Taking two to tango: the joint prospective assessment of pension sustainability and adequacy in Belgium

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Abstract - This presentation discusses how such integrated approach using shared demographic and macroeconomic assumptions has been developed in Belgium. It describes the dynamic microsimulation model MIDAS, highlighting how it aligns to the simulation results of the semi-aggregate model MALTESE. The authors would like to thank Jean-Maurice Frère and Michel Englert for their valuable comments on a previous version of this paper.

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Executive summary

Since about a decade, the pension policy of member states is a focal point of attention on the European level. Traditionally, the focus was primarily on securing the financial sustainability. But a sensible assessment of financial sustainability cannot do without taking into account the social impact of ageing, budgetary and pension policy. Specifically should the development of pension adequacy be taken into account.

This presentation discusses how such integrated approach using shared demographic and macroeconomic assumptions has been developed in Belgium. It describes the dynamic microsimulation model MIDAS (an acronym for 'Microsimulation for the Development of Adequacy and Sustainability'), highlighting how it aligns to the simulation results of the semi-aggregate model MALTESE.

Three example of a joint assessment of recent pension policy on both the sustainability and adequacy of pensions in Belgium are discussed: the recent increase of the means-tested minimum benefit for the elderly, a change of the long term growth rate of wages, and a change in the employment rate of the older active population.

The two models demonstrate that the important increase of the means-tested minimum pension benefit in 2006 has a limited impact on the costs of ageing (0.045% GDP), but a very important and immediate impact on the risk of poverty among the elderly. Furthermore, they show that a higher growth rate or a higher employment rate among the older active population have a comparable impact on the budgetary costs of ageing (from 5.3% GDP in the base-variant to 4.5 or 4.7% GDP), but that the impacts on the development of the risk of poverty among the elderly are far from comparable. Contrary to the high-employment rate variant, the high-growth rate variant results in a gradual increase in the risk of poverty among the elderly from 2020 on.

Finally, some recent developments that may be relevant to the members of the SCP/ISG are presented and discussed in 'sneak preview'. The implementation of SIA in Europe is hampered by a lack of appropriate tools and models to assess social impacts. The tool LIAM 2 might partially resolve this problem, because it will be freely available to all those that want to engage in dynamic microsimulation. The foundations of a FP7 research proposal (EURODYM) are being laid, which should result in jointly developing a general 'MIDAS-like' dynamic microsimulation for various member states.

Introduction

This presentation will discuss how an integrated approach to assessing pension sustainability and adequacy has been developed by the Federal Planning Bureau in Belgium.

It will start by describing the dynamic microsimulation model MIDAS (an acronym for '**Mi**crosimulation for the **D**evelopment of **A**dequacy and **S**ustainability'), highlighting how it aligns to the simulation results of the semi-aggregate model MALTESE. The microsimulation model thus adopts the demographic and macroeconomic simulation results of the semi-aggregate model, as well as its social-policy hypotheses and assumptions.

Next, three examples of a joint assessment of both the sustainability and adequacy of pensions in Belgium will be discussed: first a change in the assumed real growth rate of GDP in the long-term, secondly a change in the employment rate among the older active population, and third the impact of the recent important increase of the residual minimum pension. Of all these variants, the impact on the cost of ageing up to 2060 as well as the development of the poverty risk among the elderly will be presented.

Finally, some recent developments that may be relevant to the members of the SCP/ISG will briefly be presented and discussed in 'sneak preview'.

1. The interdependence of adequacy and sustainability

Since about a decade, the pension policy of member states is a focal point of attention on the European level. This is especially so because Europe faces important demographic changes, that already today have profound consequences on both the sustainability and adequacy of social security, including pensions.

Traditionally, the focus was primarily on securing the financial sustainability. But a sensible assessment of financial sustainability cannot do without taking into account the social impact of ageing, budgetary and pension policy. Specifically should the development of pension adequacy be taken into account. Lusardi et al. (2008, 8) define a pension system to be adequate when it provides means for individual consumption smoothing, and reduces inequality and poverty. The sustainability and adequacy of pensions are two sides of the same coin, and the assessment of sustainability may not be very meaningful without considering current or prospective developments in adequacy. If not, then all problems pertaining to the sustainability of pensions could be resolved by cutting all pension benefits in half.

But the interdependence also goes the other way round (Englert, 2011), since a decrease of (pension) adequacy may cause the welfare to the elderly to increase faster as one would expect based on macro-economic figures alone.

The prospective European-level indicators of adequacy currently are limited to the dependency ratio produced by the AWG and the theoretical replacement ratios produced through the SPC/ISG. These indicators provide limited information to sketch the development of pension adequacy. Furthermore, the magnitude of the changes often differs between these indicators, and they in some cases are not even consistent. For example, Englert (2011) finds that the replacement rate of Belgium shows a moderate increase whereas the benefit ratio shows a decline. He explains this apparent contradiction by pointing out that the theoretical replacement rate does not include actual labour market trends, including ignoring the increase of the proportion of elderly who receive a single person-benefit, while the proportion of beneficiaries who receive a supplement for a depending spouse decreases. On the other hand does the benefit ratio not include the increasing importance of pension benefits from the 2nd pension pillar in Belgium.

