market participation rates in this group are expected to rise. Indeed, raising the general employment rate, and in particular the work rate among women and among older workers is an important goal for policy makers, as part of the Lisbon strategy. We use projections by the Belgian Federal Planning Bureau for future employment rates.

The approach of the paper is as follows. Using data from the Survey of Income and Living Conditions (SILC) and a fairly simple static micro-simulation model, we will make projections of the future income distribution, concentrating on inequality and poverty among the elderly, as well as their income position vis-à-vis the non-elderly. We use reweighting to match the sample to the projected composition of the population in terms of age and household position. Reweighting is also used to simulate the effects of increased labour market participation among women and those aged between 50 to 64. Wages, pensions, benefits and other incomes are adjusted through uprating, in line with the projections of the Belgian Planning Bureau. Most projections imply unchanged policies; we will also simulate the effect of one policy change, viz. uprating of the minimum pension in line with wages (i.e. in Belgian terminology, 'welfare linking' of the minimum pension).

Four scenarios are projected, in which we cumulatively introduce elements affecting the future income position of the elderly. In the first one, the sample is only reweighted as regards the age and household position distribution. While this is in itself not very realistic, it is equivalent to a situation where all incomes are uprated by the same percentage, and thus pensions and other benefits are fully linked to wages. The first scenario therefore serves as a useful baseline projection. In the second scenario, incomes are uprated following the 'official' assumptions of the Belgian Planning Bureau (in addition to the reweighting scheme of scenario one), where the uprating of existing pensions is only partially linked to the development of wages. In the third scenario, we also reweight in order to simulate rising employment rates. Finally, in the fourth scenario, we show what happens (given the assumptions introduced earlier) when the minimum pension is uprated fully in line with wages, i.e. the minimum pension is fully 'welfare-linked'.

This paper is part of an ambitious project to simulate the future distribution of incomes and pensions. The intention is to further incorporate dynamic elements for key transitions (survival, household situation, retirement); future wages will be estimated using a regression model, and future pensions and other benefits will be calculated using a detailed (existing) tax-benefit model. Moreover, instead of survey data, the model will fed by data from a large sample from an administrative dataset (as is currently the case for the demographic projections), containing detailed records of past employment, as well as household composition. This will enable us to produce much more realistic projections of future incomes than the necessarily rather stylized results presented in this paper.

The plan of the paper is as follows. In the next section we discuss the advantages and disadvantages of static vs. dynamic modelling of the consequences of the ageing of the population. In the third section, we briefly review existing microsimulation models in Belgium which could or have been used for projecting these consequences. In the fourth section, we discuss our methods in detail. In section five, the results are presented. Finally, section six concludes.

## 2. Microsimulation modelling to analyse ageing process

As we want to make a projection towards 2021 of the income distribution, we need to take account of future developments, such as changes in the population structure, economic processes, policy adaptations etc. There are various methods to incorporate the time horizon in microsimulation models. Broadly, one can distinguish static and dynamic microsimulation models.

**Static** ageing techniques can be defined as "methods attempting to align the available micro-data with other known information (such as changes in policy aggregates, age distribution or unemployment rates), without modelling the *processes* that drive these changes (e.g. migration, fertility, or economic downturn)" (Immervoll et al. 2005). Basically, in a static model one uses two different steps, namely reweighting and uprating. Reweighting is used to take account of changes in the relative sizes of distinct groups in the population. Uprating is used to adjust monetary values of variables for evolutions that occur between period *t* and period *t+x*, such as the increase in wages and benefits.

With **dynamic** simulation modelling, the process of ageing of individuals is endogenised: major life events happen to individuals on the basis of probabilities of these events happening to real people (e.g. the probability of a single aged 25 to marry in period *t* is applied to each 25-year old single in the sample, such that a certain proportion of individuals of this group will make a marriage transition towards period *t+1*) (Harding 1996). A dynamic microsimulation model can generate detailed projections of changing population characteristics (such as age structure) and estimate the life paths of individuals. Dynamic microsimulation modelling requires extensive data in order to estimate transition probabilities of real life events occurring (e.g. birth, changes in labour force status etc.). Building a dynamic model also requires a methodology in order to try to disentangle age, cohort and period effects (see Harding 1990). E.g. the lifetime earnings profile of an individual exhibits an increase of earnings in the earlier part of working life, then a stabilisation towards the end of the working career and later on a decline in retirement. This is the age effect, which is influenced by a cohort effect, meaning that the individual's profile has certain characteristics because he/she belongs to a specific cohort, as well as by a period effect, following from variations in the economic cycle. These three effects can not be distinguished easily on the basis of existing longitudinal or cross-sectional data, and the model should also be tested for the various assumptions on which it is based. Dynamic microsimulation models require a considerable longer development time than the more traditional static models (see e.g. the

Australian model DYNAMOD of NATSEM (Abello et al. 2002, King et al. 1999); the Dutch model NEDYMAS (Nelissen 1993))

Ideally, if one wants to address topics such as intergenerational redistribution, contributory capacity of future pensioners for care arrangements, etc. over a longer time span, one should use a dynamic model which incorporates the major demographic and economic trends that influence an individual’s income development, so that one can estimate a life-cycle income for each individual. The model has to calculate changes in the age distribution of the sample population in response to changes in birth and mortality rates, migration streams, labour force status etc.

However, the construction of dynamic model is a complex and labour intensive task. Compared to static models operational dynamic models are still rarely used, as the information required to build such a model is enormous. A dynamic model also risks to become a kind of “black box”.

