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In the mid2030s, the health of the baby boomers will have deteriorated and many in these large cohorts will be in need of formal and/or informal long-term care.

This "**care wave**" will transform two generations: the baby boomers in need of care and their children who may supply care. It will have significant implications for labour supply, especially for women, saving behaviour, and therefore for productivity, economic growth and its inclusiveness.

The overarching objective of BB-Future is to understand the size and the implications of the care wave on economic and social outcomes, to appreciate the quality of this second ageing-related transformation and to develop policy recommendations for advance planning on the EU and Member State levels.

This deliverable assesses the fiscal effects of mobilizing underutilized labor market potential of women and part-time workers on pay-as-you-go social insurance systems in times of demographic aging. Aging implies a decreasing working-age population relative to the number of beneficiaries of social insurance, especially pensions, healthcare and long-term care. Hence, increasing labor force participation of women and hours of labor supply by part-timers in countries, where female labor force participation is low and part-time employment high are obvious candidates to compensate for this loss. This deliverable shows that matters are not that simple. Beneficial effects on the contribution rate to social insurance are different between adding workers and adding hours and depend on the link between wages and benefits. Specifically, if the increase of benefits is linked to annual wage growth, then adding hours will have no effect on the contribution rate to the social insurance system since the effect of the additional hours will be neutralized by an equiproportional increase of benefits.

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Women and Part-Time Workers: Saviors of Social Insurance Systems?

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October 2025

Abstract:

This study assesses the fiscal effects of mobilizing underutilized labor market potential of women and part-time workers on pay-as-you-go social insurance systems in times of demographic aging. Aging implies a decreasing working-age population relative to the number of beneficiaries of social insurance, especially pensions, healthcare and long-term care. Hence, increasing labor force participation of women and hours of labor supply by part-timers in countries, where female labor force participation is low and part-time employment high are obvious candidates to compensate for this loss. This paper shows that matters are not that simple. Beneficial effects on the contribution rate to social insurance are different between adding workers and adding hours and depend on the link between wages and benefits.

The study uses Germany as an example. It shows that increasing female labor force participation has only a modest impact, as the gender gap in participation rates has largely closed. Even between extreme scenarios, the difference in contribution rates across all insurance schemes would not exceed one percentage point. Reducing Germany's high share of part-time employment has greater potential to relieve financial pressures, but primarily in health and long-term care insurance. If part-time work in Germany were lowered to the Swedish level, the combined contribution rate for these schemes would rise by about 1.2 percentage points less, assuming no adverse effects on health or informal care. In contrast, the pension contribution rate remains largely unaffected. That is because the shift from part-time to full-time work raises annual earnings and therefore overall wage growth, which under Germany's pension adjustment mechanism translates almost one-to-one into higher pension benefits. The gains from additional labor therefore primarily accrue to pension recipients rather than reducing the financial burden on all contributors.

Introduction

In almost all European countries, demographic change is expected to result in a significant decline in the labor force (Börsch-Supan and Rausch, 2025). This development will place substantial financial pressure on the country's social security systems, as the contribution base shrinks while expenditures continue to rise. One often proposed countermeasure is the mobilization of previously untapped labor force potential in order to offset the decline in employment and working hours and thereby stabilize the social security contribution base. In this context, particular attention is directed toward the comparatively lower labor force participation of women and the persistently high rate of (female) part-time employment in many countries. As Börsch-Supan and Rausch (2025) have shown, both groups indeed represent considerable untapped labor force potential that could help cushion the decline in hours worked. However, the extent to which this will reduce the future financing pressure on the social insurance systems remains uncertain.

The aim of this study is to quantify the effects of increasing female labor participation and a reduction in the part-time employment on the financial sustainability of social insurance schemes, excluding statutory unemployment insurance. The study uses Germany as an example. Higher female labor participation exerts a positive effect on the contribution rates of the three remaining insurances. However, this effect becomes significant only if women's participation converges substantially with that of men. This reflects the fact that the gender gap in labor force participation has already narrowed considerably since 1990. This is different for countries with a low female labor force participation rate such as Italy or Poland. Closing the remaining gap in Germany by 40% or 80% by 2040 would therefore increase the number of full-time equivalent (FTE) employees[1] by only 1.7% or 3.4%, respectively. The corresponding rise in the total wage bill would be even smaller due to women's lower average earnings. The effect on the contribution rate would, moreover, be permanent only in the health and long-term care insurance systems. In contrast, in the pension system the effect is merely temporary, as the additional pension entitlements accrued by women who would otherwise not have been employed offset the initial gains from their contribution payments.

A reduction in part-time employment, by contrast, can have strong effects on the health and long-term care insurance, due to the high part-time employment in Germany. In our simulations, the health insurance contribution rate is on average 1 percentage point (or in relative terms 5%) lower from 2040 onwards compared to the reference scenario, while long-term care insurance shows a deviation of 0.2 percentage points (4%). These results assume, however, that a decline in the part-time employment does not impose a stronger increase in the health and long-term care expenditure. This assumption may be overly optimistic, particularly in long-term care, where reduced part-time availability could raise demand for ambulatory or institutional care workers when informal care by relatives is not compatible with a full-time employment. In such cases, the positive contribution rate effect could be offset or even reversed.

The impact of a decline in part-time employment on the statutory pension insurance is more complicated and depends on the precise definition of the link between wages and pension benefits. In countries, where pension benefits are linked one-to-one to the average gross annual wages per employee, as is the case in Germany and many other European countries, the impact will be minimal. This is because average annual wages per employee increase more rapidly when part-time employment declines. As a consequence, contribution revenues do not improve relative to pension liabilities, and the development of the contribution rate does not change compared to the reference

[1] Full-Time Equivalents (FTE) refer to the number of full-time positions represented within the workforce, where approximately two part-time positions are considered equivalent to one full-time position. Accordingly, the FTE measure is simplified calculate as the number of full-time employees plus one half of the number of part-time employees.

scenario. While there is no relief for the contributors, the already retired population and those close to retirement benefit from higher pensions. For younger cohorts, however, this does not apply, as pension entitlements are adjusted in line with the increase in average wages. Future pension liabilities therefore increase solely as a result of the higher pension entitlements accrued by individuals who were previously employed part-time.

Hence, in the case of Germany, higher female labor force participation yields positive but limited fiscal relief for the social security system and cannot, on its own, resolve the financing challenges. A substantial reduction in part-time employment can ease financial pressure on health and long-term care insurance—provided that it does not trigger additional costs—yet it offers no relief for the German public pension system.

The remainder of this paper is structured as follows. Section 2 documents the historical development of labor force participation, working hours, and wage trends for men and women since 1991. Section 3 introduces the simulation model MEA-SOCSIM used for the projections of the future development of the social security systems under different scenarios. Afterwards the assumptions for the forecast are presented as well as the considered scenarios. Section 5 presents the simulation results on participation and part-time rates, and Section 6 concludes.

Labor Market Participation, Working Hours and Wage Growth since 1991

Both female employment and part-time employment rates have undergone substantial changes in recent decades. To contextualize the assumptions made for the future projections, it is therefore advisable to first review their historical trends. This section examines labor force participation rates, average weekly working hours, and part-time employment based on Microcensus data since 1991. In addition, the difference in the evolution of hourly and annual gross wages is reviewed.

Labor Force Participation

Throughout the entire observation period, women's labor force participation remained consistently lower than that of men (see Figure 1). However, while the men's participation rates remained constant around 81.6%, the participation rate of women increased steadily from 1991 onward. As a result, the gender gap in participation rates narrowed considerably over time. In 1991, only 62% of women were active in the labor market—20.8 percentage points (pp) below the male participation rate. By 2023, this gap had declined to 7.9 pp, representing a relative reduction of more than 60%. If the observed trend continues, the remaining gap is projected to shrink by a further 40% by 2030 and to disappear entirely by 2040.

Working Hours

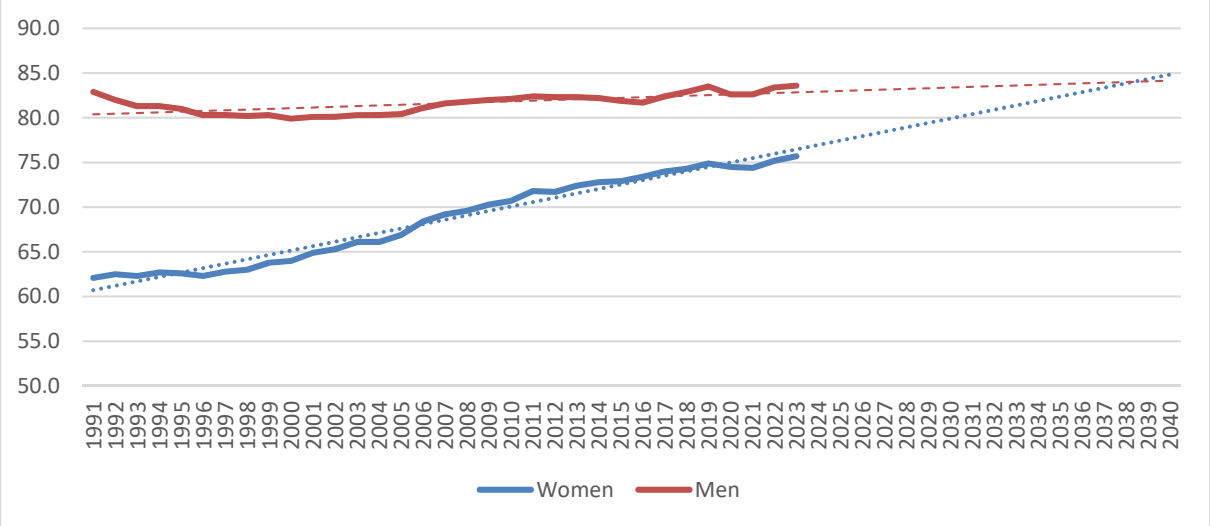
As with participation rates, the average weekly working hours of women have consistently been lower than those of men (see Figure 2). In 1991, standard weekly working hours amounted to 34.4 hours for women and 41.2 hours for men. This discrepancy is largely attributable to the higher prevalence of part-time employment among women (see Figure 3).

However, in contrast to the participation rates, average weekly working hours declined for both women and men. Among women, this decrease occurred between 1991 and 2005 and amounts to 4 hours. After 2005, women normally work, therefore, only 30.3 hours per week. For men, on the other side, the normal weekly working hours began to decline only after 2000 and have since fallen by 3 hours, reaching 38 hours in 2023.

