



Unequal effects on working time: immigrants' vulnerability in the German labor market in the early COVID-19 pandemic

Lina Tobler ^a, Lukas Fervers ^{a,b}, Marita Jacob ^a and Veronika Knize ^c

^aInstitute of Sociology and Social Psychology, University of Cologne, Cologne, Germany; ^bDIE – Leibniz Centre for Lifelong Learning, Bonn, Germany; ^cInstitute for Employment Research (IAB), Nuremberg, Germany

ABSTRACT

Do economic shocks increase labor market inequalities between immigrants and natives? The COVID-19 crisis reduced economic activity for almost all social groups, providing a recent case for answering this question. Research tends to focus on employment levels, overlooking potential inequalities in other job characteristics. Workers in Germany have largely kept their jobs, although their working hours were reduced. Using German high-frequency survey data, we analyze whether there was a difference in the reduction of hours for immigrants and immigrants' descendants (IAD) compared to natives. Since IAD are overrepresented in both heavily affected and essential jobs, we argue that the effects may be heterogeneous across the distribution of the change in hours. As merely comparing averages would ignore this heterogeneity, we employ OLS and quantile treatment effect estimations to analyze working hours changes in the early COVID-19 crisis. Results show that IAD reduced hours more than natives. This effect is particularly pronounced at the lower end of the distribution of the change in working hours. Our findings suggest that IAD experienced economic hardship more often than natives and corroborate earlier findings of increased immigrant-native inequalities in times of crisis. This calls for further investigation of policies aimed at protecting vulnerable groups.


ARTICLE HISTORY Received 27 October 2022; Accepted 16 January 2024

KEYWORDS Economic shocks; COVID-19; employment; labor market inequality; migration; quantile treatment effects

1. Introduction

Previous research has shown that immigrant workers tend to be more vulnerable to economic downturns than native workers (e.g. Dustmann *et al.* 2010). As an unforeseen exogenous event with closed borders,

CONTACT Lina Tobler  tobler@wiso.uni-koeln.de  Institute of Sociology and Social Psychology, University of Cologne, Albertus-Magnus-Platz, D-50923 Cologne, Germany

 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/14616696.2024.2308011>.

© 2024 European Sociological Association

strict lockdowns (for an overview, see Hale *et al.* 2021) and a sharp decline in economic activity (e.g. Destatis 2020; Eurostat 2020b; Bunde 2021), the COVID-19 crisis presents a unprecedented case to further study how and to what extent immigrants are affected differently from natives by an economic shock.

Looking at potential inequalities in Germany provides unique insights, as the government relied on a short-time work scheme and other measures to reduce working hours to prevent unemployment from rising (Konle-Seidl 2020). This strategy was largely successful as unemployment rates in Germany have been considerably lower than in many other European countries (Eurostat 2022) and remained relatively stable (Statistik der Bundesagentur für Arbeit 2023). Nevertheless, it still implied a reduction in working hours with only partial compensation, resulting in non-negligible financial losses for the affected workers.

While COVID-19 had substantial impacts on the economy as a whole, it is reasonable to assume that different social groups were affected to different degrees. In particular, the group of immigrant workers, who more often work in precarious employment and are more vulnerable than their native counterparts, may have faced greater adversity (see, for example, Kreyenfeld and Konietzka 2002; Kogan 2004, 2011; Heath and Cheung 2007; Algan *et al.* 2010; Giesecke *et al.* 2015; Ubalde and Alarcón 2020). Immigrants may be disadvantaged in the labor market due to imperfect transferability of human capital or a lack of labor market-related resources beneficial for job placement (e.g. Chiswick 1978, 1991; Friedberg 2000; Behtoui and Neergaard 2010; Lancee 2010, 2012; Kalter 2011; Leschke and Weiss 2020; Argue and Velema 2022). These disadvantages have been shown to extend also to the descendants of immigrants (e.g. Kalter and Granato 2007; Kalter 2011). Hence, it seems likely that immigrants were more likely to be hit hard by the early COVID-19 crisis in spring 2020, implying a larger reduction in hours worked on average compared to their native counterparts.

At the same time, the changes in working hours of immigrants and natives may have differed not only on average. Immigrants' and natives' changes in hours may also have differed to different extents across the distribution of changes in hours: On the one hand, immigrants are overrepresented in sectors of the economy where the demand for labor suddenly collapsed (Eurostat 2020a). The share of immigrants is particularly high in sectors, such as transport and storage, construction and parts of the service sector such as accommodation and food services (OECD 2020b; European Commission 2022).¹ Work in these sectors often cannot be

done from home or requires close social contact (Fasani and Mazza 2020a; Mongey *et al.* 2021). As the reduction in working hours was particularly strong in these sectors, this suggests that immigrants are overrepresented among those who have experienced the greatest loss in working hours. On the other hand, immigrants are also overrepresented among workers in so-called ‘essential jobs’ that could not be interrupted during the COVID-19 pandemic (OECD 2020a; Fasani and Mazza 2020b, 2023; for Germany, see Giesing and Hofbauer 2020; Khalil *et al.* 2020b). These jobs are found in sectors such as food retailing, postal services, transportation, and care and health care services. Evidence shows that these essential workers were less likely to be absent from work during the pandemic (Montenovo *et al.* 2020) or even increased their workload (e.g. for Germany, cf. Kramer *et al.* 2021; for Spain, cf. Blanco-Donoso *et al.* 2021). Given the overrepresentation of immigrants in differently affected sectors and jobs, examining average changes may not be definitive. Therefore, to fully understand the impact of the COVID-19 crisis on immigrants, it is crucial to consider both average and distributional effects with respect to the change in working hours.

To shed light on this issue, we examine the change in working hours of immigrants and descendants of immigrants (hereafter abbreviated as IAD) in Germany between pre-COVID-19 times and May 2020. We use survey data from the High-frequency Online Personal Panel *Life and Work Situations in Times of Corona* (IAB-HOPP) (Haas *et al.* 2021; Volkert *et al.* 2021a, 2021b) from the Institute for Employment Research (IAB), which includes information on respondents’ working hours during and before the COVID-19 crisis. The data were linked to registry data (social security records) containing detailed information on past employment history and occupational characteristics. In the first step, ordinary least squares (OLS) regressions are used to estimate the average effects of having a migration background on changes in working hours. Second, quantile treatment effect (QTE) estimations are used to assess the gap between IAD and natives across the unconditional distribution of the change in working hours.

Our research adds to previous literature in three regards. First, at the most general level, it adds to labor market research on inequalities between immigrants and natives (e.g. Kreyenfeld and Konietzka 2002; Kogan 2004, 2011; Heath and Cheung 2007; Algan *et al.* 2010; Giesecke *et al.* 2015; Ubalde and Alarcón 2020). By looking at (changes in) working hours, we provide

¹For an overview, see Annex Table 3.B.1 in OECD (2020b, 163).

insights into an alternative measure of employment inequality to outcomes such as wages or (un)employment that are often used in labor market research with a focus on immigrants. Inequalities in working time may reflect specific labor market dynamics, social structures and potential disparities, such as occupational segregation alongside more or less standardized working hours, job opportunities and flexibility, and fair labor practices. Second, our research contributes to previous literature on the extent to which immigrants and natives are affected by economic shocks, which has documented the greater vulnerability of immigrants in past crises (e.g. Dustmann *et al.* 2010; Bratsberg *et al.* 2014; Panichella 2018). Therefore, it deepens our understanding of the dynamics of immigrant-native inequality in terms of the vulnerability to economic downturns. The COVID-19 crisis can be seen as a particularly interesting case here in two respects. On the one hand, it was a rather extreme shock with an exceptional decline in economic activity. On the other hand, it was an unforeseen exogenous event that left no room for planned, smooth adjustments, i.e. in preparation for the crisis employees could not adjust their work arrangements (e.g. by changing jobs) and employers could not adjust their personnel strategy (e.g. by laying off workers). Third and more specifically, our study extends research on the societal impact of COVID-19 on minority groups (e.g. Borjas and Cassidy 2020; Couch *et al.* 2020; Hu 2020; Brücker *et al.* 2021; Fasani and Mazza 2023). To the best of our knowledge, this article is the first to ever quantify the change in working hours of IAD and natives during the early phase of the pandemic in Germany. In particular, we extend previous research by looking at quantile treatment effects, providing insights into inequalities that cannot be detected by merely comparing overall group means or average effects. With regard to this research question, it is important to closely examine the IAD-native gap across the distribution of the change in working hours, as IAD are overrepresented in both heavily affected and essential jobs. To do so, we analyze the difference between IAD and natives at different quantiles of the distribution of the change in working hours.

