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THE LEGACY OF THE COVID-19 PANDEMIC ON RESIDENTIAL MOBILITY IN MAJOR SPANISH CITIES: SPATIAL AND SOCIOECONOMIC PATTERNS

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EL LEGADO DE LA PANDEMIA DE COVID-19 SOBRE LA MOVILIDAD RESIDENCIAL EN LAS PRINCIPALES CIUDADES ESPAÑOLAS: PATRONES ESPACIALES Y SOCIOECONÓMICOS.

RESUMEN. El estallido de la pandemia de la COVID-19 suscitó interrogantes sobre posibles cambios en los determinantes de la movilidad residencial, al tiempo que se planteaba una crisis de los entornos urbanos más densos y poblados. Algunos trabajos han constatado efectos reseñables en los primeros meses de la pandemia, aunque en general no fueron lo suficientemente intensos como para provocar cambios profundos en los sistemas residenciales.

Esta investigación se propone profundizar en aspectos que no han sido abordados todavía en el contexto de las ciudades españolas: (i) nos centramos en los municipios centrales, que fueron objeto de especulaciones sobre una posible migración masiva hacia áreas rurales; (ii) ampliamos el periodo de análisis hasta el año 2022, el tercer año desde el inicio de la pandemia; (iii) incorporamos la dimensión socioeconómica, lo que nos permite examinar los cambios en los perfiles de las personas que cambiaron de residencia; y (iv) consideramos los traslados dentro de las ciudades centrales, un aspecto crucial para validar, o no, la hipótesis del éxodo urbano.

Al abordar estos aspectos, delineamos el legado y las implicaciones futuras de la pandemia en términos de movilidad residencial y su relación con los procesos de reconfiguración socio-espacial en áreas urbanas. Tras dos años con algunos cambios respecto a la pre-pandemia, en 2022, las pautas de movilidad residencial tendieron a converger con las observadas previamente en la mayor parte de las dinámicas. Sin embargo, un cambio reseñable ha sido el refuerzo de los movimientos de salida de las ciudades entre los grupos socioeconómicamente más aventajados.

Palabras clave: movilidad residencial, migración interna, Covid-19, éxodo urbano, ciudades españolas, gradiente educativo

ABSTRACT. The outbreak of the COVID-19 pandemic raised concerns about possible shifts in the determinants of residential mobility and the potential for a crisis in densely populated urban settings. Some studies have noted significant effects in the early months following the outbreak, though generally not intense enough to induce profound changes in residential systems.

This research aims to explore aspects not yet addressed in the context of Spanish urban areas: (i) we focus on central municipalities, which were subject to speculation regarding a possible mass migration to rural areas; (ii) we extend the period of analysis until 2022, marking the third year since the pandemic's onset; (iii) we incorporate a socioeconomic dimension, enabling us to examine changes in the profiles of individuals who changed residence after the pandemic; and (iv) we consider intra-city moves, a critical aspect for validating (or invalidating) the urban exodus hypothesis.

By addressing these aspects, we outline the legacy and future implications of the pandemic in terms of residential mobility and its interplay with the socio-spatial reconfiguration of urban areas. After two years with some observable changes compared to the pre-pandemic period, by 2022, residential mobility patterns aligned with pre-pandemic tendencies in most dynamics. However, a significant change has been the reinforcement of movements away from urban cores among the most socioeconomically advantaged groups.

Keywords: residential mobility, internal migration, COVID-19, urban exodus, Spanish cities, educational gradient

1. INTRODUCTION

The onset of the COVID-19 pandemic in early 2020 drove significant scholarly interest on its potential implications for human mobility and territorial dynamics across various scales. Initial inquiries often focused on the question of whether residential mobility determinants and internal migration would shift due to the pandemic, potentially resulting in the transformation of territorial patterns. The pandemic's pronounced effects on urban areas, coupled with mobility constraints, a heightened desire for improved residential and environmental conditions, and the widespread shift toward remote and hybrid work, likely engendered new residential needs and preferences. This assumption initially drove hypotheses, greatly amplified by news media internationally, predicting a population shift from densely populated urban areas to more sparsely populated locations in metropolitan outskirts, peri-urban, or even rural, areas. In contrast, social scientists tempered expectations of a widespread urban exodus, since residential decisions are influenced by a complex interplay of factors including life course, proximate family and social ties, concentration of employment opportunities, lifestyle choices, and the challenges of housing access (cost, availability, etc.). Furthermore, scholars have highlighted the difficulty of substantially altering established territorial, infrastructural, and residential patterns of urbanization—and the infrastructures that undergird them—which have unfolded over decades or centuries.

Various Spanish and international case studies have documented how residential and migratory behavior have somewhat shifted because of the pandemic. However, important gaps remain in the literature. Focusing on the Spanish context, we identify four key areas lacking substantial empirical evidence, serving as the focal points and analytical axes of our investigation:

1. We focus our analysis on central city dynamics, since many initial hypotheses of the pandemic's impact were directed toward the most densely populated urban areas, namely metropolitan centers. Meanwhile, quantitative data regarding the experiences of major Spanish cities throughout the pandemic remain scarce.
2. Our analysis extends the temporal scope to include the year 2022, thus encompassing what happened during the third year of the pandemic; this update is crucial for identifying potentially enduring changes. To date, most international studies have only explored the first two years of the pandemic. It is also the case that, in Spain, the interrupted publication of the 2021 Spanish Register of Residential Change (INE) limited the extension of the analytical timeframe.
3. We introduce a socioeconomic dimension to the study of mobility and immobility during the pandemic years. While this aspect has been hypothesized to explain mobility variations, quantitative analysis has been absent in Spain, largely due to the lack of relevant variables in the Spanish Register of Residential Change.
4. We include residential relocations occurring within major cities, recognizing that most relocations taking place in Spanish metropolitan centers occur within the same municipality. For this reason, it is imperative to incorporate an intra-municipal perspective—absent from the Spanish Register of Residential Change—to discern whether there was a greater tendency for residents to flee urban cores during the pandemic.

To explore these aspects in more depth, this study evaluates the impacts of the pandemic on residential dynamics in the three years following COVID-19's outbreak. It focuses on residential dynamics of six Spanish

municipalities with populations exceeding 500,000: Madrid, Barcelona, Valencia, Seville, Zaragoza, and Malaga. Our analysis utilizes data from three principal sources: the Spanish Register of Residential Change (2018-2021), the 2021 Population Census, and the Municipal Registers of Dwelling Changes in Madrid and Barcelona (2018-2022).

The structure of this paper is as follows: we begin by reviewing relevant national and international literature on the topic of COVID-19 and residential mobility. We then detail the characteristics of the consulted data sources. The findings section presents the dynamics observed in the aforementioned central cities during the 2018-2021 period, followed by an in-depth examination of Madrid and Barcelona up to 2022. The discussion section synthesizes the trends we have observed and situates our findings within currently existing literature. Finally, the conclusions highlight the pandemic's potential long-term effects on residential behavior and its socio-territorial implications for the short- and medium-term.

2. THEORETICAL BACKGROUND

On March 14, 2020, the Government of Spain declared a state of alarm across its territory due to the spread of the SARS-CoV-2 coronavirus. The first cases in Europe, including Spain, were confirmed in January 2020, following its emergence in China at the end of 2019 (Melin et al., 2020). Spain was among the countries worldwide where the virus spread most intensely and rapidly during initial weeks. Consequently, this led to the extension of the state of alarm, implementing very strict—albeit gradually more flexible—lockdown measures until June 21st (Pollán et al., 2020). Spain's major urban centers reached the highest levels of transmission (Pollán et al., 2020), especially in denser, neighborhoods with aging populations and lower income levels (López-Gay et al., 2021). After summer 2020, various waves of virus transmission occurred across diverse geographies throughout Spain. In the fall of 2020, a new state of emergency was decreed, including various actions aimed at restricting mobility, managed by regional governments. Measures such as curfews or perimeter lockdowns prevailed, restricting mobility between areas to those individuals who could not demonstrate a residential or employment link with other regions or municipalities. Although various waves of infection followed until 2022, mobility restriction measures were scaled back by the beginning of 2021 (Martínez-Beneito et al., 2023).

Shortly after the pandemic outbreak, hypotheses were formulated by scholars and the media about a potential change in residential mobility and internal migration behaviors, mainly as a consequence of the restrictions on mobility, the desire to improve housing and environmental conditions, the expansion of remote work, and the strong impact of the pandemic in urban areas (Rowe et al., 2023). This echoed longstanding speculations on the geographical transformations driven by remote work, or “telecommuting,” in which telecommunications might allow for the decentralization of work, challenging the traditional centrality of cities and creating more diffuse spatial organization of economic activities and residential choices, while potentially driving new forms of inequality (Hanson, 1998).

Initially, despite the evident lack of data on the population's residential movements, it was primarily the news media that announced the existence of a potential urban exodus, both in Spain and abroad (Gazengel, 2020; Marsh, 2020). Academic literature pointed to the emergence of specific residential needs and preferences that could differ from the triggers of residential mobility prior to the pandemic (Duque et al., 2021), but the scholarly discourse on urban exodus was much more tempered, often including arguments against sensationalist hypotheses predicting the end of urban centers (Rowe et al., 2023).

From the second half of 2021, data, usually from official population registers, became available, facilitating the first quantitative analyses of migration flows in various countries. Notable studies focused on France (Breuillé et al., 2022), Germany (Stawarz et al., 2022), Sweden (Vogiazides and Kawalerowicz, 2023), United Kingdom (Rowe et al., 2022), Japan (Fielding and Ishikawa, 2021; Kotsubo and Nakaya, 2023) and Australia (Borsellino et al., 2022; Perales and Bernard, 2022). These studies generally observed a reduction in internal migrations during 2020, primarily due to the pandemic's peak months and the resulting restrictions. The decrease in migration intensity from 2019 to 2020 varied, with reductions noted in Australia (8.8%), Germany (5%), and Japan (4%).

