



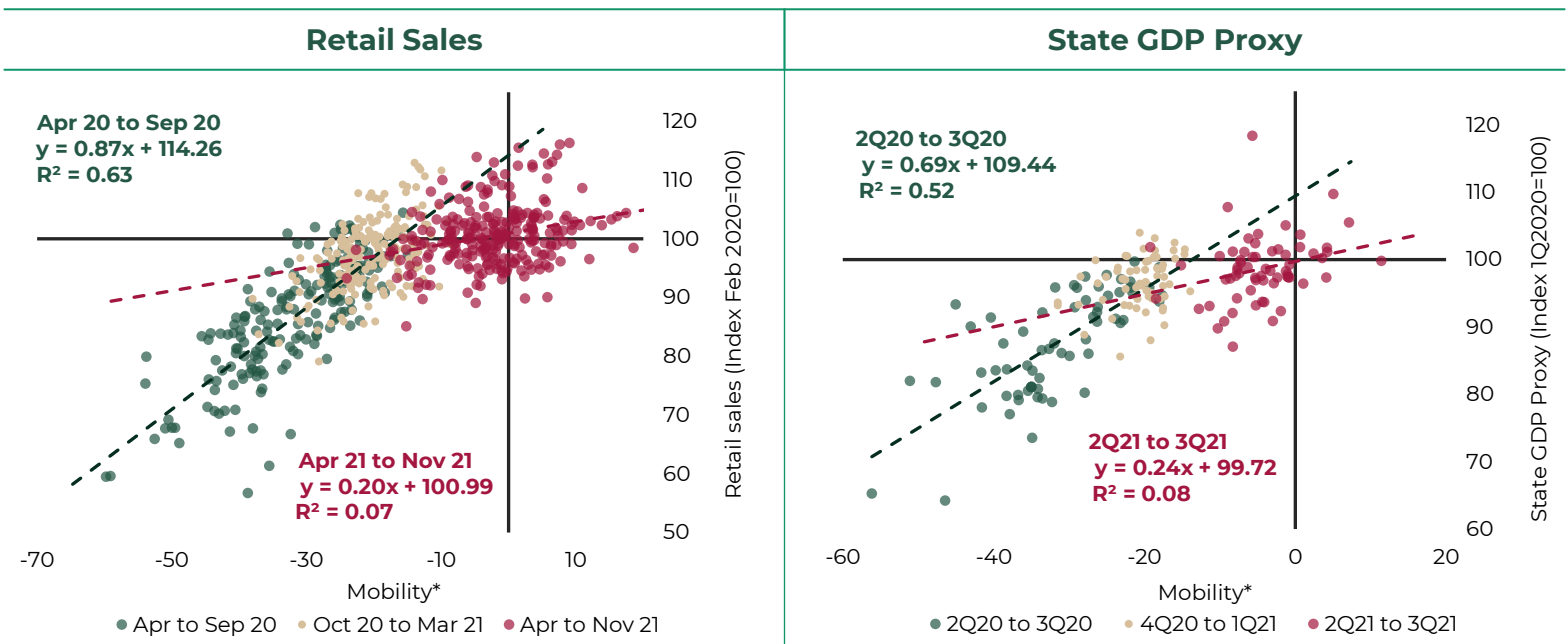
# Technical Note

## Geographic mobility and economic activity

Since the early stages of the pandemic, mobility indexes based on the use of mobile apps have been used to study the relationship between people’s movements and countries’ economic performance (SHCP, 2020). Campos-Vásquez and Esquivel (2021) find a relationship between workplace mobility and credit card expenditures in Mexico between February and June 2020. Banco de México (2021) studies the period between March 2020 and March 2021 and finds that an increase in the time people spend at home translates into lower retail sales across states. This note examines the relationship between geographic mobility and economic activity. It shows that, based on more recent data, this relationship has weakened as mobility returns to pre-pandemic levels and the population adapts to cohabitate with the virus.

Figure 1 shows the relationship between geographic mobility and the level of retail sales relative to its pre-pandemic level for the 32 states of Mexico between April 2020 and November 2021. There is a positive relationship between geographic mobility and retail sales. This relationship is observed both over time and between states, as shown by the pooled ordinary least squares estimations for the periods of April-September 2020, and April-September 2021. However, the relationship appears to have weakened as the economy has reopened, as can be inferred from the estimates for the months of April to October 2021, which show a lower relationship between the variables. A similar pattern is observed with figures from the state quarterly GDP proxy (ITAE for its acronym in Spanish).

Figure 1: Geographic Mobility vs Economic Activity



Source: INEGI and Google. \*It is defined as the simple average of the components offered by Google (Shops and leisure, supermarkets and pharmacies, parks, transport stations, workplaces, and residential areas) considering residential areas with an inverse sign. Each value is interpreted as the percentage change from pre-pandemic mobility levels. In this sense, higher values represent greater mobility.

