The impact of the COVID-19 pandemic on internal migration in Germany: A descriptive analysis

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Abstract
The COVID-19 pandemic has affected economies, labor markets, health care, education and tourism around the globe in unprecedented ways. However, little research has yet been devoted to the impact that the pandemic might have had on internal migration. This study aims to address this gap by determining how the intensity and spatial patterns of internal migration changed between 2019 and 2020 in Germany. We draw on data from the population register on annual flows between 401 counties. We find that the COVID-19 pandemic was associated with a 5% drop in the intensity of inter-county migration in 2020 compared to the previous year, with significant variation across age. The pandemic was also associated with an upsurge in net migration losses for the largest cities, driven by fewer inflows of young adults and continuing outflows of families.

Keywords
COVID-19, Germany, internal migration, suburbanization, urbanization

INTRODUCTION

The COVID-19 pandemic has profoundly altered people’s daily lives. Various measures implemented by governments to limit the spread of the virus ranged from social distancing (e.g., closure of restaurants, recreational facilities, childcare and educational facilities) to restrictions of international and national travel and lockdowns (Alipour et al., 2020; Karako et al., 2020; Kawashima et al., 2020). The social contact restrictions also involved the enforcement of working from home policies and remote learning, which enhanced the usage of ICT technologies and decreased the need for business travel and commuting (Barrero et al., 2020; Beck et al., 2020; Bick et al., 2020; Brynjolfsson et al., 2020; De Haas et al., 2020). Consequently, the pandemic was associated with a historic decline in daily mobility and travel volume (Abdullah et al., 2021; Christidis et al., 2021; Federal Statistical Office Germany, 2020; Koehl, 2020; Thomas et al., 2021). Besides the direct effects of the pandemic on working lives, ICT, and daily mobility, little is yet known about the impact of the COVID-19 pandemic on internal migration. Changes in internal migration in response to COVID-19 are very likely because the COVID-induced global recession is expected to affect internal migration flows (Bernard et al., 2020; Decressin, 1994; Gans, 2017; Stawarz & Sander, 2020). A very first study by Fielding et al. (2021) on the impact of COVID-19 on internal migration in Japan revealed a decline in the intensity of migration and a weakening population concentration in urban areas in 2020.

Our paper aims to provide a descriptive analysis of the impact of the COVID-19 pandemic on internal migration flows in Germany. We draw on data from the population register on annual flows between 401 counties for the years 1991–2020 provided by the German Federal Statistical Office and the Statistical Offices of the Federal States.
In Germany, the number of COVID-19 infections started to rise steeply in March 2020, with the southern and western states being affected the strongest during the first wave. Across the country, schools and childcare facilities were closed in mid-March, and social distancing was strongly recommended. On March 23, a far-reaching nationwide contact restriction was imposed by government authorities, which included the prohibition of small public gatherings as well as the closing of universities, restaurants, and all nonessential shopping facilities. Moreover, the borders with most neighboring countries were closed. The number of infections slowed down in the second half of April, so that most measures were relaxed in mid-May. Schools and restaurants reopened in late spring, but universities remained closed. Apart from some local resurgences, infection rates remained rather low during summer 2020. However, the beginning of a second wave of infections hit Germany in late September. In the second wave, the southern part of eastern Germany (Saxony and Thuringia in particular) experienced a sharp rise in infections and mortality. To reduce the spread of the virus, a second nationwide lockdown was imposed on November 2, including the closure of restaurants, entertainment facilities, and public recreation centers. In addition, gatherings in public places were limited to members of two households. On December 16, the lockdown was extended to the nationwide closure of schools, childcare facilities, and nonessential shopping (Klüsener et al., 2020). The second lockdown continued to be in place until April 2021. Most restrictions were lifted in May 2021, when Germany experienced a significant drop in infections and a steady increase in the vaccination rate against COVID-19. At the time of writing in February 2022, infections with the omicron variant rise sharply, while 74% of the population in Germany are fully vaccinated against COVID-19 (Robert Koch Institute, 2022).