The decline is even more pronounced when actual weekly hours worked are considered. Actual weekly working hours are generally lower than the normal working hours discussed above, as they account

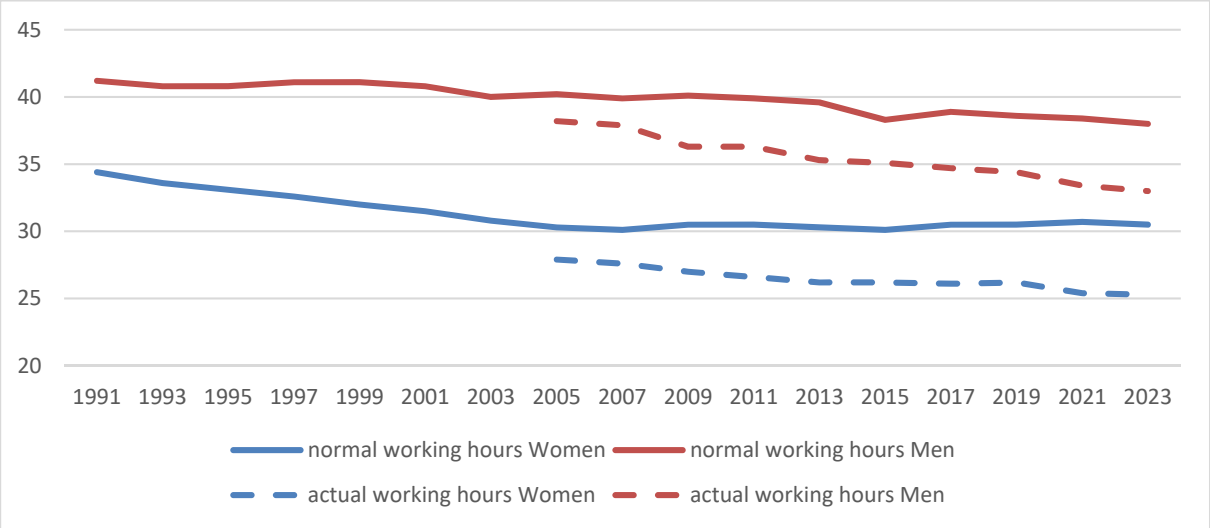
for vacation and sick leave, while also including overtime (see Figure 2). For women, actual hours worked per week fell by an additional 2.6 hours after 2005, despite stable normal weekly working hours. For men, the decline was even greater, amounting to 5.2 hours, although the normal weekly working hours decreased by only 2.2 hours during the same period.

Figure 1: Labor Force Participation Rates by Gender since 1991 (in %)



Source: WSI (2025a) based on German Federal Statistical Office, Microcensus.
Note: Doted Lines show a linear extrapolation of the observe values.

Figure 2: Total Weekly Working Hours since 1991

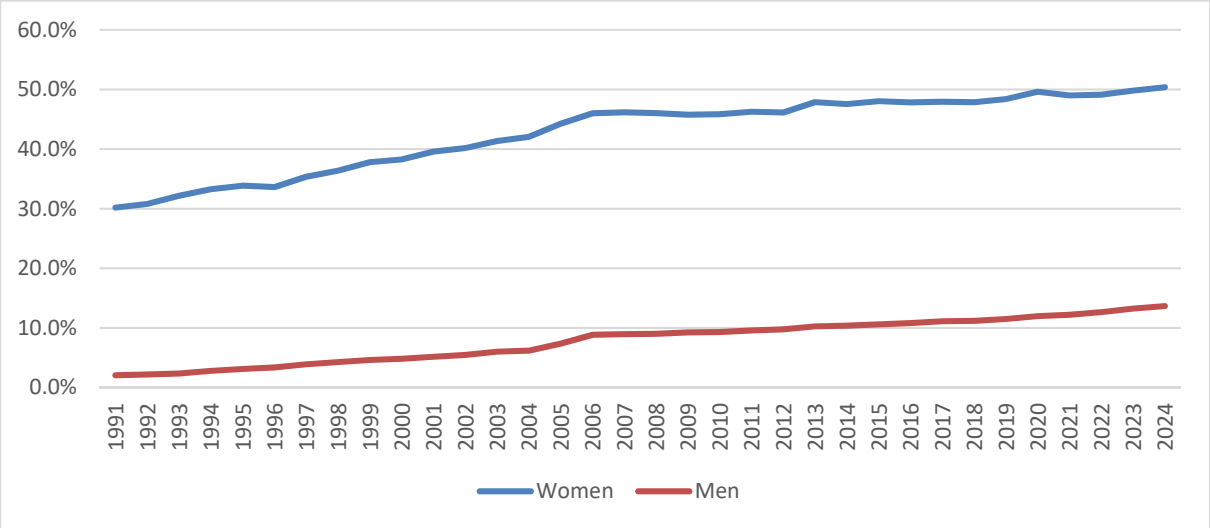


Source: WSI (2025b) and Sozialpolitik-aktuell (2024) based on German Federal Statistical Office, Microcensus.
Note: The figure reports the actual working hours only after 2005 as the definition changed at this time.

Part-Time Employment

Part-time employment has consistently been more prevalent among women than among men. In 1991, already over 30% of women in dependent employment worked part-time, compared to only 2% of men (see Figure 3). Since then, the proportion of part-time workers has increased for both genders. Among women, the most pronounced increase occurred between 1991 and 2006, coinciding with the decline in standard weekly working hours but also the increase in the labor participation of women. During this period, the female part-time rate rose from 30% to 46%. After 2006, the female rate continued to grow at a slower pace, reaching 50% in 2024. For men, the increase was more gradual: the share of part-time employees rose to 9% by 2006 and to 14% by 2024.

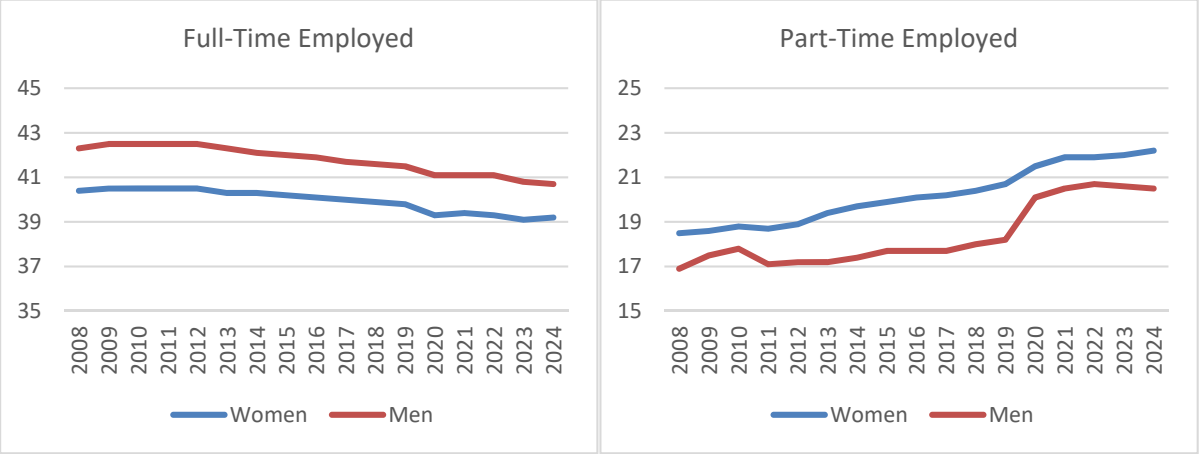
Figure 3: Part-Time Employment among Dependently Employed Workers since 1991



Source: German Federal Statistical Office, Microcensus.

The expansion of part-time employment accounts for a substantial share of the overall decline in average weekly working hours. However, it is not the sole reason. For instance, in recent years, the normal weekly working hours has decreased among full-time employment while it has increased among part-time employed workers (see Figure 4). According to the Labor Force Survey (Eurostat), average weekly hours in full-time positions fell by 1.6 hours between 2012 and 2024 (1.8 hours for men and 1.3 for women), whereas previously fluctuations had been relatively minor. The average weekly working hours of part-time employed increased in the same time by 3.3 hours for men and women.

Figure 4: Normal Weekly Working Hours by Employment Status since 2008



Source: Eurostat, Labor Force Survey.

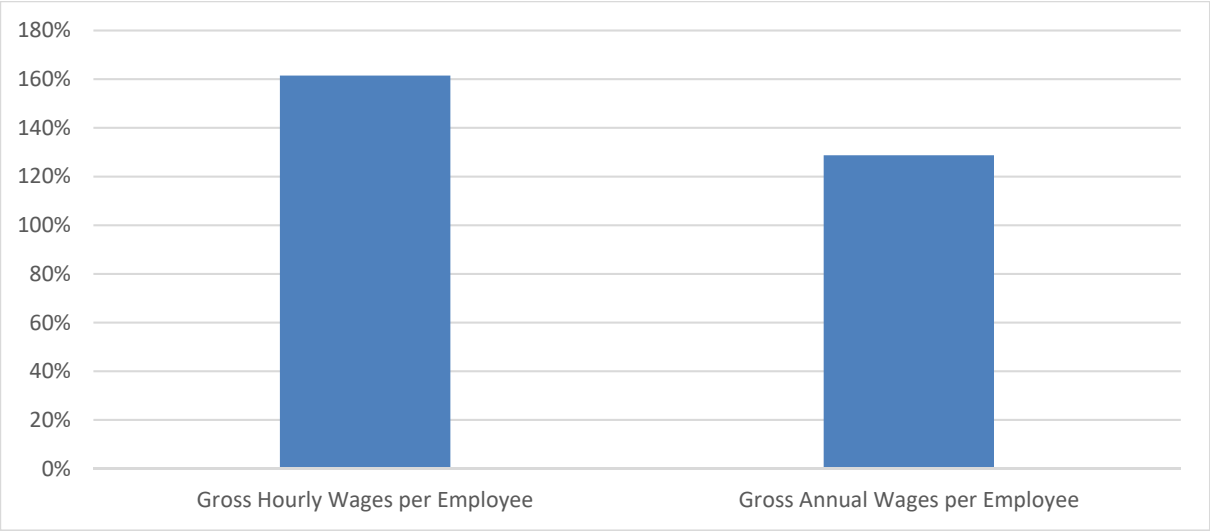
Wage Growth

For the social insurance system and in particular the social pension insurance the nominal wage growth is of greater relevance than the real wage growth. Figure 5 depicts therefore the aggregate nominal growth in gross hourly wages and gross annual wages per employee between 1991 and 2024. Over this period, hourly wages increased by roughly 30 percentage points more than annual wages. Relative to annual wage growth that translates to a 25% stronger increase of hourly wages. This

discrepancy is largely explained by the decline in average working hours per employee, driven in particular by the rise in part-time employment.[2]

To illustrate the mechanism, if hourly wages were to rise by 3% while average hours worked declined by 50%, annual wages per employee would increase by only 1.5%. This relationship is of central importance for the following analysis, as pensions and other key parameters of the public pension insurance system are directly linked to the development of annual wages per employee rather than hourly wages.

Figure 5: Nominal Gross Hourly Wage Growth and Gross Annual Wage Growth between 1991 and 2024



Source: Own calculation based on data of the German national account ("Volkswirtschaftliche Gesamtrechnung") and Institut für Arbeitsmarkt- und Berufsforschung (IAB) of the Bundesagentur für Arbeit (BA) (StaBA, 2025)

While the increase in part-time employment explains part of the discrepancy between hourly and annual wage growth, the extent to which the expansion of female labor force participation and part-time work has affected overall wage growth remains unclear. The literature provides limited and sometimes conflicting evidence. Kiss and Van Herck (2018) find that, for the period 2010–2014 in Germany, higher female and part-time employment had a small negative effect on wage growth, largely due to the concentration of new labor market entrants in lower-paid or part-time positions. Across some EU countries, Christopoulou et al. (2010) report for the period 1995–2002 that changes in workforce composition, including increased female participation, contributed only modestly to wage growth, while structural factors, such as changes in returns to education and institutional characteristics, played a more important role. However, in most other EU countries, the increase in female labor participation was not accompanied by a similarly strong rise in part-time employment as in Germany, suggesting that the effect in Germany could differ from the EU average. Overall, both studies indicate that the expansion of female labor force participation likely had at most a minor effect on general wage growth.

