
RELATIONSHIP BETWEEN MOBILITY¹ AND INCOME WITHIN THE CONTEXT OF COVID-19

The Metropolitan Transport Authority (Autoritat del Transport Metropolità), together with the *Energy, Territory and Society Study Group* from the Autonomous University of Barcelona, has carried out a study analysing the relationship between people's mobility in terms of their use of collective public rail transport and territorial determining factors given the social impact of the COVID-19 pandemic. The main aim of this study is to assess whether living conditions and income are decisive in quantifying the number and starting points of the trips made.

Based on an analysis of the background in terms of people's mobility in terms of their use of collective public rail transport and the current lockdown of the population due to the pandemic caused by COVID-19, this research aims to determine the correlation between the rate of infection in different social groups and their mobility patterns in order to assess whether there are any significant differences depending on people's living conditions and income.

In general, the initial hypothesis assumes that the COVID-19 pandemic has a greater effect on more disadvantaged social groups and that these are forced to maintain higher rates of mobility.

From the perspective of people's living conditions and space, it can be stated that the higher population density in vulnerable districts, smaller living space and the presence of previous pathologies related to income and living conditions are decisive factors when analysing the impact of the pandemic. Together with these prior factors, the fact that people from such social groups have less opportunity to reduce their mobility is a key factor that helps to explain the spread of the pandemic throughout the territory. This more limited ability of vulnerable social groups to reduce their mobility may be due to the fact that more affluent groups have more flexibility and more resources to tackle employment difficulties and often work in sectors where it is easier to adapt to remote working. On the other hand, the more disadvantaged groups tend to be employed in basic services and little or unskilled jobs with more precarious employment conditions, with fewer savings available and a lower rate of private vehicle ownership, and therefore have to continue using public transport more intensively.

In methodological terms, the data used to correlate mobility and income were as follows:

- Tickets stamped to access the railway system for all stations that form part of the Integrated Fare System or STI (the station networks of METRO TMB, RENFE Rodalies, FGC, TRAM Baix and TRAM Besòs).
- Household disposable income for the metropolitan area as a whole based on the census section classification produced for the study *Barris i crisi* (Blanco & Nel·lo, 2018). This classification divides the territorial census sections into three categories (affluent, intermediate and vulnerable) based on four variables closely related to income (percentage unemployment, percentage share of foreigners, average land registry value and average surface area of dwellings).

¹ Mobility on Collective Public Rail Transport

- Household disposable income for the specific area of the city of Barcelona based on the estimated income for Barcelona districts produced by Barcelona City Council.

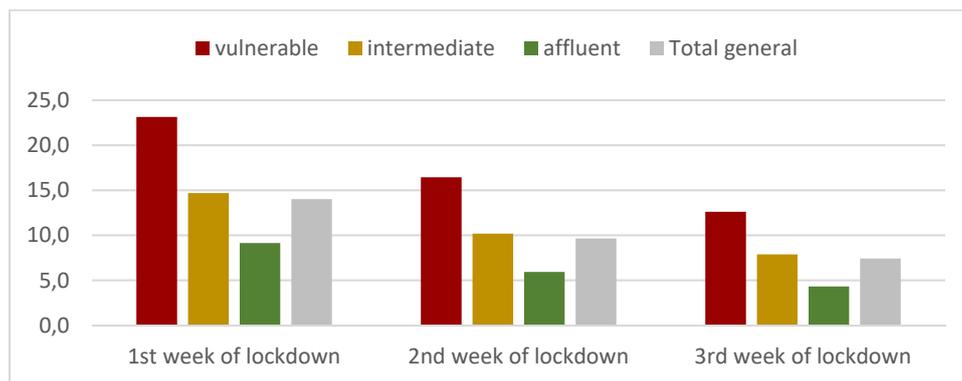
In terms of timescale, the scope of the data include the situation prior to lockdown (total working days from Monday to Friday in January and February 2020), the first week of lockdown (from 16 to 20 March 2020), the second week of lockdown (from 23 to 27 March 2020) and the third week of lockdown (from 30 March to 3 April 2020).

In terms of geographical scope, the analysis includes two areas of study: the 36 municipalities in the Metropolitan Area of Barcelona or AMB (zone 1 of the STI, including the city of Barcelona) and the municipality of Barcelona.

Findings

The analysis carried out has confirmed the existence of a close correlation between the reduction in mobility and income level of territories in the Metropolitan Area of Barcelona, as well as in the city of Barcelona. In general terms, the largest drop in mobility has occurred in those areas where the population's purchasing power is highest whereas the reduction in mobility has been smaller in areas where the population's purchasing power is lower.

