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Data Glacier – Final Project Week 11: EDA Presentation

Data Analyst: Cross-Selling Recommendation

-by Asha K C
LISUM43

Date: 20-May-2025

Agenda

- Team Details
- Problem Statement
- Business Understanding
- GitHub Repo Link
- EDA Summary
- Final Recommendations

Team Details

Team Member Details: Individual project (no team)

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Company: Data Glacier

Specialization: Data Analyst

Problem Statement

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The XYZ bank is having difficulty cross-selling its products to existing customers. Customers are not buying additional products sold by their bank. Hence, data analysts must provide the information required to enhance their cross-selling methods.

Dataset provided:

1. Train.csv (1,36,47,309 entries) – This dataset is 2.13 MB. There are a total of 48 features. Features mainly consist of customer code, age, gender, income, address, products held, seniority, active/passive index,…

Business Understanding

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The problem statement indicates that XYZ Bank excels at acquiring new customers but struggles with customer retention and service diversification. Cross-selling involves offering complementary or related products to current customers.

For example:

- A customer with a checking account might be offered a credit card or a retirement savings plan.
- A customer with a home loan could benefit from the option to acquire a safe deposit box or an insurance product.

Cross-sell vs Upsell

	Definition	Use case
Cross-sell	Selling additional products to customers	Someone has a checking account → offers a credit card
Upsell	Selling a higher-ed or upgraded version of a product	Customer has a basic savings account → suggest a premium account with benefits

GitHub Repository link

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https://github.com/Asha-KC-07/Data-Glacier-Internship-2025---LISUM43/blob/main/Week%2010%20-%20Data%20Analyst_Cross-selling%20recomendation/EDA_v1.ipynb

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EDA Summary

1. Demographics Analysis

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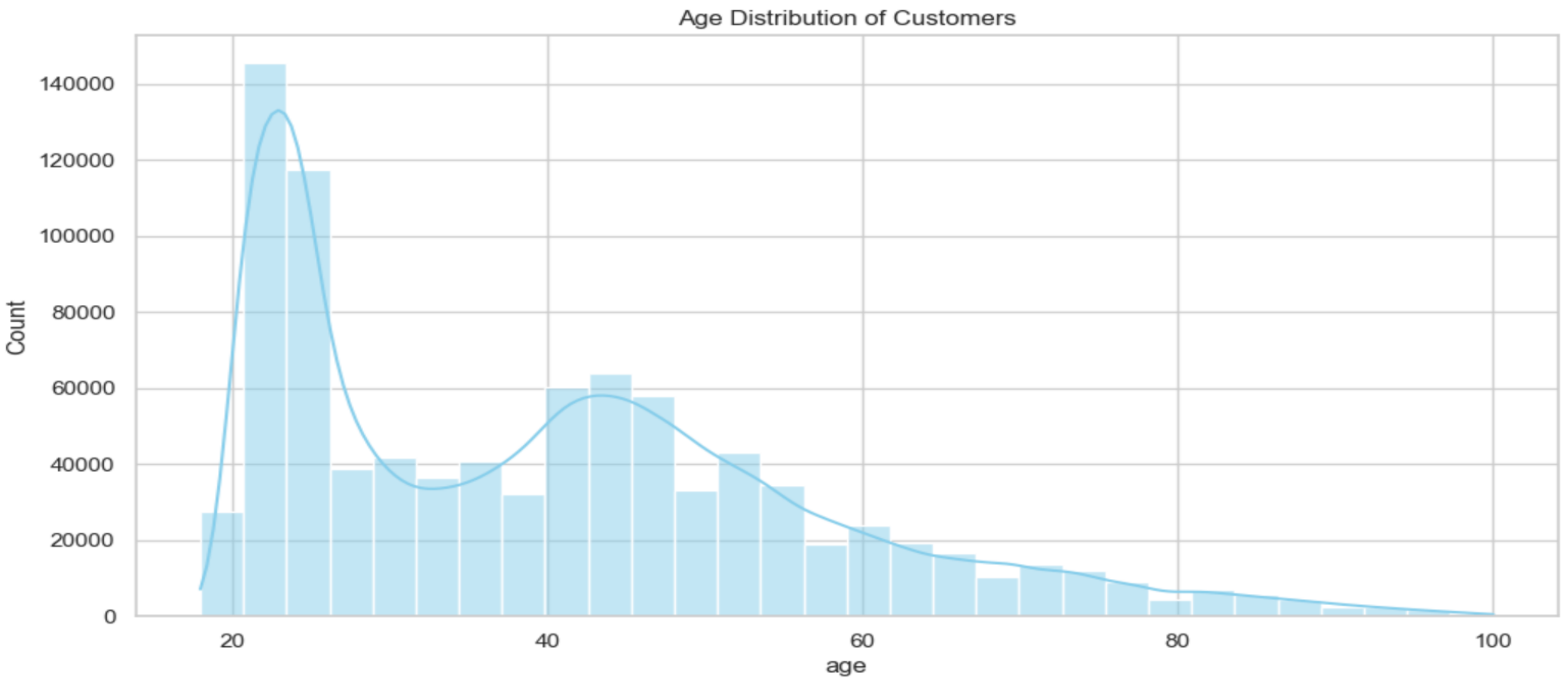