## 3. Microsimulation models used to study the effects of ageing in Belgium

Currently, there are four micro models in Belgium that deal with the issue of ageing, namely MIMOSIS (Microsimulation Model for Belgian Social Insurance Systems), M-DULBEA (Microsimulation model du Département d'Economie appliquée de l'Université libre de Bruxelles), STATION (Static Microsimulation model) and MEP (Micro-Economic Pension Model) (see table below). Besides these micro models we must also mention the macro model developed by the Belgian Plan Bureau, namely MALTESE, which provides projections towards 2050 (see e.g. Fasquelle & Weemaes 1997; Englert et al. 2002). As MALTESE has been used as a basis for explorations of the financial effects of an ageing society, it will provide crucial information for our own model.

Table 1: Overview of Belgian microsimulation models on ageing.

| | MIMOSIS | M-DULBEA | STATION | MEP |
|---|---|---|---|---|
| Type simulation | static | dynamic | static | standard |
| Data | administrative | unknown | SEP92 | employee types |
| Time horizon | unknown | 2050 and later | 1992-2050 | none |

The STATION model was developed by G. Dekkers in the mid-nineties and is a static ageing model using the data of the Socio-Economic Panel (SEP) of 1992. Reweighting is used to adapt the data for changing in age and sex-structure on the hand and household composition on the other. Uprating is done by applying 4 different macro-economic scenarios (based on projections from the Plan Bureau).

Little information could be found on the Model of DULBEA (M-DULBEA), as model results have not been disseminated. Apparently, the model was developed to simulate the pension system for employees, with as primary aim to calculate the macro cost of pension benefits.

A model that is still under construction (though already partially operational) is the static tax-benefit model MIMOSIS, which uses a large and detailed sample of administrative data (Bay et al. 2007). MIMOSIS provides a detailed code of social security and personal income tax regulations. As the dataset has information from the administrative databank used for the determination of the actual pensions of employees (the “Pensioenkadaster”), with this model one can calculate the exact pension rights of individuals. The model is well suited to simulate the distribution and budgetary implications of reforms in the tax-benefit system.

The Micro-Economic Pension model (MEP) is another recent model, but from a different type as the previous models. It calculates pension rights for 4 types of employees (Dekkers 2006). At the heart of this model lies the option value approach of pensions, which states that labour market participation of older workers depends on the ‘actuarial non-neutrality’ of the pension system (Duval 2003): individuals want to maximize their utility deriving from consumption (as coming from a higher income from work) and leisure (retirement). For each employee the model calculates the expected value of the future stream of benefits and wages. At a given age an individual compares the expected future utility of immediate retirement with the expected utility of postponing retirement (see also Pestiaux & Stijns 1999). However, it is not (yet) geared to projections towards the future.

The model used in this paper picks up the essential features of the STATION model, in particular the same reweighting and uprating techniques are used. However, it is updated in two crucial ways: SILC data of 2004 are used, it incorporates the latest projections regarding the future age – sex – household position distribution, as well as current assumptions regarding future trends in incomes used by the Federal Planning Bureau in its projections of the 'cost of ageing'.

# 4. Data and Methods

As pointed out by Immervoll et al. (2005), there is no "one-size-fits-all" ageing technique. A popular approach is the static ageing technique. In this method, the population is reweighted to their future population share. The advantage of this technique is its simplicity and straightforwardness. The clear disadvantage is the implicit assumption that only the shares of population groups will change, and that the characteristics of these groups remain stable.

We use the Flemish data from the European Survey on Income and Living Conditions (EU-SILC) wave 2006, referring to incomes from 2005. At this point our analysis is restricted to the Flanders region (where 58 percent of the Belgian population lives) since the demographic projections for the other regions are still under development.

## *4.1 Ageing Procedure*

One of the prime determinants of the future income distribution is the household composition. The demographics of our model are based on a dynamic simulation of LIPRO household projections as developed by Van Imhoff & Keilman (1991). The LIPRO typology distinguishes 12 categories of household positions, all of which express the relation of individuals to the head of household. The typology is calculated with high detail, distinguishing the 12 household positions for men and women in age classes of five years, resulting in 480 cells.

For each individual, one of twelve household positions is assigned according to the composition of the household and the individual's position in it. The twelve positions are:

| | |
|---|---|
| CMAR | Child of a married couple |
| CUNM | Child of an unmarried couple |
| C1PA | Child of a single parent |
| SING | Single without children |
| MAR0 | Married person without children |
| MAR+ | Married person with children |
| UNM0 | Unmarried person without children |
| UNM+ | Unmarried person with children |
| H1PA | Single parent |
| NFR | Other person living in a household type 1 to 6 |

OTHR Other person not living in a household type 1 to 6

COLL Person living in a collective household[1]

The household position of the head of the household determines the household typology. Households who have no nucleus that can by characterized as one of the first six household types are assigned category "other".

1. Single person household
2. Married couple without children
3. Married couple with children
4. Unmarried couple without children
5. Unmarried couple with children
6. Single parent household
7. Other household

For every age group of five years, the number of individuals in every LIPRO position is estimated. In a next step, a static ageing procedure is implemented where we divide the original SILC population weight by the size of the LIPRO positions by age group as observed in SILC 2004. In a second step, we multiply this number by the size of the projected LIPRO groups by age for the years 2006, 2011, 2016 and 2021.