Notably, not all movement types were equally affected by the pandemic. Case studies consistently revealed significant shifts in spatial movement patterns during the pandemic's first year, including an increase in flows from more to less densely populated areas, within both metropolitan regions (suburbanizing movements) and toward rural areas (counterurbanizing flows) (Breuillé et al., 2022; Rowe et al., 2022;

Vogiazides and Kawalerowicz, 2023). Conversely, a significant reduction in movements towards large metropolitan centers was observed (Borsellino et al., 2022; Stawarz et al., 2022). As a result, urban centers registered significant population losses (Fielding and Ishikawa, 2021), a trend that had been intensifying in pre-pandemic years (Stawarz et al., 2022; Vogiazides and Kawalerowicz, 2023).

The nature of the data used in most studies addressing post-pandemic residential and migratory patterns has limited the analysis of the demographic and socioeconomic characteristics of post-pandemic internal migration. The results of investigations addressing this issue have not revealed points of convergence as they have in spatial patterns. While in Sweden, no significant changes were observed in the profile of people who changed home in 2020 compared to the years before the pandemic (Vogiazides and Kawalerowicz, 2023), in Germany, greater immobility among young adults was identified (Stawarz et al., 2022). In Australia, lower mobility was identified among the more educated population, which was linked to lessened labor mobility in 2020 (Perales and Bernard, 2022). In contrast, in the United States, a notable increase in interest in buying or renting houses after the first months of the pandemic was registered, potentially driven by the more privileged population (Lei and Liu, 2022). At the same time, a qualitative investigation conducted in six cities worldwide found that the pandemic led to involuntary immobility among lower-income respondents, who could not fulfill their residential and migratory aspirations (Jolivet et al., 2023). In this regard, there is a broad consensus on the challenges faced by the most disadvantaged social groups during the pandemic (Lambert and Cayouette-Remblière, 2021; Le Roux et al., 2023).

In Spain, like other international case studies, research focused on spatial migration patterns during the pandemic's first year, with less evidence analyzed for 2021 and none for 2022. Generally, the 2020 trends aligned with international observations, showing a pronounced negative migratory balance in large metropolitan centers, driven by a decline in arrivals and a slight increase in departures (González-Leonardo et al., 2022a). This increase in departures was primarily due to counter-urbanizing movements, significantly influenced by second homes and a certain surge in rural areas (Del Romero-Renau and Arroyo, 2022; Gómez et al., 2023). These types of flows, despite decreasing compared to 2020, continued to be higher than pre-pandemic levels in 2021. These trans-

formations, though comparable to international cases, did not substantially alter the pre-pandemic residential and internal migration model (González-Leonardo et al., 2022b). Nonetheless, although these changes have not been profound in numerical terms, there appears to be a certain shift of the residential preferences among a portion of the population and a redefinition of the boundaries of metropolitan areas (Duque-Calvache et al., 2024).

The studies that have addressed the Spanish case have relied on data from the Register of Residential Change, which have the significant limitation of not providing data on socioeconomic characteristics of the population nor including intra-municipal changes of residence. While remote work and second homes were hypothesized to influence counterurbanizing movements (González-Leonardo et al., 2022a; Duque-Calvache et al., 2024), conclusive evidence remains elusive, and the continuity or change in 2022 remains unexplored. This work aims to address these gaps.

3. METHODOLOGY

This study explores the impact of COVID-19 on residential and migratory behaviors with a focus on Spain's most populated urban centers, drawing upon three key data sources. Two of these sources capture data on residential relocations crossing municipal boundaries: the Register of Residential Change and the 2021 Population Census. Drawing upon these databases, we examine relocation patterns to and from Spain's six largest municipalities (Madrid, Barcelona, Valencia, Seville, Zaragoza and Malaga), which correspond to the cores and most densely populated areas of their respective metropolitan regions. The third source, the Municipal Register of Dwelling Changes of Madrid and Barcelona, allows us to incorporate the analysis of residential relocation within the boundaries of these two municipalities. In what follows, we elaborate the key characteristics of each source and considerations pertinent to our research:

- The Register of Residential Change ('Estadística de Variaciones Residenciales'): Disseminated by the National Institute of Statistics (INE) and derived from the Population Register, this dataset tracks housing changes across municipal borders in Spain, detailing the sex, age, place of birth, and nationality of individuals, as well as the municipalities of origin and destination. The most up-to-date data available from this source correspond

to 2021, following the INE's decision to suspend its publication and replace it with the Statistics of Migrations and Changes of Residence, first released in December 2023 and covering only 2021 and 2022. This paper primarily utilizes the 2018-2021 dataset for the selected municipalities, occasionally referencing the 1998-2021 series to contextualize pandemic-related changes.

- **Municipal Registers of Dwelling Changes:** These databases resolve key limitations of the INE's Register of Residential Change, since they also include residential movements occurring within municipalities (which constitute the majority of housing changes), provides detailed geographic information at the neighborhood scale, and includes the educational level of individuals at the time of their change of address, providing an opportunity for socioeconomic analysis of residential mobility. These Municipal Register data cover the period up to 2022. Given their nature as data that are not publicly available, these sources have been scarcely used in Spain. We are unaware of any scientific publications utilizing these data to assess the pandemic's impact on residential behavior in the country. Data for Madrid and Barcelona, provided by their city councils, focus on the 2018-2022 period.
- **2021 Population Census:** Unlike the aforementioned databases that register residential flows, the census identifies individuals who relocated following the pandemic's outbreak, allowing for an in-depth examination of their socioeconomic characteristics. However, its reference date was January 1, 2021, only enabling analysis of residential and migratory behaviors in the pandemic's first year. Due to the unavailability of the microdata file at the time of this study, we utilized aggregated data tables with various filters. For each of the six municipalities studied, we selected individuals who changed residences from January 1, 2018, to December 31, 2020, whose last municipality of residence was one of the six under analysis. We then compared four socioeconomic variables for individuals who arrived in their current municipality of residence in 2020 against those who arrived between 2018 and 2019: level of education, employment status (active/inactive), type of occupation, and housing size (m^2).

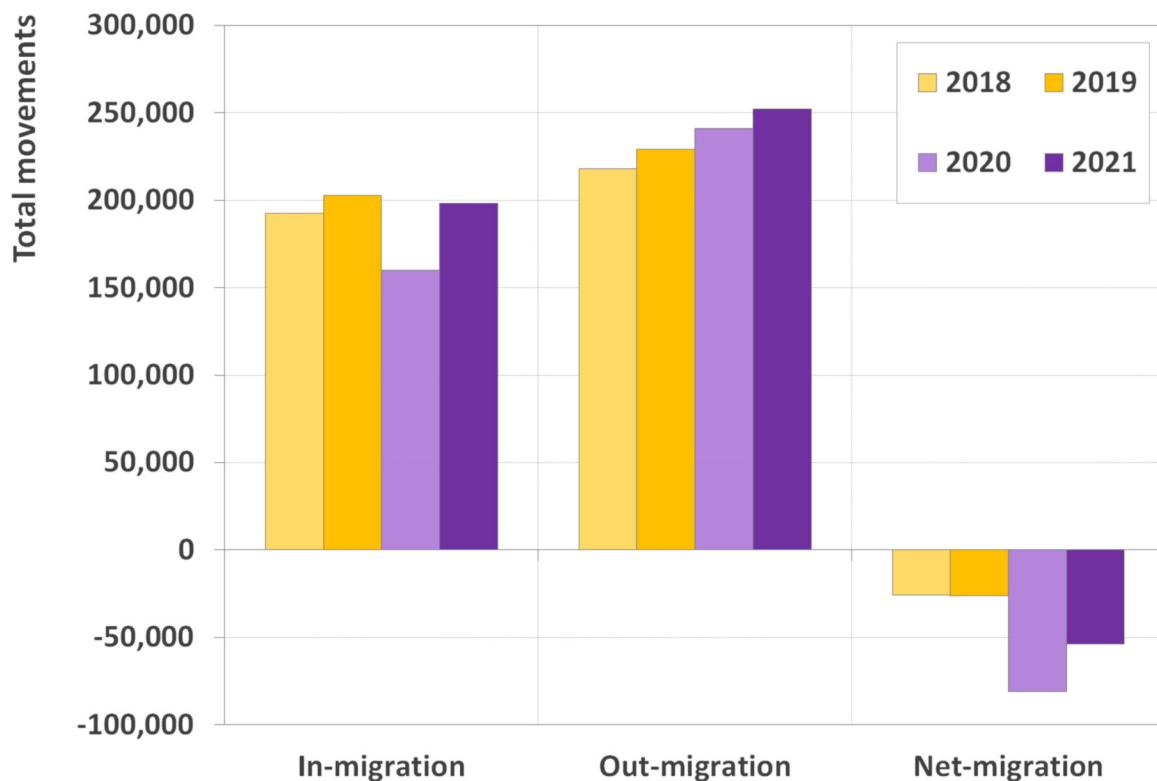
In this comparative analysis we must acknowledge certain limitations: it cannot identify individuals who

left these municipalities during the analysis period if they moved multiple times, nor can it equate the experiences of individuals relocating at the end of the period to those who arrived at the beginning. For example, someone arriving in a municipality in 2018 had more opportunity to change their employment status, occupation, or housing size than someone arriving in 2020.

Most of our findings are descriptive in nature. However, we include an ecological approximation, by means of bivariate correlations and linear regression models, to explain the variation in emigration rates from the central municipalities of Madrid and Barcelona in the two post-pandemic years, compared to the previous two-year period. Our observation unit is the neighborhood, with Barcelona officially divided into 73 neighborhoods and Madrid into 131. We merge neighborhoods with fewer than 3,000 inhabitants with adjacent units of similar socioeconomic characteristics to formulate more statistically robust units, resulting in a final division of 193 neighborhoods (67 in Barcelona and 126 in Madrid), each with an average population of 24,500 in Barcelona and 26,000 in Madrid, covering areas of 1.5 km^2 in Barcelona and 4.8 km^2 in Madrid. Independent variables in our model include average income per consumption unit (Distribution of Household Incomes, INE), population density (from each city's official webpage), average household size (Population Register), and the ratio of dwelling size (m^2) to household size (data from cadastral maps accessed through the websites of each municipality).