At the same time, while overall wage growth has been only slightly influenced by female labor force expansion, the gap between the hourly wages of full-time and part-time employees in Germany has widened considerably since 1990. Granados et al. (2019) show that in West Germany, the hourly wages of women working part-time were about 10% lower than those of full-time employees in 1990, and this gap nearly doubled by 2017. In East Germany, no initial wage difference was observed

[2] Theoretically, factors other than changes in working hours may also contribute to discrepancies between hourly and annual wage growth. One possible explanation is bonus payments, which are included in annual wages but not in contractual hourly wages. Nevertheless, variations in working hours are likely to represent the primary driver of these differences.

immediately after reunification, but by 2017 it had reached a level comparable to West Germany. According to Granados et al. (2019), the increase in the part-time wage gap is partly attributable to observable characteristics, such as education and work experience, as well as unobserved factors, including labor market orientation. More recent data indicate that the part-time wage gap increased further after 2017, reaching approximately 22.5% for women and 28% for men in 2023 (StaBA, 2023).

The Simulation Model MEA-SOCSIM

For our predictions we are using our simulation model MEA-SOCSIM which provides projections for the development of the Germany public pension, health and long-term care insurance (see Wilke, 2004; Holthausen et al., 2012; Rausch and Gasche, 2016; Rausch, 2017 and Rausch, 2023a). The model is structured in such a way that the future development of the German population and labor market can be adjusted freely. Moreover, reforms to the systems can be implemented easily as long as they are not affecting individuals based on to detailed individual determinants.

All model calculations are based on a detailed revenue and expenditure calculation. The calculation of these amounts and the projection of contribution rates and pension levels require assumptions regarding the development of the population and the labor market, with the labor market development depending on the population projection.

The population projection requires assumptions regarding the future development of life expectancy at the time of birth, future net (im)migration and future female fertility. The base year of the population projection is 2024. Alternatively, the official 15th Coordinated Population Projection of the Federal Statistical Office can be used.

The labor market is determined by multiplying the population by German labor force participation rates. MEA-SOCSIM distinguishes between gender, age and the new and old federal states. The latter was necessary as until 2024 the statutory pension insurance evaluates work in the old federal states differently than in the new federal states. The base year of our labor market simulations is also 2024. The labor force participation rates are taken from the German national account, whereby the age-structure is taken from the German Microcensus. For the future, the labor force participation rates can be varied to simulate the effects of changing labor force participation (of women) or to take into account changes in labor market conditions. The number of unemployed, (compulsorily insured) employed, self-employed and civil servants is then determined using age-specific rates based on the labor force. Over the simulation period, these rates can be increased or reduced (independent of age).

Finally, the number of pensioners must be calculated. MEA-SOCSIM considers, therefore, a retirement period between age 51 and age 80, i.e. the first person receives a statutory pension at age 51, while the last person applies for a pension at age 80. In the retirement period, the number of retirees of a given age depends on the presumed retirement behavior of the population. In MEA-SOCSIM it is assumed that the non-compulsorily insured individuals (e.g. self-employed, civil servants, housewives) apply for their pension at the statutory retirement age, although they may leave the labor market earlier or later. Regarding the retirement of compulsorily insured individuals (unemployed and compulsorily insured employees), MEA-SOCSIM considers a more complex procedure, which depends on the labor force participation of these labor market groups. Basically, it is assumed that the time of labor market exit coincides with the time of first receipt of a statutory pension. This is actually in line with the finding that in Germany only 14.3% of workers aged 50-69 continue working on first receipt of a pension (OECD, 2025).[3] Based on this assumption, MEA-SOCSIM includes two methods for calculating and adjusting the retirement behavior of compulsorily insured individuals.

[3] In France and Italy is the share with 10.9% and 9.9% even lower. The EU average is on the other hand with 22.4% considerable larger.

The first method calculates the share of pensioners at a certain age based on the decline in the share of compulsorily insured individuals in the population since age 50. From the statutory retirement age, the share of the population drawing a pension is consequently given by (1 minus the rate of compulsorily insured individuals in the population), since by definition all non-compulsorily insured individuals claim their statutory pension at this point. Thus, the first method depends on the assumptions regarding the future evolution of labor force participation rates. The number of pensioners is obtained by multiplying the calculated rates by the population of the age under consideration.

The second method reverses the just presented procedure. It begins with exogenously specified assumptions regarding the future retirement behavior of the compulsorily insured. Accordingly, the number of pensioners is predetermined, while the share of unemployed and compulsorily insured persons in the elderly population has to be determined by applying the procedure of the first method inversely. Finally, the distribution of the calculated compulsorily insured persons into unemployed and compulsorily insured employees is based on the future general unemployment rates.

Following the labor market projection, MEA-SOCSIM continues with the projection of wages and salaries. MEA-SOCSIM distinguishes several wage variables, such as the gross salary per employee according to the national accounts, the wages subject to pension insurance as well as the wages subject to health insurance. The projections themselves are based on exogenously specified growth rates of the hourly wages. The yearly growth of the annual wages and wage bill is afterwards computed within MEA-SOCSIM based on assumptions regarding the development of part-time employment. The part-time rates as well as average working hours in part-time relative to the working hours of full-time employed workers are taken from the Microcensus of 2019 (see RDC, 2019).

Based on these projections, MEA-SOCSIM then first determines the development of the average pension entitlements of a cohort by gender. These depend mainly on the labor market history and average contributory wages of a cohort. Afterwards, the number of pensioners and their pension entitlements determine the expenditures of the pension insurance. For a precise description of the computation of the pension insurance income and expenditure (calculation), see Holthausen et al. (2012).

The revenues of the public health and long-term care insurance systems are based on the same contribution base. The number of contributing insured individuals is derived from data provided by the statutory health insurance. Contributory wages are calculated within the wage module. In addition to wage-based contributions, fixed rules determine contributions for unemployed individuals, which are considered. Moreover, pensioners contribute to both systems on the basis of their pension benefits. In case of the health insurance, the statutory pension insurance covers half of the contributions, analogous to the employer's share for employees. Until 2004, this was also the case for the long-term care insurance. Since then, however, pensioners have to pay the whole long-term care contribution rate by themselves. The long-term care insurance, moreover, charges a higher contribution rate from individuals without children and grants a reduced contribution rate for parents with children younger than 27. These additional and reduced contributions are considered in MEA-SOCSIM through corresponding adjustment factors.

Health insurance expenditures are computed using age- and gender-specific expenditure profiles derived from data of the statutory health insurance. It is important to note that the number of insured individuals exceeds the number of contributors, as non-employed family members such as children and spouses are covered by their working parents/spouses. The expenditure profiles can be modified/adjusted to account for general expenditure growth, cost-driving factors such as medical and technological progress, or structural changes related to health improvements and deteriorations

in the course of the rising life expectancy (compression of morbidity, see Fries 1980; expansion of morbidity, see Verbrugge 1984).

While health insurance operates on the principle of needs-based coverage, long-term care insurance is designed as partial coverage. For this purpose, persons in need of care are classified into five care levels, with benefits increasing in line with severity. The benefits are provided by standardized lump sums payments, including flat rates for stationary care, home care by ambulant care services or cash payments for private care. In certain cases, lump sums can be combined or received in parallel.

The expenditures in the long-term care insurance are computed through the average lump-sum payments and the risk of being in need of care. Both determinants are disaggregated by the kind of care (stationary vs. ambulant care) and care level. The risk of being in need of care is based on administrative data from the statutory long-term care insurance, which reports the number of beneficiaries by age, gender, kind of care and care level. Like the health expenditure profiles, the risk profiles can be adjusted over the simulation timeline in order to model a compression or expansion of morbidity. The average lump sum payments are determined from the actual legal lump sum payments and data on the number of recipients of each payment. MEA-SOCSIM applies average lump sums for each care level separately for stationary and ambulant care. The lump sums can be adjusted over the simulation period through external rates.

As the flat rates have been far from enough to cover the costs, particularly residents of nursing homes had to pay high co-payment. As those co-payments exceeded the financial means of many, especially pensioners, the social care insurance has started to cover a part of those co-payments. The amount covered depends on the length a person is already in stationary care but not on the care level as long as it is at least level 2.[4] The maximal covering rate is payed after three years in stationary care and amounts to 75% of the co-payments claimed by the nursing home. MEA-SOCSIM considers those payments taking into account the average claimed co-payments and the average time a resident spends in a nursing home. The average co-payments can be adjusted again annually through exogenous rates.

The contribution rate for the health and long-term care insurance is then calculated based on the contribution base, the expenditures of the systems and legally required reserves. A more detailed description of the calculation of health and long-term care insurance in MEA-SOCSIM can be found in Gasche and Rausch (2012) and Rausch (2023b).

Assumptions

The simulations presented in this paper are based on the moderate variant (G2-L2-W2) of the 15th coordinated population projection (see StaBA 2022). This projection extends the German population until 2070 under the following assumptions:

- an increase in life expectancy at birth to 84.6 years for men and 88.2 years for women by 2070,
- an increase in the fertility rate from now 1.35 to 1.55 by 2032,[5] and
- a linear decrease in annual net immigration from 1.3 million persons in 2022 to 250,000 in 2033.

From 2033 onward, constant rates are assumed for both the fertility rate and net migration.

[4] There is actually no reimbursement for people in stationary care who are only in care level 1.
[5] At the same time, the average age of women at birth is expected to increase by1.1 years.

The labor market assumptions are based on the middle variant of the Pension Insurance Report 2024 (BMAS, 2024), the Joint Economic Forecast of the German Economic Institutes of 2025 (Gemeinschaftsdiagnose, 2025), and the spring forecast of the German government of 2025 (BMWE ,2025). These sources provide assumptions regarding the development of the total number of employed persons, self-employed, employees (separated into compulsorily insured and marginally employed persons), and unemployed. However, they do not disaggregate by gender, old and new federal states, or age, although different growth rates are to be expected. Nor do they specify the future number of pensioners or the assumed behavioral response to the increase in the statutory retirement age. Consequently, an exact replication of the administrative assumptions is not possible. The future labor market rates are obtained through age-independent adjustments to the base-year rates. Effectively, these assumptions imply that female labor force participation will close 40% of the current gender gap by 2030. This trajectory is consistent with the trend observed since 1991 (see Figure 1). Retirement patterns are simultaneously adjusted such that the compulsorily insured individuals postpone retirement by nine months for the remaining year the statutory retirement age is raised. At the same time, retirement behavior in the new federal states is assumed to converge to that of the old federal states. Current data from the pension insurance statistics indicate that individuals in the new federal states still retire earlier on average.