Table 2: LIPRO distribution, Flanders 2006-2021

| Year | 2006 | | 2011 | | 2016 | | 2021 | |
|---|---|---|---|---|---|---|---|---|
| Age | 65- | 65+ | 65- | 65+ | 65- | 65+ | 65- | 65+ |
| C1PA | 6% | 0% | 7% | 0% | 7% | 0% | 7% | 0% |
| CMAR | 27% | 0% | 24% | 0% | 22% | 0% | 21% | 0% |
| CUNM | 3% | 0% | 4% | 0% | 5% | 0% | 6% | 0% |
| H1PA | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| MAR+ | 26% | 7% | 25% | 7% | 22% | 7% | 20% | 6% |
| MAR0 | 13% | 54% | 13% | 54% | 13% | 53% | 13% | 52% |
| NFR | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| OTHR | 2% | 2% | 1% | 2% | 2% | 2% | 2% | 2% |
| SING | 10% | 29% | 10% | 30% | 11% | 30% | 11% | 31% |
| UNM+ | 4% | 0% | 5% | 0% | 6% | 0% | 7% | 0% |
| UNM0 | 4% | 2% | 5% | 2% | 6% | 2% | 6% | 3% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| N | 4969855 | 1018812 | 5002709 | 1079660 | 4958724 | 1176998 | 4894596 | 1274597 |

Note: We thank our CoViVE consortium partners Patrick Deboosere and Johan Surkyn for providing the estimates of the LIPRO distribution in Flanders towards 2021.

[1] Since our survey data do not cover these collective households, this type is omitted.

Table 2 shows the projections of the LIPRO distribution for the aged and non-aged separately. The most important changes are that the number of ‘traditional’ nuclear families, i.e. married couples with children declines substantially, while the number of families with two unmarried parents and children increases. Among the aged no large changes are apparent (at this level of generality); the number of couples declines a bit, while the number of single persons rises slightly.

**Employment rates**

Labour force participation rates are cumulated to match the division in two age groups (25-49 and 50-64). The Static Ageing weight for the employed is multiplied by (original number of employed in age/gender group divided by the new number of employed in age/gender group as calculated by the Federal Planning Bureau). For the year 2006, actual labour market participation rates are used instead. This is done within each age/sex cell, in order to maintain the correct age / LIPRO distribution.

Number of working adults:

$$NE_t^{age,sex} = N_t^{age,sex} * Factor_t^{age,sex}$$

$$We_t^{age,sex} = \frac{E_t^{age,sex}}{NE_t^{age,sex}}$$

$$NU_t^{age,sex} = N_t^{age,sex} * (1 - Factor_t^{age,sex})$$

$$Wne_t^{age,sex} = \frac{U_t^{age,sex}}{NU_t^{age,sex}}$$

Where

$NE_t^{age,sex}$ is the target number of employed people in age/gender group in year t.

$NU_t^{age,sex}$ is the target number of not employed people in age/gender group in year t.

$E_t^{age,sex}$ is the number of employed people in age/gender group in year t.

$U_t^{age,sex}$ is the number of not employed people in age/gender group in year t.

$We_t^{age,sex}$ is the weight for employed people in age/gender group in year t

$Wne_t^{age,sex}$ is the weight for not employed people in age/gender group in year t

$Factor_t^{age,sex}$ is the division of age, gender and time specific participation rates as expected by the Federal Planning Bureau (or the official participation rate for 2006).

Table 3 presents the resulting employment rates;

Table 3: Projected employment rates, Flanders 2006-2021..

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| Men | | | | |
| 25-49 | 86.9% | 87.70% | 87.90% | 88.10% |
| 50-64 | 55.9% | 50.50% | 50.05% | 49.60% |
| Women | | | | |
| 25-49 | 74.00% | 81.10% | 81.95% | 82.80% |
| 50-64 | 35.6% | 42.50% | 44.75% | 47.00% |

Source: Statistics Belgium (2006), Federal Planning Bureau (2002)

### *4.2 Taxes and social security contributions*

Ideally, one would like to take account of the distributive impact of taxes and social contributions. The incidence of taxes and social security contributions differs considerably for the various income types in Belgium. Indirect taxes paid out of social benefits are regressive with respect to disposable income (see Decoster et al., 2007). Social contributions and personal income taxes on the contrary are progressive, which means that the proportion of income that is taken in tax decreases with income. Moreover, they are considerably more progressive for pensions than for labour income (see Verbist, 2007). There are three reasons for this. First, taxable income of old age individuals is on average lower than that of workers, and as personal income tax systems are progressive, this will lead to a higher tax burden for workers. Second, the Belgian personal income tax system provides important tax advantages for replacement incomes, especially for the lower incomes (as part of the so-called social-fiscal measures). And third, social contributions are reduced for low pensions. Hence the relative income position of pensioners is better in net terms than in gross terms. In future work, we intend to bring in these effects of the tax system, in order to be able to simulate the distributive effects of potential changes in the tax system.

As we have only partial information on taxes and social contributions (in particular, we do not have information on employer contributions and on indirect taxes), we do not attempt to balance (increases in) benefits and taxes. Instead, we assume a fixed environment for the taxation and social security contributions. Under this assumption, the fiscal treatment of households with a specific combination of incomes remains constant over time. This is done by using net values for all income components during the uprating procedure.

In other words, we assume that the total tax and contribution system (brackets, deductions, etc. ) is ‘welfare-linked’, i.e. is adjusted in real terms at the same rate as incomes increase. As the official projections of the Federal Planning Bureau imply a constant tax rate over time (the 'cost of ageing' is assumed to be met by lower interest payments on the national debt, and other changes), this is probably not very unrealistic.

## *4.3 Uprating*

The assumptions regarding the annual growth of wages and benefits are in accordance with the expectations of the Belgian Federal Planning Bureau (Englert e.a. 2002) used in the projections regarding the ‘cost of ageing’, i.e. the evolution of social security expenditure between 2000 and 2050, using the macro-economic MALTESE model (see Englert e.a. 2002). While these assumptions are made on the national level, at the current stage our demographic projections are only available for Flanders region (where about 60% of the national population lives). We therefore assume that these parameters apply also to Flanders separately.

