

The German Minimum Wage and the Gender Pay Gap

Marco Caliendo*

University of Potsdam, IZA, DIW, IAB

Linda Wittbrodt†

University of Potsdam

Working Paper:

February 1, 2018

PRELIMINARY VERSION, PLEASE DO NOT CIRCULATE!

Abstract

In this paper we analyze the impact of the German minimum wage introduction on gender inequality in hourly wages. In January 2015, Germany introduced a statutory nationwide wage floor with only few exemptions. The reform denoted an important intervention for the German labor market that translated into a wage increase for about 10 percent of the eligible employees. Accordingly, recent literature has identified a positive impact of the wage floor on hourly wages at the bottom of the wage distribution. Since women are often found to be overrepresented among low-wage employees, a wage floor could benefit them particularly. In that sense, the minimum wage could pose a suitable policy tool to fight gender inequality by raising women's wages disproportionately. Our paper draws upon that notion and estimates the relationship between the German wage floor and the gender pay gap. We employ detailed individual data from the Socio-economic Panel (SOEP) and the Structure of Earnings Survey (SES). Analyzing the short-term development of wages for different socio-economic subgroups, we find that while women still earned less than men in 2016, the overall gender pay gap decreased from 22.89 percent in 2014 to 21.08 percent in 2016. In some subgroups, such as among employees with a foreign nationality and in small firms, women's wages caught up in particular. Exploiting regional variation in the bite of the minimum wage as proposed by Card (1992), we then estimate the impact of the minimum wage on regional gender wage gaps in a difference-in-difference framework. We do not find a significant effect of the bite on regional wage inequality. This may be due to the fact that in those regions where the wage floor bites hardest, wage disparities are lower to begin with. In contrast to evidence from other countries, our results thus suggest that the minimum wage might not be an effective tool to alleviate gender wage inequality in Germany.

Keywords: Minimum Wage, Gender Wage Gap, Regional Bite

JEL codes: J16, J31, J38, J71

*e-mail: caliendo@uni-potsdam.de. Corresponding address: University of Potsdam, Chair of Empirical Economics, August-Bebel-Str. 89, 14482 Potsdam, Germany. Tel: +49 331 977 3225. Fax: +49 331 977 3210.

†e-mail: wittbrodt@empwifo.uni-potsdam.de

1 Introduction

In January 2015, Germany introduced a nationwide statutory minimum wage of €8.50 gross per hour. In doing so, Germany followed many of its European neighbor countries that had already implemented a compulsory wage floor. At this point, it meant a wage increase for about 4 million employees, or about 10 percent of the eligible workers (Destatis, 2016; Caliendo *et al.*, 2017b). The reform thus covered a substantial share of employees and was therefore accompanied by many fears and expectations. It was the result of a long-lasting debate, where, on the one hand, proponents of the introduction pointed to an increase in social justice by decreasing inequality and preventing poverty (Bosch, 2007; Kalina and Weinkopf, 2014; BMAS, 2014). Critics, on the other hand, feared enormous job losses caused by the large number of affected employees and the corresponding degree of the impact on the labor market (SVR, 2013, 2014; Müller and Steiner, 2010, 2011, 2013; Knabe *et al.*, 2014).

While the first empirical short-run evidence finds only small negative employment effects of the minimum wage (Bossler and Gerner, 2016; Garloff, 2016; Caliendo *et al.*, 2017a), the reform's positive effect on wages is more apparent. As was desired by the advocates, Caliendo *et al.* (2017b) find indeed an increase of hourly wages at the bottom of the wage distribution. This compressing effect of the minimum wage could also impact other dimensions of inequality. Since women are typically more likely to be in the group of low-paid employees (Connolly and Gregory, 2002; Kahn, 2015; Card *et al.*, 2016), they could particularly benefit from a minimum wage. If, in accordance with the wage floor, their wages increase more strongly than men's wages, wage disparities could be alleviated and the gender wage gap reduced (Blau and Kahn, 1996, 2013).

In this paper, we first give a short overview on the recent literature about the wage gap in Germany and other countries. Moreover, previous literature about the relationship between a minimum wage and gender earnings inequality is reviewed. To shed some light onto the development of male and female wages in the years around the minimum wage reform, we examine wage growth and the development of the gender wage gap for different sociodemographic subgroups. Since women are typically employed in a different type of employment we also look at work-specific characteristics. Making use of regional variation in the bite, we then analyze the effects of the German minimum wage on regional gender wage gaps. Moreover, we will apply a quantile regression and estimate effects separately for different groups according to education and employment type.

2 Previous Evidence

2.1 Wage Gap in Germany and Other Countries

The differences between men and women's earnings have been studied a lot over the last years. One aspect that has been examined more closely are country-specific differences in the pay gap. Figure 1 shows OECD data for the unadjusted gender wage gap in 2014 for different countries, defined as the difference between median earnings of men and women relative to median earnings of men.

The figure shows that gender inequality varies strongly between different OECD countries. While the nations with the smallest wage differences, Belgium and Luxemburg, display a gap of only roughly three percent, the country with the largest gap, Korea, has a divergence of over ten times that size. In Germany, the difference amounts to 17.2 percent, which puts it very close to the United States and the United Kingdom and slightly below the European Union average.

[INCLUDE FIGURE 1 HERE]

[INCLUDE FIGURE 2 HERE]

However, the differences between male and female earnings have also developed during the last years. Figure 2 displays the gap for a number of states and shows that wage disparities follow different time trends across countries. Korea, which still has the largest gender wage inequality in the OECD countries, has experienced a reduction in the gender wage gap from over 50 percent to less than 40 percent. It thus follows a similar trend as the US and the UK, where the gap amounted to over 35 percent in the early 1980s, but decreased considerably in the last decades. In contrast, Germany experienced a sharp decline in the wage gap in the early 1990s, but disparities have stayed rather stable since then. It is now on a very similar level of gender inequality as Sweden. However, the Scandinavian country does not follow the general trend of declining wage gaps, since it has stayed on a nearly constant path since over 30 years and has even experienced an increase in the late 1980s. The country with the lowest wage disparities, Belgium, has always had a smaller level of wage inequality and managed to reduce it even further in the recent past. It is thus demonstrating that it is possible and, in comparison, Germany's continuously high levels raise the question of how the wage gap can be diminished further there. In this sense, it is worthwhile to look at explaining factors of

wage disparity.