Wage and salary developments follow the assumptions of the Pension Insurance Report 2024. In its medium scenario, the report uses a nominal gross wage growth of around 3% p.a.. In this study, it is assumed that this growth is made up of 1.8 pp inflation and 1.2 pp productivity growths. However, these assumptions were formulated before the change of administration in the United States and the subsequent adjustment of tariff policy, suggesting that short-term expectations may be overly optimistic. For the baseline scenario, the reported wage growth is applied to hourly wages of full-time employed and part-time employed, although the report originally refers to annual wages. This approach creates no inconsistency as long as average working hours remain constant and the part-time wage gap is assumed to remain constant, which is the case in the baseline scenario. The part-time wage gap is set to 25% for men and 20% for women.

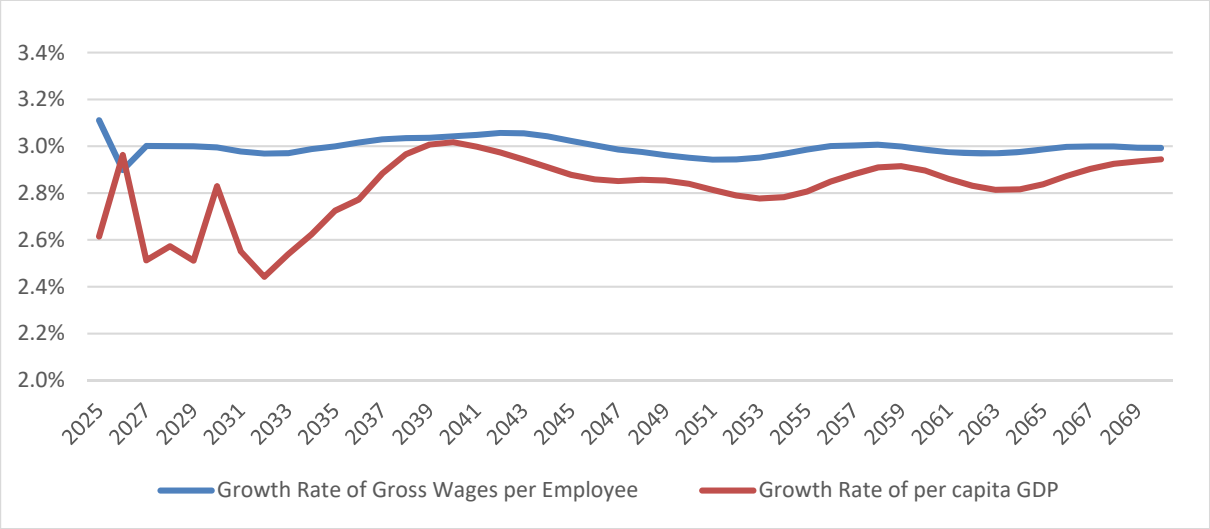
The simulations of the social insurance systems are based on the legal situation as of March 2025. It is assumed that pension adjustments after 2025 will once again be determined by gross annual wage growth per employee, the sustainability and the contribution rate factors, thereby replacing the current temporary threshold regulation that guarantees a pension level of 48%. The study, therefore, does not consider the coalition agreement which foresees a continuation of the threshold. The main findings of this study are, however, the same under both regulations.

The healthcare and nursing care assumptions follow Werding et al. (2020). According to their approach, per capita health expenditures grow in line with GDP per capita. In MEA-SOCSIM, GDP growth is estimated through the development of the aggregate gross wage bill. In contrast, long-term care expenditures are likely to depend more strongly on personnel costs. Werding et al. (2020) therefore apply gross wage growth per employee to adjust the flat-rate benefits per case, which is adopted here. Co-payments for nursing home residents are assumed to grow at the same rate. Under the general assumptions of the simulations, the growth of the GDP per capita is lower than the growth of the gross wages per employee, since the growth of the wage bill is dampened by the declining number of employed persons. That is in particular the case until 2040 due to the retirement of the baby boomer generation (see Figure 6).

The lump sum payments of the long-term care insurance are updated only every third year. This follows an old legal regulation that is currently suspended but most likely reinstalled in the future. The current legal situation includes a 4.5% increase in 2025 (which has already been implemented) and an increase in 2028 by the cumulated core inflation between 2025 and 2028, but not by more than the

cumulated growth of the sum of gross wages over the same period (see §30 SGB XI). Accordingly, adjustments based on gross wage are assumed to begin in 2031. At the same time, the co-payments claimed by the nursing homes are expected to rise more strongly until 2028. This is partly due to adjustments to the inflation rate between 2026 and 2028, and partly due to the Third Care Strengthening Act (*Drittes Pflegestärkungsgesetz*), which introduced sector-wide collective bargaining agreements and new staffing assessment procedures, both of which increase costs. The larger growth rates are based on Rothgang (2021) and are, on average, 1.4pp above the wage growth per employee.

Figure 6: Growth Rate of Gross Hourly Wages per Employee and per Capita GDP



Source: Own calculation.

The simulations impose no change in the age-related share of individuals receiving stationary care. By contrast, the proportion of individuals in ambulatory care has shown a marked increase over past years, which cannot be attributed solely to demographic change. This increase is most pronounced in care level 1, while almost no variation is observed for care level 5. The continuation of ambulatory care probabilities is projected on the basis of past trends using a linear extrapolation for care levels 1 to 4. For care level 1, the extrapolated trend is extended until 2030, whereas for care levels 2 to 4 the extrapolation is restricted to 2026. This procedure yields growth rates of 15% (care level 1), 8% (care level 2), 10% (care level 3), and 4% (care level 4).

In addition to the baseline scenario, alternative labor market scenarios are constructed by varying future female labor force participation and part-time employment:

- **Female Labor Participation**
    1. *Low scenario*: Female labor force participation remains unchanged. The gap between male and female participation rates thus persists at current levels.
    2. *High scenario*: Female participation continues to rise between 2030 and 2040, albeit at a slower pace. By 2040, 80% of the current participation gap between men and women is projected to close.
- **Part-Time Employment Rates**
  A decline in part-time employment for both men and women until 2030 is assumed. As a benchmark for a realistic reduction, the difference between German and Swedish part-time rates is employed. Actually, among 25- to 65-year-old workers, Swedish part-time employment is approximately 15% lower for men and 50% lower for women compared to Germany (see Figure 7). This gap persists despite higher female labor market participation in Sweden (see Börsch-Supan and Rausch, 2025).

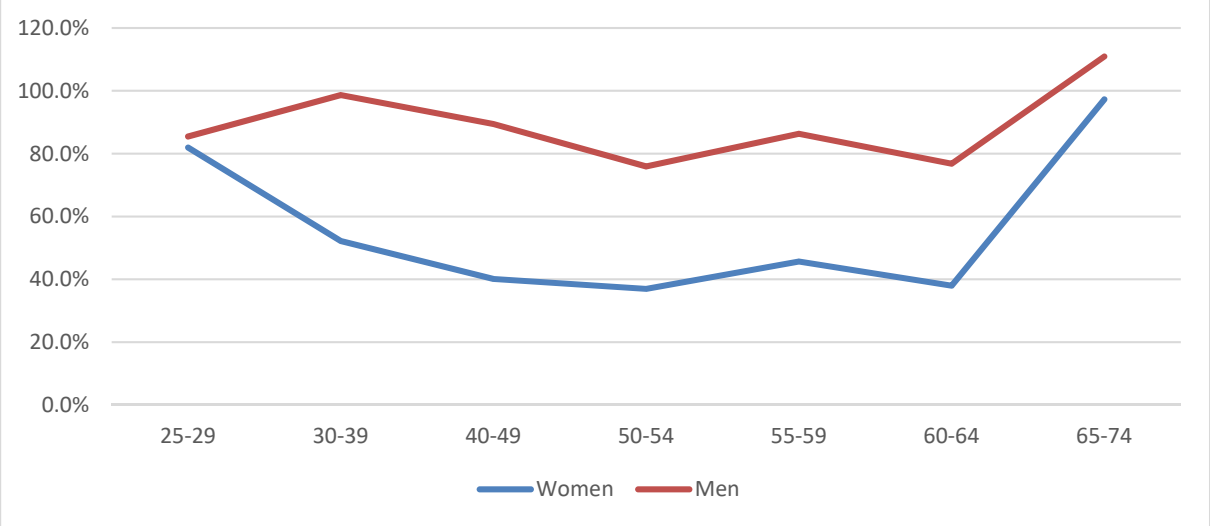
Given that lower part-time employment could reduce the availability of informal family care, three cases are examined:

1. No additional adjustments, holding all other rates constant.
2. A moderate decline in the provision of informal care by relatives, offset by increased use of professional home-care services.
3. A strong decline in informal care, accompanied by a substantial shift toward professional services.

In both the moderate and strong cases, this transition affects the average flat-rate payments of long-term care insurance, since lump-sum payments for professional nursing services exceed those for family-based care. In the moderate case, an additional increase of 3pp is assumed for average ambulatory care payments; in the strong case, the additional increase amounts to 17pp. There is a more detailed description of those alternative cases in the section examining the future development of the long-term care insurance.

As outlined above, the alternative scenarios affect the trajectories of both annual income and GDP. This impact is intentional and constitutes a central element of the analysis. Under the logic of the baseline scenario, however, such changes would also imply adjustments in the development of health and long-term care expenditures, thereby introducing an indirect dependency of health status on labor market participation. While such a relationship cannot be ruled out entirely, it is deliberately excluded in the present study. Variations in employment behavior are assumed to influence only income and GDP, without feeding back into health-related demand. Accordingly, expenditure profiles and lump-sum payments in the alternative scenarios are decoupled from changes in GDP per capita and wage dynamics. Their growth rates are instead fixed at the values specified through the baseline scenario, unless stated otherwise. This approach ensures that labor market effects remain analytically distinct from health and long-term care expenditure developments, thereby safeguarding the clarity and interpretability of the scenario analysis.

Figure 7: Ratio of Swedish Part-Time Rates to German Part-Time Rates



Source: Eurostat (Labor Force Survey) and RDC of the Federal Statistical Office and Statistical Offices of the Federal States, Microzensus 2019, DOI: https://doi.org/10.21242/12211.2019.00.00.3.1.0.

