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Is There an Ethnic Pay Gap in Germany? Evidence from a Representative Sample of the Adult Population*

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Abstract

This study investigates a disparity in hourly wages (i.e., a pay gap) between employees with an ethnic minority vs. ethnic majority background in Germany. To this aim, a Blinder-Oaxaca decomposition based on a representative survey of the adult population in Germany is used. The analysis is restricted to employees who completed secondary schooling in Germany (N = 9,304). The results show that, overall, ethnic minority employees receive significantly lower gross hourly wages than ethnic majority employees, and this difference amounts to 13.8%. The larger part of this gap is explained by group differences in demographic, human capital, and occupational characteristics—in particular, education level, work experience, job tenure, the precise employment status, and occupational status. However, there is also a significant unexplained pay gap that amounts to 2.7% lower wages for ethnic minority (vs. ethnic majority) employees, indicating potential wage discrimination against ethnic minority employees. The total, explained, and unexplained ethnic pay gaps appear to be somewhat larger among men than among women. Finally, an exploratory analysis suggests that the part of the ethnic pay gap that has remained unexplained might be largely explained by whether employees hold the German citizenship and whether they were born in Germany.

Keywords: discrimination, ethnic background, ethnicity, Germany, pay gap, wages

JEL classification: J24, J31, J38, J71

Analysis code: https://osf.io/h6ua7/?view_only=f70765f432e24cbda91c48bd82a24cc0

1. Introduction

In this paper, I investigate a disparity in hourly wages (i.e., a pay gap) between employees with an ethnic minority vs. ethnic majority background (in short: ethnic minority vs. ethnic majority employees) in Germany. In particular, I analyze (a) whether and in which direction such an ethnic pay gap exists and (b) to what extent such a pay gap is explained by group differences in demographic, human capital, and occupational characteristics.

An ethnic pay gap is practically relevant from several perspectives. For example, if ethnic minority employees receive lower wages, then this reduces their fiscal contributions to the economy, is likely to create disutility among affected employees, and might even facilitate social unrest in minority groups (Algan et al. 2010). To the extent that such a pay gap is not explained by differences in demographic, human capital, and occupational characteristics, it is an indication for potential wage discrimination based on ethnic background. Such discrimination is illegal[1] and ethically problematic, may prevent firms from attracting, motivating, and retaining productive employees (e.g., Sanchez and Brock 1996; Huber, Lindenthal, and Waldinger 2021), and may lead to a reduction of human capital investments and job search effort among individuals from discriminated groups because—due to discrimination—they (rationally) expect lower returns to such investments (Arrow 1973; Lundberg and Startz 1983; Heslin, Bell, and Fletcher 2012).

In the international literature, several studies have analyzed ethnic pay gaps and to what extent they are explained by demographic, human capital, and occupational characteristics.

[1] E.g., for Germany, see the General Equal Treatment Act (*Allgemeines Gleichbehandlungsgesetz*) of 2006.

These studies use data from different countries, including the United States (e.g., Reimers 1983), the United Kingdom (e.g., Blackaby et al. 2005; Elliott and Lindley 2008; Brynin and Güveli 2012; Longhi, Nicoletti, and Platt 2013; Zwysen and Longhi 2018), France (e.g., Aeberhardt and Pouget 2010), and Vietnam (Pham and Reilly 2009). The results of these studies mostly indicate that ethnic minority employees receive lower average wages than ethnic majority employees and that these disparities are partly—but not fully—explained by group differences in demographic, human capital, and occupational characteristics. Some of these studies investigate ethnic pay gaps specifically among those employees who were born in and/or received their education in the country of residence in which they are employed (e.g., Reimers 1983; Blackaby et al. 2005; Elliott and Lindley 2008; Longhi, Nicoletti, and Platt 2013; Zwysen and Longhi 2018), mostly finding that, even in these subgroups, ethnic minority (vs. ethnic majority) employees receive lower wages and that these disparities are not fully explained by demographic, human capital, and occupational characteristics.

A possible interpretation of these results is that there is (overall) wage discrimination against ethnic minority employees (e.g., Reimers 1983; Blackaby et al. 2005; Elliott and Lindley 2008; Aeberhardt and Pouget 2010; Brynin and Güveli 2012; Longhi, Nicoletti, and Platt 2013). In line with this interpretation, a field experiment conducted in Greece has shown that, among (fictitious) applicants with equivalent CVs who obtained all their educational qualifications and work experience in Greece, applicants whose name signals an ethnic minority background are invited to interviews for jobs with lower wage offers than ethnic majority applicants (Drydakis 2017).

So far, there is only little evidence on ethnic pay gaps in Germany. Most of the existing related studies with German data compare employees who have vs. have not immigrated or who

do not vs. do hold the German citizenship (e.g., Dustmann 1993; Licht and Steiner 1994; Schmidt 1997; Bartolucci 2014; Lehmer and Ludsteck 2015; Aldashev, Gernandt, and Thomsen 2016; Himmler and Jäckle 2018). This research neglects employees of ethnic minority background who have not immigrated and who hold the German citizenship. The number of these individuals has been increasing, especially because descendants of the large group of labor immigrants from the 1960s and 70s (i.e., of the so-called guest workers) were often born in Germany and often obtained the German citizenship at birth or over time (Germany has also expanded the access to the German citizenship in the year 2000). Furthermore, these employees are important in the present context, because they have typically obtained their human capital in Germany (therefore, it is possible to compare their human capital to ethnic majority employees) and might subjectively expect to receive similar wages as ethnic majority employees (so their disutility would be particularly pronounced if they received lower wages).

One study that investigates ethnic earnings disparities in Germany considers so-called second-generation immigrants (i.e., children of immigrants), including individuals with German citizenship (Algan et al. 2010). However, the earnings analysis of that study includes relatively few explanatory variables, not accounting for possible group differences in occupational characteristics such as occupational activity, industry, or occupational position. In addition, ethnic pay gaps might have changed since the data used by Algan et al. (2010) was assessed (i.e., 2005–2006), for example because of cultural or economic developments in Germany. More research on ethnic pay gaps in the German labor market is valuable because it is likely that ethnic pay gaps differ between countries (e.g., due to different labor market institutions, different migration histories, and/or different approaches to and traditions of integration or assimilation).

The present study contributes to the literature by investigating a current ethnic pay gap in Germany, accounting for a large set of demographic, human capital, and occupational characteristics. Compared to an experimental study on wage offers, an empirical analysis of wages (as conducted in this study) has the advantage that the eventual outcome that is of interest in the present context (i.e., actually received wages) is measured. In contrast, a difference in wage offers would not necessarily imply a difference in wages, because it is possible, for example, that affected applicants compensate for this unequal treatment by rejecting offers and applying for more jobs until they receive their desired wage.