Besides the potential direct impact that the course of the pandemic might have had on moving behavior, COVID-19 might have also had an indirect impact on migration due to its economic implications. Previous research has demonstrated that movement behavior changes in response to an economic recession (Monras, 2018). Thus, in their projections Bernard et al. (2020) expect a decline in inter-county migrations flows in Australia in 2020 due to the economic decline associated with the pandemic. Internal migration in Germany and the decision to move tend also to be associated with economic shifts (Decressin, 1994; Gans, 2017; Stawarz & Sander, 2020). For instance, in the decades following reunification in 1990, internal migration in Germany was dominated by high levels of migration from the economically weaker East to the economically stronger West, which resulted in East Germany having lost a population of more than 1.2 million through internal migration since reunification (Stawarz et al., 2020). Consequently, it is worth considering how the COVID-19-induced economic downturn in Germany might have impacted on internal migration flows in Germany. In 2020, the GDP declined by 4.6% compared to 2019, after a phase of constant growth over the last 10 years (Federal Statistical Office Germany, 2021). Moreover, the number of employees decreased by around 1.1% and the unemployment rate rose by 0.9 percentage points to 5.9% compared with 2019 (Federal Employment Agency, 2021). Existing employment relationships were strongly protected by state-subsidized short-time work (Kurzarbeit) and other measures (e.g., emergency financial state relief for companies and the self-employed).

Besides its overall impact on jobs and the economy, the pandemic is expected to have a particularly strong impact on life course transitions that mainly take place at young adult ages, such as entry into postsecondary education, labor market entry and early career development (Settersten et al., 2020). Between 2019 and 2020, the number of new hires decreased by around 3.4% and newly concluded training contracts by around 11% (Bossl er et al., 2021; Federal Institute for Vocational Education and Training, 2021). Estimations show that the amount of offered apprenticeships declined by around 7.3% due to the pandemic in 2020 (Oeynhausen et al., 2020). The distribution of employees across economic sectors reveals that the hospitality industry, which tends to be popular among students, is one of the branches that was affected most strongly by the pandemic (the number of employees declined by 7.5% according to the Federal Employment Agency, 2021). A decrease in employment possibilities may have a negative impact on the financial resources of students, coupled with rising rental prices in university towns across Germany. This is likely to affect the decision to leave the parental home, or to return back home from the place of study. Furthermore, the greater usage of virtual formats in contrast to on-site teaching at universities as well as very limited possibilities to meet other students and establish new social contacts—due to measures of social distancing—may have reduced the incentive to move to the place of study. In fact, a recent survey conducted among young adults aged 18–34 from five European countries revealed that 46% of the German respondents who were considering leaving the parental home before the onset of the pandemic had postponed their plan, and 23% had abandoned it altogether. These rates were even higher among young adults from Spain, Italy and the UK (Luppi et al., 2021). Overall, we would hence expect a decline in the intensity of internal migration flows in Germany in 2020, especially among young adults.
We assume that the pandemic has not only affected the intensity of migration but also the spatial pattern. Given that young adults tend to move predominantly to urban areas (Bernard et al., 2014; Dittrich-Wesbuer et al., 2008; Gans, 2017; Plane & Jurjevich, 2009), a decline in movements among young adults is likely to result in fewer inflows to urban areas. At the same time, incentives to migrate away from the urban areas may have increased during the pandemic for several reasons: housing costs in the cities remained high and provided an incentive especially for families to move to suburban and rural settings with more affordable housing (BBSR, 2020; Stawarz et al., 2021). In addition, the lockdown measures against the spread of COVID-19 have forced people to spend more time at home, which posed a challenge especially for those living in urban places with little access to green spaces. Consequently, the pandemic is associated with a growing attractiveness of green space as well as having an own garden (Dolls & Mehles, 2021). The increased desire for detached housing and green spaces is likely to result in a higher number of movements from urban to suburban or more rural areas (Bauer et al., 2005). In sum, the reduced movement of younger adults into the cities, coupled with the continuing or increased moves of young families out of the cities is likely to have contributed to a strengthening of suburbanization tendencies in 2020. In the following section, we examine the impact of the COVID-19 pandemic on overall migration intensities and their spatial pattern by focusing on changes in internal migration flows between 2019 and 2020, thereby paying attention to differences across age and urban/rural settings.