There is already a large strand of literature that focuses on reasons for the gender wage gap. A substantial part of the differences in earnings of men and women can be explained by observable factors, such as differences in schooling and work experience, the decision on how to divide labor within the family, compensating wage differentials and discrimination. Also factors that determine selection into occupations, industries and firms as well as labor force participation as a whole might be different between the genders. Moreover, a more recent strand of research focuses on norms, psychological factors and non-cognitive skills that might influence the pay gap, such as risk aversion and inclination to compete or negotiate (for a comprehensive literature overview see Blau and Kahn, 2017).

Differences in these factors might also be the reason for the wide cross-country divergences in the wage gap that was seen in Figure 1. In a number of papers, Blau and Kahn study the differences in pay gaps across countries (Blau and Kahn, 1992, 1995, 1996, 2003). Looking at returns to skills, they find that the wage gap is strongly influenced by high levels of wage inequality. This is due to the fact that female workers typically are more likely to earn wages at the bottom of the wage distributions (Connolly and Gregory, 2002; Kahn, 2015; Card *et al.*, 2016). Moreover, the wage gap also depends upon cultural views on female labor force participation, fertility, child care availability and these factors could also partly explain cross-country differences (Borck, 2014; Polachek and Xiang, 2014). Hirsch *et al.* (2013) also find a relation between the wage gap and urbanness. They show that regional labor markets that are more densely populated are more competitive and thus hinder the employer to discriminate against women.

Accounting for the observable reasons for differing wages, however, still leaves a substantial gap that is unexplained. This so called *adjusted gap* has been declining in the last decades, such that the decrease in the overall wage gap during the last years can partially be explained by a decrease in the unexplained gap. However, an adjusted gender wage gap still remains (Blau and Kahn, 2017). It could be possibly due to unobservable characteristics such as employer's discrimination (Sin *et al.*, 2017).

Additionally, the wage gap takes different forms. While in some countries, it is wider at the top of the wage distribution ('glass ceilings'), in others it is more pronounced at the bottom ('sticky floors'). A lot of literature finds larger gaps for higher wages (Christofides *et al.*, 2013; Blau and Kahn, 2017), but there is also evidence for the gender pay gap being especially rel-

evant at the lower percentiles of the distribution (Kahn, 2015; Duraisamy and Duraisamy, 2016).

Identifying the gender pay gap is not trivial, since it depends on which information is included, which moments of the wage distribution are compared and what the underlying database is. For Germany, there are some studies that aim to quantify the wage disparity. Boll and Leppin (2015) estimate the wage gap on the basis of different definitions and calculate a gap between 19.9 and 23.3 percent for 2011, the adjusted gap lying between 2.3 and 8.3 percent. The varying numbers are due to the in- or exclusion of small firms, the public sector, bonuses and overtime. The German Federal Statistical Office published similar results, stating that the average gross hourly earnings of women undercut those of men by 22 percent in 2014. However, three quarters of that can be explained by structural differences, the main reasons being gender-specific differences in industries, branches and occupations as well as differing leadership and job requirements. Moreover, women work part-time more often than men (Destatis, 2017). Yet, this still leaves an adjusted pay gap of about 6 percent. Moreover, Boll and Leppin (2015) point out, that just because part of the pay gap is explained, it is not necessarily free of discrimination. Men and women can have different access possibilities to various explaining factors, might be disadvantaged in evaluation procedures and less aggressive in wage negotiations. Moreover, Wrohlich and Zucco (2017) argue that explaining factors such as different preferences regarding working hours and occupation are also consequences of social and institutional norms and restrictions and as such possibly also caused by discrimination.

2.2 Wage gap and minimum wages

Seeing that the gender pay gap has gained more public attention over the last decades, it seems consequential that the debate about policy tools to reduce it has also sparked. One possible tool to fight gender wage inequality are labor market institutions in general, and minimum wages more specifically. In their seminal paper, DiNardo *et al.* (1996) have looked at the role of labor market institutions for the distribution of wages. They find evidence that a decline in the real US minimum wage in the 1980s has led to higher wage inequality for women. They thus reason that labor market institutions are as important in explaining changes in the wage distribution as supply and demand issues.

Some studies have continued this line of research and widened the evidence to other countries.

Robinson (2005) looks at differences in the minimum wage and the gender wage gap across regions in Britain. She finds that that higher minimum wage gaps indeed coincide with smaller wage gaps. Bargain *et al.* (2016) study the minimum wage introduction in the UK and Ireland. Using distribution regression, they find that the wage floor decreases the gender wage gap for Ireland, especially for low wage workers but also with some spillover effects for higher earning employees. The effect on the mean gap was negligible, though. There was no effect in the UK, which they attribute to a lack of compliance with the new regulations. There is also evidence for a positive impact of the minimum wage on gender equality from Australia, (Broadway and Wilkins, 2017), China (Li and Ma, 2015), Indonesia (Hallward-Driemeier *et al.*, 2015), India (Menon and van der Meulen Rodgers, 2017) and Poland (Majchrowska and Strawinski, 2017). In a simulation study for Germany, Boll *et al.* (2015) predict that the minimum wage can reduce the gender pay gap by 2.5 percentage points. Moreover, some studies show that the higher the minimum wage bites into a countries wage distribution, the larger the impact on the gender wage gap. Schäfer and Gottschall (2015) compare 25 European countries and show that high levels of the minimum wage narrow the gender wage gap for full-time employees. Additionally, Kahn (2015) shows that the gender pay gap is negatively associated with a country’s Kaitz-index, i.e. the level of the statutory minimum wage relative to its median wage.

