

# Weekly Report

## A new pension formula—for more fairness and less old-age poverty

*The statutory pension insurance system is set up according to the principle of participatory equivalence. This principle seeks to hold pension claims at a specific ratio to paid contributions so that a redistribution of income does not take place. In truth, however, there is a massive redistribution in favor of wage earners with higher incomes, as these individuals draw on their pensions for a longer period of time due to their greater statistical life expectancy. If life expectancy was taken into consideration in the pension formula, this would not only lead to greater distributional neutrality, it would also lead to significantly less old-age poverty among long-term contributors to the pension system.*

### The Rüttgers initiative against old-age poverty

According to the provisions of the most recent reform of Germany's statutory pension insurance system (SPI), the pension level—that is, the ratio of the average pension to the average wage from employment—will decline significantly in the coming decades. The goal is to only permit a marginal rise in contribution rates in the future. Similar reforms have already been passed in countries with different pension systems, such as Sweden. However, particularly in the German system, where the pension amount drawn is pegged proportionately to previous income from employment, the reduction of the pension level will result in more old-age poverty for employees with low incomes. If companies or private individuals fail to make sufficient provisions for retirement, the prevention of old-age poverty will ultimately fall to the basic income support provided by the government (this support is called the Grundsicherung). In this way, for the impacted individuals, pension contributions take on the nature of a tax. Furthermore, the attractiveness of private pension plans is declining, as the benefits received are offset by the government's basic income support.<sup>1</sup>

In order to rectify this deficiency, the Premier of North Rhine-Westphalia, Jürgen Rüttgers (CDU), has demanded that long-term contributors be guaranteed a pension significantly above the amount provided under basic income support. This recom-

<sup>1</sup> The share of pensioner households, which are both lacking income and assets, is still low in comparison with non-pensioner households. However, on the basis of increasing gaps in the professional career of employees—particularly in Eastern Germany—the risk of old-age poverty will increase; cf. Frick, J. R., Grabka, M. M.: Gestiegene Vermögensungleichheit in Deutschland ("Wealth Inequality in Germany"). DIW Berlin Weekly Report No. 4/2009.

**Friedrich Breyer**  
Friedrich.Breyer@uni-konstanz.de

**Stefan Hupfeld**

**JEL Classification:**  
H55, I38

**Keywords:**  
Social security, Life expectancy,  
Poverty, Redistribution

## New pension formula

The formula is as follows:

$$R_t(P_i) = V_t \cdot P_i \cdot T \cdot \frac{10.16}{5.17 + 4.05 \cdot P_i}$$

$R_t$  represents the (monthly) pension amount,  $P_i$  stands for the pension entitlement points per year acquired by the insured  $i$ ,  $T$  is the duration of contribution payments and  $V_t$  is the social component of the pension amount in year  $t$ . The currently valid pension formula only encompasses the first three elements on the right-hand side of the equation. A new aspect is the correction factor recommended by DIW Berlin, the fraction on the right-

hand side. The numerator expresses the average life expectancy of a male, 65-year-old person with pension insurance and the denominator expresses the relationship found between the expected payment term and the number of pension entitlement points per year. While a (fictitious) pensioner with zero pension entitlement points per year can only expect to live an additional 5.17 years at 65-years-old, for each additional pension entitlement point per year, life expectancy rises by an 4.05 years.<sup>1</sup>

<sup>1</sup> As the data analysis exclusively includes male insured persons, the pension formula can only refer to men.

mendment was taken up by the current government coalition and the introduction of a tax-financed pension supplement was promised. In contrast, a change to the existing pension formula was rejected. It was argued that the particular strength of the current pension formula is that each euro contributed to the system is worth the same amount, and that this strength should by no means be given up.<sup>2</sup>

However, for future generations of tax payers, such a financial solution will presumably become more expensive than the implementation of the Rüttgers proposal within the SPI system, as these tax payers now need to provide regular pension insurance contributions in addition to the tax funds for guaranteed pensions.