2. Background

2.1. *The COVID-19 crisis in Germany: lockdown measures and working time reductions*

The first lockdown period in Germany officially started on March 22, 2020 (Bundesregierung 2020; Bundesgesundheitsministerium 2023).

The government imposed restrictions on social contact and travel. Schools and daycare centers, restaurants, bars, service businesses and non-essential shops were closed. This went along with a 9.7% decline in the country's GDP in the second quarter of 2020 compared to the first quarter (Destatis 2020). Reopenings slowly started in May 2020.

To cope with the decline in economic activity, employers in Germany relied on various strategies that had proven to be effective measures in previous crises to retain employees instead of having to dismiss them (Möller 2010; Herzog-Stein *et al.* 2018). One measure was the use of short-time work (*Kurzarbeit*, Konle-Seidl 2020). Within this scheme, firms could keep their employees but reduce working hours – even to zero – and employees' earnings losses would be partly compensated by the Federal Employment Agency. While this compensation was 60% of an employee's salary (67% if they had children), some employees on short-time work received additional top-up payments, either because of collective agreements or because of voluntary top-ups by firms (Konle-Seidl 2020). To administer short-time work, a contractual, company or collective agreement between the employer and the affected employees is required (Bundesministerium für Arbeit und Soziales 2022). Employers could apply for short-time work for all or some of their employees (e.g. subdivisions) if labor demand was reduced considerably. In the beginning of the crisis, requirements were relaxed so that employers could apply for short-time work if at least 10% (instead of the original one-third) of their employees experienced a substantial loss of work (Konle-Seidl 2020: 7; Bundesagentur für Arbeit 2023; Bundesministerium für Arbeit und Soziales 2022). In case of increasing workloads, overtime was paid less often than in 2019 (Frodermann *et al.* 2020: 5). As in previous recessions (see, for example, Herzog-Stein *et al.* 2018), other measures included the use of overtime or holiday credits in companies with working time accounts or the reduction of working hours (below contractual hours) without compensation (Konle-Seidl 2020; Brücker *et al.* 2021).

Due to the short-time work scheme, job loss was less relevant in the German context (Adams-Prassl *et al.* 2020, see also Brücker *et al.* 2021: 10f.), with an increase of overall unemployment by only one percentage point from 5.1% to 6.1% between March and May (Statistik der Bundesagentur für Arbeit 2023 (see table 2.1.2)). Nevertheless, short-time work was associated with a loss of income for almost all affected workers.

2.2. Previous research on immigrant and native workers during the COVID-19 crisis

A growing body of research has considered the societal impact (e.g. Grasso *et al.* 2021) and the potential negative effects of COVID-19 on immigrant employment. Several studies from EU14 countries, the UK and the United States report disadvantages for ethnic, racial, or immigrant minorities,² mainly in terms of unemployment (for EU14; see Fasani and Mazza 2023; for the UK, see Hu 2020; for the United States, see Borjas and Cassidy 2020; Couch *et al.* 2020; Mongey *et al.* 2021; Montenovolo *et al.* 2020). However, other research from the UK suggests that ethnic minorities were less affected by the COVID-19 crisis in terms of furlough, layoff, and work reduction (summarized as one ‘economic hardship’ variable) due to their overrepresentation among essential workers (Witteveen 2020; with regard to time reduction, see also Hu 2020). First findings for Germany indicate that the increase in unemployment was higher for immigrants than for natives (Giesing and Hofbauer 2020; OECD 2020c; Brücker *et al.* 2021), although Brücker *et al.* (2021, 10f.) note that a reduction in working hours (rather than layoffs) was the predominant means used to adjust to the crisis. Indeed, immigrants were more likely to reduce working hours, too (Brücker *et al.* 2021).

At the same time, quantitative evidence both on the magnitude of the changes and on distributional differences with regard to changes in working hours remains sparse. We go beyond previous research by (1) providing a detailed account on changes in working hours, and (2) assessing distributional differences.

3. Methods

3.1. Data and variables

The analyses relied on the first wave of the High-frequency Online Personal Panel *Life and Work Situations in Times of Corona* (IAB-HOPP). It was conducted by the IAB, the Research Institute of the Federal Employment Agency, in response to the COVID-19 crisis (Haas *et al.* 2021;

²In the US context, studies tend to take a racial rather than a migratory perspective. Couch *et al.* (2020) and Montenovolo *et al.* (2020) use the concepts of race and ethnicity. So do Mongey *et al.* (2021), but add citizenship and foreign country of birth in their analyses. Borjas and Cassidy (2020) also apply the concept of being foreign-born. In the UK context, Hu (2020) distinguishes between four groups: white versus ethnic minority immigrants and white versus ethnic minority natives.

Volkert *et al.* 2021a).³ The database includes information on respondents' employment, working time, short-time work, and home office work. The first wave covers May 2020, the period shortly after the first lockdown. Retrospective questions provide information on the period before the COVID-19 crisis. It is crucial to note that retrospective information may be inaccurate thus leading to measurement error in the dependent variable. At the same time, the estimated difference between natives and IAD is not biased by this error as long as it does not differ between groups, i.e. the measurement error is similar for natives and IAD. While this remains an assumption, there is little reason to believe that the extent of measurement error is correlated with migration background. As long as the error is random, it will only increase unexplained variance in the outcome variable, thus making significance tests conservative (see e.g. Wooldridge 2002).

The survey sample of the IAB-HOPP was drawn from the Integrated Employment Biographies (IEB), which comprise registry data of the Federal Employment Agency (cf., e.g. Antoni *et al.* 2019). As only people with an attachment to the labor market or the social security system are included in the IEB, the survey is representative of the German working population, excluding the self-employed and civil servants. For respondents who provided linkage consent, the dataset was combined with the most recently available registry information (i.e. until the end of 2019) on their employment history and other employment-relevant variables.⁴

As we are interested in changes in working hours, our sample is restricted to people who were employed before the crisis and during the observation period, provided valid information on the main variables, and consented to link survey data with registry data. Those older than age 65, on parental leave, who worked less than one hour per week before the crisis, or with implausible values (more than 80 working hours per week) were excluded. The total sample amounts to $N = 7,202$ observations, which is about 64% of the persons in the first survey wave. Sample selection due to job loss plays a minor role, as only 1.63% in the sample of employed persons plus job-losers became unemployed between the two time points.

³The analyses use the first version of the IAB-HOPP. The data are now available as Scientific Use File (Volkert *et al.* 2021b).

⁴A Scientific Use File for IAB-HOPP data combined with registry/administrative data is now available (Bellmann *et al.* 2021b).

The main dependent variable is the change in working hours between the time before the lockdown and May 2020. The analyses rely on self-reported weekly working hours, including overtime and extra hours, rather than contractual working hours. With regard to pre-crisis working hours, respondents were asked: ‘Thinking about the time before the Covid-19 crisis, how many hours did you usually work per week, including overtime, extra work etc.? Note: If you did not have fixed working hours, enter the average hours over several weeks’. This was followed by a question on current working time: ‘And if you think about your last working week: How many hours did you actually work, including regular overtime, extra work etc.? Note: If you do not have fixed working hours, enter the average hours over several weeks’ (Volkert *et al.* 2021a, 2021b). Based on these two questions, the difference (i.e. change) between the two time points was calculated. Negative numbers indicate a reduction and positive numbers show an increase in working hours.