Finally, the above mentioned indicators are not necessarily based on the same assumptions, hypotheses and projections. There clearly is a need for integration. In a note to the ISG, the European Commission (2011, 2) notices that "even though the Euro Plus Pact focuses on the sustainability of public finances, the European Council explicitly refers to the "sustainability and adequacy of pensions and social benefits", highlighting the need to analyse these two concepts together and "not [...] in isolation".

This importance of assessing prospective indicators of (pension)adequacy has been reinforced by the EU2020-targets. The contribution of pensions to the attainment of the target of reducing poverty in old age becomes in this way a central issue in the monitoring of pensions' adequacy. "The SPC will therefore need to strengthen its capacity to assess the adequacy of pension systems and to identify policy strategies that would lead to the most cost-effective delivery of pensions and social benefits in ageing societies." (op. cit., 2).

The Commission then highlights this point by echoing a suggestion that resulted from a discussion between the EPC and SPC chairmen, being "a better coverage of the adequacy dimension [that; GD] should be secured mainly by the SPC, ISG and Working Group on Ageing Issues. This work will therefore run parallel to the work of the EPC-AWG, which focus on sustainability, and should be based on the same demographic and macroeconomic assumptions" (op. cit., 2).

A problem with this approach, and generally a problem with the assessment of adequacy is that tools and models may not be available. In their joint study on social impact assessment of June 2010, TEP and CEPS report that "the lack of appropriate tools, models or data sources to assess social impacts[1] quantitatively is one of the most frequently cited challenges to effective social IA" (TEP & CEPS, 2010, 4). This paper will discuss how such integrated approach using shared demographic and macroeconomic assumptions has been developed in Belgium. More specifically, this text will start by describing the dynamic microsimulation model MIDAS (an acronym for 'Microsimulation for the Development of Adequacy and Sustainability'), highlighting how it aligns to the simulation results of the semi-aggregate model MALTESE. Since the latter is the model that generates the input projections for the AWG, this paper assumes MALTESE known and focuses on the microsimulation model MIDAS.

[1] The same report also provides one of the rare explicit definitions of SIA as "any impacts that affect individual citizens or groups of individuals" (op. cit., 2010, 12). Since dynamic microsimulation is prospective and model on the level of the individual and his or her household, it is obvious that these models can be an important tool in SIA. See Dekkers (2006) for a more elaborate discussion of this point.

Next, an example of a joint assessment of recent pension policy on both the sustainability and adequacy of pensions in Belgium will be discussed. Finally, some recent developments that may be relevant to the members of the SCP/ISG will briefly be presented and discussed in 'sneak preview'.

2. A birds-eye view on the Belgian pension system.

Social security pension benefits in Belgium have an occupationally-tied character that is toned down by diverse minimum provisions and ceilings. It is financed through PAYG and provided a benefit to 2 million persons on January 1st, 2008 (De Vil, 2010, page 3).

Private sector employees and public sector employees that were no civil servants build up a benefit in the first-pillar retirement system for wage earners. This benefit is a function of the length of the past career, the average of past salaries (where each annual salary is taken into account up to the wage ceiling pertaining to that year) indexed to the development of prices. The official age of retirement is now 65 for men and women. The pension equals 60 per cent of the wage base for singles. If he/she is married to someone with a very low pension entitlement, the couple can opt for a 'family pension benefit', based on of 75 per cent of the wage base of the higher-earning partner. Redistributive solidarity elements are embedded in the pension system through a minimum right per career year and the minimum pension. The average 'pure' monthly old-age employees' scheme pension benefit was equal to €1,030 in 2007[2] (Berghman et al., 2010, Table 2.16, page 66). According to De Vil (2010), this was €1,111 for men and €634 for women on January 1st, 2008.

The Conventional Early Leavers' Scheme (CELS) for employees is essentially an unemployment scheme for private sector workers aged 58 and over, up to the legal retirement age. Even though there is a career requirement for entering the scheme, and unlike the retirement pension, the CELS pension benefit does not depend on the number of working years, but only on the level of previous wage. Furthermore, when one enters the CELS, the career length, which is a key element of the old-age pension, continues to increase as if the individual were still working.

The disability scheme benefit is equal to 40 per cent and 50 per cent of the last wage, depending on whether the individual is cohabiting or not.

Like for employees, the retirement is compulsory for civil servants, generally at the age of 65, though there are exceptions. Early retirement is possible from the age of 60 onwards. Contrary to employees, however, benefits in the civil servants' scheme are a proportion of the average wage over the last five years before retirement. This proportion equals the length of career in the public service divided by a benchmark, usually 60. As a result, the average monthly 'pure' civil servants' benefit is about twice as much as the average employees' pension benefit. Berghman et al. (2010, Table 2.16, page 66) find it equal to €2,272 per month on average in 2007. According to De Vil (2010), the average monthly public

[2] This figure only includes those receiving an old-age pension benefit. On the whole, this is the case for about 65% of pension recipients (Berghman et al., 2010, Table 2.1, page 49). About 12% receive a widows' or widowers' benefit, 18% receive both, and about 5% receive a means-tested minimum benefit GRAPA.

sector old-age pension benefit on January 1st, 2008 was around €2,400 for men and around €2,000 for women.