The uprating of incomes takes place at the household level. After this procedure, the uprated household income is inflated for unit non-response (following the SILC procedure) and finally standardised using the modified OECD equivalence scale.

**Labour income**

The Federal Planning Bureau (Englert e.a. 2002) expects an annual productivity growth of 1.75% and a wage drift of 0.5 %. We assume wages and self-employment income to have a real annual growth rate of 2.25%.

$$W_t = (W_{t0} * 1.0225^{t-t0})$$

Where

$W_t$ is net labour income at point t .

**Pension income**

The uprating of pensions takes account of two main factors which will affect future pension growth. First, in Belgium, pensions are – in principle – calculated as a certain percentage of the sum of all wages during the career, divided by 40 (the assumed full-length career in years). Therefore, if Olivia enters the labour market five years later than Carl, and also retires five years later, she can expect a higher pension, as, due to economic growth, her wages have been higher during all her career. We assume – in accordance with the Planning Bureau projections – that in the past real wages have on average grown by 2.25 percentages a year, and will continue to do so in the future. Secondly, *after retirement*, pensions are adjusted to price increases. In the past, existing pensions have been increased in real terms (so-called welfare adjustment) somewhat irregularly. In the future, this welfare adjustment (real increase of existing pensions) is assumed to amount to 0.5 percent per year on average.

In our stylized simulation, we assume that all people retire at age 65. In the static simulation we employ here, the pension of a person aged, say, 73 in 2021 is simulated by uprating the pension of a person aged 73 now (i.e. in the base year, 2004). A person aged 73 in 2021 will have worked between 2006 (our base year) and 2013, and been in retirement between 2013 and 2021. Therefore, for the simulations for the year 2021, the pension of a person aged 73 in the sample is uprated by a factor of $1.0225^{(2013\text{-}2006)} * 1.005^{(2021\text{-}2013)}$; the first term reflecting higher pension due to higher wages, and the second one the welfare adjustment after retirement. In formula, this becomes:

$$P_t = (P_{t0}^{a} * 1.005^{t-t0}) \,|\, a > 65 + t - t_0$$
$$P_t = P_{t_0} * 1.0225^{(t-t0+65-a_t)} * 1.005^{(a_t-65)} \,|\, a_t >= 65 \,\&\, a_t < 65 + t - t_0$$

Where

$P_t$ is net individual pension income at point t

$a_t$ = age at point t

**Minimum pension income**

In the minimum pension scenario, every individual who is aged 65+ and has a pension income below a household dependent threshold receives a simulated tax free pension income up to this threshold. The threshold is derived from the Elderly Income Guarantee, a currently means tested benefit. The yearly value of this benefit was €9,554 for single elderly and €12,726 for elderly couples (value 2007).

$$P_{\min tresh,t} = P_{\min tresh,t0} * 1.0225^{t-t0}$$
$$P_{\min,t} = P_{\min tresh,t} - P_t \,|\, a_t >= 65 \,\&\, P_t < P_{\min tresh,t}$$

Where

$P_{\min tresh,t}$ is the net household dependent minimum threshold at time t.

$P_{\min,t}$ is the additional net household pension income at point t, to match the minimum threshold.

**Social security income**

We assume wage related social security benefits (i.e. unemployment, invalidity and early retirement benefits, among others) to increase 0.5% annually and non-wage related social security benefits (child benefits, social assistance) to grow by 1% annually.

$$SSI\_W_t = (SSI\_W_{t0} * 1.005^{t-t0})$$
$$SSI\_NW_t = (SSI\_NW_{t0} * .1.01^{t-t0})$$

Where

$SSI\_W_t$ is net household wage related social security income at point t

$SSI\_NW_t$ is net household non-wage related social security income at point t

**Other income**

Income from capital gains or property income is an important source of income for many households, especially elderly households. The effect of the changing demographic structure on the return on capital income is uncertain. Theoretical analysis using general equilibrium models suggest a rise followed by a decline in the return on capital income under the current demographic evolution, where a large cohort is succeeded by a smaller one (Abel 1999; 2001, Yoo 1994). Empirical analysis of the relation between demography and asset return however shows this relation is not significant (Poterba 2001). Ceteris paribus capital incomes can be expected to be closely related to productivity growth.

We therefore assume additional household income growth to equal the annual productivity growth rate of 1.75%, as projected by the Federal Planning Bureau (2002).

$$O_t = (O_{t0} * 1.0175^{t-t0})$$

Where

$O_t$ is net capital and rental income at point t .

**Household income**

Projected household income is the sum of all uprated net income components. A household inflation factor is used to control for unit non-response. Finally, income is equivalised using the modified OECD scale (Hagenaars et al. 1994).

$$Y_t = \frac{P_t + SSI\_W_t + SSI\_NW_t + W_t + O_t}{E} * hif$$

Where

$Y_t$ is equivalent household income

$E$ is the equivalence scale factor (modified OECD scale)

$hif$ is the household *unit non response* inflation factor

# 5. Results: Projecting future income distributions

## *5.1 The four scenarios*

As explained above, we simulate four scenarios, where the various elements are introduced successively. They can be briefly described as follows:

| | |
|---|---|
| Scenario 1: | (Base):<br>Reweighting to match projected age – sex – household position distributions. |
| Scenario 2: | (Uprating):<br>Reweighting to match projected age – sex – household position distributions<br>+ Uprating of incomes following Planning Bureau assumptions |
| Scenario 3: | (Employment):<br>Reweighting to match projected age – sex – household position distributions<br>+ Uprating of incomes following Planning Bureau assumptions<br>+ Reweighting to match projected employment rates |
| Scenario 4: | (Minimum Pension):<br>Reweighting to match projected age – sex – household position distributions<br>+ Uprating of incomes following Planning Bureau assumptions<br>+ Reweighting to match projected employment rates<br>+ Minimum pension is uprated in line with wages |

For each scenario, we present average incomes by age group, headcount poverty rates (using a poverty line set at 60 percent of median equivalent income), and estimates of inequality, using the Atkinson (0.5) inequality coefficient. Since our simulations are applied in a rather stylized and mechanical way, we present our inequality analysis with only one inequality aversion parameter (other parameters yielded similar results).