One potential problem, however, is that minimum wages could also impact the intensive and extensive margins of employment. Women could deliberately or involuntarily reduce their working hours or be forced out of employment completely. However, the literature is not clear on the effect of the wage floor on hours worked for women (Blau and Kahn, 2017; Kahn, 2015; Addison and Ozturk, 2012; Connolly and Gregory, 2002). In this paper, we only analyze hourly wages of women and men in employment, not looking at a possible reduction in jobs.

3 Data

3.1 Data Sources

We use data from the Socio-economic Panel (SOEP, 2017, v33) and the Structure of Earnings Survey (SES)¹. The SOEP is an ongoing panel survey that currently contains about 15.000 participating households – or 30.000 individuals, respectively – per year and is conducted annually since 1984 (see Wagner *et al.*, 2007). It allows us to make use of individual information

¹Source: FDZ der Statistischen Ämter des Bundes und der Länder, Verdienststrukturerhebung, 2014.

about socio-demographics, employment, earnings and place of residence of each participant. The following analysis will rely on its person-level data from the years 2011 to 2016.

While hourly wages are not surveyed directly in the SOEP, we can compute them as the ratio of gross monthly wages and weekly working hours adjusted by average weeks per month. Since minimum wage regulations are binding for any working hours, including overtime, ‘actual wages’ are the policy target, i.e. wages that account for unpaid overtime. This is why we will look at actual hourly wages in our upcoming analysis.²³ Moreover, we include all employees with a valid wage. Although the minimum wage defines a number of exemptions⁴, we include all workers irrespective of their eligibility to the wage floor, thus analyzing the effect on the whole workforce. However, we will look into the consequences of this decision in the sensitivity analysis.

Additionally, we use the SES, an employer data set that includes more than 70,000 firms and about one million employees overall. Every four years, representatively-chosen firms are asked to provide detailed information on firm- and person-level data of their employees, such as income and working hours. Since it is more comprehensive than the SOEP, it is better suited to aggregate individual information to a regional level. Unfortunately, it is only conducted every four years, the most recent wave being from April 2014. We thus use it to determine our pre-minimum wage bite measures on the regional level.

In section 4, we will conduct an analysis on the regional level. To do so, we rely on the 96 planning regions (“Raumordnungsregionen”, ROR, see BBSR, 2016), which combine several administrative districts according to their commuter flows and economic structure.

3.2 Descriptive Statistics

The wage distribution in Germany varies strongly for women and men. Figure 3a shows the distribution of actual hourly wages in 2014, one year prior to the minimum wage introduction. It shows that women are more likely to earn around €8.50, the amount of the introduced the wage floor, while men display higher wages. Two years later, in 2016, the wage distribution

²See Brenke and Müller (2013); Brenke (2014) for the calculation of actual hourly wages.

³Note that the SOEP surveys gross monthly income for the previous month, while the working hours are taken as those of the previous week. Thus, income and working hours do not necessarily match each other. This could possibly lead to measurement biases due to the lag between hours and income, especially when overtime is taken into account. However, overtime is an important tool in circumventing the minimum wage and should therefore be taken into account.

⁴The minimum wage regulations entail exemptions for the self-employed, trainees, some interns, workers aged under 18 without formal training, volunteers and the long-term unemployed. Moreover, industries with preexisting sector-specific minimum wage agreements under €8.50 were granted a transition period until 2017.

has shifted upwards, and there is an even larger spike slightly above the minimum wage. However, there are still large differences between wages of males and females (see Figure 3b).

[INCLUDE FIGURE 3 HERE]

Overall, the average hourly wage amounted to €16.20 in 2014 and it increased to €16.88 in 2016. Yet, hourly wages differ for different subgroups of employees, as is depicted in Table 1. There are strong differences with respect to sociodemographic and workplace related factors. Foreign employees earn much less than German workers, as do people living in East Germany. Moreover, wages increase with a workers education, with working hours and with firm size. Additionally, employees covered by a temporary contract earn substantially less than workers without a time limit on their work agreement. The structure of these differences does not change in 2016, although hourly wages increase for all groups.

[INCLUDE TABLE 1 HERE]

Table 1 displays wages for men and women separately. It can be seen, that women earn less than men in every single group, since the wage gap is positive for categories and in both years. Overall, women's hourly wages amounted to €14.14 in 2014, while men earned €4.19 more. The absolute disparity is the widest at the level of highly educated employees, where women earn €6.30 less than men. However, when looking at percentage differences, women with primary education are disadvantaged the most, since their unadjusted wage gap amounts to 29 percent. The differences also prevail in 2016. The smallest difference between male and female hourly wages can be observed in the group of workers in part-time employment and employees with a temporary contract. Men earn 'only' about three percent more in those groups. Moreover, although overall wages are much lower in East Germany than in West Germany, the same holds true for the gender wage gap. While women earn only 10 percent less than their male counterparts in the regions of the former GDR, the gap amounts to 25 percent in West Germany. This large difference could be due to different takes on traditional gender roles and preferences about family work.

Overall, the gender wage gap was narrowed two years after the minimum wage introduction and women seem to be catching up. While in 2014 women earned 22.89 percent less than men, the gap decreased to 21.08 percent in 2016. Both in total and for most subgroups, women experienced a larger relative wage increase than men. Most prominent was the relative raise

in wages of women with a foreign nationality (8.77 percent) compared to the wage increase for foreign men (1.02 percent), leading to a substantial drop in the gender gap in this group. Moreover, this holds true for people living in West Germany (5.44 vs. 2.79 percent), employees with primary education (5.41 vs. 2.41 percent), marginally employed (4.69 vs. 2.15 percent) and workers in small firms (4.89 vs. 1.40 percent). This gives the first indication, that the wage disparity decreased in the years around the wage floor reform and that women in some subgroups benefitted particularly. Interestingly, in part-time employment, where women are strongly overrepresented (see Table 2), men experienced larger wage increases than women, such that the gender wage gap in fact increased by 4 percentage points for this group. However, wage disparity is still comparably low among part-time employees.