3. A birds' eye view on the institutional setting wherein the MIDAS and MALTESE models are being used.

Before turning to the discussion and application of the models MIDAS and MALTESE to assess budgetary impacts and adequacy impacts of first-pillar pensions, we briefly discuss the institutional setting where the models are used in. The Federal Planning Bureau is a public research institution within the federal government. Besides doing independent research, collecting and analysing data, it has a number of legal assignments. One of these is that the FPB supports the work of the Study Committee on Ageing, among other things through its models. The Study Committee for Ageing was established in 2001 and has been publishing since then an annual report on the budgetary as well as social consequences of demographic ageing up to 2060. The Study Committee falls under the High Council of Finances, which, presided by the Belgian minister of Finances, analyses and studies fundamental budgetary, financial and fiscal issues, and suggests adaptations or reforms.

4. The microsimulation model MIDAS: ready to tango

Microsimulation models in recent years have gained popularity in the assessment of social security systems in terms of adequacy, and specifically pension policy. The characteristics that distinguish micro-simulation models from other models are (i) that modelling is done at the level of the individual and the household, and (ii) that the point of departure of simulations is a survey or an administrative dataset representing actual individuals at a certain point in time. Put differently, microsimulation models differ from (semi-)aggregate budgetary models in that they simulate the impact of policy measures and schemes on real people, and not averages or "representative agents" (Atkinson, 2009; 33). As a consequence, the level of modelling in microsimulation models is in line with the level at which policy takes effect. The microsimulation models take individual heterogeneity into account, whereas semi-aggregate models focus on the relations between averages or aggregates. Semi-aggregate models are therefore better suited for the year-to-year budgetary assessment of social policy, while microsimulation models report the effects of policy on the income distribution, as well as poverty (often a function of the location of specific groups within this distribution), in short on the adequacy of a social security scheme.

The EUROMOD-framework is of course the most well-known on the European level, and its impact cannot be overstated. But it has some problems too. First of all, it is a static model that is primarily designed to simulate the 'overnight' impacts of demographic, economic or policy changes. Secondly, in many countries, it does not include pensions. Third, it is in several countries used in an academic setting, and hence not directly involved in the policy preparation and assessment process. Some member states therefore have dynamic microsimulation models for policy support (PENSIM II in the UK, SESIM in

Sweden, DESTINIE in France, MIDAS in Belgium) or are well under way in developing them (T-DYMM in Italy, the IER model in Slovenia, and DyMiLux in Luxembourg[3]).

This presentation describes MIDAS, emphasizing its conjunction with the semi-aggregate model MALTESE for Belgium. Technically speaking, MIDAS is a dynamic population model with dynamic cross-sectional ageing. This means that it starts from a cross-sectional dataset of representing a population of all ages at a certain point in time, in this case the PSBH dataset for Belgium in 2002. The model then simulates the life spans of individuals in the dataset, including with their interactions, for the years between 2003 and 2060. So new individuals are born, go through school, marry or cohabit, enter the labour market, retire and, finally, die. All these main events in a life time are simulated by the model. During their active years, they build up pension rights, which result in a pension benefit when they retire.

MIDAS was originally developed through a 6th framework project AIM: [FP6-2003-SSP-3] OJ C243 of 10.10.2003. Its original version was designed to simulate future developments in the adequacy of pensions in Belgium, Germany and Italy, following, wherever possible, the projections and assumptions of the AWG. See Dekkers et al. (2009, 2010) for a more elaborate discussion. Contrary to the first version of the model, which was intended for use in an international setting[4] , the second version -whose results will be discussed next, is intended for use in the Belgian context only. The simulation results that will be discussed next have been produced by MIDAS aligning not to the AWG projections, but to the projections and assumptions of the reference scenario of the 2009 Study Committee for Ageing report (cf. supra).

In its current version, MIDAS covers employees' and civil servants' pensions and Conventional Early Leavers' Scheme (CELS), as well as unemployment benefits, disability pensions and social assistance. It includes all relevant policy changes between 2001 and the last observed year 2010.

MIDAS has an extensive alignment procedure, which allows it to be consistent with exogenous semi-aggregate projections and assumptions; in this case separating gender- and age-groups as produced by the MALTESE model. Thus, for example, the activity rates that result from a behavioural equation (usually a binary logit) are aligned with the MALTESE activity rate projections differentiated by age and gender. The behavioural equation therefore determines the 'risk' of an event for an individual of certain characteristics relative to other individuals, but the state-alignment procedure determines the actual number of events occurring. To give a rather stylised example, suppose that we know from the MALTESE projections that, in the simulation year 2020, 1 per cent of women of 50 years of age must die. Furthermore, suppose that we know the relative mortality risk of women of 50 years of age in relation to a set of background variables such as level of education, health, and a stochastic component. Then these women will be ranked according to their individual mortality risk, and the state-alignment procedure will 'kill' exactly 1 per cent of the age group, taking those with the highest ranking first.

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[3] An interesting development is that there has been a first attempt to 'dynamize' EUROMOD by integrating it in a dynamic setting provided by DyMiLux (Liégeois and Dekkers, 2011).

[4] In fact, the AIM project resulted in three separate models; MIDAS_BE, MIDAS_GE and MIDAS_IT for Belgium, Germany and Italy, respectively. The first was developed into the current model MIDAS, while the third provided the foundation of T-DYMM. Furthermore, the Luxembourg model DyMiLux is also being based on MIDAS_BE.

