Micro-simulation of Social Security Reforms in Belgium

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PRELIMINARY AND INCOMPLETE

Abstract

The present paper analyzes the budgetary impact of various Social Security reforms in the Belgian institutional setting. Our approach relies on parameters that were derived in Dellis et alii (2002) using a micro-modeling strategy. Focusing our attention on a hypothetical age cohort, we illustrate the budgetary impact that the reforms considered might have on the budget of the federal government.

Introduction

The various Belgian social security schemes face an uncertain future. The general trend towards demographic aging all across the developed world and large parts of the developing world has not left Belgium unaffected. Demographic aging is the result of a combination of two trends. First, there has been a substantial decrease in fertility rates of women over the last few decades. Second, we have been able to observe a strong increase of life expectancy across most categories in the population. Unfortunately, these trends have a strongly negative financial impact on a variety of social insurance and social protection programs, ranging from child support payments, over the health care sector to the questions of retirement income and long-term care arrangements. While the problem can be approached in a myriad of ways, we approach the problem from the perspective of the social security system, thus largely leaving aside the question of health and long-term care costs. While it is true that this focus inhibits a truly global view of the financial consequences of aging for government budgets, it is also

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true that introducing it would cause tremendous problems in terms of modeling the evolution of health-care costs, as well as in terms of a loss of international comparability.

For the social security systems to survive this demographic process, higher contribution levels and/or lower benefits will have to be introduced given the outright pay-as-you-go (PAYG) nature of these systems. Indeed, a straight increase in the public debt financing of the demographic transition is not truly an option in Belgium, as it would be totally incompatible with the Maastricht criterion of the European Economic Monetary Union (EMU) relating to the level of GDP.[1] But even beyond this purely institutional limit, a further increase in public debt levels is also financially unsustainable, as it would at short notice cause a snowball effect such as the one observed in Belgium in the 1980's.

Leaving aside these purely demographic considerations, other factors are challenging the way the Belgian social security institutions and systems are organized. First, there is the potential for increase labor mobility. At present, mobility between jobs in the public sector, the private sector and in self-employment is rather limited, at least partly because of the way the three systems work. The needs of the labor market of the future with its increased degree of flexibility may thus induce large changes in the way the three corresponding social security systems work. International job mobility is also becoming more and more important, particularly for a small open economy in the heart of Europe like Belgium. Jousten and Pestieau (2000) argue that both levels of intra- and intergenerational redistribution will be heavily affected by increased international labor mobility, even if the phenomenon is limited to some subgroups of the population.

The second and biggest non-demographic challenge is the widespread use of a variety of early retirement programs. In fact, Belgium excels in the use of these programs as the world-leading low average retirement age of approximately 57 for men clearly illustrates.[2] Originally these systems were motivated by several objectives. Faced with an environment of industrial restructuring early retirement seemed to be the royal route out of the problem for all partners involved. First it allowed companies to lay off old workers and if needed hire cheaper young workers, while the government supported a large chunk of the costs. Older workers were encouraged by the trade unions to leave to free up space for younger ones. To the present day, many older workers believe that they take a decision beneficial to their younger counterparts. Third, the successive governments since the 1970's were also political gainers, though financial losers, in this consensus towards early retirement because it allowed the government to show a better performance in terms of unemployment (particularly youth unemployment) and guaranteed a social peace. Lately however, these early retirement schemes have undergone some scrutiny. Not surprisingly, the beneficial labor market effects have been rather modest, if not completely absent. Recent discussions and decisions at the government level clearly move into the direction of lifting the effective early retirement age, and hence also the sector-specific mandatory retirement ages. Financial costs of early retirement programs to the federal government have been huge, both on the income (contributions, taxes) as on the expenditure side (early retirement benefits).

The goal of the paper is to simulate the impact of reforms of retirement income systems. The impact we are interested in resides on two levels. First, we consider the financial and behavioral impact on individuals and families. Second, we consider the financial impact on federal government budget. We do not restrict our attention to the budgetary impact on the social security systems, but rather on all of the federal government's finances. Such reforms will have both an automatic effect on fiscal contributions by changing contributions and

[1] Belgian national debt currently hovers at a level of approximately 110 percent.