[INCLUDE TABLE 2 HERE]

However, when looking at the gender wage gap it is not only crucial how large wages are in these groups on average. As discussed in section 2.1, women also display very different personal and job-related characteristics. Table 2 therefore displays the share of females as well as the share of workers that earn less than €8.50 for each group. It becomes clear, that women are strongly overrepresented among the part-time and marginally employed. Seeing that these groups have also lower wages and thus much higher percentage of affected employees, women are even more affected by them. The same holds true for people with secondary education and temporary contracts and for employees in firms with less than 20 workers. At the same time, the categories where women are more present, often display a higher share of employees earning less than the wage floor. Among the marginally employed workers, of which only every fourth is a man, over 50 percent had an hourly wage below €8.50. Although this share decreased to 46 percent in 2016, still a substantial share of those employees was not paid what they were due.

It is thus evident, that women earn less than men in general and are also more likely to be employed in groups with strong wage differences. The minimum wage could therefore be a useful tool to reduce these gender wage disparities, by benefiting women especially.

4 Methodological Approach

After having discussed possible relations between wage disparities among men and women with wage floor regulations, we will identify the impact of the German minimum wage on

the gender wage gap in the following. We follow Card (1992), who proposes an identification approach that relies on regional variation. It does therefore not depend on differences in legislation, which can not be exploited in the German case (see also Caliendo *et al.*, 2017a). The approach incorporates the intuition that regional wages have to adapt to varying degrees in accordance with a newly introduced minimum wage. In regions where wages were lower before the introduction, the minimum wage is assumed to bite harder into the wage distribution and its effect on the gender wage gap will therefore be stronger. To control for time persistent regional characteristics, we employ a fixed effect estimation on the gender wage gap, which is defined as

$$GWG_{j,t} = \gamma_j + \gamma' T_t + \theta'_1 T_t \times Bite_{j,2014} + v_{j,t}, \quad (1)$$

where $GWG_{j,t}$ denotes the gender wage gap in percent in period t and region j , γ_j a region-fixed effect and $v_{j,t}$ the error term. T_t is a year vector, which entails the years 2011 to 2016. $Bite_{j,2014}$ denotes the bite and is measured as the fraction of affected workers in region j in the year 2014.

5 Results

As a first indicator for the relationship between the wage gap and the minimum wage, we look at the regional distribution of both measures. Figure 4 displays the indicators for the 96 planning regions. Subfigure 4a, shows the gender wage gap, derived from the SOEP. It exhibits a considerable amount of variation but seems to be much higher in most western regions and lower for East Germany.⁵ This is also in line with results obtained in section 3.2, which suggests that federal states in the east of Germany have a larger degree of wage equality. In contrast, Subfigure 4b shows the fraction of affected employees in each region. The overall picture here changes, the bite is substantially higher in the east and regions in the south – that are among those with the highest degrees of gender inequality – exhibit very low bite indicators. This is the first indication that the minimum wage might not be an adequate tool to decrease the gender wage gap. Regions that have low wages and are thus subject to a larger bite of the minimum wage have lower gender inequality to begin with,

⁵Please note that the gender wage gap is calculated with SOEP data. Therefore regions contain on average only 160 observation. The smallest region contains 31 individuals.

while those regions that suffer from a large gender pay gap are not very affected by the wage floor.

[INCLUDE FIGURE 4 HERE]

[INCLUDE TABLE 3 HERE]

As a second step, we estimate equation 1 in a fixed effects framework. The results are displayed in Table 3. We repeat the regression for our 96 planning regions and the smaller sample of 36 more aggregated regions. For all years in all specifications we do not find a significant effect of the bite on the regional gender wage gap. This is to say, that, on average, the minimum wage introduction did not reduce the gender wage gap. However, the results could be different for smaller parts of the wage distribution. This is why we will apply a quantile regression in the following. Moreover, we will estimate effects separately for different groups according to education and employment type.

[*To be completed.*]