Additionally, we study three dependent variables: total emigration rates, intraregional emigration, and interregional emigration. Beginning by analyzing bivariate correlations between each independent variable and each dependent variable, we were able to take a first look at the strength and direction of observed associations, helping us interpret the results of the models. Then, we implement three sets of linear regression models (one for each dependent variable), with three models each: one for Madrid and Barcelona combined, as well as one for each city. Each model includes the four independent variables, with the three that pool together data from Madrid and Barcelona controlling for municipality. This approach enables us to study the influence of each independent variable, after controlling for the others, on each dependent variable. In Table 1 of the Results section we include a summary of the linear regression models, and detailed results of bivariate correlations are available upon request.

FIGURE 1. INTERNAL MIGRATION FLOWS IN THE 6 LARGEST SPANISH CORE CITIES, 2018-21



Source: Spanish Register of Residential Change, INE (2018-2021). Note: Includes the municipalities of: Madrid (3.3M), Barcelona (1.6M), València (0.8M), Seville (0.7M), Zaragoza (0.7M) & Malaga (0.6M).

4. RESULTS

4.1. SOCIOECONOMIC AND RESIDENTIAL PATTERNS IN SPAIN'S MAJOR CITIES, 2018-2021

4.1.1. The territorial dimension

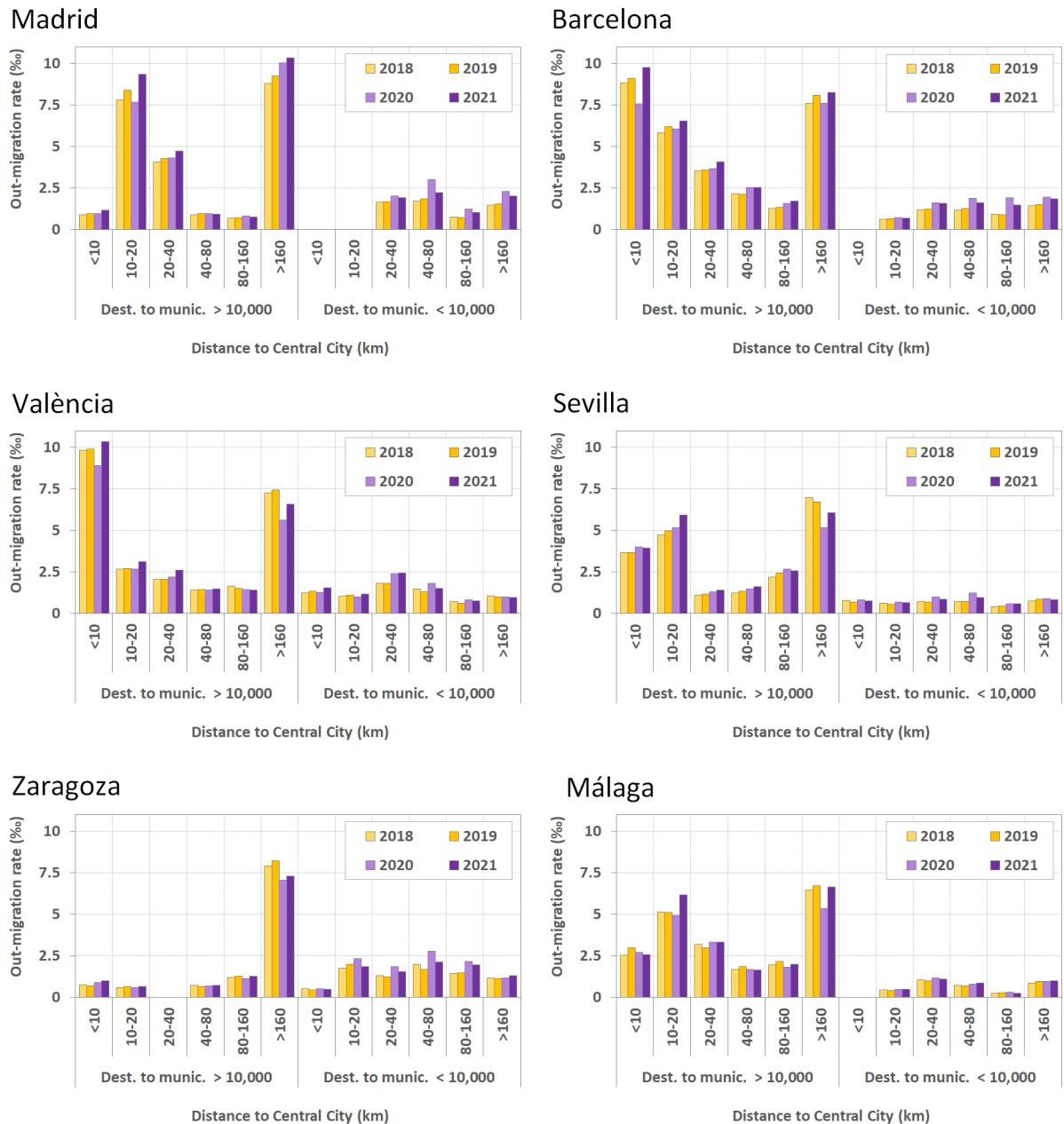
Prior to delving into an exhaustive examination of the residential mobility from urban centers, we categorize internal migration in Spain's six most populous central cities by typology: immigration, emigration, and net migration (Figure 1). It is important to note that, at this point of our analysis, we have accounted for all residential changes between Spanish municipalities, excluding intra-municipal movements and migratory flows of international origin or destination.

The results indicate a pronounced change in the number of movements toward Spain's largest cities following the pandemic's onset. This effect was par-

ticularly marked in 2020, with a 19% reduction in the six cities studied. However, 2021 registered a recovery, with migratory flows reverting nearly to pre-pandemic levels. Regarding the movements leaving urban cores, an annual increase of approximately 7% was registered in 2020 and 2021. As a result, net migration was especially unfavorable for the major central cities of Spain in 2020, with population losses tripling pre-pandemic figures. This significant shift would not have occurred without the advent of COVID-19. In 2021, although the negative balance was not as pronounced as in 2020, population losses nevertheless doubled those recorded in the two years preceding the pandemic.

Next, we explore the migration patterns of the flows originating from each of the central cities within our study, considering both the type of destination municipality (categorized as urban or rural based on population size) and the linear distance from the central municipality (Figure 2). The year 2020 registered

FIGURE 2. OUT-MIGRATION RATES (%) FROM CORE CITIES BY TYPE OF DESTINATION (SIZE AND DISTANCE TO THE CENTRAL CITY), 2018-21



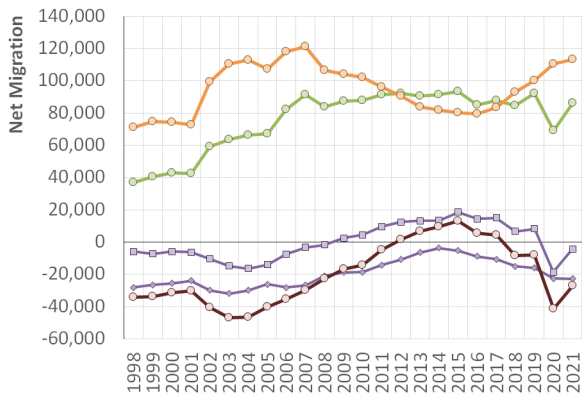
Source: Spanish Register of Residential Change, INE (2018-2021).

a marked decline in migration flows to the nearest metropolitan municipalities, which are typically more densely populated. These reductions in emigration rates were observed in radii of up to 20 km surrounding central cities such as Madrid and Barcelona. Bar-

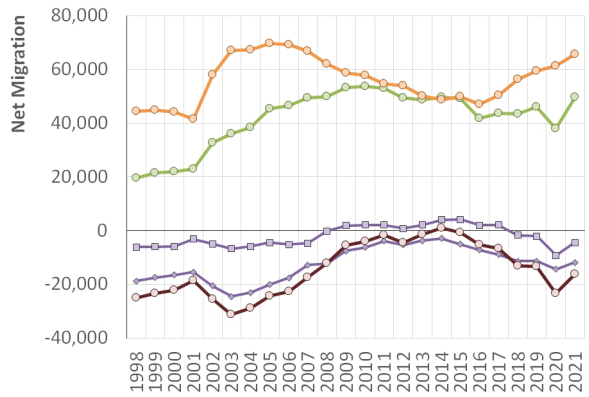
celona witnessed a 17% decrease in the emigration rate to its nearest municipalities, while Madrid experienced an 8% decrease in migration intensity to the area within a 10-20 km radius. Valencia and Malaga reported a 10% and 9% decline, respectively, in move-