[2] The average age of retirement of 57,6 for men was estimated by Blöndal and Scarpetta (1998) on the basis of Labor Force Surveys. In this study we estimated an average retirement age of 58.4 for men and 57.4 for women.

benefits for a given work history (the "mechanical" effect) and an additional effect through labor supply responses to the reform (the "behavioral" effect). We will estimate the fiscal implications of both the mechanical and the behavioral effect, using our retirement probit models derived in Dellis et alii (2002) to predict labor supply responses. The result will be an estimate of the steady-state impact of the reforms on the financial balance sheet of retirement income systems.

The structure of the paper is as follows. Section 2 describes the essential features of the various public retirement and early retirement systems in Belgium. In section 3 we explain the different components of our administrative dataset, as well as the key results of Dellis et alii (2002) that we heavily rely upon. The following section describes the simulation methodology used. Section 5 describes the simulation results obtained. Section 6 is devoted to the conclusions.

Social security schemes[3]

The Belgian retirement income system relies on three very unequal pillars. First of all, there are the dominant public social security programs that represent the largest part of pension income for a wide majority in the population. A second pillar consists of company pension schemes, which only plays a minor role as a source of income for the average Belgian worker. Essentially, they are currently confined to the higher-income individuals in the private sector and to the self-employed, a finding which is at least in part due to their tax-treatment. A third type of retirement income comes from individual retirement savings. These take multiple forms: First, there are tax-favored individual pension savings accounts with a maximum annual contribution of EUR 580 per person (approximately US$ 615),[4] or under the form of more traditional savings vehicles such as the tax-favored savings accounts, investments in trust funds, life insurance, etc.

The first pillar, public retirement programs, essentially consists of four components. There are three large sectoral social security programs, one for the public sector, one for the private sector wage earners and one for the self-employed. Some special categories of workers, such as coalmine workers and military personnel have special retirement systems that we will not explicitly model in the present paper. A fourth large category of public retirement income consists of the guaranteed minimum pension system, that operates on a means-tested basis.

Wage-earner's scheme

The wage earner's scheme is by far the largest one according to the number of people affiliated with the program. The program allows for retirement starting at age 60, with a normal retirement age fixed at 65. The choice of the retirement age does not induce any actuarial adjustment under current rules.

However, in the case of most workers, the choice of the retirement age is not completely neutral with respect to the benefit amount because a full earnings history consists of 45 years of work for men, a condition that many people do not satisfy at the age of 60. For those having more than 45 working years, a dropout year provision operates replacing low-income years by higher ones. The situation has so far been slightly different for women who only needed 40 years to complete a career. A transition (between 1997 and 2009) is under way to progressively increase the complete career condition to 45 years of work. Hence, for most women included in our dataset, a full career still consists of 40 years of work. Additional years can be added to ones career by working, but also by spending additional time on other

[3] The present section heavily relies on Dellis et alii (2002).

[4] In this paper, we apply a EUR/US$ exchange rate of 0,942 EUR per US$, which approximately corresponds to the exchange rate in place on 31/12/1999.

social insurance programs such as unemployment insurance, disability insurance, workers compensation or early retirement programs.

Benefits are computed based on the earnings during periods of affiliation. The benefit formula, which is subject to floors and ceilings, can be represented as follows:

Benefit =n/N * average wage * k

where n represents the number of years of affiliation with the wage-earner's scheme, N the number of years required for a full career (in our case either 40 or 45) and k is a replacement rate, which takes on the value of 0.6 and 0.75 depending on whether the social security recipient claims benefits as a single or as a household. The variable "average wage" corresponds to indexed average wages over the period of affiliation, with indexation on the price index combined with additional discretionary adjustments for the evolution of growth. A peculiar feature of the Belgian wage-earners scheme is that periods of the life spent on replacement income (unemployment benefits, disability benefits, workers compensation…) fully count as years worked in the computation of the average wage, and hence of the social security benefit. For any such periods, fictive wages are inserted into the average wage computation. In line with the general philosophy of the Belgian social insurance system that any such spell on a replacement income system is purely involuntary, imputed wages are set equal in real terms to those that the workers earned before entering these replacement income programs.