The analysis in this study is based on the 2019 wave of the Socio-Economic Panel (SOEP; Goebel et al. 2019), a large representative sample of the adult population in Germany. In order to facilitate the comparability of human capital measures between groups and to approximately ensure a similar proficiency in the German language between groups, I restrict the analysis to individuals who completed secondary schooling in Germany (I also perform a robustness check with additional restrictions on German language proficiency). Moreover, the analysis is restricted to employees and does not consider self-employed individuals and individuals who are not employed. The final sample comprises N = 9,304 employees. Wages are measured in terms of gross (i.e., before-tax) wages per actual working hour. Since there is no direct measure of ethnic background in the dataset (or in other German datasets), I approximately identify ethnic minority vs. majority background on the basis of own and parental native languages, such that any employee who is not a native speaker of German or has a parent who is not a native speaker of German is assigned an ethnic minority background. As explained in Section 3.2, this measure has some advantages over the concept of “migration background” as a measure of ethnic minority background. I use Blinder-Oaxaca decompositions (Blinder 1973; Oaxaca 1973) to

analyze a pay gap between ethnic minority vs. ethnic majority employees and to what extent such a gap is explained by individual characteristics observed in the dataset. A broad range of characteristics is considered, including demographic characteristics (such as gender, age, marital status, children in the household, and region), human capital characteristics (such as education level, work experience, and job tenure), and occupational characteristics (the precise employment status, fixed-term vs. permanent employment contract, temporary employment agency, occupational activity, occupational status, leadership position, industry, public vs. private sector, and firm size).

2. Theoretical considerations

From a theoretical perspective, it is likely that ethnic minority employees receive, on average, lower hourly wages than ethnic majority employees. Such a disparity might at least partly be explained by group differences in human capital and occupational characteristics.

Ethnic minority (vs. ethnic majority) employees are likely to have, on average, less human capital (understood as knowledge and skills that increase productivity in the German labor market), at least in the perception of employers. For example, there are several reasons why ethnic minority employees might tend to have a lower level of education. One reason are historical migration patterns (many immigrants came as low-skilled labor migrants or refugees to Germany) and a transmission of human capital across generations (e.g., Black and Devereux 2011). Furthermore, the early tracking of students into an academic vs. non-academic track, which is common in Germany, might have negative effects on the educational attainment of students who are disadvantaged based on their background. Sometimes there might also be ethnic discrimination in teachers' grading decisions, which is indicated by experimental evidence from Germany (Bonefeld and Dickhäuser 2018) and which might further restrict ethnic minority

individuals' access to educational qualifications and degrees. In addition, ethnic minority employees might have collected less work experience (even conditional on age and education). This group difference might be created by ethnic minority individuals' lower probability of employment (e.g., Algan et al. 2010; Luthra 2013), which might (partly) be a consequence of discrimination against ethnic minority applicants in some firms' recruiting decisions (e.g., Kaas and Manger 2012; Koopmans, Veit, and Yemane 2019; Weichselbaumer 2020). Finally, ethnic minority employees might have lower levels of job tenure (i.e., work experience at the current employer), possibly because they are more likely to change their employer due to experiences of workplace discrimination (e.g., Van Laer and Janssens 2011; King et al. 2012). Overall, the resulting lower human capital might lead to lower wages received by ethnic minority employees.

Relevant group differences in occupational characteristics are plausible, as well. For example, ethnic minority employees might have a higher probability of marginal or irregular employment (marginal employment is employment in a mini job with very low monthly earnings or short duration). This tendency might be caused by difficulties in entering regular employment, for example due to insufficient networks of ethnic minority individuals in their country of residence (e.g., Heath, Rothon, and Kilpi 2008; Luthra 2013) or due to some hiring discrimination, considering that employers who offer regular employment probably have the choice between a larger number of qualified candidates. Ethnic minority employees might also less often be assigned to a higher occupational status (such as managerial positions), as indicated by previous evidence from Germany (Luthra 2013). Overall, such occupational differences probably decrease the wages of ethnic minority (vs. ethnic majority) employees.

In addition to the part of the ethnic pay gap that is likely to be explained by such human capital and occupational characteristics, there might also be an unexplained pay gap (i.e., a part

that is not explained by demographic, human capital, and occupational characteristics) associated with lower wages for ethnic minority employees. Such an unexplained gap might be caused by wage discrimination based on ethnic background. This discrimination might be implemented in different ways: Some employers might (conditional on hiring) discriminate against ethnic minority employees in their wage setting, and/or ethnic minority applicants might, on the basis of their ethnic background, be less often accepted at firms that offer higher wages.

Researchers have provided different theories in order to explain why such discrimination might occur. The theory of "taste-based" discrimination (Becker 1957/1971) predicts that some employers experience a psychological disutility when they hire individuals from particular groups (even if these individuals are equally productive as individuals from the preferred group). Such employers are then ready to hire individuals from particular groups only if they are compensated for their disutility by a reduction in the wage costs, i.e., by paying a lower wage to these employees. Therefore, if some employers have a personal preference against hiring ethnic minority individuals, then they might pay them lower wages on this basis. In contrast, the theory of statistical discrimination (Phelps 1972; Arrow 1973) predicts that, if employers have imperfect information about the productivity of individual applicants or employees, then they make use of (assumed) group characteristics in order to estimate these individuals' productivity and to determine their wage offers. For example, if employers tend to believe that ethnic minority individuals are on average less productive than ethnic majority individuals (given that the other characteristics observed by the employer are identical between ethnic groups), then they might offer lower wages to ethnic minority (vs. ethnic majority) individuals based on these individuals' ethnic background. Discrimination might also occur through unconscious processes, such that some employers offer lower wages to ethnic minority individuals without being aware

that they treat individuals differently based on their ethnic background (implicit discrimination; e.g., Greenwald and Banaji 1995; Bertrand, Chugh, and Mullainathan 2005). Any of these types of discrimination (or a combination of them) might lead to an unexplained ethnic pay gap associated with lower wages for ethnic minority employees.

In practice, the extent of an unexplained pay gap (and potential wage discrimination) in the German labor market might be limited by the fact that many wages in Germany are determined by collective labor agreements, which are results of negotiations between employers and trade unions. If an ethnic minority individual is hired for a position with such a negotiated wage, then the employer has little or no room to discriminate based on the individual's ethnic background (or other demographic characteristics) in the wage setting. However, for some employers no negotiated wages exist, so that these employers are often largely free in their wage setting. And even in case of negotiated wages it is possible that ethnic minority (vs. ethnic majority) applicants are—on the basis of their ethnic background—less often hired by firms that offer (higher) negotiated wages and then work for firms with lower wages, which could likewise lead to an unexplained ethnic pay gap due to such discrimination. Therefore, an unexplained pay gap is possible despite the frequent existence of negotiated wages in the labor market.

3. Method

3.1. Sample

Data from the SOEP (Goebel et al. 2019) is used for the analysis.[2] The SOEP is a representative survey of the adult population in Germany. I am using this data source because the

[2] SOEP-Core v37, EU Edition, 2022, data from years 1984–2020, https://doi.org/10.5684/soep.core.v37eu.

SOEP includes information on hourly wages, ethnic minority background, and a large set of demographic, human capital, and occupational variables for a large number of employees.

In particular, the present study uses data from the 2019 survey of the SOEP. The first reason for this choice is that all required variables are available in that wave. In addition, data from 2020 are very likely to be affected by the coronavirus pandemic, so the interpretation of the results would have been complicated if data from that year was used.

