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Measuring pension liabilities and the perspective of sustainability: the case of the reformed German statutory pension scheme

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Measuring pension liabilities and the perspective of sustainability: the case of the reformed German statutory pension scheme

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Abstract

In this paper we will show that open-system net liabilities (OSNL) represent a valuable tool for policy makers to assess the fiscal sustainability of a pension scheme. Furthermore, it will be outlined that OSNL are useful to assess the impact of pension reforms. Taking the example of the German statutory pension scheme we will illustrate that due to recent reforms this pension scheme can be regarded as close to being sustainable.

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1 Introduction

Pension liabilities represent a valuable indicator for policy makers. Not only can they be used to realize the implications of pension reforms but also to show the influence of the demographic shift – as observed in most OECD countries – on the future situation of a pension scheme.

In the course of the current revision of the 1993 SNA, an increasing attention has been paid to the concept of accrued-to-date liabilities (ADL) of public pension schemes in recent years.[1] This indicator consists of the pension entitlements of private households earned up to a certain point in time. In other words, ADL are equal to the present value of a capital stock necessary to satisfy the claims accrued-to-date of private households. In that way, policy makers get an idea of the fiscal consequences of a pension scheme's (partially) termination. There are many other areas of application for ADL;[2] however, they do not serve as an indicator for fiscal sustainability.

For this reason we will introduce a further concept of pension liabilities in this paper: open-system net liabilities (OSNL) show if the pension scheme in question can be continued under current rules and settings or if its rules have to be adjusted in order to ensure future fiscal balance. It will be outlined that OSNL represent a simple extension of the ADL concept. Within the scope of this paper we will apply the indicator of OSNL exemplarily to evaluate the reform process of the German statutory pension scheme in recent years. The paper proceeds as follows:

In chapter 2 we supply a definition for the different types of liabilities. Furthermore, we describe the method and input data necessary to calculate the OSNL of a pension scheme. The outcomes of our calculations are presented in chapter 3. The paper finishes with a short conclusion.

[1] See for example Eurostat/ECB Task Force (2008) or Mink and Rother (2007).

[2] See for example Weddige (2009).

2 Assessing fiscal sustainability – method and data

In the course of the current revision of the 1993 SNA, accrued-to-date liabilities (ADL) of social security pension schemes will be recorded in National Accounts. Against this background researchers and policy advisors dealt with the calculation and use of these pension entitlements in recent years. It has been outlined inter alia that such figures provide valuable information regarding the timing of accumulation of ADL, the impact of pension reforms and explanation of national savings.[3] Pension entitlements, however, are not representing an indicator to evaluate the fiscal sustainability of pension systems. The following passages will outline how this aim can be achieved by a simple extension of the approach to calculate ADL. First of all the concept of ADL will be defined to illustrate the differences to a fiscal sustainability indicator. Thereafter, the method and data to model a sustainability indicator on the basis of the ADL calculations will be described.

ADL consist of the actual pension payments and the present value of pensions to be paid in the future on the basis of accrued rights. Table 1 makes clear that the concept of ADL has a relatively limited perspective in comparison to other forms of liabilities. In contrast to open-system liabilities future pension rights earned by current and future workers are not included.

Table 1: Definition of liabilities

Time horizon	Gross liabilities (incl. expenditures)	Net liabilities (incl. expenditures & revenues)
⇓	Accrued-to-date liabilities (ADL)	
infinite	Open-system gross liabilities (OSGL)	Open-system net liabilities (OSNL)

Furthermore, revenues are not taken into consideration when applying the ADL approach. By focusing on expenditures only, no statement regarding the sustainability can be made. In other words it is not analyzed to which extent future pensions can be covered by future contributions.

[3] See for example Durant and Reinsdorf (2008) or Weddige (2009).

