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Labour market trends and income inequality in Germany, 1983–2020

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Abstract
This study analyses the development of inequality in Germany from 1983 to 2020, focusing on labour market trends and income inequality. Using data from the German Socio-Economic Panel, we show that one of the most important trends in the German labour market in recent decades has been the increasing participation of women in the labour market. In addition, we confirm previous findings that inequality in earnings and household disposable income increased from the 1990s to 2005. Since then, inequality has not increased further despite changes in the composition of the labour force that tend to increase inequality, such as increased assortative matching and high net migration rates.

KEYWORDS
benefits, childcare, education, gender, immigration, income, labour force

JEL CLASSIFICATION
D31, J13, J16, J21, J31, J61

1 | INTRODUCTION

Germany has undergone major demographic and economic changes in recent decades, which have affected various aspects of society, including wage and income inequality. Thorough labour market studies have examined the effects of German reunification (e.g. Biewen, 2000; Fuchs-Schündeln, Krueger and Sommer, 2010), changes in the wage-setting process (e.g. Dustmann et al., 2014; Bossler and Schank, 2023) and firm heterogeneity (e.g. Card, Heining and Kline, 2013) on wage

and earnings inequality in Germany. Some studies of inequality trends in Germany also examine income, wealth or consumption at the household level (e.g., Fuchs-Schündeln et al., 2010; Peichl, Hufe and Marc, 2018; Drechsel-Grau et al., 2022). However, a comprehensive and up-to-date account of the factors underlying income inequality at the household level in Germany is still lacking. In this paper, we fill this gap by looking at the years 1983–2020. This period covers the last years before reunification for West Germany and the 30 years thereafter for both West and East Germany. Based on work undertaken as part of the IFS Deaton Review Country Studies initiative (Blömer et al., 2023),[1] we present a comprehensive overview of the main trends in inequality for working-age individuals over the past decades, taking into account demographics, labour market trends and changes in the tax and benefit system.

One of the fundamental factors transforming the German economy and society in recent decades was reunification in 1990. Not only was it an enormous disruption for the East German economy, but it also marked a major change in West Germany. With the end of the Cold War, Germany faced the challenge of financing reunification while adapting to increasing competition from Eastern European labour markets (Dustmann et al., 2014). Reunification was followed by lower economic growth (Statistisches Bundesamt, 2023a) and a decade of stagnation in median real wages. However, this stagnation at the median masks significant changes in the tails of the earnings and household income distribution over time. In both East and West Germany, individual gross earnings inequality increased until 2010 (Fuchs-Schündeln et al., 2010). We find that this development is partly reflected in an increase in gross household inequality from 1993 onwards. In contrast, we find that household disposable income inequality did not start to increase until the late 1990s and early 2000s. Since then, household income inequality has remained relatively stable (Figure 1).

Focusing on the tails of the distribution in Figure 1, we see that there has been little movement between the 50th and 90th percentiles (bottom left) over the whole observation period, but that there was a significant increase in the 50:10 percentile ratio between the early 1990s and the Great Recession for gross household income (bottom right). This increase mirrors the rise in the Gini coefficient and takes into account changes in both employment and non-labour income over time. The increase in the 50:10 percentile ratio for gross household income in working households is also noticeable, but less pronounced, and the ratio for disposable income has barely increased over the same period. Finally, the share of income going to the top 10 per cent of the respective distribution also increased by 5–10 percentage points between the 1980s and the Great Recession for gross income, earnings and disposable income, and has remained stable since.

Starting from these time trends in income inequality, we analyse how different factors affect the development of inequality at the household level. First, we look at trends in the labour market and consider the evolution of hourly earnings. In this context, we discuss the literature on possible drivers such as skill-biased technological change, firm heterogeneity and de-unionisation and their impact on the wage-setting process (e.g., Dustmann, Ludsteck and Schönberg, 2009; Card et al., 2013; Dustmann et al., 2014).

We also reflect on the transformation of Germany's economic institutional system, which has changed significantly over these years. A minimum wage was introduced in 2015, and the Hartz reforms of the early 2000s made significant changes to welfare and unemployment benefits, changing the patterns of labour supply in the lower half of the income distribution. While the impact of the Hartz reforms on inequality appears to be limited (Biewen and Juhasz, 2012; Immel, 2021), the introduction of the minimum wage reduced earnings inequality in Germany (Bossler and Schank, 2023).

Finally, we examine how the increasing participation of women in the labour market has changed the composition of the labour force and affected income inequality. In this context, we look not only at the employment status of women, but also at the gender gap in working hours and hourly wages

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[1] The IFS Deaton Review Country Studies initiative is a collaborative effort involving 17 countries from Europe and North America to harmonise data and measurement methods in order to gain a comprehensive understanding of the drivers of economic inequality in high-income countries.
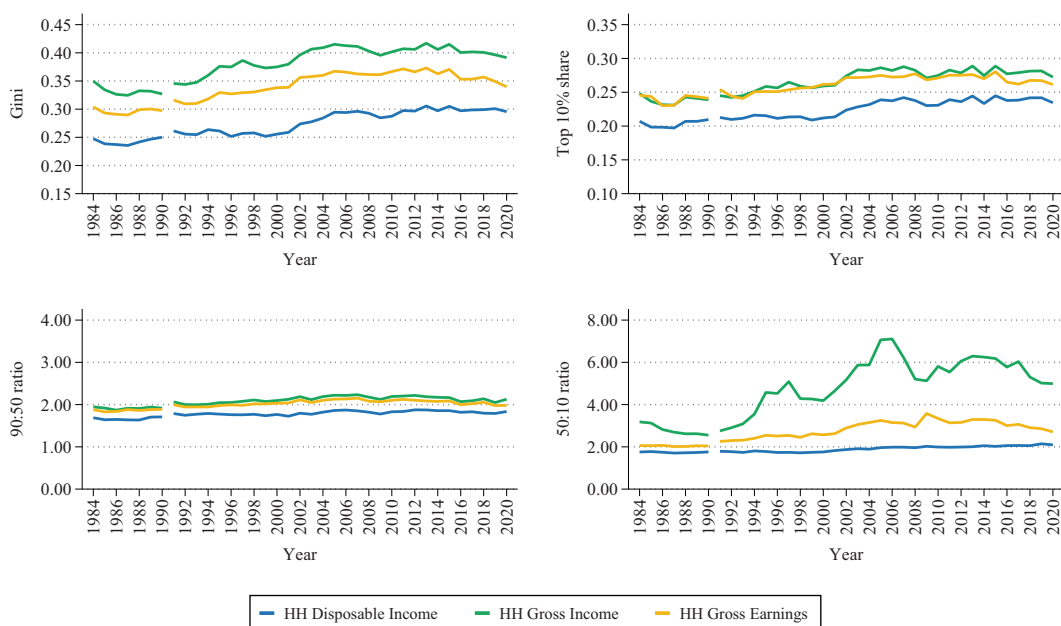
FIGURE 1 Inequality measures of disposable household income and gross household earnings/income. *Note*: This figure shows (from top left to bottom right) the Gini coefficient, the top 10 per cent income share, the 90:50 percentile ratio, as well as the 50:10 percentile ratio of disposable household income, gross household earnings and gross household income in a sample of individuals aged 25–60. The inequality measures for gross household labour earnings are calculated for households in which at least one household member is in work. Individuals are considered in work if they worked at least 52 hours in the year preceding the survey and received earnings either from labour income or from self-employment. The inequality measures in household disposable income and household gross income are calculated for all households. Until 1990: West Germany only. *Source*: Authors' calculations using data from the Socio-Economic Panel (SOEP): data for years 1984–2021, SOEP Core v38.1, EU Edition – Update, https://doi.org/10.5684/soep.core.v38eu. 'IAB-SOEP Migration Samples (M1, M2), data of the years 2013–2021,' https://doi.org/10.5684/soep.iab-soep-mig.2021.1. 'IAB-BAMF-SOEP Survey of Refugees (M3-M5), data of the years 2016–2021,' https://doi.org/10.5684/soep.iab-bamf-soep-mig.2021.1. [Colour figure can be viewed at wileyonlinelibrary.com]