The sample is restricted in the following way. First, I drop individuals who are at least 65 years old, as these individuals are typically eligible for pensions in Germany. Second, only employees are considered (including not only white-collar employees but also blue-collar employees and civil servants); self-employed individuals and individuals who are not working are dropped from the sample. Third, I also drop all forms of students and all individuals who are primarily in a training program (e.g., apprentices and interns), because—even if they are employed—their employment situation is usually not comparable to that of other workers (compare, e.g., Hirsch and Winters 2014). Likewise, individuals who receive old-age pensions and individuals who are working in sheltered workshops are dropped.

In order to facilitate the comparability of the education level across groups and to approximately ensure a similar proficiency in the German language between groups, I restrict the analysis to those employees who obtained a secondary schooling qualification in Germany (compare, e.g., Weichselbaumer 2017, 2020). For the purpose of the comparability of education level, I also exclude individuals who obtained a vocational qualification or university degree outside of Germany.

The final sample consists of 9,304 employees. Of these, 847 have an ethnic minority background and 8,457 have an ethnic majority background (see Section 3.2.2 for the precise measurement of the ethnic group variable).

3.2. Variables

3.2.1. Dependent variable

The dependent variable is the gross wage (i.e., the wage before subtracting taxes and social security payments) per actual working hour in €. Respondents have reported their gross monthly earnings in € and their actual weekly working hours (i.e., weekly working hours including any overtime). Weekly working hours are transformed to monthly working hours by multiplying them by 4.3 weeks per month. The hourly wage is then determined by dividing gross monthly earnings by actual monthly working hours. Because the residuals of hourly wage are not normally distributed (a very common phenomenon for wages), I use the natural logarithm of hourly wage (log hourly wage) as the dependent variable in the regression models.

3.2.2. Group variable

I distinguish the following two groups: (1) employees with an ethnic minority background and (2) employees with an ethnic majority background. Because the ethnic background is not directly assessed in the dataset (which is a general limitation of German data), I use information on own and parental native languages to approximately identify whether a respondent has an ethnic minority background. Specifically, respondents are asked the following question: “Is German the native language of you and <u>both</u> of your parents?” (accentuation in the original). Respondents who answer “No” to this question are assigned an ethnic minority background, and respondents who answer “Yes” are assigned an ethnic majority background. Therefore, ethnic minority background within this study means that the employee or at least one of their parents is not a

native speaker of German, while the other employees are assigned an ethnic majority background.

When aiming to identify an ethnic minority (vs. ethnic majority) background, the described measure has some advantages over the concept of “migration background”, which is a quite common concept in Germany. Migration background (as it is defined in the survey) means that the individual or at least one of their parents was born outside of Germany. However, a migration background does not necessarily imply an ethnic minority background, and an ethnic minority background does not necessarily imply a migration background. In particular, ethnic Germans who migrated to Germany from East European countries since the end of the Second World War (Sudeten Germans, *Aussiedler*, and *Spätaussiedler*) as well as their children have a migration background but do not have an ethnic minority background. At the same time, employees with an ethnic minority background who live in Germany in the third or a higher generation (e.g., a part of the descendants of Turkish labor immigrants) do not have a migration background, because both of their parents were born in Germany. The group of ethnic German immigrants from Eastern Europe (and their children) is very large in Germany (e.g., Aldashev, Gernandt, and Thomsen 2016), and the number of ethnic minority individuals with German-born parents has strongly increased as the labor immigration wave from the 1960s and 70s is longer ago. With the measure of ethnic minority background used in this study, employees from both of these groups are likely to be correctly assigned: Ethnic German immigrants and their children are assigned an ethnic majority background (if they are native speakers of German), and employees with an ethnic minority background who have German-born parents are assigned an ethnic minority background (if the employee or at least one of their parents is not a native speaker of German).

Overall, this measure comes closer to the concept of ethnic background, which is linked to cultural and language background.

3.2.3. Explanatory variables

As explanatory variables, I include characteristics that might affect wages and that might (partly) explain a wage disparity between groups (because these characteristics might be associated with ethnic minority background as well). I distinguish demographic, human capital, and occupational characteristics. For the regressions, each categorical variable used in this study is transformed to a set of dummy variables, with one dummy variable for each category. In the Blinder-Oaxaca decompositions, I additionally use the so-called deviation contrast transform for sets of dummy variables, where the reference categories are included (this procedure is recommended by Jann 2008).

Among the demographic characteristics, I first include gender with a dummy variable for being female (1 = yes, 0 = no = male). Second, age in years as well as squared age are included as metric variables. Third, a dummy variable for being married (1 = yes, 0 = no) is included. Fourth, the number of children living in the respondent's household is included as a metric variable. Finally, I include each respondent's region in terms of the federal state of residence, distinguishing the 16 German federal states with a categorical variable.

Regarding the human capital characteristics, I first include the education level, measured with a categorical variable assessing the respondent's highest educational qualification or degree. I build this variable by combining information from the CASMIN (Comparative Analysis of Social Mobility in Industrial Nations) and the ISCED (International Standard Classification of Education) 2011 classifications (the classification has been published in 2011 but the data is from 2019). There are nine resulting categories (e.g., lower secondary schooling qualification;

vocational qualification (from apprenticeship); master (or equivalent) degree from research university). Second, work experience (i.e., the respondent's total work experience in any job they have had) in years is included with four metric variables: work experience in full-time positions, squared work experience in full-time positions, work experience in part-time positions, and squared work experience in part-time positions. Third, job tenure (i.e., the respondent's work experience at their current employer) in years as well as squared job tenure are included as metric variables.

With respect to the occupational characteristics, I first include the respondent's employment status, assessed with a categorical variable distinguishing three categories (full-time employment; part-time employment; marginal or irregular employment). As noted in Section 2, marginal employment is employment in a mini job with very low monthly earnings or short duration. Second, a dummy variable capturing whether the respondent has a fixed-term employment contract (1 = yes, 0 = no = permanent contract) is included. Third, I include a dummy variable assessing whether the respondent is employed by a temporary employment agency (1 = yes, 0 = no). A temporary employment agency sends its employees to firms where they work for a limited time (temporary work or *Zeitarbeit*). Fourth, the respondent's occupational activity is included with a categorical variable, using the ten main categories from the KldB 2010 classification by the German Federal Employment Agency (Bundesagentur für Arbeit 2011) (e.g., mining, production, and manufacturing; company organization, accounting, law, and administration; health, social services, teaching, and education). Fifth, the respondent's occupational status is included with a categorical variable that has 13 categories (e.g., semi-

trained worker; salaried employee: skilled; civil servant: raised level).[3] Sixth, a dummy variable assessing whether the respondent has a leadership position (1 = yes, 0 = no) is included. (A check confirmed that leadership position is not fully determined by occupational status, so the leadership variable is not redundant.)

Seventh, the industry (or sector) of the respondent's firm is included with a categorical variable, using 19 categories based on the 21 main categories of the NACE Rev. 2 classification of the European Union (Eurostat 2008: 57) (e.g., mining and quarrying / manufacturing; wholesale, retail, and repair; human health and social work).[4] (A check confirmed that industry is not fully determined by occupational activity, so the industry variable is not redundant.) Eighth, I include a dummy variable assessing whether the respondent's firm belongs to the public sector (1 = yes, 0 = no = private sector). (A check confirmed that public vs. private sector is not fully determined by industry, so the public sector variable is not redundant.) Finally, the size of the respondent's firm is included, assessed with a categorical variable capturing the number of employees with seven categories (e.g., 1–4 employees; 20–99 employees; 2000 or more employees).