Only two further steps are required to calculate the sustainability of pension systems on the basis of the ADL approach.[4] In a *first* step the time horizon needs to be extended. While the ADL represent the cost of terminating a pay-as-you-go pension scheme, a longer perspective is naturally been taken when assessing sustainability. Therefore, pension entitlements which will be accrued in the future should also be taken into account. Of course, the level of ADL is not connected with any good or bad financial situation of the respective pension system since any financial burden could be balanced by sufficiently high contributions. Therefore, in a *second* step not only expenditures but also future contributions have to be considered when evaluating fiscal sustainability. As a result one arrives at the OSNL – a valuable indicator to assess fiscal sustainability. It is worth noticing, that the instrument we use to measure this figure is generational accounting. Considering the future demographic development, generational accounting shows which effects a prolongation of a given policy will have on the tax and transfer payments of living and future generations.[5]

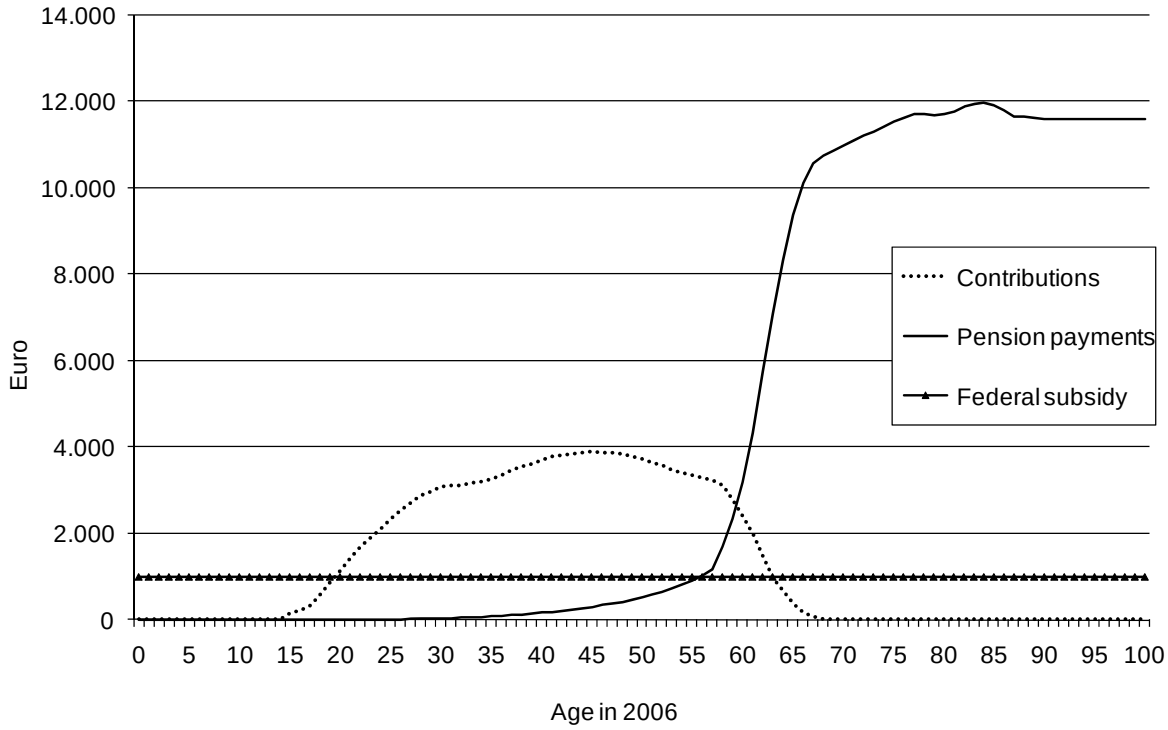
The OSNL approach is based on the same data as the ADL approach: 1) age specific pension expenditure profiles and 2) demographic population projections.[6] In addition, 3) age specific contribution profiles are needed to assess also the revenue side of the respective pension system.[7] Figure 1 illustrates the age-specific payments and contributions for the example of the German statutory pension scheme. It shows the typical picture: While on average contributions are paid at the age of 25 to 60, pension payments are received at the age of 60 and older. Moreover, federal subsidies should not be neglected when analyzing pension systems. Since in the German statutory pension scheme this subsidy cannot be clearly assigned to specific age groups, it is evenly distributed to all cohorts.

[4] For an overview on our methodology to measure ADL see Heidler et al. (2009).

[5] For a detailed description of generational accounting see Auerbach et al. (1994) or Raffelhüschen (1999).

