

## Income Distribution and At-Risk-of-Poverty Rate



**REPORT** by Markus M. Grabka and Jan Goebel

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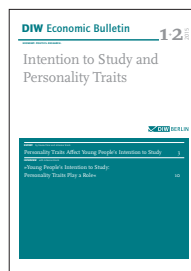
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## NEXT ISSUE OF DIW ECONOMIC BULLETIN

# Brown coal industry in eastern Germany

# Real income rose significantly between 1991 and 2014 on average – first indication of return to increased income inequality

By Markus M. Grabka and Jan Goebel

The real disposable income of private households in Germany, accounting for inflation, rose by 12 percent between 1991 and 2014. This is what the present study based on data from the Socio-Economic Panel (SOEP) has shown. However, the trends varied greatly depending on income group. While the middle income segment rose by more than eight percent, the highest income segment increased by up to 26 percent. The lower income segment, on the contrary, declined in real terms. Consequently, income inequality has increased overall, especially in the first half of the 1990s, in the period from 1999 to 2005, and after 2009. It stagnated or even decreased in the interim periods. The proportion of people at risk of poverty has recently become greater again. Gainful employment still provides the most effective protection against income poverty, but more and more employed persons are at risk of becoming poor. Containment of the low wage sector, by revoking the privileged status of mini-jobs, for example, could counteract this effect. And single parents should no longer be fiscally disadvantaged in comparison to childless coupled households – this could also reduce the number of children at risk of poverty.

The present study updates previous DIW Berlin studies on personal income inequality and the proportion of people at risk of poverty in Germany up to and including 2014 (box).<sup>1</sup> The empirical analysis is based on Socio-Economic Panel (SOEP) data collected by DIW Berlin in partnership with *Kantar Public* (formerly TNS Infratest Sozialforschung).<sup>2</sup> Since the SOEP survey is repeated every year, it can be used to analyze trends in income over time.<sup>3</sup> The following functional income analysis, which initially examines the distribution of income across the production factors “labor” and “capital,” was based on the German national accounts (*Volkswirtschaftliche Gesamtrechnungen*) of the German Federal Statistical Office (*Statistisches Bundesamt*).

## Employee compensation trend no longer lags behind that of company profits

To analyze functional income distribution, we contrasted the two main production factors, “capital” (corporate profits) and “labor” (employee compensation from corporations).<sup>4</sup>

<sup>1</sup> See Jan Goebel, Markus M. Grabka, and Carsten Schroeder, “Einkommensungleichheit in Deutschland bleibt weiterhin hoch – junge Alleinlebende und Berufseinsteiger sind zunehmend von Armut bedroht,” *DIW Wochenbericht* 25 (2015): 571–86.

<sup>2</sup> SOEP is a recurring annual representative survey of private households. It began in West Germany in 1984 and expanded its scope to include the new federal states in 1990; see Gert G. Wagner et al., “Das Sozio-oekonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland – Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender),” *ASA Wirtschafts- und Sozialstatistisches Archiv* 2 no. 4 (2008): 301–28.

<sup>3</sup> In accordance with the conventions used in the German federal government’s *Report on Poverty and Wealth* (Federal Ministry of Labour and Social Affairs, “Lebenslagen in Deutschland,” report in German only, 2013. [http://www.bmas.de/SharedDocs/Downloads/DE/PDF-Publikationen-DinA4/a334-4-armuts-reichtumsbericht-2013-kurzfassung.pdf?\\_\\_blob=publicationFile&v=3](http://www.bmas.de/SharedDocs/Downloads/DE/PDF-Publikationen-DinA4/a334-4-armuts-reichtumsbericht-2013-kurzfassung.pdf?__blob=publicationFile&v=3)) and the appraisal of the German Council of Economic Experts (most recent annual appraisal: “Time for Reforms,” excerpts in English, 2016/2017. <https://www.sachverstaendigenrat-wirtschaft.de/jahresgutachten-2016-2017.html?&L=1>), this report identifies the relevant income year. The SOEP collects annual income information in retrospect – for the previous calendar year – but weighted according to the population structure at the time of the survey. The data for 2014 presented here were collected in the 2015 survey wave.

<sup>4</sup> The wage share is an additional key indicator in our functional distribution analysis. It indicates the relationship of employee compensation to overall GDP.

## Box

**Definitions, Methods, and Assumptions for Measuring Income**

The analyses presented in this report are based on data from the longitudinal household survey the Socio-Economic Panel (SOEP) study and primarily based on annual incomes. In the survey year ( $t$ ), all the income components affecting a surveyed household as a whole, and all the individual gross incomes of the current members of the surveyed household are added together (market income from the sum of capital income and earned income, including private transfer payments and private pensions), all of these referring to the previous calendar year ( $t-1$ ). In addition, income from statutory pensions as well as social transfer payments (income support, housing assistance, child benefits, unemployment benefits, and others) are taken into account, and finally, annual net incomes are calculated employing a simulation of taxes and social security contributions—including one-off special payments such as a 13th or 14th month's salary for a given year, a Christmas bonus, and a vacation bonus.

The calculation of the annual burden of income taxes and social security contributions is based on a micro-simulation model<sup>1</sup> which generates a tax assessment incorporating all types of income in accordance with the Income Tax Act (*Einkommensteuergesetz, EStG*) as well as tax exemptions, income-related expenses, and extraordinary expenses. Since this model cannot simulate all the complexity of German tax law because of its numerous special provisions, income inequality measured in the SOEP is assumed to be underestimated.

<sup>1</sup> See Johannes Schwarze, "Simulating German income and social security tax payments using the GSOEP. Cross-national studies in aging," Program project paper no. 19 (Syracuse University, US, 1995).

Following the international literature,<sup>2</sup> fictitious (net) income components from owner-occupied housing (imputed rent) are added to income. In addition, non-monetary income components from subsidized rental housing (government-subsidized housing, housing with rents reduced by private owners or employers, households that do not pay rent) are taken into account in the following—as required by the EU Commission for EU-wide income distribution calculations based on EU-SILC as well.

The income situations of households of different sizes and compositions are made comparable by converting a household's entire income into equivalent incomes (per capita incomes modified according to needs) in accordance with international standards. Household incomes are thereby converted employing a scale proposed by the Organisation for Economic Co-operation and Development (OECD) and generally accepted in Europe. The calculated equivalent income is allocated to each household member on the assumption that all household members benefit from the joint income equally. The head of household is given a needs weighting of 1; additional adults each have a weighting of 0.5, and children up to 14 years of age weightings of 0.3.<sup>3</sup> In other words, cost degression is assumed in larger households.

<sup>2</sup> See Joachim R. Frick, Jan Goebel, and Markus M. Grabka, "Assessing the distributional impact of "imputed rent" and "non-cash employee income" in micro-data," in European Communities, ed., *Comparative EU statistics on Income and Living Conditions: Issues and Challenges*. Proceedings of the EU-SILC Conference, Helsinki, November 6–8, 2006, EUROSTAT 2006: 116–142.

