The regional (re)allocation of migrants during the Great Lockdown in Italy

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Abstract
This paper presents first-hand evidence of the impact of Covid-19 on the re-allocation of migrants. I use monthly data on the migrants in reception centres and on daily arrivals in Italy during the period from October 2017 to October 2020, combined with information on Covid-19 cases across Italian regions. I employ a difference-in-differences design, finding that the presence of migrants decreased approximately 7% points more in regions highly exposed to the pandemic as compared to those less affected by Covid-19. In practice, migrants in second-line reception centres are reduced by approximately 381 units when considering a region less affected by the pandemic, and by around 2150 units in regions severely hit by the Covid-19 outbreak. Finally, back-of-the-envelope calculations suggest that in more affected regions, such an unusual reallocation of migrants implies potential savings in the range of 60–94 million euros, corresponding to about a 30–90% reduction in spending on migrant, refugee, and asylum seekers in these regions, whereas the reduction is of roughly 3–6% in less exposed areas.

Keywords Covid-19 · Migration · Reception of refugees · Public expenditure on security and immigration

JEL Classification J15 · D72 · H51
1 Introduction

The Covid-19 pandemic, which began in December 2019 in the city of Wuhan in China, continues to spread around the world. At the time of the first draft of this paper, and according to the latest data from the World Health Organization (19 November 2021), more than 255 million cases have been reported, including 5 million deaths.1

The unprecedented nature of this event was emphasized by Antonio Guterres, the U.N. Secretary-General, who warned that the world is facing the most challenging crisis since World War II—a pandemic threatening people in every country and which will bring a recession that probably has no parallel in the recent past. In a recent speech,2 he puts it vividly:

‘We are facing a global health crisis unlike any in the 75-year history of the United Nations—one that is killing people, spreading human suffering, and upending people’s lives. […] But this is much more than a health crisis. It is a human crisis. The coronavirus disease (COVID-19) is attacking societies at their core.’

Along these lines, in the April World Economic Outlook, the International Monetary Fund (IMF) projected that global growth in 2020 would fall to –3%. This corresponds to a decrease of 6.3% points from January 2020, a major revision over a very short period. This makes the pandemic event, known as the ‘Great Lockdown’, the worst recession since the Great Depression and far worse than the Global Financial Crisis. In addition, the International Labour Organization estimates that between 5 and 25 million jobs were lost in 2020, with a corresponding loss of between 860 million and 3.4 trillion US dollars in labour income.

These figures have attracted the attention of all international organizations, including the European Commission, the IMF, the World Bank, and the OECD, to the extent that several financial packages have been put in place, accounting for trillions of euros.3 At the same time, the Covid-19 outbreak has encouraged scholars to contribute to various scientific areas, with dedicated taskforces set up across Europe and the US.4 As for the economic aspects of the pandemic, broad policy-based research is being carried out on many topics, with the main aim of disseminating

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1 Daily coronavirus disease (COVID-2019) situation reports are available on the World Health Organization’s webpage. See https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports,

2 “A call for solidarity”, United Nations, https://www.un.org/sites/un2.un.org/files/sg_remarks_on_covid-19_english_19_march_2020.pdf, March 19, 2020.

3 For instance, on April 23rd 2020 EU leaders agreed on a recovery fund to help Europe’s economy, as the coronavirus pandemic is sending it into a steep decline, and stated that it will be linked to the EU’s long-term budget. Along these lines, the president of the US signed a $2 trillion coronavirus relief bill on March 27th.

4 For Europe see, among others, the European Commission’s action on coronavirus (https://ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response/european-commissions-action-coronavirus_en); while for US, see the White House Coronavirus Task Force.
emerging scholarly work on the Covid-19 epidemic to improve our understanding of policy options.\footnote{In this respect, it is worth mentioning Covid Economics, the new online peer-reviewed review launched by the Centre for Economic Policy Research (CEPR) with the scope of publishing formal investigations into the effects of Covid-19 based on explicit theory and/or empirical evidence (see \url{https://cepr.org/content/covid-economics-vetted-and-real-time-papers-0#About}).}

While many studies have tackled the challenges of the Covid-19 outbreak in different areas of economics, including health (Abaluck et al., 2020), industrial organization (Barrot et al., 2020), macroeconomics (Atkeson, 2020), finance (Boot et al., 2020; Toda, 2020), development (Leiva-Leon et al., 2020), and inequality (Alon et al., 2020), the unintended consequences of the pandemic on migrants have not yet been explored in depth (Devillanova et al., 2020; Guadagno, 2020).

I complement the existing first-hand contributions on the effect of Covid-19 by implementing a difference-in-differences (DiD) research design and by explicitly—and primarily—focusing on the consequences of the pandemic in terms of the government (re)allocation of migrants. In particular, I use monthly observations of both the presence of migrants in reception centres and on migrant arrivals in Italy during the period from October 2017 to October 2020, combined with monthly data on Covid-19 cases across Italian regions. Italy represents a crucial case study as it was the first Western country hit by Covid-19 and for which granular data for a relatively long timespan are available. The identification mainly rests on cross-regional differences in the exposure to Covid-19, while exploiting the shock due to the spread of the virus in Italy since February 2020. I posit that regions more affected by the pandemic, namely regions that experienced a larger fraction of Covid-19 cases, might have experienced a different allocation of migrants in their reception centres compared to less exposed ones. Following this approach, I find that the regional presence of migrants decreases approximately 6% points more in regions more exposed to the pandemic as compared to those that are less exposed. In practice, this decrease corresponds to a decline of between 381 units when considering Puglia, a region not strongly hit by Covid-19, and around 2150 units in Liguria, a region highly affected by the pandemic. These results survive a battery of robustness tests, including the traditional event study à la Autor, time falsification, and alternative specifications of regional exposure to Covid-19.