Wage-earners pensions are shielded against inflation through an automatic consumer price index (CPI) adjustment and are subject to an earnings test. Currently, the earnings limit is approximately EUR 7,450 or US$ 7,900 per year. For earnings above this limit, pension entitlement is suspended. Benefits are also paid to surviving spouses, or more generally surviving dependents of deceased wage earners.

The wage-earners system is essentially based on the PAYG principle, and financed through payroll taxes that are levied both on the side of the employers and of the employees, with a combined tax rate of 16.36 percent (no earnings limit). The system also receives a subsidy from the Belgian federal government that is approximately equal to 11 percent of overall benefits.

Next to the official wage-earner scheme, several forms of early retirement programs have developed: mandatory collective retirement and individual early retirement. During the 1980's and the 1990's, an arsenal of mandatory early retirement schemes was put in place. All of these arrangements were and are based on collective agreements, which are negotiated with the active involvement of employees and employers, sometimes at the sector level, sometimes at the level of an individual company or production site. For some companies in a difficult economic position, mandatory retirement ages as low as 50 were introduced. Individual early retirement differentiates itself from its collective counterpart by the fact that it is based on an individual's decision to retire from work. The most prevalent way is to pass through the unemployment system in which unemployed aged fifty or more are considered 'aged unemployed' and not more subject to controls on availability to work, nor to benefit cuts due to long-term unemployment.[5] Therefore, people unwilling to continue to work can ask their employer to lay them off. The latter is often willing to do so because of a lack of experience rating in the unemployment insurance system.

[5] Disability is not a major route towards early retirement due to rather stringent qualifying conditions and rather advanced screening.

Public sector employees

Public sector pensions are paid out of the general federal budget and are officially considered as deferred income rather than old-age insurance. The only official insurance element is a coverage for survivor benefits, which is financed through a 7.5 percent payroll tax. No spousal benefits are available. Civil servants face compulsory retirement at the latest at age 65 for both men and women. However, as for the private sector, there is a multitude of ways of retiring earlier than this normal age of 65. There is disability protection, which is a much more plausible route to retirement than in the private sector system as the screening is considered to be much less severe. Most importantly however, it is possible to opt for an incomplete career and retire at 60. For some particular categories of workers, the normal retirement age is lower than 65, and early retirement provisions are sometimes extremely generous (military servicemen, teachers...). Public sector pensions are based on the income earned by an individual during the last 5 years before retirement. Benefits are computed according to a rather complicated formula but can never exceed 75 percent of the average wages over the last five years. The benefit formula can be represented as follows:

Benefit = average wage over last five years * min [*fract* ; 0.75**]**

Where *fract* is a fraction with a numerator consisting of the number of years the person worked in the public service, and the denominator being a benefit accrual factor. This latter benefit accrual factor, also called “tantième”, depends on the rank the person occupied in the hierarchy. This denominator ranges from 30 to 60, taking the value of 30 for the highest-ranking civil servants (university professors...) and 60 for the lowest ranks. As in the private sector wage earner's scheme, the system applies floors and ceilings which are however much more generous than for private sector retirement benefits. Most notably, higher income individuals get a much better deal in the public sector than in the private sector. This finding is even reinforced once we consider indexation rules, as public sector pensions are indexed on average wages (“péréquation”). Public servants therefore enjoy the benefits of productivity increases in the economy even beyond the moment when they actively contribute to them as workers.