Results

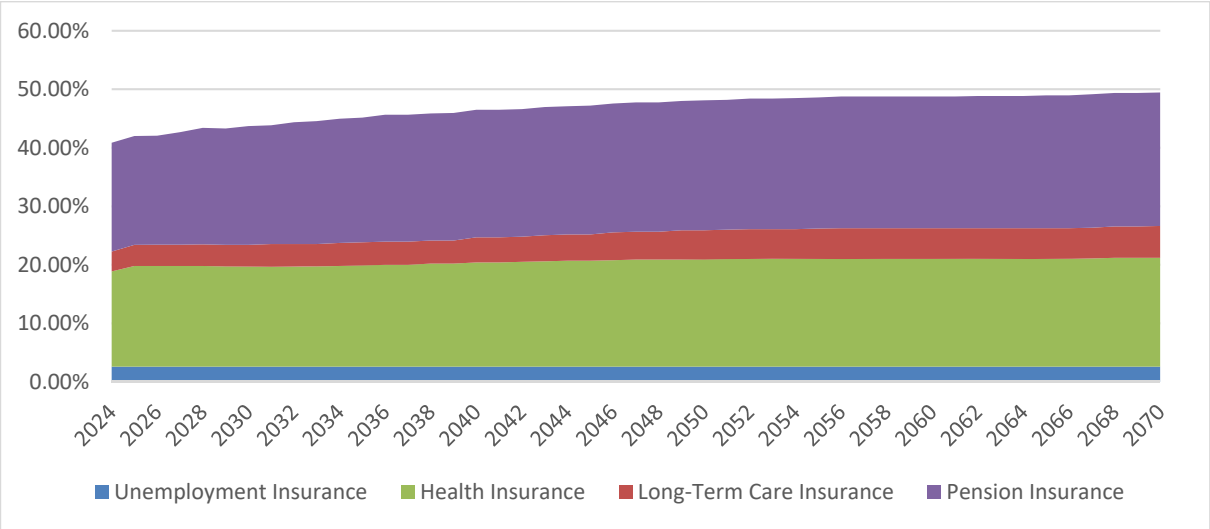
Figure 8 illustrates the projected development of the aggregate contribution rate of the German statutory social security system up to 2070 under the baseline scenario.[6] According to the underlying assumptions, the contribution rate increases from around 41% to more than 49% by 2070. This rise is

[6] The contribution rate of the public unemployment insurance is kept on the current level of 2.6%.

driven primarily by the long-term care and pension insurance, whereas the health insurance contributes only a comparatively modest share. The latter outcome reflects the moderate assumptions regarding the growth of health expenditure profiles. Nevertheless, as shown by Rausch (2023b), the future development of contribution rates for health and long-term care remains highly uncertain. Contribution rates may rise less steeply if population ageing is accompanied by a reduction in morbidity (compression of morbidity), but could increase significantly more under scenarios of worsening health (expansion of morbidity) or under cost-driving medical and technological developments.

Against this background, the subsequent analysis examines to what extent an expansion of female employment and a reduction in part-time work could alleviate financial pressures on the system. First, the implications of the different assumptions for the number of full-time equivalent (FTE) employed and on income variables are presented. This is followed by an assessment of their impact on the individual branches of the social security system.

Figure 8: Total Contribution Rate of Germany Social Insurance System

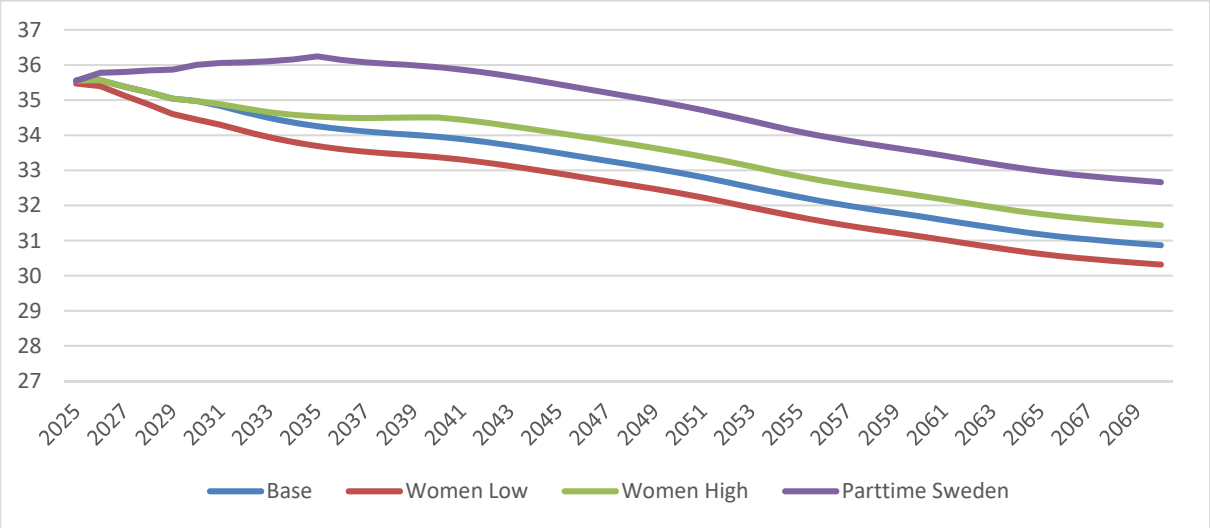


Source: Own Calculation.
Note: Contribution Rate of Unemployment Insurance is kept constant at 2.6%.

Impact on the Number of Fulltime Equivalents

Changes in female labor force participation and part-time employment rates alter the projected number of full-time equivalent workers (see Figure 9). By 2040, the number of FTE workers would be 1.7% lower than in the baseline scenario if female participation rates stagnate. In contrast, a further increase in female participation between 2030 and 2040 would raise the number of FTE workers by 1.6% relative to the baseline. The largest effect arises from a reduction in part-time employment rates: in this scenario, the number of FTE workers in 2040 would exceed the baseline level by 5.8% and until 2045 even to more FTE worker as observed in 2025. A more detailed discussion of labor market implications is provided in Börsch-Supan and Rausch (2025).

Figure 9: Number of Fulltime Equivalent Worker (in Million)



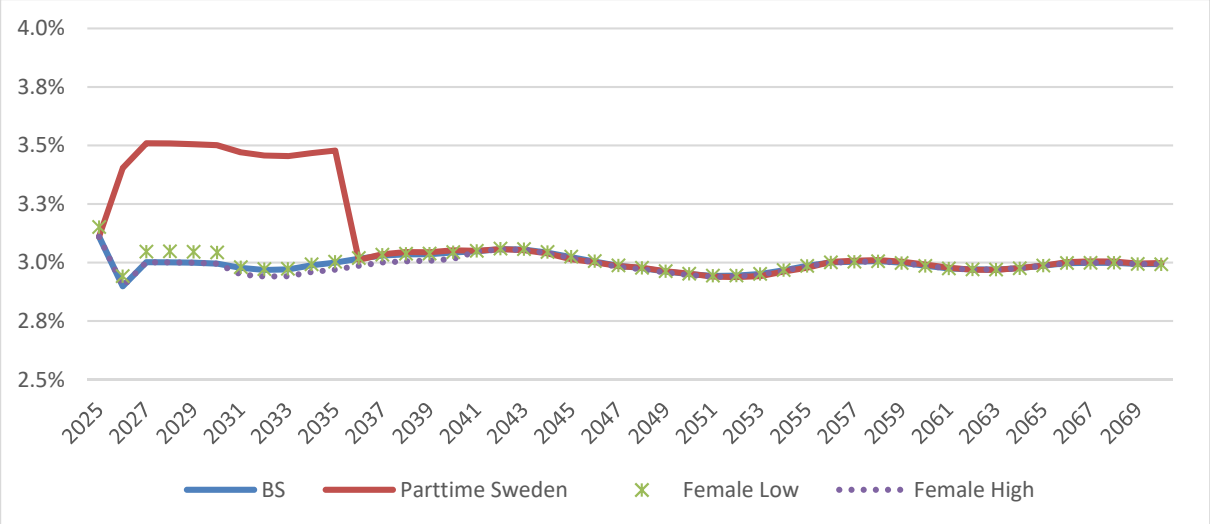
Source: Own Calculation.

Impact on Income

Three income-related variables are central to the social insurance system: the hourly wage per employee, the annual wage per employee, and the aggregate wage bill. In MEA-SOCSIM, hourly wage growth is externally determined at approximately 3% across all scenarios. Annual wage growth, however, is additionally affected by changes in labor force composition and working time, while the wage bill further depends on the size of the employed population.

Figure 10 presents the growth rates of annul gross wages per employee. In the baseline scenario, as well as in scenarios assuming stronger or weaker increases in female labor force participation, annual wage growth remains close to the hourly wage growth of 3%. Minor deviations occur due to shifts in labor force composition, such as changes in the age structure. Differences between the female employment scenarios and the baseline are marginal: without further increases in female employment, growth is slightly higher until 2030; with continued increases, it is marginally lower between 2030 and 2040. This reflects the lower average wages of women, so that a rising female share in the labor force modestly dampens average wage growth.

Figure 10: Growth Rate of Annual Gross Wages per Employee



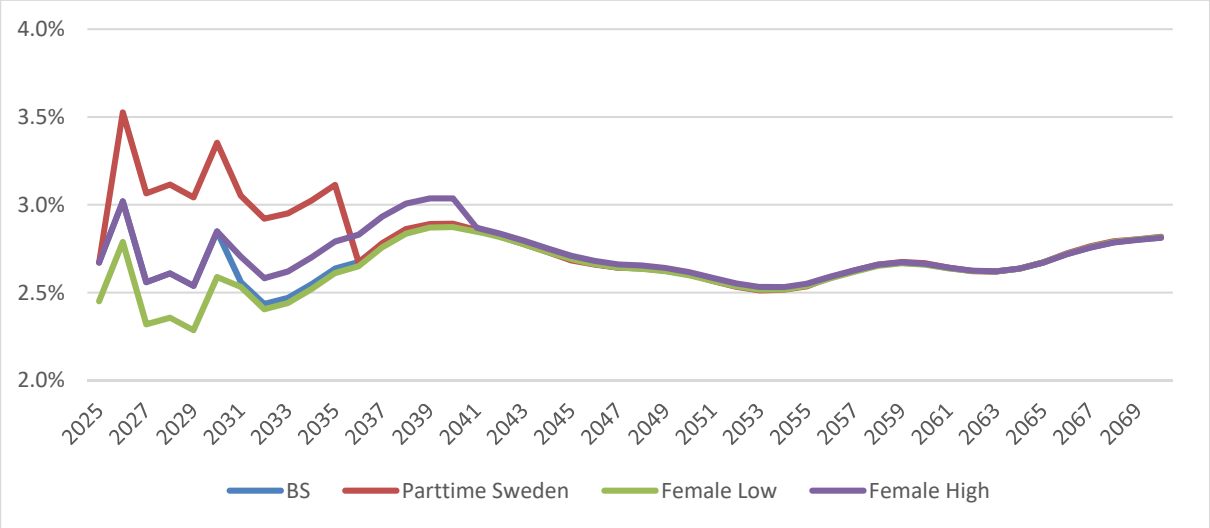
Source: Own Calculation.

By contrast, a reduction in part-time employment exerts a much stronger change in the growth of annual wages. As part-time workers transition into full-time positions, their substantially higher

annual earnings increase the overall average, generating a “fictitious” acceleration in wage growth. This effect is confined to the adjustment period up to 2035, during which part-time rates decline. In this phase, annual wage growth exceeds the baseline by roughly 0.5 percentage points; thereafter, no deviation from the baseline scenario is observed. It is important to note that the underlying calculation assumes that former part-time employees continue to receive an hourly wage that is 20% (women) or 25% (men) lower than that of the average full-time employee (part-time wage gap). That is, we assume that this pay gap is due to the qualification of the employees and not feature of the part-time employment. The magnitude of the growth differential would be correspondingly greater if it were assumed that former part-time workers attain also the average hourly wage of full-time employees upon transitioning to full-time employment.

