

Short report

Unemployment due to the SARS-CoV-2-pandemic among people with and without severe disabilities: a difference-in-differences analysis

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ABSTRACT

Objectives Unemployment reduces health and impairs participation in important areas of life, especially for people with severe disabilities, who tend to have a longer duration of unemployment and are less likely to find new employment than their counterparts without such constraints. Our analysis examines the increase in unemployment due to the SARS-CoV-2 pandemic among people with and without severe disabilities in Germany.

Methods Monthly cross-sectional data on unemployment for 2019 and 2020 were provided by the Federal Employment Agency. We used a difference-in-differences model to estimate the increase in unemployment attributable to the pandemic. The months April to December 2020 represented the months of exposure to the pandemic. Incidence rate ratios (IRRs) are reported.

Results The increase in unemployment among people with severe disabilities due to the pandemic is 11.2% (IRR 1.112; 95% CI 1.107 to 1.117). People with severe disabilities receiving unemployment benefits due to unemployment lasting less than a year (Social Code III: short-term unemployment) and women have been most affected. Among people without severe disabilities, unemployment has increased by 24.8% due to the pandemic (IRR 1.248; 95% CI 1.246 to 1.249), while people receiving unemployment benefits according to social code III and men have been most affected. Both groups show a varying increase in unemployment depending on the region of residency.

Conclusions The findings show a particularly significant increase in unemployment among people without severe disabilities. People with severe disabilities might be less impacted due to the special legal protection against their dismissal. The clear regional differences in the increase in unemployment suggest a strong influence of regional economics.

INTRODUCTION

In April 2020, extensive shutdown measures were taken in Germany due to the spread of SARS-CoV-2 and unemployment rose significantly.¹ Unemployment affects health and participation in many areas such as society and work. Unemployed people generally have poorer health and a greater risk of mortality than employed people.^{2,3} The longer unemployment lasts, the stronger its negative impact.³ Unemployed people with severe disabilities tend to be less likely to find new employment in the primary labour market and the average duration of their unemployment is significantly longer than

Key messages

What is already known on this topic

⇒ Unemployment declines health and impairs participation in important areas of life, especially for people with severe disabilities who have a longer duration of unemployment and are less likely to find new employment.

What this study adds

⇒ Our difference-in-differences analysis shows an increase in unemployment of people with and without severe disabilities attributable to the pandemic.
 ⇒ Unemployment among people with severe disabilities increased by 11.2%, among people without severe disabilities by 24.8% due to the pandemic.

How this study might affect research, practice and/or policy?

⇒ The special protection measures against dismissal of people living with severe disabilities have averted a more severe impact of the pandemic on their jobs and health and are therefore an important tool to maintain.
 ⇒ Those who have experienced a job loss due to the pandemic should receive close monitoring of their work ability and circumstances in order to provide tailored support that facilitates resumption of work.

is the case for people without severe disabilities.⁴ Job loss or failing to find new employment during the pandemic can therefore have drastic social and health consequences for people with disabilities.

In Germany, the degree of a disability is measured in increments of 10, ranging from 20 to 100. It is a measure of physical, mental and psychological impairments as well as social effects. A severe disability is defined as a degree of disability of 50 or more. In this paper, we examine the increase in unemployment due to the SARS-CoV-2 pandemic among people with and without severe disabilities in Germany.

METHODS

Study design

We used monthly cross-sectional data on unemployment for 2019 and 2020 for our difference-in-differences analysis. Data were provided by the Federal Employment Agency, which offers services



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to support work participation (in particular job placement and job promotion) and administers unemployment benefits. Data were differentiated by month, federal state, gender, presence of a severe disability and the legal foundation of unemployment benefits. In Germany, there are two types of unemployment benefits, which are regulated by law in different social codes. Unemployment benefits I, which are regulated in social code III, are paid for up to 12 months if a person has been employed for at least 12 months. If an individual is not eligible to receive unemployment benefits I or if they have already received them for 12 months, they can request unemployment benefits II, which is an unrestricted support programme to ensure subsistence. Unemployment benefits II are regulated in social code II. Hence, the claiming of unemployment benefits by social code II or III indicates the duration of unemployment.