Self-employed

The self-employed retirement scheme is the latest one to have been introduced, as it only exists since 1956. It is also the least generous of the three big social security systems with retirement benefits close to the level of the guaranteed minimum income (see below). It does not allow for unemployment benefits, or for early retirement benefits. Disability benefits exist, but both qualifying conditions and financial characteristics of the system make it a most unlikely exit route to retirement. For a very long time, old-age pensions have been independent of earnings levels. However, since 1984, the system is progressively being transformed to allow for a stronger link between contributions and benefits. Additional earnings past 1984 enter the pension computation formula at their correct value, instead of some fictive amount. Full benefits are available at age 65 for men with a complete earnings history of 45 years. However, early retirement is possible as early as age 60 with an actuarial reduction of 5 percent per year of anticipation. As for the wage earners scheme, women are in a transitory phase, with the complete career requirement shifting from 40 years of work to 45, and normal retirement age from 60 to 65.

The social security system of the self-employed is financed through two broad categories of income. First, there are direct social insurance contributions levied under the form of a tax of 16.7 percent on the first EUR 46,035 (US$ 47,368) of income, and 12.27 percent on the income in the bracket between EUR 46,035 and EUR 67,352 (US$ 89,302). Income above the latter threshold is not subject to social insurance taxation. More than 75 percent of the contributions raised using this social insurance taxation are used for the pension system of the self-employed, the remainder serves to cover health-care and other social insurance benefits

for the self-employed. Second, the federal government pays a large subsidy to the system that corresponds to approximately 37 percent of benefits.

Guaranteed minimum income

The guaranteed minimum income pensions are fully paid for by general government revenue, and are means-tested. This type of pension is only available after the legal retirement age.

The model

We opt for an approach of micro-simulation relying on the data and estimates already used in Dellis et alii (2002). The underlying data stem from five different sources, most of which are of administrative origin. The different data were merged using the national ID number that is the Belgian equivalent to the US Social Security number.

The first component of the data is the SFR (Statistiques Fiscales des Revenus) file, which are collected by the Finance Ministry, and then processed by the INS (National Statistics Office). We use the SFR files for the years 1989 to 1996 to extract all the information relevant for the computation of individual's tax liabilities. Variables available include wage income and income from other professional activities, household size and type, number of dependents in the household, age and income of spouse, social insurance transfers and private pension receipt, house ownership status (owner, renter), taxable real estate income, contributions to second and third pillar pensions… The second component is the CIP (Comptes Individuels de Pension) that includes all career information relevant for the wage earner pension computation: gross wages, days of work, days on social insurance programs, etc. The third and fourth components are the equivalent datasets for the self-employed and the civil servants, both of which files are less detailed than the one for the wage earners. Finally, information from the Census (1991) is merged in to determine education levels so as to be able to use survival tables that are education-level specific.

Dellis et alii (2002) used a multi-step sample selection procedure to obtain a sample of households where at least one member of the household is in the 50-64 age bracket and has not yet retired. A total of 21,818 households were used to analyze retirement decisions of men and women separately. Using the data, the authors estimated the parameters of retirement probit models. Among the explanatory variables in the estimation the authors paid a particular attention to financial incentive measures. To measure the impact of the social security systems incentives we use several different indicators. A first one is the concept of household social security wealth (SSW), which is the present discounted value of all future benefit flows from a given social security system. Discounting is done allowing both for time preference and mortality adjustments. Further, SSW also has to allow for the possibility of people being subject to different retirement income systems. The authors apply the official rules that exist for cumulating benefits from the three main public systems. Hence, the total SSW is the weighted sum of the different pathways to retirement available to the individual or the couple. The weights on the early retirement and the unemployment/disability routes correspond to the sum of observed frequencies of these routes among all people of any given age up to age 65, the public retirement system takes the residual weight. For wage earners, we add the unemployment insurance and disability insurance paths as the two systems produce very similar benefit structures. Doing so, we give an upper bound on incentives for people to retire as we render all of disability voluntary. Given the lack of information for the public sector, we consider as early retirees all people retiring before the age of 60.