## *5.2 Scenario 1: Base*

Scenario one involves modifying the age, sex and family structure of the population by implementing the LIPRO weight, which results in limited effects on the overall income distribution. Differences in gender and household composition results in an average income decrease by 1% between 2006 and 2021 (Table 4), both poverty (Table 5) and inequality rates (not tabulated) remaining stable.

Table 4: Trend in average income by age group, base scenario (2006 = 100)

| | 0-24 | 25-34 | 35-49 | 50-64 | 65-74 | 75+ | All |
|---|---|---|---|---|---|---|---|
| *(2006)* | 18938 | 22109 | 20628 | 20821 | 15415 | 13458 | |
| 2011 | 98% | 100% | 101% | 98% | 100% | 99% | 100% |
| 2016 | 98% | 101% | 101% | 98% | 100% | 99% | 100% |
| 2021 | 98% | 101% | 101% | 97% | 100% | 99% | 100% |

Note: actual average equivalent incomes in 2006 in second row

Table 5: Poverty rates (headcount), base scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 12% | 12% | 13% | 12% |
| 25-34 | 6% | 5% | 5% | 5% |
| 35-49 | 10% | 9% | 9% | 9% |
| 50-64 | 14% | 15% | 15% | 15% |
| 65-74 | 23% | 23% | 23% | 23% |
| 75+ | 35% | 35% | 34% | 34% |
| Overall | 13% | 13% | 14% | 14% |

### *5.3 Scenario 2: Uprating*

The uprating of household income components leads, of course, to a general increase in average income, but there are important differences by age group, reflecting the composition of household income through the life cycle. Age groups with high shares of fast-growing income components – such as labour income or pension income for new pensioners – move up the income distribution. On the other hand, poverty and inequality increases among the oldest cohort and among the age group 50-64, where labour market participation is low. After uprating, overall poverty and inequality is on the rise.

Table 6: Trend in average income by age group, uprating scenario (2006 = 100)

| | 0-24 | 25-34 | 35-49 | 50-64 | 65-74 | 75+ | All |
|---|---|---|---|---|---|---|---|
| *(2006)* | 18938 | 22109 | 20628 | 20821 | 15415 | 13458 | |
| 2011 | 109% | 111% | 112% | 107% | 108% | 103% | 110% |
| 2016 | 120% | 124% | 124% | 115% | 124% | 108% | 121% |
| 2021 | 132% | 137% | 138% | 125% | 144% | 118% | 134% |

Table 7: Poverty rates (headcount), uprating scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 12% | 13% | 13% | 14% |
| 25-34 | 6% | 5% | 5% | 5% |
| 35-49 | 10% | 10% | 11% | 11% |
| 50-64 | 14% | 18% | 20% | 23% |
| 65-74 | 23% | 27% | 24% | 20% |
| 75+ | 35% | 45% | 52% | 55% |
| Overall | 13% | 15% | 16% | 17% |

Relative poverty increases among those aged below 25, probably because family benefits increase slower than wages. The uprating scenario affects the income position of the group 50-64 years most strongly. Initially, inequality is already high in this age group due to the fact that it is fairly evenly split between a large group of workers still in the labour force, who enjoy high earnings, and an important share of persons on relatively low benefits (early retirement, unemployment, invalidity). The disparity between wage growth (2.25 percent per year) and benefit growth (0.5 percent per year) results in further polarisation of income between benefit dependent and working households. Within group inequality increases sharply, as does the poverty rate.

Table 8: Atkinson inequality (a=0.5), uprating scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 0.045 | 0.046 | 0.048 | 0.049 |
| 25-34 | 0.034 | 0.035 | 0.036 | 0.036 |
| 35-49 | 0.045 | 0.047 | 0.050 | 0.052 |
| 50-64 | 0.065 | 0.069 | 0.073 | 0.078 |
| 65-74 | 0.041 | 0.044 | 0.044 | 0.044 |
| 75+ | 0.040 | 0.041 | 0.044 | 0.046 |
| | | | | |
| within | 0.044 | 0.046 | 0.048 | 0.050 |
| between | 0.004 | 0.006 | 0.006 | 0.006 |
| Total | 0.048 | 0.051 | 0.051 | 0.056 |

After uprating, we see a diverging welfare path between new and old pensioners. Those who retired recently, with higher pensions due to higher wages over their total working career, witness an improvement of their income position while the older retirees fall behind. This results in a large and steady increase in poverty, and to a lesser extent in inequality, among people aged over 75.

It is interesting to look briefly at gender differences. In a cross-country perspective, Belgium is one of the few EU-countries where (high) elderly poverty rates are combined with gender equity (i.e. no difference in poverty rates between men and women), while in most countries older women are worse off than men (Van den Bosch et al. 2007). Surprisingly, our projections show that this gender equity in poverty among the elderly for Flanders disappears, as poverty among elderly women rises more strongly than among men. This is due to the fact that women are disproportionately represented among those aged 75+. Looking forward to the minimum pension scenario, as older women have low pension income, they benefit more often from a non-wage related minimum pension. After simulation of 'welfare linked' minimum pension (i.e. uprating in line with wages) the gender difference in elderly poverty becomes smaller again.

