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FULL LENGTH ARTICLE

Demand and Acceptance in Euro-Area Retail Payments: A Country-Level Decision Analysis of the 2024 SPACE Survey

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ABSTRACT

Retail payment providers must decide whether to invest in consumer activation, merchant acceptance, or both. This study compares those signals using published country tables from the European Central Bank's 2024 Study on the Payment Attitudes of Consumers in the Euro Area. Across 20 countries, the share of point-of-sale transactions paid without cash correlates with the share of respondents preferring noncash methods ($r = 0.65$) and with the share of transactions where noncash payment was available ($r = 0.70$). Leave-one-country-out prediction error falls from 11.67 percentage points for a country-mean benchmark to 9.54 with preference alone, 8.91 with acceptance alone, and 8.89 with both. Adding account ownership yields 8.58, a modest further gain. Latvia, Portugal, and Slovakia combine above-median noncash preference with above-median reports of cashless payment refusal. Germany illustrates the limits of a simple market screen: its observed noncash use exceeds the model's held-out estimate by 26.03 points. The results support using demand and acceptance as complementary market diagnostics, followed by local transaction research before investment. The analysis describes associations among national aggregates and does not identify a causal effect of merchant acceptance.

Keywords: Payment acceptance ▪ Consumer preference ▪ Point-of-sale transactions ▪ Retail strategy ▪ Euro area ▪ Cross-validation

1. INTRODUCTION

A payment provider considering a new retail market faces a two-sided operating problem. Customers may want to pay without cash but encounter a merchant that cannot accept their preferred instrument. A merchant may install the infrastructure yet see little use. Separating those conditions helps allocate research and pilot budgets. A single headline measure of digital payment adoption conceals the distinction.

The 2024 Study on the Payment Attitudes of Consumers in the Euro Area (SPACE) reports how people paid at physical points of sale (POS), what respondents say they prefer, and whether noncash methods were available at the places where transactions occurred [1]. Its public chart workbook permits a country-by-country comparison using the same survey release. The question here is precise: *How do stated preference and encountered acceptance compare as descriptive signals of noncash POS use across the euro area?* We also ask whether combining them improves held-out country prediction and whether reported refusal offers a useful separate market screen.

Evidence on payment adoption suggests that consumer characteristics and the context of use both matter. Meyer and Teppa [2] examine consumer payment preferences, perceived cashless acceptance, and banking digitalisation in the euro area, while Long et al. [3] find associations between financial literacy and electronic payment adoption in Japan. Laboratory evidence shows how consumers and merchants learn to

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coordinate over a new payment method when adoption costs change [4]. These studies motivate a two-sided decision analysis, but none justifies treating a cross-country correlation as the effect of installing a payment terminal. This article contributes a reproducible, small-sample comparison of signals available to a provider before it has proprietary merchant data.

2. BUSINESS SETTING AND RESEARCH DESIGN

Consumer preference and merchant acceptance are different quantities. The first is the share of surveyed people who report that they would rather pay by card or another noncash method. The second is the share of observed POS transactions at which the respondent could have used a noncash method. Payment use is measured per transaction, so a frequent shopper carries greater weight in the use and acceptance series than in the respondent preference share. We therefore compare market-level patterns, never subtract the two measures to claim a count of frustrated customers.

The economics of acceptance include equipment, processing fees, and customer demand. Arifovic et al. [4] show experimentally that a higher fixed cost can slow coordinated adoption. On the consumer side, Broekhoff and van der Cruijsen [5] document that electronic payment is experienced differently from cash; Schomburgk et al. [6] synthesize evidence of a small positive association between cashless payment and spending. These findings make usage and access commercially consequential, while also cautioning that payment choice reflects behavior beyond infrastructure.

2.1 Data and Units of Observation

We use the ECB's country-specific chart data accompanying its report published on 19 December 2024 [1]. The workbook supplies 2024 figures for all 20 euro-area countries. Germany's interviews occurred in September–December 2023; the report's other country data were collected in 2024. The country, rather than a respondent or transaction, is the unit of our analysis. Countries receive equal weight. We exclude the published euro-area aggregate and use no later release or subsequent revision.

Our dependent variable is 100 minus the cash share of POS transactions by number (Chart 5), namely the share completed with cards, mobile apps, or other noncash instruments. Preference is the respondent share choosing card or other noncash payments (Chart 22). Acceptance is the share of POS transactions where noncash payment was accepted or could have been used (Chart 46). Refusal is the respondent share reporting non-acceptance of a cashless instrument at least once in the preceding month (Chart 48); multiple reasons can be selected. Account access is the respondent share holding an account for payments (Chart 39). The supplied code extracts each country code from the exact sheets and columns, aligns countries by code, and writes the analysis table.