To continue analyzing how the relationship between geographic mobility and economic activity has changed, we estimate a model in which we regress the economic activity indicator on the mobility.

$$y_{i,t} = f_i + f_t + \theta \text{Mobility}_{i,t} + u_{i,t}$$

Where  $y_{i,t}$  refers to retail sales or the state GDP proxy in the state  $i$  in month  $t$ , expressed as indices relative to their pre-pandemic level (February 2020 for sales and Q1 2020 for the state GDP proxy).  $\text{Mobility}_{i,t}$  refers to Google's geographic mobility indicator (see graph 1 note). State fixed effects,  $f_i$ , are included to control for differences between states constant over time and time fixed effects,  $f_t$ , to control for factors that affect all states during the same period.

The model was estimated with two different samples: one that considers the entire dataset (March 2020 to November 2021 in the case of retail sales and 2Q2020 to 3Q2021 in the case of the state GDP proxy) and another that excludes data after the first quarter of 2021. The results are presented in Table 1. In the case of retail sales, for both samples the estimator is significant at 99%, but its magnitude decreases when considering the entire period. In the case of the state GDP proxy, the small sample from the estimate until the 1Q2021 results in a non-significant coefficient.

**Table 1: Estimation Results**

Estimate ( $\hat{\theta}$ )	Retail Sales		State GDP Proxy	
	Until 1Q2021	Whole period	Until 1Q2021	Whole period
	0.43*** (0.04)	0.35*** (0.08)	.16 (0.13)	.24* (0.10)
Observations	416	672	128	192
R <sup>2</sup>	0.70	0.67	0.68	0.66

**Notes:** \*\*\*Indicate significance at 99%. \*\*Significance at 95%. \*Significance at 90%. Robust standard errors are in parentheses

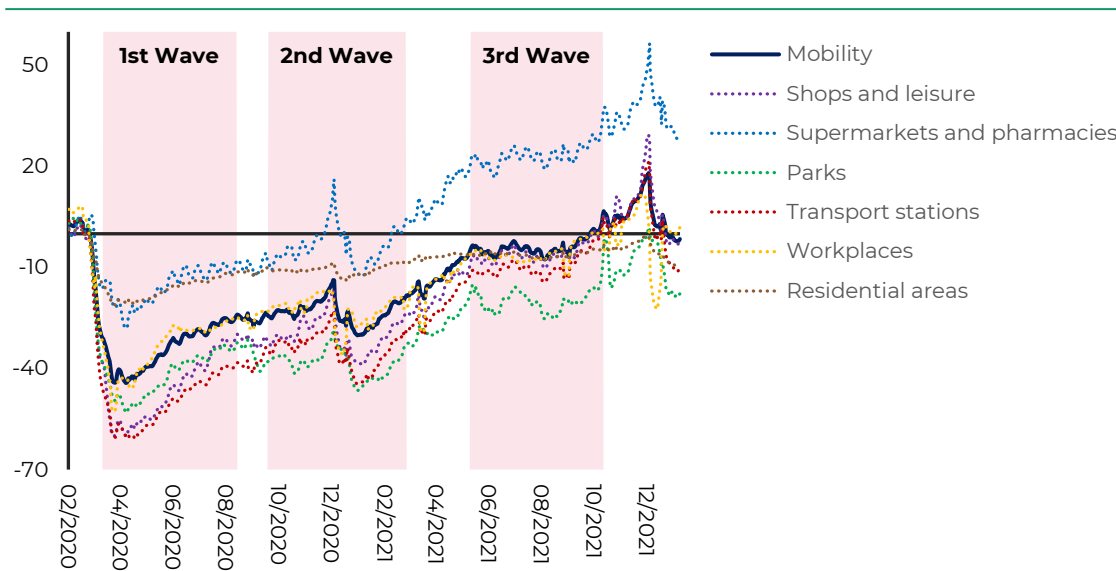
These results might be attributed to the more targeted social distancing restrictions, which has been possible thanks to the progress in vaccination, and the learning curve of living with the virus. Regarding the targeting of the restrictions, Figure 2 shows that, after significant reductions in mobility during the first and second waves as a result of the lockdowns to contain the virus, during the third wave these indicators were more resilient as a result of the implementation of more eased and targeted measures. A similar pattern can be seen when looking at the data at the state level. Figure 3 shows mobility for Mexico City and Nuevo León, as well as the evolution of the epidemiological traffic light in those states. The restrictions during the first and second waves were longer lasting and had a greater impact on mobility than the restrictions imposed during the third wave, in which the traffic light was red for less time.

Regarding the greater adaptation of the population to cohabite with the virus, a greater penetration of digital commerce has allowed economic activity to be less dependent on the mobility of people. Indeed, according to the Mexican Association of Online Sales, in 2020 electronic commerce increased by 81% compared to 2019, and according to INEGI figures, about 30% of the companies surveyed adopted online sales during the pandemic (ECOVID -IE).