The following list gives the different states that are aligned, in the version of MIDAS used in this paper based on the baseline aggregate projections of the 2009 report of the Study Committee for Ageing:

- mortality (by age, gender and year of simulation);
- fertility (by age, gender and year of simulation);
- employment rate (by age classes, gender and year of simulation);
- unemployment rate (by age classes, gender and year of simulation);
- proportion of self-employed (by age classes, gender and year of simulation);
- proportion of public sector employees (by age classes, gender and year of simulation);
- proportion of civil-servants (by age classes, gender and year of simulation);
- proportion of disabled (by age classes, gender and year of simulation);
- proportion of CELS recipients (by age classes, gender and year of simulation).

Even if the proportion of retired individuals is not in the list of aligned aggregates, the number of retirees and the 'other inactives' are indirectly aligned, since these are the residual states. For individuals younger than 60, the 'other inactive' state is the residual state. For those of 60 and over, the retirement state is the residual state when employment, unemployment, disability and CELS states are determined [5].

In addition to alignment of the states that individuals occupy, consistency of MIDAS with MALTESE is also imposed through the inclusion of the MALTESE assumptions and projections in the development of aggregate earnings (through 'monetary alignment' imposed the aggregate of the simulated micro-level earnings to follow the growth rate of productivity to gender) and the social policy hypothesis pertaining to the relation between the growth rate of wages and of social security benefits.

In short, the simulation results of the microsimulation model MIDAS describe the consequences of the latest budgetary projections and assumptions on the projected adequacy of pensions in Belgium.

5. Some examples highlighting the consistency between MIDAS and MALTESE through various channels

In this section, some simulation results of MIDAS and MALTESE will be discussed. The simulation variants are chosen as to highlight the way in which the two models can coincide to jointly assess the sustainability and adequacy of social security, and specifically pensions. Furthermore, they are chosen to show how the relation between the two models can go via different channels: monetary alignment, state alignment and by implementing the same policy variant. The simulation results of MALTESE presented here will be limited to the costs of ageing as a percentage of GDP between 2008 and 2060. The

[5] Since they are not produced by MALTESE, the alignments of the divorce and the cohabitation- separation procedures are based on observed statistics from the Directorate-general Statistics Belgium. This implicitly assumes that the proportion of divorcees and cohabitation failures do not change over time.

simulation results of MIDAS will be limited to the poverty risk of various groups between 2002 and 2060 [6] [7].

Before turning to the simulation variant, however, we discuss the simulation results of the base-variant. Table 1 shows the budgetary impact of ageing between 2008 and 2060.

Table 1 Budgetary costs of ageing: rate of increase in % of GDP, 2008 to 2060

	Base scenario (1,5% increase of productivity per year)
Pensions	5.3
Health care	4.2
Other	-1.4
Total	8.2

Source: Annual Report of the Study Committee for Ageing (High Council of Finances, 2009) June 2009

In the base scenario, pension costs would increase by 5.3% GDP, while health care costs would increase by 4.3% GDP. Other costs would however decrease relative to GDP (among other things a result of decreasing child benefits, and unemployment benefits), so that, on balance, the budgetary costs of ageing would amount to 8.2% GDP between 2008 and 2060.

Next, we discuss the development of the poverty risk of the elderly, workers and pension recipients in the base variant[8] in Figure 1. In the first decade of simulation, the poverty risk among the elderly increases and it starts a noticeable decrease afterwards, until about 2040. Three factors can explain this development.

The first factor that explains the declining risk of poverty for pensioners during the first four decades is the increased participation of women in the labour market. This increases the share of earnings in the income of especially male pensioners, thereby decreasing their risk of poverty. The most important impact of this increasing labour market participation of women is however on their own future pensions. As women tend to have longer careers, this enables them to get higher pensions.

The second factor is closely related to the first factor and is that, also due to the increasing active rate of women, more and more couples opt for two single-person pension benefits, and proportionally fewer couples take the 'family pension benefit' where the high-pension partner takes a who receive a supplement for a depending spouse. Since the supplement equals 25% of the pension benefit while the equivalence scale of two individuals is 50% higher than for one individual, this development decreases the poverty risk among the elderly.

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6 The poverty risk indicator equals p/N where N is the size of the population, and p is the number of individuals whose equivalent household income is on or below an exogenous threshold level, usually 60% of median equivalent income. Equivalent income equals total household income, corrected for the size and composition of the household using the modified OECD scale (1, 0.5, 0.3).

7 The interested reader is invited to read the original papers (Dekkers & Desmet, 2011, De Vil et al., 2010, Dekkers et. al., 2010) for a more extensive discussion of these and other simulation results.

