DIW Weekly Report 9 2018

AT A GLANCE

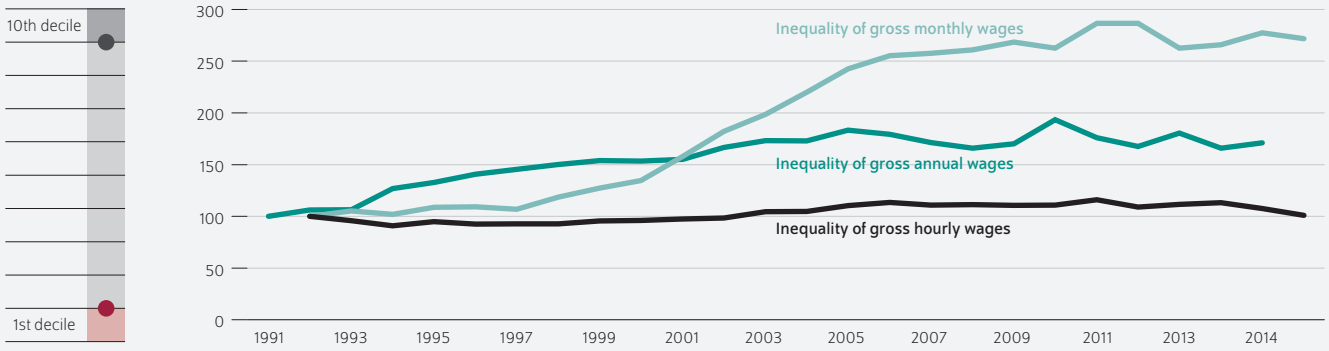
Inequality in Germany: decrease in gap for gross hourly wages since 2014, but monthly and annual wages remain on plateau

By Markus M. Grabka and Carsten Schröder

- The average real gross hourly wage rose by five percent between 2013 and 2016
- In the lowest decile between 2013 and 2016, at around 13 percent gross hourly wages rose disproportionately for the first time in years
- Despite the legal minimum wage, gross monthly wages rose minimally in the lowest decile because the number of working hours dropped for the low earners.
- For gross hourly wages, wage inequality has declined since 2014; gross monthly and annual wages plateaued during that period

Inequality in gross hourly wages is decreasing while inequality in monthly and annual wages is increasing

Gross salary of the person on the ● lower limit of the top decile in relation to the gross salary of the person on the ● upper limit of the lowest decile (90:10 percentile ratio), standardized, 1992 and 1991[1] = 100



Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

1 The gross annual wage is always indicated for the previous year. The annual wages are set to 100 in 1991 and only last until 2015.

FROM THE AUTHORS

"The legal minimum wage has a positive effect on gross hourly wage inequality, but this effect has not yet reached the gross monthly and annual wages." — ***Markus M. Grabka*** —

"The fact that the gross monthly wages are affected less than the hourly wages is due to fewer paid working hours." — ***Carsten Schröder*** —

Inequality in Germany: decrease in gap for gross hourly wages since 2014, but monthly and annual wages remain on plateau

By Markus M. Grabka and Carsten Schröder

ABSTRACT

Despite the booming German labor market, wage inequality is still a relevant issue. In the present study, the authors report on the changes in wages and their distribution between 1992 and 2016. In addition to real contractual gross hourly wages, we closely examined gross monthly and annual wages. Based on Socio-Economic Panel (SOEP) data, the results show that wage inequality rose significantly between 1992 and 2005, in particular with respect to monthly and annual wages. Since then inequality in monthly and annual wages has plateaued at its 2005 level. Inequality in hourly wages has decreased only since 2014, and between 2013 and 2016, average real gross hourly wages rose by five percent after a longer phase of stagnation. For the lowest ten percent of the population, they rose by 13 percent—a rate related to the implementation of sector-specific wages and the statutory minimum wage. However, these minimum wages obviously did not affect monthly and annual wages as anticipated.

Over the last 25 years, the general perception of the condition of Germany's labor market shifted radically. In view of the high unemployment rate after reunification, it was considered a "sick man" unable to compete in the global market due to a range of structural issues.[1] As a result of high employment and rising earnings, Germany's labor market is now considered as very competitive and attractive for employees. Alongside changes in the general economic environment, such as globalization, digitalization, and the global economy's growth, a series of reforms that made the labor market more flexible and reduced unit labor costs are driving the shift. These reforms include: adding opening clauses to collective bargaining agreements, the Hartz laws, relaxing the rules on working hours, and expanding the low-wage segment while making it more flexible.

The minimum wages implemented by sector after 2009 and the legal general minimum wage that followed in 2015 were reforms targeted at improving pay in the low-wage segment. The legal minimum wage in particular should have significantly reduced the gap in gross hourly wages, since around ten percent of eligible employees earned less than the legal minimum wage before the reform.[2] The extent to which narrowing the gap is reflected in the gross monthly wage distribution depends on how working hours were adjusted following the reform. The effect on the distribution of gross annual wages also depends on whether sub-annual periods without gainful employment, bonuses, and one-time payments underwent structural changes in the course of the years, and if so, how.[3]

1 See Dennis J. Snower and Christian Merkl, "The caring hand that cripples: The East German labor market after reunification," *American Economic Review Papers and Proceedings*, 96(2) (2006): 375–282.

2 See Patrick Burauel et al., "Mindestlohn noch längst nicht für alle – Zur Entlohnung anspruchsberechtigter Erwerbstätiger vor und nach der Mindestlohnreform aus der Perspektive Beschäftigter," *DIW Wochenbericht*, no. 49 (2017): 1109–1123. (available online, accessed February 12, 2018; this applies to all other online sources in this report unless stated otherwise).

3 A second example deals with the employment structure. German "mini-jobs" include a cap on gross monthly wages. If the proportion of people with mini-jobs rises, the average monthly wage will fall as long as labor market conditions remain the same. This does not necessarily apply to the average gross annual wage, if without this regulation, people with mini-jobs were to have considerably shorter periods of employment during the year.