To consider the economic implications of these findings, I complete the analysis by collecting data on the amount of spending on refugees and asylum seekers by the general government across Italian regions in 2019. Back-of-the-envelope calculations suggest that the reallocation of migrants in regions more exposed to the pandemic implies potential savings in the range of 60–94 million euros, corresponding to about a 30–90% reduction in spending on migrant, refugee, and asylum seeker functions in these regions. In contrast, for regions less exposed to the Covid-19 outbreak the reduction is of roughly 3–6%. Moreover, I document that these savings have been (at least partially) offset by a lower than expected amount of financial resources transferred from the central government to regions for healthcare provisions to tackle the pandemic.
While contributing to the existing literature on migration in general, this article is most closely related to contributions focusing on finding plausible sources of exogenous variation in the allocation of migrants (Dhalberg et al., 2012; Edo et al., 2019; Fasani, 2015). By documenting that the presence of migrants is affected by external shocks, I also contribute to the large existing body of research showing to what extent the allocation of migrants is influenced by natural disasters, wars, and climate change (see, for example, Do Yun & Waldorf, 2016; Fouka, 2019; Hugo, 2013). Finally, this paper is related to the emerging literature on the link between immigration and the choice of specific public spending items at the local level (Bove et al., 2021; Gerdes, 2011; Gamele, 2018).

The remainder of the article is organized as follows: Sect. 2 discusses the institutional setting and Sect. 3, the empirical framework; Sect. 4 presents the data, and Sects. 5 and 6 illustrate the results and robustness tests, respectively; Sect. 7 discusses some of the potential implications of the results. Section 8 concludes.

2 Institutional setting

The Italian Constitution defines four administrative layers of government: the central government, regions, provinces, and municipalities. While most regions are ruled by ordinary statutes, some of them—the autonomous regions—are ruled by special statutes.6 Regions do not enjoy much discretion in spending decisions regarding the migrant issue, as migration is a function typically in the hands of the central government. However, according to data from the State General Accounting Department, in 2019 the amount spent by the central government on migration in Italian regions, and in particular on refugees and asylum-seekers, was about 2.7 billion euros, corresponding to approximately 1% of total government expenditure (274 billion euros).7

As for the reception of refugees and the asylum-seeker system in Italy, these procedures have changed significantly in recent years. In particular, Law 132/2018 organizes the system along two levels. The first level, known as the phase of first aid and assistance, is under the responsibility of national authorities and is implemented through ‘hotspots’ (e.g. key harbours as places of disembarkation). More specifically, there are three types of centres. To begin with, there are the first-aid and hospitality centres (Centri di primo soccorso e accoglienza, CPSA), which host newly arrived migrants. In these centres, after receiving medical assistance migrants are identified and hence can apply for asylum. Second, there are hospitality centres (Centri di Accoglienza, CDA) where migrants can certify the regularity of their presence in Italy. Finally, there are reception centres for asylum seekers (Centri di accoglienza per richidenti asilo, CARA), which host migrants coming from CPSAs.

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6 In Italy, there are five autonomous regions (Sicily and Sardinia, which are insular territories, and Valle d’Aosta, Trentino–Alto Adige, and Friuli–Venezia Giulia, which are northern boundary territories) and two autonomous provinces (Trento, with Italian as its official language, and Bolzano, with German as its official language, making up the Trentino–Alto Adige region).

7 Additional details about the data are available here: http://www.rgs.mef.gov.it/VERSIONE-I/pubblicazioni/pubblicazioni_statistiche/la_spesa_statale_regionalizzata/.
who have applied for asylum. It is worth mentioning that these centres are managed by the central government. Usually, the time foreseen for the exploitation of these procedures is 30 days, so that migrants are entitled to stay in these first-level centres for a period no longer than one month before being transferred to second-line centres.8

As far as the second level is concerned, the 2018 reform transformed the second-line reception system known as the System of Protection for Refugees and Asylum Seekers (Sistema di protezione per richiedenti asilo e rifugiati, SPRAR) into the System of Protection for Beneficiaries of Protection and Unaccompanied Minors (Sistema di protezione per titolari di protezione internazionale e minori stranieri non accompagnati, SIPROIMI). These centres host refugees coming from the first reception level, and their goal is to provide integration services and help refugees and asylum seekers learn Italian, find a job, and integrate into society.

The overall activities are conducted under the programming and criteria established by both national and regional working groups (Tavolo di coordinamento nazionale e tavoli regionali). The Department of Civil Liberties and Immigration of the Ministry of Interior controls and monitors activities in the reception facilities and registers the presence of migrants in all reception centres, providing aggregated information at the regional level. Hence, after the phase of first aid and assistance, the number of migrants registered at the regional level in the second-line reception system increases if the reallocation after arrival exceeds the number of migrants who are repatriated or who request asylum in another country.

3 Empirical strategy

The baseline empirical model of this study builds on a large literature that uses the DiD method to investigate the net impact of a policy or a program on given outcomes. The standard case for applying DiD is when an exogenous shock, i.e. a change in the law or a change due to a natural disaster or pandemic (treatment), affects only one group of units (the treated units) and there is another group (the controls) that is similar in all respects but which is not affected by the intervention. Both groups are observed over a period of time across the event. It is then natural to measure the effect by comparing changes in the mean outcome of the treated cases with changes in the mean outcome of the untreated controls. This approach can, under some conditions, identify the causal effect of the event on the outcome of interest.

Since all Italian regions are affected by the Covid-19 pandemic, the identification of treated and control units is not immediately straightforward. Therefore, I use a slightly different approach. Although all regions are influenced by the newly discovered coronavirus disease, they differ in the extent to which they are exposed to the pandemic. This creates different treatment intensities that can be exploited to

8 Details regarding permanence in these centres are available here: https://www.camera.it/leg17/561?appro=accoglienza_richiedenti_asilo.
identify Covid-19 effects. Specifically, I define regional exposure to Covid-19 on the basis of the degree to which the coronavirus pandemic hit Italian regions. Such an exposure is measured by the fraction of total Covid-19 cases registered in each region over the total population on a given day. The intuition is that the greater the fraction of Covid-19 cases a region experiences, the higher the expected impact on the regional redistribution of migrants.

Therefore, for a given level of regional exposure to Covid-19 the impact is estimated by comparing monthly changes in the regional distribution of migrants in more exposed regions to the monthly changes in less exposed ones, before and after the Covid-19 pandemic.