The next two incentive indicators are forward-looking measures. "Peak value" represents the difference between SSW at its peak and SSW today. The second forward-looking measure is the concept of "option value" such as defined by Stock and Wise (1990) that is based on a

utility maximization framework. The utility function V_t underlying the computation of the option value process can be summarized by the following mathematical expression:

$$V_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} Y_s^{\gamma} + \sum_{s=r}^{S} \beta^{s-t} \left(kB_s(r)\right)^{\gamma}$$

where the first expression on the right hand side represents the utility derived from labor income Y, and the second expression represents utility derived from retirement income $B_s(r)$; β is the time preference rate which we assume to be approximately β=0.97, which corresponds to a discount rate of 3 percent. γ corresponds to a parameter of risk-aversion and is set to γ=0.75. Finally, k=1.5 expresses the relative weight of utility of retirement income as compared to wage-income.

The concept of option value $G_t(r^*)$ is then defined as the difference in utility terms between retiring at the best point in the future (r^*) and now (t).

$$G_t(r^*) = V_t(r^*) - V_t(t)$$

The key estimates of the authors are summarized in the following tables.

INSERT TABLE 1 AND 2 HERE

Simulation methodology

For our simulations purposes, we restrict our attention to a sub sample of the previously discussed dataset. We use a cross-section of individuals instead of the entire age range 50-64. More specifically, we consider pre-retirement age workers (male and female) aged 50 and then age them forward. To ensure a sufficient sample size, we use a synthetic age 50 cohort made up of individuals aged 50 in 1993, 1994 or 1995. This gives us a total sample size of 3171 individuals, 2515 men and 656 women.

We first estimate the probability that each worker will exit the labor force via death or retirement at each future age. Exit probabilities are computed using the estimates of table 1 under the baseline setting with regards to all variables, including the SSW and peak and option value indicators. More precisely, we even compute the spouse's conditional probability of retirement at any given age for every possible exit route into retirement (death or actual retirement) of the prime earner. In a second step, all these probabilities then serve as weights in the computation of the net present discounted value (NPDV) of the in- and outflows from the government budget.[6] This marks a difference with respect to Dellis et alii (2002) as we consider the full budgetary costs and benefits of the synthetic cohort as it ages. The total impact of individuals on the government's budget is measured as the difference between the outflows from the budget as measured by the flow of social security and other social insurance program benefits (unemployment and early retirement) and the inflows as measured by social security contributions and all taxes paid. As already mentioned in the introduction, we explicitly leave aside health insurance and workers compensation contributions and benefits, as they both are extremely difficult to measure in an adequate way.

[6] To ensure international comparability across different countries considered, we discount all financial variables back to the age of 55 using a 3 percent real discount rate.

By taxes we mean both direct income taxes on labor and pension income and indirect taxes such as VAT. We incorporate direct taxes in accordance with the Belgian Personal Income Tax Code IPP (Impôt des Personnes Physiques), thus also including the favorable tax treatment of pension income. However, to render the computation feasible, we have fully individualized the tax accounts of husbands and wives while the tax code only allows a partial splitting of incomes of spouses. Further, we decided to ignore some other tax code provisions. For example, we left aside the possibility to itemize deductions in favor of the standard flat-rate deduction, and we ignore taxation of private annuity income. The likely impact of the simplifications is difficult to sign as these omissions are to some degree offsetting. As for the VAT part, we rely on consumption data by income quartiles from the "Enquête sur les budgets des ménages" of the INS. Using the expenditure shares of different products in the typical household consumption basket by income quartile and weighting the corresponding VAT rates accordingly, the INS data imply an average VAT rate by income of 10,65 percent for the lowest income quartile, 10,60 for the second, 10,04 for the third and 9,14 for the top income quartile. We apply these average rates for all age groups in a uniform way, as we are unfortunately unable to derive more refined numbers for different age sub-groups.

The concept of NPDV is the basis for comparison among different policy reform scenarios. We do so by re-estimating the exit probabilities, benefits, contributions and taxes under several reforms proposals for both spouses to obtain new NPDV estimates. We even break down the total effect of a reform on the NPDV into its components: the mechanical budgetary effect (with unchanged retirement probabilities with respect to the pre-reform situation) and the fiscal implications of the behavioral effect. We use the terminology "fiscal implications of the behavioral effect" to measure the budgetary impact of the labor supply reactions (which is properly speaking the change in the behavior of the individual). Indeed, this distinction is rather important, as it is quite imaginable to have a strong labor supply reaction, while at the same time having a very limited budgetary impact thereof due to a high degree of actuarial neutrality.