over time, as well as at the differences between mothers and non-mothers in terms of employment and earnings.

With regard to inequality at the household level, changes in household composition are another factor to consider. In the 1980s, single-earner households were still common. We examine changes in partnership and cohabitation patterns and their distributional effects and find evidence of increasing assortative matching in Germany over time. Finally, we analyse the redistributive character of the German tax and transfer system over time as another element in our analysis of household disposable income.

2 | INSTITUTIONAL BACKGROUND

Germany has a complex tax and benefit system and many institutions such as a social security system, extensive employment protection legislation, short-time work and trade unions. Schools and public university education are largely free of charge.

The bulk of public revenue comes from taxes on personal and corporate income and profits, social insurance contributions and the value added tax (VAT). Taxes on wealth play a minor role in total government revenue. Personal income tax is progressive, with marginal tax rates ranging from

14 per cent to 48 per cent and a basic tax-free allowance, as well as various other allowances such as child allowances. Married couples can be taxed jointly, with full income splitting applied to their joint income. There is a universal child benefit up to the age of 18, or 25 if in education, which is offset against the child allowance in the income tax system. The last significant change in income tax rates took place between 2000 and 2005, with deeper income tax cuts for higher incomes.

Consumption taxes include a VAT with a standard rate of 19 per cent and a reduced rate of 7 per cent on certain goods such as food and some services, as well as excise duties. Social security contributions make up a large part of the personal burden. They lead to individual entitlements, but also have a redistributive effect. The branches of the social security insurance include pension, health, unemployment, social care and accident insurance. De-jure contributions are approximately 40 per cent of the gross wage and are paid equally by employers and employees, with contribution ceilings. Marginal employments ('Minijobs') below 538 euros per month are tax-free, and social security contributions are gradually phased in above this threshold.

Public expenditure consists mainly of spending of the social security system and education. The benefits paid by the various branches of social insurance include statutory pensions, unemployment insurance benefits (60–67 per cent of previous earnings) for up to one year, and long-term sickness benefits. Additionally, long-term social assistance transfers play an important role in the German welfare state. Citizen's benefit (*Bürgergeld*), being the most relevant, is intended to secure a minimum standard of living. This benefit has in principle been in place since 2005 as part of the Hartz reforms, which included changes to unemployment benefits, employment services and labour market regulations. It is means-tested with respect to income and wealth, and determined on the level of the household. There is also an alternative means-tested benefit system for (working) low-income households, consisting of a housing benefit and a supplementary child benefit. The take-up of these two benefits is low and the interactions with the tax and benefit systems are quite complex, leading to high effective marginal tax rates. The two benefit systems are mutually exclusive.

In 2015, a national minimum hourly wage of initially 8.50 euros was introduced (12.41 euros in 2024). The level of the minimum wage is to be set by an independent commission consisting of representatives of unions and employers' associations.

3 | DATA

Our analysis is based on data from the German Socio-Economic Panel (SOEP), a nationally representative household panel survey of the German population established in 1984, sampling around 15,000 German households or 25,000 individuals each year (Goebel et al., 2019).[2] Compared with other available micro data in Germany, it covers not only income and employment but also education, household composition and parental background. This allows for the examination of various types of inequalities within the same dataset to obtain a consistent set of results. The sample for our analysis is restricted to individuals aged between 25 and 60, except when stated otherwise, for all available survey years from 1984 to 2021. Until 1990, the sample only includes West German individuals, while East German individuals are included from 1991 onwards. When analysing wages and earnings, the sample is further restricted to individuals reporting strictly positive wages or earnings. Wages are defined as gross hourly labour income from dependent work, excluding income from self-employment. Earnings comprise, in addition, income from self-employment and all other labour-related income. Gross household income, in addition to labour earnings from all individuals in the household, includes income from asset flows (interest, dividends and rent) as well as private retirement income and private transfers. We define disposable household income as gross household