References

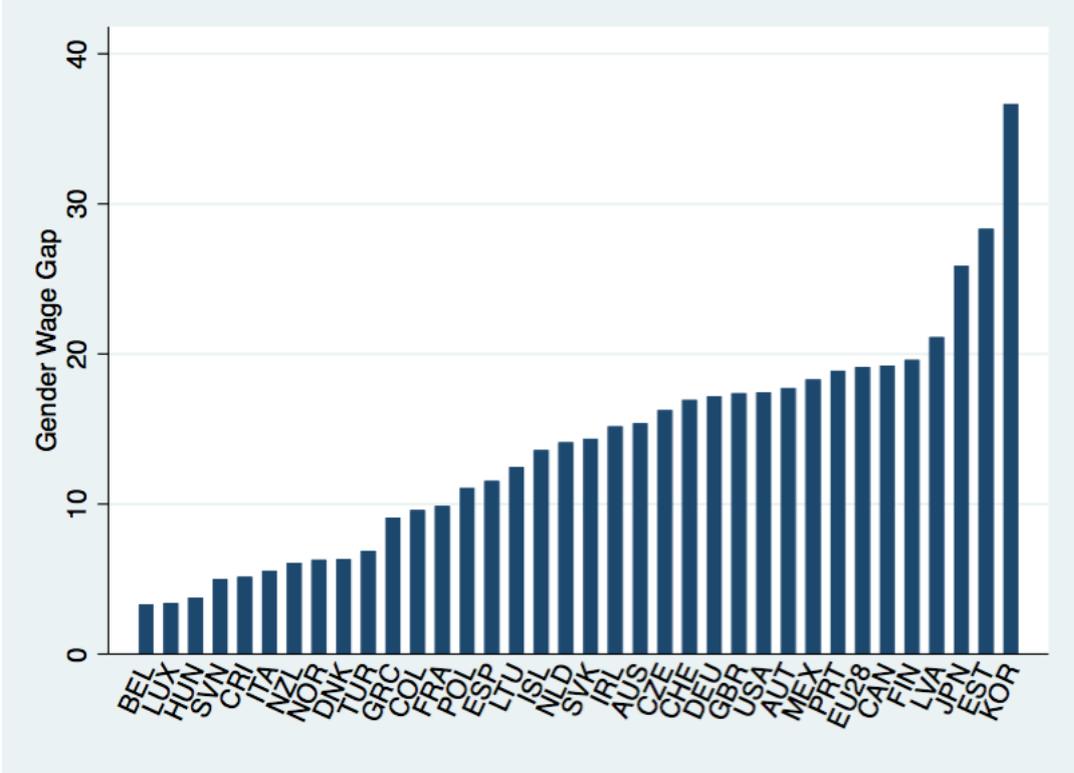
- ADDISON, J. T. and OZTURK, O. D. (2012). Minimum Wages, Labor Market Institutions, and Female Employment: A Cross-Country Analysis. *ILR Review*, **65** (4), 779–809.
- BARGAIN, O., DOORLEY, K. and VAN KERM, P. (2016). *Minimum wages and the gender gap in pay. Evidence from the UK and Ireland*. LISER Working Paper Series 2016-02, LISER.
- BBSR (2016). Bundesinstitut für Bau- Stadt- und Raumforschung - INKAR: Indikatoren und Karten zur Raum und Städtenwicklung, see <http://inkar.de/>.
- BLAU, F. D. and KAHN, L. M. (1992). The Gender Earnings Gap: Learning from International Comparisons. *American Economic Review*, **82** (2), 533–538.
- and — (1995). The Gender Earnings Gap: Some International Evidence. In *Differences and Changes in Wage Structures*, NBER Chapters, National Bureau of Economic Research, Inc, pp. 105–144.
- and — (1996). Wage Structure and Gender Earnings Differentials: An International Comparison. *Economica*, **63** (250), 29–62.
- and — (2003). Understanding International Differences in the Gender Pay Gap. *Journal of Labor Economics*, **21** (1), 106–144.
- and — (2013). Female Labor Supply: Why Is the United States Falling Behind? *American Economic Review*, **103** (3), 251–256.
- and — (2017). The Gender Wage Gap: Extent, Trends, and Explanations. *Journal of Economic Literature*, **55** (3), 789–865.
- BMAS (2014). Der Mindestlohn kommt, Bundesministerium für Arbeit press release from April 2 2014, see <http://www.bmas.de/DE/Presse/Pressemitteilungen/2014/mindestlohn-kommt.html>.
- BOLL, C., HÜNING, H., LEPPIN, J. and PUCKELWALD, J. (2015). *Potential Effects of Statutory Minimum Wage on the Gender Pay Gap: A Simulation-Based Study for Germany*. Tech. rep.
- and LEPPIN, J. S. (2015). Die geschlechtsspezifische Lohnlücke in Deutschland: Umfang, Ursachen und Interpretation. **95**, 249–254.
- BORCK, R. (2014). Adieu Rabenmutter—culture, fertility, female labour supply, the gender wage gap and childcare. *Journal of Population Economics*, **27** (3), 739–765.
- BOSCH, G. (2007). Mindestlohn in Deutschland notwendig - Kein Gegensatz zwischen sozialer Gerechtigkeit und Beschäftigung. *Zeitschrift für Arbeitsmarktforschung*, **43**, 421–430.
- BOSSLER, M. and GERNER, H.-D. (2016). Employment effects of the new German minimum wage, IAB Discussion Paper 10/2016.
- BRENKE, K. (2014). Mindestlohn: Zahl der anspruchsberechtigten Arbeitnehmer wird weit unter fünf Millionen liegen. *DIW-Wochenbericht*, **81** (5), 71–77.
- and MÜLLER, K.-U. (2013). Gesetzlicher Mindestlohn : kein verteilungspolitisches Allheilmittel. *DIW Wochenbericht*, (39), 3–17.
- BROADWAY, B. and WILKINS, R. (2017). *Probing the Effects of the Australian System of Minimum Wages on the Gender Wage Gap*. Melbourne Institute Working Paper Series wp2017n31, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne.