<sup>3</sup> See Brigitte Buhmann et al., "Equivalence Scales, Well-Being, Inequality and Poverty," *Review of Income and Wealth* 34 (1998): 115–142.

We did not consider the overall economy but covered a substantial part of it: 71 percent of total employee compensation is included in the study. Three groups were excluded: business partnerships (small and micro businesses) and – of particular significance – the government and non-profit organizations. The present study also focused on investment income in the overall economy, which included income that was not directly generated from ongoing production (e.g., income from rentals and leases).

From 1991 to 2000, employee compensation from corporations rose by just under 33 percent in nominal terms. In the same period, corporate profits experienced vigorous growth, increasing by almost 50 percent (Figure 1). Subsequently, the gap widened. While profits almost

doubled until 2007 – the year of the global financial crisis – employee compensation rose by only eight percent in nominal terms. In 2007 and 2009, corporations were forced to accept a massive decrease in profits, but all in all the financial crisis hardly made a dent in employee compensation.

Since the crisis did not last long in Germany, profits rose again after 2009 – at a rapid pace. They dropped again temporarily, but swiftly recovered as of 2013. Employee compensation showed a much steadier trend. After the financial crisis it increased continuously – at a higher rate than before. From the crisis year 2009 until 2015, employee compensation rose by 25 percent. During the same period, employment surged upward as well. In these years, profits rose to the same overall extent. On the whole the gap between the wages paid by corporations and their profits has not grown larger since the cri-

In 2000, the unadjusted wage share was 71.9 percent – the highest since German reunification. In the wake of the wage restraint of the 2000s, it dropped to under 64 percent in 2007. By 2015, it reached 68.3 percent.

That means, for example, that household income for a four-person household (parents, a 16-year-old, and a 13-year-old) is not divided by four as is the case in a per-capita calculation ( $=1+1+1+1$ ), but by 2.3 ( $=1+0.5+0.5+0.3$ ).

In all population surveys, a particular challenge is how to take proper account of missing values for individual people surveyed, especially concerning questions considered sensitive, such as those about income. The incidence of missing values is often selective, with households with incomes far above or below the average refusing to respond.

In the SOEP data analyzed here, missing values are replaced using an elaborate imputation procedure that is both cross-sectional and longitudinal.<sup>4</sup> This also applies to missing values for individual household members refusing to answer any questions in households otherwise willing to participate in the survey. In these cases, a multi-stage statistical procedure is applied to six individual gross income components (earned income, pensions and transfer payments in case of unemployment, vocational training/tertiary-level study, maternity benefits/child-raising allowance/parental leave benefits, and private transfer payments).<sup>5</sup> For each new data collection, all missing values are always imputed again retrospectively because new information from the surveys can be used to impute missing data from the

previous year. This can result in changes to earlier evaluations. As a rule, however, these changes are minor.

In order to avoid methods-based effects in the time series of calculated indicators, the first survey wave of the individual SOEP samples was excluded from the calculations. Studies show that there are more changes in response behavior which cannot be attributed to differences in willingness to participate in the survey.<sup>6</sup>

After taking weighting factors into account, the SOEP microdata on which these analyses are based (version v32 based on the 32th survey wave in 2015) show a representative picture of the population in households and thus permit inferences about the entire population.

To stay abreast of changes in the number of migrants, independent sub-samples has been drawn in 2013 and 2015. However, for the inequality analyses the IAB-SOEP-migration sample drawn in 2013 has been additionally considered only.<sup>7</sup> The weighting factors allow for differences in the sampling designs of the various SOEP samples as well as in the respondents' participation behavior. In order to increase compatibility with official statistics, these factors are adjusted to currently available framework data from the official microcensus. Populations living in institutions (for example, in retirement homes) are generally not taken into account.

<sup>4</sup> Joachim R. Frick and Markus M. Grabka, "Item Non-response on Income Questions in Panel Surveys: Incidence, Imputation and the Impact on Inequality and Mobility," *Allgemeines Statistisches Archiv* 89 (1) (2005): 49–61.

<sup>5</sup> Joachim R. Frick, Markus M. Grabka, and Olaf Groh-Samberg, "Dealing with incomplete household panel data in inequality research," *Sociological Methods & Research* 41 (1) (2012): 89–123.

<sup>6</sup> Joachim R. Frick et al., "Using Analysis of Gini (ANOGL) for Detecting Whether Two Subsamples Represent the Same Universe. The German Socio-Economic Panel Study (SOEP) Experience," *Sociological Methods & Research* 34 (4) (2006): 427–468, doi: 10.1177/0049124105283109.

<sup>7</sup> Martin Kroh et al., "Neue Muster der Migration," *DIW Wochenbericht* 42 (2014): 1126–1135.

sis. More than a decade earlier, profits were quickly outstripping wages.

Looking at investment income in the overall economy, we see a similar pattern: until the crisis it rose much more significantly than wages. There was a subsequent drop, but not as large as that of profits. From 2009 onward, investment income barely increased. This was probably linked to the European Central Bank's monetary policy, which curbed interest income.

That said, it must be kept in mind that the significance of trends in variables from the German national account for issues relating to personal income distribution is limited. The present study focuses on income not directly generated by the interplay of production factors. For example, households can receive income from entrepreneurial activities, capital investments and state transfers in addition to income from paid employment. Furthermore,

since households are responsible for making social welfare contributions and paying taxes on various types of income, they only receive part of the income they generate. In the following section, we present the results of analyzing personal income distribution based on the SOEP survey.

## On average, real income has increased since 1991

Adjusted for household size<sup>5</sup> and inflation, between 1991 and 2005 the average annual market income<sup>6</sup> of persons

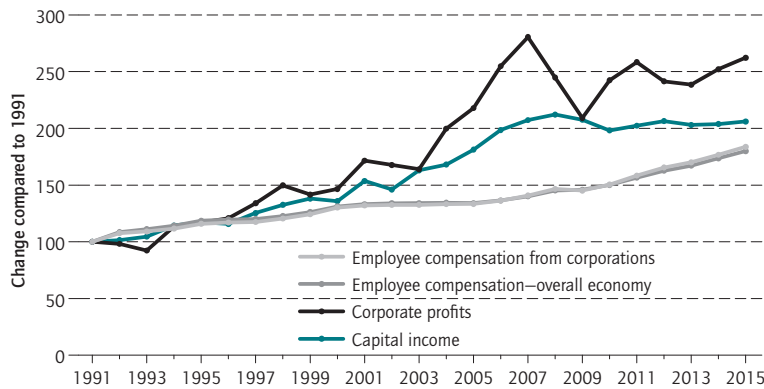
<sup>5</sup> Also see the term *Äquivalenzeinkommen* in the DIW Berlin glossary (in German only). [http://www.diw.de/de/diw\\_01.c.411605.de/presse\\_glossar/diw\\_glossar/aequivalenzeinkommen.html](http://www.diw.de/de/diw_01.c.411605.de/presse_glossar/diw_glossar/aequivalenzeinkommen.html).