FIGURE 3. EVOLUTION OF THE ABSOLUTE NUMBER OF IN-FLOWS, OUT-FLOWS AND NET MIGRATION BY CORE CITY, 1998-21

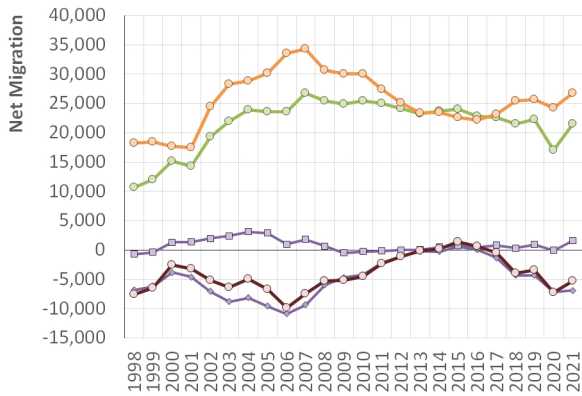
Madrid



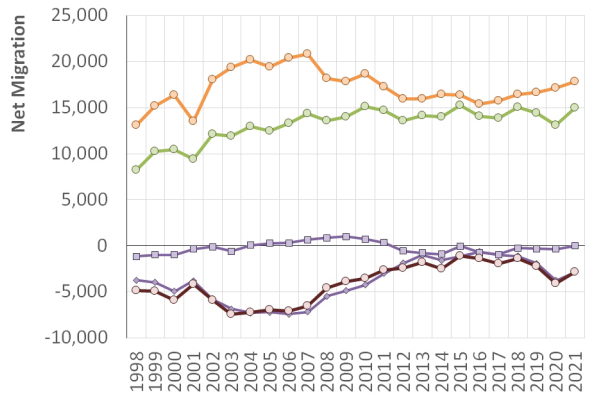
Barcelona



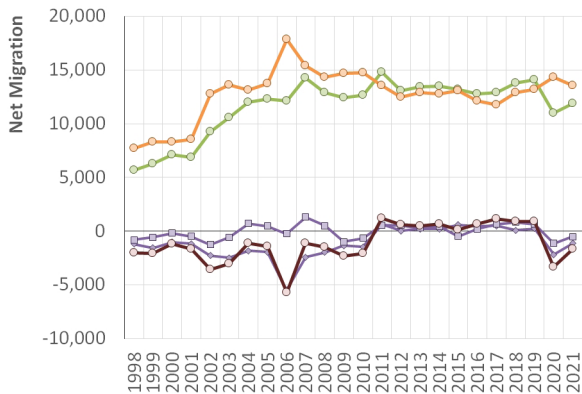
València



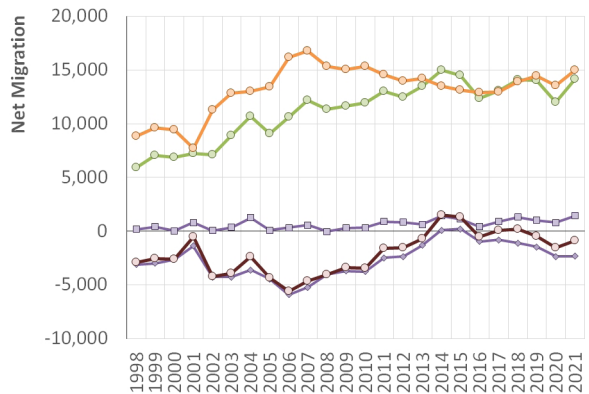
Sevilla



Zaragoza



Málaga



— In-flows — Out-flows — Net Migr. (Prov.) — Net Migr. (Rest of Sp.) — Net Migr. (Total)

Source: Spanish Register of Residential Change, INE (1998-2021).

ments to municipalities within a 10 km radius. On the other hand, Seville and Zaragoza saw a slight increase in such mobility types. Nevertheless, a trend reversal occurred in 2021 among the cities that had previously faced declines, with the intensity of residential mobility to nearby metropolitan municipalities returning to pre-pandemic levels. Notably, Madrid and Barcelona experienced increases in intensity between 5-10% in 2021.

Unlike residential mobility towards the nearest metropolitan municipalities to central cities, there was no decline in movements to more distant urban municipalities in 2020. Instead, a modest rise was documented across all cities under review, intensifying according to distance from the central city. The intensification of this type of movement was further bolstered in 2021, with some cities exhibiting substantial deviations from pre-pandemic patterns. In Barcelona, for example, the intensity of the emigration rate to urban municipalities located 40-80 km from the central municipality in 2021 increased by 20% compared to 2019, and Valencia saw a 25% increase in movements to municipalities within a 20-40 km radius.

Regarding movements with destination to other urban municipalities located at greater distances, presumably aligned with migratory than residential reasons, the pattern is heterogeneous. Cities with populations under one million experienced a significant downturn in such movements, particularly in 2020, with declines reaching approximately 20% across cases. Conversely, Barcelona's migration patterns remained relatively unchanged, whereas Madrid recorded a nearly 10% increase.

The type of movement that intensified most after the pandemic were those relocating to rural municipalities (with populations under 10,000), especially those located at intermediate distances from the urban core. For example, the emigration rate to rural municipalities 80-160 km away from Barcelona doubled. Madrid saw a near 70% increase in residential movements to rural areas within a 40-160 km range. In Seville, the emigration rate to rural municipalities within a 40-80 km radius rose by 70%, Zaragoza experienced a 55% average increase in relocations within a 40-160 km belt, Valencia reported a 35% increase, and Malaga observed a more modest rise of around 20%.

This nuanced examination exploring post- and pre-pandemic migration trends underscores the importance of considering the varying intensities of

emigration rates across different movement types. Despite post-pandemic fluctuations, the highest intensities continued to be encountered in movements towards the nearest urban municipalities. Although there was a strong increase in flows towards rural municipalities, this type of mobility continued to occur much less intensely than those moving towards municipalities within the same metropolitan regions.

In evaluating whether central cities' negative migration balance during the initial two years of the pandemic represented an extraordinary event within the recent residential and migratory trends, a broader temporal analysis of in-flows, out-flows, and net migration from the Spanish Register of Residential Change are instructive. This analysis reveals that, across all cities examined, there have been historical moments when movements away from central cities and negative migration balances have been more pronounced than those recorded in 2020 and 2021 (Figure 3).

Specifically, Madrid's negative migration balance of approximately 41,000 individuals in 2020 was less than during the years 2003 and 2004, a period characterized by intense suburbanization, which saw nearly 47,000 departures. Similarly, the nearly 25,000 individuals lost in Barcelona in 2020 were fewer than during the 2002-2005 period. Valencia experienced greater losses in 2006-2007. Seville and Malaga recorded more than a decade of years with higher losses, whereas in Zaragoza—a central municipality nearly encompassing its entire urban area—the losses in the pandemic's first year were more exceptional, with only two years counting greater losses than in 2020.

4.1.2. *The socioeconomic dimension*

The data from the Register of Residential Change do not allow for an examination of the socioeconomic profile of individuals who demonstrated the behavioral changes identified in the previous section. However, data from the recent 2021 Census provide an opportunity to explore this dimension, bearing in mind that, with January 1st as the reference date, our analysis must be limited to individuals who moved municipalities in 2020, which can be compared to the average of the two preceding years.

Our analysis reveals a discernible increase in mobility among more socioeconomically advantaged groups (Figure 4), particularly for movements originating from the two largest cities and, more specifically, those directed towards less populated municipalities.

FIGURE 4. SOCIOECONOMIC INDICATORS BY YEAR OF ARRIVAL AT CURRENT RESIDENCE, SIZE OF CURRENT MUNICIPALITY AND MUNICIPALITY OF PREVIOUS RESIDENCE, CENSUS 2021



Source: Population Census 2021, INE

For instance, 48% of individuals residing in municipalities of less than 10,000 people as of January 1, 2021 and who moved there from Madrid during 2020, held university degrees. This is nearly 10 percentage points higher than those who experienced the same type of movement in 2018 and 2019. In the case of individuals relocating from Barcelona to municipalities of less than 10,000 people, the increase was slightly less, at 7 percentage points, yet the university-level educational attainment of this group nearly reached 60%. Those relocating from the two largest cities to municipalities of more than 10,000 people in 2020 also displayed higher qualifications compared to pre-pandemic movers, albeit the difference was more modest.

These noted trends are further supported by other socioeconomic indicators for Barcelona and Madrid, particularly noting the significant increase in the representation of senior managers and professionals (ISCO-88 categories 1 & 2). Among those relocating to smaller municipalities, their representation is markedly increased. For instance, while 25% of individuals settling in municipalities with less than 10,000 residents from Madrid during 2018-2019 belonged to these occupational categories, this figure rose to 32% among those arriving in 2020. In Barcelona, the proportion of individuals in these occupational categories making similar moves increased from 34% to 40%. In these types of movements, the population

also demonstrates a higher level of activity compared to pre-pandemic trends, whereas in movements towards urban municipalities, this percentage decreases slightly. Additionally, there is a noted increase in individuals moving into larger homes after relocating in 2020, although this trend is less pronounced compared to other analyzed indicators.

In the broader context of other cities included in our study, a similar pattern emerges, with a noticeable post-pandemic presence of individuals from higher socioeconomic groups, and those in managerial and professional occupations, in municipalities with populations under 10,000. This trend has been most notable in relocations from Zaragoza and Malaga. However, the distinctions between the pre-pandemic period and the first year of the pandemic tend to be subtler overall. Regarding housing characteristics, the most substantial increases in dwelling size were observed among individuals relocating from Valencia and Malaga to municipalities with fewer than 10,000 residents.

4.2. AN IN-DEPTH LOOK AT MADRID AND BARCELONA THROUGH THE MUNICIPAL REGISTERS OF DWELLING CHANGES, 2018-2022

As we have previously outlined, the data on residential and migratory movements obtained from the Municipal Registers of Dwelling Changes in Barcelona and Madrid allow us to address four key gaps identified in current academic literature. These gaps include the dynamics of residential changes within central municipalities themselves, the socioeconomic dimensions of all movements, the internal heterogeneity of urban spaces, and an updated examination incorporating the dynamics unfolding in 2022, the first year with minimal pandemic-related restrictions.

A preliminary analysis of immigration patterns in Spain's two major central cities reveals the profound impact the pandemic outbreak had on incoming flows from more distant origins, particularly international ones. In 2020, arrivals from the same region saw a decrease of around 15% in both cities compared to the 2018-19 average, arrivals from the rest of Spain decreased by around 25%, and international arrivals dropped by 42%. Internal migration in-flows recovered to pre-pandemic levels by 2021 and stabilized in 2022. International migration, although not fully recovering to pre-pandemic figures by 2021, experienced a substantial increase, surpassing pre-pandemic levels in 2022. The most current data available, from 2022,

indicates a 25.6% increase in Madrid and a 29.7% increase in Barcelona of international in-movers compared to the 2018-2019 average.