The DiD model estimated in this study is specified as follows:

\[ \text{migrants deviation}_m = \alpha + \gamma \text{Covid19Exposure}_r \times \text{Post}_m + f_r + f_m + u_{rm}, \] (1)

where \( \text{migrants deviation}_m \) is the relative deviation in the regional presence of migrants in month \( m \) with respect the monthly average value \( (\bar{m}) \). In other words, this variable captures the monthly deviation in the presence of migrants in all second-line reception centres experienced by a given region. It is calculated as

\[ \text{migrants deviation}_m = 100 \times \left( \frac{\text{migrants}_m - \text{migrants}_m}{\text{migrants}_m} \right). \]

\text{Covid19Exposure}_r is an indicator, measured on March 26th, that is meant to account for the degree of regional exposure to the coronavirus pandemic; \( \text{post}_m \) is a binary variable that is equal to one for February 2020 onwards, namely after the first case of Covid-19 was registered in Italy and as the virus spread throughout the country, and zero otherwise; \( f_r \) are regional fixed effects that control for unobserved heterogeneity in the presence of migrants between regions, \( f_m \) are monthly fixed effects that capture shocks common to every region; and \( u_{rm} \) is the error term, clustered at the regional level.\(^{9}\)

It is important to note at the outset that in this estimation framework, a negative sign of \( \gamma \) indicates a negative deviation in the presence of migrants with respect to the average in regions more affected by Covid-19, as compared to less-affected ones. Model (1), in fact, estimates the differential effect between regions with relatively high and relatively low exposure to the coronavirus pandemic.

A few more empirical choices merit further explanation. Although in this kind of econometric approach the treatment indicator is usually measured by using predetermined variables, with the aim of avoiding reverse-causality issues, I use an indicator

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\(^{9}\) It is worth noting that the \( \text{post} \) indicator also captures the lockdown restrictions that were put in place by the Italian government in response to the growing Covid-19 pandemic in the country. Along these lines, the first lockdowns were registered on February 21st, 2020, and covered eleven municipalities in the province of Lodi, in Lombardy, and one in the province of Padova (Veneto), affecting around 50,000 people (Law n. 6, 23 February 2020). As of March 8th, 2020, a second lockdown area covering the entire region of Lombardy and fourteen provinces in Piedmont, Veneto, Emilia-Romagna, and Marche was put in place (Law 8 March 2020), and finally, on March 10th, 2020, the quarantine measures were expanded to the entire country (Law 9 March 2020).

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of exposure computed in March 2020, in the middle of the pandemic event. I argue that it is very unlikely that the reallocation of migrants among regions, and thus the presence of migrants registered in all second-line reception centres, influences the regional degree of exposure to Covid-19. In other words, it is hard to believe that the inflow of migrants in Italy during February, March, and April could have had any impact of the number of coronavirus patients, for at least two reasons.

First, and as documented above, these people are welcomed in refugee centres where screening procedures related to the coronavirus have been taking place, as declared by the Ministry of the Interior in the communication notes of March and April related to prevention measures against the coronavirus in the migrant reception system.\footnote{For details, see https://www.interno.gov.it/it/notizie/misure-prevenzione-covid-19-nel-sistema-accoglienza-migranti.} Second, for migrants already present in the reception centres, the probability of meeting residents outside the centre is close to zero.

Nevertheless, to mitigate the potential concern of reverse causality, I gather daily information on migrant arrival numbers in Italy in March 2020. According to these figures, the arrivals of migrants were concentrated around three dates: March 12th, 22nd, and 27th. Therefore, in the main analysis I build the regional exposure indicator using the total number of Covid-19 cases registered in each region on March 26th: the day before one of the main arrival days and for which the distribution of Covid-19 across Italy is representative. In addition, I replicate the main results by changing the date used to compute the regional exposure to Covid-19. More precisely, I use figures from March 11th and 21st: the other two days before significant migrant arrivals. Moreover, I also build the exposure indicator by relying on the Covid-19 cases registered on February 24th: the first day for which data are available.\footnote{While it is true that data are available for February 24th, regional cases on this specific day are not very informative, as demonstrated by the fact that on February 24th only 229 cases were registered in Italy, with 15 regions out of 20 displaying 0 cases.}

One might argue that there could be regional cycles that explain the allocation, and thus the presence, of migrants. For this reason, an additional interaction of region-by-year fixed effects is taken into account in some further specifications.

\section*{4 Data}

The analysis is based on monthly data on the presence of migrants and refugee and asylum seekers in all second-level centres, aggregated at the regional level. These data are hand-collected from the Italian Ministry of Interior’s Department of Civil Liberties and Immigration.\footnote{For a full description of the data, see http://www.libertaciviliimmigrazione.dlci.interno.gov.it/it/documentazione/statistica/cruscotto-statistico-giornaliero.} This information is then complemented with daily data on the coronavirus emergency taken from the Civil Protection Department. Finally, I obtain a balanced panel sample of 20 regions, including 740 observations spanning...
from October 2017 to October 2020. The following sections describe in depth the different data sources and the definitions of the main indicators and variables.

4.1 Migrants

The Department of Civil Liberties and Immigration of the Italian Ministry of Interior provides information on the arrival of migrants in the structures managed by the Central Directorate of Civil Services for Immigration and Asylum. This information is organized in a statistical dashboard (one for each month) that includes data on the number of arrivals, the countries of origin, and presence at the regional level. While the dashboard is available from January 2017, data on the geographical distribution of immigrants is available only from October 2017 and is limited to the NUTS-2 level.

Our main variable of interest is the number of immigrants registered each month in all second-level centres for a given region. Figure 1 shows the evolution of the presence of migrants over the considered period. According to the figure, what emerges is a stable decrease in the presence of migrants, from approximately 200,000 units in October 2017 to around 81,000 units in October 2020.

Turning now to the geographical distribution of migrants, Fig. 2 depicts the monthly average presence of migrants in refugee centres across Italian regions and offers a glimpse into the variation in the presence of migrants across Italy. While some regions are characterized by a large number of migrants, such as Lombardy (17,612), Campania (11,727), and Lazio (11,224), in other regions their presence is very low (Basilicata, 1,683 and Valle d’Aosta, 214).