- CALIENDO, M., FEDORETS, A., PREUSS, M., SCHRÖDER, C. and WITTBRODT, L. (2017a). *The Short-Run Employment Effects of the German Minimum Wage Reform*. IZA Discussion Papers 11190, Institute for the Study of Labor (IZA).
- , —, —, — and — (2017b). *The Short-Term Distributional Effects of the German Minimum Wage Reform*. IZA Discussion Papers 11246, Institute for the Study of Labor (IZA).
- CARD, D. (1992). Using regional variation in wages to measure the effects of the federal minimum wage. *Industrial and Labor Relations Review*, **46** (1), 22–37.
- , CARDOSO, A. R. and KLINE, P. (2016). Bargaining, Sorting, and the Gender Wage Gap: Quantifying the Impact of Firms on the Relative Pay of Women. *The Quarterly Journal of Economics*, **131** (2), 633–686.
- CHRISTOFIDES, L. N., POLYCARPOU, A. and VRACHIMIS, K. (2013). Gender wage gaps, ‘sticky floors’ and ‘glass ceilings’ in Europe. *Labour Economics*, **21** (C), 86–102.
- CONNOLLY, S. and GREGORY, M. (2002). The National Minimum Wage and Hours of Work: Implications for Low Paid Women. *Oxford Bulletin of Economics and Statistics*, **64** (0), 607–631.
- DESTATIS (2016). 4 Millionen Jobs vom Mindestlohn betroffen, Statistisches Bundesamt press release from April 6, 2016 - 121/16.
- (2017). Drei Viertel des Gender Pay Gaps lassen sich mit Strukturunterschieden erklären, Statistisches Bundesamt press release from March 14, 2017 - 094/17.
- DI NARDO, J., FORTIN, N. M. and LEMIEUX, T. (1996). Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach. *Econometrica*, **64** (5), 1001–1044.
- DURASAMY, M. and DURASAMY, P. (2016). Gender wage gap across the wage distribution in different segments of the Indian labour market, 1983–2012: exploring the glass ceiling or sticky floor phenomenon. *Applied Economics*, **48** (43), 4098–4111.
- GARLOFF, A. (2016). Side effects of the new German minimum wage on (un-)employment. First evidence from regional data, IAB Discussion Paper 31/2016.
- HALLWARD-DRIEMEIER, M. C., RIJKERS, B. and WAXMAN, A. R. (2015). *Can minimum wages close the gender wage gap? evidence from Indonesia*. Policy Research Working Paper Series 7364, The World Bank.
- HIRSCH, B., KÖNIG, M. and MÖLLER, J. (2013). Is There a Gap in the Gap? Regional Differences in the Gender Pay Gap. *Scottish Journal of Political Economy*, **60** (4), 412–439.
- KAHN, L. (2015). Wage compression and the gender pay gap. *IZA World of Labor*, pp. 150–150.
- KALINA, T. and WEINKOPF, C. (2014). Niedriglohnbeschäftigung 2012 und was ein gesetzlicher Mindestlohn von 8,50 Euro verändern könnte, IAQ-Report No. 02/2014.
- KNABE, A., SCHÖB, R. and THUM, M. (2014). Der flächendeckende Mindestlohn. *Perspektiven der Wirtschaftspolitik*, **15** (2).
- LI, S. and MA, X. (2015). Impact of minimum wage on gender wage gaps in urban China. *IZA Journal of Labor & Development*, **4** (1), 1–22.
- MAJCHROWSKA, A. and STRAWINSKI, P. (2017). Impact of minimum wage increase on gender wage gap: Case of Poland.

- MENON, N. and VAN DER MEULEN RODGERS, Y. (2017). The Impact of the Minimum Wage on Male and Female Employment and Earnings in India. *Asian Development Review*, **34** (1), 28–64.
- MÜLLER, K.-U. and STEINER, V. (2010). Labor market and income effects of a legal minimum wage in Germany, IZA Discussion Paper No. 4929.
- and STEINER, V. (2011). Beschäftigungswirkungen von Lohnsubventionen und Mindestlöhnen – Zur Reform des Niedriglohnssektors in Deutschland. *Zeitschrift für ArbeitsmarktForschung*, **44** (1-2), 181–195.
- and STEINER, V. (2013). Distributional effects of a minimum wage in a welfare state - The case of Germany, SOEP Discussion Paper No. 617.
- POLACHEK, S. and XIANG, J. (2014). *The Gender Pay Gap Across Countries: A Human Capital Approach*. IZA Discussion Papers 8603, Institute for the Study of Labor (IZA).
- ROBINSON, H. (2005). Regional evidence on the effect of the national minimum wage on the gender pay gap. *Regional Studies*, **39** (7), 855–872.
- SCHÄFER, A. and GOTTSCHALL, K. (2015). From wage regulation to wage gap: how wage-setting institutions and structures shape the gender wage gap across three industries in 24 European countries and Germany. *Cambridge Journal of Economics*, **39** (2), 467–496.
- SIN, I., STILLMAN, S. and FABLING, R. (2017). *What Drives the Gender Wage Gap? Examining the Roles of Sorting, Productivity Differences, and Discrimination*. IZA Discussion Papers 10975, Institute for the Study of Labor (IZA).
- SOEP (2017). Data for years 1984-2016, version 33, SOEP, 2016, Socio-Economic Panel Data, DOI: 10.5684/soep.v33.
- SVR (2013). *Gegen eine rückwärtsgewandte Wirtschaftspolitik, Jahresgutachten 2013/14*. Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung.
- SVR (2014). *Mehr Vertrauen in Marktprouesse, Jahresgutachten 2014/15*. Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung.
- WAGNER, G. G., FRICK, J. R. and SCHUPP, J. (2007). The German Socio-Economic Panel Study (SOEP) - Scope, evolution and enhancements. *Schmollers Jahrbuch*, **127**, 139–169.
- WROHLICH, K. and ZUCCO, A. (2017). Gender Pay Gap innerhalb von Berufen variiert erheblich. *DIW Wochenbericht*, **84** (43), 955–961.