Acceptance is *encountered at transactions*, not the percentage of merchants that accept cards. A person may pay in cash even where a card is accepted, and the past-month refusal item records an experience rather than a transaction rate. These denominators are intentionally distinguished throughout. They also prevent a national aggregate from identifying the overlap of customers who prefer noncash and were refused.

Table 1. Selected 2024 country summaries and associations

Measure	Median	r with use
Noncash POS use (transactions)	56.38	—
Prefer noncash (respondents)	58.65	0.65
Noncash accepted (transactions)	88.53	0.70
Cashless refusal (respondents)	12.17	−0.52
Payment account (respondents)	92.06	0.47

Note. Unweighted medians across 20 euro-area countries; shares are percentages. r is the country-level Pearson correlation with noncash POS use. The measures have different denominators and recall periods.

2.2 Analytical Comparison

For country i, let y_i denote the percentage of POS transactions paid without cash, p_i the percentage of respondents preferring noncash, and a_i the percentage of transactions with noncash acceptance. We report Pearson correlations of y_i with p_i, a_i, reported refusal, and account access, alongside Spearman rank correlations. A descriptive least-squares specification is

$$y_i = \beta_0 + \beta_p p_i + \beta_a a_i + \varepsilon_i. \quad (1)$$

The regression is a compact benchmark for comparing signals, not a structural demand equation. Preference and acceptance are measured in the same survey, and merchants may choose acceptance in response to customer behavior [1]; reverse causality and common factors preclude causal interpretation.

We compare five prespecified linear predictors: the mean of the other countries, preference alone, acceptance alone, preference plus acceptance, and those two measures plus payment-account access. For each of 20 rounds, one country is held out, coefficients are fitted on the remaining 19, and the held-out share is predicted. Root mean squared error (RMSE) and mean absolute error (MAE) are measured in percentage points. This leave-one-country-out procedure is more informative than in-sample fit for a short country series, though the countries remain within the same survey year and do not represent a time forecast. We repeat the two-signal calculation after removing Malta and then the Netherlands as sensitivity checks. No causal effect, confidence interval for survey sampling, or decision threshold is estimated.

3. RESULTS

3.1 Distinct Signals in the Same Markets

The median country paid for 56.38% of POS transactions without cash, while 58.65% of respondents preferred a noncash method (Table 1). Noncash payment was reportedly available in a median 88.53% of transactions. The difference between 88.53% and 56.38% cannot be called unused capacity: these are country medians of distinct transaction measures, and acceptance does not force use. In the median country, 12.17% of respondents recalled at least one non-acceptance of cashless payment in the preceding month.

Figure 1 shows a positive country-level relationship of use with preference ($r = 0.651$) and with encountered acceptance ($r = 0.702$). Refusal is inversely associated with use ($r =$