4.2 Covid-19

This study uses new data on the coronavirus emergency provided by the Civil Protection Department to construct a regional indicator of exposure to the Covid-19 pandemic. In particular, starting from February 24th the Civil Protection Department has provided daily information on the coronavirus emergency at the national, regional, and provincial level. This information includes data on the number of people (1) hospitalized with symptoms; (2) in intensive care; (3) in home isolation; (4)
testing positive for Covid-19; (5) discharged from the hospital; (6) recovered; (7) deceased due to the disease; and (8) the total Covid-19 cases.16

I use data on Covid-19 from March 26th, 2020, and build the indicator of regional exposure as follows:

$$\text{Covid19 exposure}_r = 100 \times \left( \frac{\text{total Covid19 cases}_{r, \text{March26}}}{\text{Population}_{r, \text{2019}}} \right),$$

where $\text{total Covid19 cases}_{r, \text{March26}}$ is the total number of Covid-19 cases registered in region $r$ on March 26th, 2020, and $\text{Population}$ is the population in that region on the 1st of January 2020, as certified by the Italian Statistical Office (ISTAT). As briefly mentioned in the previous section, the choice of March 26th, 2020, is driven by two reasons. First, March 26th corresponds to the day before one of the March waves of migrant arrivals. Second, this day represents an exhaustive and complete picture of the Covid-19 pandemic across Italian regions, thus limiting the risk of misrepresentation of the data. Along these lines, the use of earlier data—registered in February, for example—could lead to a biased representation of the exposure indicator. To give a measure of this, consider that if one used data registered on the 24th of February—the first available data—only 5 regions would be affected by the coronavirus, leading to a biased measure of the indicator of regional exposure.17

Figure 3 shows the regional exposure to the Covid-19 pandemic, and a visual inspection reveals significant heterogeneity across regions. According to the indicator, Lombardy (0.35%), Valle d’Aosta (0.32%), and Emilia Romagna (0.24%) were the regions most affected by the coronavirus, while Calabria, Campania, and Sicily seem to have been only modestly hit by the pandemic. The summary statistics for all the variables used in the analysis are reported in Table A1 of the Online Appendix.

5 Results

The first round of results is shown in Table 1. Each column corresponds to different specifications of Eq. (1). The baseline specification, which includes regional and time fixed effects, is reported in column (1). Column (2) includes estimates where observations are weighted according to the level of foreign population, as migrants are likely to be allocated to areas characterised by a larger share of foreign communities (Rudiger & Spencer, 2003). Column 3 factors in region-by-year fixed effects, which control for unobserved drivers of the presence of migrants not necessarily related to regions more exposed to Covid-19. Along these lines, the network (or diaspora) effect is likely to be one of these potential factors, as the reallocation of new migrants might be influenced by the presence of community networks. Relevant cycles in migration/allocation to second-phase centres are taken into account.

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16 Data are available here: https://github.com/pcm-dpc/COVID-19/tree/master/dati-regioni.
17 The main results remain unchanged when different days are used, as shown in Sect. 6.3.
in column 5, where region-by-quarter fixed effects are included. Finally, estimates considering all combinations of fixed effects are shown in column (6).

All models in Table 1 show a negative and statistically significant coefficient of the exposure to Covid-19×Post interaction. The point estimates range from −25.335 to −49.659. This implies that during the Covid-19 outbreak, the deviation from the mean in the presence of migrants registered in regions highly exposed to the pandemic is (negative) and larger than in those that were less exposed. The magnitude of the effect depends on the degree of exposure to the coronavirus. For instance, following the point estimates of column 2, the relative deviation of the
The presence of migrants is reduced by approximately 6 percentage points when considering a shift from Puglia, whose level of exposure is equal to the 25th percentile value (0.030%), to Liguria, whose exposure indicator represents the 75th percentile (0.165%).

![Fig. 3 Indicator of exposure to the Covid-19 pandemic on 26 March 2020](image)

### Table 1 Covid-19 and the reallocation of migrants

| Dep. variable: migrants deviation | (1) | (2) | (3) | (4) | (5) |
|----------------------------------|-----|-----|-----|-----|-----|
| Exposure to Covid-19 × Post      | −32.257* | −46.890*** | −25.335** | −49.659*** | −28.990*** |
|                                  | (15.636) | (14.884) | (9.838) | (15.049) | (9.750) |
| Observations                     | 740 | 740 | 740 | 740 | 740 |
| Region fixed effects             | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects              | Yes | Yes | Yes | Yes | Yes |
| Weights                          | No  | Yes | Yes | Yes | Yes |
| Region × Year fixed effects      | No  | No  | Yes | No  | Yes |
| Region × Quarter fixed effects   | No  | No  | No  | Yes | Yes |
| R-squared                        | 0.993 | 0.991 | 0.997 | 0.992 | 0.997 |

Exposure to Covid-19 is the share of Covid-19 cases registered in each region. Post is a binary variable that equals one for February 2020 onwards and 0 otherwise. Standard errors (in parentheses) are clustered at the regional level.

***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level

18 This effect is computed as follows: $-6.33 = [-46.890 \times (0.165 - 0.030)]$, and it is statistically significant at the 5% level.
Moreover, it is worth analysing whether such an effect is driven by a specific region, or instead, whether it can be generalized. To determine this, Fig. 4 provides a visual overview of the relevance of each region. Specifically, regions are dropped from the sample one at a time and point estimates of the baseline specification (Table 1, col. 1) are reported in Fig. 4. If a deviation from the main trend is observed, this signals that the specific dropped region plays a pivotal role in driving the estimates of the baseline specification. Reassuringly, the value of the impact is rather constant and does not seem to suffer from notable changes when single regions are excluded.

Finally, to provide a more direct interpretation of the previous results, I estimate Eq. (1) by adopting the number of migrants in all second-line reception centres as the dependent variable. Thus, in Table 2, I replicate the specifications in Table 1 but with the new dependent variable. Turning to our main results, I find that regions more exposed to the pandemic experienced a larger decrease in the reallocation of migrants as compared to regions less affected by the Covid-19 outbreak. The results hold independent of whether one controls for different combinations of fixed effects. The only exception is in column (1), where only region and month fixed effects are included. In this case, while the coefficient is negative it is not statistically significant. In terms of the magnitude of the results and following the point estimates of column (2), it turns out that the presence of migrants is reduced by approximately 381 units when considering Puglia, whose level of exposure is equal to the 25th percentile value (0.030%), and around 2148 units in Liguria, whose exposure indicator represents the 75th percentile (0.165%).