[6] These two components represent the main data input to calculate ADL. Of course, also other data and assumption are required to calculate this figure such as information about the past and future work biography of pension contributors. For a more detailed description of the data used to calculate ADL see Heidler et al. (2009).

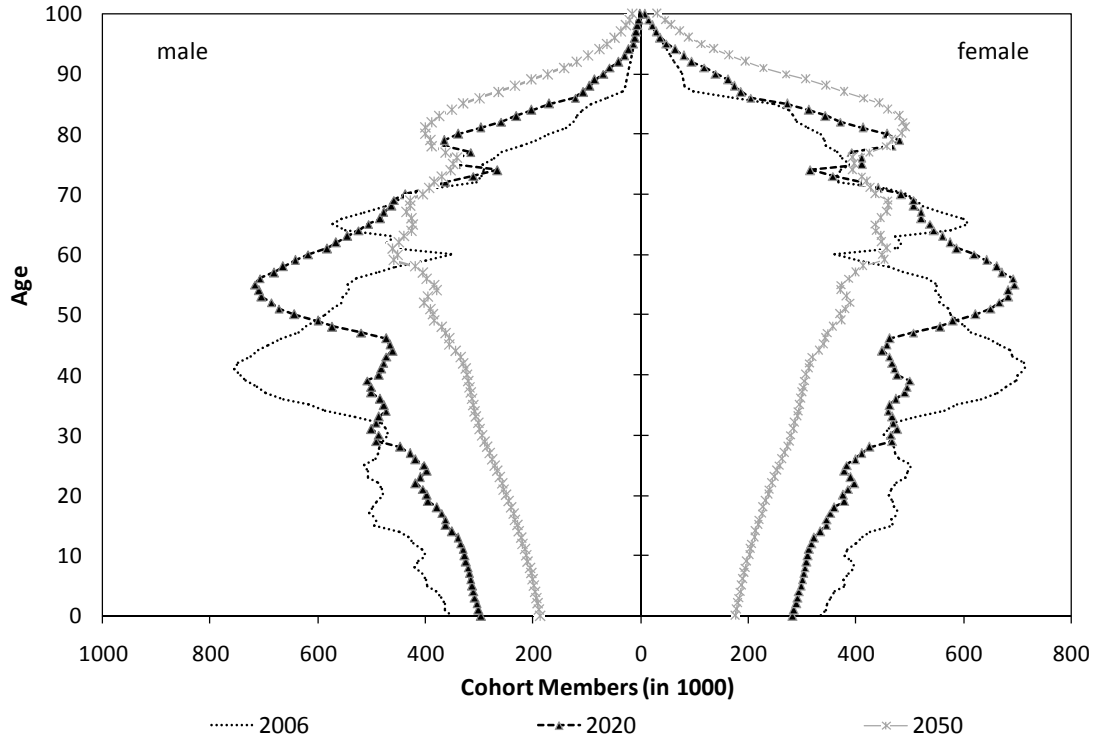
Figure 1: Age-specific payments and contributions of the German statutory pension scheme



Source: Own calculations based on Deutsche Rentenversicherung (2007)

Of course, Figure 1 on its own does not provide any information about fiscal sustainability. However, when weighting the age-specific profiles with the respective cohort sizes, one can draw conclusions about the short and long term financial condition of the respective pension scheme. Such cohort sizes are taken from population projections which include future age-specific population structures. Figure 2 illustrates the respective population structure in Germany for 2006, 2020 and 2050.

Figure 2: Population structure Germany 2006



Source: Own calculations based on Eurostat (2009)

At first sight it becomes obvious that the German statutory pension scheme – as most European pension systems – will be faced by the challenge of a double aging process. On one hand life expectancy is assumed to rise considerably in the coming decades;[8] on the other hand fertility is expected to stay on its low present level.[9] As a result, the German population pyramid´s appearance will considerably change in the years to come (see Figure 2). In simple terms, this development will lead to a decreasing number of contributors paying for more and more pensioners. The question to which extent the German statutory pension scheme will be prepared to tackle this demographic challenge will be assessed in the following chapter. The German example shall illustrate how policy making can be evaluated and advised applying the indicator of OSNL.