Box

Definitions, methods, and assumptions for income measurement

The present study is based on the database of the Socio-Economic Panel (SOEP) longitudinal household survey. The survey asks all persons 17 and older questions about a range of socio-economic matters, including wages.

The authors examined the data with respect to three wage concepts:

1. Contractual hourly wages are based on information on gross monthly earnings from the previous month from main employment without one-time payments but including overtime pay, if applicable, divided by the contractual weekly working hours times 4.33, the factor required to arrive at monthly working hours.

2. Gross monthly wages from the previous month from main employment excluding one-time payments but including overtime pay, if applicable.

3. The gross annual wages earned in the previous year, including one-time payments such as vacation pay, Christmas bonus, 13th- or 14th-month wage, profit sharing, other bonuses, etc.

Properly dealing with missing information is a challenge faced by all surveys of the general population, in particular when it comes to sensitive issues such as income. In the SOEP data analyzed here, missing information is replaced using an elaborate imputation methodology on a cross-sectional and longitudinal basis.[1] The process includes newly imputing all missing values in retrospect after each new data collection period, since new information from surveys can be used to replace the data missing from prior years. This can lead to changes in earlier analyses. As a rule, the changes are minor.

Studies show that multiple adjustments in survey behavior occur during the first two survey waves, and they are not due to fluctuating willingness to participate.[2] To avoid such effects in the time series for wages, the first survey wave of each SOEP sample was excluded from the calculations.[3]

Upon consideration of extrapolation and weighting factors, the underlying SOEP microdata (version v33 based on the 33rd survey wave in 2016), these analyses are based on a representative picture of the dependent employees in private households. They therefore allow for conclusions about the overall population.

1 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.

2 Joachim R. Frick et al., "Using analysis of Gini (ANOGI) for detecting whether two subsamples represent the same universe," *The German Socio-Economic Panel Study (SOEP) Experience, Sociological Methods Research*, May 2006 vol. 34 no. 4 (2006): 427–468.

3 In 2016 for example, this was the case for the two new refugee samples, M3 and M4.

Three concepts, three realities: wages per hour, per month and per year

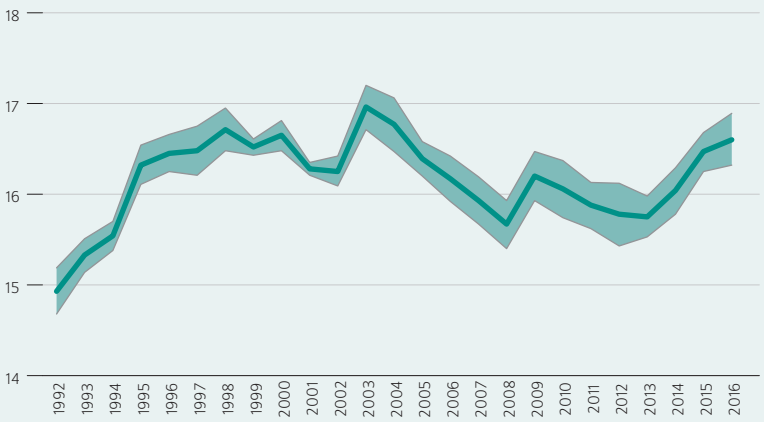
The present study adds breadth and depth to the German Institute for Economic Research's previous examinations of wage inequalities in Germany, updating it to 2016.[4] Unlike other studies, the calculations presented are based on three compensation concepts. Alongside frequently used contractual gross hourly wages, the authors also looked at gross monthly and annual wages, including one-time payments such as paid vacation or bonuses in the previous year (see Box).

It is interesting to compare the developments of the three different concepts because they reflect various facets of employees' workplace reality. A contractual gross hourly wage specifies an employee's earned income potential and, in the static view, is unrelated to hours worked. Gross

4 See Karl Brenke and Alexander Kritikos, "Hourly wages in lower deciles no longer lagging behind when it comes to wage growth," *DIW Economic Bulletin*, no. 21 (2017): 407–416. (available online).

Figure 1

Contractual real hourly gross wage[1]
In euros



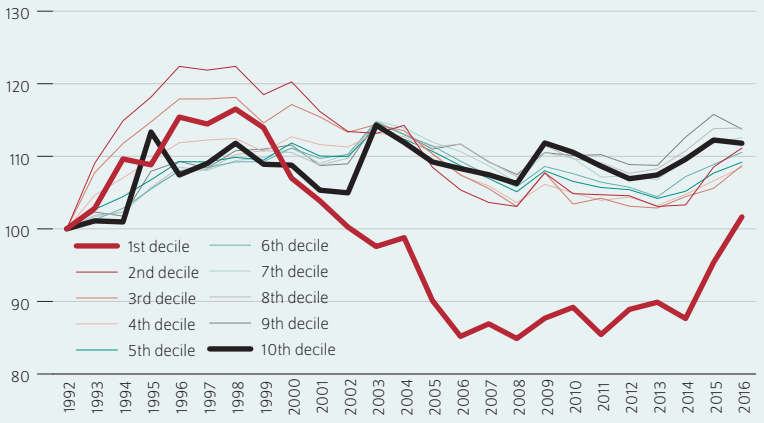
1 Gross hourly wage at main job, in 2010 prices.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

The average gross hourly wage has increased significantly since 2013.