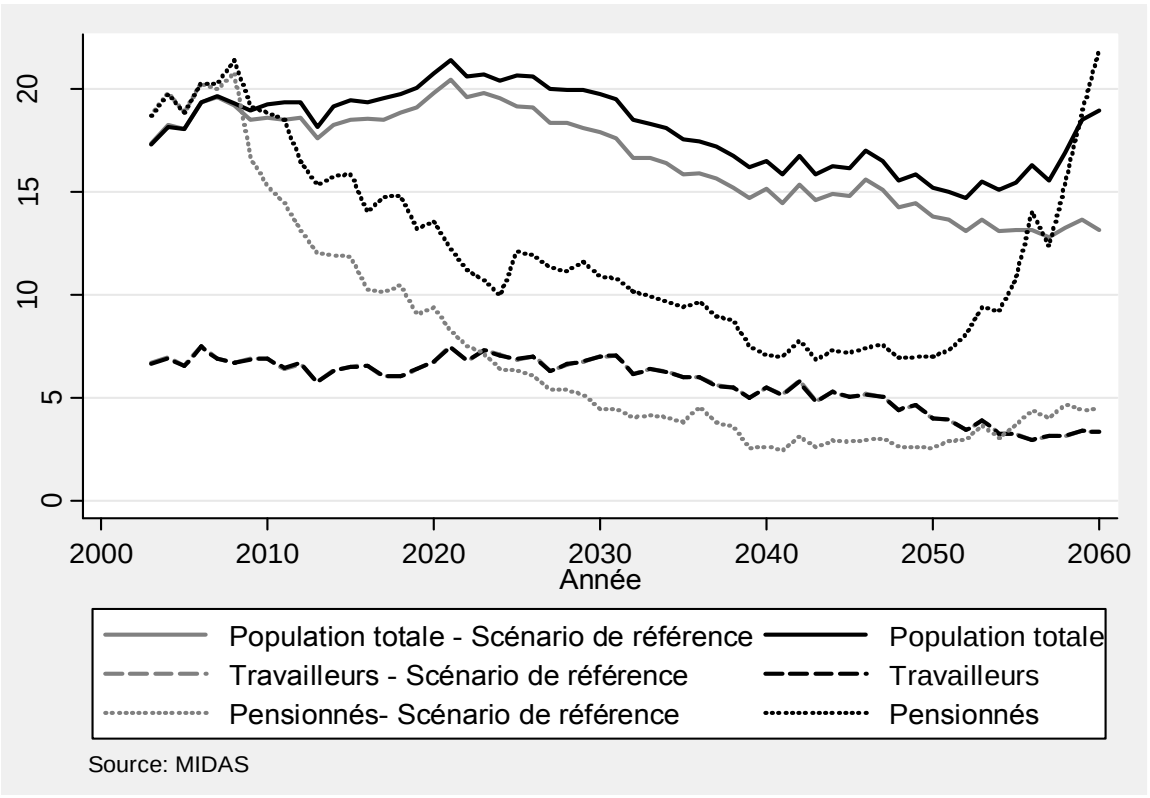
8 Note that these poverty risks in the first simulation years differ from the official figures since the former are based on the PSBH-dataset whereas the latter are derived on the EU-SILC. Furthermore, MIDAS does not include all sources of income, including returns on investments as well as benefits and capitals received from the second and third pillars of the Belgian pension system. See Dekkers, Desmet and De Vil (2010, page 69) for a more extensive discussion.

The third factor is the whole of the recent measures that have been taken in order to raise pension minima at the end of 2006, mainly the nearly 14% rise of the "guaranteed income for the elderly" (GRAPA/IGO). The means-tested character of this benefit allows it to have an important impact on poverty measures. Furthermore, because of this large re-value, the impact of this benefit is felt during the whole simulation period. Hence, as will be shown in Figure 1 below, the reduction of the poverty risk among pensioners is, to a great extent, the result of the increasing level of women's pensions.

5.1. Simulation variant 1: an increase of the "guaranteed income for the elderly" (GRAPA/IGO) by 13.7% in 2006

This first example illustrates how the two models can simulate the same policy variant, in this case an increase of the "guaranteed income for the elderly". This is a means-tested minimum benefit for people of 65 and older. Its beneficiaries are mainly women, and former self-employed. For most recipients, the GRAPA is complementary to the pension benefit. In November 2006, the base amount of the guaranteed income was increased by 13.7% to €530,30 for a cohabiting partner, and €795,46 for a single beneficiary. The purpose of this increase was to bring the GRAPA to the poverty line pertaining to the risk of poverty. Simulations using MALTESE show that the budgetary impact of this increase of the GRAPA is 0.045% GDP. Underlying this increase is an increase of the number of beneficiaries and an increase of the average benefit.

Figure 1 **Poverty risk to status - base scenario and scenario without the increase of the residual minimum benefit**



Source: MIDAS

Next we discuss the impact of *not* having the 2006 increase of the means-tested minimum pension benefit on the basis of Figure 1. The base scenario in the microsimulation model MIDAS includes the increase of the residual minimum pension benefit GRAPA. The simulation variant whose results are expressed in Figure 1 therefore does *not* include this increase. It should furthermore be noticed that the current version of MIDAS does not include all arguments of the means test. Hence it overestimates the average GRAPA benefit and, consequently, the impact of this simulation variant. Nevertheless is it obvious that the poverty risk among the elderly is much higher in the simulation variant than in the base variant. Put differently; had the 2006 increase of the GRAPA benefit not been taken place, then the cost of ageing would have been 0.045% GDP lower, but the poverty risk of the elderly in any simulation year would have been considerably higher than in the base variant.

5.2. Simulation variant 2: a change of the assumed growth rate of GDP

Both MALTESE and MIDAS adopt the actual development of wages between 2002 and 2008, and the mid-term projections 2009-2014. For the years up to 2018, the assumption is that the wage growth rate converges gradually to its long-term level, which by hypothesis is 1.5% p.a. in the base variant. In the second simulation variant, this annual growth rate is 1.75%.