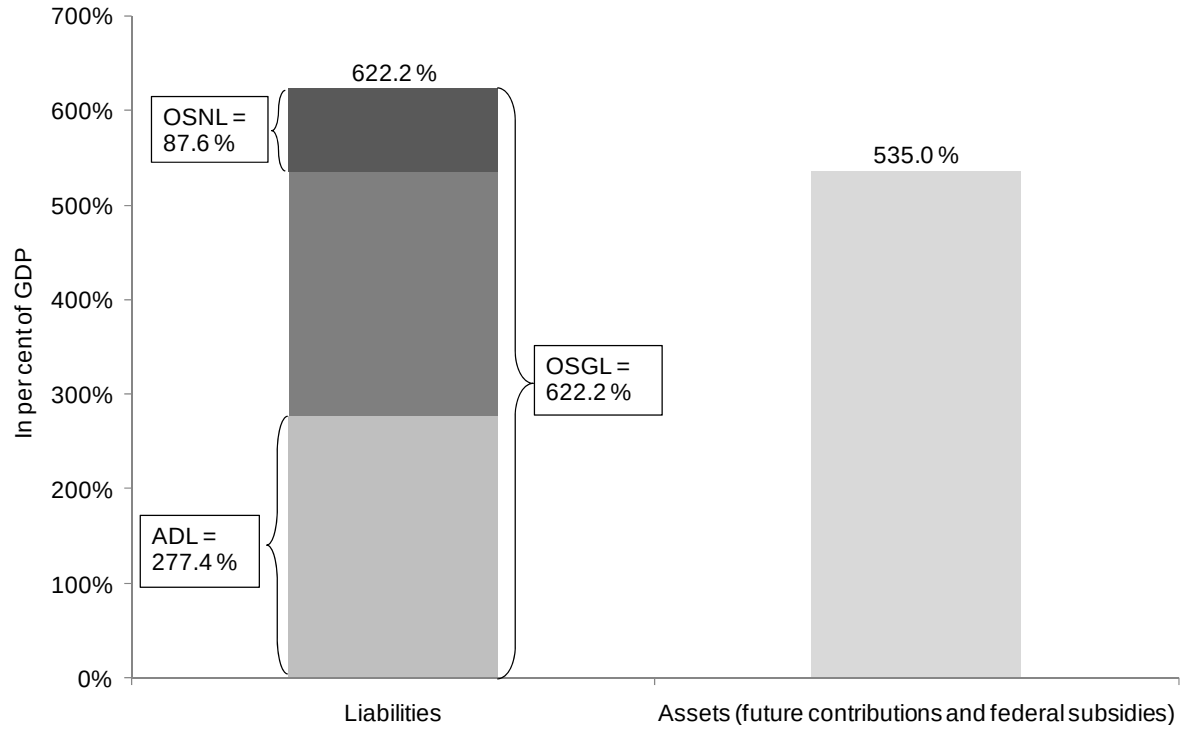
[8] According to Europop2008 life expectancy of a male (female) born in 2006 will increase from 77.2 (82.4) to 83.6 (88.0) years until 2050. See Eurostat (2009).

[9] The fertility rate in Germany amounted to a level of about 1.3 in the last years. See Eurostat (2009).

3 The evaluation of the pension reform process in Germany

We will start by confronting the ADL of the German statutory pension scheme with its OSNL. Figure 3 illustrates our calculations.

Figure 3: Liabilities and assets of the German statutory pension scheme
(in per cent of GDP 2006)