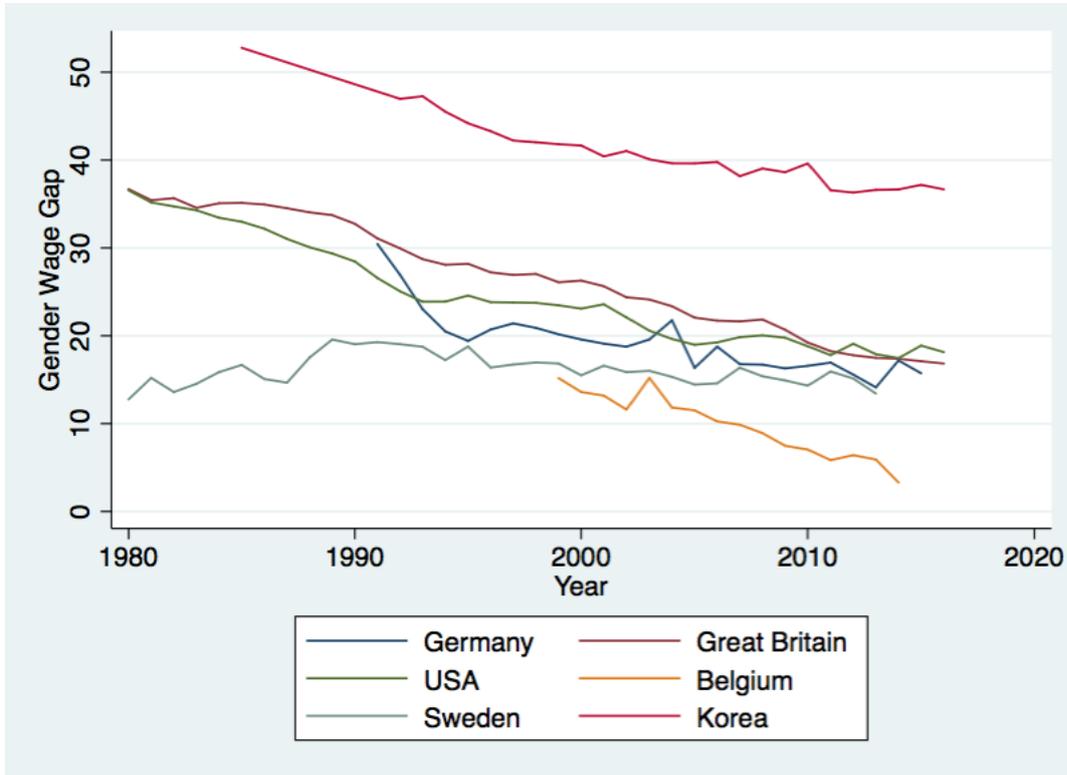
Appendix

Figure 1: Gender Wage Gap Across Different Countries in 2014



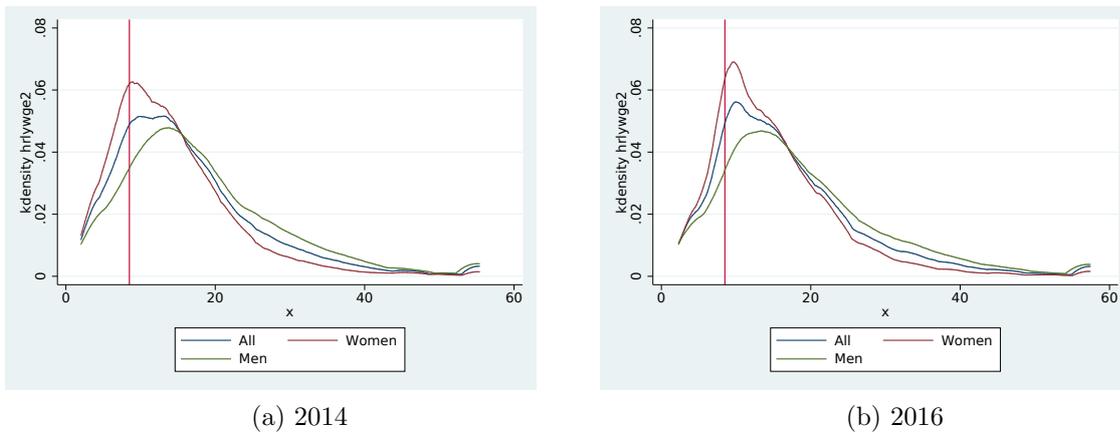
Source: OECD (2018), Gender wage gap (indicator). doi: 10.1787/7cee77aa-en (Accessed on 25 January 2018).
 Note: The gender wage gap is unadjusted and is defined as the difference between median earnings of men and women relative to median earnings of men. Data refer to full-time employees and to self-employed.

Figure 2: Gender Wage Gap between 1980 and 2016



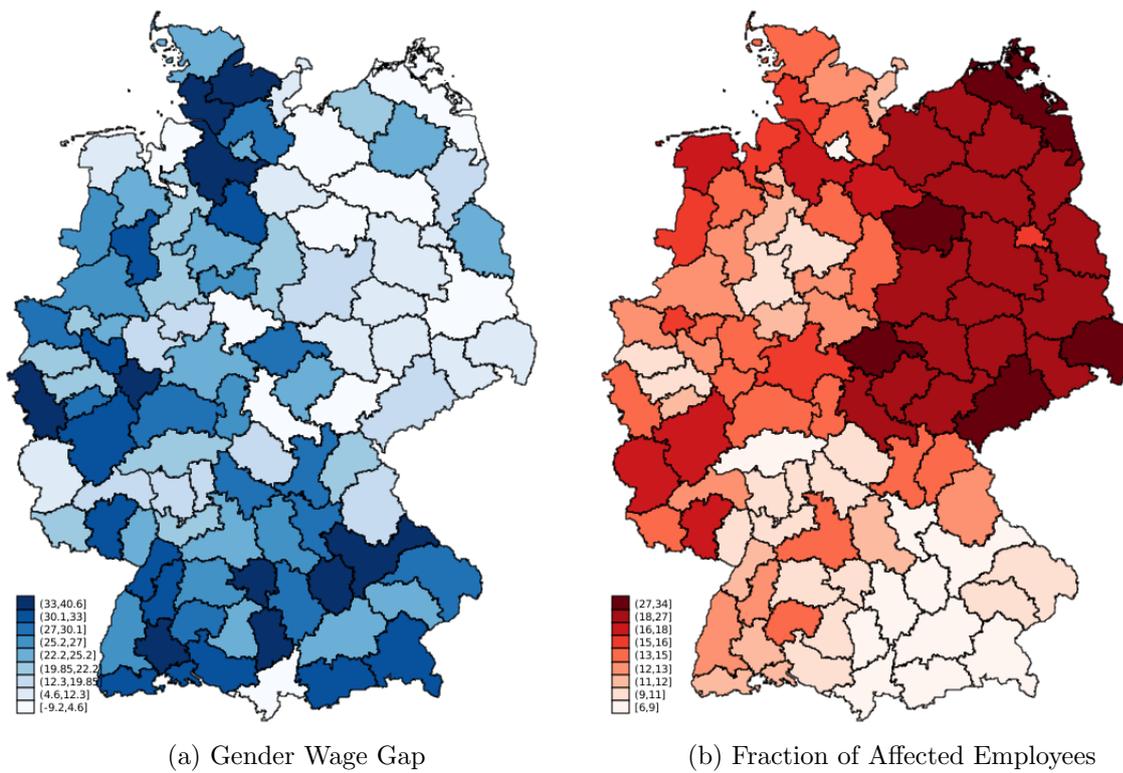
Source: OECD (2018), Gender wage gap (indicator). doi: 10.1787/7cee77aa-en (Accessed on 25 January 2018). Note: The gender wage gap is unadjusted and is defined as the difference between median earnings of men and women relative to median earnings of men. Data refer to full-time employees and to self-employed.