3 DATA AND METHODS

To investigate the impact of the COVID-19 pandemic on internal migration in Germany, we use time-series data of annual inter-county migrations flows from the German Federal Statistical Office and the Statistical Offices of the Länder for the years 1991 to 2020 (territorial status 2018). The data covering the period 1991–2017 was originally compiled and adjusted for boundary changes by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR, 2010). We added the data for the years 2018–2020 to the time series, which was straightforward in the absence of complex boundary changes. Our data captures all registered changes of residence across municipal boundaries and contains information about the number of moves taking place between i and j (e.g., from Hamburg to Munich and vice versa) for all 401 counties (Kreise) in each year. Hence, our data covers 160,400 county pairs over a period of 30 years. The counties are nested within 16 federal states (Bundesländer), for which we also calculated the annual number of moves to trace changes in the intensity of longer-distance moves. Moreover, we differentiate internal migration flows by five age groups (<17, 18–24, 25–29, 30–50 and ≥50). The data is considered as reliable and robust as persons moving within Germany are legally required to deregister their old and register their new address at the municipal level. We also obtained information on the monthly number of moves between federal states, but our data only covers the moment of registration and not the date of the actual move. The time lag was especially large when municipal offices were closed for several weeks during the lockdown in spring 2020. The time lag in registration, however, did not affect the accuracy of the annual migration numbers used in this paper.

We use the crude migration intensity (CMI) to determine how the internal migration rate changed over time (Bell et al., 2002; Rees et al., 2017). The CMI indicates the percentage or level of migration defined as the ratio of moves (M) to the population at risk (P). We specify the population at risk in a given county as the mid-year population.

\[
CMI = \frac{100M}{P}. \tag{1}
\]

To identify changes in the impact of internal migration on the redistribution of population across counties and between urban and rural areas, we compute net internal migration rates (Bell et al., 2002):

\[
N_i = 100(D_i - O_i)/P_i, \tag{2}
\]

where \(D_i\) are the total inflows, \(O_i\) is the total outflows, and \(P_i\) is the population of region \(i\).

To determine how internal migration patterns between rural and urban areas have changed between 2019 and 2020, we aggregate the county-level data to a regional typology developed by the BBSR (Milbert, 2015) that differentiates between the largest cities, cities, hinterland, and rural areas. Additionally to the BBSR classification, we adopt an approach suggested by Rees and Kupiszewski (1999) that uses the population density as a proxy to distinguish between urban and rural areas. This approach has the benefits of capturing the urban–rural continuum and being internationally comparable (Amcoff, 2006; Buettner, 2015; Stawarz & Sander, 2020). The population density is calculated by dividing the number of inhabitants \(P_j\) in a given region \(i\) and year \(j\) by the area \(A_j\) measured in km\(^2\) and then taking the base-10 log of population density.

Finally, we visualize the changes in the spatial pattern of internal migration between 2019 and 2020 with circular plots of net migration flows (Abel & Sander, 2014).

4 RESULTS

We find that the total number of internal migration flows between counties declined by 5% from 2.82 million in 2019 to 2.67 million in 2020. In a similar fashion, internal migration flows between federal states decreased by around 6% from 1.09 million in 2019 to 1.03 million in 2020.\(^1\) Hence, longer distance moves were even more affected than moves between counties. With regard to the seasonal differences between 2019 and 2020, the total number of registered flows between federal states in the pre-lockdown months January and February 2020 was similar to that observed in early 2019.

\(^1\)Due to the delayed reporting of moves during the COVID-19 pandemic the internal migration statistic for 2020 can be slightly down-biased.
In March and April 2020, however, migration flows between federal states dropped by more than 25% in comparison to the previous year. As described above, this decline may be attributed not only to a lower number of moves but also to the pandemic-related closure of municipal offices during the lockdown. In June 2020, the number of moves exceeded the previous year’s level, suggesting a catch-up of previously postponed registrations. In the months of July, September, October and December 2020, the total number of moves was lower than in 2019 and in August and November slightly higher or similar to 2019.

In Figure 1, we depict the CMI of inter-county flows for the period 1991–2020. We find that the CMI of inter-county flows, which indicates the intensity of migration defined as the ratio of moves to the population at risk, dropped from 3.4 points in 2019 to 3.2 points in 2020, which is the lowest rate since 2011 (for the detailed numbers, see Table A1 in the appendix). This drop may appear rather small in comparison to the peak intensity observed in 2015/2016, when the redistribution of refugees across Germany was captured in the statistics as internal migration. However, when placing the recent drop in intensity in an historical context, we find that the intensity of internal migration was remarkably stable in the 1990s and 2000s. Among German nationals, the intensity was also stable in the 2010s, whereas internal migration among foreigners increased substantially with the influx of refugees (Stawarz & Sander, 2020). Against this background, the recent drop in intensity is noteworthy.