Source: Own calculations

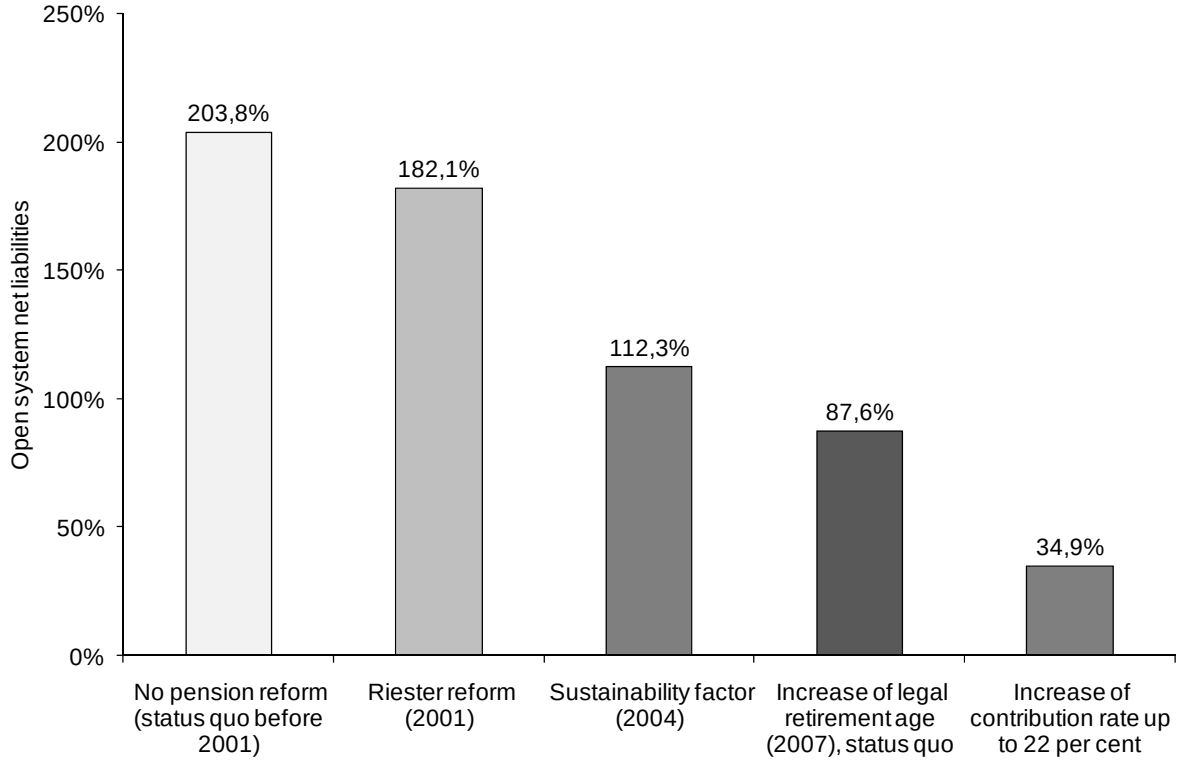
As can be seen, the ADL account for nearly half of the open-system gross liabilities (OSGL). The ADL symbolize that part of the OSGL which contributors have been earned up to the base year.[10] The residual part of the OSGL represents the present value of all entitlements which will be earned by present and future contributors after the base year. On the right side of our image we displayed the assets of the German statutory pension scheme. These consist of future contributions and federal subsidies and sum up to a present value of 535 per cent of German the GDP in 2006. The OSNL are now derived by subtracting the assets from the liabilities of the pension scheme. In the case of the German statutory

[10] Braakmann et al. (2007) estimate ADL for the German statutory pension scheme which are roughly 20 per cent below the ADL shown in this paper. This can be traced back to a different methodology as well as different parameter choices regarding growth and discount rate.

pension scheme, the ONSL amount to a value of 87.6 per cent of GDP. In other words, the sum of all future deficits discounted to the base year equates to ONSL of 87.6 per cent.[11]

In this context it has to be emphasized that the outcome presented above is the result of numerous reforms of the German statutory pension scheme in recent years. In the following part we will briefly sketch out the major reform steps. Furthermore, we will demonstrate the impact of each reform step on the OSNL of the pension scheme.