Figure 2

Normalized contractual real hourly gross wage[1] at main job per decile
Mean per decile in euros (standardized to 1992=100)



1 In 2010 prices.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

The lowest decile has decreased the most but has been rising since 2014.

monthly wages are the product of the gross hourly wage and the actual number of hours worked. The growth trends of the two concepts can vary. Due to productivity gains or the implementation of a minimum wage, the average gross hourly wage can rise as the average gross monthly wage falls due to fewer hours worked.[5]

Gross annual wages—the sum of all monthly wages for one year, plus bonuses and one-time payments—describe incoming resources resulting from gainful employment over one year.[6] In addition to including supplementary compensation components, the gross annual wage distribution is different from the two other wage distributions because it encompasses all persons who pursued gainful employment at least once during the year.[7] On the other hand, hourly and monthly wage distributions only include those persons who pursued gainful employment in the month in question.[8]

Accordingly, structural changes in the labor market potentially have various and different effects on the three wage concepts. For example, if more and more highly qualified, commensurately paid women work during the period, the inequality in the distribution of gross hourly wages should increase. But if these women work less on average than those previously employed, the effect on gross monthly or annual wages is uncertain.

The data collected as part of the Socio-Economic Panel (SOEP) longitudinal study conducted annually by the German Institute for Economic Research (DIW Berlin) in collaboration with Kantar Public are the empirical basis of the following analyses.[9] The present study examined wage-dependent employees with the exception of apprentices, interns, persons performing military or civil service; only wages from main employment were considered in the computation of gross hourly and monthly wages.[10]

5 An individual employee's position in the distribution of gross hourly and gross monthly wages can also vary. For example, an employee can have a high gross hourly wage but can end up with a low gross monthly wage due to a low number of (paid) hours worked, and vice versa.

6 To find out how one-time payments affect wage inequality in general, see Thomas Lemieux, W. Bentley Macleod, and Daniel Parent, "Performance pay and wage inequality," *The Quarterly Journal of Economics*, CXXIV (1) (2009): 1–49.

7 For the influence of different observation periods on measured inequality, see Carsten Schröder, *Wage distributions and the accounting period: An assessment of the Shorrocks effect*, eds. John A. Bishop and Juan Gabriel Rodríguez, *Economic Well-Being and Inequality: Papers from the Fifth ECINEQ Meeting* (Bingley: Emerald Publishing Ltd., 2014).

8 Based on the month prior to the date of the survey.

9 For information on the SOEP, 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)," *AStA Wirtschafts- und Sozialstatistisches Archiv 2*, no. 4 (2008): 301–328. (available online).

10 The SOEP survey includes detailed information on monthly pay for main employment only. Monthly wages encompass full-time, part-time, and mini-job employment.

Significant rise in real contractual hourly wages in lowest decile since 2013

The average real[11] contractual gross hourly wage showed weak growth over the study period (1992–2016). From just under 15 euros in 1992, it rose to 17 euros in 2003. By 2013, it had fallen to 15.75 euros (see Figure 1). Starting in 2013 and with the implementation of the statutory minimum wage,[12] the average real contractual gross hourly wage rose to 16.60 euros in 2016. This equals a significant increase of over five percent in comparison to 2013.[13]

The growth of gross hourly wages differs by wage segment. Sorting dependent employed people by level of contractual gross hourly wage and dividing them into ten groups of equal size results in deciles. Using 1992 as the base year for the average wage per decile (=100), all deciles showed a significant rise in real wages during the 1990s (see Figure 2). Around the turn of the millennium, the trend changed for the lowest decile in particular. Due to the expansion of the low-wage sector,[14] as more and more people pursued minijobs, the average fell to 85 percent of its 1992 value until 2006. And around 2005, contractual hourly wages plateaued in all deciles. The picture was more positive as of 2013, especially in the lowest decile, which returned to its original level in 2016. The positive trend in the lowest decile is most likely the result of implementing the statutory minimum wage.[15]

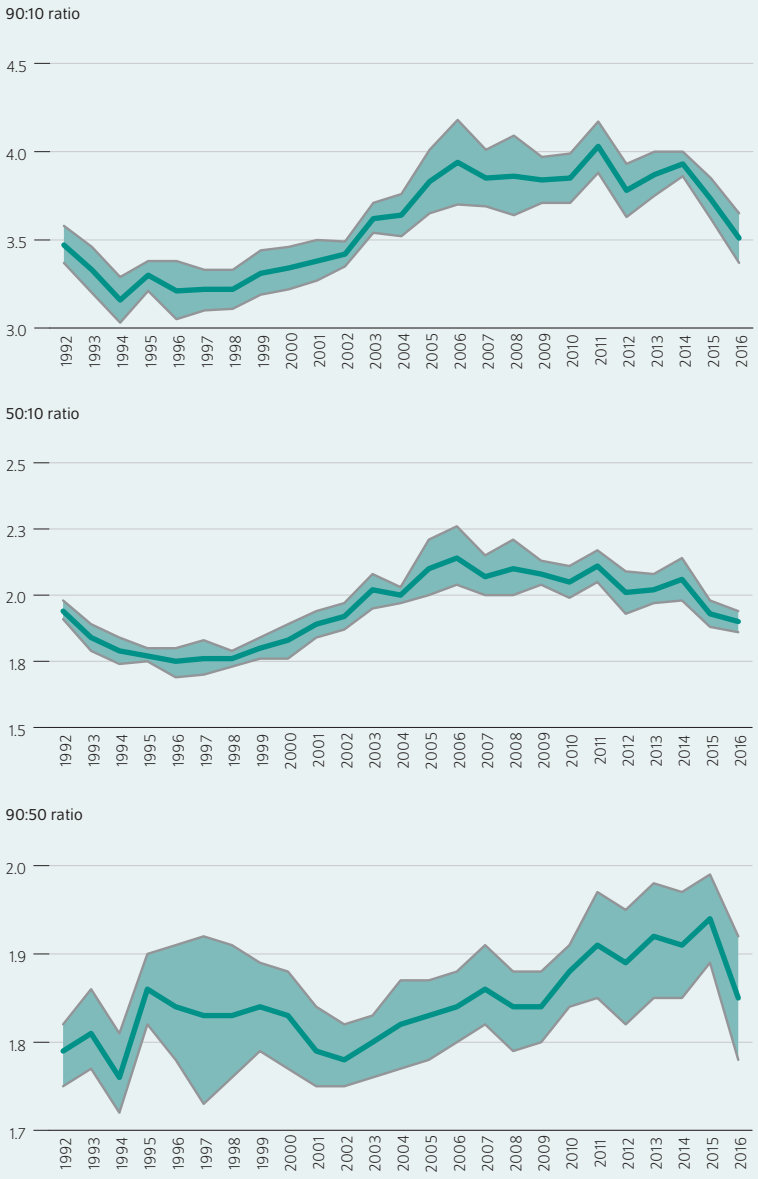
Inequality in contractual hourly wages declined as of 2014