Table 9: Poverty by age and gender, uprating scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| Men 0-64 | 10% | 10% | 10% | 11% |
| Men 65+ | 26% | 33% | 34% | 31% |
| Women 0-64 | 11% | 12% | 12% | 13% |
| Women 65+ | 30% | 37% | 40% | 40% |

### *5.4 Scenario 3: Higher employment*

The household income increase due to higher employment is distributed relatively equally. Compared to our uprating scenario, average income rises further with 1%. From a distributional point of view, inequality and poverty remain constant compared to the uprating scenario.

Table 10: Average income by age group, higher employment scenario (2006 = 100)

| | 0-24 | 25-34 | 35-49 | 50-64 | 65-74 | 75+ | All |
|---|---|---|---|---|---|---|---|
| *(2006)* | 18938 | 22109 | 20628 | 20821 | 15415 | 13458 | |
| 2011 | 109% | 112% | 113% | 109% | 108% | 103% | 110% |
| 2016 | 120% | 125% | 126% | 119% | 124% | 108% | 122% |
| 2021 | 132% | 139% | 140% | 129% | 144% | 118% | 136% |

Table 11: Poverty rates (headcount), higher employment scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 12% | 13% | 14% | 15% |
| 25-34 | 6% | 5% | 5% | 5% |
| 35-49 | 10% | 9% | 10% | 10% |
| 50-64 | 14% | 17% | 19% | 21% |
| 65-74 | 23% | 27% | 24% | 21% |
| 75+ | 35% | 45% | 53% | 57% |
| Overall | 13% | 15% | 16% | 17% |

Table 12: Atkinson inequality (a=0.5), higher employment scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 0.045 | 0.046 | 0.048 | 0.049 |
| 25-34 | 0.034 | 0.034 | 0.034 | 0.035 |
| 35-49 | 0.045 | 0.046 | 0.048 | 0.050 |
| 50-64 | 0.065 | 0.068 | 0.072 | 0.076 |
| 65-74 | 0.041 | 0.044 | 0.044 | 0.044 |
| 75+ | 0.040 | 0.041 | 0.044 | 0.046 |
| | | | | |
| within | 0.044 | 0.045 | 0.047 | 0.048 |
| between | 0.004 | 0.006 | 0.007 | 0.007 |
| Total | 0.048 | 0.051 | 0.053 | 0.055 |

### 5.5 *Scenario 4: Minimum pension*

As the previous results show, the evolution of wages and benefits has a considerable distributional impact in a policy neutral environment. Especially the oldest age group faces a serious lack of income growth between 2006 and 2016. In the fourth scenario, we therefore take our simulations a step further by introducing a policy intervention. We explore the effect of a change in the uprating of the minimum pension on the income position of the elderly, that is we assume that the pension floor is uprated in line with wages, i.e. by 2.25 percent per year, instead of 0.5 percent.

Previous research on the introduction of a minimum pension in the Belgian pension system pointed out that the introduction of such a scheme would imply considerable increase of pension expenditure (17%), while elderly poverty would become virtually non-existent (Cantillon et al. 1993).

Table 13: Average income by age group, minimum pension scenario (2006 = 100)

| | 0-24 | 25-34 | 35-49 | 50-64 | 65-74 | 75+ | All |
|---|---|---|---|---|---|---|---|
| *(2006)* | 18938 | 22109 | 20628 | 20821 | 15415 | 13458 | |
| 2011 | 109% | 112% | 113% | 109% | 113% | 109% | 111% |
| 2016 | 120% | 125% | 126% | 119% | 129% | 116% | 123% |
| 2021 | 132% | 139% | 140% | 130% | 150% | 129% | 137% |

Our results show that stronger uprating of the minimum pension reduces poverty among the elderly compared to the uprating scenario, although the prime result is a reduction of inequality among pensioners. As table 13 shows, average income growth in the oldest age group is still below overall average after simulation of a stronger minimum pension. The impact is largest among the 75+ and becomes stronger as time progresses.

Table 14: Headcount poverty, minimum pension scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 12% | 13% | 14% | 15% |
| 25-34 | 6% | 5% | 5% | 5% |
| 35-49 | 10% | 9% | 10% | 10% |
| 50-64 | 14% | 16% | 18% | 20% |
| 65-74 | 23% | 22% | 19% | 16% |
| 75+ | 35% | 41% | 49% | 52% |
| Overall | 13% | 14% | 15% | 16% |

Still, stronger uprating of the minimum pension only contains the projected rise in poverty. This is due to two factors. One cause for the inadequacy of this simulated minimum protection is the calculation method of the current benefit: it is composed of a base amount, which is multiplied by 1.5 for singles and 2 for couples. Given the structure of the modified

OECD equivalence scale, couples are worse of than singles after income standardisation. Secondly, the combination of wage growth, higher employment and demographic change causes the poverty line to rise at a speed close to 2.25% per year, which is the yearly growth of the minimum pension (Table 15). This difference is too small to make the minimum pension catch up with the poverty line, even if this minimum pension is fully linked to wage growth.

Table 15: Evolution of minimum pension compared to evolution of the poverty line

| | 2011 | 2016 | 2021 |
|---|---|---|---|
| Rise of poverty line compared to 2006 value[2] | 11% | 22% | 35% |
| Rise of minimum pension compared to 2006 value | 12% | 25% | 40% |

The impact on inequality of stronger uprating of the minimum pension is also substantial. Since almost 37% of the elderly have an increased income after minimum pension simulation, inequality is reduced among pensioners. Since many recipients are oldest-age pensioners, the decrease in inequality is highest among people over 75.