3.3. Econometric analysis

[3] In order to avoid empty categories in the ethnic minority group, I combine (a) the category "salaried employee: industry or factory master" with the category "salaried employee: unskilled without completed training" and (b) the category "civil servant: lower level" with the category "civil servant: middle level".

[4] In order to avoid empty categories in the ethnic minority group, I combine (a) the category "mining and quarrying" with the category "manufacturing" and (b) the category "activities of extraterritorial organisations and bodies" with the category "professional, scientific and technical activities".

I use Blinder-Oaxaca decompositions (Blinder 1973; Oaxaca 1973) to analyze the pay gap between ethnic minority vs. ethnic majority employees and to what extent this gap is explained by demographic, human capital, and occupational characteristics. Blinder-Oaxaca decompositions have frequently been used to investigate ethnic pay gaps in other countries (e.g., Blackaby et al. 2005; Lindley 2005; Elliott and Lindley 2008; Pham and Reilly 2009; Aeberhardt and Pouget 2010; Longhi, Nicoletti, and Platt 2013).

The goal of Blinder-Oaxaca decompositions is to decompose a total difference (disparity) in average outcomes (e.g., mean log wages) between two groups into two parts: one part that is explained by group differences in observable characteristics (e.g., demographic, human capital, and occupational characteristics; the "explained" part of the difference) and one remaining part that is not explained by these characteristics (the "unexplained" part, which might be an indication for discrimination). I am using a twofold decomposition in order to focus on the explained and the unexplained part of the disparity (see Jann 2008).

In the present analysis, the starting point is the following linear model of log wages:

$$w_i = x_i{}'\beta_g + \varepsilon_i, \tag{1}$$

where i is the individual employee, w_i is the employee's log hourly wage, x_i is a vector of the explanatory variables (i.e., demographic, human capital, and occupational characteristics) and a constant, g is the group (1 = ethnic minority employees and 2 = ethnic majority employees), β_g is a vector of coefficients (including an intercept), and ε_i is the error term (with the expected value $E(\varepsilon_i) = 0$). A separate model for each ethnic group is used.

The total difference d in average log wages (predicted by the Models (1)) between the groups is then:

$$d = E(w_1) - E(w_2) = E(x_1)'\beta_1 - E(x_2)'\beta_2. \quad (2)$$

Equation (2) is rewritten in the following way:

$$d = E(x_1)'\beta_1 - E(x_2)'\beta_2 + E(x_1)'\beta^* - E(x_1)'\beta^* + E(x_2)'\beta^* - E(x_2)'\beta^*, \quad (3)$$

where β^* is a nondiscriminatory vector of coefficients (i.e., coefficients that would hold if the same coefficients held for both groups). This nondiscriminatory coefficients vector is obtained from a pooled wage model (based on (1)) over both groups (see Neumark 1988; Oaxaca and Ransom 1994) that includes the group variable g as an additional explanatory variable (as recommended by Jann 2008).

Equation (3) is rearranged to:

$$d = [E(x_1) - E(x_2)]'\beta^* + [E(x_1)'(\beta_1 - \beta^*) + E(x_2)'(\beta^* - \beta_2)]. \quad (4)$$

The left-hand side of Equation (4) shows the explained part a of the total wage disparity (i.e., the part that is explained by group differences in demographic, human capital, and occupational characteristics):

$$a = [E(x_1) - E(x_2)]'\beta^*, \quad (5)$$

while the right-hand side of Equation (4) shows the remaining (i.e., unexplained) part u of the total wage disparity:

$$u = E(x_1)'(\beta_1 - \beta^*) + E(x_2)'(\beta^* - \beta_2). \quad (6)$$

The unexplained part can be interpreted as discrimination but might also capture wage effects of group differences in unobserved variables (Jann 2008). I return to this point in Section 5.

4. Results

4.1. Descriptive statistics

Table 1 shows the mean and standard deviation of each variable separately for (1) ethnic minority employees and (2) ethnic majority employees. Column (3) shows the statistical significance (*p*-values) of mean differences between these groups, obtained from two-sided *t*-tests.

Ethnic minority employees receive, on average, an hourly wage of €17.01, while ethnic majority employees receive a higher hourly wage of €19.43. This difference is statistically significant ($p < .001$).

As Table 1 shows, there are several significant differences in demographic characteristics between ethnic minority vs. ethnic majority employees. For example, ethnic minority employees are on average younger, are less often married, but have more children in their household. With respect to region, ethnic minority employees are more likely to live in the federal state of North Rhine-Westphalia or in Baden-Württemberg and less likely to live in any of the East German states except Berlin (Brandenburg, Mecklenburg-Vorpommern, Saxony, Saxony-Anhalt, or Thuringia).

There are also several significant group differences in human capital characteristics. For example, regarding the education level, ethnic minority employees more often have a low education level (lower or intermediate secondary schooling) and less often have a degree from a university of applied sciences or a master degree from a research university. Ethnic minority employees also have lower levels of work experience and job tenure.

Finally, there are several significant group differences in occupational characteristics. For example, with respect to the employment status, ethnic minority employees are more likely to be marginally or irregularly employed. They are also more likely to have a fixed-term employment

contract and are more often employed by a temporary employment agency. Their occupational activity is more often in the category of trade, sales, hotel, and tourism and less often in accounting, law, and administration. Regarding occupational status, ethnic minority employees are more likely to have a relatively low status as semi-trained workers or as unskilled and untrained salaried employees and are less likely to work as highly skilled or managerial employees or as civil servants at the raised or higher level. With respect to the industry of their firm, ethnic minority employees more often work in the sector of wholesale, retail, and repair or in accommodation and food service and less often work in public administration, defense, and security. They are also less likely to be employed in the public sector.