The distribution of contractual gross hourly wages can be assessed by means of different inequality indices. In this study, we use percentile ratios to present the results. For example, 90:10 percentile ratio is the ratio of the wages of the person in the top (tenth) decile with the lowest earnings to the person with the highest earnings from the lowest (first) decile.

In the mid-1990s, the 90:10 percentile ratio of the contractual gross hourly wage was around 3.3.[16] It had risen to 3.9 by 2005 and has decreased significantly again since 2014 (see Figure 3). In 2016, the ratio was 3.5.

Figure 3

Inequality in contractual gross hourly wages at main job
Different percentile ratios



Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

The salary of the person with the lowest salary in the highest decile is around 3.5 times higher than the salary of the person with the highest salary in the lowest decile.

11 In 2010 prices, calculated using the consumer price index of the German Federal Statistical Office.

12 See Patrick Burauel et al., "Mindestlohn noch längst nicht für alle."

13 The index of hourly wages under collective bargaining agreement excluding one-time payments increased by 7.5 percent in the same period. See German Federal Statistical Office, "Verdienste und Arbeitskosten. 4. Vierteljahr," (2017).

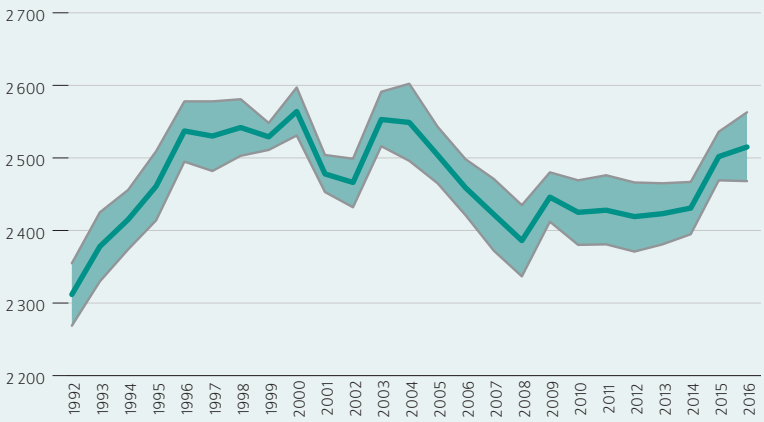
14 For example, the proportion of low-wage employees was just under 19 percent in 1995 and rose to just under 25 percent in 2009. See Thorsten Kalina and Claudia Weinkopf, "Niedriglohnbeschäftigung 2012 und was ein gesetzlicher Mindestlohn von 8,50 Euro verändern könnte," *IAQ Report* 2014-02 (2014). This means Germany has one of the largest low-wage sectors in Europe. See Eurostat, "Verdienststrukturerhebung. Jeder sechste Arbeitnehmer in der Europäischen Union ist Niedriglohnempfänger", press release 246/2016, December 8, 2016.

15 See Patrick Burauel et al., "Mindestlohn noch längst nicht für alle."

16 In other words, the gross hourly wage of the person at the lower limit of the tenth decile was 3.3 times higher than that of the person at the upper limit of the first decile.

Figure 4

Real gross monthly wage[1]
In euros



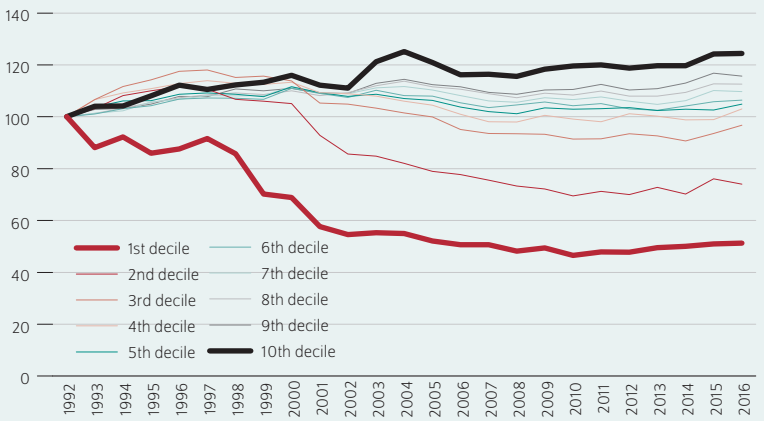
1 In 2010 prices at main job.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

The average real gross monthly wage has returned to its 2005 level.

Figure 5

Normalized real gross monthly wages[1] at main job per decile
Average per decile in euros (standardized to 1992=100)



1 In 2010 prices.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

The lowest deciles are the biggest losers despite rising hourly wages in monthly wages.

While the 90:10 percentile ratio describes the wage ratio for the two tails of the distribution, the 90:50 percentile ratio describes the relationship of top wages to the median wage.[17] The 90:50 percentile ratio fluctuated between 1.75 and 1.95 during the study period. This means that the differences in pay per hour in the upper half of the distribution have hardly budged despite all of the changes the German labor market has experienced since 1992.