<sup>6</sup> Market income equals the sum of capital and employment income, including private transfers and private pensions, before taxes and monetary social benefits.

Figure 1

### Employee compensation from corporations and corporate profits, capital income in overall economy

Change in percent, 1991 = 100



Source: Federal statistical office; calculations of DIW Berlin.

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Since the financial crisis employee compensation from corporations and corporate profits no longer grow apart.

in private households basically remained unchanged (Figure 2). It rose by 6.5 percent from 2005 to 2014, primarily the result of the significant upswing in employment<sup>7</sup> and subsequent increase in total wages. Overall, average real market income has risen by around 2,000 euros since 1991 – to just under 25,000 euros per person in 2014 (for the definition and measurement of income, see box).

However, this trend only partly applies to median market income.<sup>8</sup> Between 1991 and 2005, it fell from approximately 20,700 euros to 19,000 euros and then rose to 20,300 euros in 2014. Real median market income ended up at the same level it initially had in 1991.

The growth of disposable household income, on the other hand, was significantly more dynamic (Figure 3).<sup>9</sup> On average, private households had disposable real incomes in 2014 that were 2,500 euros higher than at the beginning of the 1990s. This is an increase of more than

<sup>7</sup> For example, the number of registered unemployed persons decreased by 2.38 million between February 2005 and February 2016. See Federal Employment Agency, "Arbeitslosigkeit im Zeitverlauf," November 2016.

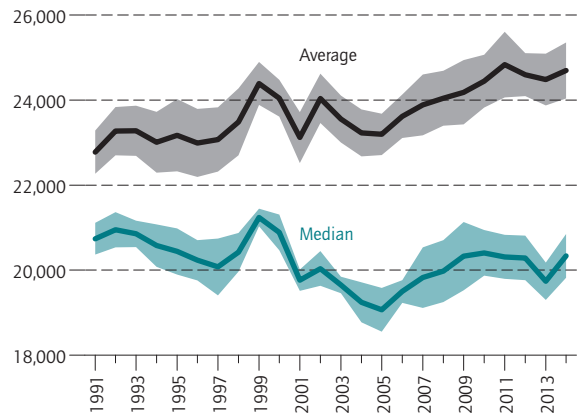
<sup>8</sup> The median is the value that separates the richer half from the poorer half of the population. Also see the term *Medianeinkommen* in the DIW Berlin glossary (in German only). [http://www.diw.de/de/diw\\_01.c.413351.de/presse\\_glossar/diw\\_glossar/medianeinkommen.html](http://www.diw.de/de/diw_01.c.413351.de/presse_glossar/diw_glossar/medianeinkommen.html).

<sup>9</sup> Disposable household income consists of market income, statutory pensions, and government transfer benefits such as the child benefit, housing allowance, and unemployment benefits minus direct taxes and social security contributions.

Figure 2

### Real market income of private households in Germany

In Euro



Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Market household income including a fictitious employer's contributions for civil servants. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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Market incomes of individuals living in private households has increased since 2005 in particular.

12 percent. Median growth was somewhat flatter. It was around 1,700 euros – an increase of nine percent.<sup>10</sup>

The fact that the growth in mean disposable household income was flatter in comparison to the median indicates growth in income was not equal among income groups. Dividing the income groups into deciles<sup>11</sup> and indexing the mean income of each decile to 1991 shows that income in the upper range experienced the highest growth (Figure 4). For example, the disposable real income of the highest income group (tenth decile) rose by almost 27 percent from 1991 to 2014,<sup>12</sup> but the fifth

<sup>10</sup> One reason for the lackluster growth in median household income is the weak trend of pensions in the statutory pension fund, since they were not indexed to inflation during the 2000s. In 2004, 2005, 2006, and 2010, pensions were not raised. When adjusted for inflation, these years are marked by income losses.

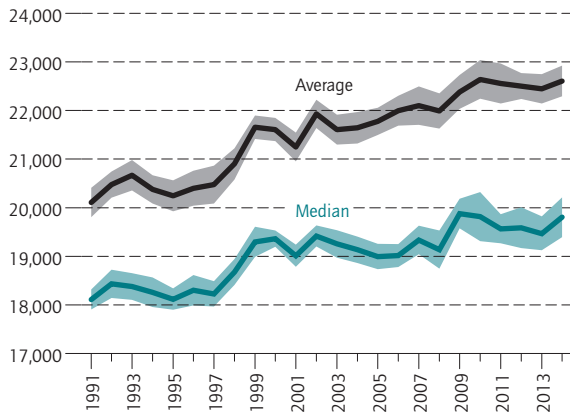
<sup>11</sup> Sorting the population by income level and dividing the results into ten groups of equal size results in ten deciles. The lowest decile indicates the income situation of the poorest ten percent of the population and the top decile, the richest. It should be noted that due to income mobility personal income positions can change, and people may not always be assigned to the same decile. For this reason, our statements refer to the mean changes in the ten income groups.

<sup>12</sup> In the SOEP survey, people who earn top incomes are underrepresented and therefore in all likelihood, the actual trend in this decile is underestimated. See Stefan Bach, Giacomo Corneo, and Viktor Steiner, "From Bottom to Top: The entire income distribution in Germany, 1992–2003," *Review of Income and Wealth* 55 (2009): 303–30.

Figure 3

### Real disposable income of private households in Germany

In Euro



Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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Real disposable income of private households has been increased by 12 percent between 1991 and 2014.

decile grew by just under nine percent. In comparison to 1991, the ten percent of the households with the lowest income (first decile) were forced to accept a loss in real income – accounting for inflation – of eight percent.<sup>13</sup> And we were able to discern several phases within the period studied. Income in the different deciles grew at different rates from 1991 to 1995, but approached each other again until 1999. The gap widened from 2000 to 2005, again followed by a phase lasting until 2009 in which growth was similar across all income deciles. After 2009, the gap widened once again.

Among other factors, sporadic expansion of the low wage sector<sup>14</sup> and inadequate inflation adjustments of government transfers<sup>15</sup> are responsible for the real income losses in the lowest deciles. Two other factors are the slow

<sup>13</sup> In the second decile, real incomes stagnated while the third decile recorded an increase of three percent in comparison to 1991.