Given that the pandemic might have a particularly strong impact on life course transitions that mainly take place at young adult ages, such as students entry into postsecondary education, labor market entry and early career development, we examine whether the drop in the intensity of migration differs by age. Indeed, Figure 2 shows that the decline in inter-county migration flows between 2019 and 2020 differs strongly by age group. The drop is most pronounced for those aged 18–24 years (−8%) and those aged 25–29 years (−7%). This finding suggests that the migration behavior of educational movers and labor market entrants was most heavily affected by the pandemic. Children below age 18 (−3%), those aged 30–49 (−4%) as well as those aged 50 and over (−2%) also experienced declines in the absolute number of internal migration flows, but to a much lower degree. Of course, 2019 could have also been an outlier from the pre-COVID period. Hence, we also compared the intensity for 2020 with the average for the years 2010–2019. Given the bias caused by the redistribution of refugees in the years 2015 and 2016, we omitted these 2 years from our calculation. We find that the decline among those aged 18–24 years (−7%), those aged 25–29 years (−8%), and those aged 30–49 years (−2%) are very similar to those observed when simply comparing 2020 to the previous year. However, the results differ for movements among children below the age of 18 (+4%) and among those aged 50 or older (+6%). This indicates that the year 2019 is representative for the prepandemic period when it comes to adults aged 18–49 years, but not necessarily when it comes to children and the elderly. The shifts in the spatial patterns of movements over the last 10 years, which we turn to in the following subsection, could be a reason for this divergence.

Our results suggest that the COVID-19 pandemic had an impact on the spatial patterns of migration and on the redistribution of population between urban and rural areas. Figure 3 shows net internal migration rates for the largest cities, cities, hinterlands, and rural areas (for detailed numbers see Table A2 in the appendix). In this respect, urbanization is characterized by positive internal migration rates for the largest cities and negative rates for rural areas and the hinterland, whereas the opposite trend indicates periods of suburbanization. Germany experienced a period of suburbanization in the years after reunification in 1990, followed by a period of urbanization from 2006 to 2012 (Stawarz et al., 2021). Since 2015, a new period of suburbanization has set in, and this suburbanization trend has been intensified strongly in the pandemic year 2020. In fact, the current net internal migration rates for the largest cities have reached the...
lowest values since the mid-1990s, indicating that the pandemic is associated with increased suburbanization in Germany.

Further evidence for this finding is presented in Figure 4, which displays the relationship between log population density and net internal migration rates. The estimated regression slopes show a negative relationship for 2019 ($B = -0.34$, $SE = 0.067$, $p < 0.001$) and 2020 ($B = -0.64$, $SE = 0.057$, $p < 0.001$), which means the higher (lower) a county’s population density, the more negative (positive) its net internal migration rate. Moreover, as indicated by the regression slopes and the 95% confidence intervals, this negative association is significantly stronger in 2020 than in 1999. This becomes also evident by the estimated interaction effect ($B = -0.30$, $SE = 0.088$, $p = 0.001$). Thus, both the net migration losses for more densely populated counties and the net migration gains for less densely populated counties have become more pronounced. Consequently, the impact of internal migration on the redistribution of population between urban and rural areas has increased since the onset of the pandemic.

Moreover, we find that the rise in suburbanization tendencies between 2019 and 2020 was driven by changes in both the inflows and outflows to and from larger cities. Table 1 provides the inflows, outflows, their net difference as well as the net internal migration rates for the years 2019 and 2020 by age group and county type. We also provide the percentage change of inflows and outflows between 2019 and 2020, which can be found in the last two columns. Except for the inflow of those above age 50 in rural areas (that increased by 2.6%), the total number of inflows and outflows decreased between 2019 and 2020 for all age group and county type pairs. The overall decline in migration is important to keep in mind when examining the impact of the pandemic on the spatial structure of migration.