The lower half of the distribution has a different relationship to the median wage. The 50:10 percentile ratio reflects increasing wage inequality between 1996 and 2006. The literature presents several explanations for this: the drop in demand for employees with low-level qualifications, a growing service sector, the reduction in collective bargaining coverage, and decreasing union organization.[18] When the minimum wage was implemented in 2015, the 50:10 percentile ratio fell significantly.[19]

Real gross monthly wage growth weaker than that of hourly wages

The growth trend of the average real gross monthly wage paralleled the trend of hourly wages. At around nine percent, growth between 1992 and 2016 was somewhat weaker than that of gross hourly wages, which rose by 11 percent during the same period. And at 3.8 percent, growth was somewhat lower than that of hourly wages (five percent) between 2013 and 2016 (see Figure 4).

Over time, we observed significantly stronger expansion in comparison to the distribution of hourly wages (see Figure 5). The upper six gross monthly wage deciles display a slight wave; whereby at 25 percent between 1992 and 2016, growth in the top decile is the highest. The lower three deciles show a different pattern. Between 1992 and 2010, real gross monthly

17 50:10 describes the ratio of the wages of the people employed at the median and those at the limit of the first decile.

18 For example, see Martin Biewen, Bernd Fitzenberger, and Jakob de Lazzer, "Rising wage inequality in Germany: Increasing heterogeneity and changing selection into full-time work," *IZA Discussion Paper Series*, no. 11072 (2017); Christian Dustmann, Johannes Ludsteck, and Uta Schönberg, "Revisiting the German wage structure," *The Quarterly Journal of Economics*, 124(2) (2009): 843–881; and David Card, Jörg Heining, and Patrick Kline, "Workplace heterogeneity and the rise of West German wage inequality," *The Quarterly Journal of Economics*, 128 (2013): 967–1015.

19 Alternative inequality indicators, such as the Gini index, mean-log deviation, and the Theil index, confirm the findings that inequality with regard to contractual hourly wages declined between 2014 and 2016. The 90:10 indicator is a conservative inequality measure that does not take the changes in wage distribution at the upper and lower tails into consideration. However, the international literature on wage inequality trends indicates that in the U.S. in particular, the top wage recipients drive wage inequality. See David H. Autor, Lawrence F. Katz, and Melissa S. Kearney, "Trends in U.S. wage inequality: revising the revisionists," *The Review of Economics and Statistics*, 90(2) (2008): 300–323.
The German Federal Statistical Office (*Statistisches Bundesamt*) reported in 2016 that the wage gap in Germany closed slightly between 2010 and 2014. The effect was stronger in eastern Germany than in the western part of the country. Subsequently, the 90:10 percentile ratio fell from 3.45 to 3.16 in eastern Germany. See German Federal Statistical Office, "Trend gestoppt: Lohnspreizung nicht weiter gewachsen," press release dated September 14, 2016. The SOEP data confirm this. Wages in the lowest decile rose disproportionately between 2006 and 2016. As a result, the 90:10 percentile ratio went from 3.9 to 3.0 between 2006 and 2016. In western Germany, it fell from 3.8 to 3.6, a much less significant drop. According to the Institute for Employment Research (*Institut für Arbeitsmarkt- und Berufsforschung*, IAB), wage inequality measured by daily pay for employees that contribute to the social insurance system in western Germany plateaued between 2011 and 2014. In the same period, the gap closed slightly in eastern Germany. See Joachim Möller, "Lohnungleichheit – Gibt es eine Trendwende?" *IAB Discussion Paper*, 9/2016 (2016).

wages in the lowest decile fell by around 50 percent,[20] in the second decile by around 30 percent and in the third decile by just under ten percent.[21] As of 2010, there was slight growth in real wages in the lowest three deciles, but it did not allow any of the three deciles to achieve its initial level.

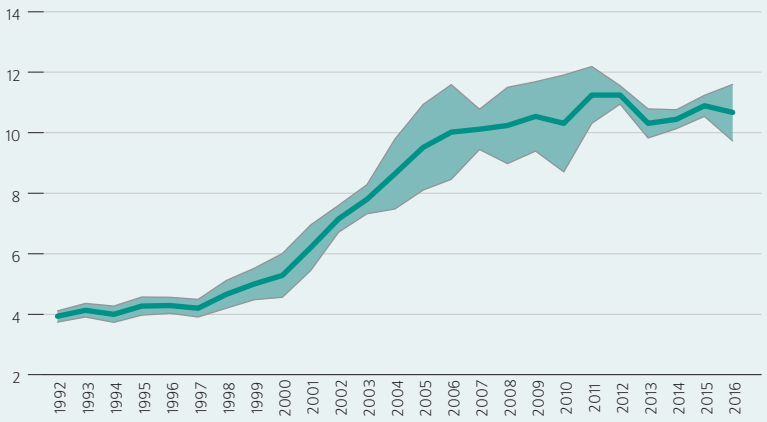
Overall, inequality in gross monthly wages increased markedly between 1992 and 2010 (see Figure 6). Measured by the 90:10 percentile ratio, the value was just under four in 1992 and had risen above ten by 2010. Unlike hourly wages, the ratio has not changed since then.[22]

The weak growth of the two lowest monthly wage deciles in Germany was accompanied by a growing number of mini-jobs. At the beginning of the 1990s there were around three million of them. The number rose to 7.5 million by 2010 and has since remained on that plateau.[23] Changes in working hours are also part of the explanation for the weak growth (see Table 1). For example, between 1992 and 2016 the number of hours worked in the lowest hourly wage decile fell by ten hours (25 percent). In the second and third deciles, the decrease was just under six hours (17 percent), or 2.5 hours (seven percent).[24] In the upper part of the hourly wage distribution, on the other hand, the number of hours worked rose by just under ten percent. Even if hourly wages had remained constant, we would have observed an increase in monthly wage inequality due to the asymmetrical change in the number of hours worked.

The positive trend of rising wages in the lowest hourly wage decile since 2014 is not reflected in a rise of similar magnitude in the lowest monthly wage decile. This finding requires an explanation and the Minimum Wage Commission provides several clues. For example, it reports that the number of working hours for those with full-time employment whose pay was below the minimum wage in 2014 decreased by around ten percent (measured by working hours per week) after the statutory minimum wage was implemented.[25]

Figure 6

Inequality in gross monthly wages at main job
Gross salary of the person on the lower limit of the top decile in relation to the gross salary of the person on the upper limit of the lowest decile (90:10 percentile ratio)



Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

Inequality in gross monthly wages increased sharply until 2010.