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[2] See SOEP data for years 1984–2021, SOEP Core v38.1, EU Edition – Update, https://doi.org/10.5684/soep.core.v38eu. 'IAB-SOEP Migration Samples (M1, M2), data of the years 2013–2021,' https://doi.org/10.5684/soep.iab-soep-mig.2021.1. 'IAB-BAMF-SOEP Survey of Refugees (M3-M5), data of the years 2016–2021,' https://doi.org/10.5684/soep.iab-bamf-soep-mig.2021.1.
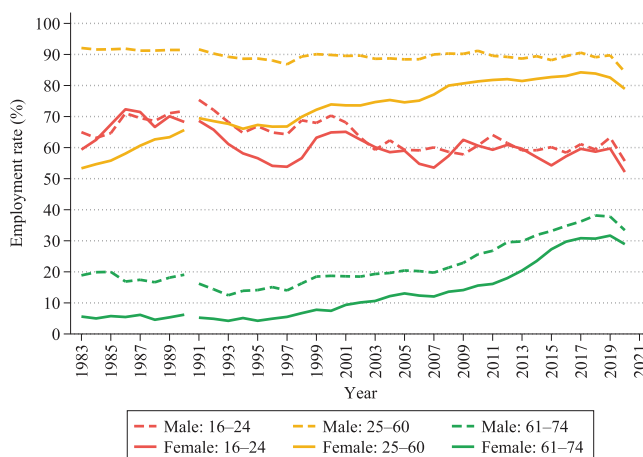
FIGURE 2 Employment rates by age and gender. *Note*: This figure shows employment rates by age and gender in a sample of all individuals aged 16–74. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

income plus public transfers minus income taxes and social security contributions. Public transfers can comprise student grants, maternity benefits, unemployment benefits, unemployment assistance, subsistence allowance and transition pay, housing allowances, child benefits, nursing care insurance, direct housing subsidy, subsistence assistance, support for special circumstances, social assistance for the elderly, unemployment benefit II and sickness benefit. To account for household size, household incomes are adjusted according to the modified OECD equivalence scale. Moreover, nominal earnings and income variables are converted into real terms based on calendar year 2020 using the consumer price index of Germany (Statistisches Bundesamt, 2024).

4 | CHANGES IN THE LABOUR MARKET

We start the presentation of the results by first characterising the most important trends in the labour market, before analysing which factors influence how inequality in earnings translates into inequality in disposable household incomes.

4.1 | Increased labour force participation among women and the elderly

The German labour market has experienced a significant trend in the past decades regarding the increasing participation of women. Since 1983, Germany has seen a steady and sustained rise in the employment rate for prime-working-age women (aged 25–60), increasing the employment in this age group from little more than 50 per cent in the early 1980s to more than 80 per cent today (Figure 2). In contrast, for prime-working-age men, the employment rate has been very stable at around 90 per cent throughout the whole period. As a result, the gender employment gap has narrowed from almost 40 to around 7 percentage points. Younger cohorts no longer show a strong difference in male and female employment rates, indicating that the gender employment gap will likely continue to narrow as soon as these cohorts fully enter working age.

An analysis of employment rates over the life cycle shows that the increased labour force participation of women is driven by all age groups beyond their early 20s. In the 1980s (in West Germany) the employment rate of 30-year-old women was 60 per cent, while in 2019 the share (in West and East Germany) was over 80 per cent. This increase can be attributed to the fact that it has

become less common for mothers to drop out of the labour market entirely after their first childbirth in Germany. Instead, these women are returning to at least part-time work after some time. Hence, the attachment to the labour market has increased substantially even beyond child-bearing age, with employment rates rising from 50 per cent in 1983 to 85 per cent in 2019 for women around the age of 50.

Overall, the major trend of increased female labour market participation has led to a steady increase in employment in the total population. In addition, labour force participation among older workers increased significantly in the last decade (see Figure 2). Among older men and women (age group 61–74), the employment rate rose from about 10 per cent in 2010 to about 35 per cent in 2019. This development reflects the gradual increase in both the statutory and the effective retirement age, as well as enhanced possibilities and incentives for part-time employment during pension age.[3]

4.2 | Low growth and increasing dispersion in hourly wages and earnings

The average number of hours worked by employees has remained very stable over the last decades. Men work almost always full-time, with the average decreasing from 42 to 40 hours per week. In contrast, women worked on average 32 hours per week in 2020, which has only marginally increased over the past two decades. Consequently, the gender gap in working hours is closing very slowly. The increased labour supply of women happened predominantly at the extensive margin rather than the intensive margin.

Following hours, we now look at the development of real hourly wages of employees for different parts of the distribution, as depicted in Figure 3. One can see a large heterogeneity in annualised growth rates along the distribution of hourly wages and for different time periods (see also Drechsel-Grau et al., 2022). The period between 1983 and 1990 was one of high and relatively inclusive wage growth, with wages growing by nearly 2 per cent a year for men and 3 per cent for women in West Germany across most of the distribution. The same picture emerges for this period with regard to real gross individual earnings. It is only for women at the bottom of the earnings distribution that we do not observe earnings growth, reflecting the decline in their hours worked.

Overall, growth rates for the entire wage distribution were significantly lower from 1991 to 2007. Even more so in West Germany, while there was at least some convergence in East Germany towards the higher wage level in West Germany (see Figure A.1 in the online Appendix). Overall, median real hourly wages did not grow at all during this time interval. Inequality in individual earnings increased notably during this period, reflecting especially a decline in the mean hours worked by female individuals in the lower part of the wage distribution, as well as real wage gains only at the top of the wage distribution. While real earnings remained constant or increased slightly at the top of the earnings distribution, all other groups experienced real earnings losses, which increased in size, moving further down the distribution (e.g. Drechsel-Grau et al., 2022).

Between 2007 and 2019, the pattern changed again to mostly inclusive growth, with real wage growth of 1 per cent for men and 2 per cent for women each year and, on average, higher growth rates for both men and women at the bottom of the distribution. Individuals in Germany were able to achieve larger increases in individual earnings. In addition to the stronger gains in hourly wages among women, the earnings of women at the bottom of the income distribution rose even faster, at annual rates of around 4–5 per cent, which is related to the significant increase in women's hours worked in the lower tail of the income distribution. While Drechsel-Grau et al. (2022) also find strong growth rates at the bottom of the earnings distribution for women in their analysis for the years