IAD status (migration background), the independent variable of interest, is defined as having been born abroad or having at least one parent who was born abroad. As disadvantages extend to the descendants of immigrants (e.g. Kalter and Granato 2007; Kalter 2011), immigrants and descendants of immigrants were grouped together. With regard to the analyses, this has the advantage of contrasting a larger group of IAD with the group of natives. IAD status was coded as a dummy variable. People born abroad with parents born in Germany were not considered IAD. Applying these definitions, 13.7% of the sample were categorized as IAD, with 5.4% being immigrants and 8.3% being descendants of immigrants. Among IAD, around 80% have a German nationality, 14% have another European nationality and 5% are non-Europeans.

A wide range of control variables commonly used in the literature on immigrant labor market vulnerability was used, such as those related to human capital and labor market-related resources. Further socio-demographic variables were included that may differ between IAD and natives and that have a potential influence on the reduction of working hours during the crisis. These control variables include gender, age, age squared, region of residence (West versus East Germany (including Berlin)), living with a child aged under 18, having a partner and education. Education relies on the 2011 International Standard Classification of Education (ISCED). For analytic purposes, ISCED categories 1–3, 4–5 and 6 or higher were grouped.

Based on the argument that IAD are overrepresented in particular sectors and jobs, several occupational characteristics were used to control for the employment situation. First, the self-reported opportunity to work from home (at least to some extent) before the crisis was taken into account.⁵ Second, information on the working hours before the crisis was considered to control for starting level differences. This acknowledges that persons in jobs with high working time may have reduced the most hours. Third, registry data on a respondent's occupation was used to determine whether the respondent worked in an essential occupation, as defined by the Federal Ministry of Labour and Social Affairs (BMAS; see Table 1 in Giesing and Hofbauer 2020, 44).⁶ The classification relies on the three-digit occupational classification by the Federal Employment Agency (*Klassifikation der Berufe: KldB 2010*).⁷ Fourth, the share of people across industries receiving short-time work allowance was introduced as a continuous aggregate variable. This share was calculated using official statistics on employment (Statistik der Bundesagentur für Arbeit 2021a) and short-time work allowance (Statistik der Bundesagentur für Arbeit 2021b) across sectors (two-digit codes) according to the Statistical Classification of Economic Activities in the European Community of 2008 (WZ08). Information on respondents' employment sector is reported in the registry data. Individual-level information on the receipt of short-time work allowance was not used directly as it would be an alternative measure of the dependent variable. Fifth, a measure of occupational skill, according to the KldB 2010, was also taken from registry data.⁸

In addition, five years of employment history (i.e. from 2015 to 2019) were gathered from the registry data. Variables were included indicating the time in contributory employment or vocational training (in months), time in marginal employment (in months), and a dummy variable indicating whether a person was unemployed during the last five years.

⁵As the questionnaire used a filter variable to retrieve this information, consolidated information was used. Only those who reported to currently have the opportunity to work from home were able to state their pre-COVID-19 home office use. Hence, it was assumed that those who did not even have the option during the crisis should also not have had it before.

⁶Unfortunately, the website of the Federal Ministry of Labour and Social Affairs (BMAS) listing all essential occupations to which Giesing and Hofbauer (2020) point is no longer available. Therefore, the list provided by the authors was used.

⁷As Koebe *et al.* (2020: 2) who also use the KldB2010 three-digit code to define essential occupations note, a definition based on said classification cannot be exact, as occupational groups might be essential in one context but non-essential in another. The authors illustrate this using the example of cleaning personnel in hospitals versus other cleaning jobs.

⁸Here using data from 2018 or earlier (for data documentation on the SUF file of the IAB-HOPP data linked to registry/administrative data, see Bellmann *et al.* (2021a)).

Controlling for the employment history should further account for differences in occupational placement and crisis vulnerability.

Table A1 in the appendix shows univariate descriptive statistics of the sample for all variables. Considering bivariate descriptions for the sample, IAD are overrepresented in accommodation and food services, information and communication, transport and storage and administrative and support service activities. IAD were more likely to have been subjected to short-time work during the pandemic. However, they were not overrepresented among essential workers, and there is no significant difference between IAD and natives in the share of pre-COVID-19 home office work.

3.2. Estimation strategy

We employ OLS regressions to analyze the average effect of migration background on change in working hours (with and without covariates). To model distributional effects, unconditional QTE models (Firpo 2007) were run. QTE estimation provides treatment effects at different quantiles of the unconditional distribution of the dependent variable. Therefore, QTE shows differences in the IAD–native gap across the distribution of the change in working hours. QTE estimates were obtained using the semi-parametric two-step estimator as implemented in Stata by Frölich and Melly (2010; for technical details on the two-step estimation see Firpo 2007, 265ff.).⁹ As in OLS regression, effects are interpreted at the individual level (Borgen *et al.* 2023). Effects were estimated at the 0.05, 0.10, 0.25, 0.50, 0.75, 0.90, and 0.95 quantile of the distribution. As the focus is on severe reductions and increases in working hours, smaller steps were chosen at the distribution's upper and lower end. We compute robust standard errors in all models. Moreover, very low random noise between $-.01$ and $.01$ was added to the dependent variable to obtain QTE estimates. The reasoning behind this is described by Machado and Santos Silva (2005) with regard to count data.¹⁰ We perform a wide range of supplementary analyses to guarantee the robustness and validity of our

⁹-ivqte- command in Stata (Frölich and Melly 2008; Frölich and Melly 2010).

¹⁰As most respondents reported integer values as their working hours, the distribution of changes in working hours is not continuous but has jumps in between values. This can lead to estimation problems as it makes observations' ranks indistinguishable from one another (cf. Firpo 2007). This warrants the addition of random noise to slightly smooth the distribution (Machado and Santos Silva 2005). Additional checks demonstrate that the obtained estimates are robust to various amounts of added noise.

approach (see Section 4.3). The analysis syntax files can be found here: <https://doi.org/10.5281/zenodo.10058620>.

4. Empirical results

4.1. Did IAD'S working hours change to a greater extent than natives' working hours?

As stated above (see Section 3.1), only a small proportion of respondents (1.6%) lost their job during the study period. Of those who did, IAD are overrepresented (21.9% compared to 13.7% in the main analysis sample).¹¹

Looking at the distribution of the change in working hours, most people in the main analysis sample had a change of 0 h (see Figure 1). This is particularly the case for natives, implying that a larger proportion of natives were not affected at all. At the same time, the distribution is rather dispersed, ranging from -60 to +39 h. Moreover, the distribution of IAD shows a thicker lower tail, which is a first indication that they are overrepresented among those who experienced the largest reductions. A closer look at the deciles of the distribution (see Table A2 in the appendix) shows a substantial overrepresentation of IAD in the lowest decile, with a share of 18% of IAD (compared to 13.7% in the overall sample). There is no substantial overrepresentation of IAD in the upper deciles.

Figure 2 shows the average working hours of IAD and natives before the COVID-19 crisis and in May 2020. Before the crisis, there was almost no difference in the working hours between the two groups. While the average overall decline was -4.03 h, the working hours of IAD declined to a larger extent (-4.9 h (reduction of 13.2%)) than those of natives (-3.9 h (reduction of 10.5%)) (see Table A3 in the appendix).

Figure 3 shows the coefficient of having a migration background with and without covariates (the full OLS regression table can be found in Table A4 in the appendix). When controlling for occupational and socio-demographic characteristics as well as employment history and pre-crisis working hours, the effect of having a migration background is reduced from -0.986 h (59 min, bivariate OLS) to -0.699 h (42 min). Moreover, when control variables are included, the effect is only marginally significant.

¹¹A Heckman model to check for selection effects (see Section 4.3) reveal that this overrepresentation has no influence on subsequent analyses.