Table 16: Atkinson inequality (a=0.5), minimum pension scenario

| | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| 0-24 | 0.045 | 0.046 | 0.047 | 0.049 |
| 25-34 | 0.034 | 0.034 | 0.034 | 0.035 |
| 35-49 | 0.045 | 0.046 | 0.048 | 0.049 |
| 50-64 | 0.065 | 0.067 | 0.071 | 0.075 |
| 65-74 | 0.041 | 0.038 | 0.037 | 0.037 |
| 75+ | 0.040 | 0.031 | 0.030 | 0.030 |
| | | | | |
| within | 0.044 | 0.043 | 0.047 | 0.046 |
| between | 0.004 | 0.004 | 0.006 | 0.005 |
| Total | 0.048 | 0.048 | 0.050 | 0.051 |

### *5.6 Discussion: The distribution of incomes between 2006 and 2021*

We saw that projected shifts in the distribution of the population across age, sex and household position in itself had little effect on the income distribution. By contrast, differential uprating of incomes had a very important effect. We assumed labour income to grow at a higher speed than social security benefits, except the pension income of recent retirees. This resulted in an improvement of the income position of households with high shares of labour income, and a relative deterioration of the income position of household with

[2] Poverty line used in the higher employment scenario

high shares of benefit income (except new pensioners). As could be expected, this has important intergenerational consequences.

When we overlook our results for the four points in time, we conclude that the relation between age and income position remains stable for people younger than 50. None of our simulations has substantial impact on the relative income position of the young. Despite the large increase of income, neither (relative) poverty nor inequality changes much. The only exception is the rising poverty rate among children, probably caused by the fact that they are the group most strongly affected by the limited uprating of family benefits (1 percent per year, against 2.25 percent per year for wages).

For people over 50, the results are more diverse. For the oldest pensioners, the fact that existing pensions are not uprated in line with wages results in a continuous increase in poverty and inequality between 2006 and 2021. Although our projections are very stylized, they point to a real and important problem. The further decline of the welfare position of the oldest is a result of the welfare erosion of pensions which is implicit in the policies on pensions taken in Belgium. Even a low-pension friendly measure such as uprating the non-contributory minimum pension in line with wages will not reduce poverty much, but merely contain the expected rise in poverty among the 75+.

As far as the income position of the age group 50-64 is concerned, the strong contrast with the 65-plus is partially due to our stylized simulation procedure, such as the fixed retirement age of 65. This results in a continuous improving welfare situation of recent retirees, who are assumed to benefit from wage growth during their career, while employment – and thus household income – among people aged 50 to 64 remains relatively low. This causes many pensioners to benefit from the wage growth, while only half the people at active age (50-64) are simulated to profit from wage growth. The other half is dependent on social security benefits, which only rise by 0.5 percent per year. Again, while the figures taken as projections are probably an exaggeration, they reflect a real problem for future policy: if benefits for those between 50 and 64 are squeezed, both because of budget constraints and in order to reduce incentives to retire early, this will endanger the income position of many individuals who – perhaps involuntarily – will be out of the labour force in any case.

## 6. Conclusion

The goal of this paper was to make a projection of the distribution of income in 2021 in Belgium, concentrating on inequality and poverty among the elderly, as well as their income position vis-à-vis the non-elderly. For this purpose, we used data from the Survey of Income and Living Conditions (SILC) and a fairly simple static micro-simulation model. This involved reweighting to match the sample to the projected composition of the population in terms of age and household position as simulated in the LIPRO projections. Reweighting was also used to simulate the effects of the projected increases in labour market participation among women and those aged 50 to 64. Wages, pensions, benefits and other incomes are adjusted through uprating, following assumptions used by the Belgian Planning Bureau in its projections of the budgetary impact of population ageing.

Four scenarios were projected, in which we cumulatively introduce elements affecting the future income position of the elderly. In the first one, the sample was only reweighted as regards the age and household position distribution. In the second scenario, incomes are uprated following the 'official' assumptions of the Belgian Planning Bureau (in addition to reweighting scheme of scenario one). The crucial feature of these assumptions is that the uprating of existing pensions is only partially linked to the development of wages. In the third scenario, we also reweight in order to simulate rising employment rates. Finally, in the fourth scenario, we show what happens (given the assumptions introduced earlier) when the minimum pension is uprated fully in line with wages, i.e. the minimum wage is fully 'welfare-linked'.

We saw that projected shifts in the distribution of the population across age, sex and household position (scenario 1) had little effect on the income distribution. By contrast, differential uprating of incomes had a very important effect. We assumed labour income to grow at a higher speed than social security benefits, except the pension income of recent retirees. This resulted in an improvement of the income position of households with high shares of labour income, and a relative deterioration of the income position of household with high shares of benefit income (except new pensioners). As could be expected, this has important intergenerational consequences. The income position of persons aged 75 and over lags behind, and poverty among this group increases dramatically. This is much less true for those aged between 65 and 74, as the latter, being retired more recently, still profit from wage growth. If only the minimum pension (but not other pensions) is uprated in line with wages, the rise in poverty among the elderly is contained, but a substantial reduction in poverty is not achieved. We also find a large projected increase in poverty and inequality for the age group 50-64. This comes about because in this group only about one in two persons are in work and therefore able to profit from wage growth. The other half is dependent on social security benefits, which only rise by 0.5 percent per year.