Figure 4: Open-system net liabilities (OSNL) of the German statutory pension scheme
(in per cent of GDP 2006)



Source: Own calculations

Beginning with the situation prior to any pension reform (status quo of 2001), the ONSL show a value of more than twice the German GDP of 2006.[12] The so-called Riester reform in 2001 introduced a new pension formula which changed the net wage indexation to the development of gross wages net of pension contributions (both public and private). This reform step reduced the OSNL by nearly 22 percentage points of GDP in 2006. The biggest cutback took place in 2004 when the sustainability factor was implemented in the pension

[11] Moog and Raffelhüschen (2009) as well as Heidler (2009) provide similar estimations of the OSNL. Their outcomes differ slightly from the ones presented in this paper mainly due to a different base year, distinct profiles and other demographic assumptions. In contrast to the papers mentioned above the results presented here outline the impact of the reform process since 2001 on the OSNL.

[12] Our analysis does not simulate a situation where none of the pension reforms has ever come into force. This is not possible due to the fact that the past impacts of the reforms are implicitly included in the budget of the base year. For this reason, we rather picture a scenario where all pension reforms are abolished in the base year 2006.

formula. This factor connects the pension level to the development of the ratio of retirees to contributors. It reduced the OSNL by some 70 percentage points of GDP. The last major pension reform in 2007 consisted of the gradual increase of the legal retirement age from 65 to 67, starting in 2011. With the result, that the OSNL decreased by another 25 percentage points; hence the current status quo amounts to about 88 per cent of GDP. [13] In other words, the sustainability gap of the German pension scheme has been more than halved thanks to numerous pension reform acts since 2001.

It is worth mentioning that the Riester reform from 2001 contains a passage regarding the future development of the contribution rate. Due to this legislation, the German government is supposed to take action in case the contribution rate will exceed a level of 20 per cent until the year 2020 and accordingly 22 per cent until the year 2030. Many pension experts regard this as a paradigm change from a defined benefit (DB) to a defined contribution (DC) scheme.

Our calculations always include the current status quo; hence, we act on the assumption of a constant pension formula and a constant contribution rate (19.5 per cent in 2006). However, Figure 4 shows how the outcome for the OSNL reacts if we assume that the contribution rate linearly increases to 20 per cent in 2020 and 22 per cent in 2030. In this case the pension scheme converges even more to a sustainable situation with OSNL amounting to about 35 per cent of GDP only.

What do we learn from the presentation of OSNL under various reform steps? It has been shown that the calculation of OSNL – one could also call it the sustainability gap of a pension scheme – represents a helpful instrument to assess the impact of certain reform steps in terms of their fiscal sustainability. In this way, ONSL can be a useful tool for policy-makers who are willing to prepare their pension schemes for future challenges. Politicians are given an indicator for the extent to which a pension reform reduces the burden for future generations.

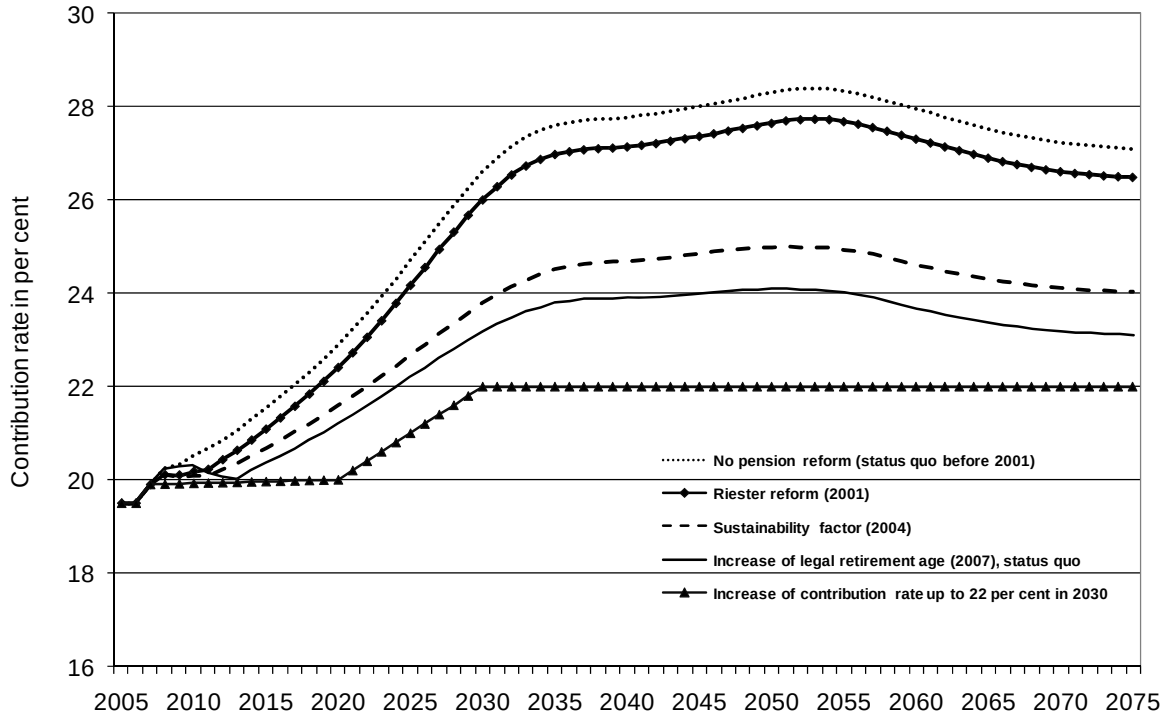
As mentioned before, one of our main assumptions is a constant continuation of current fiscal policy. In the case of the pension sector, this inter alia implies constant contribution rates.[14] We now change this assumption by illustrating what will happen if policy makers