Table 2 Budgetary costs of ageing: rate of increase in % of GDP, 2008 to 2060

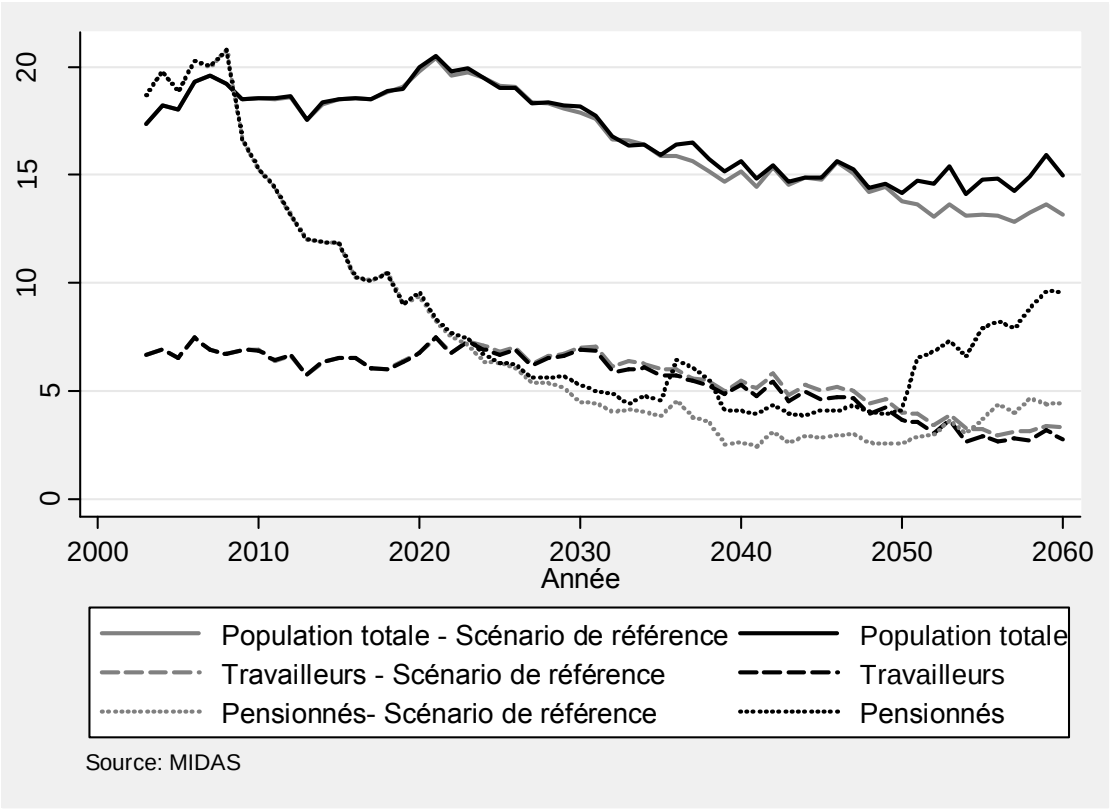
	Base scenario (1,5% increase of productivity per year)	Variant (1,75% increase per year)
Pensions	5.3	4.5
Health care	4.2	4.2
Other	-1.4	-1.7
Total	8.2	7.0

Source: Annual Report of the Study Committee for Ageing (High Council of Finances, 2009) June 2009

In the base scenario, the budgetary costs of ageing would amount to 8.2% GDP between 2008 and 2060. Increasing the assumed growth rate of productivity in the long run from 1.5 to 1.75% per year would cause these budgetary costs to reduce to 7% GDP. This would be the result of the decreasing benefit ratio only. To understand this, one needs to realize that the Belgian first-pillar pension system is essentially a Bismarckian pension system toned down by diverse minimum provisions and ceilings. Contrary to many countries, the development of these provisions, ceilings and other parameters over time is *independent* of the growth rate of wages. An increase in the assumed long-run productivity rate thus relatively decreases the unchanged minimum provisions and lowers the ceilings. This results in a lower benefit ratio relative to the base variant.

In MIDAS, the aggregate earnings follow the growth rate of earnings in MALTESE through a process of 'monetary alignment' where individual earnings are proportionally uprated to meet the growth rate of the aggregate. The below Figure 2 shows the development of the poverty risk from MIDAS, representing the base variant and the variant with a higher long-run assumed productivity growth rate.

Figure 2 **Poverty risk to status, % - base scenario and scénario with 1,75% productivity growth rate**



Assuming a long-term growth rate of 1.75% instead of 1,50% per year from 2019 onwards causes the poverty risk among the elderly to increase relative to the base variant. This essentially is because the earnings of the working population increase faster than in the base variant. This development is only partially reflected in the development of pensions, since the growth rate of the minimum provisions and ceilings do not change. Thus, the development of the average pension benefit lags behind the development of wages, relative to the base variant, and the poverty risk of the elderly increases[9] .

5.3. Simulation variant 3 : an increased employment rate among the older active population

In this scenario, the employment rate among people of 55 and older is assumed to grow towards the average observed employment rate in the Scandinavian countries. The overall employment rate of people aged between 55 and 64 thus increases from 49% in the base scenario to 63%, and the overall employment rate increases from 68 to 71%. This is achieved in MALTESE through

– reducing the structural employment rate;

– reducing the inflow in the Conventional Early Retirement System (CELS);

[9] One might wonder why the decrease of the poverty risk of the working population is not equally strong.