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[3] In 2014, a reform was implemented to simplify employment relationships beyond the statutory retirement age. With the introduction of the *Flexirentengesetz* 2016/2017, adjustments were made to the additional earnings rule and increased pension supplements for employment beyond the statutory retirement age.
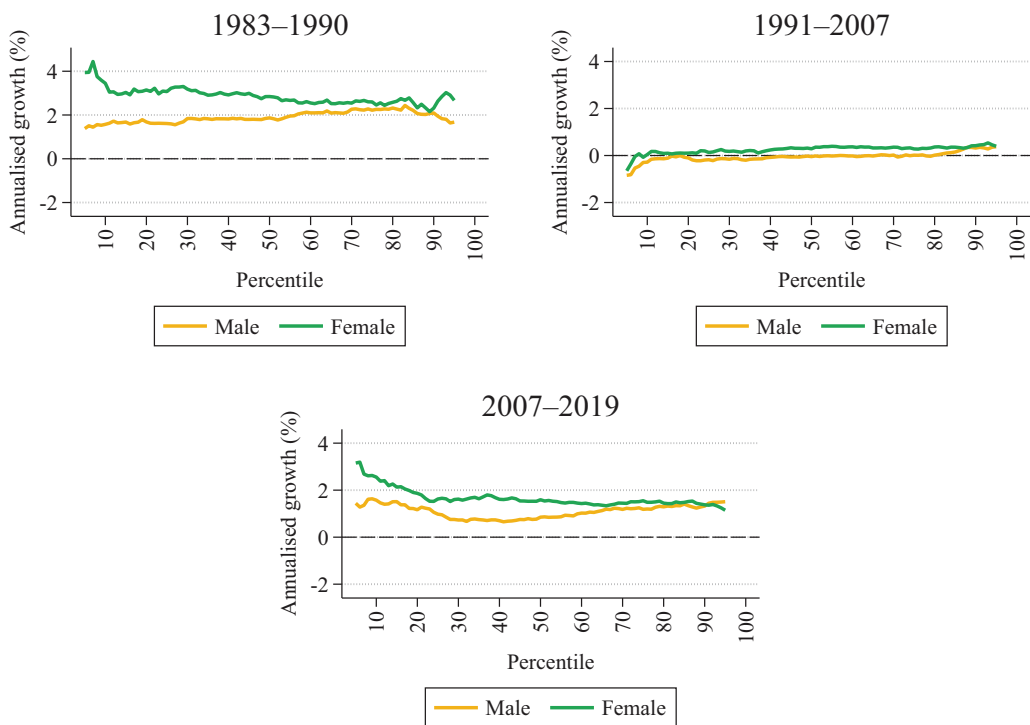
FIGURE 3 Annualised growth in hourly wages by wage percentile. *Note*: This figure shows annualised growth in hourly wages by wage percentile (overall and by gender) in a sample of employees aged 25–60 for selected time periods. The sample does not include individuals with earnings from self-employment. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

2001–16 based on two administrative datasets, they discover an even stronger increase in earnings at the very top. Female earners above the 95th percentile, who we excluded due to sample size in our analysis, show the strongest growth rates in real earnings.

In particular, the years 1993–2010 were characterised by an increasing dispersion in earnings and wages, as shown in Figure 4. Other studies link the dispersion in wages[4] at the top of the distribution to skill-based technological change and the increase at the bottom of the distribution to de-unionisation and the relative flexibility in the wage-setting process in Germany (Dustmann et al., 2009, 2014). Card et al. (2013) point to an increasing importance of firm-specific wage premia and assortative matching between workers and firms. Biewen and Juhasz (2012) provide a quantification of different factors that contributed to the increase in household inequality between 1999 and 2006 and identify a dispersion in labour market returns as the most relevant factor.

Only in the last decade has the Gini coefficient for both hourly wages and individual earnings fallen again.[5] The recent decline in the Gini coefficient can be partially attributed to a reduction in the inequality of hours and wages among women. Moreover, other studies confirm above-average growth rates in general at the lower end of the earnings distribution of employees in the last years (Felbermayr, Battisti and Lehwald, 2016). This was linked to the introduction of a nationwide minimum wage in 2015 of 8.50 euros per hour (Brüll and Gathmann, 2020; Grabka, 2021; Peichl and Popp, 2022; Bossler

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[4] These studies mostly look at daily gross wages for full-time working employees (see Dustmann et al., 2009, 2014; Card et al., 2013) when hours are not available.

[5] Other studies also find a turnaround in earnings inequality trends in more recent years (Möller, 2016; Drechsel-Grau et al., 2022).
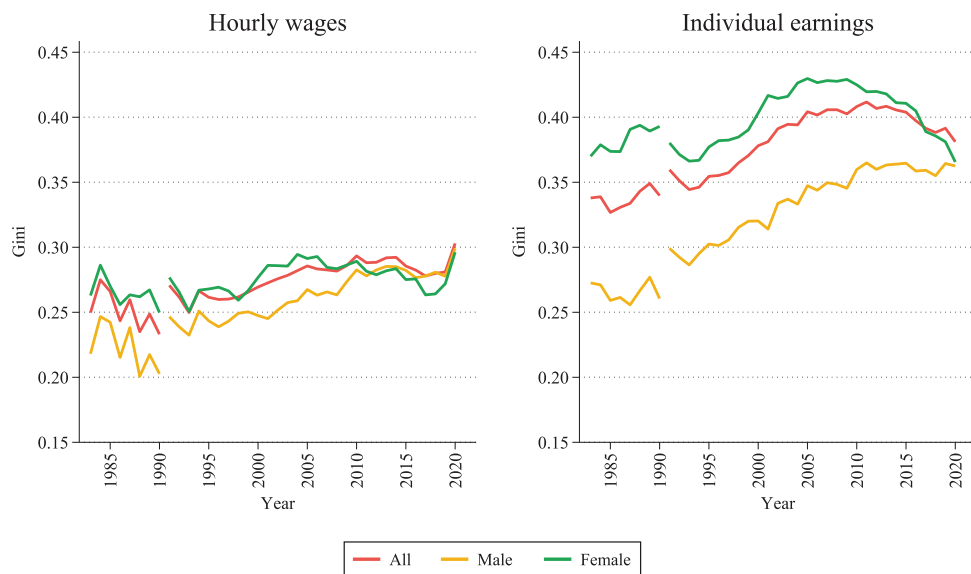
FIGURE 4   Gini coefficient of real gross hourly wages and individual earnings. *Note*: This figure shows the Gini coefficient (overall and by gender) of real gross hourly wages in a sample of employees aged 25–60 and for individual earnings in a sample of individuals in work aged 25–60. The sample of employees does not include individuals with earnings from self-employment. We exclude the bottom and top 1 per cent of the gender-specific distribution of hourly wages from the analysis. Individuals are considered in work if they worked at least 52 hours in the year preceding the survey and received earnings either from labour income or self-employment. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

and Schank, 2023) and the positive wage agreements of the trade unions in recent years (Felbermayr et al., 2016). Although somewhat muted, the wage increases of the minimum wage introduction also led to increases in household incomes (Pusch, 2024).