Statistical analyses

Unemployment figures were first descriptively analysed. We then used a difference-in-differences model to estimate the increase in unemployment among people with and without severe disabilities attributable to the pandemic. The difference-in-differences approach uses repeated cross-sectional data collected before and after an event (eg, a law reform or the outbreak of a pandemic).^{5,6} In our analyses, the exposed condition was represented by the months from January to December of the pandemic year 2020, while January to December 2019 were our non-exposed condition (online supplemental figure 1). The first quarter of each year (ie, January to March) was categorised as the preobservation period. The period of April to December was categorised as the postobservation period. The distinction between the preobservation and postobservation periods is based on the fact that the German Bundestag declared the SARS-CoV-2 pandemic a national concern on 27 March 2020; we expected an increase in unemployment after this declaration.

We used a Poisson regression model to calculate the difference-in-differences estimators for the total populations and subgroup-specific estimators.⁷ These estimators were determined as incidence rate ratios (IRRs) comparing the number of unemployed people in the follow-up period of the pandemic year 2020 with the number of unemployed people in the corresponding period of the previous year. An IRR >1 would represent an increased number of unemployed people attributable to the pandemic. The IRR minus 1 would describe the average proportion by which the unemployment figures increased during the follow-up period in the pandemic year 2020. In addition to the difference-in-differences estimator for the total populations, we determined difference-in-differences estimators by gender (female and male), Social Code (II and III) and region of residence (federal states of Germany). All variables were included in the Poisson regression model simultaneously. A detailed description of the methodology is provided elsewhere.⁸ We additionally performed a sensitivity analysis for which we assumed a preobservation period from January to February and a postobservation period from March to December.

Furthermore, we correlated the cumulative incidences of reported SARS-CoV-2 infections in April with the observed increase in unemployment figures in April for people with and without severe disabilities. The reported incidence of SARS-CoV-2 infections was obtained from the Robert Koch Institute.

The two-sided probability of error was 5%. All analyses were performed using Stata/SE V.16.0.a.

RESULTS

Figure 1 shows the relative increase in unemployment in 2020 compared with in 2019. A total of 157 523 people with severe

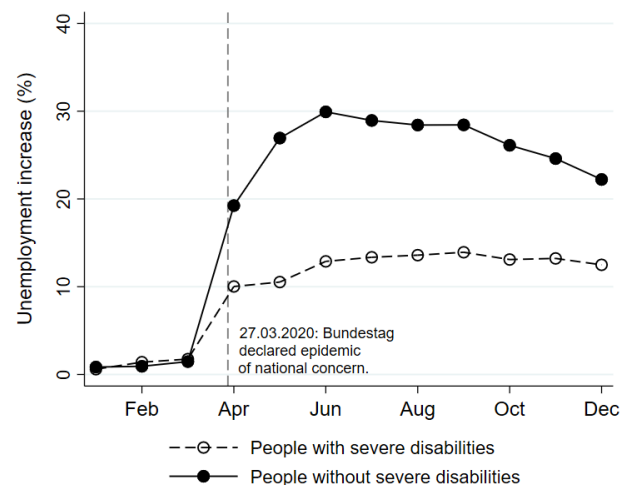


Figure 1 Relative increase in unemployment in 2020 compared with the corresponding month in 2019 for people with and without severe disabilities.

disabilities were registered as unemployed in March 2020 (1.8% more than in March of the previous year), increasing to 167 997 in April 2020 (10.0% more than in April 2019). After another slight relative increase to 12.9% in June, unemployment remained elevated at similar levels throughout 2020. People without severe disabilities experienced a more significant increase in unemployment. In March 2020, 2 177 425 people were unemployed (1.5% more than in the previous year), while in April, 2 475 227 people were unemployed (19.2% more than in the previous year). The gap between 2019 and 2020 increased to 29.9% until June; from July on, it fell back almost linearly to the level in April.