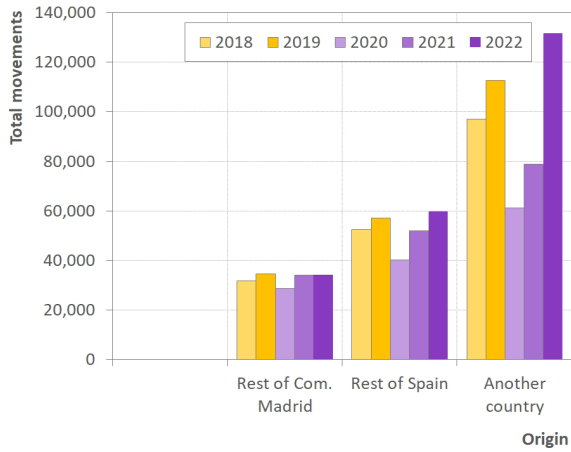
In respect to movements that were generated in both central cities, there was a slight decrease in total movements in 2020 compared to the two pre-pandemic years. This reduction was exclusively due to a significant drop in the number of intra-municipal address changes (12.7% in Barcelona and 7.5% in Madrid), while moves to other municipalities increased slightly. Conversely, in 2021, there was an increase in all types of residential movements originating from central cities, including those remaining in the same neighborhood or moving to another neighborhood in the same municipality. These types of relocations registered an approximate 20% increase in both cities, likely propelled by relocations postponed in 2020. As mentioned in the previous section, mobility towards suburban municipalities also increased in 2021, whereas interregional movement slightly decreased following the 2020 boom, nevertheless remaining above pre-pandemic levels. In 2022, there was a minor contraction in all movement types compared to 2021, yet movements originating from the central city were still approximately 5% higher than the 2018-2019 average.

The trends observed in 2022 suggest that residential mobility generated in large cities in the post-pandemic context has scarcely changed compared to the two years before the pandemic. The proportion of short-distance moves has marginally declined, especially those within the same neighborhood, though the change has been minimal. Nonetheless, such movements continue to be the most common: in 2022, 67.3% of residential relocations in Madrid and 63.3% in Barcelona did not cross municipal borders. Meanwhile, movements to more distant municipalities, those to other autonomous communities from Madrid, and to Catalonia's interior from Barcelona, have slightly increased their share of total movements.

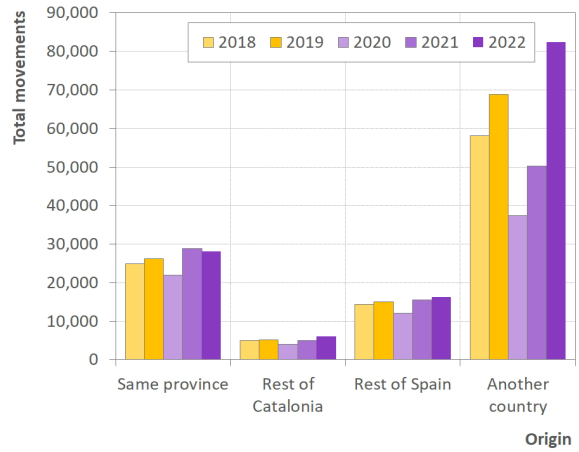
The intermunicipal inflow and outflow balance reveals that Barcelona's net migration in 2022 was the closest to zero across the 2018-2022 series, markedly distant from the losses recorded in 2020 and 2021. In Madrid, the interregional migration balance has returned to the positive pre-pandemic trend, and the intra-provincial balance has also neared the less intense losses observed before the outbreak of COVID-19.

FIGURE 5. EVOLUTION OF RESIDENTIAL AND MIGRATORY FLOWS IN MADRID AND BARCELONA BY TYPE OF MOVEMENT, 2018-22

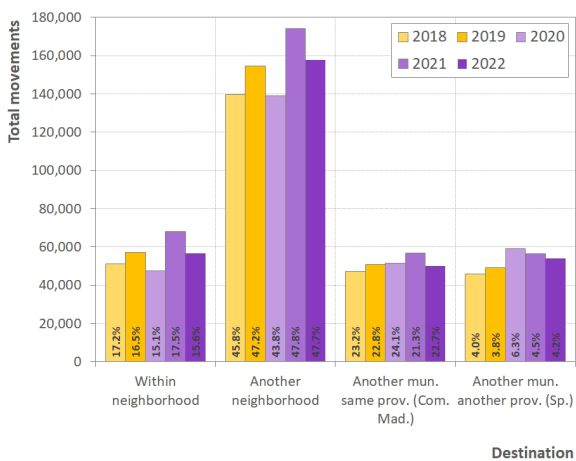
In-flows to Madrid



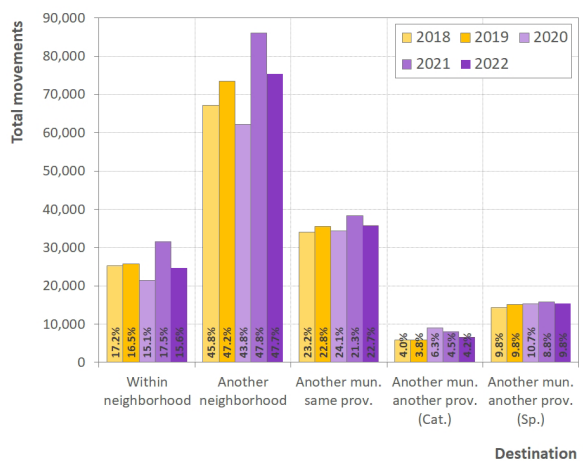
In-flows to Barcelona



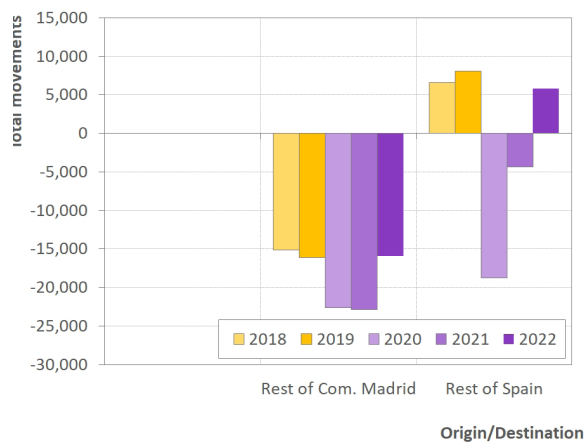
Flows with origin in Madrid



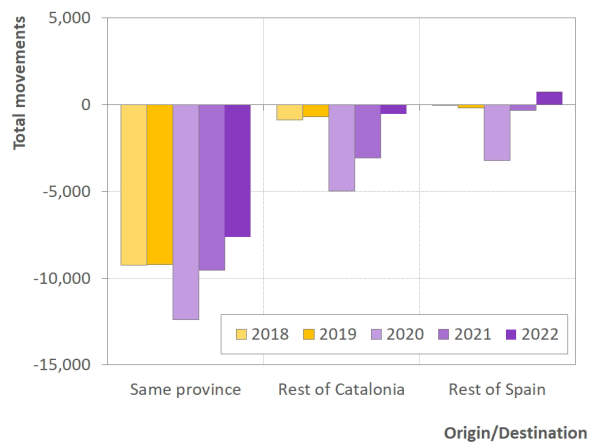
Flows with origin in Barcelona



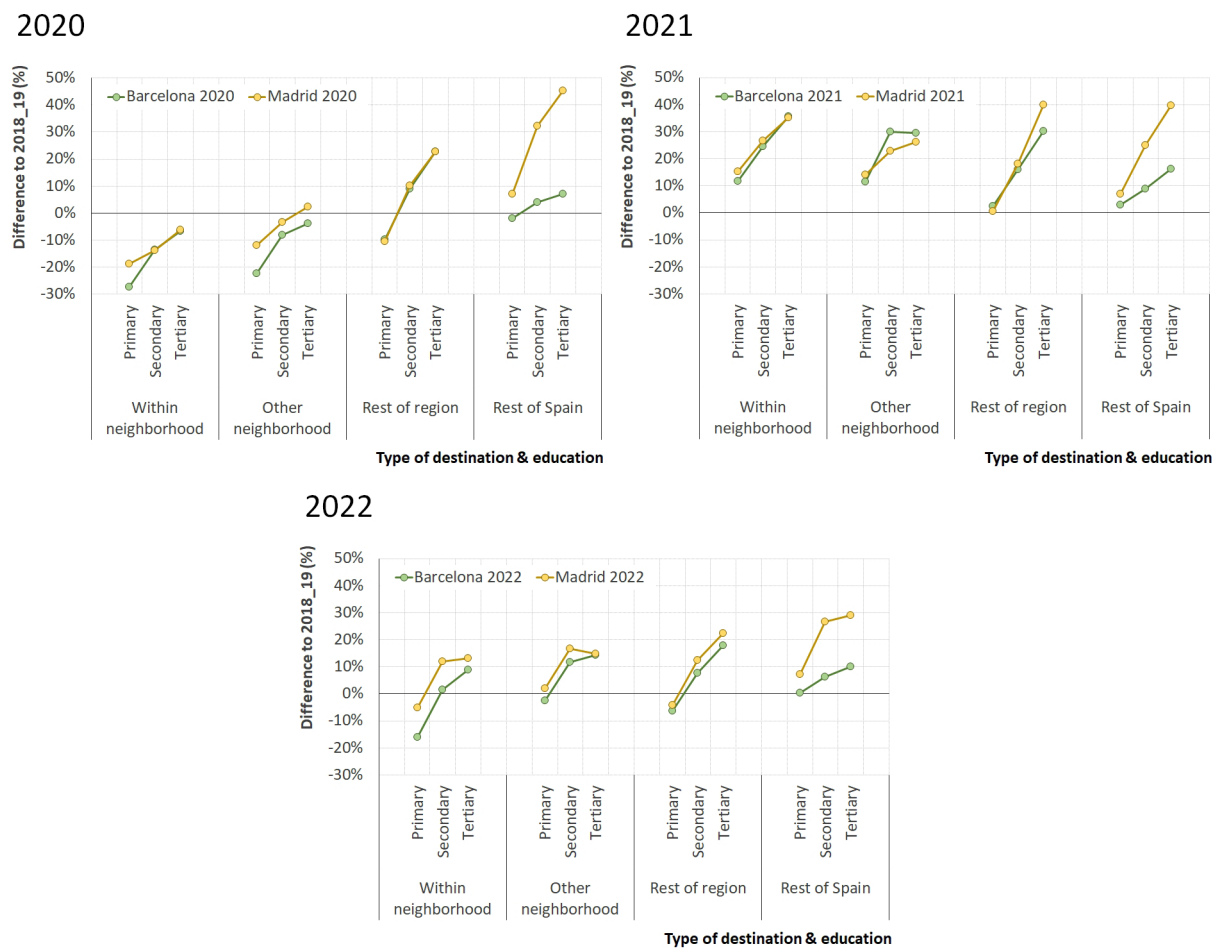
Net Migration in Madrid



Net Migration in Barcelona



Source: Municipal Registers of Dwelling Changes, 2018-2022

FIGURE 6. POST-PANDEMIC MOVEMENTS WITH ORIGIN IN BARCELONA AND MADRID INNER CITIES BY TYPE OF DESTINATION AND EDUCATIONAL ATTAINMENT. POPULATION ≥ 25 Y.O. DIFFERENCE WITH 2018-19 (%)