Figure 11 illustrates the growth rate of the wage bill which is given by the multiplication of average annual wages per employee with the number of employees. Owing to the decline in the labor force, this rate is lower than the growth of annual wages per employee. In the baseline scenario, the growth of the wage sum is on average 0.3pp lower than the growth of the annual wages. In the scenario without further increases in female labor force participation, the wage bill grows on average 0.25pp less until 2030, reflecting the reduced number of employed persons. Conversely, if female participation continues to rise after 2030, the growth rate increases, averaging 0.15pp more until 2040. The reduction in part-time employment rates, on the other hand, produces an effect of similar magnitude to that observed for annual wages per employee, since in this scenario the number of employees remain constant. Hence, under the part-time scenario, both the average annual wages per employee and wage bill grow at the same additional rate compared to the baseline scenario.

Figure 11: Growth Rate of Aggregate Gross Wage Bill



Source: Own Calculation.

Public Health Insurance

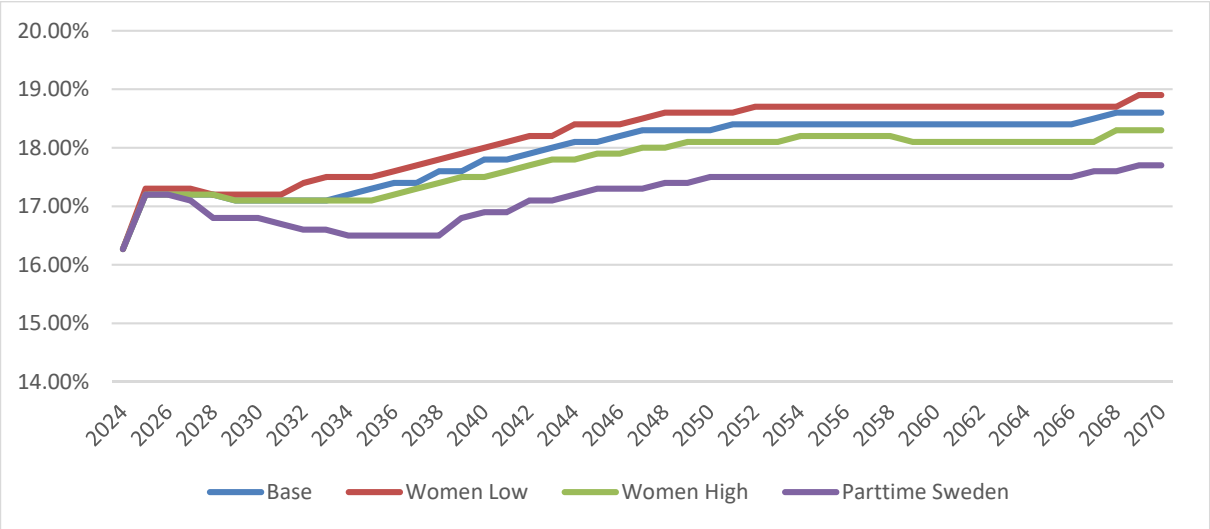
Figure 12 presents the projected development of the health insurance contribution rate up to 2070. At the beginning of the projection horizon, a sharp increase in the total contribution rate (general rate of 14.6% plus the supplementary contribution) is observed, amounting to +0.9 percentage points between 2024 and 2025. Thereafter, the contribution rate remains temporarily stable, primarily due to slower growth in GDP per capita relative to the contribution base.[7] From 2033 onwards, the contribution rate resumes its upward trend, rising from 17.1% to 18.4% by 2051, after which it remains relatively stable.

[7] Given the fiscal strain on the statutory health insurance system (GKV), the assumptions may be overly optimistic. Stronger cost pressures would, in turn, accelerate the increase in the contribution rate.

Under the scenarios of lower or higher female employment, the timing of this second increase shifts accordingly: with lower female employment, the rise occurs earlier; with higher employment, later. In addition, the contribution rate after 2040 is on average 0.3 percentage points (1.5%) higher or lower than in the baseline, reflecting differences in the total wage bill that constitutes the contribution base. The effects of the employment scenarios turn out to be surprisingly modest. This can be attributed to the already high level of female labor force participation in Germany. As a result, a further reduction in the gap between male and female participation rates exerts only a minor influence on the aggregate wage bill and, consequently, on the liquidity position of the social security systems

The effect is considerably more pronounced under the scenario that halves part-time employment. Assuming health expenditure profiles follow the baseline trend, the health insurance contribution rate would even decline temporarily between 2026 and 2038. In the longer term, the contribution rate returns to roughly its current level, remaining about 1 percentage point (5%) below the baseline scenario.

Figure 12: Public Health Insurance Contribution Rate ((General Rate plus Average Supplementary Rate)



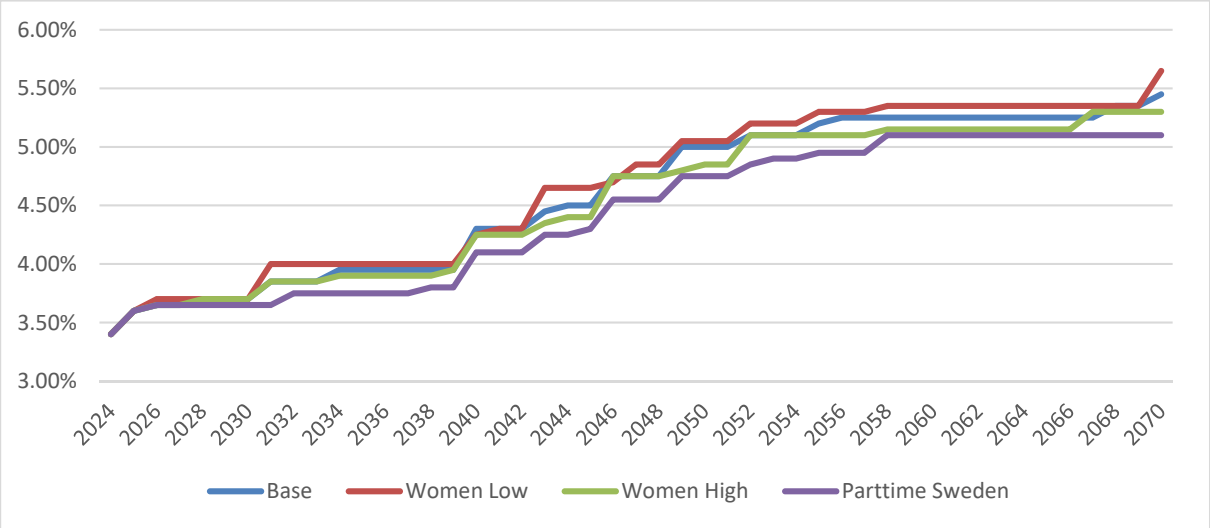
Source: Own Calculation.
Note: The presented contribution rate includes the General Contribution Rate and the average additional Contribution Rate.

Public Long-Term Care Insurance

Compared with health insurance, the contribution rate for the public long-term care insurance rises more steeply (see Figure 13). Two factors account for this. First, the cost assumptions differ: long-term care expenditures are linked to wage growth per employee, which exceeds the growth of GDP per capita. Second, the long-term care insurance is more directly affected by the demographic change, as the demand for care is even more concentrated among the elderly population as the health expenditures. In the baseline scenario, the general contribution rate for long-term care insurance increases from 3.6% to 5.25% by 2067 and 5.45% in 2070.

In the alternative scenarios, the increase of the contribution rate shifts upward or downward, mirroring patterns observed in health insurance and reflecting liquidity effects arising from changes in the aggregate wage bill. In contrast to health insurance, however, the rate does not decline in any of the scenarios. The magnitude of the effect amounts to roughly 0.08 percentage points in the employment scenarios and about 0.2 percentage points (around 4%) in the part-time scenario. In relative terms, these effects are comparable to those observed for health insurance.

Figure 13: General Long-Term Care Insurance Contribution Rate



Source: Own Calculation.
Note: General Contribution Rate without surcharge for childless or discount for (young) parents.

A reduction in part-time work or a rise in employment participation diminishes the capacity of individuals to provide informal care for relatives. It is therefore important to assess the implications of declining informal care for the development of long-term care contribution rates, particularly in the part-time scenario, where the strongest effects are observed.

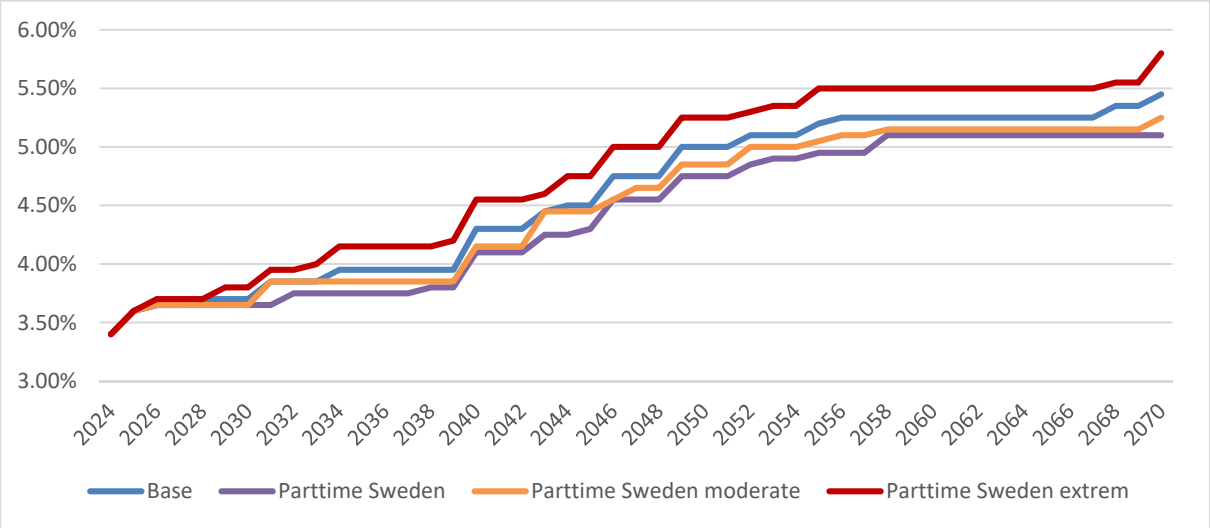
Within the long-term care insurance system, cases of informal care can be identified through the recipients of *Pflegegeld*, the cash benefit for family-based care. With almost 3 million beneficiaries, this group constitutes the majority of all individuals supported by the system. Depending on the care level, annual *Pflegegeld* payments in 2025 range from €4,164 to €11,880. By contrast, professional ambulatory care services (*Pflegesachleistungen*) involve substantially higher lump-sum payments, ranging from €11,124 to €29,160 per year. In 2024, only around 176,000 individuals received these benefits exclusively, while approximately 600,000 received a combination of *Pflegegeld* and *Pflegesachleistungen*.[8]

To capture the potential substitution of informal by professional care, two additional scenarios are examined. In a moderate case, the share of *Pflegegeld* recipients is assumed to decline by 5%, offset by a corresponding increase in the utilization of *Pflegesachleistungen*, i.e., formal home care. The second scenario considers a more extreme substitution, with the prevalence of informal home care reduced by 20% in favor of formal services. These adjustments translate into increases in average flat-rate payments for non-institutional care of 4 and 16 percentage points, respectively, which are implemented stepwise in the simulations for the period 2025 to 2035.