4.3 │ Compositional changes in labour force participation and labour market reforms

In the years around the turn of the millennium, Germany was often referred to as the 'sick man of Europe'.[6] By 2005, the overall unemployment rate had risen to nearly 12 per cent, equivalent to almost five million people. This motivated the most important transformation of the German welfare state in the recent decades, known as the Hartz reforms, which took place in the early 2000s. The aim of the Hartz reforms was to enhance the efficiency and flexibility of the labour market, reduce unemployment, and improve the responsiveness of the welfare system to individual needs. The reforms included changes to unemployment benefits, in particular reducing generosity, changes in job placement services and changes in labour market regulations. The legislation aimed to create a more dynamic and competitive labour market while also providing greater support and opportunities for jobseekers.

By causality or correlation, unemployment numbers decreased substantially in post-reform years and stood at 7.4 per cent in 2008 and only 5.2 per cent in 2019 (Bundesagentur für Arbeit, 2023). Hartung, Jung and Kuhn (2018) argue that the reforms have causally increased employment, mainly

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[6] This term, popularised by *The Economist*, was used to describe Germany's poor economic state at the time.

FIGURE 5   Gini coefficient of gross individual earnings. *Note*: This figure shows the Gini coefficient of gross individual earnings in a sample of individuals aged 25–60. Employed individuals are either employees or self-employed. The line for employed and not employed individuals shows the Gini coefficient, where the hourly wage of not employed individuals is set to zero. Wages are in 2019–20 prices. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

by a dramatic reduction in separation rates. Carrillo-Tudela, Launov and Robin (2021) show that the reforms contributed to an increase in labour force participation, mostly among female workers who formerly did not participate in the labour market. However, they also state that the reduction in unemployment is also due to a greater number of long-term unemployed individuals no longer registering as jobseekers. The relevance of investigating various labour market states to capture the full employment effects of the Hartz reforms is also highlighted by Rothe and Wälde (2017). In addition to the Hartz reforms, other factors are likely to have contributed to the decline in the unemployment rate. Cassel and Thomas (2017), for example, link the positive labour market development to Germany's increased competitiveness due to moderate wage increases in the 1990s.

Concurrently with other policy changes such as the creation of the 'Midijob', a phase-in zone for social security contributions, and the reform of marginal employment, many previously unemployed workers entered the labour market. It is important to note here that employment increased disproportionately for low-skilled workers (Felbermayr et al., 2016), typically in the lower half of the income distribution. As a result, the large reduction in unemployment changed the composition of the workforce substantially, contributing to the increase in the Gini coefficient among employees in the years after the implementation of the Hartz reforms. However, calculating the Gini coefficient not only for the group of employed people but also for the entire working-age population yields a different picture. We follow Felbermayr et al. (2016) and compute the Gini coefficient of real gross individual earnings by assigning a value of zero to the income variable of individuals without any labour income. The result is depicted in Figure 5. The Gini coefficient for the sample of employed individuals and those without employment declines from 2005 to 2011. Due to the reduction in the unemployment rate, the share of individuals with zero income becomes smaller. Hence, earnings inequality in the working-age population decreases.

FIGURE 6 Differences in employment and part-time share across mothers and non-mothers, different cohorts.
Note: This figure shows the differences in the employment and part-time rates of mothers and non-mothers of different ages over different cohorts. The sample contains individuals aged 28–32, 38–42 and 48–52 of the cohorts 1940–45, 1950–55, 1960–65, 1970–75 and 1980–85, their employment status, parenthood status and gender. Employment is defined as working at least an average of one hour per week over the last year. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

4.4 | Gender gap and impact of childbirth

Another important compositional effect of inequality dynamics in Germany concerns the increasing labour force participation of women. Felbermayr et al. (2016) argue that a higher share of female employees in the labour force mechanically increases inequality, as women receive lower wages than men on average, and inequality is greater within the group of women than within men. With respect to the wage differential between men and women, we find that the gender gap in median hourly wages has narrowed slightly over the last decades. After reunification, hourly wages for men with tertiary education but even more so for women with tertiary education rose markedly compared with less-educated population groups (Blömer et al., 2023).

An analysis of hourly wages over the life cycle for different time periods shows that the wage differential between men and women at age 25 is almost non-existent in more recent years and declined substantially in the last decades.[7] However, over the life cycle, the gender wage gap gradually starts to open between age 25 and 35, which is associated in the literature with the arrival of the first child – also known as the child penalty (Bertrand, Goldin and Katz, 2010; Correll, Benard and Paik, 2007; Goldin, 2014; Kleven et al., 2019; Schrenker and Zucco, 2020).

After starting a family, women, more often than men, work fewer hours (in part-time jobs or marginal employment) or no longer work at all. This becomes apparent in the differences in employment rates between mothers and non-mothers (Figure 6) or between mothers and fathers. Younger mothers around the age of 30, even of the youngest cohorts, are more than 20 percentage points less likely to be employed and are four times more likely to work part-time than women

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[7] Other empirical studies find similar results (see Drechsel-Grau et al., 2022; Ilieva and Wrohlich, 2022; Oberfichtner, 2022; Statistisches Bundesamt, 2023b).
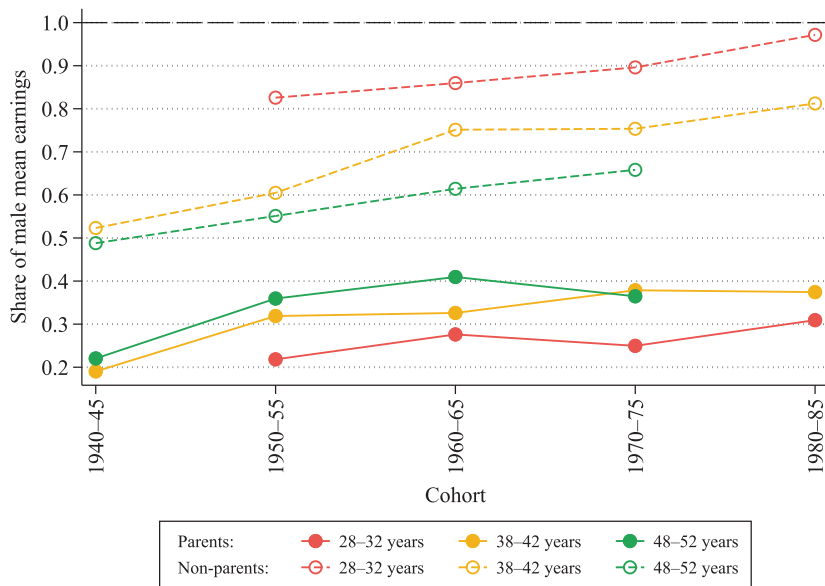
FIGURE 7 Gender earnings gap for parents and non-parents, different cohorts. *Note*: This figure shows female mean earnings as a share of male mean earnings, separately for parents and childless individuals. A value of less than 1 on the *y*-axis implies a gender gap in earnings, with lower mean earnings for mothers compared with fathers and lower mean earnings for non-mothers compared with non-fathers, respectively. The sample contains individuals aged 28–32, 38–42 and 48–52 of the cohorts 1940–45, 1950–55, 1960–65, 1970–75 and 1980–85, their labour earnings, parenthood status and gender. Parents are defined as living with a biological child below the age of 20. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