Table 1

Descriptive statistics

Variable	(1) Ethnic minority employees (n_1 = 847)		(2) Ethnic majority employees (n_2 = 8,457)		(3) *p*-value of mean difference
	Mean	SD	Mean	SD	
Hourly wage (€)	17.01	12.56	19.43	10.35	< .001
Female	0.52	0.50	0.54	0.50	.293
Age	36.80	10.42	45.79	11.11	< .001
Married	0.55	0.50	0.62	0.49	< .001
Children in household	0.92	1.05	0.76	1.04	< .001
Region:					
Schleswig-Holstein	0.03	0.16	0.04	0.20	.043
Hamburg	0.02	0.16	0.02	0.13	.109
Lower Saxony	0.10	0.30	0.11	0.31	.303
Bremen	0.02	0.13	0.01	0.08	.002
North Rhine-Westphalia	0.35	0.48	0.18	0.39	< .001
Hesse	0.08	0.27	0.07	0.25	.095
Rhineland-Palatinate	0.05	0.22	0.04	0.21	.437
Baden-Württemberg	0.16	0.36	0.11	0.31	< .001
Bavaria	0.12	0.33	0.16	0.36	.004
Saarland	0.01	0.08	0.01	0.09	.906
Berlin	0.03	0.17	0.04	0.19	.350
Brandenburg	0.01	0.08	0.05	0.21	< .001
Mecklenburg-Vorpommern	0.00	0.05	0.02	0.15	< .001
Saxony	0.01	0.12	0.08	0.27	< .001
Saxony-Anhalt	0.01	0.11	0.04	0.19	< .001
Thuringia	0.00	0.05	0.04	0.19	< .001
Education level:					
Lower secondary schooling	0.12	0.32	0.03	0.17	< .001
Intermediate secondary schooling	0.04	0.21	0.02	0.14	< .001
Vocational qualification (apprenticeship)	0.41	0.49	0.50	0.50	< .001
Vocational upper secondary schooling	0.14	0.34	0.13	0.34	.861
General upper secondary schooling	0.10	0.30	0.03	0.16	< .001
Degree from university of applied sciences	0.06	0.24	0.11	0.31	< .001
Bachelor degree from research university	0.05	0.21	0.04	0.20	.492
Master degree from research university	0.07	0.26	0.12	0.33	< .001
Doctoral or PhD degree	0.01	0.10	0.01	0.11	.421
Work experience full-time	9.73	9.79	16.02	12.06	< .001
Work experience part-time	3.16	4.91	5.21	7.38	< .001
Job tenure	6.94	7.76	12.01	11.03	< .001
Employment status:					
Full-time employment	0.63	0.48	0.66	0.47	.143
Part-time employment	0.28	0.45	0.30	0.46	.257
Marginal or irregular employment	0.09	0.29	0.05	0.21	< .001
Fixed-term employment contract	0.15	0.36	0.08	0.28	< .001
Temporary employment agency	0.03	0.17	0.01	0.11	< .001

Occupational activity:					
Agriculture, forestry, farming, gardening	0.01	0.08	0.01	0.12	.040
Mining, production, and manufacturing	0.20	0.40	0.15	0.36	.001
Construction and architecture	0.04	0.20	0.05	0.21	.515
Natural sciences	0.04	0.18	0.05	0.21	.088
Traffic, logistics, protection, and security	0.14	0.34	0.11	0.31	.011
Trade, sales, hotel, and tourism	0.16	0.37	0.11	0.31	< .001
Accounting, law, and administration	0.17	0.38	0.24	0.43	< .001
Health, social services, teaching, education	0.22	0.41	0.25	0.43	.059
Language, literature, art, and culture	0.03	0.16	0.03	0.17	.515
Military	0.00	0.05	0.00	0.06	.543
Occupational status:					
Untrained worker	0.03	0.17	0.02	0.14	.033
Semi-trained worker	0.09	0.29	0.05	0.23	< .001
Trained or skilled worker	0.07	0.26	0.07	0.26	.999
Foreman/Forewoman	0.01	0.09	0.01	0.11	.398
Master craftsperson	0.00	0.05	0.01	0.07	.233
Salaried employee: unskilled and untrained	0.12	0.33	0.06	0.24	< .001
Salaried employee: unskilled and trained	0.11	0.31	0.10	0.30	.824
Salaried employee: skilled	0.34	0.47	0.35	0.48	.604
Salaried employee: high skills/management	0.19	0.40	0.22	0.41	.066
Salaried employee: top management	0.01	0.11	0.03	0.17	.010
Civil servant: lower/middle level	0.01	0.09	0.02	0.13	.075
Civil servant: raised level	0.01	0.08	0.04	0.19	< .001
Civil servant: higher level	0.01	0.10	0.02	0.15	.008
Leadership position	0.28	0.45	0.30	0.46	.313
Industry:					
Agriculture, forestry, and fishing	0.00	0.05	0.01	0.10	.023
Mining and quarrying / manufacturing	0.24	0.43	0.20	0.40	.009
Electricity, gas, steam, and air conditioning	0.01	0.08	0.01	0.11	.225
Water supply and waste management	0.00	0.03	0.01	0.09	.022
Construction	0.03	0.18	0.04	0.20	.248
Wholesale, retail, and repair	0.15	0.36	0.10	0.31	< .001
Transportation and storage	0.06	0.24	0.05	0.21	.068
Accommodation and food service	0.05	0.22	0.02	0.14	< .001
Information and communication	0.04	0.19	0.04	0.19	.830
Finance and insurance	0.02	0.14	0.04	0.19	.003
Real estate	0.01	0.10	0.01	0.09	.294
Science and technology	0.04	0.20	0.04	0.20	.799
Administration and support service	0.05	0.21	0.04	0.19	.148
Public administration, defense, and security	0.04	0.21	0.09	0.28	< .001
Education	0.06	0.24	0.10	0.30	.002
Human health and social work	0.15	0.36	0.17	0.38	.149
Arts, entertainment, and recreation	0.01	0.11	0.01	0.10	.600
Other service	0.02	0.12	0.02	0.15	.224
Households as employers	0.01	0.08	0.00	0.05	.038
Public sector	0.20	0.40	0.29	0.45	< .001
Firm size:					
1–4 employees	0.05	0.21	0.04	0.20	.615
5–10 employees	0.09	0.29	0.07	0.26	.034
11–19 employees	0.07	0.25	0.07	0.25	.989

20–99 employees	0.15	0.35	0.16	0.37	.179
100–199 employees	0.09	0.28	0.08	0.28	.562
200–1999 employees	0.21	0.41	0.24	0.42	.137
2000 or more employees	0.34	0.48	0.33	0.47	.520

Notes: SD = standard deviation. *p*-values are obtained from two-sided *t*-tests.

4.2. Blinder-Oaxaca decomposition

Table 2 shows the main decomposition results, where the total ethnic disparity in log hourly wages is decomposed into an explained and an unexplained part with a Blinder-Oaxaca decomposition. The total difference in (predicted) log hourly wages between ethnic minority vs. ethnic majority employees is –0.149 points ($p < .001$), meaning that ethnic minority employees receive, on average, lower hourly wages than ethnic majority employees and that the relative difference in hourly wages between these groups amounts to $e^{-0.149} - 1 = -13.8\%$.

The explained part of the difference in log hourly wages amounts to –0.122 points ($p < .001$), so the larger part of the total difference is explained by group differences in observed characteristics (i.e., demographic, human capital, and occupational characteristics). Table 2 also shows a decomposition of this explained part of the pay gap. This decomposition indicates that, in particular, group differences in the education level, work experience, job tenure, employment status, and occupational status explain parts of the negative difference in wages between ethnic minority vs. ethnic majority employees.

However, Table 2 indicates that there is also an unexplained part of the total difference in log hourly wages and that this unexplained difference amounts to –0.027 points ($p = .061$), meaning that a smaller part of the total difference is not explained by the observed demographic, human capital, and occupational characteristics. The unexplained disparity in hourly wages is $e^{-0.027} - 1 = -2.7\%$. This might be an indication of wage discrimination against ethnic minority employees.