– increase the probability of working after the age of 60. The following table shows the impact of this measure on the budgetary costs of ageing.

Table 3 Budgetary costs of ageing: rate of increase in % of GDP, 2008 to 2060

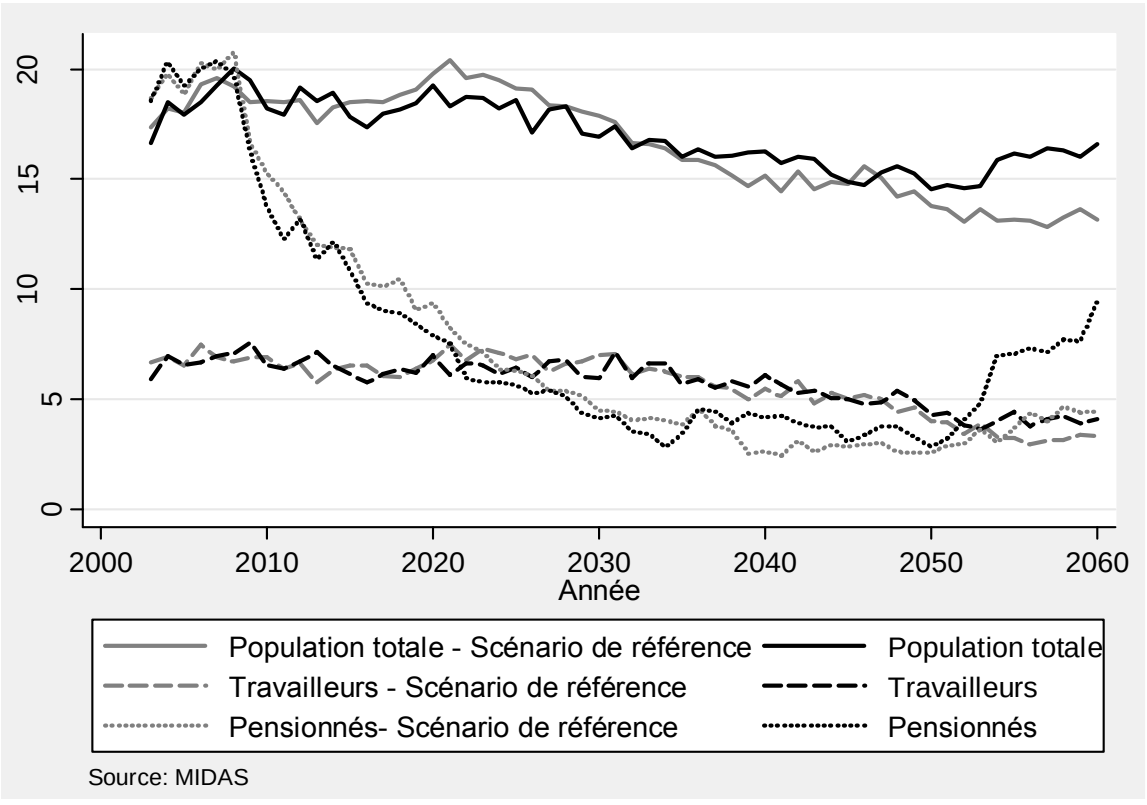
	Base scenario (1,5% increase of productivity per year)	Productivity variant (1,75% increase per year)	Employment variant
Pensions	5,3	4,5	4,7
Health Care	4,2	4,2	4,2
Other	-1,4	-1,7	-1,9
Total	8,2	7,0	7,0

Source: Annual Report of the Study Committee for Ageing (High Council of Finances, 2009) June 2009

The overall budgetary impact is again simulated through MALTESE. This impact of the higher employment rate among the elderly is the same as in the higher productivity growth variant: the budgetary costs of ageing decrease from 8.2 to 7% GDP between 2008 and 2060. However, the reasons for this decrease are different from the high productivity variant. In this case, this reduction is caused by a reduction in the costs of pensions and the reduction in the costs pertaining to unemployment.

Through the state-alignment processes, the employment probabilities of individual older people in MIDAS are changed according to the hypothesis and simulation results delivered through MALTESE. The resulting development of poverty risk is presented in Figure 3.

Figure 3 Poverty risk to status, % - base scenario and scenario with higher employment rate



As the proportion of workers in the older age categories increases, the proportion of people occupying other states obviously decreases. The impact of the increased activity rate on the poverty risk of the elderly can be disentangled in two separate effects. On the one hand, the poverty line increases as a result of the higher part of earnings in the income of households. This first effect increases the poverty risk among the elderly. On the other hand results the higher activity rate of older age categories in the active population eventually in a higher pension benefit, which reduces the poverty risk among the elderly. Furthermore, the importance of earnings in the household income of the elderly in this variant exceeds that of the base variant, which also results in a reduction of poverty among the elderly. Thus there are various opposing effects, and they roughly balance each other out between 2002 and 2035. Thereafter, however, the poverty risk of the elderly increases relative to the base variant, which is because the employment increase will have reached its full impact on the pension benefit, the further increase of this pension benefit will therefore slow down, and the increasing impact of the higher proportion of earnings on the poverty line will exceed the higher pension benefit, resulting in a proportionally higher poverty line and an increasing poverty risk among the elderly.