without children. It is not until the age of 50 that the gap in the employment rate between mothers and non-mothers closes. But mothers around the age of 50 are still more likely to work part-time than non-mothers. Fathers are not negatively affected by parenthood. Instead, they are slightly more likely to be employed and earn slightly more than non-fathers.

The decrease in labour supply from mothers is associated with sharply increasing differences between men and women in earnings over the working life – even among younger cohorts (Oberfichtner, 2022). Figure 7 illustrates this disparity and shows large gender gaps in individual labour earnings for parents. Mothers' labour earnings around the age of 30 are, on average, 70–80 per cent lower than fathers' in the same age group. For childless individuals, the gender earnings gap is less pronounced and has decreased over the last decades. In particular, for childless women around the age of 30, it has decreased to less than 5 per cent for the most recent birth cohort (1980s). However, while the employment rates of women with and without children converge around the age of 50, the labour earnings of mothers remain lower than those of non-mothers. Further, significant gender gaps remain, regardless of parenthood.

Compared with other European countries, the employment rate of working-age women in Germany is relatively high and, at 80 per cent, well above the European Union (EU) average (Eurostat, 2024). The gender employment gap is also less pronounced in Germany than in many other European countries. However, due to the high share of part-time working mothers, the earnings gap between fathers and mothers has been relatively large in Germany despite the low employment gap when compared with other developed countries (Kleven et al., 2019).

5 | CHANGES IN DEMOGRAPHICS

Having documented trends in earnings, two factors affect the way in which inequality in individual earnings translates into inequality in household incomes: demographic characteristics and the tax and benefit system. For demographic changes, we look in particular at assortative matching and migration.

5.1 | Increase of assortative matching

Compared with 1984, the share of individuals who are married or living with a partner is lower today for individuals with low levels of formal education (ISCED 0–2) than it is for the rest of the population. Conditional on individual earnings, this tends to lower disposable household incomes in the group compared with individuals who have acquired more formal education, and constitutes a first indication for increased assortative matching. Interestingly, this development is entirely driven by men, whereas for women marriage rates are actually slightly lower among the highly educated (Figure 8).

As shown in Chiappori, Iyigun and Weiss (2009), an important potential driver of such differences can be gender-specific trends in education. As in many developed economies, the educational level of women in Germany has increased more than for men. For highly educated women looking for an equally educated partner, there are simply not enough highly educated men available. Rather than partnering with lower-educated men (tending to decrease assortative matching), these women often stay single. Similarly, there are increasingly more low-educated men than women on the marriage market, leading to falling marriage rates among low-educated men. De Hauw, Grow and Van Bavel (2017) exploit these mechanisms more formally, using data from the European Social Survey.

Figure 9 confirms that assortative matching has become even more common in Germany over the past three decades (see also Pestel, 2017). It shows that for couples in which both partners work, the correlation between the gross earnings percentile of an individual with the partner's position in the gross earnings distribution changed over the years (top row). When we account for changes in participation rates over time by using the partner's potential earnings instead of actual earnings, we
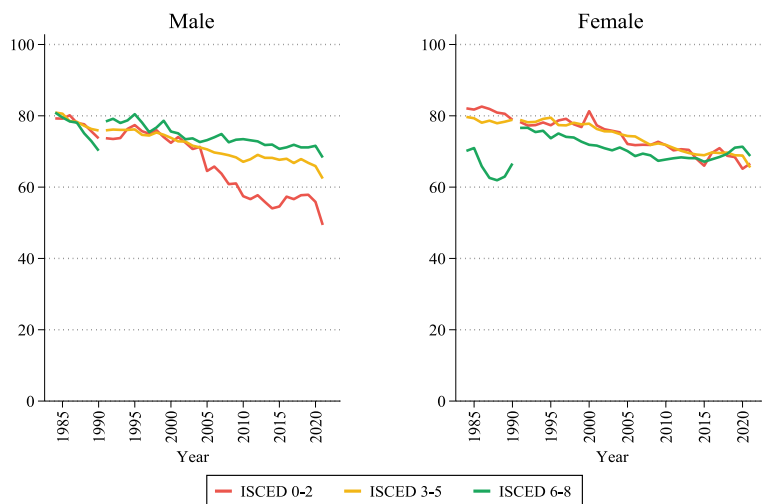

