Chile's Internal Migration Dynamics during the COVID-19 Pandemic

Extended Abstract

So far, most research regarding mobility and COVID-19 has focused either on studying day-to-day mobility to understand and measure the efficacy of lockdowns, on correlating mobility and socioeconomic factors bearing on new cases and deaths, or on building origin-destination matrices to inform epidemiological models [2]. The present report addresses a less-studied phenomenon of general mobility, namely, the patterns of long-term relocation within a country during the pandemic. Our results show a different pattern of mobility during the pandemic compared to day-to-day findings, mainly associated with socioeconomic aspects. While on a daily basis lower income groups moved more (mostly explained by, e.g., lack of access to remote work or other social factors), in the long-term, the high-income sectors of the population were the ones leaving metropolitan areas on a larger scale. This coincides with results from similar studies for cities in developed countries like London or Stockholm [1, 3, 4]

Previous analyses on long-term relocation during COVID-19 are based on social media data or official records from authorities. This represents a limitation for its applicability to other regions with lower social media penetration or slow/expensive cost of polling official values. We study the dynamics of internal migration within a country by analyzing eight months of anonymized eXtended Detail Records for three years (2017, 2020, and 2022) for approximately 1.3M mobile phones in Santiago de Chile (SCL, population: 8.1M). For each device, we calculated its home location per week from Mar 1st, until Nov 30th on each year. If the statistical mode of home in the four weeks of November was in a different region than their March home, we assumed that the device had migrated. We compared our measurements for 2017 against the migration information from the national 2017 Census, which validated that our definition can be used to approximate the movement from SCL to other regions in Chile ($r(13) = .93, p < .001$).

In general, we see a larger migration flow leaving the Metropolitan region in 2020 and somewhat coming back to pre-pandemic values in 2022 (Figure 1). Our results show that about 173.8K people (2.17% of the population) permanently left SCL in 2020 versus an estimated 110.7K that moved in the same period of 2017. In Figure 1, comunas of origin are sorted from left to right by an increasing income average decile. Results show that the exodus from Santiago during 2020 was most significant for richer comunas like Las Condes and Providencia, which significantly increased their contribution to multiple regions. However, preferred destinations stayed relatively stable, except for Valparaíso (a neighboring region and a popular vacation destination), which saw a statistically significant increase in immigration.

Also, the average socioeconomic level for 2017 does not show any correlation with the percentage of the population migrating from each comuna, while in 2020, the average household income decile of the comuna alone explains 53% of the variance (see Figure 2), hinting at a strong economic effect. For 2022, again, we see a slight recovery after the pandemic. However, income still shows to be a much stronger predictor than it was in 2017.

We further investigated the selection of destinations for people leaving Santiago in 2020. We used the relative quality of life in urban areas (ICVU[1]). We found that not everyone was willing to sacrifice in the same way. Providencia (second in the ranking) conceded more than expected, while Vitacura (first in the ranking) was more conservative. A similar tendency can be seen in the difference in the average decile between the origin and destination (see Figure 3). People tended to move to communes with similar or higher socioeconomic levels. This suggests that the economic aspect influenced not only the decision to emigrate but also the selection of the destination.

Regarding migration from urban to rural areas, people predominantly stayed in urban comunas. Only poorer comunas showed a small percentage increase ($< 10\%$) of the migrants moving to rural areas. We compared the origin-destination matrices from 2020 and 2017, calculating the difference between the percentages of the population that moved at the comuna level (see Figure 4). In the figure, red cells represent a decrease in the emigration to a destination comuna, and blue ones represent an increase. We sorted the destinations in the rows by their percentage of rurality. Columns represent the comunas in Santiago (origin) sorted by average decile. Marginal graphs show the average value per row and column correspondingly. The predominance of red at the bottom of the matrix confirms that people tend to avoid densely populated places. However, the very light colors to the top suggest that there was no particular preference for rural areas.

Although the decision to migrate is complex and multifaceted, overall, our findings suggest that during the COVID-19 pandemic, an advantageous socioeconomic status might have facilitated relocation. This gap in access to migration during periods of crises based on socioeconomic factors is a serious problem and requires further study to understand its underlying mechanisms better.

References

[1] Miguel González-Leonardo, Antonio López-Gay, Niall Newsham, Joaquín Recaño, and Francisco Rowe. Understanding patterns of internal migration during the covid-19 pandemic in spain. *Population, Space and Place*, 28(6):e2578, 2022.