## Participatory equivalence in pension insurance?

But is each euro contributed to the SPI (at its expected value) really worth the same? According to the original idea of “participatory equivalence,” the pension entitlement of two pensioners who are born in the same year and leave working life at the same time is precisely proportional to their total paid contributions. If one always received twice as much income as the other (and therefore paid double the contributions), his monthly pension is twice as high. The aim here is to prevent the systematic redistribution of income in the pension insurance system.<sup>3</sup>

<sup>2</sup> For example, Federal Minister Olaf Scholz in the Frankfurter Allgemeine Zeitung, dated 24 April 2008: Zusammenhang zwischen Beiträgen und Rentenhöhe muss bleiben (“Relationship between contributions and pension amount must remain”), at [www.bundesregierung.de/nn\\_774/Content/DE/Interview/2008/04/2008-04-24-interview-olaf-scholz-faz.html](http://www.bundesregierung.de/nn_774/Content/DE/Interview/2008/04/2008-04-24-interview-olaf-scholz-faz.html).

<sup>3</sup> It should be noted in this regard that redistribution takes place in various ways in the SPI. For example, there are pension-related calculatory adjustments for parenting and educational periods. In addition, redistri-

However, this concept is flawed in that only the monthly pension entitlements are pegged at a fixed ratio to total paid contributions. Whether or not distributional neutrality has been achieved, however, can only be evaluated if the total (expected) pension benefit drawn is placed in relation to total paid contributions.<sup>4</sup> Specifically, the total benefit drawn hinges on the monthly pension amount in addition to the expected pension payment period, which, in turn, is determined by the life expectancy of the relevant income group. In numerous studies, it has been shown that life expectancy rises systematically with rising income.<sup>5</sup>

## A new pension formula for Germany

How would the pension formula need to be adapted in order to take the greater life expectancy of higher wage earners into account and thereby establish distributional neutrality? The analysis of a large SPI data set covering 382,000 male pensioners who died between 1994 and 2005 shows that a systematic, positive relationship exists between the level of acquired pension entitlement points per year (as an indicator of income) and life expectancy.<sup>6</sup> An additional pension entitlement point per year is

tribution takes place in the case of a reduction in earning capacity. However, these non-insurance benefits are financed by tax-financed federal subsidy.

<sup>4</sup> See Breyer, F., Hupfeld, S.: On the Fairness of Early Retirement Provisions. Forthcoming in: German Economic Review.

<sup>5</sup> See Reil-Held, A.: Einkommen und Sterblichkeit in Deutschland: Leben Reiche länger? (“Income and Mortality in Germany: Do the Rich Live Longer?”) Beiträge zur angewandten Wirtschaftsforschung, 580-00, 2000; Gaudecker, H.-M., Scholz, R. D.: Differential Mortality by Lifetime Earnings in Germany. Demographic Research, 17, pp. 83-108, 2007 for Germany. Cutler, D., Deaton, A., Lleras-Muney, A.: The Determinants of Mortality. Journal of Economic Perspectives, 20/2006, pp. 97-120 for the US.

<sup>6</sup> See Research Data Centre for Pension Insurance: Scientific-Use-File Demographic Dataset Pension Shortfall, 1993–2005. SUFRWFjXVSTDemo, 2007.

therefore associated with an additional life expectancy of approx. four years.<sup>7</sup>

On the basis of this data, a pension formula can be calculated, which—provided the observed empirical relationship remains stable over time—would create distributional neutrality between income groups (see Box). According to this new pension formula, the monthly pension entitlement would, as previously, be proportional to the number of years of employment, but would increase at a decreasing rate with higher annual income. The resulting curve, which relates an individual’s annual pension entitlement based on annual income from employment, is comparable to the curves for Swiss and US pension systems. In fact, the curve quite closely resembles its US counterpart (see Figure). The main difference between the curves is that the US curve has two arbitrarily set inflexion points and otherwise runs linearly, while the curve proposed by us is consistently concave.<sup>8</sup>

### Effects on old-age poverty in Germany

The impact that this pension formula would have on the level of old-age poverty among longstanding contributors to the pension system can be calculated using SPI data. For this calculation, a 10 percent random sample of all pension payments in 2004 to male old-age pensioners with at least 35 contribution years was used (i.e. the target group of the Rüttgers recommendation), yielding just under 40,000 cases.