FIGURE 8 Share married/cohabiting, by education and gender. *Note*: This figure shows the share of married or cohabiting individuals by education level and gender in a sample of individuals aged 25–60 who have completed full-time education. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]
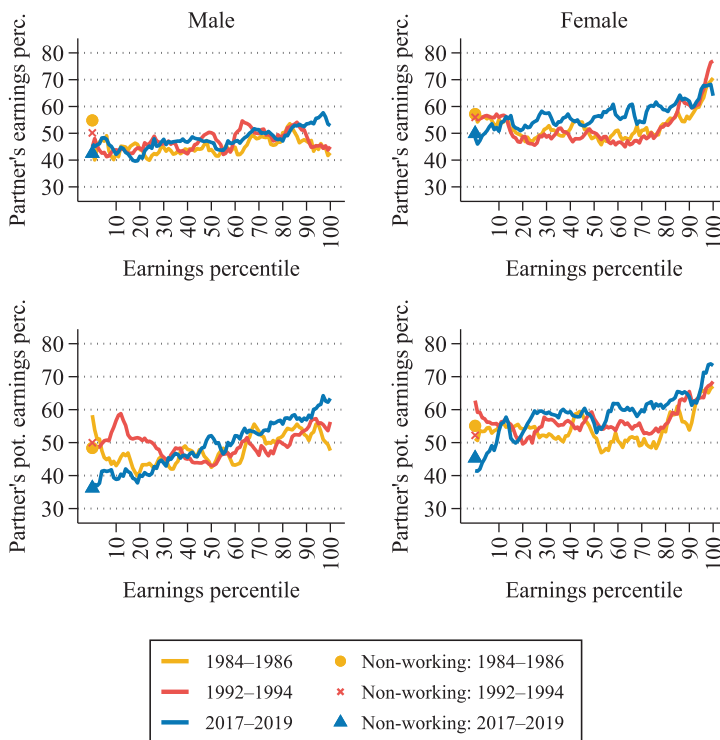
FIGURE 9 Mean (potential) gross earnings percentile of partner/spouse by individual's gross earnings percentile. *Note*: This figure shows the mean gross earnings percentiles (upper row) or the potential (pot.) earnings percentile (lower row) of the partner or spouse by an individual's gross earnings percentile in a sample of individuals aged 25–60. Married/cohabiting also includes civil partnerships. Mean (pot.) earnings of partners are plotted as five-point moving averages across the earnings distribution. Potential earnings are obtained from Mincer wage regression of experience, experience squared and education on log wages separately for men and women. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

similarly observe increased assortative matching (bottom row). For women, the U-shaped pattern of the 1980s and 1990s has changed to a more linear relationship. In addition, non-working women are now, on average, cohabiting with partners with below-average income. For men, the correlation became stronger, pushing up inequality in household earnings. The rise in assortative matching means that the catch-up of women with men over the last four decades largely reduced earnings inequality within, rather than across, households.

5.2 | Effect of immigration on the composition of the income distribution

When studying changes in inequality over longer periods of time, it is important to keep in mind that the underlying population of interest may also change, mechanically affecting the shape of the income distribution (see, e.g., Krolage, Peichl and Waldenström, 2022). In the period 1983–2020, two major developments have contributed to a substantial change in the composition of the German society. The first is obviously the German reunification in 1990/91, which increased the population in the Federal Republic of Germany in West Germany by 16 million East German inhabitants. As explained before, this added comparatively more mass at the bottom of the income distribution, as wages in the East were (and still are to some extent) considerably lower than in the West. The impact of the reunification on
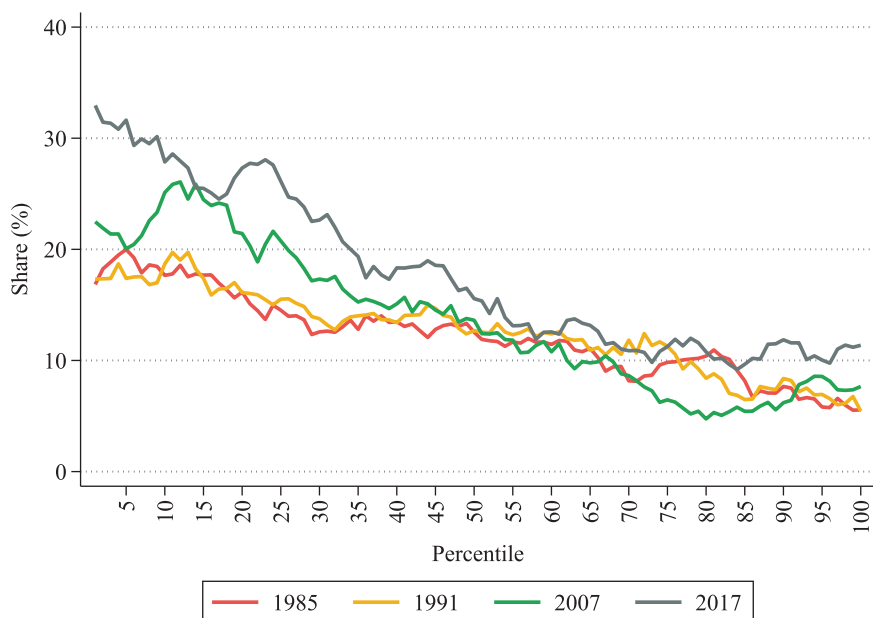
FIGURE 10   Share of immigrants in the population, across the disposable income distribution. *Note*: This figure shows the share of immigrants in the population across the disposable income distribution. Sample is individuals aged 25–60. Incomes are in 2019–20 prices. Disposable household incomes have been equalised using the modified OECD equivalence scale. Five-year averages have been calculated and smoothing across five percentile points has been applied. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

the income distribution is relatively well understood today (e.g. Biewen, 2000; Fuchs-Schündeln et al., 2010; Kohn and Antonczyk, 2013).

The second major change in the composition of the population is immigration, which increased significantly in the early 1990s after the fall of the Iron Curtain. In the following decades, there were several further immigration waves. The Yugoslav wars led to a large influx of asylum seekers in the mid-1990s. The expansion of the freedom of movement in the EU in 2011 allowed more East Europeans to work and live in Germany.[8] More recently, Germany received many refugees from Syria and the Middle East during the migration movements of 2015. Most recently, Russia's invasion of Ukraine has triggered large migration movements to Germany. According to the latest projections, this trend will continue, with 2022 marking the highest net migration balance ever recorded.

Given that a large share of immigrants came to Germany from conflict regions, it is perhaps not surprising that immigrants are at least initially more likely to be located in the bottom half of the income distribution, as shown in Figure 10.[9] In 2017, the share of immigrants at the bottom of the income distribution was 30 per cent, compared to 10 per cent at the top. This gap of now 20 percentage points was substantially smaller in the 1980s and 1990s. Via this mechanical channel, immigration has been – at least in the short term – a factor pushing towards higher earnings inequality in Germany. Figure A.2 in the online Appendix shows that within the population of individuals with a migration background, the Gini coefficient for household income inequality in the 1980s was lower than in the overall population but has risen to levels exceeding those for the entire German population by 2020.

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[8] Dustmann et al. (2014) argue that the increased trade integration with and competition from Eastern Europe after the fall of the Iron Curtain also increased inequality via a decrease in collective-bargaining coverage and overall less favourable wage agreements.