Comparing the net internal migration rates for the years 2019 and 2020 shows that the largest cities experienced lower (less positive or more negative) net migration across all age groups and even across young adults, whereas the opposite is true for cities, and particularly for hinterlands and rural areas. Moreover, Table 1 reveals strong declines in the inflows to the largest cities, while the outflows showed a substantial decline only for the 18 to 29 year olds. In contrast, outflows for the families (≤17 and 30–49 years old) have decreased marginally, which demonstrates that they continued to leave the largest cities during the pandemic for less densely populated regions. Thus, the age groups ≤17 and 30–49 years experienced the smallest decline in total inflows to rural areas between 2019 and 2020. In contrast, the rural–urban movements of those aged 18–29 declined strongly between 2019 and 2020, suggesting a postponement of moves for education or job-related reasons during the pandemic. In concert, these changes in age-specific flows mean that suburbanization increased markedly in 2020.

Given that the pandemic did not spread evenly across Germany, one might expect that the suburbanization tendencies may differ among regions. However, Figures 5 and 6 reveal a uniform increase in net migration losses for almost all larger cities. The circular plots provide a more detailed insight into the spatial patterns of internal migration in Germany and how it was affected by the pandemic. The plots show the net internal migration flows between 52 regions, which are based on the German NUTS-2-regions plus larger cities. For better readability, we only show net migration flows that are equal or greater than 400 individuals. The origins and destinations of internal migrants are each assigned a color and represented by the circle’s segments. The volume of movement is indicated by the width of the flow. To give an example, the 2019 net migration loss of Berlin (red segment) with regard to Brandenburg (orange segment) of more than 15,600 individuals is represented by the wide red flow. This means that the migration flow from Berlin to surrounding Brandenburg was much larger than the flow in the opposite direction. Figure 5 shows that Germany’s larger cities, such as Berlin, Hamburg, Munich, Cologne and Frankfurt experienced substantial net migration losses to their surrounding areas already before the start of the
Comparing the plots for 2019 and 2020 reveals that the net losses increased even further since the onset of the pandemic, as the flows between the larger cities and their surrounding areas have increased in volume (see, for instance, the flow from Hamburg to Schleswig-Holstein). This finding once again illustrates that the suburbanization trend in Germany was most likely intensified by the COVID-19 pandemic. Moreover, fewer flows go through the center of the circle in 2020 compared with 2019, which indicates that longer distance flows to Berlin and other large cities decreased during the pandemic.