For people with severe disabilities, the difference-in-differences estimator for the change in unemployment attributable to the pandemic shows an overall increase of 11.2% (IRR 1.112; 95% CI 1.107 to 1.117). In this group, people receiving unemployment benefits I according to social code III (IRR 1.156; 95% CI 1.148 to 1.164) were significantly more affected than people receiving unemployment benefits II according to the social code II (IRR 1.077; 95% CI 1.071 to 1.084). Women with severe disabilities (IRR 1.119; 95% CI 1.111 to 1.127) were slightly more affected than men with severe disabilities (IRR 1.107; 95% CI 1.101 to 1.114). An increase in unemployment was observed in all federal states except Saarland. The highest increases in unemployment were in Berlin with 18.9% (IRR 1.189; 95% CI 1.164 to 1.214), in Hesse with 16.4% (IRR 1.164; 95% CI 1.144 to 1.185) and in Brandenburg with 15.6% (IRR 1.156; 95% CI 1.124 to 1.189) (online supplemental table 1).

Among people without severe disabilities, unemployment increased by 24.8% due to the pandemic (IRR 1.248; 95% CI 1.246 to 1.249). People receiving unemployment benefits I according to social code III (IRR 1.400; 95% CI 1.397 to 1.402) were significantly more affected than people receiving unemployment benefits II according to social Code II (IRR 1.159; 95% CI 1.157 to 1.161). In this group, men (IRR 1.252; 95% CI 1.250 to 1.254) were slightly more affected than women (IRR 1.243; 95% CI 1.240 to 1.245). The highest increases in unemployment were in Bavaria with 37.9% (IRR 1.379; 95% CI 1.373 to 1.384), in Berlin with 31.7% (IRR 1.317; 95% CI 1.310 to 1.323) and in Hesse with 30.2% (IRR 1.302; 95% CI 1.296 to

1.308). All differences reported between subgroups were statistically significant (online supplemental table 1).

The difference-in-differences model estimated in our sensitivity analysis showed comparable results for people with and without severe disabilities (online supplemental table 2).

The regional infection incidence was significantly associated with an increase in unemployment in April 2020 both among people with severe disabilities ($r=0.37$; $p=0.002$) and people without severe disabilities ($r=0.31$; $p=0.014$).

DISCUSSION

Our analyses have shown the pandemic's direct impact on unemployment among people with and without severe disabilities. The greater increase in unemployment among people without severe disabilities is likely due to the special protection against dismissal that applies for people living with severe disabilities.⁹ In addition, the two cohorts differ in terms of age (online supplemental table 3), qualifications and job sector.⁴ An analysis of survey data on changes in the employment status of people with and without disabilities in the USA has shown a comparable discrepancy in unemployment change between February and April 2020.⁹

The impact on unemployment attributable to the pandemic has been particularly significant in the eastern federal states (online supplemental table 1), even though these were characterised by a low incidence of COVID-19 infections during the first wave of the disease. The regional differences in the increase in unemployment between the federal states suggest that the trend in unemployment has been driven less by regional incidence than by the resilience of regional economies and regionally different federal policy during the first pandemic year.

As expected, we can mainly observe an increase in unemployed people receiving unemployment benefits I due to recent layoffs (social code III). The long-term effects of the pandemic on the permanent receipt of unemployment benefits II due to the failure to resume work after a layoff (social code II) cannot be clarified with the available data and therefore require further monitoring, in particular for people with disabilities who have a verifiably long duration of unemployment. Future analyses should also clarify the extent to which labour policy measures taken to prevent drastic job losses during the pandemic (such as the short-time work regulation) have influenced the unemployment of people with and without severe disabilities.

When interpreting our findings, the following limitations must be considered. First, a standardisation of the two cohorts by age as well as gender might have facilitated further comparison of the pandemic's effect on both groups, but standardised data were not available. Second, we were not able to differ job sectors or occupational titles. These probably also influenced the level of increase. Third, by using aggregated data, we cannot rule out under-reporting of unemployment and severe disability. Our unemployment figures reflect unemployed persons who are actually available to the labour market. The actual number of unemployed people is higher. In addition, we only considered people with certified severe disabilities, while the real number of people with disabilities and chronic diseases is significantly higher.¹⁰ Fourth, the period we included in the analyses is limited to the first pandemic year. The extent to which the described

increase in unemployment will continue can only be clarified with future data.

In conclusion, people with and without severe disabilities experienced an increase in unemployment due to the pandemic. It is important to track employment changes for persons with severe disabilities in the second and third pandemic year to determine if the increase persists. Those who have experienced a job loss due to the pandemic should receive close monitoring of their work ability and circumstances in order to provide tailored support that facilitates resumption of work.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants but was not approved as this study only uses aggregate data, a review by an ethics committee was not required. We used monthly cross-sectional data on unemployment for 2019 and 2020 in Germany that were provided by the Federal Employment Agency (FEA).