What of all this evidence seems to point to is that there is a different allocation of migrants in response to Covid-19 according to the degree of regional exposure to the pandemic. At the same time, however, it is important to recognize that data does not allow a further investigation of whether this effect is driven by a larger number
of migrants asking for asylum or, instead, by a different reallocation decided by the central government after the phase of first aid and assistance.

### 6 Robustness checks

In this section, the validity of the previous results is confirmed through a battery of robustness checks that are intended to address possible issues related to the research design that could bias the baseline estimates. First, a traditional event study is carried out. Then, several sensitivity checks are performed on alternative specifications of the regional exposure to Covid-19. Finally, some falsification tests are conducted.

#### 6.1 Event study

The existence of a common trend is the key identifying assumption for DiD estimates to be unbiased. In the framework of this analysis, the assumption implies that in the absence of the Covid-19 shock, regions more exposed to the pandemic would have experienced the same trends in their potential allocation of migrants as less exposed regions. While this is not testable, an event-study analysis can shed some light on the validity of the research design. Specifically, following Autor (2003) the interactions of the time dummies and the exposure indicator for pre-treatment

| Dep. variable: migrants (#) | (1) | (2) | (3) | (4) | (5) |
|-----------------------------|-----|-----|-----|-----|-----|
| Exposure to Covid-19 × Post | −3,996.638 | −12,976.529*** | −1,951.324** | −13,108.315*** | −1,479.925** |
| (7,015.940) | (4,152.927) | (782.924) | (4,144.815) | (526.771) |
| Observations | 740 | 740 | 740 | 740 | 740 |
| Region fixed effects | Yes | Yes | Yes | Yes | Yes |
| Month fixed effects | Yes | Yes | Yes | Yes | Yes |
| Weights | No | Yes | Yes | Yes | Yes |
| Region × year fixed effects | No | No | Yes | No | Yes |
| Region × quarter fixed effects | No | No | No | Yes | Yes |
| R-squared | 0.931 | 0.947 | 0.992 | 0.949 | 0.994 |

Exposure to Covid-19 is the share of Covid-19 cases registered in each region. Post is a binary variable that equals one for February 2020 onwards and 0 otherwise. Standard errors (in parentheses) are clustered at the regional level.

***Significant at the 1% level

**Significant at the 5% level

*Significant at the 10% level
periods are added to the baseline specification of Eq. (1). If the trends in the mean-deviation of migrants in more and less exposed groups are the same, then the interactions should not be statistically significant, i.e. the DiD coefficient is not significantly different in the pre-treatment period. An attractive feature of this test is that the interaction of the time dummies (up to one month) after the treatment with the exposure indicator is informative and can show whether the effect changes over time. The specification is estimated as

$$migrants\ deviation_{rm} = \alpha + \sum_{\pi=Oct2017}^{Dec2019} \gamma_\pi (Covid19\ Expoure_{r} \times month_\pi) + \sum_{\tau=Feb2020}^{October2020} \gamma_\tau (Covid19\ Expoure_{r} \times month_\tau) + f_r + f_m + u_{rm}$$

(2)

The omitted month is January 2020, coinciding with the period immediately preceding the first case of Covid-19, which in Italy was registered on February 21st. This specification allows testing for the presence of parallel trends in the pre-treatment period, namely, whether the coefficients associated with the lead ($\gamma_\pi$, with $\pi$ going from October 2017 to December 2019) are not statistically different from zero. As already anticipated, this approach is convenient for understanding whether the treatment effect fades, increases, or stays constant over time, depending on the estimated coefficients of the lags ($\gamma_\tau$, with $\tau$ going from February 2020 to October 2020).

The estimates and their 90% confidence intervals are plotted in Fig. 5. According to the point estimates, there is no difference in the mean-deviation of the regional presence of migrants in the pre-treatment period. In February, when the first case was registered, the difference remains not statistically significant (the Covid-19 case was registered at the end of the month), while the coefficient associated with the lag turns out to be negative and statistically significant at the 1% level in March ($-10.633$), the month coinciding with the beginning of the lockdown, and at the 10% level from April ($-13.057$) to June ($-13.486$), indicating that regions more exposed to Covid-19 experienced a significantly larger (negative) deviation in the presence of migrants as compared to regions less exposed to the coronavirus. It is also important to note that since July, when containment measures were strongly relaxed, and thus with a situation similar to the pre-pandemic period, the deviation turns out to be no longer statistically significant, thereby reinforcing the evidence that during the period of severe lockdown, regions more exposed to the pandemic indeed experienced a greater decline in the allocation of migrants.20

Taken together, these results seem to validate the research design, as there is no evidence against the presence of a common trend between treated and control units.

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19 Full estimates are shown in Table A2 of the Online Appendix.
20 See Barbieri and Bonnini (2021) for more details on institutional phases engaged by the government to tackle the spread of the virus.
6.2 Placebo test

A common way to conduct a placebo test in the context of DiD analysis is to focus on the span prior to the shock, that is, to simulate what would have happened to the deviation in the regional presence of migrants if a fake month of the Covid-19 event were used. Specifically, I replicate the main analysis by assuming that the Covid-19 outbreak occurred 3, 6, 9, or 12 months earlier than February 2020, over the period of October 2017–January 2020. That is to say, I create four Post dummy variables, one for each of the fake months of the coronavirus pandemic, and I interact them with the exposure indicator.\(^{21}\)

Were the coefficient associated with \(\text{Covid19Exposure} \times (\text{fake})\text{Post}_m\) negative and significant, it would suggest that before the true month of the Covid-19 outbreak more exposed regions were already experiencing a negative deviation from the mean in the regional presence of migrants as compared to less exposed ones, thus casting doubt on the validity of the previous results.

Despite the standard errors are quite similar in magnitude to the ones obtained in the baseline specification, the effect of the placebo exercise does not seem to lead to any effect on the deviation in the regional presence of migrants as the \(\gamma\) coefficient turns out to be not statistically significant at the conventional level in the specification that controls for regional and monthly fixed effects (Table 3, col. 1, 4, 7, and 10), in the specifications that weigh the observations with the foreign population (Table 3, col. 2, 5, 8, and 11), and also where region-by-quarter fixed effects are included (Table 3, col. 3, 6, 9, and 12).