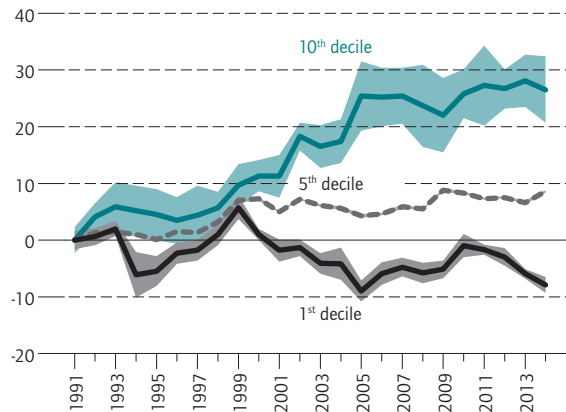
<sup>14</sup> Thorsten Kalina and Claudia Weinkopf, "Niedriglohnbeschäftigung 2012 und was ein gesetzlicher Mindestlohn von 8,50 € verändern könnte," *IAQ Report* 02 (2014), report in German only. <http://www.iaq.uni-due.de/iaq-report/2014/report2014-02.pdf>. However, various effects must be considered. After all, an expansion of the low wage sector can create more (additional) employment but it can also trigger displacement processes if, for example, full-time positions are converted into several low-wage jobs.

<sup>15</sup> An example of this is the child benefit. Between 2010 and 2014, the child benefit was not raised, leading to a loss in real value of more than six percent.

Figure 4

### Disposable income of private households in Germany by deciles

Change in percent, 1991=100



Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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In real terms low income households receive less income compared to 1991.

growth of retirement income and the fact that on average, old-age pensions have an increasingly larger piece of the household income pie than income from employment due to the demographic shift in Germany. Unfortunately pensions usually represent lower sums of money. On the other hand, in many years income from capital investments and self-employment increased in the top decile, leading to income increases. And employment has special significance in this situation: overall, the proportion of employed persons increased, and growth was especially dynamic in the top income range. While the employment rate remained virtually constant in the lowest decile between 2005 and 2014, in the top three deciles it rose by around five percentage points.

### Germany falls short of UN targets for reducing inequality

As part of the debate on alternatives to using GDP to measure society's progress,<sup>16</sup> the United Nations (UN) adopted a catalog of 17 sustainability targets.<sup>17</sup> The Millen-

<sup>16</sup> See Joseph E. Stiglitz, Amartya Sen, and Jean-Paul Fitoussi, *Mismeasuring Our Lives. Why GDP Doesn't Add Up* (New York: The New Press, 2010).

<sup>17</sup> See United Nations, Sustainable Development Goals, online at <https://sustainabledevelopment.un.org/sdgs>.



nium Development Goals for 2015<sup>18</sup> were ambitious, but in September 2015 the intergovernmental organization set the even more ambitious goal of eradicating extreme poverty by 2030. The member states also set distribution goals aimed at reducing the level of income inequality in individual (developed) nations. The UN Agenda for Sustainable Development targets an increase in income for the poorest 40 percent of the population that is higher than the mean income gain of the total population by 2030. UN members are still working out how to turn the goals into concrete actions.<sup>19</sup> But at present the clearly defined indicator only lacks the relevant periods to which the growth in income will refer (e.g., five or ten years).

Looking at the situation from 1991 to 2014, Germany fell short of the goal. The lowest 40 percent's income growth lagged behind that of the overall population's mean income growth (Figure 5). Since 1999, the real disposable income of this 40 percent of the population has actually fallen, while the real income of the remaining 60 percent has grown significantly.<sup>20</sup>

### Market income inequality remains high

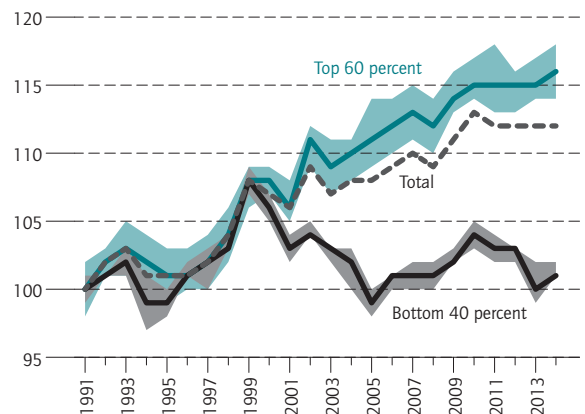
The Gini coefficient is a standard measure of income inequality.<sup>21</sup> It can have a value in the 0 to 1 range; the higher the value, the more pronounced the inequality measured. The Gini coefficient trend shows that inequality of market incomes increased significantly between 1991 and 2005, and subsequently dropped sharply until 2010 (Figure 6). This was partially due to the fact that overall, capital income had less of an influence on inequality in this period.<sup>22</sup> Since then, however, the measured inequality of market incomes has increased significantly again. In 2014 it was approximately at the same level as in the mid-2000s.

Income from paid employment is the main component of market income. We can distinguish two aggregate levels here: individual gross wages and household income from paid employment adjusted for household size for

Figure 5

### Income changes of the bottom 40 percent and the top 60 percent

Change in percent, 1991=100



Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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The goal set by the United Nations that the incomes of lowest 40 percent should increase faster than the mean of the total population, has been failed.

households in which at least one person earns this type of income.

Individual income from paid employment showed a significant rise in the Gini coefficient from 0.38 to 0.44 between 1991 and 2004 (Figure 7). With minor fluctuations, it rose further to 0.45 by 2010. The Gini coefficient has slightly decreased since then, but this is only statistically significant when a 90-percent confidence interval in comparison to 2010 is applied.<sup>23</sup> At the same time, annual wages and salaries in the lowest decile have increased by more than 300 euros (a solid 20 percent) since 2010. However, it should be noted that since 1991 the lowest decile has experienced a 30-percent drop in real income from paid employment. The latest income increase was not to compensate for the overall loss.<sup>24</sup>

<sup>18</sup> See United Nations, *The Millennium Development Goals Report 2015*, 2015, online at [http://www.un.org/millenniumgoals/2015\\_MDG\\_Report/pdf/MDG%202015%20rev%20\(July%2015\).pdf](http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%2015).pdf).

<sup>19</sup> In Germany, the Federal Ministry of Economic Cooperation and Development (*Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, BMZ*) is in charge: *Die Agenda 2030 für nachhaltige Entwicklung*, online at [http://www.bmz.de/de/ministerium/ziele/2030\\_agenda/index.html](http://www.bmz.de/de/ministerium/ziele/2030_agenda/index.html).

<sup>20</sup> Looking at the trend between 2004 and 2014, the income of the lowest 40 percent stagnated while the mean rose by slightly more than four percent. Between 2009 and 2014, the real income of the lowest 40 percent fell by more than one percent, while the mean rose by one percent.

<sup>21</sup> Also see the term *Gini-Koeffizient* in the DIW Berlin glossary (in German only), online at [http://www.diw.de/de/diw\\_01c.413334.de/presse\\_glossar/diw\\_glossar/gini\\_koeffizient.html](http://www.diw.de/de/diw_01c.413334.de/presse_glossar/diw_glossar/gini_koeffizient.html).

<sup>22</sup> See Markus M. Grabka, "Income and wealth inequality after the financial crisis—the case of Germany," *Empirica – Journal of European Economics* 42 (2) (2015): 371–90. Original version DOI: 10.1007/s10663-015-9280-8.