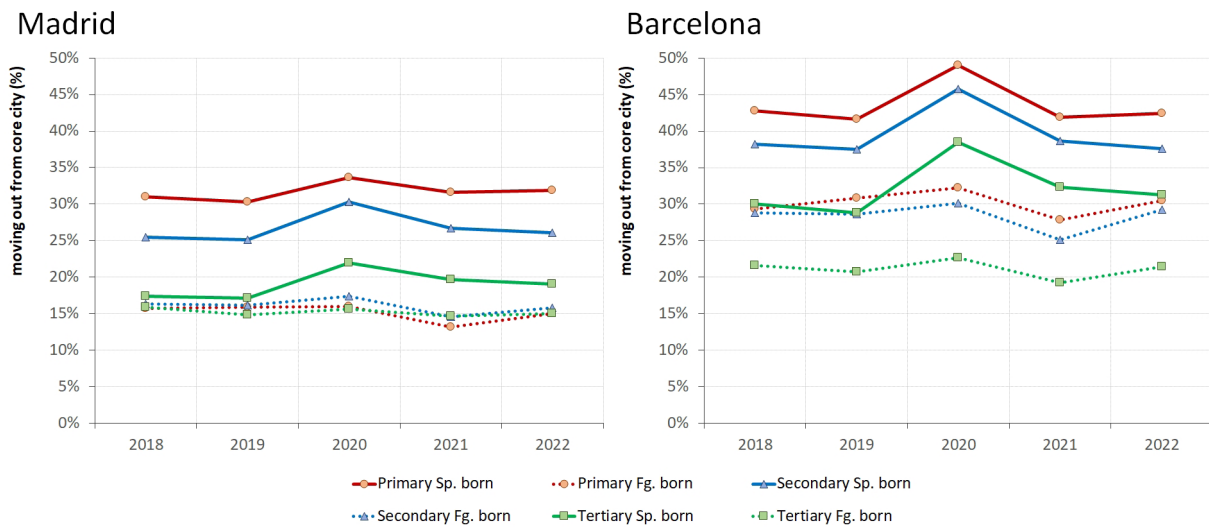
Source: Municipal Registers of Dwelling Changes, 2018-2022

The findings presented thus far indicate a significant impact of the pandemic on how the population of Spain's two most populous central cities changed residences during 2020 and 2021. However, in 2022, general behavior largely reverted to patterns observed in the years immediately preceding the pandemic. The availability of a socioeconomic variable such as education level allows us to dig deeper into post-pandemic behavior and ascertain whether these trends were consistent across all social groups.

The analysis reveals a pronounced educational gradient in residential movements with origin in central cities in the aftermath of the pandemic, a trend that persisted into 2022 (Figure 6). Individuals with higher educational attainment exhibited a higher frequency of residential changes in the years following the pandemic compared to the biennium preceding it. In con-

trast, a heightened level of residential immobility was observed among those with lower educational levels. This educational attainment gradient manifested across all movement types and throughout the three post-pandemic years, and is especially pronounced in out-flows from central cities to other parts of their respective autonomous communities. In the case of Madrid, this gradient was also pronounced for relocations to other parts of Spain.

In 2020, the volume of housing changes among the less educated demographic was significantly reduced across all movement types compared to the pre-pandemic era. Movements within the same neighborhood, for instance, registered a reduction of 27.3% in Barcelona and 18.8% in Madrid for this group, with movements to other municipalities within the same autonomous community decreasing by approxima-

FIGURE 7. PERCENTAGE OF MOVEMENTS LEAVING THE CENTRAL MUNICIPALITY (OUT OF ALL MOVEMENTS WITH DESTINATION TO THE SAME AUTONOMOUS COMMUNITY). POPULATION ≥ 25 Y.O. 2018-2022

Source: Municipal Registers of Dwelling Changes, 2018-2022

tely 10% in both cases. Although the more educated also experienced a decline in intra-municipal housing changes, this decrease was marginal. In contrast, their relocations to other municipalities within the autonomous community saw a 23% increase in both Barcelona and Madrid. Regarding movements to other Spanish municipalities, a divergence was observed between the two cities, with a significant increase and a pronounced educational gradient in Madrid, in contrast to a much smaller increase and less pronounced educational differences in Barcelona.

As indicated in previous figures, there was an uptick in flows to all types of destinations during the second year of the pandemic, maintaining the educational gradient across all movement types. The less educated population did not leave central cities at a higher rate than in the pre-pandemic period, though they did so more frequently than in 2020. On the other hand, housing changes within the municipalities for this period increased by 10% compared to the 2018-19 period. For the more educated cohort, the increase in mobility was between 25% and 40% higher than pre-pandemic levels across all types of movements (excluding those relocating from Barcelona to other autonomous communities).

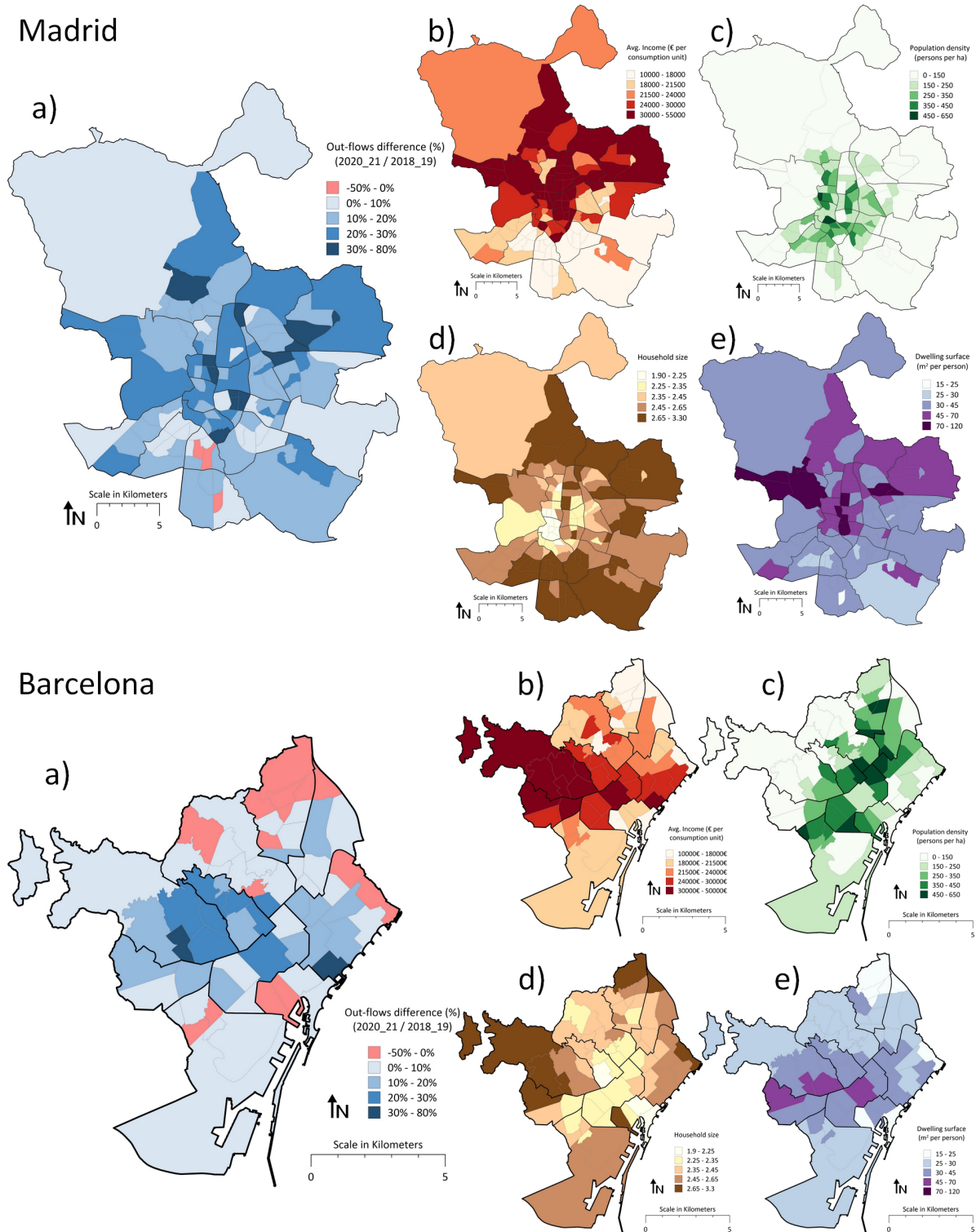
Ultimately, the decrease in mobility flows observed in 2022 compared to 2021 spanned across all educational groups. Although the educational gradient remained evident in comparison to pre-pandemic

flows, there was a tendency towards a diminishing slope, indicating a slight convergence in mobility patterns across educational strata.

After completing three years of observation following the pandemic's outbreak, a relevant question arises: Has there been an increase in the frequency at which populations leave urban centers for residential reasons? This inquiry is examined by analyzing the evolution of the proportion of relocations from the central municipality to other municipalities within the same autonomous community, relative to the total number of housing changes that encompass both these movements and those within the municipality itself (Figure 7). In both Madrid and Barcelona, a significant surge was observed in the first year following the pandemic, while by 2022 the figures realigned with the pre-pandemic levels. It is only among the higher-educated, Spain-born population that the percentage of departures from the central city in 2022 exceeds that of the two years prior to the pandemic. Post-pandemic, the historical disparity in urban departure rates between the more and less educated cohorts has slightly decreased.