6.3 Different exposure indicator

The results discussed so far have been based on the indicator of regional exposure using figures from March 2020, a period coinciding with the onset of Covid-19 in Italy. This could raise the concern that this indicator is influenced by the presence of migrants, which, in turn, could lead to a greater exposure to Covid-19. In other words, since the Covid-19 pandemic might have generated non-random allocation in the intensity of exposure across Italian regions, this indicator might suffer from reverse causality.

While Covid-19 can be considered a purely exogenous shock and, hence, it seems very unlikely that the regional presence of migrants has influenced the degree of exposure to the pandemic, and in light of the fact that migrants are hosted in centres where screening procedures related to coronavirus take place, there are some ways to mitigate this potential concern.

To begin with, recall that in all estimations the exposure indicator is built by relying on Covid-19 cases on March 26th, the day before one of the major migrant

\(^{21}\) It follows that the variable \((\text{fake})\text{Post}\) is equal to one i) from December 2019 onwards and zero otherwise in the first specification; ii) from September 2019 onwards and zero otherwise in the second specification; iii) from June 2019 onwards and zero otherwise in the third specification; and iv) from March 2019 onwards and zero otherwise in the final specification.
arrival days in March 2020. In this respect, the endogeneity issue should be mitigated as the exposure indicator cannot be influenced by the wave of migrants on March 27th. In addition, I also exploit three other crucial moments that might lead to biased estimates. In particular, I use the other two dates in March on which significant arrivals of migrants were registered, March 12th and 22nd 2020, and I build the regional exposure indicator using the number of Covid-19 cases registered in Italian regions the day before these arrivals, namely, the 11th and 21st of March. Clearly, if the definition of more/less exposed regions were undermined by a reverse-causality type of issue, I would observe a path of results not in line with that obtained with the treatment indicator based on March 26th.

The results of this analysis are reported in Table 4 and indicate that the coefficient of interest is negative and statistically significant in all specifications. As for the size of the coefficients, however, it turns out to be larger the more earlier data are used to build the exposure indicator. The reason of such large coefficients is that the ranking of Italian regions based on the ‘exposure’ to Covid-19 observed on March 26th predicts the real intensity with which the pandemic hit regions, which can be reasonably proxied by the number of cases observed during the peak of the first wave of the pandemic (April 22nd). It then follows that using March 26th or April 22nd yields very similar conclusions, as the ranking is virtually the same. In contrast, using an earlier date to determine the exposure indicator might be less precise, as the ranking determined with a date registered distant in time might be very different with respect to the real one. Put it differently, the point estimates turn out to be more precisely

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22 The number of daily arrivals of migrants registered in March 2020 can be found here: http://www.libertacivilimmigrazione.dlci.interno.gov.it/sites/default/files/allegati/cruscotto_statistico_giornaliero_31-03-2020_0.pdf.
Table 3  Covid-19 and the reallocation of migrants—placebo analysis

| Dep. Variable: Migrants deviation | (1)     | (2)     | (3)     | (4)     | (5)     | (6)     | (7)     | (8)     | (9)     | (10)    | (11)    | (12)    |
|----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Exposure to Covid19×(fake)       |         |         |         |         |         |         |         |         |         |         |         |         |
| Post (3 months earlier)          | − 24.061(14.612) | − 30.854(16.894) | − 29.213(17.570) |         |         |         |         |         |         |         |         |         |
| Exposure to Covid19×(fake)       |         |         |         |         |         |         |         |         |         |         |         |         |
| Post (6 months earlier)          |         |         |         |         |         |         |         |         |         |         |         |         |
| Exposure to Covid19×(fake)       |         |         |         |         |         |         |         |         |         |         |         |         |
| Post (9 months earlier)          |         |         |         |         |         |         |         |         |         |         |         |         |
| Exposure to Covid19×(fake)       |         |         |         |         |         |         |         |         |         |         |         |         |
| Post (12 months earlier)         |         |         |         |         |         |         |         |         |         |         |         |         |
| Observations                     | 560     | 560     | 560     | 560     | 560     | 560     | 560     | 560     | 560     | 560     | 560     | 560     |
| Region fixed effects             | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     |
| Month fixed effects              | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     | Yes     |
| Weights                          | No      | Yes     | Yes     | No      | Yes     | No      | Yes     | Yes     | No      | Yes     | Yes     | Yes     |
| Region×quarter fixed effects     | No      | No      | Yes     | No      | No      | Yes     | No      | No      | Yes     | No      | Yes     | Yes     |
| R-squared                        | 0.994   | 0.993   | 0.993   | 0.994   | 0.993   | 0.993   | 0.994   | 0.993   | 0.993   | 0.994   | 0.993   | 0.993   |

Exposure to Covid-19 is the share of Covid-19 cases registered in each region. Standard errors (in parentheses) are clustered at the regional level.

***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level
**Table 4** Covid-19 and the reallocation of migrants—falsification exercise

| Dep. Variable: Migrants deviation | (1)       | (2)       | (3)       | (4)       | (5)       | (6)       |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Exposure to Covid19 (March 11) × Post | − 188.442*** | − 188.627*** | − 201.135*** | − 43.207* | − 63.083*** | − 66.780*** |
|                                   | (65.440)  | (61.084)  | (61.959)  | (21.022)  | (19.495)  | (19.778)  |
| Exposure to Covid19 (March 21) × Post | − 43.207* | − 63.083*** | − 66.780*** |           |           |           |
| Observations                     | 740       | 740       | 740       | 740       | 740       | 740       |
| Region fixed effects             | Yes       | Yes       | Yes       | Yes       | Yes       | Yes       |
| Month fixed effects              | Yes       | Yes       | Yes       | Yes       | Yes       | Yes       |
| Weights                          | No        | Yes       | Yes       | No        | Yes       | Yes       |
| Region × quarter fixed effects   | No        | No        | Yes       | No        | No        | Yes       |
| R-squared                        | 0.994     | 0.993     | 0.993     | 0.994     | 0.993     | 0.993     |

Exposure to Covid-19 is the share of Covid-19 cases registered in each region. Post is a binary variable equal to one for February 2020 onwards and 0 otherwise. Standard errors (in parentheses) are clustered at the regional level.