1. Age Distribution Histogram

- Most customers fall between **25 to 60 years**.
- There's a visible right skew due to older age values.
- Minor counts exist for extremely old ages (over 90).

1. Demographics Analysis

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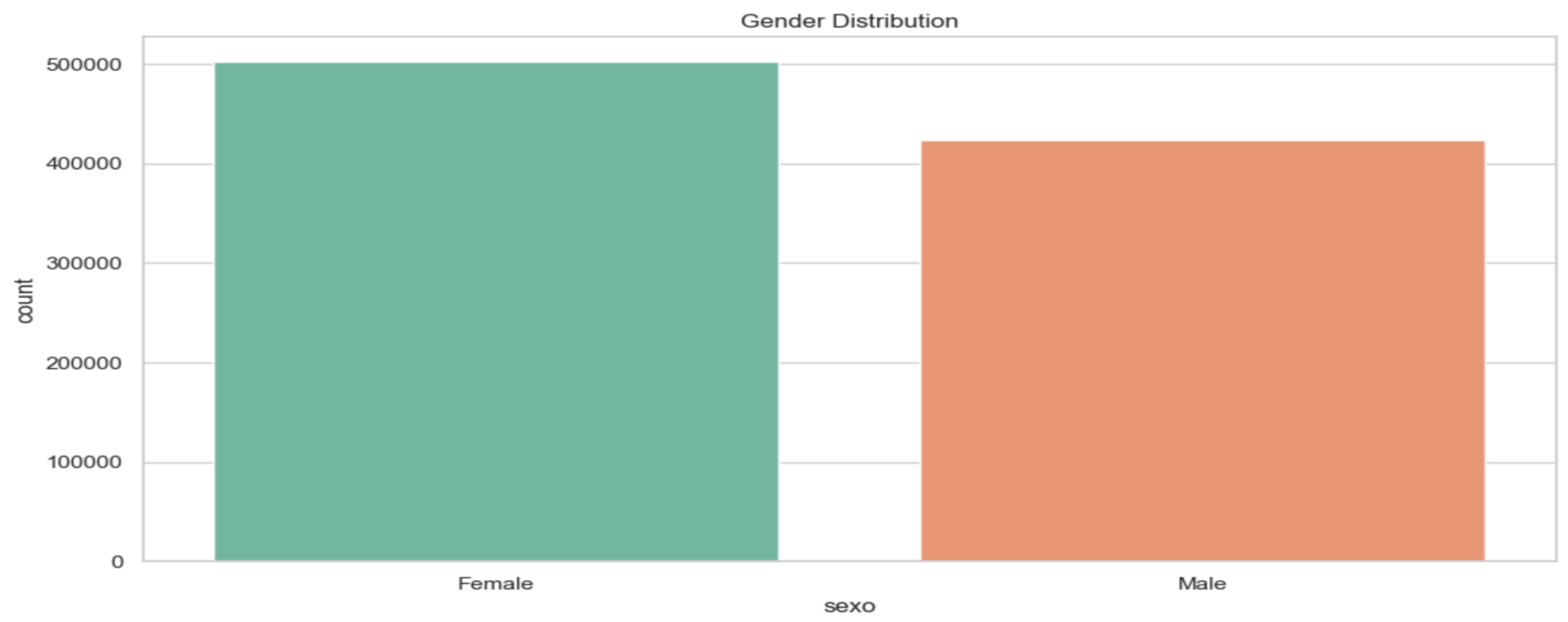