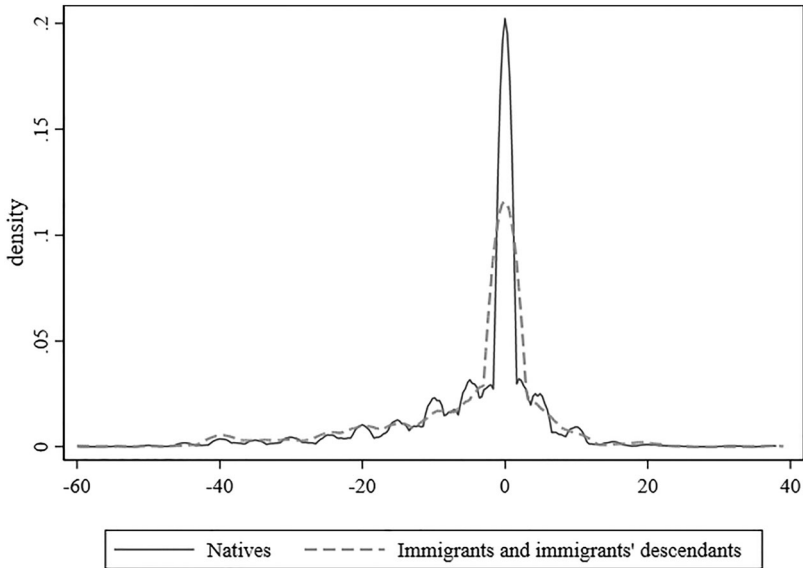


Figure 1. Distribution of the change in working hours (May 2020 – before COVID-19). Note: Kernel density plots of the distribution of the change in working hours for natives versus immigrants and immigrants’ descendants. Source: IAB-HOPP, own calculations. Unweighted data. $N = 7202$; $N(\text{natives}) = 6216$; $N(\text{IAD}) = 986$.

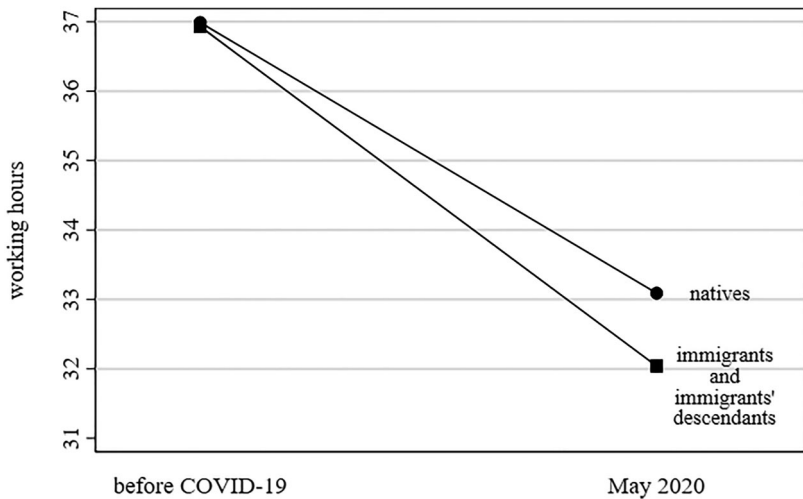


Figure 2. Working hours before the outbreak of the COVID-19 pandemic and in May 2020. Notes: Descriptive graph; point estimates of the working hours of natives versus immigrants and immigrants’ descendants before COVID-19 and in May 2020. Source: IAB-HOPP, own calculations. Unweighted data. $N = 7202$; $N(\text{natives}) = 6216$; $N(\text{IAD}) = 986$.

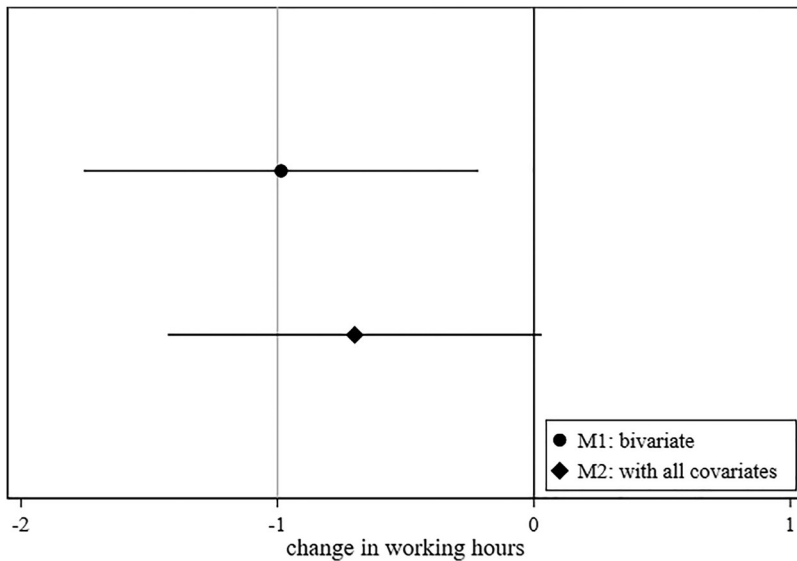


Figure 3. Effect of having a migration background on the change in working hours (OLS results). Notes: Coefficient plot (migration background coefficient shown) of bivariate and multivariate OLS results. The different positions of the coefficients along the x -axis show that part of the effect is explained when covariates are included. Dependent variable: Change in working hours (May 2020 – before COVID-19). Control variables: gender, age, age squared, living with child(ren) under 18, having a partner, lives in East Germany (including Berlin), education, skill level, short-time work share in industry, having an essential job, worked from home before COVID-19, working hours before COVID-19, employment history (2015–2019): months in contributory employment, months in marginal employment, unemployed. Source: IAB-HOPP, own calculations. Unweighted data. 95% confidence intervals shown. $N = 7202$.

There are several reasons why the effect of having a migration background might be different for men and women. One example is industry-specific employment not only by migration background but also by gender (e.g. Blau and Kahn 2017; see also Farris 2015). Therefore, additional analyses were conducted to test for gender effects. A comparison of the distribution of the dependent variable (change in working hours) for natives and IAD by gender reveals no obvious differences (see Figures A1a and A1b in the appendix). Similarly, regression results (Table A5 and Figure A2 in the appendix) do not indicate a gender-specific migration background effect. The loss of significance of the migration background effect for both genders is due to small subsample sizes.

The above results mainly confirm the theoretical expectations. On average, IAD have reduced hours more than natives in the beginning

of the COVID-19 crisis. Apart from theoretical expectations, this result is insofar expected as IAD were already shown to be overrepresented among those who reduced their working hours the most (see above). As expected, part of the effect is explained by relevant covariates. However, a small (marginal) difference between IAD and natives remains even after including controls, which does not match theoretical expectations. This result suggests that even after controlling for key occupational characteristics that we hypothesized to be the underlying reason for IAD–native differences (plus socio-demographic variables), the difference in the change in working hours between IAD and natives does not completely disappear (see Section 5 for a detailed discussion of this finding).

Considering the effect size, however, an average difference of about one hour does not appear to make a big difference substantively. To further determine the extent to which IAD were disadvantaged compared to natives beyond average effects, it is important to take a closer look at effects across different quantiles of the distribution of the change in working hours.

4.2. Are IAD and natives affected differently across the distribution of the change in working hours?

Figure 4(a and b) shows the results of the QTE estimation with and without controls for the 0.05, 0.10, 0.25, 0.50, 0.75, 0.90, and 0.95 quantile of the distribution. Complete regression tables are presented in Table A6 in the appendix. For all lower end quantiles, the effect of having a migration background is negative. Figure 4(a) shows that this effect is especially pronounced at the 0.05 and 0.10 quantile with an IAD–native gap of -6.871 and -3.934 h respectively (compared to an average effect of -0.986). At the 0.25 quantile, the effect is still larger than the average effect (-1.975 h) but only marginally significant. These results suggest that the effect of a migration background is much stronger at the lower end of the distribution compared to the average effect.