### TABLE 1

| County Type | 2019 Inflow | 2019 Outflow | 2019 Net | 2019 Net rate\(^a\) | 2020 Inflow | 2020 Outflow | 2020 Net | 2020 Net rate\(^a\) | % Change 2019–2020 Inflow | % Change 2019–2020 Outflow |
|-------------|-------------|-------------|----------|---------------------|-------------|-------------|----------|---------------------|-----------------------------|-----------------------------|
| Largest cities |             |             |          |                     |             |             |          |                     |                             |                             |
| ≤17         | 87          | 136         | -49      | -1.24               | 80          | 134         | -54      | -1.36               | -7.90                       | -1.00                       |
| 18–24       | 268         | 182         | 85       | 4.15                | 242         | 173         | 70       | 3.41                | -9.46                       | -5.24                       |
| 25–29       | 212         | 200         | 11       | 0.58                | 194         | 190         | 4        | 0.23                | -8.07                       | -5.02                       |
| 30–49       | 265         | 348         | -83      | -1.22               | 244         | 340         | -97      | -1.42               | -7.91                       | -2.06                       |
| ≥50         | 102         | 128         | -25      | -0.26               | 94          | 127         | -33      | -0.34               | -7.65                       | -0.42                       |
| Total       | 933         | 993         | -61      | -0.25               | 855         | 965         | -110     | -0.45               | -8.36                       | -2.89                       |
| Cities      |             |             |          |                     |             |             |          |                     |                             |                             |
| ≤17         | 153         | 132         | 21       | 0.38                | 150         | 126         | 24       | 0.43                | -1.95                       | -4.28                       |
| 18–24       | 195         | 233         | -37      | -1.52               | 180         | 213         | -33      | -1.37               | -7.82                       | -8.43                       |
| 25–29       | 187         | 193         | -6       | -0.33               | 176         | 180         | -4       | -0.20               | -5.63                       | -6.79                       |
| 30–49       | 344         | 307         | 37       | 0.47                | 332         | 291         | 41       | 0.53                | -3.58                       | -5.43                       |
| ≥50         | 167         | 167         | 0        | 0.00                | 164         | 162         | 2        | 0.02                | -1.98                       | -3.22                       |
| Total       | 1047        | 1032        | 15       | 0.04                | 1002        | 972         | 31       | 0.09                | -4.25                       | -5.85                       |
| Hinterland  |             |             |          |                     |             |             |          |                     |                             |                             |
| ≤17         | 74          | 59          | 15       | 0.65                | 74          | 58          | 16       | 0.68                | -0.72                       | -2.06                       |
| 18–24       | 80          | 106         | -26      | -2.71               | 76          | 97          | -21      | -2.18               | -4.91                       | -8.71                       |
| 25–29       | 73          | 75          | -2       | -0.33               | 68          | 69          | -1       | -0.10               | -6.11                       | -8.20                       |
| 30–49       | 151         | 126         | 25       | 0.73                | 148         | 120         | 28       | 0.83                | -2.04                       | -5.06                       |
| ≥50         | 84          | 74          | 11       | 0.16                | 84          | 72          | 12       | 0.18                | -0.58                       | -2.13                       |
| Total       | 462         | 440         | 22       | 0.16                | 449         | 415         | 34       | 0.24                | -2.70                       | -5.58                       |
| Rural areas |             |             |          |                     |             |             |          |                     |                             |                             |
| ≤17         | 64          | 51          | 13       | 0.67                | 62          | 47          | 15       | 0.78                | -2.86                       | -7.83                       |
| 18–24       | 63          | 85          | -22      | -2.73               | 61          | 77          | -16      | -1.97               | -3.65                       | -9.89                       |
| 25–29       | 55          | 58          | -3       | -0.45               | 52          | 52          | 0        | 0.01                | -5.77                       | -10.20                      |
| 30–49       | 122         | 101         | 21       | 0.72                | 120         | 93          | 27       | 0.93                | -1.62                       | -8.01                       |
| ≥50         | 76          | 62          | 14       | 0.24                | 78          | 60          | 18       | 0.31                | 2.58                        | -3.53                       |
| Total       | 380         | 356         | 24       | 0.20                | 373         | 328         | 45       | 0.37                | -1.92                       | -8.01                       |

Note: Data: Federal Statistical Office Germany and the Statistical Offices of the Länder, Spatial Monitoring of the BBSR, own calculations.

\(^a\)Net internal migration rate in percent.

### 5 | SUMMARY AND DISCUSSION

The aim of this paper was to provide first insights into the impact of the COVID-19 pandemic on internal migration in Germany. Our descriptive analysis draws on data from the German Federal Statistical Office and the Statistical Offices of the Länder on annual inter-county flows covering the period 1991 to 2020. Our results show that the pandemic is associated with a decline in the intensity of migration, confirming earlier findings by Fielding et al. (2021) for Japan. In Germany, the intensity of inter-county migration declined...
by 5% and the intensity of inter-state migration by 6%. The CMI of inter-county migration decreased from 3.4% in 2019 to 3.2% in 2020. The decline stands in sharp contrast to a remarkably stable intensity that was observed in the period 2011 to 2019, with the exception of the period around the year 2015, which was biased by the redistribution of refugees being captured in the population register as internal migration. It remains to be seen whether the intensity of internal migration will soon return to pre-COVID-19 levels. Preliminary data on inter-state migration during the first 9 months of 2021 are indicative of a recovery: the CMI for the 9-month period in 2021 was 4.8% higher than in 2020.

The decline in internal migration was not distributed evenly across age groups. In line with demographic studies published at the beginning of the pandemic (Settersten et al., 2020), our analysis also revealed that the decline was most pronounced among young adults aged 18–29, for which migration decreased by 7%–8%, while movements of other age-groups (≤17; 30–49, and ≥50) only decreased by 2%–4%. In consequence, the changes in migration flows resulted in an increased suburbanization trend in Germany. Key drivers of this trend were fewer rural–urban moves among young adults, coupled with continuing urban–rural moves among the age groups ≤17, 30–49 and ≥50 years.