[9] This finding is consistent with studies explicitly examining the labour market impacts of immigration in Germany, such as Angrist and Kugler (2003), Dustmann, Schönberg and Stuhler (2016) and Berbée and Stuhler (2023).

In contrast, for the subpopulation of Germans without a migration background, the Gini coefficient evolves very similarly to the overall population (Figure A.3), so the changes within the subpopulation of individuals with migration background seem to have a limited influence.

6 | CHANGES IN THE TAX TRANSFER SYSTEM

6.1 | Benefit/income ratio stopped increasing after the Hartz reforms

Changes in the German tax and benefit system have altered the mapping between individual labour earnings and disposable household income. The Hartz reforms, already discussed above, took place in the early 2000s and aimed to create a more dynamic and competitive labour market, while also providing greater support and opportunities for jobseekers.

Figure 11 shows both the motivation and the impact of the reform by plotting the share of benefits in total gross household income, across quartiles of the equivalised disposable income distribution. From 1990 to 2005, this share increased steadily, particularly in the bottom quarter of the income distribution. Since the Hartz reforms came into effect in 2005, this trend has been broken and the share of benefits among total income has slowly but continuously declined. This development corresponds to the increase in the unemployment rate before and the decline after the Hartz reforms (Bundesagentur für Arbeit, 2023), reflecting lower aggregate unemployment-related benefit payments. However, causal evidence of the Hartz reforms on inequality in the literature is inconclusive (Biewen
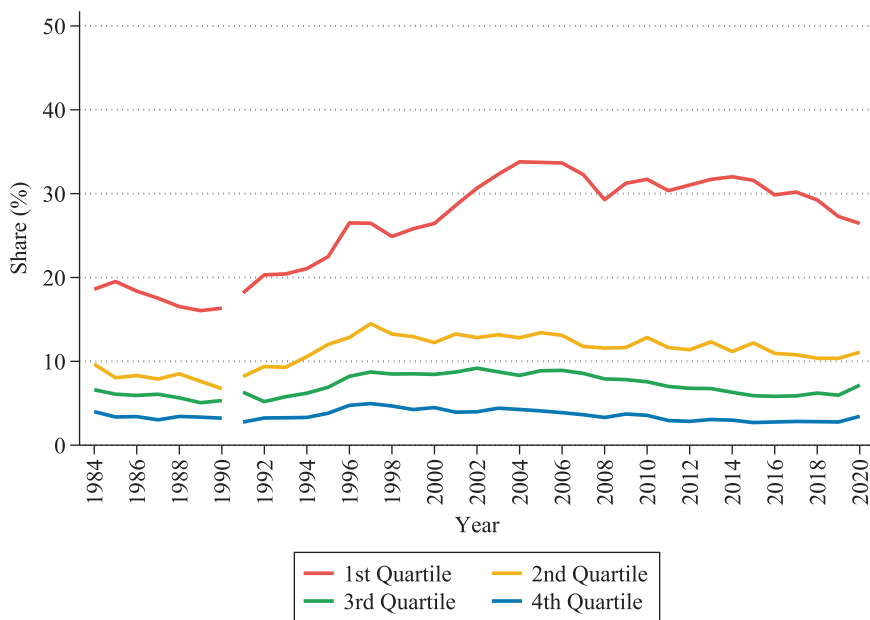
FIGURE 11 Benefits as a proportion of overall income, across quartiles of the equivalised disposable income distribution. *Note*: This figure shows the share of benefits as a proportion of overall income across quartiles of the equivalised disposable income distribution in a sample of individuals aged 25–60. Income and benefits are aggregated at the household level. Overall income includes gross labour earnings, asset income, income from private transfers, private retirement income and public benefits. Public benefits include all public transfers as well as income from social security pensions. Disposable income is overall income net of direct taxes and employee social security contributions and is equivalised according to the modified OECD equivalence scale. Benefits and income amounts are calculated as the mean in the respective quartile of the equivalised disposable income distribution. Until 1990: West Germany only. *Source*: Authors' calculations using data from SOEP (for details, see source note for Figure 1). [Colour figure can be viewed at wileyonlinelibrary.com]

and Juhasz, 2012; Carrillo-Tudela et al., 2021; Immel, 2021), and Dustmann et al. (2014) argue that labour supply changes and wage moderation instead led to the expansion of the low-wage sector rather than lower benefits.

6.2 | The tax and transfer system has dampened the increase in inequality

Unemployment and social assistance benefits constitute just one part of the tax and transfer system, which has changed along numerous dimensions in the past decades. To obtain a comprehensive picture of the role of taxes and transfers in reducing inequality, Figure 1 has provided insight on the development of the Gini coefficient in gross and net household income. As stated above, earnings and household income inequality both increased in the early 2000s. Biewen and Juhasz (2012) show that a reform that decreased the progressivity of the tax system at the top was one of the driving factors of the increase in household inequality during that time. Nonetheless, the Gini of disposable incomes was consistently lower in all years, documenting that the tax and transfer system has remained progressive up to today, thus reducing inequality. This is not only caused by the higher share of benefits received by the lower half of the income distribution (see Figure 11), but also by the progressive income tax tariff. As shown in the introduction, the difference between the gross and net Gini coefficients increased from 9 to 11 percentage points between 1984 and 2000, before decreasing again to 7 percentage points in 2020 (Figure 1). This shows that, taking into account direct taxes and transfers, as well as compositional changes, the overall degree of redistribution in the tax and transfer system now is not substantially different from what it was more than three decades ago, despite several major reforms.

7 | CONCLUSION

In this paper, we document how various underlying factors, such as labour market trends, changes in the demographic composition of the labour force and changes in the tax and benefit system, have shaped the evolution of different dimensions of inequality in Germany over the period 1983–2020. Using data from the SOEP, we show that inequality in earnings and household disposable income has remained stable in recent years despite changes in the composition of the labour force that tend to increase inequality, such as increased assortative matching and high net migration rates. These changes are counteracted by other factors, such as the introduction of the minimum wage or a slowly closing gender pay gap, which have had a dampening effect on inequality. The most important development in the German labour market in recent decades has been the increasing participation of women. However, most of these employment gains have taken place in part-time jobs and, conditional on working, women's working hours have changed little. As a result, the gender pay gap is still widespread.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the SOEP Research Data Center under restrictions. Information related to it is available at https://www.diw.de/en/diw_02.c.222516.en/data.html.

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Additional supporting information can be found online in the Supporting Information section at the end of this article.