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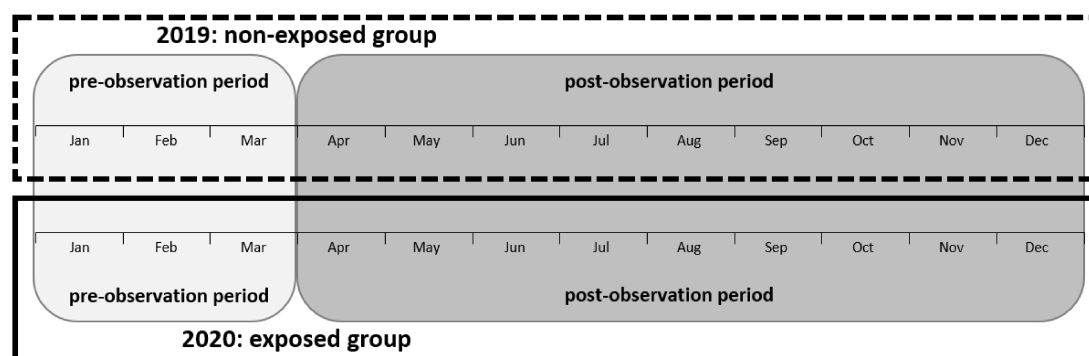
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Supplementary Material



Supplementary figure 1: Difference-in-differences analysis

Supplementary table 1: Difference-in-differences estimators for the increase of unemployment attributable to the pandemic among people with and without severe disabilities

	People with severe disabilities				People without severe disabilities			
	IRR	95% CI	p	p _{subgroup}	IRR	95% CI	p	p _{subgroup}
Total	1.112	1.107; 1.117	< 0.001		1.248	1.246; 1.249	< 0.001	
Sex				0.027				< 0.001
Women	1.119	1.111; 1.127	< 0.001		1.243	1.240; 1.245	< 0.001	
Men	1.107	1.101; 1.114	< 0.001		1.252	1.250; 1.254	< 0.001	
Unemployment benefits				< 0.001				< 0.001
Social Code III	1.156	1.148; 1.164	< 0.001		1.400	1.397; 1.402	< 0.001	
Social Code II	1.077	1.071; 1.084	< 0.001		1.159	1.157; 1.161	< 0.001	
Federal states								
Schleswig-Holstein	1.134	1.104; 1.164	< 0.001		1.227	1.219; 1.235	< 0.001	
Hamburg	1.093	1.057; 1.130	< 0.001		1.269	1.260; 1.278	< 0.001	
Lower Saxony	1.105	1.087; 1.124	< 0.001		1.227	1.222; 1.232	< 0.001	
Bremen	1.102	1.052; 1.156	< 0.001		1.126	1.115; 1.137	< 0.001	
North Rhine-Westphalia	1.077	1.068; 1.086	< 0.001		1.185	1.182; 1.188	< 0.001	
Hesse	1.164	1.144; 1.185	< 0.001		1.302	1.296; 1.308	< 0.001	
Rhineland-Palatinate	1.099	1.073; 1.124	< 0.001		1.231	1.224; 1.238	< 0.001	
Baden-Württemberg	1.094	1.077; 1.111	< 0.001		1.273	1.268; 1.279	< 0.001	
Bavaria	1.137	1.123; 1.151	< 0.001		1.379	1.373; 1.384	< 0.001	
Saarland	1.019	0.978; 1.062	0.369		1.131	1.119; 1.143	< 0.001	
Berlin	1.189	1.164; 1.214	< 0.001		1.317	1.310; 1.323	< 0.001	
Brandenburg	1.156	1.124; 1.189	< 0.001		1.232	1.223; 1.240	< 0.001	
Mecklenburg-Western Pomerania	1.132	1.100; 1.165	< 0.001		1.273	1.263; 1.282	< 0.001	
Saxony	1.137	1.113; 1.160	< 0.001		1.265	1.258; 1.272	< 0.001	
Saxony-Anhalt	1.124	1.091; 1.157	< 0.001		1.207	1.199; 1.215	< 0.001	
Thuringia	1.118	1.089; 1.149	< 0.001		1.240	1.230; 1.249	< 0.001	