In sum, our results provide evidence for a substantial impact of the COVID-19 pandemic on the intensity and spatial patterns of internal migration. The impact appears to be most pronounced for young adults. As argued in Section 2, this is likely related to the fact that the

**FIGURE 5** Circular plots of net internal migration flows among 52 Regions in 2019. Data: Federal Statistical Office Germany and the Statistical Offices of the Länder, Spatial Monitoring of the BBSR, own calculations.
pandemic has worsened the labor market situation for those at the labor market entry stage (e.g., fewer new hires), and caused disruptions to higher education programs that in turn resulted in fewer graduations in 2020 compared to previous years. Once social contact restrictions due to the pandemic are lifted and the economy recovers, one can also expect the intensity of job-related moves to quickly recover to pre-COVID levels. Whether university students will move to the place of study at pre-COVID levels partly depends on the future of university teaching. Unless distance learning will be made widely available beyond the pandemic, a recovery of rural-urban moves among students to pre-COVID levels is plausible. The only exception to this could be universities in the largest cities, where rising housing costs act as a deterrent to relocation to the cities among students.

Conversely, the pandemic increased the demand for (semi) detached housing and the desire to live in a greener environment (Dolls & Mehles, 2021). While the decline in rural-urban movements may well be a tempo effect caused by a postponement of leaving the parental home during the pandemic, the new flexibilities of working from home may bring about a new age of suburbanization, with all its consequences for infrastructure and service provision. Thus, the pandemic has reinforced the increasing trend towards suburbanization among young families, where a shortage of affordable family housing in the cities has been the prime incentive to move (Karsten, 2020). Besides the financial incentives, the pandemic might have brought about new possibilities for moving to less densely settled places beyond the commuting belts that meet personal

**FIGURE 6** Circular plots of net internal migration flows among 52 Regions in 2020. Data: Federal Statistical Office Germany and the Statistical Offices of the Länder, Spatial Monitoring of the BBSR, own calculations.
preferences for a rural lifestyle. The COVID-19 pandemic has resulted in a rapid increase in working from home (or telecommuting), and has raised questions about the necessity of working in city offices and daily commuting. Among families with a personal preference for a rural lifestyle, the possibility of extensive telecommuting is likely to be translated into the realisation of intentions to move out of cities and into more rural areas (Denham, 2021). Hence, the pandemic has the potential to result in a longer-term trend of redistribution of population from the cities towards smaller, less densely settled places in more rural settings. The revival of a phenomenon that has been described as “counterurbanization” more than 30 years ago (Champion, 1989) would imply the COVID-19 pandemic to have a long-term impact on internal migration that extends way beyond the direct impact of the pandemic itself but is moderated by the impact of the pandemic on our working life.

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CONFLICTS OF INTEREST
The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available on request from the authors.

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### Appendix

**Tables A1 and A2**

#### Table A1

Inter-county migrations flows (in 10,000) by age and crude migration rate for all moves