Hence, the latest data suggest that the relationship between mobility measures and economic activity in Mexico has gradually weakened. This, without a negative effect on health indicators: during the third wave of infections, 48% fewer deaths were observed than in the second, and the peak of infections was reached 24 days earlier.

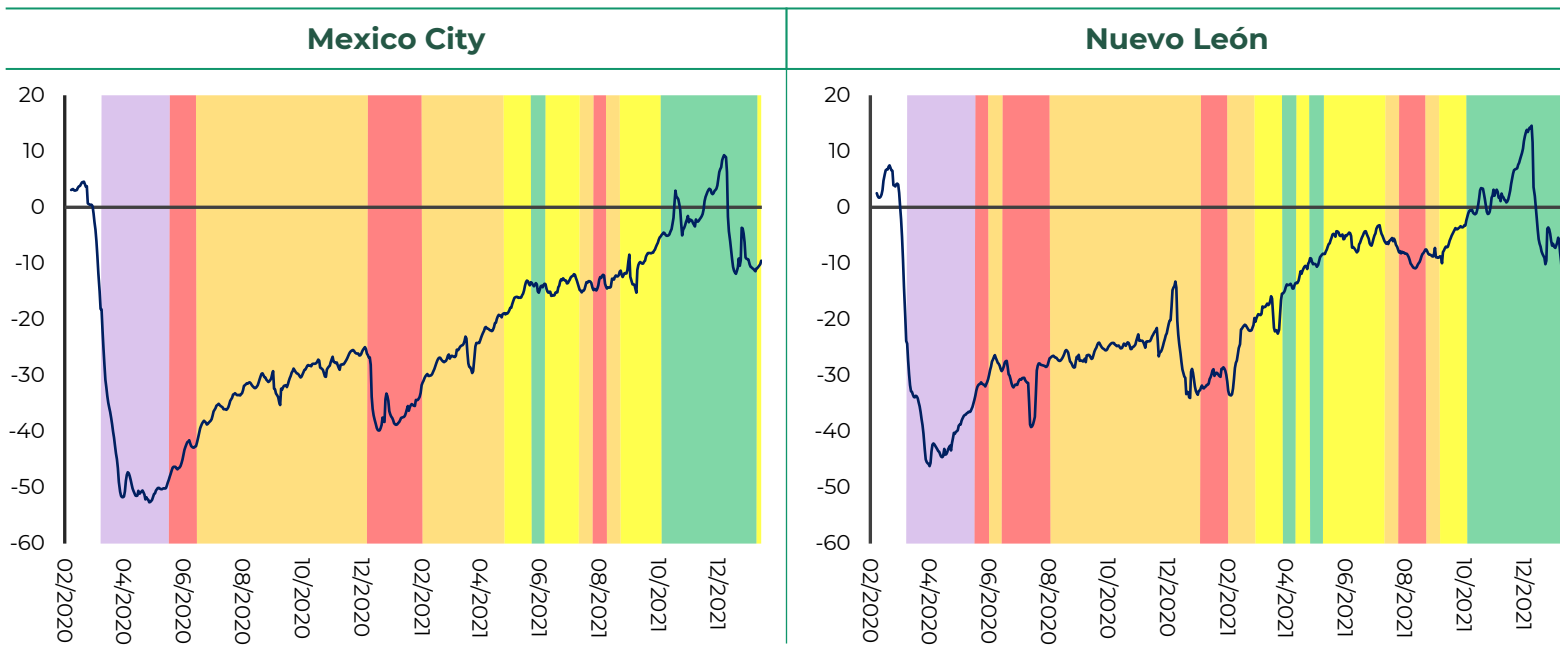
The results of this technical note are relevant to the extent that the economy is going through a fourth wave of infections in which, although mobility levels have been reduced, they continue to be above those observed during the first two waves.

**Figure 2: Geographic mobility and its components in Mexico**



**Source:** Google. Notes: Figures are shown as a 7-day moving average.

Figure 3: Mobility and epidemiological traffic light



**Source:** Google. **Notes:** The shaded areas represent the colors of the epidemiological traffic light. The purple shading covers the National Time of Healthy Distance. Mobility figures are defined as in the note to Figure 1 and are shown as a 7-day moving average.

### References

- ◆ Banco de México (2021). “Distanciamiento Social y Consumo Regional durante la Pandemia de COVID-19”. Reporte sobre las Economías Regionales Enero – Marzo 2021, Recuadro 2
- ◆ Campos-Vazquez, R.M. & Esquivel, G. (2021). “Consumption and geographic mobility in pandemic times: Evidence from Mexico.” Review of Economics of the Household, pp. 1-19.
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