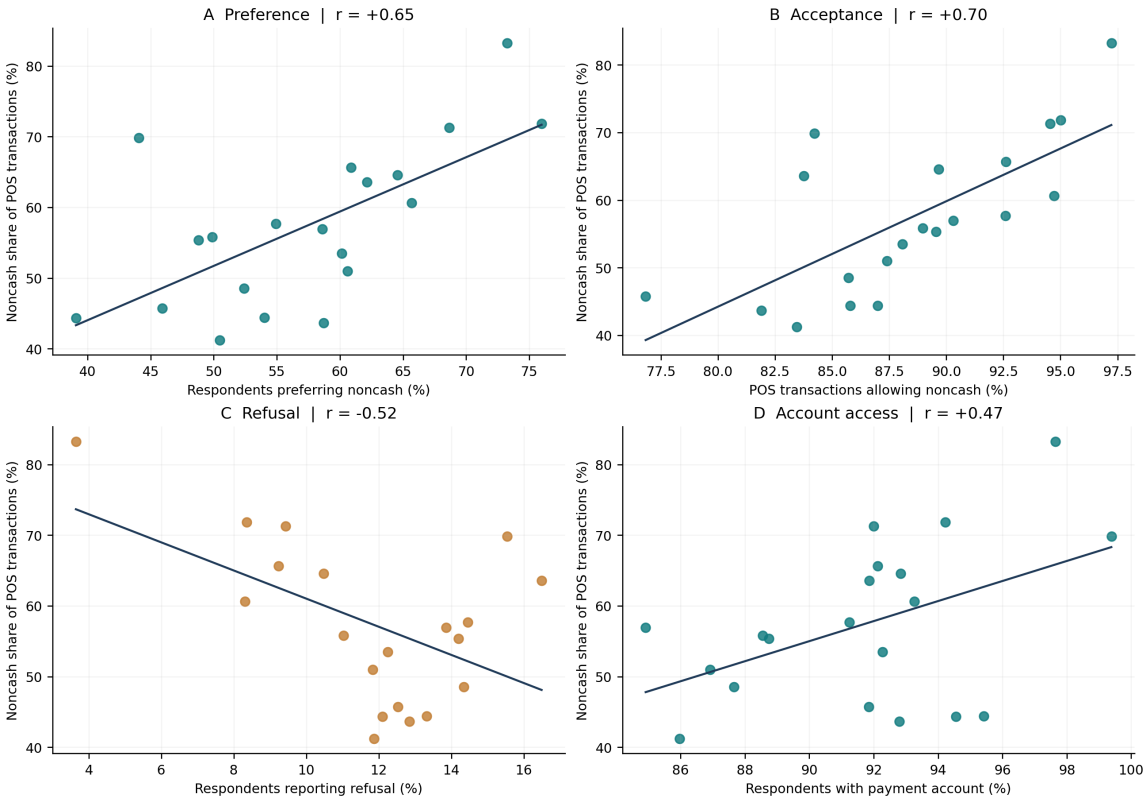


Figure 1. Four views of country-level payment use. Each point is one euro-area country ($n = 20$). Lines are ordinary least-squares fits for visualization. Preference, refusal, and account ownership refer to respondents; use and encountered acceptance refer to POS transactions. Correlations describe cross-country associations.

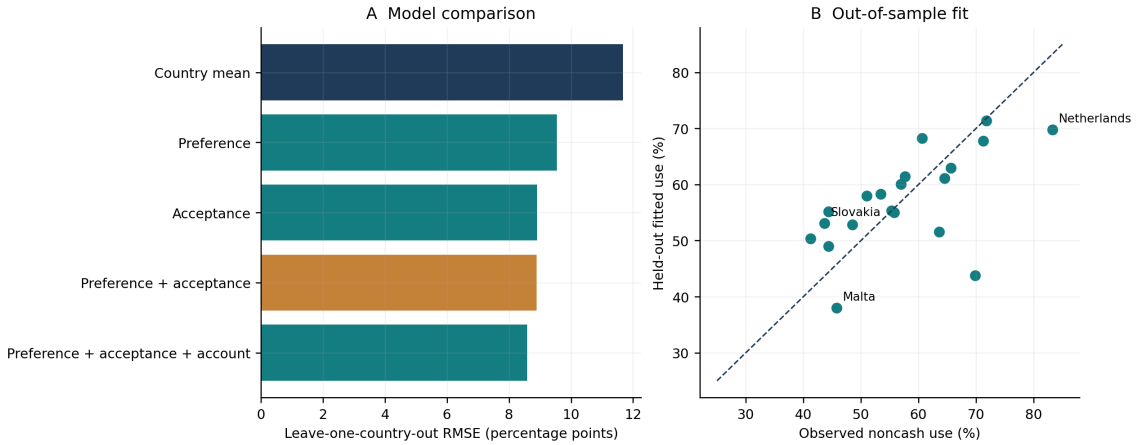


Figure 2. Out-of-sample comparison. Panel A reports root mean squared error for five models; panel B compares observed use with predictions from the preference-plus-acceptance model when each country is withheld in turn. The diagonal represents perfect held-out prediction.

-0.521); account access has a weaker positive association ($r = 0.466$). The corresponding rank correlations are 0.630, 0.728, -0.350, and 0.356. The signs are plausible for a two-sided retail market, but substantial dispersion remains. Germany, for instance, reports 44.05% noncash preference, 84.22% noncash acceptance, and 69.84% noncash POS use. The answers about general preference are not a direct measure of what the same people would have paid at the surveyed transactions.