First, the percentage of cases was calculated in which the monthly pension payment amount was lower than the level of “basic income support in old age.”<sup>9</sup> Two statistical errors are committed, however, when the resulting percentage is interpreted as the “poverty rate”:<sup>10</sup> On the one hand, additional members of household are neglected, such as a spouse, so that the subsistence minimum

<sup>7</sup> See Breyer, F., Hupfeld, S.: Fairness of Public Pensions and Old-Age Poverty. DIW Berlin Discussion Paper No. 817 (corrected version), November 2008.

<sup>8</sup> Empirical studies on the distribution effects of the US Social Security system show that this is virtually distribution-neutral, or despite the concave curve, is marginally distributional from poor to rich. Cf. Coronado, J. L., Fullerton, D., Glass, T.: The Progressivity of Social Security. NBER Working Paper No. 7520, February 2000; and Hurd, M. D., Shoven, J. B.: The Distributional Impact of Social Security. NBER Working Paper, No. 1155, 1986.

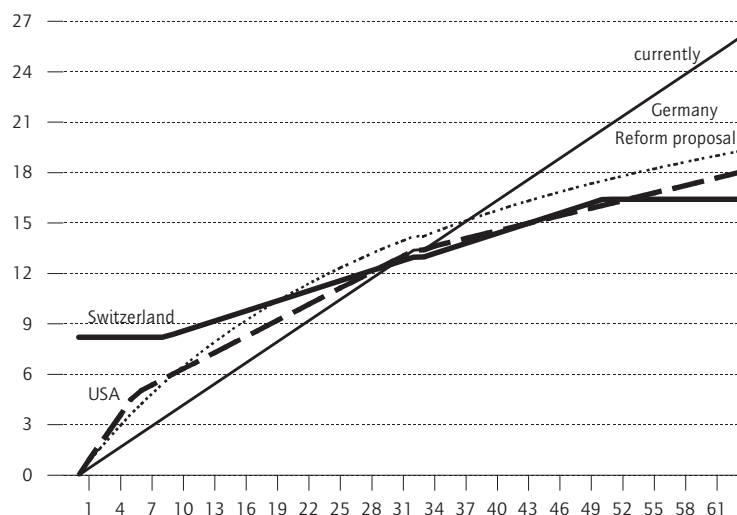
<sup>9</sup> The “basic income support in old age” was 589 euros for single persons in 2004.

<sup>10</sup> The definition of “poverty” used here deviates fundamentally from the description generally recognized at the European level of relative income poverty, as, among other things, no household income is used as a calculatory basis and also no need-based weighting takes occurs in order to take scale effects from joint economic activity of several household members into consideration.

Figure

### Pension level based on income subject to social security contributions in Germany, Switzerland and the US

In euro thousands per year



Source: Calculations by DIW Berlin.

DIW Berlin 2009

is potentially underestimated.<sup>11</sup> On the other hand, additional sources of income—own income as well as from other members of household—such as an additional pension, income from assets, or rental income are not taken into account, with the result that actual income is potentially underestimated.<sup>12</sup> Both of these errors distort the result in opposite directions: The first error leads to an underestimate, the second to an overestimate of the actual poverty rate. These results need to be interpreted carefully, as none of the missing information is available. Yet even if the figures derived here are not totally accurate, they provide an indication of the impact that a change in the pension formula would have on the poverty rate.

When the recommended pension formula is applied, it emerges that the percentage of pension recipients below the basic income support level—which was still very low in 2004, at 1.2 percent—declines by more than three-quarters to just under 0.26 percent. If it is assumed that the pension level—as envisaged until 2030—declines by 15 percent, the share of pension recipients below the basic income support level would be higher, in absolute terms, at 2.4 percent. However, with the reform recommended here, this share would also decline just as sharply to 0.56 percent (see Table).

<sup>11</sup> For couples, the basic income support was 1,060 euros, that is, 180 percent of that for individuals.

<sup>12</sup> The underlying database does not provide information regarding additional sources of income in the household.