Once control variables are included (see Figure 4(b)), the migration background effect considerably decreases, becoming non-significant in the 0.25 quantile (marginally significant and still large at the 0.05 quantile). This means that the IAD–native gap can be partly explained by socio-demographic and occupational characteristics, employment history and pre-crisis working hours. However, in the 0.10 quantile, the coefficient (-3.025) remains significant and considerably larger

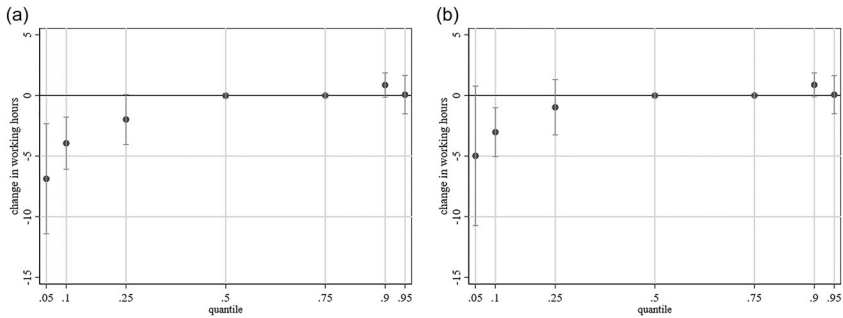


Figure 4. (a) Quantile treatment effects (QTE) at different quantiles of the unconditional distribution (without covariates). (b) Quantile treatment effects (QTE) at different quantiles of the unconditional distribution (with covariates). Notes: Graphs show the treatment effects (migration background) at different quantiles of the unconditional distribution of the dependent variable (change in working hours (May 2020 – before COVID-19)). Effects are estimated at the 0.05, 0.10, 0.25, 0.50, 0.75, 0.90, and 0.95 quantiles. Reading example for (a) At the 0.10 quantile, the effect of having a migration background amounts to -3.934 h. At the 0.25 quantile it amounts to -1.975 h (marginal significance) (while the average effect is -0.986 h (see bivariate OLS result in Figure 3)). Control variables (b): gender, age, age squared, living with child(ren) under 18, having a partner, lives in East Germany (including Berlin), education, skill level, short-time work share in industry, having an essential job, worked from home before COVID-19, working hours before COVID-19, employment history (2015-2019): months in contributory employment, months in marginal employment, unemployed. Source: IAB-HOPP, own calculations. Unweighted data. 95% confidence intervals shown. $N = 7202$.

than the average effect, even when control variables are included. Additional factors to those included in the models seem to be especially relevant at this lower end quantile of the distribution.

While there is no gap in the middle quantiles, the effect of having a migration background points in the expected opposite direction at the upper end. However, while the gap is positive at both the 0.90 and 0.95 quantiles, the effect is smaller in size ($+0.861$ and $+0.063$ h respectively) and only marginally significant in the case of the 0.90 quantile, but not significant at the 0.95 quantile. Effects hardly change when control variables are included.

Apparently, the effect of having a migration background is not constant across the distribution of the change in working hours. The effect is observed only at the lowest end of the distribution, meaning there is no consistent IAD-native gap in the change in working hours. The QTE results indicate that the negative average effect of migration background shown in Figure 3 (and Table A4) is driven largely by those at

the lower end of the distribution. Relatedly, the effect is weaker or slightly positive at the upper end.

Considering gendered effects, patterns in the effect of having a migration background across the unconditional distribution are fairly (but not completely) similar between the men's and women's subsamples and the full sample (see Figure A3a-d in the appendix). Effects are pronounced at the lower end, especially among women. Effects at the upper end found for the full sample appear to be driven by men. Larger confidence intervals in the gender-specific graphs again indicate smaller subsample sizes.

4.3. *Supplementary analyses*

In addition to the main analyses, several robustness and sensitivity checks with regard to sample selection, estimation strategy and coding of variables were run. To account for possible selection due to job loss, Heckman selection models consider that IAD status might already affect job loss, thereby leading to endogenous sample selection (Heckman 1976, 1979).¹² This check was done using all covariates except for the home office variable and the information on pre-crisis working hours since only those who remained employed received the home office and working hours questions in the survey. As it is probably impossible to find a valid exclusion restriction here (i.e. a variable that influences the probability to lose employment but has no effect on a possible loss of working hours among those who remain employed), we rely on the version of the Heckman correction in which identification is based on functional form assumptions rather than external instruments. The results of these models (see Table A7 in the appendix) show a small selection effect for having a migration background, that is, IAD have a slightly higher probability of losing a job. However, selection does not affect the results of the second stage: the Heckman and OLS results look rather similar, which is probably attributable to the low amount of selection. While the Heckman correction is not available for the QTE estimation, it seems reasonable to argue that it does not matter at different quantiles, either. It should be noted that the higher drop-out rate among IAD is likely to (if at all) bias the estimated difference downwards, as a larger share of those in the weakest position are not in the sample anymore.

¹²Heckman models were estimated using both the default maximum likelihood estimator and the two-step estimation procedure.

Using an alternative essential job variable (see Table A8 in the appendix), as employed by other authors (Koebe *et al.* 2020; Khalil *et al.* 2020b; cf. Khalil *et al.* 2020a), does not make a difference regarding the effect of having a migration background compared to the baseline specification.

Furthermore, all OLS regression models were re-estimated using probability and calibrated weights (see Table A9 in the appendix).¹³ Although the sizes of the migration background coefficients and significance levels are somewhat different, the main substantive conclusions appear to be relatively robust.

As a robustness check to the QTE results, linear probability models with a general reduction or a certain (minimum) reduction as the dependent variable were estimated. The results mirror the QTE effects. While there is no difference between IAD and natives concerning losing hours at all, IAD indeed have a larger probability to lose a substantial number of hours (especially 15 or more hours; see Table A10 in the appendix). In addition, the probability of having reduced working hours without receiving compensation in the form of short-time work allowances was considered, as this indicates a higher financial loss (see Table A11 in the appendix). Once again, IAD are more likely to experience severe losses in hours (15 h and more) without compensation (marginal significance; it should be noted that the small absolute effects translate into large relative effects due to the low baseline probability). These results reveal that IAD were overrepresented among those experiencing the most extreme financial losses.

Following a more substantive point of view, we further distinguish IAD into first-generation immigrants and their descendants.¹⁴ This follows previous findings of smaller labor market disadvantages for the descendants of immigrants (e.g. Kalter and Granato 2007). However, the results (Table A8) show that the difference between immigrants and immigrants' descendants appears to be small at the onset of the COVID-19 crisis.

Overall, the results are robust to sample selection, the use of weights, the coding of the variables and the estimation strategy applied. Similarly, further distinguishing IAD does not point to systematic differences

¹³The calibration is based on employment status, age, gender, federal state as well as last registered job, occupational position, and sector (Volkert *et al.* 2021a: 31ff.).

¹⁴Considering the differentiation between immigrants and immigrants' descendants, people who provided information that their parents were born abroad but not on their own birthplace are conservatively categorized as descendants of immigrants.

between immigrants and immigrants' descendants. The additional robustness checks confirm the main results.

5. Summary and discussion

Concerned with the weak labor market position of immigrants, this article has assessed whether immigrants and immigrants' descendants (IAD) were more affected than natives during the early phase of the COVID-19 crisis. To do so, changes in working hours of natives and IAD were compared during the period around the first German lockdown in spring 2020. The results show that, on average, working hours of IAD decreased more than those of natives. Despite statistical significance, the group-level gap between IAD and natives is limited, at around 40–60 min. However, a closer look at different quantiles of the unconditional distribution of the change in working hours using QTE reveals a strong effect heterogeneity across the distribution. At the lower end, the difference is three to four hours. Given the institutional framework that provided only partial compensation for reductions in working hours, these results suggest that IAD have experienced economic hardship more often than natives. Supplementary analyses indicate that IAD were also more likely to experience a large reduction in working hours without monetary compensation in the form of short-time work allowances, reinforcing the finding that IAD experienced greater losses in household income.

The results contribute to previous labor market and migration research at various levels. First, differences in (average) changes in working hours between IAD and natives in Germany have been quantified for the first time. Second, the difference between average and distributional effects demonstrates the importance of looking beyond averages. The substantial difference in effects across the distribution indicates that looking only at averages may ignore more fine-grained inequalities between social groups. While the extent to which this generalizes to other contexts remains to be seen, it does imply that looking beyond averages can provide important insights here as well. Third, from a policy perspective, these effect differences imply that policy responses aimed at protecting particularly vulnerable groups in times of crisis should be further studied. Finally, from a more theoretical perspective, the results further support the notion that immigrants (and the descendants of immigrants) tend to be more vulnerable to changes in the economy and to economic crises.