Table 1

Average actual work hours per decile of the contractual hourly wage
In hours per week

	1992	2002	2012	2016	Change 1992 to 2016 in percent	Absolute difference 1992 to 2016
1st decile	36.4	27.9	26.2	26.8	−26.5	−9.7
2nd	35.6	32.2	30.4	29.6	−16.9	−6.0
3rd	37.2	35.9	35.5	34.6	−7.0	−2.6
4th	37.4	36.7	36.8	35.3	−5.5	−2.1
5th	37.9	37.1	38.6	36.9	−2.5	−0.9
6th	38.9	38.6	38.2	39.0	0.2	0.1
7th	39.0	39.1	39.4	38.3	−1.8	−0.7
8th	39.4	39.8	40.4	39.1	−0.8	−0.3
9th	40.0	40.7	41.1	39.9	−0.2	−0.1
10th decile	37.9	40.3	42.5	41.5	9.7	3.7
Mean	38.0	36.8	36.9	36.1	−4.9	−1.9

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

20 Other studies also found a significant decline in real wages. See for example David Card, Jörg Heining, and Patrick Kline, "Workplace heterogeneity and the rise of West German wage inequality," *The Quarterly Journal of Economics* 128(3) (2013): 967–1015. Data from the IAB show that men in the first decile in western Germany with full-time employment in the private sector were subject to a 25-percent decrease in daily pay between 1996 and 2008.

21 When comparing the deciles for hourly wages and monthly wages, it should be noted that the same employees are not necessarily included.

22 The 50:10 percentile ratio also rose during the period—from around 2 to 5.5. The 90:50 percentile ratio rose slightly during the period.

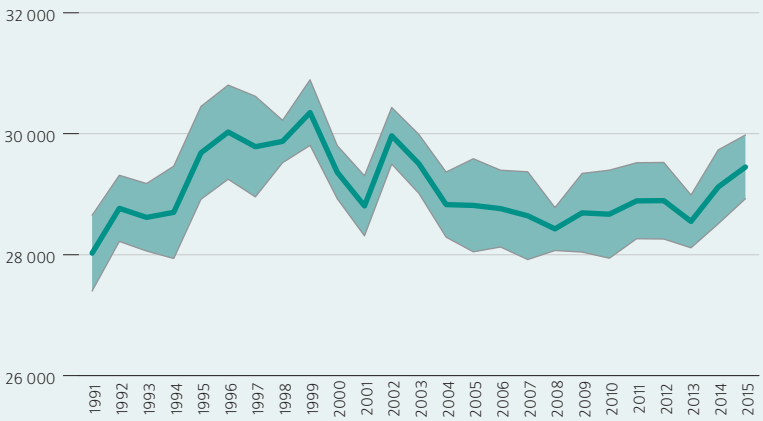
23 This includes all mini-jobs held, whether exclusively, as main employment, or as secondary employment. See Federal Employment Agency, Beschäftigungsstatistik (2017). (in German; available online).

24 The expansion of part-time employment in Germany, particularly among women, was also responsible for this development.

25 See Minimum Wage Commission, English summary of the first evaluation report by the Minimum Wage Commission (2016). (available online). Also see the findings for companies in Saxony. Lutz Bellmann et al., "Mindestlohn: Längsschnittstudie für sächsische Betriebe", *IAB Forschungsbericht*, no. 7/2017 (2017). When comparing hourly and monthly wage deciles, it should also be noted that the underlying populations are not identical. Instead, around 50 percent of those in the lowest hourly wage decile are in the second and third monthly wage decile.

Figure 7

Real annual earnings[1] including one-time payments
In euros



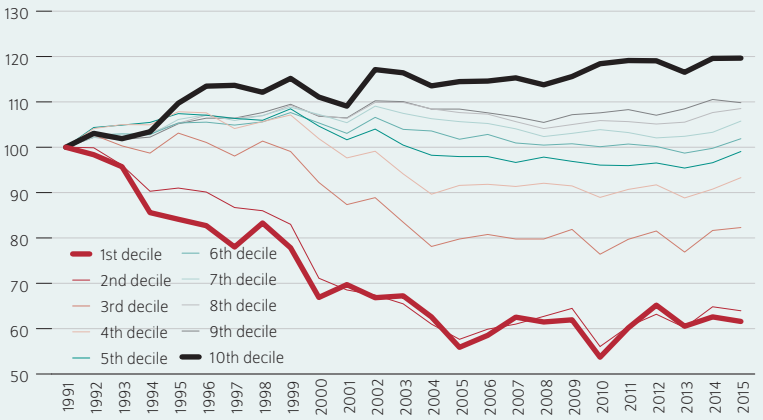
1 In 2010 prices. Annual earnings from main and secondary jobs.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

Gross annual earnings are increasing less than hourly and monthly wages.

Figure 8

Normalized real annual earnings[1] including one-time payments per decile
Mean per decile in euros (standardized to 1991=100)



1 In 2010 prices. Annual earnings from main and secondary jobs.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

The spread of gross annual earnings is increasing.

No change in real gross annual wages

Over the entire study period, real gross annual wages including one-time payments from main and secondary employment rose around five percent on average, making their growth flatter than that of hourly or monthly wages as a percentage (see Figure 7). This could be the result of various factors, in particular a decrease in one-time payments or the greater importance of periods without gainful employment during the year.

As with the two other wage concepts, the gap in the distribution of gross annual wages has grown wider since 1992 (see Figure 8). While real annual wages grew by a total of 20 percent in the top decile, they did not change in the fifth and sixth deciles, and in the two lowest deciles they decreased by around 35 percent. Further, unlike the case of hourly wages, no growth in gross annual wages was visible at the current tail of the lower three deciles.