% average of tickets stamped on working days after the state of emergency was declared compared with the average tickets stamped on working days in January and February 2020 by census section vulnerability, AMB.



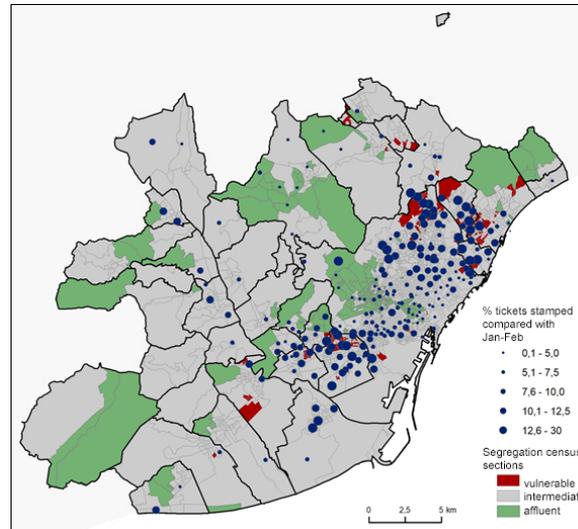
Source: GURB-UAB based on data from the Metropolitan Transport Authority and "Barris i crisi".

In the whole of the Metropolitan Area of Barcelona (AMB), the average number of tickets stamped in affluent census sections not only decreased more dramatically but also more quickly than in the rest. As can be observed, the affluent sections of the AMB had already reduced their mobility by 90.9% in the first week of lockdown. However, the drop in mobility in vulnerable census sections was only 76.9%, a difference of 14 percentage points. Since that date, mobility in vulnerable sections has remained significantly higher. The fact that the difference between both has narrowed to 8 percentage points as from the third week of lockdown, coinciding with the suspension of all non-essential jobs, may indicate the significance of forced mobility for work in these census sections. This trend has also been observed in the city of Barcelona, based on Household Disposable Income.

The spatial distribution of the reduction in mobility in relation to the segregation and income in the Metropolitan Area of Barcelona as a whole and the city of Barcelona can be seen in the following maps. In the case of the AMB, it is evident that relatively higher levels of mobility have continued in areas along the River Besòs (municipalities of Santa Coloma de Gramenet, Sant Adrià del Besòs, Badalona and the north of Barcelona), as well as in Hospitalet de Llobregat and El Prat de Llobregat, coinciding with the presence of vulnerable census sections. On the other

hand, there has been a sharp decrease in mobility in the rest of the municipalities and a large part of the more affluent census sections.

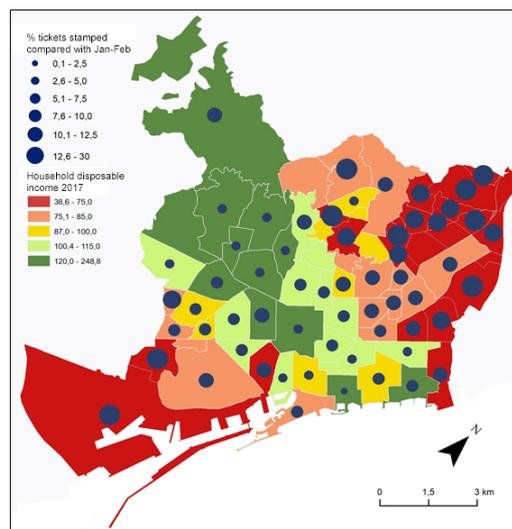
% of transport tickets stamped in the third week of lockdown compared with the average for Jan-Feb 2020. AMB, by vulnerability of census sections.



Source: GURB-UAB based on data from the Metropolitan Transport Authority and "Barris i crisi".

In the case of the city of Barcelona, the spatial distribution of mobility confirms these extremes. The drop in mobility is relatively lower in the lower-income districts (Nou Barris, Sant Andreu, Horta-Guinardó, Sants Montjuïc) than in the higher-income districts (Sarrià-Sant Gervasi, Les Corts, Sant Martí). The district of Eixample has maintained relatively high mobility, probably due to people returning from other districts in the city. Vallvidrera, a high-income area with a relatively small drop in mobility, is an exception, possibly due to the nature of its location.

% of transport tickets stamped in the third week of lockdown compared with the average for Jan-Feb 2020. Barcelona districts by Gross Household Disposable Income.



Source. GURB-UAB based on data from the Metropolitan Transport Authority and "Barris i crisi".

Barcelona, 23 April 2020