***Significant at the 1% level
**Significant at the 5% level
*Significant at the 10% level
estimated (and smaller) the more the distribution of the exposure to the Covid-19 resembles the real one, measured, for example, on the peak day of the first wave of the pandemic.23

To sum up, the analyses carried out in this section strengthen the evidence of a negative relationship between Covid-19 and the presence of migrants in regions more exposed to the pandemic event, as compared to those that were less exposed. In addition, the results indicate that it is very likely that such an effect is due to the shock caused by Covid-19, as no other plausible explanations that clearly hold as an argument against a causal interpretation of this relationship are found.

7 Discussion

So far, it has been shown that the pandemic event led to an unusual distribution/allocation of migrants across regions by the central government, but the underlying mechanism behind these results is not yet clear. A seemingly obvious candidate is the trade-off between spending on immigration and on health, as the change in the reallocation of migrants is likely to influence the allocation of central government spending at the regional level. While information on the exact amount of government and regional spending in 2020 devoted to migrants and health is not available yet, back-of-the-envelope calculations might shed some light on the extent to which the decline in immigrant inflows affects the expenditure of regions on immigration and health.

More precisely, I gather data from the State General Accounting Department on the amount spent by the central Government in 2019 for second-level migration and refugee centre functions in each Italian region (col. 1 in Table 5), and then I obtain a regional measure of per-migrant spending on migrants, dividing the total amount of spending on migrants, refugees, and asylum seekers by the (average) number of immigrants registered in 2019 in all second-level centres (col. 2 in Table 5). In this way, it is possible to create a regional proxy of the annual average ‘cost’ of a migrant in a second-level centre (col. 3 in Table 5).

Furthermore, I use estimates of \( \gamma \) obtained in Table 2 to compute the deviation of the presence of migrants in absolute terms. Along these lines, for example, following the point estimates of column 2 the presence of migrants is reduced by 381 units when considering Puglia, whose level of exposure is equal to the 25th percentile value (0.030%), and of 2148 units in Liguria, whose exposure indicator represents

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23 I also complement this set of robustness tests by considering the 24rd of February, that is, the first day for which data on Covid-19 is available, to construct my exposure indicator. Results are shown in Table A3 of the Online Appendix. While the results are consistent with those of the baseline specification, the coefficients are very large in magnitude. Nevertheless, it is worth noting that the use of this data for building the exposure indicator might not be very representative of Covid-19 exposure as on this day only 229 cases were registered in Italy, with 15 regions displaying zero cases. Along these lines, the use of earlier data to determine the exposure indicator is likely to produce less precise estimates, as also pointed out by Rajan and Zingales (1998), who pioneered this approach.
Table 5  Estimated savings from spending on immigration and real transfers for health provisions for Covid-19: a simulation

| Region    | Spending on immigration and the reception of refugees (2019, millions) | (Average) Immigrants in refugee centres (2019) | Per-migrant spending on immigration and the reception of refugees | Government reallocation of migrants induced by Covid-19 (#) | Estimated savings (millions) | Covid-19 healthcare-related transfers (2020, millions) |
|-----------|-----------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------|----------------------------|--------------------------------------------------|
| Abruzzo   | 69                                                                    | 2189                                          | 31,379                                                       | − 936                                                    | 29                         | 54                                               |
| Basilicata| 37                                                                    | 1642                                          | 22,270                                                       | − 309                                                    | 7                          | 42                                               |
| Calabria  | 118                                                                   | 4392                                          | 26,898                                                       | − 262                                                    | 7                          | 76                                               |
| Campania  | 219                                                                   | 9197                                          | 23,789                                                       | − 293                                                    | 7                          | 179                                              |
| Emilia    | 196                                                                   | 10,205                                        | 19,165                                                       | − 3147                                                   | 60                         | 145                                              |
| Friuli    | 73                                                                    | 3468                                          | 21,065                                                       | − 1306                                                   | 28                         | 53                                               |
| Lazio     | 359                                                                   | 9790                                          | 36,687                                                       | − 463                                                    | 17                         | 199                                              |
| Liguria   | 92                                                                    | 4177                                          | 21,949                                                       | − 2148                                                   | 47                         | 53                                               |
| Lombardy  | 319                                                                   | 15,182                                        | 20,984                                                       | − 4500                                                   | 94                         | 297                                              |
| Marche    | 83                                                                    | 2922                                          | 28,416                                                       | − 2649                                                   | 75                         | 59                                               |
| Molise    | 33                                                                    | 1557                                          | 21,035                                                       | − 437                                                    | 9                          | 16                                               |
| Piedmont  | 217                                                                   | 9521                                          | 22,741                                                       | − 1946                                                   | 44                         | 140                                              |
| Puglia    | 163                                                                   | 5481                                          | 29,759                                                       | − 381                                                    | 11                         | 139                                              |
| Sardinia  | 60                                                                    | 1918                                          | 31,145                                                       | − 391                                                    | 12                         | 473                                              |
| Sicily    | 249                                                                   | 7940                                          | 31,403                                                       | − 302                                                    | 9                          | 780                                              |
| Tuscany   | 184                                                                   | 7670                                          | 24,011                                                       | − 1122                                                   | 27                         | 133                                              |
| Trentino  | 45                                                                    | 2466                                          | 18,099                                                       | − 2666                                                   | 48                         | 725                                              |
| Umbria    | 54                                                                    | 1818                                          | 29,492                                                       | − 1180                                                   | 35                         | 33                                               |
| Valle d’Aosta | 6                   | 200                                          | 30,391                                                       | − 4213                                                   | 128                        | 84                                               |
| Veneto    | 164                                                                   | 7375                                          | 22,198                                                       | − 1834                                                   | 41                         | 135                                              |
| Italy     | 2,737                                                                | 109,108                                       |                                                              |                                                          | 430                        |                                                   |