<sup>23</sup> Data from the Institute for Employment Research (*Institut für Arbeitsmarkt- und Berufsforschung, IAB*) also indicate a slight decrease in wage inequality in Germany. See Joachim Möller, "Lohnungleichheit: Gibt es eine Trendwende?" *IAB Discussion Paper* 09 (2016): 17.

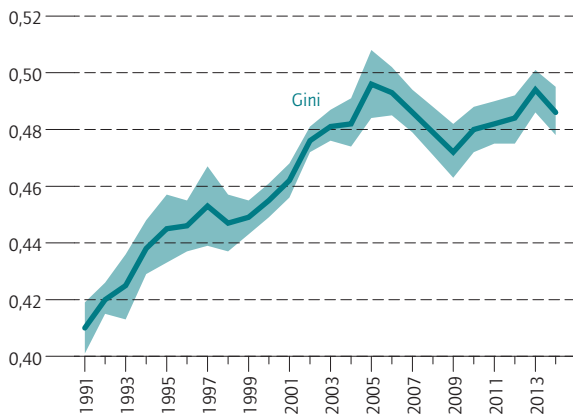
<sup>24</sup> The relatively sharp increase in wages and salaries in the first decile are the result of sector-specific minimum wages and initial anticipatory effects in the wake of an announcement by the German government (or political parties) that a generally binding minimum wage would be implemented. In the fifth decile, real income has dropped by three percent since 1991, and in the tenth decile, it has risen by 17 percent in real terms. The difference in the growth of wages can be explained in part by a difference in demand for quali-



Figure 6

### Inequality of market household income

Gini-coefficient



Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Market household income including a fictitious employer's contributions for civil servants. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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Since 2010 inequality of market income has risen again.

Household income from paid employment adjusted for household size behaved differently. Here, the Gini coefficient rose significantly – from 0.325 to 0.393 – between 1991 and 2006. Inequality subsequently plateaued. One reason individual income and household income from paid employment adjusted for household size show different trends is that persons with low individual incomes from employment are able to benefit from other household members who receive higher incomes from paid employment.<sup>25</sup>

### Return to increased inequality in disposable household income

The level of inequality in disposable household income remained virtually constant from 1991 to 1999 (Figure 8). It subsequently increased until 2005: the Gini coefficient rose from 0.25 in 1999 to 0.29 in 2005. Unlike inequality in market income, inequality in disposable household income regressed only slightly between 2005 and 2009. Since 2009, inequality has tended to increase again. The 90:10 percentile ratio is an alternative indicator for meas-

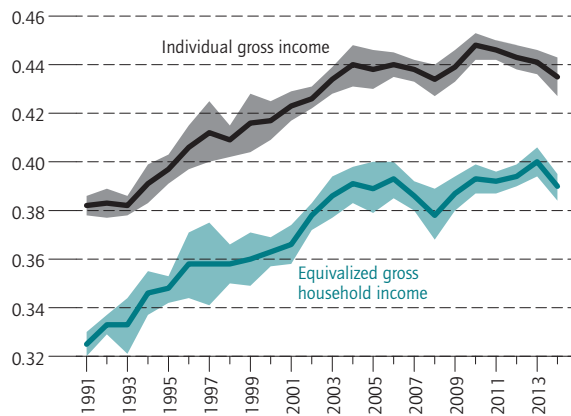
ured vs. unqualified employees (the "Skilled-Biased Technical Change" hypothesis).

<sup>25</sup> For example, this occurs when a person with a mini-job lives in the same household as someone with well-paid full-time employment.

Figure 7

### Inequality of income from dependent employment

Gini-coefficient



Note: Real incomes in prices of 2010. Population: Persons with income from dependent employment (individual gross income) and persons in private households (equivalized gross household income). Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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Income from dependent employment are now more unequal than in 1991.

uring inequality. It indicates the relationship between the income of the person with the lowest income in the top decile and the income of the person with the highest income in the bottom decile. In the 1990s, this indicator hovered around 3.0 (the rich person's income was three times higher than the poor person's income). Similar to the Gini coefficient, it rose to a value of 3.5 by 2005. It experienced a further statistically significant rise after 2011 – to a record high of 3.65 in 2014.

### Upswing in the at-risk-of-poverty rate

In this section, we look at the people whose income is below the at-risk-of-poverty threshold, as they are a special focus socio-politically.<sup>26</sup> People in households with less than 60 percent of the median net household income of the overall population at their disposal live below the at-risk-of-poverty line.<sup>27</sup> Based on the SOEP sample, in

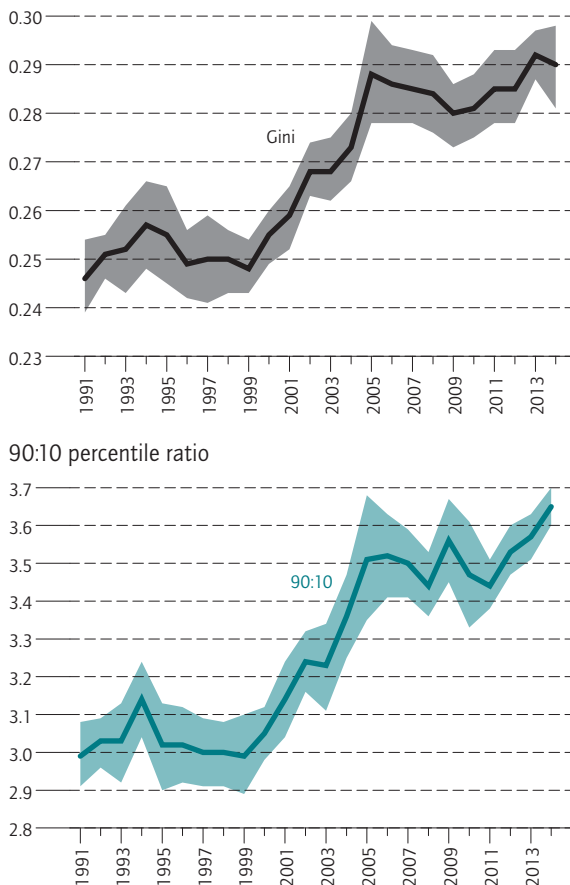
<sup>26</sup> Also see the term *Armut* in the DIW Berlin glossary (in German only), online at [http://www.diw.de/de/diw\\_01.c.411565.de/presse\\_glossar/diw\\_glossar/armut.html](http://www.diw.de/de/diw_01.c.411565.de/presse_glossar/diw_glossar/armut.html).

<sup>27</sup> The at-risk-of-poverty threshold is a relative limit. The at-risk-of-poverty indicator describes the proportion of the population below the at-risk-of-poverty threshold. We can also speak of "absolute poverty" in the case of people who receive basic social benefits such as welfare or unemployment benefits. As a rule, this measure leads to underestimating the population of people living in poverty because some people who have a right to basic social benefits do not

Figure 8

### Inequality of disposable household income

Gini-coefficient



Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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Since 2010 inequality of disposable income tend to increase again.