The results, presented in Figure 14, show only minor changes under the moderate scenario. The effect on the contribution rates persist, albeit at a somewhat lower level than in the original part-time scenario that assumes no changes in the compositions of care types. Under the extreme scenario, however, contribution rates exceed even the baseline development. In the most adverse case, therefore, increased female employment could indirectly intensify financial pressures on long-term care insurance.

[8] All numbers exclude individuals classified under care level 1, who receive only minimal basic support.

Figure 14: General Long-term Care Insurance Contribution Rate for Changes in the Share of Informal Care



Source: Own Calculation.

Note: General Contribution Rate without surcharge for childless or discount for (young) parents.

Public Pension Insurance

Design of the German Public Pension System

An analysis of the effects within the public pension system requires an understanding of its institutional design and the formulas that determine individual benefits. In the following, a brief overview of the German pension system is provided. A detailed description can be found in Börsch-Supan et al. (2024). The pension benefit $P_{i,t}$ of individual i in year t is given by:

$$(1) \quad P_{i,t} = a_i \cdot EP_i \cdot PV_t$$

This formula can be separated into an individual component (a_i and EP_i) and a general component (PV_t), which is identical for all insured individuals. EP_i denotes the accumulated earnings points at retirement R, reflecting pension entitlements acquired through contributions during the working life (starting at S). Each year, earnings points are credited in proportion to the ratio between an individual's gross income $y_{i,t}$ and the average income of the pension insurance $\bar{y}_t$. The latter is updated annually in line with growth of the gross annual wage per employee.

$$(2) \quad EP_i = \sum_{t=S}^{R} \frac{y_{i,t}}{\bar{y}_t}$$

The factor a_i is an access factor that adjusts benefits for early or delayed retirement (actuarial adjustments) or due to the type of pension (e.g. old-age pension, disability pension or survivor pensions). Finally, PV_t (the pension value) reflects the monetary value of one earnings point in year t. It is adjusted annually through the pension adjustment formula, which links benefits to the growth of gross annual wages per employee and incorporates sustainability and contribution rate factors (SF_t, CF_t) to mitigate demographic pressures:[9]

$$(3) \quad PV_t = PV_{t-1} \cdot \frac{\bar{y}_{t-1}}{\bar{y}_{t-2}} \cdot CF_t \cdot SF_t$$

[9] As the sustainability factor and contribution rate factor are not central to the analytical focus, their exact functional specifications are omitted from the formal representation.

According to the current coalition agreement, it is planned to suspend these damping factors until 2031, ensuring that the gross standard pension level before taxes remains constant at 48%.[10] This study follows, however, the legal regulation in place which still does include both damping factors.

Due to the strictly earnings-oriented calculation of pension benefits, redistribution has traditionally played only a subordinate role within the statutory pension system. Nevertheless, certain redistributive elements exist, such as additional earning points for child-rearing or the *Grundrente* (basic pension) introduced in 2021, which increases low pensions under specific eligibility conditions (for a detailed discussion of the basic pension, see Börsch-Supan and Goll, 2021; Börsch-Supan et al., 2024). In particular, part-time employees may benefit from the *Grundrente* due to their comparatively lower lifetime earnings. In some cases, the additional entitlements from the *Grundrente* may even exceed the additional pension claims that would have been accrued through full-time employment. It is not possible to model this effect within MEA-SOCSIM because the eligibility criteria for the *Grundrente* are complex and cannot be differentiated in a macro-level model. However, given that current expenditures on the *Grundrente* account for only about 0.5% of total pension expenditures, the potential bias in the results is likely to remain limited.

Contribution Rate of the Public Pension Insurance

Figure 16 shows the projected development of the contribution rate to the public pension insurance. The scenarios differ only marginally, which makes it difficult to distinguish the individual developments in the figure. The reasons for this robust pattern across scenarios are outlined in the following. Under the baseline scenario, the rate is expected to increase sharply by 1.3 percentage points between 2027 and 2028. This rise is driven by the depletion of the sustainability reserve of the system, which is currently well filled but will be reduced rapidly over the next years due to rapid ageing. After 2028, the contribution rate continues to grow, reaching 21.8% by 2040 and 22.8% by 2070.

As in the health and long-term care insurances, the contribution rate is slightly lower or higher in the two employment scenarios. The deviations remain small, averaging only about 0.2 percentage points at the beginning. They stem from changes in the contribution base through additional employment of women who were previously not working, while the effect on annual wage growth remains negligible (see Figure 10). In the long run, the effect should disappear once the additional female contributors retire and draw their pensions. The limited impact of higher female employment rates on the contribution rate also reflects again the fact that the gender participation gap has already narrowed down considerably over the past decades, leaving little scope for huge initial effects.[11]

The impact of a decline in part-time employment on statutory pension insurance is more complex. This is because pension benefits are linked to the average gross annual wage per employee (3), which rises more rapidly when part-time employment decreases (see Figure 10). As discussed above, the additional growth in the average annual wage per employee is thereby identical to that of the wage bill. Consequently, contribution revenues do not improve relative to pension liabilities, and the development of the contribution rate does not change significantly compared to the baseline

[10] The gross standard pension level before taxes is defined as the ratio of the pension benefits of a standard pensioner to the average income, in both cases excluding social insurance contributions. A standard pensioner is an individual with 45 earnings points and 45 contribution years, i.e. someone who has earned exactly the average income of the pension insurance system in each year of their working life.

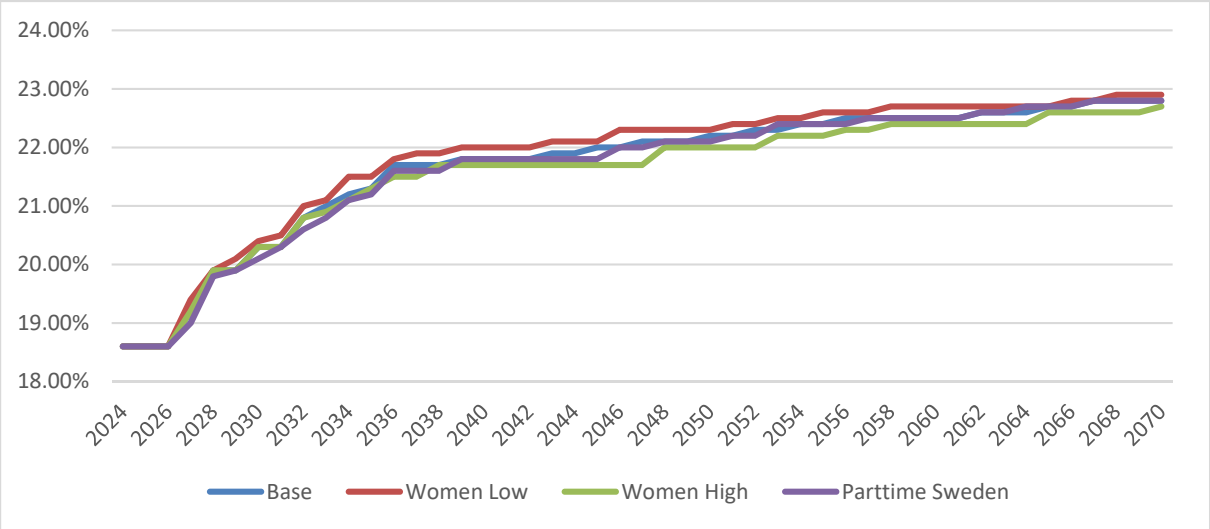
[11] In the case of continued stabilization of the pension level, the initial effect on the contribution rate would be twice as strong, since the factors SF and CF in equation (3) distribute positive and negative liquidity effects more or less equally between contributors (pension level) and beneficiaries (pension amount).

scenario.[12] However, while there is no relief for contributors, the already retired population and those close to retirement benefit from higher pension payments (approximately 5% after 2035).

This, however, does not apply to younger cohorts, as the average income, which determines the accrual of earnings points, is also linked to annual wage growth per employee (2). As a result, for a given contribution payment, the number of earnings points accrued decreases in the same proportion as the current pension value has increased—that is, by roughly 5%. Consequently, no long-term effect on the contribution rate emerges, as pension expenditures rise only for those individuals who are assumed to work full-time but would have worked part-time in the baseline scenario.

However, this conclusion rests on the assumption that the pension benefits paid to formerly part-time employees increase proportionally with their working hours. In the case of *Grundrente* eligibility, this assumption does not hold, since additional pension entitlements would not initially translate into higher pension payments but would first reduce the *Grundrente* supplement. Given the relatively small share of *Grundrente* costs in total pension expenditures, this effect is very small.

Figure 15: Public Pension Insurance Contribution Rate



Source: Own Calculation.

Net Standard Pension Level before Taxes

The net standard pension level before taxes declines after 2025 due to the sustainability factor and the contribution rate factor (see Figure 16). Under the baseline scenario, this decline amounts to approximately 5 percentage points. In the employment scenarios, the pension level is slightly higher if more women enter the labor market, and slightly lower if fewer women do so. This is because the financial burden on the system decreases in the former case and increases in the latter, to which the sustainability factor adjusts accordingly.

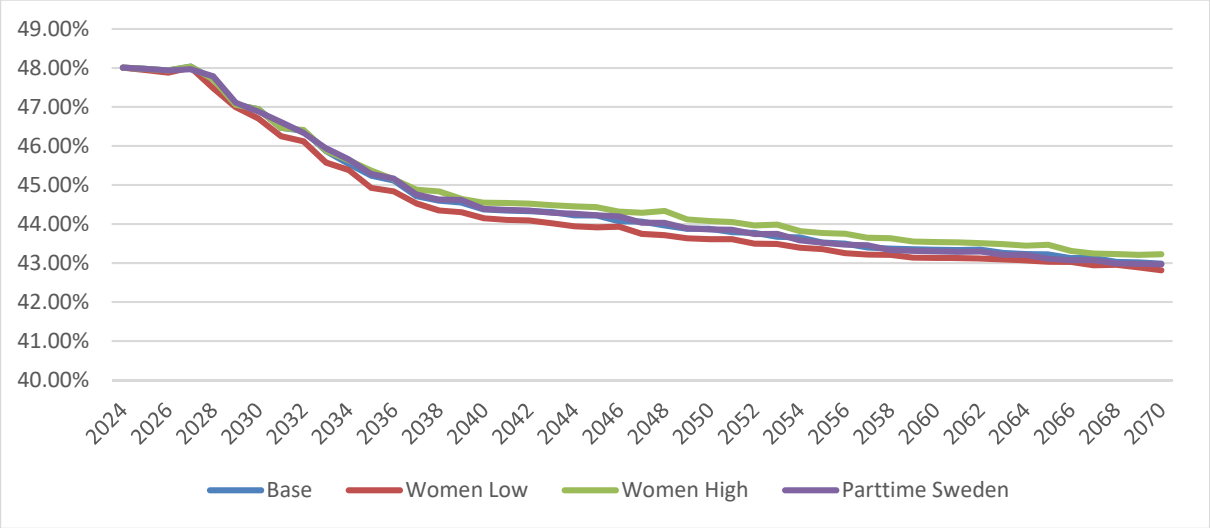
As with the contribution rate, there is no significant effect on the net standard pension level before taxes when working hours increase as a result of reduced part-time employment. The reason for this is that this indicator relates average annual pensions to average annual income, and—as explained—both rise more strongly when part-time workers increase their working time.[13] Individual replacement rates, however, may change. For example, already retired individuals will receive higher pension

[12] In the initial years, a marginally lower contribution rate can indeed be observed. This effect arises from the one-year lag in the adjustment of the pension value to wage growth.