The final empirical objective of this article is to address, for the case of the two largest Spanish cities, hypothesis that were posited at the onset of the pandemic. Some hypotheses suggested the inclination of individuals living in denser areas to relocate, aiming to enhance their living conditions, particularly for

FIGURE 8. A) RELATIVE DIFFERENCE IN MIGRATORY OUT-FLOWS, 2020_21/ 2018_19 (%); B) AVERAGE INCOME PER UNIT OF CONSUMPTION; C) POPULATION DENSITY; D) HOUSEHOLD SIZE; E) DWELLING SIZE PER PERSON



Source: A) Municipal Registers of Dwelling Changes, 2018-2022; B) Atlas of income's distribution, INE; C) and D) Barcelona and Madrid city councils; e) Land Registry, Ministry of Finance.

TABLE 1. LINEAR REGRESSION MODELS FOR THE RELATIVE DIFFERENCE IN MIGRATORY OUT-FLOWS TO ANY REGION OF SPAIN, TO THE SAME REGION AND TO ANOTHER REGION, 2020_21/ 2018_2019 (%)

Dependent variable	Sample		Beta coeff.	Sig.	S.E.
Relative difference in migratory out-flows to any region of Spain, 2020_21/ 2018_2019 (%)					
	Madrid and Barcelona	Constant	9,222	0,305	8,959
		Average income (thousands of €)	0,97	0	0,118
		Dwelling surface per person (tens of square meters)	-1,972	0,027	0,883
		Population density (tens of people)	0,093	0,074	0,052
		Household size	-3,972	0,201	3,093
		Municipality (Ref.: Madrid)	-11,116	0	1,531
		Adjusted r-square	0,523		
	Madrid	Constant	9,53	0,424	11,887
		Average income (thousands of €)	0,821	0	0,16
		Dwelling surface per person (tens of square meters)	-1,346	0,236	1,131
		Population density (tens of people)	0,084	0,32	0,084
		Household size	-3,567	0,369	3,958
		Adjusted r-square	0,362		
	Barcelona	Constant	7,858	0,615	15,524
		Average income (thousands of €)	1,338	0	0,218
		Dwelling surface per person (tens of square meters)	-3,524	0,17	2,538
		Population density (tens of people)	0,129	0,027	0,057
		Household size (person)	-10,01	0,078	5,582
		Adjusted r-square	0,614		
Relative difference in migratory out-flows to the same region in Spain, 2020_21/ 2018_2019 (%)					
	Madrid and Barcelona	Constant	-9,78	0,432	12,409
		Average income (thousands of €)	1,396	0	0,163
		Dwelling surface per person (tens of square meters)	-4,768	0	1,223
		Population density (tens of people)	0,073	0,31	0,072
		Household size	2,024	0,637	4,283
		Municipality (Ref.: Madrid)	-5,597	0,009	2,12
		Adjusted r-square	0,357		
	Madrid	Constant	-13,609	0,405	16,292
		Average income (thousands of €)	1,173	0	0,219
		Dwelling surface per person (tens of square meters)	-4,055	0,01	1,55
		Population density (tens of people)	0,094	0,417	0,116
		Household size	4,462	0,412	5,425
		Adjusted r-square	0,249		
	Barcelona	Constant	-8,167	0,689	20,294
		Average income (thousands of €)	1,496	0	0,285
		Dwelling surface per person (tens of square meters)	0,54	0,871	3,318
		Population density (tens of people)	0,062	0,411	0,074
		Household size (person)	-8,569	0,245	7,297
		Adjusted r-square	0,654		

Relative difference in migratory out-flows to another region in Spain, 2020_21/ 2018_2019 (%)					
Madrid and Barcelona	Constant		7,467	0,574	13,253
	Average income (thousands of €)		0,272	0,121	0,175
	Dwelling surface per person (tens of square meters)		2,793	0,034	1,306
	Population density (tens of people)		0,155	0,044	0,076
	Household size		-2,499	0,586	4,575
	Municipality (Ref.: Madrid)		-15,916	0	2,264
	Adjusted r-square		0,444		
Madrid	Constant		12,691	0,425	15,871
	Average income (thousands of €)		0,373	0,083	0,213
	Dwelling surface per person (tens of square meters)		2,596	0,088	1,51
	Population density (tens of people)		0,081	0,472	0,113
	Household size		-4,706	0,375	5,284
	Adjusted r-square		0,266		
Barcelona	Constant		14,671	0,615	28,998
	Average income (thousands of €)		0,865	0,037	0,407
	Dwelling surface per person (tens of square meters)		-8,966	0,063	4,742
	Population density (tens of people)		0,252	0,021	0,106
	Household size (person)		-3,868	0,712	10,427
	Adjusted r-square		0,067		

Source: Municipal Registers of Dwelling Changes, 2018-2022; Atlas of income's distribution, INE; Barcelona and Madrid city councils; Land Registry, Ministry of Finance.

those living in smaller homes (Marsh, 2020). Additional hypotheses emphasized the importance of access to second homes, the opportunity for remote work, and the ability to access housing as factors likely to increase the residential mobility of more privileged groups during the pandemic (González-Leonardo et al., 2022a). To explore these factors more deeply, we adopt an ecological approach, analyzing residential behaviors at the neighborhood scale, incorporating aggregated variables, and including territorial aspects such as density.

The maps we present above for the municipalities of Barcelona and Madrid show the difference in out-migration rates in 2020-21—identified as the period most affected by the pandemic—relative to 2018-2019 (Figure 8). The results suggest, at first glance, a scenario in which the neighborhoods with the most pronounced increases in migration flows do not align with those of higher density or more cramped housing conditions. Rather, the areas witnessing the most significant increases are those with higher incomes and larger living spaces per inhabitant. Despite considerable variance in the sizes of Madrid and Barcelona's central municipalities, the observed patterns appear consistent. In historical cores and working-class outskirts that developed in the early latter

half of the 20th century, residential and migratory flows either remained stable or diminished compared to the pre-pandemic era. On the other hand, in districts developed in the 19th century with concentrations of higher socioeconomic strata, and in more recent lower-density suburbs, there was a markedly significant increase in outflow during the two years following the onset of the pandemic.

Table 1 shows the results of the linear regression models charting the relative difference in migratory out-flows from Madrid and Barcelona to other municipalities in Spain. In general, results are in line with the preliminary bivariate correlations. The results of the models for emigration to any autonomous community of Spain show that household income is the most relevant variable, both for the pooled model and for each city's specific model. This result is confirmed by the preliminary bivariate correlations, where household income is the independent variable with the highest Pearson correlation coefficient and is significant at the 0.01 level. Higher household income is associated with higher increases in out-migration, which supports hypotheses pointing to the importance of second homes, the possibility of teleworking, and the economic capacity to access a new home. After controlling for the other independent variables,

dwelling size is negatively associated with out-migration, meaning that neighborhoods where people live in households with less surface per person, the emigration increase was higher. Population density is positively associated with higher increases in emigration, but only in Barcelona. Most of these results hold true when focusing on emigration to the same region. However, the effect of population density is no longer statistically significant in Barcelona. Results of the models for emigration to another autonomous community of Spain are quite dissimilar, indicating that migration flows with different destinations follow varying rationales. In the pooled model, dwelling size is positively associated with out-migration. However, when differentiated by city, this effect is not statistically significant in Madrid. In Barcelona, it is statistically significant but in the opposite direction. Household size does not play a relevant role in any of the models, which was anticipated by the bivariate correlations. Finally, in the three pooled models, after controlling for the set of independent variables, Madrid's neighborhoods show higher increases in emigration compared to Barcelona's ones.

5. DISCUSSION

The COVID-19 pandemic has markedly influenced migration flows, particularly affecting major Spanish urban centers. This phenomenon instigated notable shifts in residential and migratory dynamics that were unprecedented prior to the pandemic's emergence. The residential dynamics of 2020, the first year of the pandemic, have been explored in preceding studies, which predominantly suggest that the outbreak instigated a migration trend toward rural areas, albeit to a limited degree (Rowe et al., 2023).

In the context of Spain's large cities, changes in residential patterns during the pandemic's initial year can be summarized as such:

1. A very significant decline in the attractiveness of central cities, reinforced by strong restrictions on international mobility.
2. Decreased residential outflow to nearby, densely populated metropolitan municipalities, especially in Madrid, Barcelona, Valencia, and Malaga. For instance, in Barcelona, outflow to neighboring municipalities decreased by 20% compared to 2019.
3. A slight increase in moves to suburban areas, intensifying with increasing distance from the central city. In Madrid, for example, outflow

rates to municipalities 20-40km from the capital's center increased by 6.0% compared to 2019.

4. A general decline in long-distance moves to other urban areas, except to Madrid, where they increased. This dynamic is related to the deceleration of human capital's interurban mobility, a migratory dynamic that was significant in the years preceding the pandemic (González Leonardo et al., 2022; Escudero-Gómez et al., 2023). Madrid's case, a preferred destination in the pre-pandemic period, could be explained by the return of younger adults to their areas of origin.
5. A very significant increase in movements to rural municipalities, especially those located at an intermediate distance from large urban centers. A more detailed territorial analysis confirms that the main rural destinations were commonly well connected by highway infrastructure and public transportation to urban centers. Municipalities across the Mediterranean axis and the eastern Cantabrian, those in the Catalan and Aragonese Pyrenees, as well as those in the Central System and other provinces surrounding Madrid, saw the most significant increase in immigration flow (González-Leonardo et al., 2022a).

The 2021 census microdata enables a more fine-grained analysis of the contributing factors to increased attractiveness of certain municipalities over others. Our results suggest a very important role of second homes, in line with international studies (Czarnecki et al., 2023), previous connections to these spaces (e.g., migratory precedents) (González et al., 2022b), environmental and tourist attraction, and "atypical registrations," which might not necessarily have reflected real changes of residence; rather, they might have been temporary moves of aimed at avoiding intense mobility restrictions during the first year of the pandemic.