This study is not without limitations. Beyond the fact that we only cover the onset of the COVID-19 crisis, one important unanswered

question concerns the mechanisms behind the IAD–native gap that remains once socio-demographic and occupational characteristics, employment history and pre-crisis working hours are taken into account. Given that the effect does reduce in size when controls are added, one possible explanation is that although the analyses controlled for many relevant characteristics, not all factors affecting the labor market situation of IAD and natives are covered by observable controls. The remaining effect could therefore simply result from remaining compositional differences. For example, even when working in the same sector, IAD and natives could perform different job tasks, work under different contract types, such as regular contracts versus subcontracts and personnel leasing (cf. Höhne and Schulze Buschoff 2015; Brücker *et al.* 2021) or in firms of different sizes (cf. Brücker *et al.* 2021). These remaining differences might affect the change in working hours in turn. Further reasons underlying this gap may include additional factors related to the generally more disadvantaged labor market position of immigrants, cultural differences, or possibly also discrimination. Therefore, developing a deeper understanding of these mechanisms in future research could be an important basis for targeted policies to protect vulnerable groups in future crises.

Overall, these findings are highly relevant from both academic and policy-oriented perspectives. It remains subject to future research to assess whether the identified patterns prevailed during the COVID-19 crisis and subsequent lockdowns, will prevail in future crises, and what policy responses can best prevent them.

Acknowledgements

We wrote this article using data from the IAB High-Frequency Online Personal Panel (IAB-HOPP). Data access was provided by the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB). The data are now available as SUF (Volkert *et al.* 2021b; DOI: 10.5164/IAB.HOPP_W01-W07.de.en.v2) and SUF with administrative data included (Bellmann *et al.* 2021b; DOI: 10.5164/IAB.HOPP-ADIAB7519.de.en.v1). We particularly thank Bernhard Christoph for his support. Moreover, we would like to thank the editorial team and the four anonymous reviewers for their helpful suggestions and advice.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The authors are grateful for funding received from the Federal Ministry of Labour and Social Affairs (BMAS) for ‘Promotion of research and teaching in the field of social policy’ (Grant Reference MPR.00.00024. 20).

ORCID

Lina Tobler  <http://orcid.org/0000-0002-0492-9728>
 Lukas Fervers  <http://orcid.org/0000-0002-7850-700X>
 Marita Jacob  <http://orcid.org/0000-0002-2674-568X>
 Veronika Knize  <http://orcid.org/0000-0001-7250-912X>

References

- Adams-Prassl, A., Boneva, T., Golin, M. and Rauh, C. (2020) ‘Inequality in the impact of the coronavirus shock: evidence from real time surveys’, *Journal of Public Economics* 189: 104245.
- Algan, Y., Dustmann, C., Gltz, A. and Manning, A. (2010) ‘The economic situation of first and second-generation immigrants in France, Germany and the United Kingdom’, *The Economic Journal* 120(542): F4–F30.
- Antoni, M., Schmucker, A., Seth, S. and vom Berge, P. (2019) *Sample of Integrated Labour Market Biographies (SIAB) 1975-2017*. FDZ-Datenreport, 02/2019 (en). Nürnberg: Institute for Employment Research (IAB). Available from: doi:10.5164/IAB.FDZD.1902.en.v1 [Accessed 16 Sept 2022].
- Argue, A. J. and Velema, T. A. (2022) ‘University prestige, cultural distance of the place of education, and wage differences between high-skilled U.S. immigrants with foreign and domestic credentials’, *Research in Social Stratification and Mobility* 77: 100650.
- Behtoui, A. and Neergaard, A. (2010) ‘Social capital and wage disadvantages among immigrant workers’, *Work, Employment and Society* 24(4): 761–79.
- Bellmann, L., Dummert, S. and Ruf, K. (2021a) *IAB-HOPP-Befragungsdaten verknüpft mit administrativen Daten des IAB. Datensatz Version: IAB-HOPP-ADIAB 7519*. FDZ-Datenreport, 16/2021 (de). Nürnberg: Institute for Employment Research (IAB).
- Bellmann, L., Dummert, S., Ruf, K., Seth, S., Graf, T., Griefsemer, S., Kaimer, S., Köhler, M., Lehnert, C., Oertel, M. and Schneider, A. (2021b) *IAB-HOPP-Befragungsdaten verknüpft mit den administrativen Daten des IAB (IAB-HOPP-ADIAB) - Version 7519 v1*. Available from: doi:10.5164/IAB.HOPP-ADIAB7519.de.en.v1 [Accessed 10 Jun 2023].
- Blanco-Donoso, L. M., Moreno-Jiménez, J., Amutio, A., Gallego-Alberto, L., Moreno-Jiménez, B. and Garrosa, E. (2021) ‘Stressors, Job resources, fear of contagion, and secondary traumatic stress Among nursing home workers in face of the COVID-19: the case of Spain’, *Journal of Applied Gerontology* 40(3): 244–56.

- Blau, F. D. and Kahn, L. M. (2017) 'The gender wage gap: extent, trends, and explanations', *Journal of Economic Literature* 55(3): 789–865.
- Borgen, N. T., Haupt, A. and Wiborg, ØN (2023) 'Quantile regression estimands and models: revisiting the motherhood wage penalty debate', *European Sociological Review* 39(2): 317–31.
- Borjas, G. J. and Cassidy, H. (2020) *The Adverse Effect of the COVID-19 Labor Market Shock on Immigrant Employment*. IZA Discussion Papers, No. 13277. Bonn: Institute of Labor Economics (IZA). Available from: <http://hdl.handle.net/10419/223719> [Accessed 16 Sept 2022].
- Bratsberg, B., Raaum, O. and Røed, K. (2014) *Labour Migrant Adjustments in the Aftermath of the Financial Crisis*. IZA Discussion Papers, No. 8291. Bonn: Institute of Labor Economics (IZA). Available from: <http://hdl.handle.net/10419/101913> [Accessed 16 Sept 2021].
- Brücker, H., Gundacker, L., Hauptmann, A. and Jaschke, P. (2021) *Die Arbeitsmarktwirkungen der COVID-19-Pandemie auf Geflüchtete und andere Migrantinnen und Migranten*. IAB-Forschungsbericht, 05/2021. Nürnberg: Institute for Employment Research (IAB). Available from: <http://doku.iab.de/forschungsbericht/2021/fb0521.pdf> [Accessed 16 Sept 2022].
- Bunde, N. (2021) *Covid-19 und die Industrie: Führt die Krise zum Rückbau globaler Lieferketten?* ifo Schnelldienst, No. 74 (1). München: ifo Institut – Leibniz-Institut für Wirtschaftsforschung an der Universität München. Available from: <https://www.ifo.de/en/publikationen/2021/article-journal/covid-19-and-industry-crisis-leading-dismantling-global-supply> [Accessed 16 Sept 2022].
- Bundesagentur für Arbeit (2023) *Kurzarbeitergeld: Anzeige, Antrag und Berechnung*. Available from: <https://www.arbeitsagentur.de/unternehmen/finanziell/kurzarbeitergeldformen/kurzarbeitergeld-anzeige-antrag-berechnung> [Accessed 23 October 2023].
- Bundesgesundheitsministerium (2023) *Chronik zum Coronavirus SARS-CoV-2*. Available from: <https://www.bundesgesundheitsministerium.de/coronavirus/chronik-coronavirus.html> [Accessed 18 Feb 2023].
- Bundesministerium für Arbeit und Soziales (2022) *Antworten auf die häufigsten Fragen zu Kurzarbeit und Qualifizierung*. Available from: <https://www.bmas.de/DE/Service/Corona/Fragen-und-Antworten/Fragen-und-Antworten-KUG/faq-kug-kurzarbeit-und-qualifizierung.html> [Accessed 2 May 2023].
- Bundesregierung (2020) *Besprechung der Bundeskanzlerin mit den Regierungschefinnen und Regierungschefs der Länder vom 22.03.2020*. Available from: <https://www.bundesregierung.de/breg-de/themen/coronavirus/besprechung-der-bundeskanzlerin-mit-den-regierungschefinnen-und-regierungschefs-der-laender-vom-22-03-2020-1733248> [Accessed 18 Feb 2023].
- Chiswick, B. R. (1978) 'The effect of Americanization on the earnings of foreign-born men', *Journal of Political Economy* 86(5): 897–921.
- Chiswick, B. R. (1991) 'Speaking, reading, and earnings among low-skilled Immigrants', *Journal of Labor Economics* 9(2): 149–70.
- Couch, K. A., Fairlie, R. W. and Xu, H. (2020) 'Early evidence of the impacts of COVID-19 on minority unemployment', *Journal of Public Economics* 192: 104287.