[13] For this reason, the results remain unchanged even if, as planned, the pension level is maintained at its current level beyond 2025.

benefits, while their previous income obviously remains unchanged. However, as discuss this effect disappears for younger cohorts.

Figure 16: Net Standard Pension Level before Taxes



Source: Own Calculation.

Conclusion

This study quantified the potential fiscal effects of activating underutilized labor market potential of women and part-time workers on pay-as-you-go social insurance systems with special attention to pension systems where pension benefits are indexed to average annual wages per employee. The impact of increased female labor force participation proves to be relatively limited for many countries where, the gap between male and female participation rates has narrowed in the recent past. A further convergence of female participation rates to those of men therefore has only a modest effect on the number of full-time equivalent (FTE) employees and, consequently, on the overall wage bill and liquidity of the insurance systems. The fiscal effect is thereby even smaller than the effect on FTE due to the gender pay gap. For Germany, the combined financial impact on statutory health and long-term care insurance results in a total contribution rate that is at most 0.7 percentage points lower. For the statutory pension system, a temporary positive effect of up to 0.3 percentage points emerges. However, even this small effect disappears once the women who are newly employed enter retirement and draw pensions based on their additional entitlements.

In contrast, reducing part-time employment in countries, where part-time employment is high, has the potential to yield a more substantial fiscal effect, particularly for health and long-term care insurance. For Germany, the projected combined increase in contribution rates could be reduced by up to 1.2 percentage points. The statutory pension system, however, remains largely unaffected by this adjustment in countries where pension benefits are tightly linked to the average annual wage per employee. This surprising result comes about since higher labor income translates directly into increased pension adjustments, almost fully offsetting the short-term liquidity gains. Consequently, the contribution rate trajectory remains unchanged. Current and soon-to-be retirees benefit from the higher pension adjustments, while younger cohorts receive pensions comparable to those they would have obtained without changes in part-time employment. This occurs because the accrual of pension entitlements decreases in proportion to the increase in the current pension value. In the long run, pension expenditures therefore rise only for those individuals who were assumed to work part-time in the baseline scenario.

Overall, the absence of a fiscal effect from reducing part-time employment in the German pension system primarily results from the close linkage of both pension benefits and entitlements to

developments in average annual wages. Such a strong connection exists in many pension systems but there are important exceptions. In Austria, for instance, only pension entitlements and initial pension benefits are linked to annual wage growth, whereas ongoing pensions are adjusted in line with inflation. Consequently, under the Austrian system, pension expenditures would not increase more sharply in response to a decline in part-time employment—assuming that inflation remains unaffected by changes in part-time work. In the medium term, however, expenditures would still rise more quickly than under the baseline scenario, as new retirees continue to benefit from higher wage growth. In the long run, no lasting effect would remain, since the newly full-time-employed still accumulate additional pension rights. Hence, the contribution rate would revert to the baseline level, albeit with some delay.

In France's AGIRC-ARRCO pension system, the degree of wage indexation is even weaker, as both initial and ongoing pensions are adjusted in line with inflation rather than wage developments. Under such a regime, a reduction in part-time employment would therefore generate short- and medium-term fiscal improvements, as only those increasing their labor participation would receive higher pension benefits upon retirement. In the meantime, the fiscal burden on the pension system would be alleviated by the additional contribution payments of those now employed full-time.

Literature

Börsch-Supan, A. and N. Goll (2021): Ziele verfehlt: Eine Analyse der neuen Grundrente, ifo Schnelldienst, Vol. 74, Iss. 06, pp. 34-39.

Börsch-Supan, A., J. Rausch, and L. Salerno (2024): Pension Reforms and Inequality in Germany: Micro-Modelling, National Bureau of Economic Research (NBER) Working Paper 32796, https://doi.org/10.3386/w32796.

Börsch-Supan, A. and J. Rausch (2025): Estimating the size of the care gap in selected European countries: an employment balance, MEA Discussion Paper.

Bundesministerium für Arbeit und Soziales (BMAS) (2024): Bericht der Bundesregierung über die gesetzliche Rentenversicherung, insbesondere über die Entwicklung der Einnahmen und Ausgaben, der Nachhaltigkeitsrücklage sowie des jeweils erforderlichen Beitragssatzes in den künftigen 15 Kalenderjahren gemäß § 154 Abs. 1 und 3 des Sechsten Buches Sozialgesetzbuch - Gesetzliche Rentenversicherung - (SGB VI) (Rentenversicherungsbericht 2024), Bonn.

Bundesministerium für Wirtschaft und Energie (BMWE) (2025): Frühjahrsprojektion 2025, https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Downloads/G/gesamtwirtschaftliches-produktionspotenzial-fruehjahrsprojektion-2025.pdf?__blob=publicationFile&v=8.

Christopoulou, R.; J.F. Jimeno; A. Lamo (2010): Changes in the wage structure in EU countries, ECB Working Paper No. 1199/ May 2010).

Deutsche Rentenversicherung (2025): Statistikportal der Rentenversicherung, https://statistik-rente.de

Fries, J. F. (1980), Aging, Natural Death, and the Compression of Morbidity, The New England Journal of Medicine, 303(3), 130-135.

Gasche, M. and J. Rausch (2012): Auswirkungen einer Versicherungspflicht der Selbständigen in der Gesetzlichen Rentenversicherung, Mea Discussion Paper.

Gemeinschaftsdiagnose (2025), Geopolitischer Umbruchverschärft Krise – Strukturreformen noch dringlicher, Gemeinschaftsdiagnose #1-2025.

Granados, P.G.; R. Olthaus; K. Wrohlich (2019): Teilzeiterwerbstätigkeit: Überwiegend weiblich und im Durchschnitt schlechter bezahlt, DIW Wochenbericht 46/2019.

Holthausen, A.; J. Rausch and C.B. Wilke (2012): MEA-PENSIM 2.0: Weiterentwicklung eines Rentensimulationsmodells, Konzeption und ausgewählte Anwendungen, MEA Discussion Paper 03-2012.

Kiss, Á. and K. Van Herck (2019): Short-Term and Long-Term Determinants of Moderate Wage Growth in the EU, IZA Policy Paper, No. 144.

OECD (2025): OECD Employment Outlook 2025: Can we get through the demographic crunch? OECD Publishing. https://doi.org/10.1787/empl_outlook-2025-en.

Rausch, J. and M. Gasche (2016): Beitragsentwicklung in der Gesetzlichen Krankenversicherung und der Sozialen Pflegeversicherung – Projektionen und Determinanten, Zeitschrift für Wirtschaftspolitik, 65(3), pp. 195-238.

Rausch, J. (2017): Was wäre, wenn wir Schweden wären? Ist das schwedische Rentensystem auf Deutschland übertragbar?, Sozialer Fortschritt, vol. 66(2), pp. 97-122.

Rausch, J. (2023a): Einkommensheterogenität und Rentenprognosen: Weiterentwicklung eines Rentensimulationsmodells und ausgewählte Anwendungen, Perspektiven der Wirtschaftspolitik, vol. 24(3), pp. 332-360.

Rausch, J. (2023b): The Social Insurance Model, MEA-Discussion Paper 01-2023.

Research Data Centers of the Federal Statistical Office and Statistical Offices of the Federal States (RDC) (2019): RDC of the Federal Statistical Office and Statistical Offices of the Federal States, Microzensus 2019, DOI: https://doi.org/10.21242/12211.2019.00.00.3.1.0.

Rothgang, H. (2021): Stellungnahme anlässlich der öffentlichen Anhörung des Ausschuss für Gesundheit des Deutschen Bundestages am 7. Juni 2021, https://www.bundestag.de/resource/blob/845766/65d271c2c1e4fed19a8a351130eb847d/19_14_0347-20-_Prof-Dr-Heinz-Rothgang_AeA-GVWG-data.pdf.

Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung (2003): Staatsfinanzen konsolidieren – Steuersystem reformieren, Jahresgutachten.

Sozialpolitik-aktuell (2024): Entwicklung der Wochenarbeitszeit nach Geschlecht 1991 – 2024: https://www.sozialpolitik-aktuell.de/files/sozialpolitik-aktuell/_Politikfelder/Arbeitsbedingungen/Datensammlung/PDF-Dateien/abbV9.pdf.

Statistisches Bundesamt (StaBA) (2022): 15. koordinierte Bevölkerungsvorausberechnung - Annahmen und Ergebnisse (https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsvorausberechnung/begleitheft.html?nn=208696#lebenserwartung

Statistisches Bundesamt (StaBA) (2023): Average hourly wage of persons employed; https://www.destatis.de/EN/Themes/Labour/Labour-Market/Quality-Employment/Dimension2/2_5_HourlyEarnings.h?utm_source=chatgpt.com

Statistisches Bundesamt (StaBA) (2025): VGR des Bundes - Erwerbstätigkeit, Löhne und Gehälter, Arbeitsstunden: Deutschland, Jahre, Wirtschaftsbereiche; https://www-genesis.destatis.de/datenbank/online/statistic/81000/table/81000-0015/search/s/JTIydm9sa3N3aXJ0c2NoYWZ0bGljaGUlMjBnZXNhbXRyZWNobnVuZ2VuJTIwZGVzJTIwYnVuZGVzJTIy

Verbrugge, L. M. (1984), Longer Life but Worsening Health? Trends in Health and Mortality of Middle-Aged and Older Persons, Millbank Memorial Found Quarterly, 62, 475-519.

Werding, M.; K. Gründler; B. Läpple; R. Lehmann; M. Mosler and N. Potrafke (2020): Modellrechnungen für den Fünften Tragfähigkeitsbericht des BMF, ifo Forschungsberichte/111.

Wilke, C.B. (2004): Ein Simulationsmodell des Rentenversicherungssystems: Konzeption und ausgewählte Anwendungen von MEA-PENSIM, MEA-Discussionpaper 048-04.

WSI GenderDatenPrtal (2025a): Erwerbstätigenquoten und Erwerbsquoten 1991-2023, https://www.wsi.de/de/erwerbsarbeit-14617-erwerbstaetigenquoten-und-erwerbsquoten-14877.htm.

WSI GenderDatenPrtal (2025b): Wochenarbeitszeiten und Gender Time Gap 1991-2023, https://www.wsi.de/de/zeit-14621-wochenarbeitszeiten-und-erwerbstaetigenquoten-14764.htm