Simulation results

We consider three different reforms. The first two reforms have already been explored in Dellis et alii (2002) with respect to their impact on the SSW and accrual variables. However, the present exercise distinguishes itself from the previous results as it incorporates a complete analysis of all budgetary implications of a retirement system change.

Reform 1 consists in a simple increase by three years of all key parameters in all retirement and early retirement systems in the country. Thus, the early and the normal entitlement ages are increased by 3 years, as is the length of a normal career from 45 to 48 years. All other system characteristics remain unchanged. Implicitly, this approach supposes the rather implausible condition that unemployment benefits are totally absent from the landscape between the ages of 50 and 53.

Reform 2, the so-called "common reform", creates a system that is identical across all countries. The common system has a benefit equal to 60 percent of average real lifetime earnings at normal retirement age (NRA) that is supposed to age 65. Past wages are deflated using real wage indexing. Average lifetime earnings are supposed to correspond to the highest 40 years of earnings during an individual's working life. In case a worker has less than 40 years of earnings, zeros are averaged in, while a career longer than 40 years has an impact on the real average lifetime wage through a dropout year provision. Early retirement is available as of the age of 60 (ERA), with an actuarial adjustment of 6 percent per year of anticipation. Survivor benefits are paid out at a rate of 100 percent of workers benefits, but are one for one for every euro of own benefits the recipients receives on his/her own earnings history. No

other benefits are available, which thus represents a rather dramatic change in benefit availability before the age of 60 in a country like Belgium.

For evaluating the results of the first two simulations, we use simulation methods S1 and S3 of Dellis et alii (2002). Method S1 relies on the estimates with a linear age trend, which is unchanged by the reform. Method S3 is based on the age dummy models and considers a shift of the dummies to perform the simulations in a specific way for each one of the reforms. For the first reform, increment the incentive and SSW measures, the eligibility probabilities, and the age dummies according to the policy change. More precisely, all age dummies are shifted upwards by three years; even those at ages lower than the earliest eligibility age so that the entire retirement hazard shifts forward. In addition to shifting age dummies, there is also a shift in the age-specific probability of unemployment, or early retirement benefit receipt. For the common reform we proceed in a similar way, but the impact of age dummies is modify in a different way. On the one hand, given that in this policy simulation alternative retirement pathways are assumed out, we apply the age 51 dummy to all ages up to the age 59, just prior to the early retirement age, and this both for men and women. On the other hand, we keep the effect of age 60 and 65 dummies unchanged assuming that Policy 2 will not affect individual behavior at these particular ages. Finally, using these two dummy values we imputed the values of the intermediary dummies, from age 61 to age 64, assuming a smooth path trend.

Reform 3 is a reform specific to the Belgian setting. We consider a reform where the government reforms the current wage-earner scheme by no longer crediting years spent on social insurance programs such as unemployment insurance, disability insurance and early retirement in the individuals pension record. All other system characteristics are supposed to remain unchanged, thus leaving the early retirement and unemployment paths into retirement intact. Thus people will more often be confronted with incomplete careers at the end of their working life. There is thus a smaller buffering effect against income shocks on a lifetime basis. Another way of looking at the problem is to notice that the reform introduces a stronger link between contributions and benefits.

The simulation of the third reform relies on approaches S1 and S2. S2 is essentially the same as S1, however it relies on the estimates from the age dummies model rather than the linear age trend one. However, the age dummy effects are far from linear and hence it is possible that these dummies better pick up the non-linearities in the various retirement and early retirement systems, or alternatively that tastes for leisure are not a linear function of age.

Results are presented in tables X.