[2] Nicolò Gozzi, Michele Tizzoni, Matteo Chinazzi, Leo Ferres, Alessandro Vespignani, and Nicola Perra. Estimating the effect of social inequalities on the mitigation of covid-19 across communities in santiago de chile. *Nature communications*, 12(1):1–9, 2021.

[3] Francisco Rowe, Alessia Calafiore, Daniel Arribas-Bel, Krasen Samardzhiev, and Martin Fleischmann. Urban exodus? understanding human mobility in britain during the covid-19 pandemic using facebook data. *arXiv preprint arXiv:2206.03272*, 2022.

[4] Louisa Vogiazides and Juta Kawalerowicz. Internal migration in the time of covid: Who moves out of the inner city of stockholm and where do they go? *Population, Space and Place*, page e41, 2022.

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[1] https://estudiosurbanos.uc.cl/10-anos-calidad-de-vida-urbana-icvu-2020/
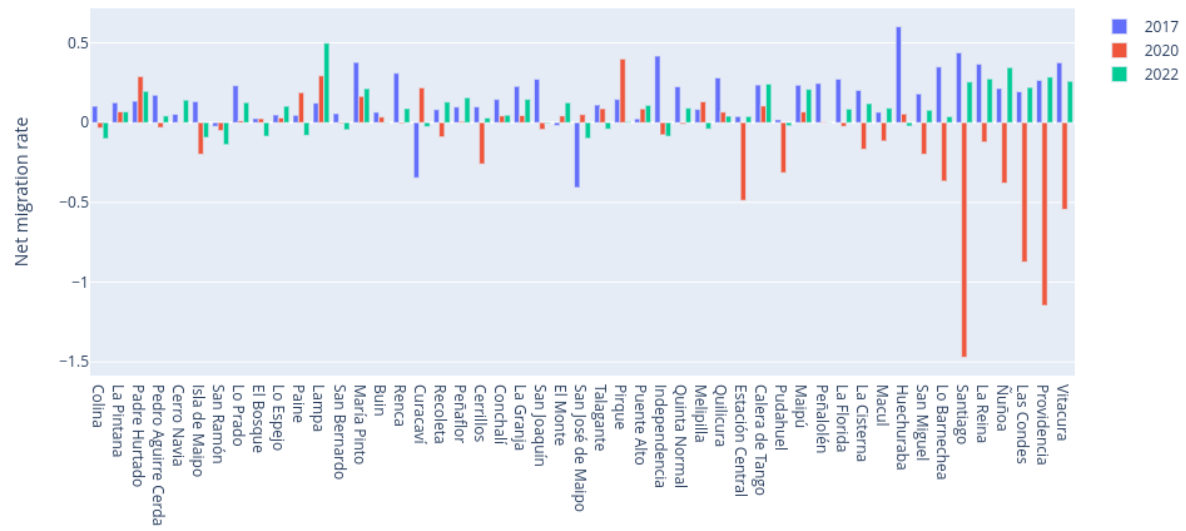
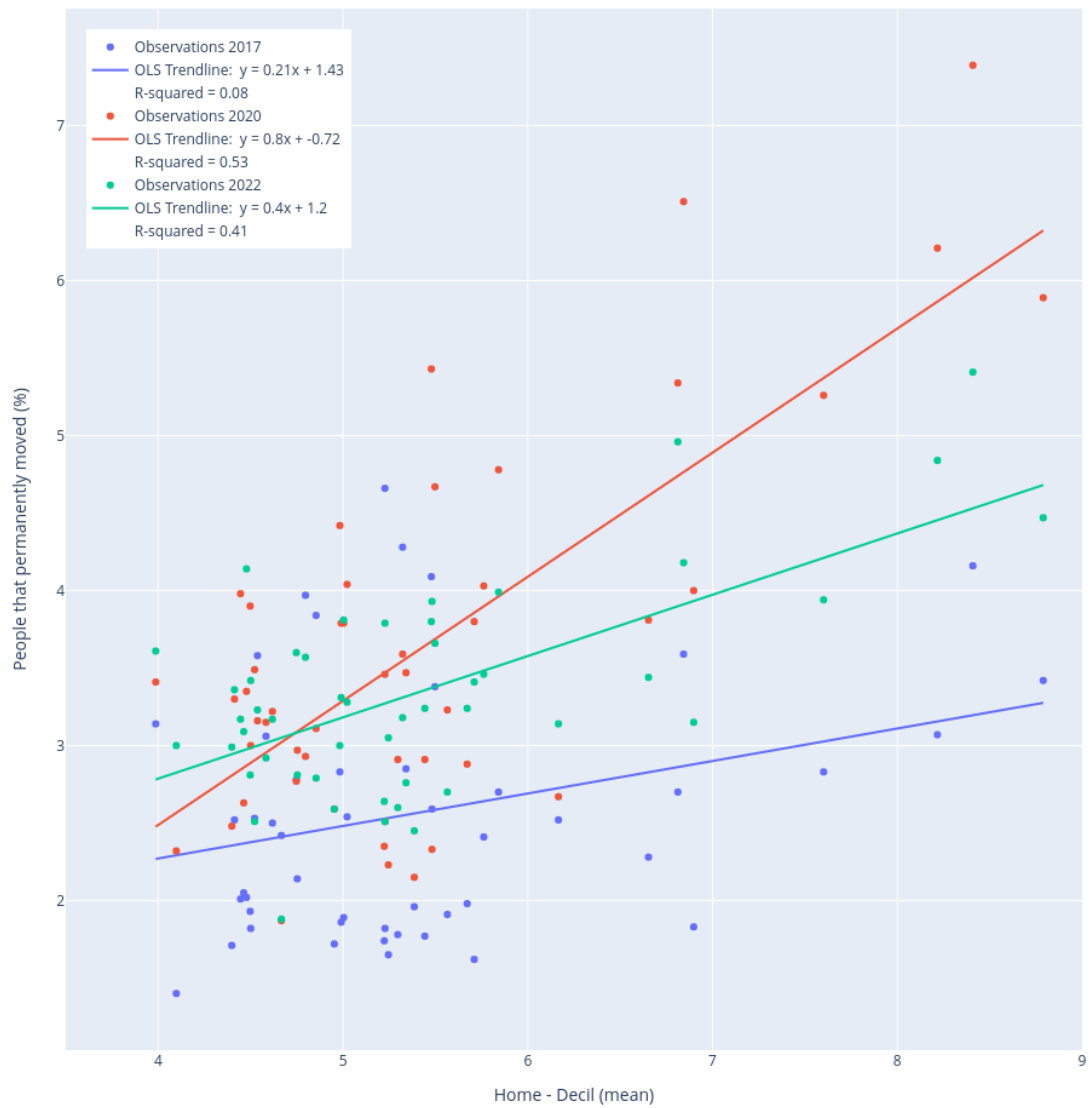Figure 1: Net migration rate for the comunas in Santiago.
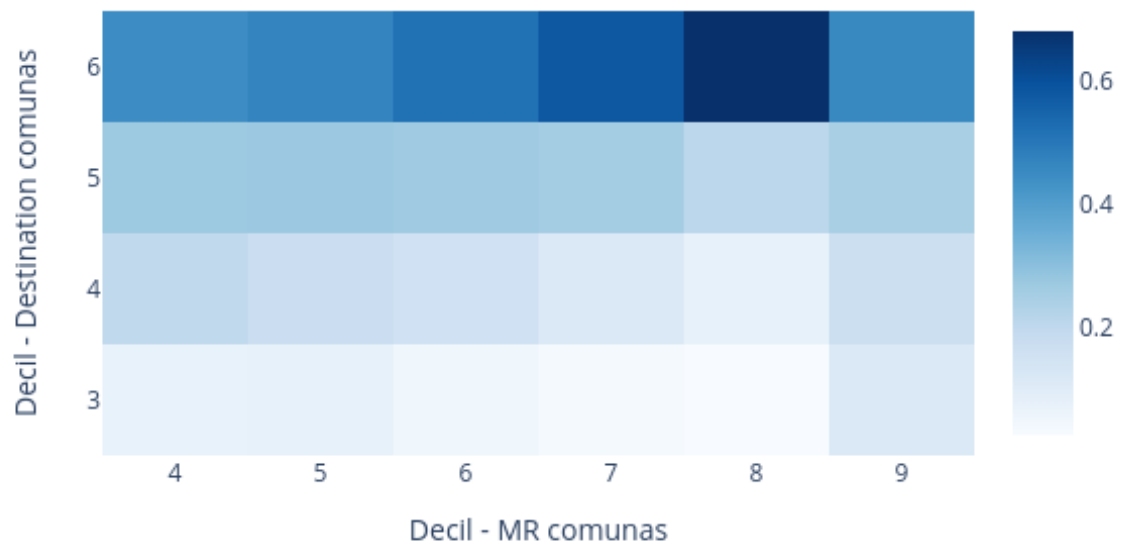
Figure 2: Emigration per comuna from Santiago.

Figure 3: Average household decile for comunas of origin and destination for people emigrating from Santiago.

Figure 4: Difference in origin-destination matrices for the percentage of migration (2020 and 2017).