- Destatis (2020) *Bruttoinlandsprodukt: Ausführliche Ergebnisse zur Wirtschaftsleistung im 2. Quartal 2020*. Pressemitteilung Nr. 323 vom 25. August 2020. Available from: https://www.destatis.de/DE/Presse/Pressemitteilung/gen/2020/08/PD20_323_811.html [Accessed 18 Dec 2023].
- Dustmann, C., Glitz, A. and Vogel, T. (2010) 'Employment, wages, and the economic cycle: differences between immigrants and natives', *European Economic Review* 54 (1): 1–17.
- European Commission (2022) *Statistics on Migration to Europe*. Available from: https://ec.europa.eu/info/strategy/priorities-2019-2024/promoting-our-european-way-life/statistics-migration-europe_en#employment-of-immigrants [Accessed 16 Sept 2022].
- Eurostat (2020a) *Impact of Covid-19 Crisis on Short-Term Statistics*. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Impact_of_Covid-19_crisis_on_short-term_statistics [Accessed 16 Sept 2022].
- Eurostat (2020b) *Impact of COVID-19 on Main GDP Aggregates Including Employment*. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Impact_of_COVID-19_on_main_GDP_aggregates_including_employment#GDP_estimates_published_for_2020-Q1 [Accessed 16 Sept 2022].
- Eurostat (2022) *Unemployment Statistics and Beyond*. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Unemployment_statistics_and_beyond [Accessed 16 Sept 2022].
- Farris, S. R. (2015) 'Migrants' regular army of labour: gender dimensions of the impact of the global economic crisis on migrant labor in Western Europe', *The Sociological Review* 63(1): 121–43.
- Fasani, F. and Mazza, J. (2020a) *A Vulnerable Workforce: Migrant Workers in the COVID-19 Pandemic*. JRC Technical Report, JRC120730. Luxembourg: Publications Office of the European Union. Available from: <https://publications.jrc.ec.europa.eu/repository/handle/JRC120730> [Accessed 16 Sept 2022].
- Fasani, F. and Mazza, J. (2020b) *Immigrant Key Workers: Their Contribution to Europe's COVID-19 Response*. IZA Policy Papers, No. 155. Bonn: Institute of Labor Economics (IZA). Available from: <http://hdl.handle.net/10419/243441> [Accessed 16 Sept 2022].
- Fasani, F. and Mazza, J. (2023) 'Being on the frontline? Immigrant workers in Europe and the COVID-19 Pandemic', *ILR Review* 76(5): 890–918.
- Firpo, S. (2007) 'Efficient semiparametric estimation of quantile treatment effects', *Econometrica* 75(1): 259–76.
- Friedberg, R. M. (2000) 'You can't take it with you? Immigrant assimilation and the portability of human capital', *Journal of Labor Economics* 18(2): 221–51.
- Frodermann, C., Grunau, P., Haepf, T., Mackeben, J., Ruf, K., Steffes, S. and Wanger, S. (2020) *Wie Corona den Arbeitsalltag verändert hat*. IAB-Kurzbericht, 13/2020. Nürnberg: Institute for Employment Research (IAB).
- Frölich, M. and Melly, B. (2008) *Unconditional Quantile Treatment Effects under Endogeneity*. IZA Discussion Papers, No. 3288: Institute of Labor Economics (IZA). Available from: <https://ideas.repec.org/p/iza/izadps/dp3288.html> [Accessed 2 Jun 2023].

- Frölich, M. and Melly, B. (2010) 'Estimation of quantile treatment effects with stata', *The Stata Journal* 10(3): 423–57.
- Giesecke, J., Heisig, J. P. and Solga, H. (2015) 'Getting more unequal: rising labor market inequalities among low-skilled men in West Germany', *Research in Social Stratification and Mobility* 39: 1–17.
- Giesing, Y. and Hofbauer, M. (2020) *Wie wirkt sich Covid-19 auf Migration und Integration aus?* ifo Schnelldienst, 73 (07): 41–46. München: ifo Institut – Leibniz-Institut für Wirtschaftsforschung an der Universität München, ISSN 0018-974X. Available from: <http://hdl.handle.net/10419/225152> [Accessed 16 Sept 2022].
- Grasso, M., Klicperová-Baker, M., Koos, S., Kosyakova, Y., Petrillo, A. and Vlase, I. (2021) 'The impact of the coronavirus crisis on European societies. What have we learnt and where do we go from here? – introduction to the COVID volume', *European Societies* 23(Suppl 1): S2–S32.
- Haas, G.-C., Müller, B., Osiander, C., Schmidtke, J., Trahms, A., Volkert, M. and Zins, S. (2021) 'Development of a new COVID-19 panel survey: the IAB high-frequency online personal panel (HOPP)', *Journal for Labour Market Research* 55 (16): 1–14.
- Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S. and Tatlow, H. (2021) 'A global panel database of pandemic policies (Oxford COVID-19 government response tracker)', *Nature Human Behaviour* 5(4): 529–38.
- Heath, A. F. and Cheung, S. Y. (2007). *Unequal Chances: Ethnic Minorities in Western Labour Markets. Proceedings of the British Academy* 137, Oxford: Oxford University Press.
- Heckman, J. J. (1976) 'The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models', *Annals of Economic and Social Measurement* 5(4): 475–92.
- Heckman, J. J. (1979) 'Sample selection bias as a specification error', *Econometrica* 47 (1): 153–61.
- Herzog-Stein, A., Lindner, F. and Sturn, S. (2018) 'The German employment miracle in the great recession: the significance and institutional foundations of temporary working-time reductions', *Oxford Economic Papers* 70(1): 206–24.
- Höhne, J. and Schulze Buschoff, K. (2015) *Die Arbeitsmarktintegration von Migranten und Migrantinnen in Deutschland. Ein Überblick Nach Herkunftsländern und Generationen*. WSI Mitteilungen, No. 5, Düsseldorf: Wirtschafts- und Sozialwissenschaftliches Institut.
- Hu, Y. (2020) 'Intersecting ethnic and native-migrant inequalities in the economic impact of the COVID-19 pandemic in the UK', *Research in Social Stratification and Mobility* 68: 100528.
- Kalter, F. (2011) 'The second generation in the German labor market: explaining the Turkish exception', in R. Alba and M. C. Waters (eds.), *The Next Generation: Immigrant Youth in a Comparative Perspective*, New York: New York University Press, pp. 166–84.
- Kalter, F. and Granato, N. (2007) 'Educational hurdles on the way to structural assimilation in Germany', in A. F. Heath and S. Y. Cheung (eds.), *Unequal*