Table 2

Blinder-Oaxaca decomposition for log hourly wage

Log hourly wage	β	SE	*p*
Difference (minority–majority)	-0.149***	0.019	0.000
Explained difference	-0.122***	0.015	0.000
Unexplained difference	-0.027*	0.014	0.061
Decomposition of explained difference:			
Female	0.001	0.001	0.301
Age	0.022***	0.008	0.006
Married	-0.002***	0.001	0.005
Children in household	0.003***	0.001	0.002
Region	0.030***	0.003	0.000
Education level	-0.020***	0.005	0.000
Work experience	-0.055***	0.008	0.000
Job tenure	-0.030***	0.003	0.000
Employment status	-0.010***	0.003	0.000
Fixed-term employment contract	-0.009***	0.002	0.000
Temporary employment agency	-0.002**	0.001	0.021
Occupational activity	-0.009***	0.002	0.000
Occupational status	-0.031***	0.005	0.000
Leadership position	-0.000	0.000	0.540
Industry	-0.003	0.004	0.461
Public sector	-0.005***	0.001	0.000
Firm size	-0.002	0.003	0.482

Notes: Results based on linear regression models. N = 9,304 employees, of whom 847 have an ethnic minority background and 8,457 have an ethnic majority background. The dependent variable is the natural logarithm of actual gross hourly wage in €. β = coefficient. SE = robust standard error. “Age” includes age and squared age. “Region” includes 16 dummy variables. “Education level” includes nine dummy variables. “Work experience” includes work experience full-time, squared work experience full-time, work experience part-time, and squared work experience part-time. “Job tenure” includes job tenure and squared job tenure. “Employment status” includes three dummy variables. “Occupational activity” includes ten dummy variables. “Occupational status” includes 13 dummy variables. “Industry” includes 19 dummy variables. “Firm size” includes seven dummy variables. ***$p < .01$. **$p < .05$. *$p < .10$.

4.3. Robustness check

Although only employees who completed secondary schooling in Germany are included in the main analysis, there is the possibility that the group of ethnic minority employees still includes some individuals whose proficiency in the German language is below that of a native speaker. Since language skills are—due to limitations of the dataset—not included as an explanatory variable, wage effects of any differences in language skills between ethnic minority vs. ethnic majority employees would enter the unexplained part of the wage difference. However, unequal wages based on differences in language proficiency should not necessarily be regarded as discrimination, because a very high proficiency in the German language might be part of the (required) qualification for some jobs. Therefore, if language proficiency is insufficiently considered in the analysis, then the unexplained part of the wage gap might overestimate the discrimination against ethnic minority employees.

In order to avoid this potential problem, I perform a robustness check where the analysis is additionally restricted to ethnic majority employees and those ethnic minority employees whose self-reported German language proficiency is “very good” (which is the highest possible value) in each of the assessed categories: speaking, writing, and reading. Language proficiency has only been assessed for ethnic minority individuals, so that all ethnic majority employees remain in the sample. In order to obtain a similar German language proficiency between groups, the necessary assumption now is that all ethnic majority individuals in the final sample likewise have a very high proficiency in speaking, writing, and reading in German (to what extent this assumption holds cannot be tested with the available data).

In the final sample, 78.9% of the ethnic minority employees report a very good German language proficiency in all of the assessed categories. The other ethnic minority employees

(20.8% with less than very good German language proficiency and 0.4% with missing data on German language proficiency) are dropped from the sample for this robustness check.

The results of the robustness check are shown in Table 3. Compared to the main results (Table 2), the total difference in log hourly wages between ethnic minority vs. ethnic majority employees becomes slightly weaker and now amounts to –0.124 points ($p < .001$), implying a difference in hourly wages of –11.7%. As before, a larger part of the total difference in log hourly wages is explained by demographic, human capital, and occupational characteristics (–0.106 points, $p < .001$). The unexplained part of the difference is now somewhat weaker and not statistically significant anymore (–0.018 points, $p = .242$), meaning that the possibility that there is no unexplained group difference in the population cannot be excluded. The results of the robustness check therefore indicate that, when the analysis is restricted to ethnic majority employees and those ethnic minority employees who report very good German language skills, then the ethnic pay gap becomes slightly smaller and the unexplained part of the ethnic pay gap becomes somewhat smaller and is not statistically significant anymore.

Table 3

Blinder-Oaxaca decomposition for log hourly wage, only ethnic majority employees and those ethnic minority employees who report very good German language proficiency

Log hourly wage	β	SE	*p*
Difference (minority–majority)	-0.124***	0.021	0.000
Explained difference	-0.106***	0.017	0.000
Unexplained difference	-0.018	0.016	0.242
Decomposition of explained difference:			
Female	-0.001	0.001	0.307
Age	0.024***	0.009	0.007
Married	-0.004***	0.001	0.001
Children in household	0.003***	0.001	0.007
Region	0.030***	0.003	0.000
Education level	-0.006	0.005	0.290
Work experience	-0.062***	0.009	0.000
Job tenure	-0.032***	0.003	0.000
Employment status	-0.012***	0.003	0.000
Fixed-term employment contract	-0.009***	0.002	0.000
Temporary employment agency	-0.002**	0.001	0.037
Occupational activity	-0.006**	0.002	0.010
Occupational status	-0.016***	0.005	0.003
Leadership position	-0.000	0.000	0.911
Industry	-0.006	0.004	0.106
Public sector	-0.005***	0.001	0.001
Firm size	-0.000	0.003	0.943

Notes: Results based on linear regression models. Sample restricted to ethnic majority employees and those ethnic minority employees who report a very good proficiency in speaking, writing, and reading in German. N = 9,125 employees, of whom 668 have an ethnic minority background and 8,457 have an ethnic majority background. The dependent variable is the natural logarithm of actual gross hourly wage in €. β = coefficient. SE = robust standard error. “Age” includes age and squared age. “Region” includes 16 dummy variables. “Education level” includes nine dummy variables. “Work experience” includes work experience full-time, squared work experience full-time, work experience part-time, and squared work experience part-time. “Job tenure” includes job tenure and squared job tenure. “Employment status” includes three dummy variables. “Occupational activity” includes ten dummy variables. “Occupational status” includes 13 dummy variables. “Industry” includes 19 dummy variables. “Firm size” includes seven dummy variables. ***$p < .01$. **$p < .05$. *$p < .10$.

4.4. Heterogeneity analysis

In order to test whether the results differ by gender, I perform the main analysis (from Section 4.2) separately for women and men. Separate analyses are useful because various coefficients on explanatory variables might differ between females and males. Separate analyses by gender have also been previously conducted in this area of research (Zwysen and Longhi 2018).

In the final sample, there are 5,015 female employees, of whom 442 have an ethnic minority background and 4,573 have an ethnic majority background. There are 4,289 male employees, of whom 405 have an ethnic minority background and 3,884 have an ethnic majority background.

Table 4 shows the results of this heterogeneity analysis. The total disparity in log hourly wages between ethnic minority vs. ethnic majority employees is somewhat less pronounced among women (–0.123 points, $p < .001$) than among men (–0.186 points, $p < .001$). This also holds for the explained part of the difference. In particular (as the decomposition of the explained difference suggests), education level, work experience, and occupational status are relatively less important for explaining the ethnic pay gap among women than among men. Finally, the unexplained part of the log wage disparity likewise appears to be somewhat less pronounced among women (–0.019 points, $p = .283$) than among men (–0.032 points, $p = .166$); in the male sample the estimated unexplained difference is larger than in the main results from Table 2. However, in the heterogeneity analysis the unexplained differences are not statistically significant, which most probably has to do with the substantially smaller sample sizes due to the separation of genders. Overall, the results of the heterogeneity analysis suggest that the total, explained, and unexplained ethnic pay gaps are apparently somewhat more pronounced among men than among women.