2. Gender Distribution

- **Slightly more females** than males.
- Imbalance isn't significant but could affect segment-specific targeting.

1. Demographics Analysis

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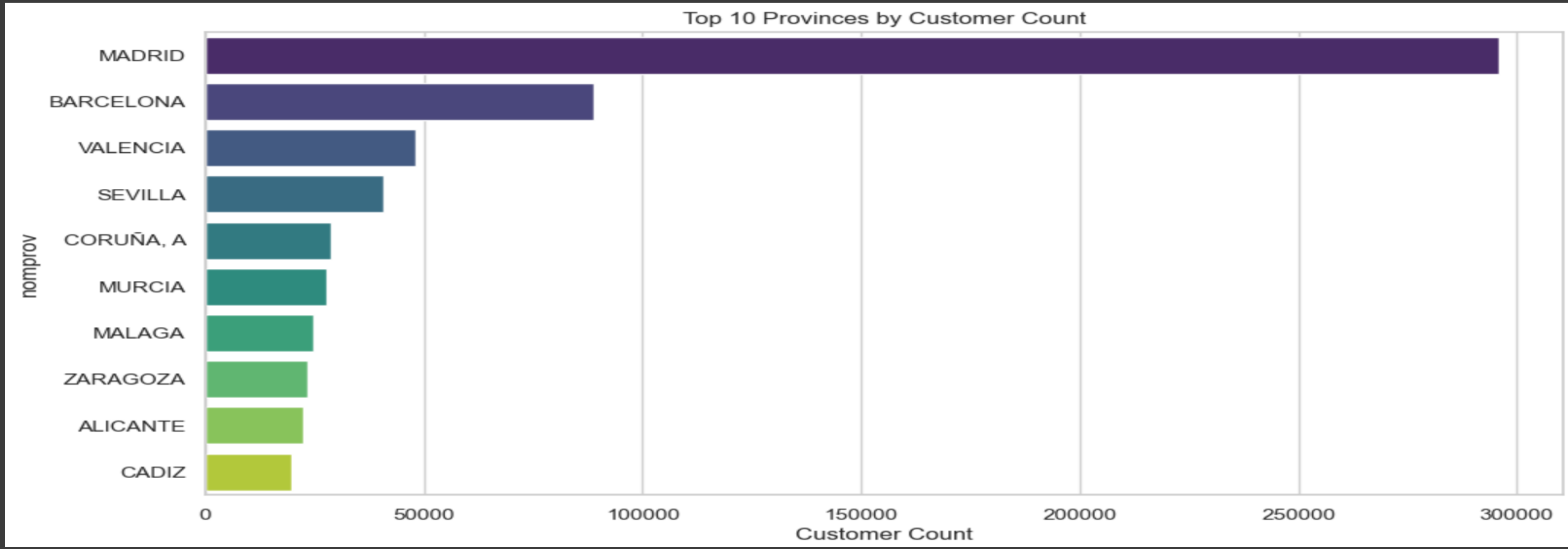

3. Top 10 Provinces by Customer Count

- Certain provinces (like **Madrid**, **Barcelona**, etc.) dominate the customer base.
- Indicates geographic concentration — great for region-specific marketing strategies.