Note: IRR = Incidence Ratio Ratio; CI = Confidence Interval

Supplementary table 2: Difference-in-differences estimators for the increase of unemployment attributable to the pandemic among people with and without severe disabilities (Sensitivity analysis)

	People with severe disabilities				People without severe disabilities			
	IRR	95% CI	p	p _{subgroup}	IRR	95% CI	p	p _{subgroup}
Total	1.104	1.098; 1.110	< 0.001		1,225	1,223; 1,227	< 0.001	
Sex				0.037				< 0.001
Women	1.111	1.102; 1.121	< 0.001		1,219	1,217; 1,222	< 0.001	
Men	1.099	1.091; 1.106	< 0.001		1,230	1,228; 1,232	< 0.001	
Unemployment benefits				< 0.001				< 0.001
Social Code III	1,143	1,133; 1,152	< 0.001		1,366	1,363; 1,370	< 0.001	
Social Code II	1,073	1,065; 1,081	< 0.001		1,143	1,141; 1,145	< 0.001	
Federal states								
Schleswig-Holstein	1.128	1.094; 1.163	< 0.001		1,204	1,194; 1,213	< 0.001	
Hamburg	1.075	1.034; 1.117	< 0.001		1,247	1,237; 1,258	< 0.001	
Lower Saxony	1.099	1.078; 1.121	< 0.001		1,208	1,202; 1,213	< 0.001	
Bremen	1.100	1.041; 1.162	0.001		1,106	1,093; 1,118	< 0.001	
North Rhine-Westphalia	1.073	1.063; 1.084	< 0.001		1,168	1,164; 1,171	< 0.001	
Hesse	1.152	1.129; 1.175	< 0.001		1,269	1,262; 1,276	< 0.001	
Rhineland-Palatinate	1.091	1.062; 1.120	< 0.001		1,207	1,199; 1,215	< 0.001	
Baden-Württemberg	1.085	1.066; 1.105	< 0.001		1,250	1,244; 1,256	< 0.001	
Bavaria	1.126	1.110; 1.142	< 0.001		1,348	1,342; 1,354	< 0.001	
Saarland	1.012	0.965; 1.062	0.616		1,120	1,107; 1,134	< 0.001	
Berlin	1.178	1.149; 1.207	< 0.001		1,284	1,277; 1,291	< 0.001	
Brandenburg	1.148	1.111; 1.186	< 0.001		1,211	1,201; 1,220	< 0.001	
Mecklenburg-Western Pomerania	1.116	1.079; 1.154	< 0.001		1,250	1,239; 1,261	< 0.001	
Saxony	1.126	1.099; 1.153	< 0.001		1,243	1,235; 1,250	< 0.001	
Saxony-Anhalt	1.113	1.076; 1.152	< 0.001		1,181	1,173; 1,190	< 0.001	
Thuringia	1.110	1.076; 1.145	< 0.001		1,220	1,210; 1,231	< 0.001	

Note: IRR = Incidence Ratio Ratio; CI = Confidence Interval

Supplementary table 3: Descriptive statistics of unemployed people with and without severe disabilities in 2020.

	People with severe disabilities				People without severe disabilities			
	January to March 2020		April to December 2020		January to March 2020		April to December 2020	
	n	%	n	%	n	%	n	%
Sex								
Women	63,371	39.8	70,024	40.4	956,790	43.0	1,156,028	44.0
Men	95,853	60.2	103,156	59.6	1,269,079	57.0	1,468,922	56.0
Unemployment benefits								
Social Code III	71,355	44.8	80,031	46.2	888,787	39.9	1,115,591	42.5
Social Code II	87,869	55.2	93,149	53.8	1,337,082	60.1	1,509,359	57.5
Age group								
15 to 29 years	13,865	8.7	15,724	9.1	465,737	20.9	581,167	22.1
30 to 49 years	48,313	30.3	52,964	30.6	1,048,197	47.1	1,244,975	47.4
50 years and older	97,045	60.9	104,493	60.3	711,909	32.0	798,781	30.4

Note: Deviations from 100% are due to rounding.