2021 registered a partial return to pre-pandemic territorial patterns, suggesting that the most relevant changes were confined to the pandemic's first months (Rowe et al., 2022). Outflows from major central cities continued to exceed pre-pandemic levels, although the migratory attraction, especially resulting from internal migratory in-flows, notably recovered. As for international immigration, it was not until 2022 that intensity levels reached pre-pandemic levels, mirroring trends observed globally (OECD, 2023).

Three main trends can be identified in the pandemic's second year:

1. An increased intensity of departures from the six central cities analyzed towards metropolitan municipalities, especially those at intermediate distances. Compared to 2019, the departure rates to municipalities with more than 10,000 inhabitants located 10-20 km from metropolitan centers increased by 15.4% in Valencia, by 19.6% in Seville, and by 20.4% in Malaga.
2. A trend towards the return of long-distance interurban mobility to pre-pandemic levels.
3. A gradual deflation of the urban exodus "bubble," evidenced by a contraction of out-migration rates to rural municipalities compared to 2020, even if levels remained higher than those recorded in 2019. In Barcelona, for example, emigration rates to rural municipalities located at a distance of 80-160 km decreased by 22.5% compared to 2020, yet were still 67.6% higher than in 2019.

Possibilities for analysis of 2022 dynamics are limited by changes to the official sources that publish migratory statistics (the replacement of the Spanish Register of Residential Change with the Statistics of Migration and Changes of Residence), making it impossible to construct a homogeneous and comparable series for the pre- and post-pandemic periods. Given this limitation, this article has utilized municipal residence change records of Barcelona and Madrid to study residential and migratory patterns in 2022. To our knowledge, this study is the first to offer results about these patterns in the pandemic's third year. The results obtained in the country's two most populous central cities show a general convergence with pre-pandemic dynamics. From the third year after the COVID-19 outbreak, we can highlight four key trends:

1. Urban centers have regained the attraction they held in the pre-pandemic period. The two cities analyzed recovered the volume of arrivals from both their own urban regions and the rest of Spain. In Madrid's case, its role as the main destination for interregional human capital movements in Spain was resumed. Moreover, 2022 marked the total recovery of international immigration flows, and even experienced increases exceeding 25% in both cities compared to the two pre-pandemic years. This significant increase was likely amplified by postponed international migration projects due to the pan-

demic and increased opportunities for remote work.

2. Short-distance residential movements returned to values very similar to those before the pandemic, as did movements to other metropolitan municipalities, which slightly decreased compared to 2021. Consequently, residence changes leaving the metropolitan centers returned to a similar importance as before the COVID-19 outbreak.
3. Residential departures from central cities toward areas that emerged during the first two years of COVID are becoming less noticeable.
4. As a result of the recovery of in-flows to central cities and the slight setback of out-flows compared to the previous two years, net migration rates to central cities has converged with pre-pandemic rates: they remain negative in relation to metropolitan areas, but losses are much smaller, and are positive with the rest of Spain.

This research has also found that the changes recorded over the three years of study have a strong socioeconomic component. Various hypotheses were proposed at the beginning of the pandemic, some of them contradictory. On one hand, it was commonly assumed that the expansion of remote work could favor labor flexibility and increase the residential mobility of certain groups, generally the most educated (Duque-Calvache et al., 2024). On the other hand, it was widely speculated that periods of lockdown and mobility restrictions might augment the residential strategies of households living in more precarious housing conditions (Gazengel, 2020).

These results provide substantial evidence to the Spanish case, which had barely been explored in this dimension, and align with findings in other countries like United States (Lei and Liu, 2022), but different to the Swedish case, where no changes in the socioeconomic profile among the movers were observed (Vogiazides and Kawalerowicz, 2023). We have identified that, just as the effects of the pandemic on residential mobility were manifested diversely across the territory, there is a clear socioeconomic differentiation pattern among the protagonists of the flows. A marked educational gradient is evident in all types of residential changes, from movements within the same neighborhood to those relocating to other municipalities in Spain. In Madrid and Barcelona, the only cities we have been able to analyze through population

registries up to 2022, individuals with a higher educational attainment relocated more frequently in each year following the pandemic compared to the two years preceding the pandemic. In contrast, the population with a lower educational level proved to be more immobile. This pattern may be a consequence of a lower ability to move and an increasing socioeconomic gap between those who can move and those who cannot (Jolivet et al., 2023), but also because of legislative protections for tenants during the first part of the pandemic. The results of our work also show that it was not the neighborhoods with the highest population density and residential overcrowding that registered the highest out-migration rates during the pandemic's first months, but those with higher incomes and larger residences.

Disparities in education attainment levels were particularly evident in movements to other municipalities, particularly those within the same urban area. While the number of residential movements to suburban areas in 2022 returned to pre-pandemic levels, we must emphasize changes in their socioeconomic compositions, now with greater representation of residents from more advantaged strata. Among the myriad changes induced by the pandemic in terms of residential mobility, this remains the most enduring impact of the COVID-19 pandemic and is the trend most likely to have an enduring impact.

6. CONCLUSIONS: THE LEGACY OF THE PANDEMIC AND ITS IMPLICATIONS FOR THE SOCIO-SPATIAL RECONFIGURATION OF URBAN AREAS

Empirical evidence from the three years in the aftermath of the COVID-19 outbreak provides substantial insights into the COVID-19 pandemic's impacts on territorial dynamics, particularly in relation to residential contexts. A key overarching conclusion is that there has not been a significant shift in the spatial patterns that have characterized residential mobility in Spain over the last few decades.

After outlining the evolution of territorial and socioeconomic patterns of residential mobility during the three years most impacted by the pandemic, we consider it imperative to examine these implications further, focusing on the socio-spatial perspective. This requires analyzing how various social groups are distributed territorially. Thus, here we explore these implications from a tripartite territorial perspective.

When we consider immigration to areas of lower density, such as rural areas or intermediate-sized

municipalities outside metropolitan regions, the initial months of the pandemic appeared to present opportunities to counteract structural trends of population decline (Morales et al., 2020). While acknowledging the significant diversity among less urbanized areas, COVID-19 may have contributed to slowing this trend in certain cases. These include areas with a significant presence of second homes, those infrastructurally well-connected to denser areas, and those with high tourist and landscape appeal (González Leonardo et al., 2022b). In this sense, we have observed that more privileged groups, in the context of the expansion of remote work and hybrid work arrangements, have been at the forefront of residential relocations to these settings. It is also notable that these rural and semi-rural areas may include substantial semi-resident or temporary populations, potentially playing a significant role in new contexts of labor flexibility, as the concept of permanent residency is becoming increasingly fluid.

Furthermore, the dynamics of metropolitan suburbanization have re-emerged as a significant post-pandemic trend. Already becoming apparent before the pandemic's onset, this tendency followed a period of decelerated residential arrivals to suburban areas in the early 2010s. As we have seen, there is a new-found attractiveness of these areas to more educated populations, who have been moving there in greater numbers. This trend coincides with parallel dynamics noted before the pandemic, such as the gentrification-driven displacement of lower-income groups from central areas, the so-called "suburbanization of poverty" (Hochstenbach and Musterd, 2018; Torrado et al., 2021). It is crucial to pay close attention to these dynamics as they indicate that different population groups may be settling in distinct metropolitan spaces, driving increased socio-spatial fragmentation (Sorando and Leal, 2019; Porcel and Antón, 2020).

The resurging attractiveness of suburban areas to local middle classes may have suggested a softening in the process of socio-demographic selection in central spaces, and more specifically, in the phenomenon of gentrification, which has been highly pronounced in Spanish cities since the latter half of the 2010s (López-Gay, 2021). Yet, there are signs that these processes are strongly continuing. For instance, housing prices in central municipalities, by 2023, surpassed pre-pandemic levels. Moreover, the labor flexibility and the expansion of telework that have facilitated the movement of certain population groups (predominantly Spanish-born) to less dense areas, are also

concurrently attracting international professionals and highly skilled teleworkers, with a growing emphasis on temporary movements, to the cores of many Southern European metropolises (Parreño-Castellano et al., 2022; López-Gay, 2023). These population flows are reinforcing the transient nature of certain neighborhoods in central cities already overburdened by tourist accommodations, risking their intensified specialization in accommodating such populations, undermining community bonds, and displacing more stationary and vulnerable residents (Brollo and Cellata, 2022). There is a significant need to investigate both the displacement mechanisms affecting vulnerable populations, such as migrant-origin communities whose residential itineraries are constrained in a housing crisis scenario (Otero-Enríquez et al., 2019; Andújar-Llosa and López-Gay, 2024), and the logics associated with (im)mobility and the (im)possibilities of residential rootedness (Barañano et al., 2022). Additionally, the relationship between residential pathways and access to social infrastructure, as well as the structuring of social and community networks, warrants further attention (Gomà and Blanco, 2022).

This research concludes with a critical realization. Contrary to predictions made during the early stages of the pandemic, Spain's large, densely populated urban centers will continue to be significant poles of attraction and population retention. It is, therefore, vital to monitor the demographic and territorial dynamics within these spaces closely to devise strategies that ensure social and territorial cohesion.

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DECLARATION OF CONFLICT OF INTEREST

The authors of this article declare that they have no financial, professional or personal conflicts of interest that could have inappropriately influenced this work.

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Declaration of authorship contribution

ALG has contributed in the following roles (CRediT taxonomy): Conceptualization, Data curation, Formal Analysis, Funding acquisition; Investigation; Methodology, Project Administration, Resources, Supervision, Validation, Visualization, Writing –original draft, Writing – review & editing.

BR has contributed in the following roles (CRediT taxonomy): Validation, Investigation, Writing –original draft, Writing – review & editing.

KOB has contributed in the following roles (CRediT taxonomy): Data curation, Investigation, Formal Analysis, Resources, Visualization, Writing – review & editing.

CSP has contributed in the following roles (CRediT taxonomy): Formal Analysis, Investigation, Writing – review & editing.

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