- Chances: Ethnic Minorities in Western Labour Markets. Proceedings of the British Academy 137*, Oxford: Oxford University Press, pp. 271–319.
- Khalil, S., Lietz, A. and Mayer, S. J. (2020a) *Anhang: Methodische Hinweise zu Research Note Systemrelevant und prekär beschäftigt: Wie Migrant*innen in unsicheren Arbeitsverhältnissen unser Gemeinwesen aufrechterhalten: Version 1.0, Stand: 14.05.2020*. Available from: https://dezim-institut.de/fileadmin/Publikationen/Systemrelevante_Berufe/Research-Note_Systemrelevant-und-prekraer_Methodischer_Anhang_v1.0.pdf [Accessed 9 Aug 2021].
- Khalil, S., Lietz, A. and Mayer, S. J. (2020b) *Systemrelevant und prekär beschäftigt: Wie Migrant*innen unser Gemeinwesen aufrechterhalten*. DeZIM Research Notes, 3/20. Berlin: Deutsches Zentrum für Integrations- und Migrationsforschung (DeZIM-Institut). Available from: <https://www.dezim-institut.de/publikationen/publikation-detail/systemrelevant-und-prekaer-beschaefigt-wie-migrant-innen-unser-gemeinwesen-aufrechterhalten-fa-5008/> [Accessed 16 Sept 2022].
- Koebe, J., Samtleben, C., Schrenker, A. and Zucco, A. (2020) *Systemrelevant, aber dennoch kaum anerkannt: Entlohnung unverzichtbarer Berufe in der Corona-Krise unterdurchschnittlich*. DIW aktuell, No. 48. Berlin: Deutsches Institut für Wirtschaftsforschung (DIW). Available from: https://www.diw.de/de/diw_01.c.792754.de/publikationen/diw_aktuell/2020_0048/systemrelevant_aber_dennoch_kaum_anerkannt_entlohnung_unverzichtbarer_berufe_in_der_corona-krise_unterdurchschnittlich.html [Accessed 16 Sept 2022].
- Kogan, I. (2004) ‘Last hired, first fired? The unemployment dynamics of male immigrants in Germany’, *European Sociological Review* 20(5): 445–61.
- Kogan, I. (2011) ‘New immigrants — old disadvantage patterns? Labour market integration of recent immigrants into Germany’, *International Migration* 49(1): 91–117.
- Konle-Seidl, R. (2020) *Short-time Work in Europe: Rescue in the Current COVID-19 Crisis?* IAB-Forschungsbericht, 04/2020(en). Nürnberg: Institute for Employment Research (IAB). Available from: https://doku.iab.de/forschungsbericht/2020/fb0420_en.pdf [Accessed 16 Sept 2022].
- Kramer, V., Papazova, I., Thoma, A., Kunz, M., Falkai, P., Schneider-Axmann, T., Hierundar, A., Wagner, E. and Hasan, A. (2021) ‘Subjective burdens and perspectives of German healthcare workers during the COVID-19 pandemic’, *European Archives of Psychiatry and Clinical Neuroscience* 271(2): 271–81.
- Kreyenfeld, M. and Konietzka, D. (2002) ‘The performance of migrants in occupational labour markets’, *European Societies* 4(1): 53–78.
- Lancee, B. (2010) ‘The economic returns of immigrants’ bonding and bridging social capital: the case of the Netherlands’, *International Migration Review* 44(1): 202–26.
- Lancee, B. (2012) ‘The economic returns of bonding and bridging social capital for immigrant men in Germany’, *Ethnic and Racial Studies* 35(4): 664–83.
- Leschke, J. and Weiss, S. (2020) ‘With a little help from my friends: social-network job search and overqualification among recent intra-EU migrants moving from east to west’, *Work, Employment and Society* 34(5): 769–88.
- Machado, J. A. F. and Santos Silva, J. M. C. (2005) ‘Quantiles for counts’, *Journal of the American Statistical Association* 100(472): 1226–37.

- Möller, J. (2010) 'The German labor market response in the world recession – demystifying a miracle', *Zeitschrift für ArbeitsmarktForschung* 42(4): 325–36.
- Mongey, S., Pilossoph, L. and Weinberg, A. (2021) 'Which workers bear the burden of social distancing?', *Journal of Economic Inequality* 19(3): 509–26.
- Montenovo, L., Jiang, X., Lozano Rojas, F., Schmutte, I. M., Simon, K. I., Weinberg, B. A. and Wing, C. (2020) *Determinants of Disparities in Covid-19 Job Losses*. NBER Working Papers, No. 27132. Cambridge, MA: National Bureau of Economic Research. Available from: <https://www.nber.org/papers/w27132> [Accessed 16 Sept 2022].
- OECD (2020a) *COVID-19 and Key Workers: What Role Do Migrants Play in Your Region?* OECD Policy Responses to Coronavirus (COVID-19). Available from: <https://www.oecd.org/coronavirus/policy-responses/covid-19-and-key-workers-what-role-do-migrants-play-in-your-region-42847cb9> (Accessed 16 Sept 2022).
- OECD (2020b) *International Migration Outlook 2020*, Paris: OECD Publishing.
- OECD (2020c) *What is the Impact of the COVID-19 Pandemic on Immigrants and Their Children?* OECD Policy Responses to Coronavirus (COVID-19). Available from: <http://www.oecd.org/coronavirus/policy-responses/what-is-the-impact-of-the-covid-19-pandemic-on-immigrants-and-their-children-e7cbb7de/> [Accessed 16 Sept 2022].
- Panichella, N. (2018) 'Economic crisis and occupational integration of recent immigrants in Western Europe', *International Sociology* 33(1): 64–85.
- Statistik der Bundesagentur für Arbeit (2021a) *Beschäftigte nach Wirtschaftszweigen (WZ 2008) (Zeitreihe Quartalszahlen): Stichtag 30. Juni 2020*. Nürnberg: Bundesagentur für Arbeit. Available from: <https://statistik.arbeitsagentur.de/Statistikdaten/Detail/Aktuell/iiii6/beschaeftigung-sozbe-wz2008-zeitreihe/wz2008-zeitreihe-d-0-xlsx.xlsx?blob=publicationFile&v=1> [Accessed 12 July 2021].
- Statistik der Bundesagentur für Arbeit (2021b) *Realisierte Kurzarbeit: nach Wirtschaftsabteilungen (WZ08) und konjunktureller Kurzarbeit.: Zeitreihe, Datenstand: Januar 2021. Sonderauswertung*. Nürnberg: Bundesagentur für Arbeit.
- Statistik der Bundesagentur für Arbeit (2023) *Arbeitslosigkeit im Zeitverlauf: Entwicklung der Arbeitslosenquote (Strukturmerkmale)*. Datenstand, April. Arbeitsmarkt in Zahlen. Nürnberg: Bundesagentur für Arbeit. Available from: <https://statistik.arbeitsagentur.de/Statistikdaten/Detail/Aktuell/iiii4/alo-zeitreihe-dwo/alo-zeitreihe-dwo-b-0-xlsx.xlsx>.
- Ubalde, J. and Alarcón, A. (2020) 'Immigrant disadvantage in the labour market: the role of attitudinal context', *European Societies* 22(5): 636–58.
- Volkert, M., Haas, G.-C., Zins, S., Bellmann, L., Dummert, S., Hensgen, S., Ludsteck, J., Müller, B., Müller, D., Osiander, C., Schmidtke, J., Stephan, G. and Trahms, A. (2021a) *Dokumentation und Codebuch für das Hochfrequente Online Personen Panel "Leben und Erwerbstätigkeit in Zeiten von Corona" (IAB-HOPP, Welle 1-7)*. FDZ-Datenreport, 04/2021 (de). Nürnberg: Institute for Employment Research (IAB). Available from: doi:10.5164/IAB.FDZD.2104.de.v1 [Accessed 16 Sept 2022].

- Volkert, M., Haas, G.-C., Zins, S., Bellmann, L., Dummert, S., Hensgen, S., Ludsteck, J., Müller, B., Müller, D., Osiander, C., Schmidtke, J., Stephan, G. and Trahms, A. (2021b) *High-frequency Online Personal Panel (IAB-HOPP)*. Research Data Centre of the Federal Employment Agency (BA) at the Institute for Employment Research (IAB). Available from: doi:[10.5164/IAB.HOPP_W01-W07.de.en.v2](https://doi.org/10.5164/IAB.HOPP_W01-W07.de.en.v2) [Accessed 16 Sept 2022].
- Witteveen, D. (2020) 'Sociodemographic inequality in exposure to COVID-19-induced economic hardship in the United Kingdom', *Research in Social Stratification and Mobility* 69: 100551.
- Wooldridge, J. M. (2002) *Econometric Analysis of Cross Section and Panel Data*, Cambridge: The MIT Press.