3.2 Which Measures Carry Useful Out-of-Sample Information?

The leave-one-country-out mean benchmark has an RMSE of 11.67 percentage points (Table 2). Preference alone reduces it to 9.54 and acceptance alone to 8.91. The two-signal model yields 8.89; its improvement over acceptance alone is just 0.02 percentage points, too small to claim a meaningful ranking advantage in this sample. Adding account ownership produces 8.58. The MAE is lower for the joint model than for either single signal (6.75 versus 7.05 for preference and 7.50 for acceptance), which shows that a conclusion about model ranking also depends on the loss measure. The in-sample two-signal R^2 is 0.548; it must not be read as predictive accu-

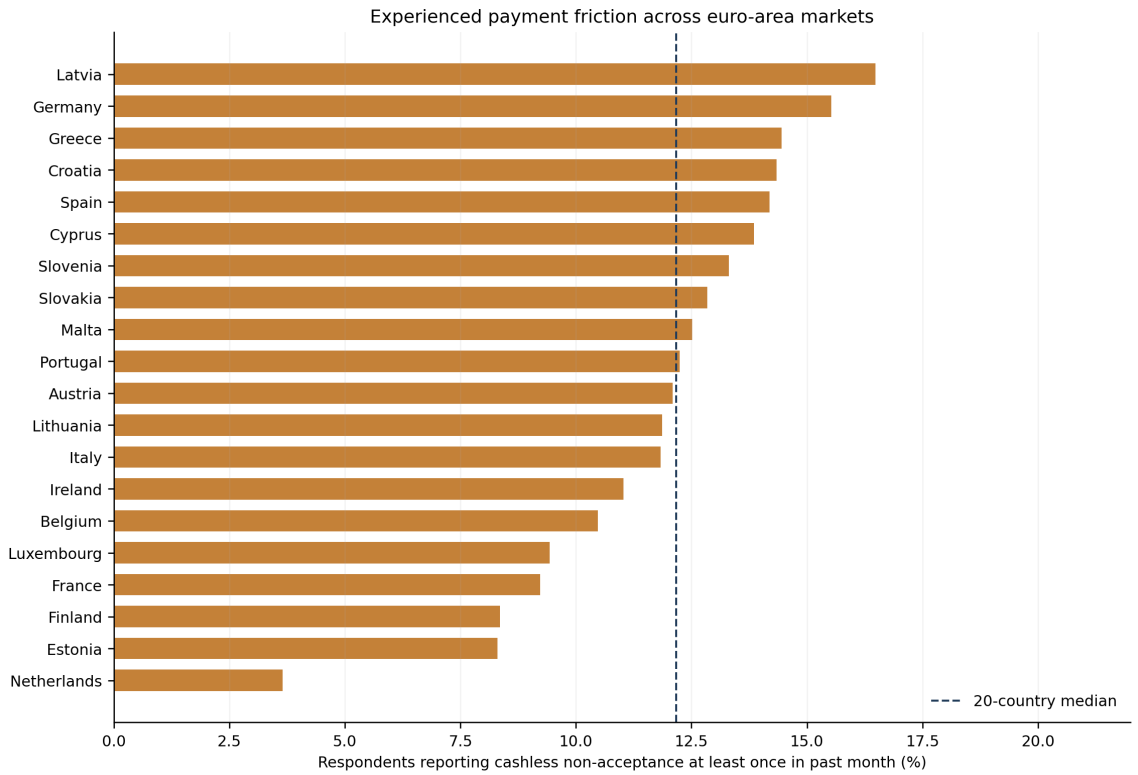


Figure 3. Country ordering by the share of respondents reporting cashless payment refusal. The figure provides a supplementary market-friction screen; respondent refusal and preference are separate national indicators and do not identify the same individuals.

Table 2. Leave-one-country-out prediction errors

Model	RMSE	MAE
Country mean	11.67	9.61
Preference	9.54	7.05
Acceptance	8.91	7.50
Preference + acceptance	8.89	6.75
Preference + acceptance + account	8.58	6.68

Note. Errors in percentage points. For each held-out country, the model is re-estimated using only the other 19 countries. Models are descriptive screens, not forecasts of future payment adoption.

racy.

The two-signal fit is particularly poor for Germany: when that country is withheld, its fitted use is 26.03 percentage points below observed use. The Netherlands is another large residual (13.48 points). Figure 2 makes these exceptions visible. Removing the Netherlands yields an RMSE of 8.51 on the remaining 19; removing Malta yields 9.22. The correlations with acceptance remain positive in each restricted set (0.629 and 0.699, respectively), but no exclusion removes the fundamental mismatch between transaction-based use and respondent-based stated preference.