In conclusion: the three simulation variants discussed in this section illustrate the way in which a semi-aggregate model and a microsimulation model can work in conjunction to simultaneously assess the budgetary and adequacy impacts of ageing, economic growth and pension policy. First of all, the two models demonstrate that the important increase of the means-tested minimum pension benefit in 2006 has a limited impact on the costs of ageing (0.045% GDP), but a very important and immediate impact on the risk of poverty among the elderly. Next, they show that a higher growth rate or a higher employment rate among the older active population have a comparable impact on the budgetary costs of ageing (from 5.3% GDP in the base-variant to 4.5 or 4.7% GDP), but that the impacts on the development of the risk of poverty among the elderly are far from comparable. Contrary to the high-employment rate variant, the high-growth rate variant results in a gradual increase in the risk of poverty among the elderly from 2020 on.

6. A sneak preview

To end this short overview of MIDAS, this section discusses some new developments that may in the future be relevant for you. The current version of MIDAS is developed in LIAM (O'Donoghue et al., 2009). Originally developed by Cathal O'Donoghue and further developed by the Federal Planning Bureau in the AIM project, LIAM is a flexible computing framework designed to create dynamic microsimulation models. LIAM has been used in the development of MIDAS in the context of the FP6 AIM project, and various institutions (the Federal Planning Bureau in Belgium, Tesoro in Italy, and CEPS/INSTEAD in Luxembourg) are using the legacy of this project to further develop their dynamic microsimulation models.

Using the experience gained in the work with LIAM, the Federal Planning Bureau worked together with CEPS/INSTEAD and the IGSS in Luxembourg in the PROGRESS project MiDaL (under the Grant VS/2009/0569) to develop an entirely new version of LIAM, originally called LIAM 2. This LIAM 2 has been presented to the research community very recently (Dekkers et al., 2011). It is in several ways a large

leap ahead in the development of microsimulation models. For example, in the current version of LIAM, the largest microeconomic dataset possible is roughly 13,000 individuals. The average run time of MIDAS that resulted in the simulation results discussed in this paper, is about 24 hours for a starting dataset of about 8,488 individuals. In the new version of MIDAS that the FPB is developing using LIAM 2, testing is routinely done using an administrative dataset of 300,000 individuals, and one full run takes between one and two hours. Actual simulation results are based on an expanded dataset of 3,2 million individuals.

Why is this relevant to you? As said in the introduction of this paper, the implementation of SIA in Europe is hampered by a lack of appropriate tools and models to assess social impacts (TEP & CEPS, 2010, 4). The tool LIAM 2 may partially resolve this problem, because LIAM 2 will be open source and thus freely available to all those that want to engage in dynamic microsimulation. Already can a testing version of LIAM 2 with a simple model and a fictitious dataset of 20,000 individuals be downloaded from http://liam2.plan.be/.

Finally, the FPB and CEPS/INSTEAD are building the foundations of a FP7 research proposal (EURODYM) that should result in jointly developing a general 'MIDAS-like' dynamic microsimulation for various member states. As was the case in the AIM project, this microsimulation model should align to the AWG projections, hypotheses and assumptions wherever possible.

7. Conclusions

This paper discusses how such integrated approach using shared demographic and macroeconomic assumptions has been developed in Belgium. After a brief description of the dynamic microsimulation model MIDAS, the way in which MIDAS align to the simulation results of the semi-aggregate model MALTESE were highlighted. This way, the microsimulation model MIDAS and the semi-aggregate model MALTESE are as consistent as possible.

Next, the joint assessment of recent pension policy on both the sustainability and adequacy of pensions in Belgium was illustrated through three simulation variants: a change of the long term growth rate of wages, a change in the employment rate of the older active population, and the recent increase of the means-tested minimum benefit for the elderly.

Finally, some recent developments that may be relevant to the members of the SCP/ISG were briefly presented and discussed.

This paper makes the point that the sustainability and adequacy of pensions are two sides of the same coin. Dynamic microsimulation modelling now offer the possibility to simulate adequacy while taking semi-aggregate simulation results (and thus the sustainability of pension systems) as a given. This paper hopes to have illustrated the possibilities that this offers for policy assessment and support.

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9. Biography

Dr. Gijsbrecht 'Gijs' Dekkers (1967) is attaché/senior researcher at the Directorate General of the Federal Planning Bureau. He is also a research associate at the Centre for Sociological Research CESO, Katholieke Universiteit Leuven, and he is an external professor at the IUP Gestion du Patrimoine, Université Paris-Dauphine. Dr. Dekkers is chief editor of the International Journal of Microsimulation (http://www.microsimulation.org/IJM/IJM_editorial_board.htm) and he is member of the International

Microsimulation Association (www.microsimulation.org), and the European network of Social Policy Analysis ESPAnet (www.espanet.org). He was an advisor to the PENMICRO project by TARKI (Hungary) for the Indicator Subgroup of the SPC. Besides doing applied and academic research involving microsimulation, his main activity is developing MIDAS and applying it for policy assessment in Belgium. He currently is working together with Asghar Zaidi (European Center, Vienna) and Philippe Liegeois (CEPS-INSTEAD, Luxembourg) to start up a European network of Dynamic Microsimulation (EURODYM). Finally, Gijs Dekkers is regularly consulted by governments or research institutions in various European countries (including Italy and Slovenia) and gives presentations or keynotes abroad.