A noticeable finding is that the NPDV is negative in all cases considered in table 3, thus the results tell us that the older workers are net contributors to the public finances. At first sight, this result looks rather intriguing as it is contrary to intuition and contrary to the finding we can observe when strictly focusing on the social security system. However, several factors help explaining it. First, it is important to note that direct taxation is extremely heavy in Belgium. Second, discounting plays an important role in the results. While taxes are essentially front-loaded in the Belgian tax and social insurance system, benefits are rather back-loaded from a life-cycle perspective. The behavioral effect is rather strong in all scenarios, particularly when considering reform 1 using simulation technique S3. Indeed, for both OV and PV estimations the latter scenarios imply a fiscal impact of the behavioral response that represents more than 50 percent of the total effect, essentially because of the outright shift by 3 years of all dummies. Third, and last, it is important to notice that we consider only a single outflow of the government budget, while we consider a large array of inflows into the budget. For example, we consider all tax revenues even though only part of them help towards financing goods and services for the elderly while some public subsidies to the old (free use of public buses...) do not appear on the outflow side.

The picture is somewhat less uniform when considering the different retirement income systems individually as in table X. The self-employed clearly are net contributors to the government budget in the base case, while the opposite hold true for the civil servants who are by far the largest net recipients.

As for reform 3, its impact is much less pronounced than for the previous two reforms. Several reasons help explain this result. First, of all, the reform only affects the wage-earners schemes, which casts the order of magnitude of the change in a different light. Further, the effect of the changes only affects one particular form of retirement income, and does not affect payments either through the unemployment or the early retirement systems. Hence, the changes only affect people retiring early through the change of the benefits they receive starting at age 65, as the latter remains the age at which people are switched into the retirement system. Therefore, for a person aged 50, the effect of the changes only apply on income he starts receiving in 15 years time, and this with a 3 percent real discount factor per year. For a person aged 65, nothing much changes in terms of benefit receipt, unless obviously the person had experienced a longer spell on a social insurance program in the past.

Distributional analysis

Tables Y display the distributional implications of the reforms when splitting the population in 5 income categories.

Complementary and more exhaustive note to be presented in Rüdesheim.

Conclusions

The analysis shows the large potential impact in terms of both government budgets but also in terms of distribution in the population that the various social security reforms can have. Different alternatives are imaginable in the Belgian context, though the common reform seems a bit unrealistic. Our country-specific reform eliminates an aspect from our largely Bismarckian system which is not insurance based. Doing so, we reestablish a clearer link between contributions and benefits. The results indicate that even such a partial reform might have interesting consequences in terms of the budgetary impact.

However, it should be kept in mind that our analysis heavily relies on the assumptions made, namely the ones on the stationary nature of the demographic assumptions.

Bibliography

Blöndal, S. and S. Scarpetta, (1998), Falling participation rates among older workers in the OECD countries, Paris.

Dellis, A., R. Desmet, A. Jousten and S. Perelman (2002), "Micro-modelling of retirement in Belgium", forthcoming in J. Gruber and D. Wise, eds., "", NBER and University of Chicago Press, Chicago

Jousten, A. and P. Pestieau (2000), "Labor mobility, redistributon and pension reform in Europe", forthcoming in Feldstein and Siebert, *Coping with the pension crisis – where does Europe stand?*, NBER and Chicago University Press, Chicago

OECD (1994), *OECD Economic Survey: Belgium, Luxembourg*, OECD, Paris

Pestieau, P. and J.-P. Stijns (1999), "Social Security and retirement in Belgium", in Gruber and Wise (1999), *Social Security and retirement around the world*, NBER and Chicago University Press, Chicago, 37-71.

Stock, J. and D. Wise (1990), "Pensions, the option value of work, and retirement", *Econometrica*, 58(5), 1151-1180

Table 1: Fiscal Implications of Reform (in euros per worker)