Table 4

Blinder-Oaxaca decomposition for log hourly wage, separated by gender

Log hourly wage	(1) Women			(2) Men		
	β	SE	*p*	β	SE	*p*
Difference (minority–majority)	-0.123***	0.022	0.000	-0.186***	0.030	0.000
Explained difference	-0.105***	0.019	0.000	-0.154***	0.022	0.000
Unexplained difference	-0.019	0.017	0.283	-0.032	0.023	0.166
Decomposition of explained difference:						
Age	0.024**	0.010	0.023	0.039***	0.014	0.007
Married	-0.001	0.001	0.117	-0.003**	0.001	0.047
Children in household	0.005***	0.002	0.007	0.000	0.001	0.816
Region	0.029***	0.004	0.000	0.027***	0.004	0.000
Education level	-0.018***	0.007	0.009	-0.026***	0.007	0.001
Work experience	-0.050***	0.010	0.000	-0.080***	0.015	0.000
Job tenure	-0.034***	0.004	0.000	-0.024***	0.004	0.000
Employment status	-0.013***	0.004	0.001	-0.009**	0.004	0.021
Fixed-term employment contract	-0.007***	0.002	0.004	-0.010***	0.003	0.001
Temporary employment agency	-0.001	0.001	0.304	-0.004**	0.002	0.045
Occupational activity	-0.006*	0.003	0.053	-0.012***	0.004	0.002
Occupational status	-0.015**	0.006	0.013	-0.051***	0.008	0.000
Leadership position	-0.000	0.000	0.586	-0.001	0.001	0.150
Industry	-0.004	0.005	0.344	-0.003	0.006	0.620
Public sector	-0.007***	0.002	0.002	-0.002	0.002	0.210
Firm size	-0.006*	0.004	0.073	0.004	0.004	0.339

Notes: Results based on linear regression models. Analysis (1) is restricted to women (N = 5,015 employees, of whom 442 have an ethnic minority background), and Analysis (2) is restricted to men (N = 4,289 employees, of whom 405 have an ethnic minority background). The dependent variable is the natural logarithm of actual gross hourly wage in €. β = coefficient. SE = robust standard error. "Age" includes age and squared age. "Region" includes 16 dummy variables. "Education level" includes nine dummy variables. "Work experience" includes work experience full-time, squared work experience full-time, work experience part-time, and squared work experience part-time. "Job tenure" includes job tenure and squared job tenure. "Employment status" includes three dummy variables. "Occupational activity" includes ten dummy variables. "Occupational status" includes 13 dummy variables. "Industry" includes 19 dummy variables. "Firm size" includes seven dummy variables. ***p < .01. **p < .05. *p < .10.

4.5. Exploratory analyses

In order to explore to what extent the ethnic pay gap is explained by whether an individual holds the German citizenship, I perform (based on the main results from Section 4.2) an analysis that includes as an additional explanatory variable a dummy variable indicating whether the employee holds the German citizenship (1 = yes, 0 = no). For example, it is possible that some employers treat applicants and employees without German citizenship differently due to their legal status and rights (citizenship is typically observed in the application documents in Germany). The potential relevance of German citizenship for wages is also indicated by previous evidence that workers who do not (vs. do) hold the German citizenship tend to receive lower earnings in Germany (e.g., Dustmann 1993; Licht and Steiner 1994; Schmidt 1997; Bartolucci 2014). German citizenship was not included in the main analysis because any unequal treatment based on citizenship is a form of discrimination that is related to ethnic discrimination. Therefore, including the variable on German citizenship as an explanatory variable creates the risk that a part of wage discrimination based on ethnic background (namely, the part that is associated with whether an employee holds the German citizenship) is shifted from the unexplained to the explained part of the pay gap. The unexplained part would then not be a good measure of such discrimination anymore and would underestimate this discrimination.

In order to additionally explore to what extent the ethnic pay gap is explained by whether an individual was born in Germany, I perform an analysis that includes as an additional explanatory variable a dummy variable indicating whether the individual was born in Germany (1 = yes, 0 = no), while the dummy on German citizenship is included as well. For example, it is possible that some employers discriminate against applicants and employees who were born abroad (the birth country is typically also observed in the application documents in Germany). The potential

relevance of having been born in Germany for wages is further suggested by previous empirical evidence that (first-generation) immigrants often receive lower earnings than children of immigrants (e.g., Algan et al. 2010; Longhi, Nicoletti, and Platt 2013). Born in Germany was not included in the main analysis because unequal treatment based on country of birth should probably be considered as a form of ethnic discrimination, so including this variable as an explanatory variable again creates the risk that a part of ethnic discrimination is shifted from the unexplained to the explained part of the pay gap.

In the final sample, 76.7% of the ethnic minority employees and 99.7% of the ethnic majority employees hold the German citizenship. Furthermore, 53.4% of the ethnic minority employees and 98.7% of the ethnic majority employees were born in Germany. (There are no missing values in German citizenship or in born in Germany.)

Table 5 shows the results of these exploratory analyses, when (1) German citizenship or (2) German citizenship and born in Germany are included as additional explanatory variables. When including German citizenship (Analysis (1)), then—compared to the main results—the unexplained part of the difference in log hourly wages between ethnic minority vs. ethnic majority employees becomes slightly weaker and is not statistically significant anymore (–0.021 points, p = .168). In line with this change, the decomposition of the explained difference suggests that the group difference in German citizenship might explain a small part of the negative difference in log hourly wages between ethnic minority vs. ethnic majority employees, but this effect is not statistically significant (–0.006 points, p = .394).

When additionally including born in Germany (Analysis (2)), the unexplained part of the difference in log hourly wages further decreases, becomes very weak, and is again statistically insignificant (–0.009 points, p = .641). The detailed decomposition results suggest that the group

difference in born in Germany might explain a part of the negative difference in log hourly wages between ethnic minority vs. ethnic majority employees, but the effect is also not statistically significant (–0.013 points, $p = .155$).

Overall, the results of the exploratory analyses suggest that the unexplained wage disparity found in the main results—which can be interpreted as discrimination—is apparently to a large extent explained by group differences in German citizenship and having been born in Germany. One possible interpretation is that some employers treat applicants and/or employees differently based on their citizenship and country of birth.