2014 that amounted to 1,050 euros per month for a single-person household – accounting for inflation in this period, this was only 20 euros more than in 2000.<sup>28</sup>

take advantage of them (called "hidden poverty" in Germany (*verdeckte Armut*)). See Irene Becker, "Der Einfluss verdeckter Armut auf das Grundsicherungsniveau," Hans Böckler Foundation Working Paper no. 309 (2015). The at-risk-of-poverty rate can also be interpreted as an alternative indicator for income inequality.

**28** The German Federal Statistical Office's system of social reporting in official statistics is based on the microcensus (see [www.amtliche-sozialberichterstattung.de/index\\_en](http://www.amtliche-sozialberichterstattung.de/index_en)). By comparison, the at-risk-of-poverty threshold we use here is higher. As per international convention, we include the rental value of owner occupied property as income in our income calculation. For additional methodological differences from the official social reporting, see Markus M. Grabka,

In the 1990s, the proportion of the population at risk of poverty was around 11 percent, but by 2014 it had risen to just below 16 percent (Figure 9). Since the turn of the millennium, the at-risk-of-poverty rate has risen continually, with brief interruptions in the upward trend in 2010 and 2011 only. In 2014, 12.7 million people in Germany were at risk of poverty. The latest results based on the German Federal Statistical Office's microcensus showed a similar proportion.<sup>29</sup> The alternative data of the European Union Statistics on Income and Living Conditions (EU-SILC) yielded an even higher value of 16.7 percent. All three data sources indicated the same slow upward trend in recent years.

There are clear differences in the extent to which the old and new federal states are affected. At 14.7 percent, the at-risk-of-poverty rate in western Germany in 2014 was around seven percentage points lower than in eastern Germany. This discrepancy chiefly reflects the lower levels of employment and investment income in the new federal states.

### Epecially high risk of poverty for children and teens

In 2014, more than 20 percent of all children and teens in Germany were at risk of poverty (Table 1). Looking at the trend in this group's risk of poverty over the past 20 years, the increase occurred almost entirely in the second half of the period – the years between 2004 and 2014, when the proportion increased by more than four percentage points.

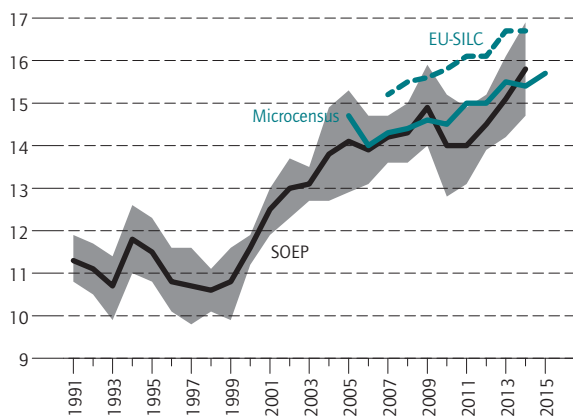
The 25–34 age group experienced the highest growth, almost nine percentage points over the past 20 years. This is surprising, since this group is typically of an employable age and should have benefited from the positive job market situation. The people in this group who received incomes from employment had an at-risk-of-poverty proportion that was seven percentage points higher than 20 years ago. Among the 25–34-year-olds who did not have income from employment, the proportion rose even more significantly. However, the age group's behavior with respect to education has changed over time: more and more of the people in this age cohort go to university.<sup>30</sup>

Jan Goebel, and Jürgen Schupp, "Höhepunkt der Einkommensungleichheit in Deutschland überschritten?" *DIW Wochenbericht* no. 43 (2012): 3–15.

**29** See German Federal Statistical Office and the statistical offices of the federal states, "System of social reporting," online at [http://www.amtliche-sozialberichterstattung.de/index\\_en](http://www.amtliche-sozialberichterstattung.de/index_en).

**30** According to data from the SOEP, the proportion of people pursuing a university degree in this age group was around seven percent in the 1990s. This figure almost doubled to approximately 13 percent in 2014.

Figure 9

**At-risk-of-poverty rate<sup>1</sup>**

<sup>1</sup> Persons with less than 60 percent of median disposable income.

Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32, Federal Statistical office (Microcensus, EU-SILC); calculations of DIW Berlin.

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The at-risk-of-poverty rate has been risen almost continuously since the millennium.

At 24 percent, the group of young adults between 18 and 24 had the highest risk of poverty in 2014. A large portion of people in this age group also went to university or participated in an apprenticeship program. They often lived in their own household,<sup>31</sup> but at the same time did not have much money.<sup>32</sup>

The proportion of people at retirement age that are at risk of poverty continues to be below the mean of the total population. However, there are significant differences depending on region. In the 65–74 age group, the proportion at risk of poverty rose by eight percentage points in eastern Germany between 2002 and 2014, while in western Germany it fluctuated between 12 and 14 percent. There is a reason for the significant rise in risk of poverty among older people in eastern Germany. In recent years, people who have entered into retirement receive lower old-age benefits, often because they were unemployed for longer periods of time. And in eastern

Germany, company-related or private pensions are the exception and not the rule.<sup>33</sup>

The 25–34 age group also exhibited a differentiated trend. While in western Germany their risk of poverty has risen somewhat more sharply than the population average since 2000 (by five percentage points to 17 percent), in the same period the risk of poverty in eastern Germany rose by 20 percentage points to slightly below 35 percent in 2014. It is interesting to note that this group's risk of poverty continued to rise even after the financial crisis, although unemployment in Germany dropped sharply during the same time period. It is evident that this age group was not wholly able to benefit from the good job market situation.

### The younger the age cohort, the higher the risk of poverty

In this section we examine age cohorts. Most of them contain ten consecutive birth cohorts, beginning with the cohort of those born between 1930 and 1939 and ending with those born between 2010 and 2015. For each year that income was recorded in the SOEP, we calculated the relevant risk of poverty. This made it possible to depict the risk of poverty for all older cohorts for 32 survey years and therefore for a major portion of their lives (Figure 10). We have shown the age of the youngest person in each of the various cohorts here.

Overall, we demonstrated that every time a younger cohort is added, the risk of poverty rises. The difference is greatest at age 30. While the risk of poverty of the cohort with those born between 1960 and 1969 was still around ten percent when the youngest person in the cohort was 30, the cohorts of those born between 1970 and 1979 had a proportion of around 15 percent. For those born between 1980 and 1989, at around 23 percent the proportion was even higher.<sup>34</sup> These findings parallel those of analyses based on data from *Deutsche Rentenversicherung Bund*, the German pension fund,<sup>35</sup> and show that the wage inequality of men across cohorts has increased in Germany. And starting with the 1955 birth cohort, the lifelong income of the lower 20 percent of wage-earning persons decreased in comparison to older birth cohorts. Amidst all of these observations, it should be considered that over time and thus, across age cohorts, education-related and pension-age behavior have changed – both of which can influence income.