3.3 A Practical Acceptance-Friction Screen

Figure 3 orders countries by the share of respondents who encountered cashless non-acceptance at least once in the previous month. The Netherlands reports 3.65%, while Latvia reports 16.49%. A useful first pass for a provider is to examine places that exceed both the 20-country median preference (58.65%) and the median refusal rate (12.17%). Latvia, Portugal, and Slovakia meet this rule. Their noncash preference shares are 62.15%, 60.13%, and 58.69%, respectively; their refusal shares are 16.49%, 12.24%, and 12.84%.

This screen locates countries in which each *separate national indicator* is above its sample median; it does not show how many individuals both prefer noncash and experienced a refusal. Slovakia's noncash POS use is 43.64%, while Latvia's is 63.56%, so the two markets should not receive the same commercial forecast simply because both qualify. Merchant category, transaction size, card scheme, and local cost information are needed to interpret each case.

4. DISCUSSION AND MANAGERIAL IMPLICATIONS

The clearest business use of these results is to structure due diligence. A provider in a market with high noncash preference and many reported refusals can investigate which retail categories, transaction sizes, and payment instruments generate the refusals. The findings favor targeted field measurement of acceptance and checkout failures over an indiscriminate terminal rollout. A market with high acceptance but weaker use calls for research into payment habits, pricing, perceived convenience, and the customer proposition. The analysis does not show that either intervention would increase revenue.

Merchants' and customers' decisions interact. Evidence from laboratory adoption experiments points to the importance of fixed merchant costs [4]; evidence on consumer preferences and payment experience indicates that infrastructure is only one part of observed use [2, 5]. The current results are consistent with this broader literature, but are also more limited: the ECB tables provide a single cross section of country estimates, not merchant-level treatment variation. In particular, merchant acceptance measured from where people

shopped is partly a product of where they choose to shop. A provider needs merchant-level acceptance logs, counts of attempts and failures, fees, transaction values, and a feasible comparison group before evaluating returns on an acceptance intervention.

Several limitations govern the analysis. Country rates are survey estimates with sampling uncertainty that the published chart tables do not allow us to propagate into these calculations. The regressors may be correlated with each other and with omitted differences in retail mix, card costs, regulation, income, and payment culture. Noncash use includes the ECB's "other" payment methods in addition to cards and mobile apps; the refusal question concerns cashless instruments as described by respondents. The 20 countries are not independent experimental units, and the models may perform differently in another year. The median-based market flag is a transparent triage device rather than an estimate of incremental customers or unmet demand. Decisions should retain cash access for customers who choose or need it [1].

5. CONCLUSION

In the ECB's December 2024 release, both preference and encountered acceptance track noncash POS use across 20 euro-area countries. Acceptance alone has a lower leave-one-country-out RMSE than preference alone (8.91 versus 9.54 percentage points), and their combination brings only a marginal additional RMSE reduction to 8.89. National refusal reports point to Latvia, Portugal, and Slovakia for closer market investigation, but cannot identify frustrated individuals from separate marginal percentages. The paper offers an auditable way to direct market research while leaving commercial impact to be established with local transaction and merchant evidence.

DATA AVAILABILITY

The ECB's *SPACE 2024* report and its public chart workbook are available from the European Central Bank website [1]. The accompanying reproducibility package includes the December 2024 workbook, extracted country data, analysis code, results, and PNG figures.

REFERENCES

[1] European Central Bank, "Study on the payment attitudes of consumers in the euro area (SPACE) – 2024," Report and chart data, 2024.

[2] J. Meyer and F. Teppa, "Consumers' payment preferences and banking digitalisation in the euro area," European Central Bank, Working Paper Series 2915, 2024.

[3] T. Q. Long, P. J. Morgan, and N. Yoshino, "Financial literacy, behavioral traits, and ePayment adoption and usage in japan," *Financial Innovation*, vol. 9, p. 101, 2023.

[4] J. Arifovic, J. Duffy, and J. H. Jiang, "Adoption of a new payment method: Experimental evidence," *European Economic Review*, vol. 154, p. 104410, 2023.

[5] M.-C. Broekhoff and C. van der Cruijsen, "Paying in a blink of an eye: It hurts less, but you spend more," *Journal of Economic Behavior & Organization*, vol. 221, pp. 110–133, 2024.

[6] L. Schomburgk, A. Belli, and A. O. I. Hoffmann, "Less cash, more splash? a meta-analysis on the cashless effect," *Journal of Retailing*, vol. 100, no. 3, pp. 382–403, 2024.