

Mobile Wallets and Other Payment Services: Regional Gaps and Their Adoption in Colombia

A diagnosis of Colombia's payments ecosystem using spatial econometrics and machine learning

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Context and Study Objective

The problem

In Colombia, the share of adults with at least one active financial product rose from **77.3% (2022) to 83.9% (2024)**, an improvement that still leaves persistent gaps in the use of non-cash payment instruments.

Objective

To identify the determinants of payment service adoption, emphasizing territorial and user-level heterogeneity, and contrasting mobile wallets with traditional instruments (debit cards, checks).

Data

- Financial Inclusion Demand Survey (2022)
- Financial Inclusion Reports (2020–2023)
- DANE, MinTIC, DNP

Two complementary approaches

S

Spatial econometrics (SAR)

Spatial autoregressive panel data models to capture regional heterogeneity across 33 departments (2020–2023).

M

Machine Learning

Decision Trees and Random Forest applied to microdata from the 2022 Demand Survey (Banca de las Oportunidades) to uncover individual-level patterns.

Regional Gaps: Spatial Model (SAR) Results

Using savings accounts (debit cards/checks) and electronic deposits (mobile wallets) as proxies, 33 departments, 2020–2023

$\rho \approx 0.68 - 0.79$

Significant spatial autocorrelation: adoption in one department spills over to its neighbors

Internet + Education

Indirect effects (spillovers) exceed direct effects for both indicators

Pandemic

Significant drop in adoption in 2020–2021, in line with the contraction in private consumption

Policy takeaway

Regions that are economically more distant (lower GDP per capita or weaker institutional performance) face greater obstacles to expanding payment coverage.

Who Owns Payment Instruments and Mobile Wallets?

Ownership determinants per Decision Trees and Random Forest (2022 Demand Survey)

Only 39.4% own a payment instrument, 39.5% own a mobile wallet, 57.6% have at least one, and just 21.2% own both (multihoming).

Traditional instruments

$F1 \approx 0.65 - 0.77$

Education, income, socioeconomic stratum, age, and confidence in financial decisions. Linked to formalization and economic stability.

Joint ownership (multihoming)

$F1 \approx 0.67 - 0.78$

Higher socioeconomic status, internet access, financial planning capacity, and trust in institutions.

Mobile wallets exclusively

$F1 \approx 0.69 - 0.79$

Education, income, age, internet access, and territorial variables; more inclusive, yet still dependent on connectivity.

Main finding: Mobile wallets complement rather than replace traditional payment instruments.

Owning Isn't Using: The Gap Between Ownership and Use

Use of traditional instruments

Random Forest: Accuracy 84.9% · F1 0.86

- Distance to the departmental capital: strongest determinant (39.6%)
- Income, socioeconomic stratum, and household composition are key in Random Forest
- Perceived excessive paperwork limits effective use

Use of mobile wallets

F1 $\approx$ 0.83 – 0.86 across both algorithms

- Also sensitive to distance to the capital, but mitigates traditional barriers
- Income, stratum, age, and households with minors remain relevant
- Perceived ease of use is a key driver of adoption

Conclusions and Policy Recommendations

- 1 Payment adoption combines territorial heterogeneity (connectivity, education) with user-level heterogeneity (income, age, perceptions).
- 2 Spatial spillovers are robust: policy should be coordinated across neighboring departments, not designed department by department.
- 3 Mobile wallets do not replace traditional instruments: a clear multihoming pattern emerges among higher-income, digitally skilled users.
- 4 Priorities: close digital and educational gaps, reduce administrative frictions, and strengthen financial education from an early stage.

Policy conclusion: Expanding digital infrastructure, financial education and reducing operational frictions are essential to achieving more inclusive digital payments in Colombia.