Consequently, if the principle of distributional neutrality in the German pension system is taken seriously, an additional, expensive instrument for combating old-age poverty—alongside basic income support in old age—need not be implemented. If the life expectancy of the various income groups is incorporated into the calculation of pension entitlements and a stop is thus put to income redistribution in favor of higher earners due to their longer life expectancy, the threat of old-age poverty to longstanding contributors can also be effectively counteracted.<sup>13</sup>

### Implementation problems and possible points of criticism

In the German pension insurance system, the principle that good faith should be protected justifiably plays an important role. Drastic changes to the pension formula, such as the recent increase of the retirement age to 67, therefore require long transitional periods. For this reason, in all likelihood the desired approach would be to implement the pension formula described here over a period of many years. The formula could be applied to a percentage of the pension amount (depending on birth cohorts) that begins at zero and gradually rises. The existing formula would be retained for the share not calculated under the new formula. Of course, the actual speed of introduction is a political decision. A rapid transition would lead to a faster reduction in the poverty rate.

A possible point of criticism regarding this reform recommendation is that the analysis is limited to male pensioners and that no proposal is made about how the pension formula should change for women. If the same analysis were to be carried out for men and women together, there would be a pension reduction for women due to their high life expectancy. On the other hand, due to their somewhat lower average income, women would benefit from the concave shape of the pension formula.<sup>14</sup> In Germany, however, a political consensus appears to prevail that the redistribution in favor of women due to their longer life expectancy should not be tinkered with. However, it would be conceivable to calculate an independent pension formula for

<sup>13</sup> The strengthening of participatory equivalence could also be transferred to the area of civil servant pensions, as civil servant pensioners overall live an average of two years longer than other pensioners and, in addition, better positioned civil servants have a longer life expectancy; cf. Himmelreicher, R. K., Sewöster, D., Scholz, R., Schulz, A.: Die fernere Lebenserwartung von Rentnern und Pensionären im Vergleich ("The additional life expectancy of pensioners and civil servant pensioners in comparison"). WSI Mitteilungen 5, 2008, 274-280.

<sup>14</sup> However, female pensioners with very small SPI pensions frequently have a high total income, as they were often only employed in a position subject to social security contributions for a few years, before becoming civil servants or self-employed, for example.

Table

### Pension payment amounts for men insured long-term under the SPI system below the basic income support level in 2004

Contribution years	Pension level in percent	Percent below basic financial security		Reduction in percent
		current	new formula	
35	51	1.23	0.26	78.44
35	43	2.41	0.56	76.93

Source: Calculations by DIW Berlin.

DIW Berlin 2009

women in a similar manner and thereby ensure that the relative level of women's pensions will not be changed in comparison to men.

Furthermore, it could be criticized that the distinction between income groups with regard to life expectancy is arbitrary. Other types of distinctions could be made with the same justification; for example, one could make adjustments based on educational achievement or place of residence.<sup>15</sup> Two arguments can be made against this criticism, however. First, the database maintained by the pension insurance system includes information on income; this is not the case for many other socio-economic factors. It is therefore simple to calibrate the system based on income. Second, the regressive redistribution of wealth between income groups described here is clearly considered undesirable. An implicit redistribution between other types of groups, however, is viewed as less problematic.<sup>16</sup>

In summary, with the reform recommendation described here for the pension formula of the statutory pension insurance system in Germany, three targets can be achieved at the same time:

1. a reduction in risk of old-age poverty among longstanding insured persons;
2. the strengthening of the principle of participatory equivalence in pension insurance, thereby achieving greater fairness;
3. the avoidance of additionally burdening future generations.

<sup>15</sup> Therefore, the health insurance status is another indicator that provides an independent contribution to explaining the level of life expectancy, cf. Scholz, R.: Differentielle Mortalität in Deutschland ("Differential Mortality in Germany") In: Schmollers Jahrbuch, 126 (3), 2006, 375-386.

<sup>16</sup> An exception could be the surviving dependents' pension, as the risk for surviving dependents' protection varies depending on social factors.

DIW Berlin  
Mohrenstraße 58  
10117 Berlin

Tel. +49-30-897 89-0  
Fax +49-30-897 89-200

ISSN 1860-3343  
Price: Euro 10.–  
[www.diw.de/english/produkte/  
publikationen/weeklyreport](http://www.diw.de/english/produkte/publikationen/weeklyreport)  
All articles are protected  
by copyright.