Our projections are of course very stylized, and should certainly not be taken as predictions. Still, they reveal some important mechanisms, which can lead to real and important problems. First of all, the projected strong decline of the welfare position of the 75+ is a result of the welfare erosion of pensions which is implicit in the policies on pensions taken in Belgium. A strong rise in relative poverty among this group is therefore a real danger. The other important result is the projected increase in poverty and inequality among those aged 50-64. If benefits for persons in this age group are squeezed, both because of budget constraints and in order to reduce incentives to retire early, this will endanger the income position of many individuals who – perhaps involuntarily – will be out of the labour force in any case.

## References

Abel, A. (1999), *The Effects of a Baby Boom on Stock Prices and Capital Accumulation in the Presence of Social Security*, Wharton School mimeograph, University of Pennsylvania.

Abel, A. (2001), Will Bequests Attenuate the Predicted Meltdown in Stock Prices When Baby Boomers Retire?, *The review of Economics and Statistics*, 83:4, 589–595.

Abello, A., Kelly, S. and King, A.-(2002), *Demographic Projections with DYNAMOD-2*, NATSEM Technical Paper No. 21.

Bay, C., Decoster, A., De Swerdt, K., Maréchal, C., Orsini, K., Perelman, S., Rombaut, K., Van Camp, G., Verbist, G. (2007), *MIMOSIS: a Belgian Microsimulation Model for Social Security and Personal Income Taxes*, paper for the Conference of the International Microsimulation Association, Vienna, 20-22 August.

Cantillon, B. Houvenaghel, I, Lambert, K. & G. Verbist (1993) *Kostprijs en doelmatigheidseffecten van een geïntegreerd basispensioen – simulatieresultaten voor België*, CSB Berichten: Antwerpen.

Deboosere, P. & J. Surkyn (2004). Huishoudens en houshoudensposities in de algemene Socio-economische enquete van 2001. mimeo.

Decoster A., K. De Swerdt & G. Verbist (2007) “Indirect taxes and social policy: distributional impact of alternative financing of social security”, Centre for Economic Studies, Discussion Paper Series (DPS) 07.11, April (Public Economics)

Dekkers, G. (2006), *De pensioenbonus in de werknemersregeling: simulatie met het model MEP*, Working Paper 11-06, Federaal Planbureau, Brussel.

Englert M., N. Fasquelle, M.-J. Festjens, M. Lambrecht, M. Saintrain, C. Streel, S. Weemaes (2002), *Verkenning van de financiële evolutie van de sociale zekerheid 2000 - 2050 : De vergrijzing en de leefbaarheid van het wettelijk pensioensysteem*, Planning Paper 91, Federaal Planbureau, Brussel.

European Commission. (2006), *Adequate and sustainable pensions. Synthesis report 2006*, European Communities, Luxembourg.

Fasquelle N. & S. Weemaes (1997), *Verkenning van de financiële evolutie van de Sociale Zekerheid tot 2050*, Planning Paper 83, Federaal Planbureau, Brussel

Hagenaars, A. K. De Vos and M. Zaidi (1994), *Patterns of Poverty in Europe*. Paper presented at the 23rd General Conference of the IARIW, St. Andrews, Canada.

Harding, A. (1990), *Dynamic microsimulation models: problems and prospects*, London School of Economics, Welfare State Programme, Discussion Paper, n°48.

Harding, A. (1996), *Microsimulation and public policy*, Amsterdam: North-Holland, Elsevier

Immervoll H., Lindström K., Mustonen E., Riihelä M. & Viitamäki H. (2005), *Static data ageing techniques. Accounting for population changes in tax-benefit microsimulation models*, EUROMOD Working Papers em7/05, EUROMOD at the Institute for Social and Economic Research

King, A., Bækgaard, H., and Robinson, M.-(1999), *Dynamod-2: An Overview*, Technical Paper No. 19-December.

Nelissen, J. (1993), The Redistributive Impact of Social Security Schemes on Lifetime Labour Income, TISSER, Tilburg.

Duval, R. (2003), *The Retirement Effects of Old-Age Pension and Early Retirement Schemes in OECD Countries*, OECD Working Paper no 370.

Pestiaux, P & J. Stijns (1999) Social security and retirement in Belgium. In: J. Gruber & D. Wise (eds.) *Social Security and Retirement Around the World*, University of Chicago Press, Chicago, 37-73

Poterba, J. (2001). Demographic Structure and Asset Returns. *Review of Economics and Statistics*, 83(4), 565-584.

Studiecommissie voor de vergrijzing. (2007), *Jaarlijks verslag 2007*, Hoge Raad van Financiën, Brussel.

Van den Bosch, K., Lefebure, S. & B. Cantillon (2007). De intergenerationele welvaartsverdeling in België, Vlaanderen en Wallonië van 1975 tot 2005. In: Cantillon et al. (ed.) *Ouderen in Vlaanderen 1975-2005. Een terugblik in de toekomst*. Leuven: Acco.

Van Imhoff, E. & N. Keilman (1991), LIPRO 2.0: an application of a dynamic demographic projection model to household structure in the Netherlands. NIDI/CBGS Pubications nr. 23, Amsterdam/Lisse: Swets & Zeitlinger. 245 p.

Verbist G. (2007), “The distribution effects of taxes on pensions and unemployment benefits in the EU-15” in O. Bargain (ed.), *Microsimulation in action. Policy Analysis in Europe using EUROMOD. Research in Labour Economics*, vol. 25, Oxford, Elsevier, pp.73-99.

Yoo, P. (1994), Age Dependent Portfolio Selection. Federal Reserve Bank of St. Louis working paper no. 94-003A.