<sup>31</sup> These age groups' comparatively high at-risk-of-poverty rates have recently triggered fundamental debates on the concept of relative poverty. See for example Georg Cremer, *Armut in Deutschland* (Munich: C. H. Beck, 2016), 47 et seq.

<sup>32</sup> In the ongoing cross-sectional analysis, trainees and students are usually poor if they do not live in their parents' households. In later life, however, they are rarely at risk of poverty.

<sup>33</sup> See Julia Simonson et al., "Ostdeutsche Männer um 50 müssen mit geringeren Renten rechnen," *DIW Wochenbericht* 23 (2012): 3–13.

<sup>34</sup> The two oldest cohorts are an exception, since their risk of poverty are virtually the same between ages 55 and 64.

<sup>35</sup> See Timm Bönke, Giacomo Corneo, and Holger Lüthen, "Lifetime Earnings Inequality in Germany," *Journal of Labor Economics* vol. 33(1) (2015): 171–208.

Table

### At-risk-of-poverty rate<sup>1</sup> by age group

In percent

|                                    | <10 years | 10-18 years | 18-25 years | 25-35 years | 35-45 years | 45-55 years | 55-65 years | 65-75 years | 75 years and over | Total |
|------------------------------------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|-------|
| 1994                               | 17.2      | 15.3        | 17.0        | 11.8        | 9.1         | 6.0         | 9.9         | 10.8        | 15.7              | 11.8  |
| 2004                               | 17.6      | 18.7        | 22.7        | 15.5        | 11.5        | 10.1        | 10.7        | 11.0        | 12.7              | 13.8  |
| 2014                               | 21.9      | 20.1        | 24.3        | 20.7        | 12.8        | 10.6        | 13.2        | 14.1        | 13.3              | 15.8  |
| Differenz 1994/2014                | 4.7       | 4.8         | 7.3         | 8.8         | 3.7         | 4.6         | 3.3         | 3.3         | -2.4              | 4.0   |
| <b>Reporting:</b>                  |           |             |             |             |             |             |             |             |                   |       |
| <b>with individual earnings</b>    |           |             |             |             |             |             |             |             |                   |       |
| 1994                               | -         | -           | 13.4        | 8.5         | 6.6         | 2.8         | 4.7         | 8.2         | 16.0              | 6.8   |
| 2004                               | -         | -           | 19.7        | 11.3        | 7.6         | 5.7         | 4.3         | 10.9        | 9.0               | 8.8   |
| 2014                               | -         | -           | 20.2        | 15.6        | 8.2         | 6.2         | 6.9         | 7.9         | 4.1               | 9.8   |
| Difference 1994/2014               | -         | -           | 6.8         | 7.1         | 1.6         | 3.4         | 2.2         | -0.3        | -11.9             | 3.1   |
| <b>without individual earnings</b> |           |             |             |             |             |             |             |             |                   |       |
| 1994                               | -         | -           | 26.1        | 29.0        | 22.8        | 21.7        | 16.9        | 11.0        | 15.7              | 16.9  |
| 2004                               | -         | -           | 29.4        | 39.6        | 35.9        | 34.9        | 20.8        | 11.0        | 12.8              | 19.0  |
| 2014                               | -         | -           | 31.8        | 52.7        | 48.1        | 44.1        | 34.6        | 15.8        | 13.8              | 22.9  |
| Difference 1994/2014               | -         | -           | 5.7         | 23.7        | 25.3        | 22.4        | 17.8        | 4.7         | -1.9              | 6.0   |

<sup>1</sup> Persons with less than 60 percent of median disposable income. .

Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale.

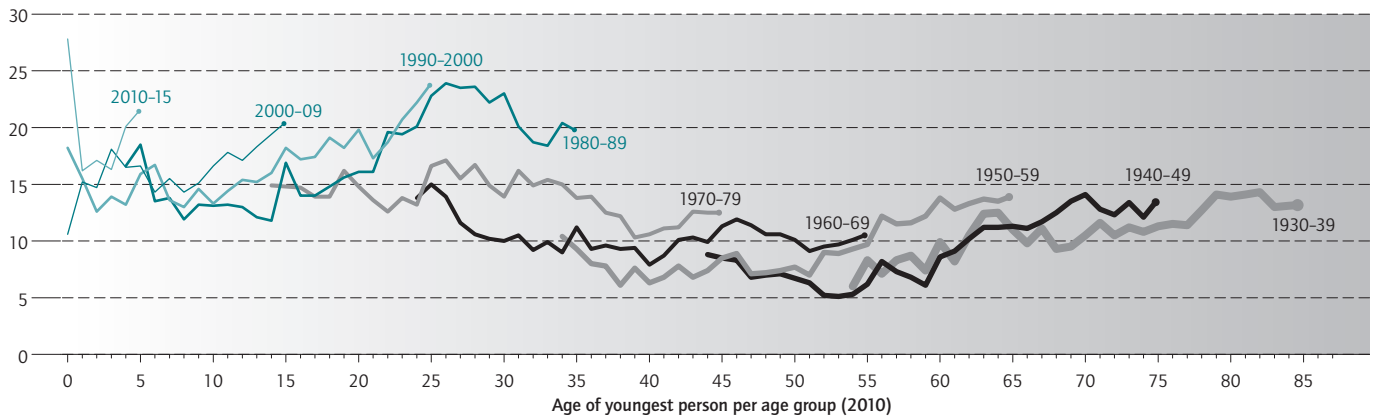
Source: SOEPv32; calculations of DIW Berlin.

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Figure 10

### At-risk-of-poverty rate<sup>1</sup> by age cohorts

In percent



<sup>1</sup> Persons with less than 60 percent of median disposable income.

Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32, Federal Statistical office (Microcensus, EU-SILC); calculations of DIW Berlin.

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The younger the age cohort the higher the risk-of-poverty.

### Employed persons are increasingly at risk of poverty

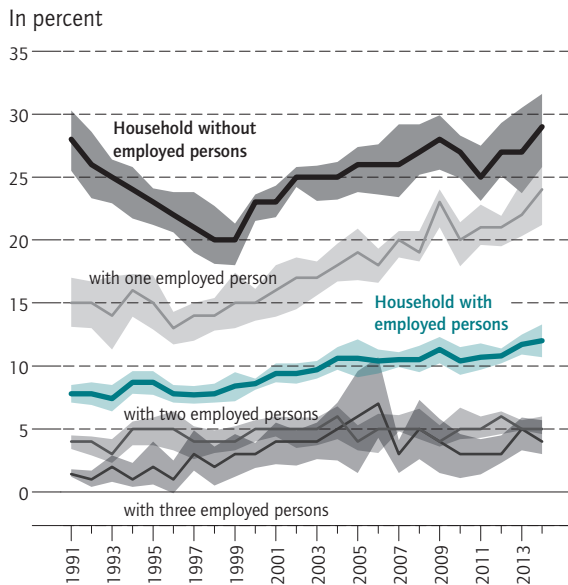
Given the sharp drop in unemployment in Germany since 2005 and the current record employment rate, we asked whether the risk of poverty among employed persons has also decreased. The initial rule of thumb is that in households in which no one received employ-

ment income in the relevant previous year, the risk of poverty was higher than average.<sup>36</sup> In 2014, the proportion of those affected was over 28 percent, but it initially regressed between 1991 and 1999. This was due to significant pension increases in eastern Germany in the

<sup>36</sup> In 2014, this affected 23 percent of the population – especially people of retirement age.