Figure 3: Distribution of Hourly Wages for Men and Women



Source: SOEP v33 and SES 2014. The red line marks the minimum wage of €8.50.

Figure 4: Regional Variation in Gender Gap and Bite in 2014 for Planning Regions (in %)



Source: SOEP v33. Measures are divided into deciles, such that each category contains about the same number of regions. Regions are defined as 96 Planning Regions (*Raumordnungsregionen*) according to the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR).

Table 1: Hourly Wages and Gender Wage Gaps by Different Categories

	2014			2016			Wage Change 2014 to 2016	
	Men €	Women €	Gap %	Men €	Women €	Gap %	Men %	Women %
German	18.75	14.48	22.80	19.54	15.32	21.59	4.21	5.84
Foreign	15.29	11.39	25.50	15.45	12.39	19.78	1.02	8.77
East	14.60	13.04	10.67	15.48	13.96	9.81	6.03	7.05
West	19.31	14.44	25.23	19.85	15.22	23.30	2.79	5.44
Primary Education	14.66	10.40	29.05	15.01	10.96	26.98	2.41	5.41
Secondary Education	16.36	13.06	20.14	16.94	13.88	18.06	3.53	6.23
Tertiary Education	26.22	19.72	24.79	26.93	20.49	23.93	2.73	3.91
Full-time Employed	19.84	16.44	17.11	20.51	17.36	15.35	3.41	5.60
Part-time Employed	15.25	14.85	2.66	16.51	15.41	6.67	8.21	3.75
Marginally Employed	10.46	8.80	15.87	10.68	9.21	13.77	2.15	4.69
Temporary Contract	10.54	10.17	3.53	11.31	11.01	2.63	7.34	8.33
No Temporary Contract	19.56	15.08	22.89	20.16	15.81	21.58	3.11	4.86
Less than 20 Employees	14.56	11.34	22.13	14.77	11.89	19.45	1.40	4.89
20 to 200 Employees	16.40	13.47	17.83	17.07	14.02	17.86	4.12	4.09
More than 200 Employees	21.27	16.74	21.30	21.94	17.65	19.56	3.15	5.44
Overall	18.33	14.14	22.89	18.94	14.95	21.08	3.32	5.75

Source: SOEP v33. See Table 2 for number of observations per group.

Table 2: Share of Women and Share of Employees with Wages Lower than 8.50€

	2014			2016		
	% Women	% Affected	N	% Women	% Affected	N
German	51.21	19.35	13611	52.06	15.06	11866
Foreign	48.64	28.14	1770	48.10	23.52	1871
East	51.92	26.39	3251	52.71	19.95	2918
West	50.64	18.75	12130	51.21	15.20	10819
Primary Education	43.17	26.87	3878	43.23	22.49	3308
Secondary Education	56.19	22.16	6999	56.92	16.40	6268
Tertiary Education	50.06	8.13	4033	50.53	6.79	3713
Full-time Employed	32.80	8.81	9489	34.02	6.40	8410
Part-time Employed	88.88	20.27	3616	87.41	14.85	3407
Marginally Employed	74.24	56.19	1607	73.33	45.98	1320
Temporary Contract	54.94	48.56	2257	53.53	41.54	2111
No Temporary Contract	50.54	12.89	11241	51.77	9.36	10083
Less than 20 Employees	58.41	33.08	3912	57.42	26.73	3229
20 to 200 Employees	50.70	20.39	3988	50.69	14.88	3326
More than 200 Employees	46.58	11.45	6657	48.75	9.35	6127
Overall	50.91	20.36	15381	51.53	16.21	13737

Source: SOEP v33.

Table 3: Results of Fixed Effects Regression on the Gender Wage Gap

	(1)	(2)	(3)	(4)
	96 regions	96 regions	36 regions	36 regions
Bite \times D2016	-0.0316 (-0.24)	-0.0255 (-0.20)	0.0558 (0.52)	0.0558 (0.52)
Bite \times D2015	-0.0814 (-0.83)	-0.0776 (-0.79)	-0.0547 (-0.77)	-0.0547 (-0.76)
Bite \times D2013		-0.0827 (-0.65)		-0.124 (-1.32)
Bite \times D2012		-0.178 (-1.26)		-0.161 (-2.02)
Bite \times D2011		-0.104 (-0.56)		-0.138 (-0.88)
Intercept	21.54*** (54.38)	21.47*** (44.64)	22.59*** (65.70)	22.59*** (62.31)
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	285	572	108	216
R ² within	0.029	0.096	0.106	0.279
R ² between	0.238	0.358	0.526	0.580
R ² overall	0.057	0.090	0.012	0.151

Note: t -statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: SOEP v33, SES 2014.