The measured inequality of gross annual wages increased between 1992 and 2010/2011 (see Figure 9). We observed significant differences in the extent of the changes among the three percentile ratios. The 90:50 ratio grew moderately during the period (from 1.9 to 2.2), while the 90:10 (from around eight to 15) and 50:10 ratios (from around four to seven) grew much more rapidly. As of 2011, there has been a slight downward trend[26] for all three percentile ratios, but it is not statistically significant.[27]

In the following section, we will find out how one-time payments, such as the traditional 13th-month salary and bonuses, have developed across the annual wage distribution and whether or not the changes are important factors in the growth of inequality in gross annual wages. First of all, the higher the gross annual wage, the higher the amount of one-time payments. Furthermore, one-time payments fell by over 50 percent in the lower half of the gross annual wage distribution between 1991 and 2015, while they rose by a solid 20 percent in the top decile (see Figure 10). Hence the asymmetrical trend for one-time payments also contributes to the inequality of gross annual wages.[28]

26 Examining regions reveals that the inequality in gross annual wages decreased in the lower half of the wage distribution between 2006 and 2016 in eastern Germany. In western Germany on the other hand, gross annual wage inequality continued on a plateau.

27 Comparing the levels and trends of percentile ratios based on gross monthly and annual wages, it becomes obvious that they basically developed in parallel during the period. The ratios for annual wages are much higher. This finding might be surprising. The literature assumes that when the period during which wages are measured is extended (here, from one month to 12 months), measured inequality will fall because a longer measurement period should smooth over short-term wage fluctuations. This effect is not apparent in the present study for a couple reasons. We did not use a balanced sample, including only those people who were gainfully employed at the time when we were designing the gross hourly and monthly wage-based study populations.

28 According to information from the German Economic Institute (IW), the one-time payment component of gross wages in the manufacturing sector also fell by virtually 50 percent between 2000 (14 percent) and 2013 (7.5 percent). See Christoph Schröder, "Personalzusatzkosten in der deutschen Wirtschaft," *IW – Trends*, 33(2) (2006): 1–12; and Christoph Schröder, "Die Struktur der Arbeitskosten in der deutschen Wirtschaft," *IW – Trends* 41(2) (2014): 29–42.

Of course, the changes in periods without gainful employment during the year could also potentially explain the development of gross annual wages. But based on the SOEP data, it is apparent that these periods have slightly decreased across all employed persons and therefore do not have a significant impact on the distribution.[29]

Conclusion: a break in the long-running inequality trend

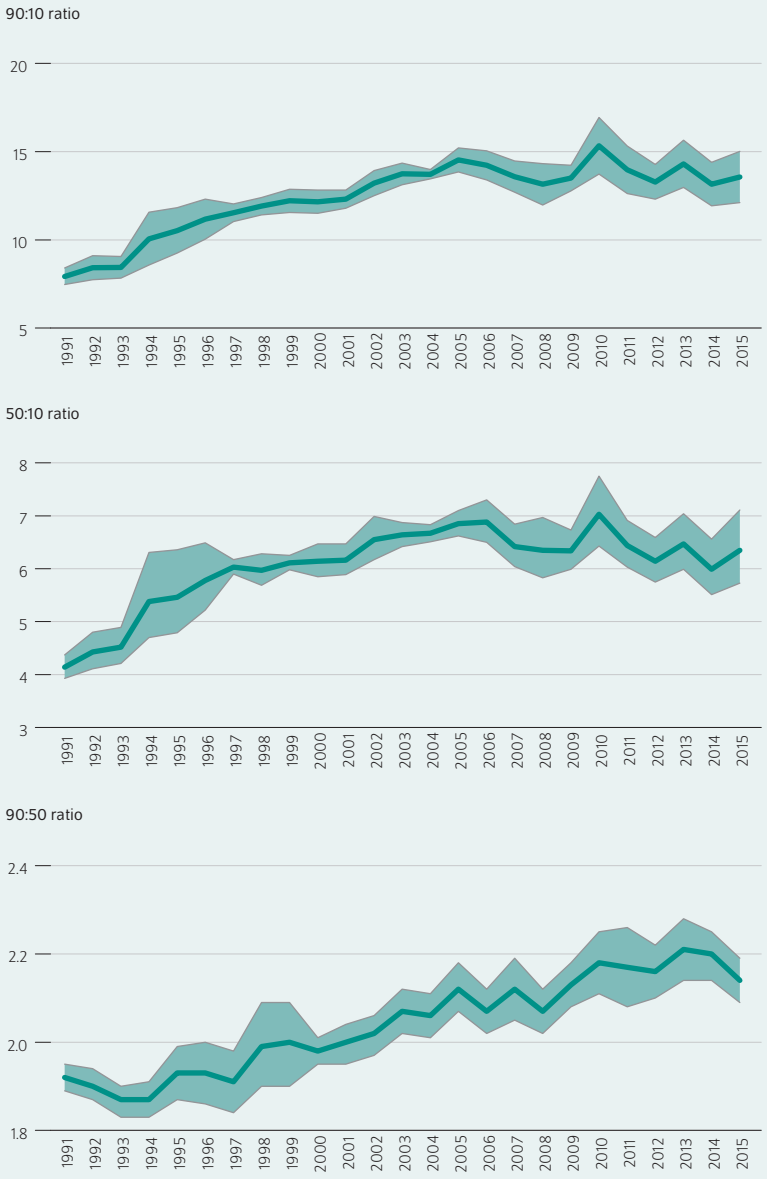
Measured by the number of persons employed, the German labor market has developed very positively in recent years. This is at least partially due to past labor market reforms and the wage restraint practiced by the collective bargaining parties in an effort to improve the country's international competitive standing. But in recent years, targets and measures for avoiding poverty wages and reducing dependency on social transfer payments to supplement wages have become the focus of debate once again. Sector-specific minimum wages and the blanket minimum wage are two important measures that were implemented in support of these goals.