Figure 11

### At-risk-of-poverty rate<sup>1</sup> by number of employed persons in household In percent



1 Persons with less than 60 percent of median disposable income.  
Note: Real incomes in prices of 2010. Population: Persons living in private households. Equivalized annual income surveyed the following year. Equivalized with the modified OECD-scale. Shaded area indicate a 95-percent confidence band.

Source: SOEPv32; calculations of DIW Berlin.

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Households with one employed person only have now a higher at-risk-of-poverty than in the 1990's.

1990s.<sup>37</sup> Since that time, however, this segment's risk of poverty has significantly increased.

In households with at least one employed person, the risk of poverty has slightly increased since 1991 – most recently to 12 percent. Further differentiating among households with employed persons by number of employed persons, we saw that the risk of poverty with two or more employed persons in the household (somewhat more than half of the population) has remained virtually the same since 2005, fluctuating around five percent. Households with only one employed person exhibited different behavior.<sup>38</sup> For them the proportion

at risk of poverty was 15 percent in the 1990s and rose to 24 percent in 2014.<sup>39</sup> This shows that not every job protects against poverty – take for example those in the low-wage segment or hours that are less than full time. In addition to hourly wages and number of hours worked, whether or not household income is sufficient to exceed the at-risk-of-poverty threshold depends on household composition.<sup>40</sup>

## Conclusion

In Germany, real GDP rose by 22 percent between 1991 and 2014. However, not everyone benefited equally from the burgeoning economy. While real disposable household income has risen by eight percent in the middle income groups since 1991 and by even more in the upper income groups, the lowest income groups were forced to accept losses in real income. Consequently, income inequality has increased.

Employment income is one of income equality's key drivers.<sup>41</sup> With the implementation of the statutory minimum wage in 2015, policy makers took a step towards counteracting a further increase in income inequality.<sup>42</sup> However, additional measures are necessary to achieve the goal set by the United Nations of increasing the income of the lower 40 percent of the population more sharply than that of the overall population on average. For example, deprivileging mini-jobs and creating incentives to convert their holders into employees who contribute to the social insurance system could contain the low wage sector in Germany. Additional measures should improve the work-family balance. It would also be helpful to remedy fiscal disadvantages to single parents as opposed to childless coupled households. This type of measure could also reduce the number of children at risk of poverty.

<sup>39</sup> For the period between 2008 and 2014, the increase was significant.

<sup>40</sup> A regression analysis to examine the determinants of the risk of poverty within the improved job market situation showed that the risk of falling below the at-risk-of-poverty threshold despite (full-time) employment has risen over time. One of the reasons is that jobs for people with low qualifications pay less. The change in household structures is less to blame. See Goebel et al., "Einkommensungleichheit in Deutschland bleibt weiterhin hoch," 3–15. This also corresponds to an increasing risk of poverty for people without professional qualifications. Between 2004 and 2014, their rate rose significantly from 24 percent to just under 29 percent.

<sup>41</sup> See Martin Biewen and Andos Juhasz, "Understanding Rising Inequality in Germany, 1999/2000 – 2005/06," *Review of Income and Wealth* vol. 58 (2012): 62–647.

<sup>42</sup> Future analyses must show the magnitude of the effect of the minimum wage on income inequality in Germany.

<sup>37</sup> Since the calculations only go until 2014, the effect of implementing the statutory minimum wage cannot as yet be analyzed.

<sup>38</sup> In 2014, this equaled 29 percent of the population.

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JEL: D31, I31, I32

Keywords: Income inequality, poverty, SOEP



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## SEVEN QUESTIONS FOR MARKUS M. GRABKA

# »The gap between the rich and the poor keeps growing«

1. Mr. Grabka, the German economy has flourished in recent years. To what extent is its economic growth reflected in the growth of income? *On average across the total population disposable household income after inflation has risen, but depending on their income level, various segments of the population have contributed to this increase differently.*
2. Which income groups had the highest growth and which ones had the lowest? *The income of the wealthiest ten percent of the population rose by about 27 percent between 1991 and 2014. In the middle income range, the growth over this period was nine percent. On the other hand, the poorest ten percent of the population suffered losses in real income of around minus eight percent.*
3. How do you explain the losses in the lowest income groups? *Change in the job market is the dominant factor. This includes: the expansion of the low wage sector, the rise of "atypical employment" during the past 20 years or so, sinking demand for people with low qualifications, and structural changes such as the increasing importance of the service sector.*
4. Income inequality in Germany hit a plateau in the recent past. Do you think it is likely to rise again? *That's correct – between 2005 and 2013 income inequality stayed constant at a historically high level. However, the latest data indicate that inequality in disposable household income seem to rise again. There are different means of measuring this. For example, you can look at the at-risk-of-poverty rate. Analyses based on the German Federal Statistical Office's microcensus and our data show that it is currently at a record high level.*
5. This means that the number of people who live below the poverty line in Germany has increased? *Maybe we should look at the meaning of the phrase, "at risk of poverty." It refers to people who have less than 60 percent of the median disposable household income. For a single-person household, the value is currently 1,050 euros per month. We saw that between the end of the 1990s and 2005, the proportion at risk of poverty rose to 14 percent in Germany. The latest data for 2014 show an increase to almost 16 percent.*
6. Is the risk of poverty the same in the old and new federal states? *The risk of poverty in eastern Germany is still significantly higher than in western Germany. This has basically held true since German reunification. I've been tracking one group in particular in recent years: the elderly in eastern Germany between 65 and 75. At the turn of the millennium, they had a lower risk of poverty than their counterparts in western Germany. However, in the past ten years the risk of poverty of eastern German pensioners has increased by seven percentage points. This means it has doubled, which re-introduces the subject of old age poverty in Germany.*
7. How can society effectively fight income inequality and the rising proportion of people at risk of poverty? *In my opinion, the key factor is the job market situation. Although unemployment has significantly decreased, we have a high level of inequality in the job market. For example, as I see it the relatively high number of mini-jobs should be curtailed. We could also think about slightly raising the minimum wage bit by bit – something the federal government actually committed to on January 1, 2017. And the system of fiscal disadvantages to single parents in comparison to coupled childless households should be reformed, which could also reduce the number of children at risk of poverty.*

Interview by Erich Wittenberg