|       | All | CMI | ≤17  | 18–24 | 25–29 | 30–49 | ≥50 |
|-------|-----|-----|------|-------|-------|-------|-----|
| 1991  | 243 | 3.04| 44   | 56    | 48    | 67    | 27  |
| 1992  | 249 | 3.09| 45   | 52    | 50    | 73    | 29  |
| 1993  | 248 | 3.06| 45   | 48    | 49    | 76    | 29  |
| 1994  | 263 | 3.23| 50   | 48    | 50    | 83    | 32  |
| 1995  | 266 | 3.26| 50   | 47    | 50    | 86    | 33  |
| 1996  | 264 | 3.22| 49   | 46    | 48    | 88    | 33  |
| 1997  | 267 | 3.25| 49   | 46    | 46    | 91    | 34  |
| 1998  | 267 | 3.25| 47   | 48    | 44    | 93    | 34  |
| 1999  | 267 | 3.25| 47   | 49    | 43    | 94    | 34  |
| 2000  | 265 | 3.22| 45   | 52    | 42    | 92    | 33  |
| 2001  | 268 | 3.25| 45   | 55    | 42    | 93    | 33  |
| 2002  | 264 | 3.20| 43   | 56    | 42    | 90    | 33  |
| 2003  | 261 | 3.17| 41   | 57    | 43    | 87    | 33  |
| 2004  | 256 | 3.11| 39   | 57    | 43    | 85    | 33  |
| 2005  | 252 | 3.05| 36   | 56    | 45    | 82    | 33  |
| 2006  | 248 | 3.00| 34   | 56    | 46    | 79    | 32  |
| 2007  | 251 | 3.05| 34   | 57    | 47    | 80    | 33  |
| 2008  | 256 | 3.12| 34   | 59    | 49    | 80    | 33  |
| 2009  | 256 | 3.12| 33   | 60    | 49    | 79    | 34  |
| 2010  | 253 | 3.09| 32   | 60    | 48    | 78    | 34  |
| 2011  | 276 | 3.40| 35   | 66    | 53    | 85    | 37  |
| 2012  | 266 | 3.30| 34   | 62    | 51    | 81    | 37  |
| 2013  | 274 | 3.40| 35   | 63    | 54    | 84    | 39  |
| 2014  | 283 | 3.50| 37   | 64    | 56    | 87    | 40  |
| 2015  | 313 | 3.83| 44   | 71    | 62    | 95    | 42  |
| 2016  | 316 | 3.83| 43   | 62    | 63    | 102   | 46  |
| 2017  | 284 | 3.44| 35   | 54    | 57    | 94    | 44  |
| 2018  | 282 | 3.40| 36   | 53    | 55    | 95    | 44  |
| 2019  | 282 | 3.40| 38   | 61    | 53    | 88    | 43  |
| 2020  | 268 | 3.22| 37   | 56    | 49    | 84    | 42  |

Note: Data: Federal Statistical Office Germany and the Statistical Offices of the Länder, Spatial Monitoring of the BBSR, own calculations.

#### Table A2

Net internal migration rates of inter-county flows by county type

|             | Largest cities | Cities | Hinterland | Rural areas |
|-------------|----------------|--------|------------|-------------|
| 1991        | −0.14          | 0.36   | −0.28      | −0.29       |
| 1992        | −0.26          | 0.28   | −0.10      | −0.09       |
| 1993        | −0.40          | 0.23   | 0.12       | 0.04        |
| 1994        | −0.53          | 0.19   | 0.12       | 0.37        |
| 1995        | −0.51          | 0.18   | 0.09       | 0.41        |
| 1996        | −0.48          | 0.13   | 0.18       | 0.35        |
| 1997        | −0.50          | 0.15   | 0.15       | 0.37        |
| 1998        | −0.47          | 0.16   | 0.15       | 0.29        |
| 1999        | −0.34          | 0.15   | 0.03       | 0.18        |
| 2000        | −0.14          | 0.09   | 0.00       | 0.04        |
| 2001        | −0.02          | 0.02   | 0.08       | −0.09       |
| 2002        | −0.03          | 0.02   | 0.08       | −0.09       |
| 2003        | 0.09           | −0.04  | 0.03       | −0.08       |
| 2004        | 0.08           | −0.02  | 0.01       | −0.10       |
| 2005        | 0.24           | −0.04  | −0.10      | −0.20       |
| 2006        | 0.37           | −0.04  | −0.22      | −0.33       |
| 2007        | 0.28           | 0.00   | −0.18      | −0.30       |
| 2008        | 0.32           | −0.02  | −0.21      | −0.31       |
| 2009        | 0.29           | −0.03  | −0.17      | −0.26       |
| 2010        | 0.30           | −0.06  | −0.16      | −0.24       |
| 2011        | 0.31           | −0.07  | −0.17      | −0.22       |
| 2012        | 0.17           | −0.04  | −0.08      | −0.15       |
| 2013        | 0.03           | −0.02  | −0.02      | 0.01        |
| 2014        | −0.13          | 0.01   | 0.05       | 0.17        |
| 2015        | −0.24          | 0.09   | −0.04      | 0.26        |
| 2016        | −0.05          | 0.05   | −0.01      | −0.02       |
| 2017        | −0.19          | 0.05   | 0.09       | 0.13        |
| 2018        | −0.22          | 0.06   | 0.12       | 0.16        |
| 2019        | −0.25          | 0.04   | 0.16       | 0.20        |
| 2020        | −0.45          | 0.09   | 0.24       | 0.37        |

Note: Data: Federal Statistical Office Germany and the Statistical Offices of the Länder, Spatial Monitoring of the BBSR, own calculations.