[13] It should be noted, that this figure reflects the legal status quo until 2009. The most recent pension act, the so called "pension guarantee", which will prevent any future nominal pension cuts from 2010 onwards is not included. Clearly this new legislation will lead to an increase of the OSNL (see Moog and Raffelhüschen (2009)). Its adoption made once again obvious that German policy makers are at risk to go astray from the recent sustainable path.

[14] This is certainly not a realistic scenario since in a non-balanced situation contribution rates are often subject to change. However, please note that generational accounting is not a forecasting tool. It is rather

immediately adjust the contribution rate in case of an unbalanced budget. Put differently, we calculate endogenous contribution rates which in every period ensure fiscal balance. By doing so, it can be demonstrated how future contributors will be burdened if deficits are financed by contribution boosts instead of taxes. Figure 5 illustrates the course of these contribution rates:

Figure 5: Sustainable future contribution rates of the German statutory pension scheme



Source: Own calculations

As shown above, the initial scenario (status quo 2001) implies a development of contribution rates up to a value of more than 28 per cent in 2045. The Riester reform slowed down this development by approximately 0.5 percentage points. Again, the biggest decrease can be traced back to the introduction of the sustainability factor which induced a decline of the sustainable contribution rate by more than two per cent. The increase of the legal retirement age as the last major pension reform further reduced the necessary contribution rate to a value of about 24 per cent from 2035 on. For illustrative purposes, the development of the contribution rate to 20 per cent in 2020 and accordingly 2030 per cent has been included. Overall the results have shown that the recent pension reform process in Germany considerably lowered the burden for future contribution payers.

supposed to unfold hidden debts and shows the consequences of what will happen if policy makers do not react.

4 Conclusion

This paper aims to introduce an indicator which assesses the fiscal sustainability of a public pension scheme. The open-system net liabilities (OSNL) point out if the settings of a public pension scheme have to be adjusted in order to guarantee future fiscal balance or if no action has to be taken by policy makers against the background of future demographic shifts.

We demonstrated that the OSNL can be a useful indicator to accompany the reform process of a pension scheme. It is not only possible to assess the consequences of a pension act *ex post* but also *ex ante*. In that way different proposals for pension reforms can be examined in regard to their impact on fiscal sustainability before they are actually enacted. In our paper we described the development of the German pension reform process and the corresponding consequences of each reform step on the ONSL of the pension scheme. As a result of the reform process, the German statutory pension scheme can be regarded as close to sustainable.

Besides the German example, rather distinct reform measures have been taken in member states of the European Union to prepare for the demographic challenges. While some countries such as France modified the pension indexation rules or – like the UK – chose to increase the legal retirement age, other states such as Italy implemented notional defined contribution (NDC) systems.[15] Future research could assess these different reform strategies in Europe using the indicator of OSNL.

[15] For an overview on the various public pension systems in the EU and their recent reforms see Müller et al. (2009).

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