Table 5

Blinder-Oaxaca decomposition for log hourly wage, with additional explanatory variables

Log hourly wage	(1) Including German citizenship			(2) Additionally including Born in Germany		
	β	SE	*p*	β	SE	*p*
Difference (minority–majority)	-0.149***	0.019	0.000	-0.149***	0.019	0.000
Explained difference	-0.128***	0.016	0.000	-0.140***	0.019	0.000
Unexplained difference	-0.021	0.015	0.168	-0.009	0.018	0.641
Decomposition of explained difference:						
Female	0.001	0.001	0.301	0.001	0.001	0.301
Age	0.022***	0.008	0.006	0.022***	0.008	0.006
Married	-0.002***	0.001	0.005	-0.002***	0.001	0.005
Children in household	0.003***	0.001	0.002	0.003***	0.001	0.002
Region	0.030***	0.003	0.000	0.030***	0.003	0.000
Education level	-0.020***	0.005	0.000	-0.020***	0.005	0.000
Work experience	-0.055***	0.008	0.000	-0.055***	0.008	0.000
Job tenure	-0.030***	0.003	0.000	-0.030***	0.003	0.000
Employment status	-0.010***	0.003	0.000	-0.010***	0.003	0.000
Fixed-term employment contract	-0.009***	0.002	0.000	-0.009***	0.002	0.000
Temporary employment agency	-0.002**	0.001	0.021	-0.002**	0.001	0.021
Occupational activity	-0.009***	0.002	0.000	-0.009***	0.002	0.000
Occupational status	-0.031***	0.005	0.000	-0.031***	0.005	0.000
Leadership position	-0.000	0.000	0.536	-0.000	0.000	0.534
Industry	-0.003	0.004	0.466	-0.003	0.004	0.473
Public sector	-0.005***	0.001	0.000	-0.005***	0.001	0.000
Firm size	-0.002	0.003	0.483	-0.002	0.003	0.481
German citizenship	-0.006	0.007	0.394	-0.005	0.007	0.453
Born in Germany				-0.013	0.009	0.155

Notes: Results based on linear regression models. The dependent variable is the natural logarithm of actual gross hourly wage in €. N = 9,304 employees, of whom 847 have an ethnic minority background and 8,457 have an ethnic majority background. β = coefficient. SE = robust standard error. “Age” includes age and squared age. “Region” includes 16 dummy variables. “Education level” includes nine dummy variables. “Work experience” includes work experience full-time, squared work experience full-time, work experience part-time, and squared work experience part-time. “Job tenure” includes job tenure and squared job tenure. “Employment status” includes three dummy variables. “Occupational activity” includes ten dummy variables. “Occupational status” includes 13 dummy variables. “Industry” includes 19 dummy variables. “Firm size” includes seven dummy variables. ***$p < .01$. **$p < .05$. *$p < .10$.

5. Conclusion and discussion

In this study, I analyze a pay gap between employees with an ethnic minority vs. ethnic majority background in Germany and to what extent such a gap is explained by group differences in demographic, human capital, and occupational characteristics. To this aim, I use a Blinder-Oaxaca decomposition based on a representative sample of the adult population in Germany, restricting the analysis to employees who completed secondary schooling in Germany. The results show that, overall, the gross hourly wage of ethnic minority employees is significantly below that of ethnic majority employees, and this total (or raw) gap amounts to 13.8%. The larger part of the gap is explained by group differences in observable characteristics, especially the education level, work experience, job tenure, the precise employment status, and the occupational status. However, a significant part of the pay gap remains unexplained, and this unexplained gap amounts to 2.7% lower wages for ethnic minority employees. When the sample is additionally restricted to ethnic majority employees and those ethnic minority employees who report very good German language skills, then the total pay gap becomes slightly smaller and the unexplained pay gap becomes somewhat smaller and is not statistically significant anymore. The total, explained, and unexplained ethnic pay gaps are apparently somewhat larger among men than among women. Finally, when including German citizenship and having been born in Germany as additional explanatory variables, then the unexplained pay gap becomes very small and is statistically insignificant.

The total pay gap indicates substantial ethnic inequality in the German labor market, associated with a significant disadvantage for ethnic minority (vs. ethnic majority) employees with respect to wages. Furthermore, the unexplained part of the pay gap in the main analysis also indicates potential wage discrimination against ethnic minority employees. Since the

unexplained gap becomes smaller and insignificant in the robustness check that includes additional restrictions on German language proficiency, it is possible that the unexplained pay gap found in the main analysis is (partly) driven by group differences in language skills that are unobserved in that analysis. However, as the language skills of ethnic majority employees have not been assessed in the survey, it is impossible to include language skills as an explanatory variable; the robustness check hinges on the untested assumption that all ethnic majority employees are very good in speaking, writing, and reading in German. In addition, the restrictions on language proficiency implemented in the robustness check reduce the sample size and the resulting statistical power, which makes it less likely to detect significant disparities. Since the exploratory results suggest that the unexplained ethnic pay gap found in the main results is apparently largely explained by group differences in German citizenship and having been born in Germany, the results provide tentative evidence that wage discrimination related to ethnic background is mainly based on whether an employee holds the German citizenship and whether an employee was born in Germany.

The fact that the unexplained pay gap indicated by the main results is relatively small (especially in comparison to the total and explained pay gaps) might be a consequence of the fact that many wages in Germany are determined by collective labor agreements with trade unions. This might to some extent protect employees against wage discrimination.

When interpreting the results, the reader should keep in mind two important restrictions resulting from the focus of the present analysis. First, since the analysis is restricted to employees, the effects of unemployment on earnings are not taken into account (compare, e.g., Aeberhardt and Pouget 2010), and any discrimination against self-employed workers based on their ethnic background is not considered either. Second, the measure of wage discrimination

(using the unexplained ethnic pay gap) is supposed to capture only *direct* wage discrimination and does not capture any *indirect* wage discrimination that is mediated by other outcomes (such as education or occupational status). For example, if ethnic minority individuals are discriminated in education and/or in access to a higher occupational status and if this results in a lower education level and/or a lower occupational status, which in turn lead to lower earnings, then that would not be reflected by the unexplained pay gap. The reason is that any effects of group differences in demographic, human capital, and occupational characteristics (including education level and occupational status) enter the explained—rather than the unexplained—part of the pay gap. Therefore, the unexplained pay gap is supposed to measure direct wage discrimination only.

In addition, I would like to mention two limitations that are associated with the data source. First, it is not certain whether (and to what extent) the unexplained ethnic pay gap actually reflects discrimination or whether it reflects the effects of group differences in unobserved characteristics. This is a general limitation of Blinder-Oaxaca decompositions (see, e.g., Jann 2008) and is related to the risk of omitted variable bias that may generally exist in observational studies. However, since I include a large set of demographic, human capital, and occupational variables observed in the dataset, I think that the scope for the influence of unobserved characteristics is rather limited. Second, due to limitations of the data source and in order to ensure sufficiently large group sizes, I cannot distinguish between different ethnic minority groups in this study.

As described in Section 1, the ethnic pay gap might be associated with negative economic, psychological, and social effects. Since the results suggest that a part of this gap might be due to wage discrimination, policy makers and firms should take steps to prevent such discrimination,

for example with the installation of diversity staff or diversity committees that are involved in wage setting processes (e.g., Kalev, Dobbin, and Kelly 2006). However, the results also indicate that the larger part of the ethnic pay gap is explained by ethnic inequalities in other outcomes, such as education level, work experience, job tenure, employment status, and occupational status. Therefore, actions that reduce such inequalities appear to be appropriate, facilitating equity in the access to educational qualifications and degrees, (regular) employment, and higher occupational positions as well as improving ethnic minority employees' duration of job tenure, for example by preventing any workplace discrimination.

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