Case	PDV of bens	PDV of SS taxes	PDV of other taxes	NPDV of bens – all taxes	Reform – base NPDV			% change in NPDV		
					Total	Mech-anical	FI of Beha-vioral	Total	Mech-anical	FI of Beha-vioral
PV, S1										
Base Case	188535	39201	171381	-22047	.	.	.	.	.	.
Reform 1	161972	42816	177573	-58417	-36370	-25932	-10438	164.96	117.61	47.35
Reform 2	127034	43813	162707	-79486	-57439	-42813	-14626	260.52	194.19	66.33
PV, S3										
Base Case	188833	39194	171195	-21556	.	.	.	.	.	.
Reform 1	156955	47576	191635	-82256	-60700	-29417	-31283	281.59	136.47	145.12
Reform 2	126365	46436	170403	-90474	-68918	-43158	-25760	319.71	200.21	119.50
OV, S1										

Base Case	187304	39859	173772	-26327	.	.	.	.	.	.
Reform 1	158163	43769	179770	-65376	-39048	-24509	-14539	148.31	93.09	55.22
Reform 2	125218	43607	163023	-81412	-55084	-41934	-13150	209.22	159.28	49.94
OV, S3										
Base Case	187937	39748	173376	-25187	.	.	.	.	.	.
Reform 1	154640	47601	191415	-84376	-59189	-29130	-30059	234.99	115.65	119.34
Reform 2	124399	44872	165266	-85739	-60551	-42448	-18103	240.40	168.53	71.87

Table 2: Fiscal Implications of Reform (in share of GDP)

Case	PDV of bens	PDV of SS taxes	PDV of other taxes	NPDV of bens – all taxes	Reform – base NPDV			% change in NPDV		
					Total	Mech-anical	FI of Beha-vioral	Total	Mech-anical	FI of Beha-vioral
PV, S1										
Base Case	4.20	0.87	3.82	-0.49	.	.	.	.	.	.
Reform 1	3.61	0.95	3.96	-1.30	-0.81	-0.58	-0.23	164.70	117.47	47.23
Reform 2	2.83	0.97	3.63	-1.77	-1.27	-0.95	-0.32	259.44	193.32	66.12
PV, S3										
Base Case	4.21	0.87	3.82	-0.48	.	.	.	.	.	.
Reform 1	3.50	1.06	4.27	-1.83	-1.35	-0.65	-0.70	280.97	136.26	144.71
Reform 2	2.82	1.03	3.80	-2.01	-1.53	-0.96	-0.57	318.60	199.40	119.20
OV, S1										
Base Case	4.17	0.89	3.87	-0.59	.	.	.	.	.	.
Reform 1	3.52	0.97	4.01	-1.46	-0.87	-0.55	-0.32	148.50	93.27	55.23
Reform 2	2.79	0.97	3.63	-1.80	-1.22	-0.93	-0.29	209.10	159.08	50.02
OV, S3										
Base Case	4.18	0.88	3.86	-0.56	.	.	.	.	.	.
Reform 1	3.44	1.06	4.26	-1.88	-1.32	-0.65	-0.67	234.98	115.73	119.25
Reform 2	2.77	1.00	3.68	-1.91	-1.34	-0.94	-0.40	240.18	168.23	71.95

Table 3: PDV of the Base Case by Social Security Program (in euros per worker)

SS Program	PDV of bens	PDV of SS taxes	PDV of other taxes	NPDV of bens – all taxes
PV, S1				
Wage-Earner	183,519	44,298	141,210	-1,989
Civil Servant	251,530	23,764	179,979	47,787
Self-Employed	73,404	49,218	294,288	-270,102
Weighted Average	188,535	39,201	171,381	-22,047
PV, S3				
Wage-Earner	183,674	44,441	141,544	-2,311
Civil Servant	251,992	23,610	179,211	49,171
Self-Employed	74,023	48,830	292,937	-267,744
Weighted Average	188,833	39,194	171,195	-21,556
OV, S1				
Wage-Earner	182,669	44,962	143,258	-5,551
Civil Servant	248,835	24,385	182,160	42,290
Self-Employed	73,615	49,933	298,760	-275,078
Weighted Average	187,304	39,859	173,772	-26,327

OV, S3				
Wage-Earner	183,161	44,923	143,245	-5,227
Civil Servant	249,760	24,287	181,899	43,574
Self-Employed	74,263	49,453	296,262	-271,452
Weighted Average	187,937	39,748	173,376	-25,187