The present study shows the growth trends of real gross hourly, monthly, and annual wages between 1992 and 2016, given the circumstances outlined above. Overall, it is apparent that wages have increased only slightly. Since 2014, only hourly wages have significantly increased. Wages in the lower wage segments have risen more quickly since that time, which has contributed to closing the wage gap. For monthly and annual wages, the most recent upturn was ultimately moderate in the lower part of the distribution due to a decrease in the number of hours worked.[30]

We found that implementing the minimum wage had only a limited impact on raising the monthly wages of low earners and putting them in the position of being able to earn a living in employment. It remains to be seen whether or not the situation will change after the minimum wage is raised again (to 9.19 euros per hour on January 1, 2019).[31] In addition to regularly raising the minimum wage, more effective controls are required to ensure that all of the employed persons who are eligible for it actually benefit from it. According to the Police Union (*Gewerkschaft der Polizei*), however, the number of "employer audits" conducted according to the 2011 Act to Combat Clandestine Employment (*Schwarzarbeitsbekämpfungsgesetz*, (SchwarzArbG)) fell from just under 68,000 to around 40,000 in 2016. In individual

Figure 9

Inequality in annual earnings[1] including one-time payments
Different percentile ratios



1 In 2010 prices. Annual earnings from main and secondary jobs.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

Inequality in gross annual earnings has mainly increased in the lower half of the distribution.

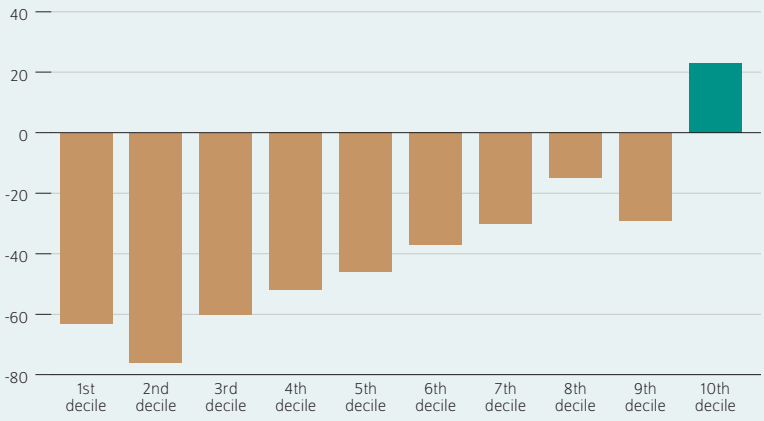
29 In the SOEP, the proportion of employed persons who were only employed during the year in question went from 19 percent in 1991 to 17 percent in 2015.

30 See Minimum Wage Commission, "English summary of the first evaluation report." (available online).

31 See Burauel et al., "Mindestlohn noch längst nicht für alle."

Figure 10

Changes in one-time payments per decile of annual earnings[1]
Change in average one-time payments between 1991 and 2015 in percent



1 In 2010 prices. Annual earnings from main and secondary jobs.

Source: SOEP v33, employees in private households, excluding trainees, interns, and the self-employed.

One-time payments have only increased in the highest wage decile.

sectors, the decline is even higher than 50 percent,[32] which is why the federal police sector of the Police Union is critical: "It remains a big mystery how customs, with diminishing inspection pressure, wants to fulfill its statutory duties under the Act to Strengthen Wage Setting Autonomy (*Tarifautonomiestärkungsgesetz*)."[33]

32 See Gewerkschaft der Polizei. "Aktuelle Meldungen der Gewerkschaft der Polizei", *Bezirksgruppe Zoll Online-Ausgabe Nr. 6,200* (2018) Oktober.

33 See Gewerkschaft der Polizei. *Newsletter*. Oktober 2014 (in German; available online).

Markus M. Grabka is a research associate at the Socio-Economic Panel study (SOEP) at DIW Berlin | mgrabka@diw.de

Carsten Schröder is deputy head of the Socio-Economic Panel study at DIW Berlin | cschroeder@diw.de

JEL: D31, I31, I32

Keywords: Wage inequality, monthly earnings, annual earnings, SOEP

LEGAL AND EDITORIAL DETAILS

DIW Berlin — Deutsches Institut für Wirtschaftsforschung e. V.
Mohrenstraße 58, 10117 Berlin
www.diw.de
Phone: +49 30 897 89–0 Fax: –200
Volume 8

Publishers
Prof. Dr. Tomaso Duso; Dr. Ferdinand Fichtner; Prof. Marcel Fratzscher, Ph.D.; Prof. Dr. Peter Haan; Prof. Dr. Claudia Kemfert; Prof. Dr. Stefan Liebig; Prof. Dr. Lukas Menkhoff; Prof. Johanna Möllerström, Ph.D.; Prof. Karsten Neuhoff, Ph.D.; Prof. Dr. Jürgen Schupp; Prof. Dr. C. Katharina Spieß

Editors-in-chief
Dr. Gritje Hartmann; Mathilde Richter; Dr. Wolf-Peter Schill

Reviewer
Dr. Johannes Geyer

Editorial staff
Renate Bogdanovic; Dr. Franziska Bremus; Rebecca Buhner; Claudia Cohnen-Beck; Dr. Daniel Kemptner; Sebastian Kollmann; Matthias Laugwitz; Markus Reiniger; Dr. Alexander Zerrahn

Sale and distribution
DIW Berlin Leserservice, Postfach 74, 77649 Offenburg
leserservice@diw.de
Phone: +49 1806 14 00 50 25

Layout
Roman Wilhelm, DIW Berlin

Cover design
© imageBROKER / Steffen Diemer

Composition
Satz-Rechen-Zentrum Hartmann + Heenemann GmbH & Co. KG, Berlin

ISSN 2568-7697