Figures in col. (4) are obtained by using point estimates of col. (2) in Table 4, $\gamma$, and multiplying these by the corresponding level of exposure to Covid-19 in each region. Col. (5) is obtained by multiplying the per capita spending on immigration and reception of refugee (col. 3) with the absolute value of col. (4)
the 75th percentile (0.165%). I replicate this approach for every region, and I report these estimates in column 4 of Table 5.24

At this point, the potential savings on migrant, refugee, and asylum seeker spending can be computed for every region by taking the ‘cost’ of each migrant (col. 3) and multiplying it with the estimated decline in immigrant inflows (col. 4). Following this approach, it turns out that for regions severely exposed to the first wave of the pandemic savings represent a non-negligible amount of financial resources (col. 5). This can be seen by considering a region such as Marche, Emilia Romagna, or Lombardy, which had a level of exposure to the pandemic above the 75th percentile value. Then, the reallocation of migrants implies a potential savings in the range of 60–94 million euros, corresponding to about a 30–90% reduction relative to the spending on migrants, refugees, and asylum seekers registered in these regions in 2019. Consider now a region that has not been severely hit by the Covid-19 outbreak (for instance, Calabria, Campania, or Sicily). In this case, the reallocation of migrants to second-phase centres implies a decrease in the level of expenditure for this function of approximately 7–9 million euros, an amount corresponding to roughly 3–6% of the 2019 expenditure for migrants, refugees, and asylum seekers recorded in these regions.

Finally, to capture a possible trade-off between spending on immigration and on health, I collect information on the actual amount of funding that was made available to Italian regions for healthcare related to the first wave of the Covid-19 crisis, and I report these amounts in column (6) of Table 5.25 While regions more affected by the pandemic can rely on more resources from both potential savings from spending on migration issues and health transfers targeted at tackling the pandemic, it is interesting to note that these two elements—savings from spending on immigration and additional resources on health—seem to be substitutes for each other. Along these lines, Fig. 6 shows the relationship between the potential savings on migrant, refugee, and asylum seeker spending obtained by the reallocation of migrants and the additional resources granted to regions for healthcare provisions related to the

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24 To strengthen the analysis I also checked whether the decrease in the number of migrants allocated to more exposed regions was matched by a (relative) increase in the number of migrants allocated to less exposed ones. In doing so, I plot the change in the regional number of migrants before and after February 2020 against the indicator of the regional exposure to the coronavirus pandemic. As it is shown in Figure A1 of the Online Appendix, lower values of exposure to Covid-19 are associated with positive (or slightly negative) values of the change, before and after the pandemic, in the number of migrants allocated by the central government in second-line centres. Conversely, large (in absolute terms) negative values are associated with an increase of the exposure indicator, thus suggesting that – if anything – migrants seem to have been re-allocated from less to more exposed regions during the first wave of the pandemic.

25 The amount of additional resources linked to the Covid-19 outbreak assigned by the central government to regions was determined by the Sate-Region Conference of 20 July 2020 and was equal to 4.3 billion euros. As for regions ruled by ordinary status, the allocation of financial resources was deliberated with Act no. 114 (https://www.statoregioni.it/it/conferenza-stato-regioni/sedute-2020/seduta-del-20072020/atti/repertorio-atto-n-114csr/), while for regions ruled by special status, see Act no. 115 (https://www.statoregioni.it/it/conferenza-stato-regioni/sedute-2020/seduta-del-20072020/atti/repertorio-atto-n-115csr/).
Covid-19 outbreak. Although purely descriptive, the figure indicates that greater savings are associated with a lower amount of health transfers.

Strikingly, what emerges therefore is that savings due to the decline in spending on migrants, refugees, and asylum seekers induced by the central reallocation of migrants in regions more affected by the Covid-19 outbreak have been (at least partially) offset by a lower than expected amount of financial resources transferred from the central government to regions targeted at healthcare provisions to tackle the pandemic.

8 Conclusion

This paper presents first-hand evidence of the impact of Covid-19 on the presence of migrants across Italian regions. Specifically, I exploit the fact the regions have been differently affected by Covid-19, thus allowing a regional level-of-exposure indicator to be built. Following a difference-in-differences research design, the evidence suggests that regions more exposed to the pandemic experienced a significant decrease in the presence of migrants in the regional second-line reception system during the period of February–October 2020, as compared to those regions less affected by the coronavirus. The main results are robust to a large battery of sensitivity checks, such as a placebo analysis and leads and lags à la Autor, among others.

Back-of-the-envelope calculations based on estimates suggest that the reallocation of migrants in regions more exposed to the pandemic implies potential savings in the range of 60–94 million euros, corresponding to about a 30–90% reduction in spending on migrant, refugee, and asylum seeker functions registered in these regions. In contrast, for regions less exposed to the Covid-19 outbreak the reduction is of roughly 3–6%. Moreover, I document that these savings have been (at least partially) offset by a lower than expected amount of financial resources transferred from the central government to regions targeting healthcare provisions to tackle the pandemic.

While these findings may help shed light on the impact of the regional reallocation of migrants on the composition of public spending induced by the pandemic, they also have some limitations that should be outlined. To begin with, the paper focuses on decisions regarding the reallocation of migrants taken by the central government to tackle the first wave of the pandemic, without considering how and to what extent the regional allocation of migrants reflects migrants’ own location choices. A second limitation concerns the type of migrants considered in the paper. Along these lines, the analysis rests on migrants in second-line reception centres who, after the first-aid phase, are neither repatriated nor reallocated to third countries. It is thus possible that these results would differ if other types of migrants, such as illegal ones, were taken into account. In a similar vein, while second-line centres are usually located in a limited number of sub-regional areas and the diffusion of the pandemic has shown marked heterogeneity within regions, this paper employs a regional scale of analysis. Hence, findings based on a local scale might lead to different conclusions. Finally, the reallocation of foreign citizens who migrated within Italy before the pandemic represent another interesting strand of
research since, for example, many foreign workers lost their temporary jobs due to the lockdown and had to move to look for work elsewhere. This, in turn, leaves room for future research to analyse how internal migration has been affected by the Covid-19 outbreak.

Despite these limitations, the results of this paper represent first-hand evidence of how the pandemic has shaped not only the reallocation of migrants but also the composition of public spending.

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