1. Demographics Analysis

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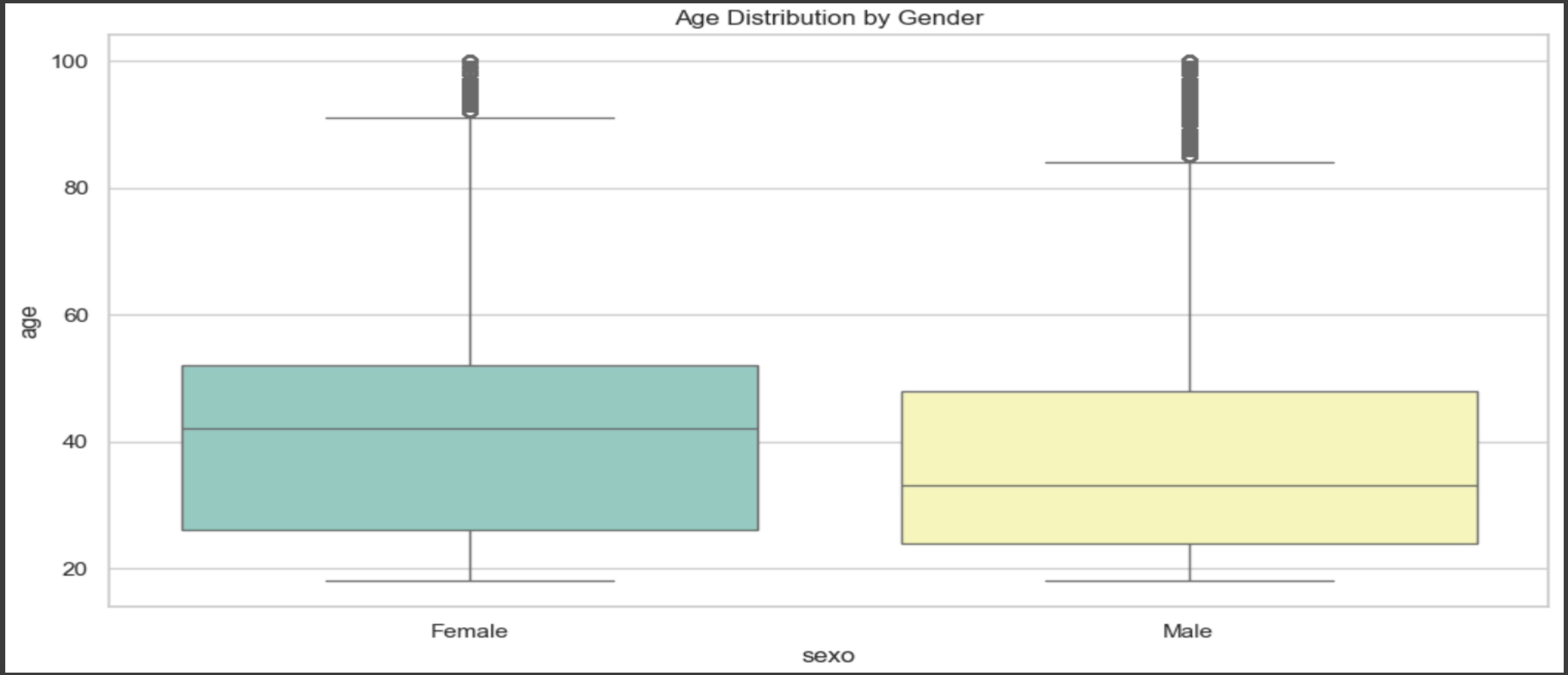

4. Age by Gender Boxplot

- Female customers tend to be **slightly older** on average.
- The age spread is similar for both genders but has a few more high-age outliers.

1. Demographics Analysis

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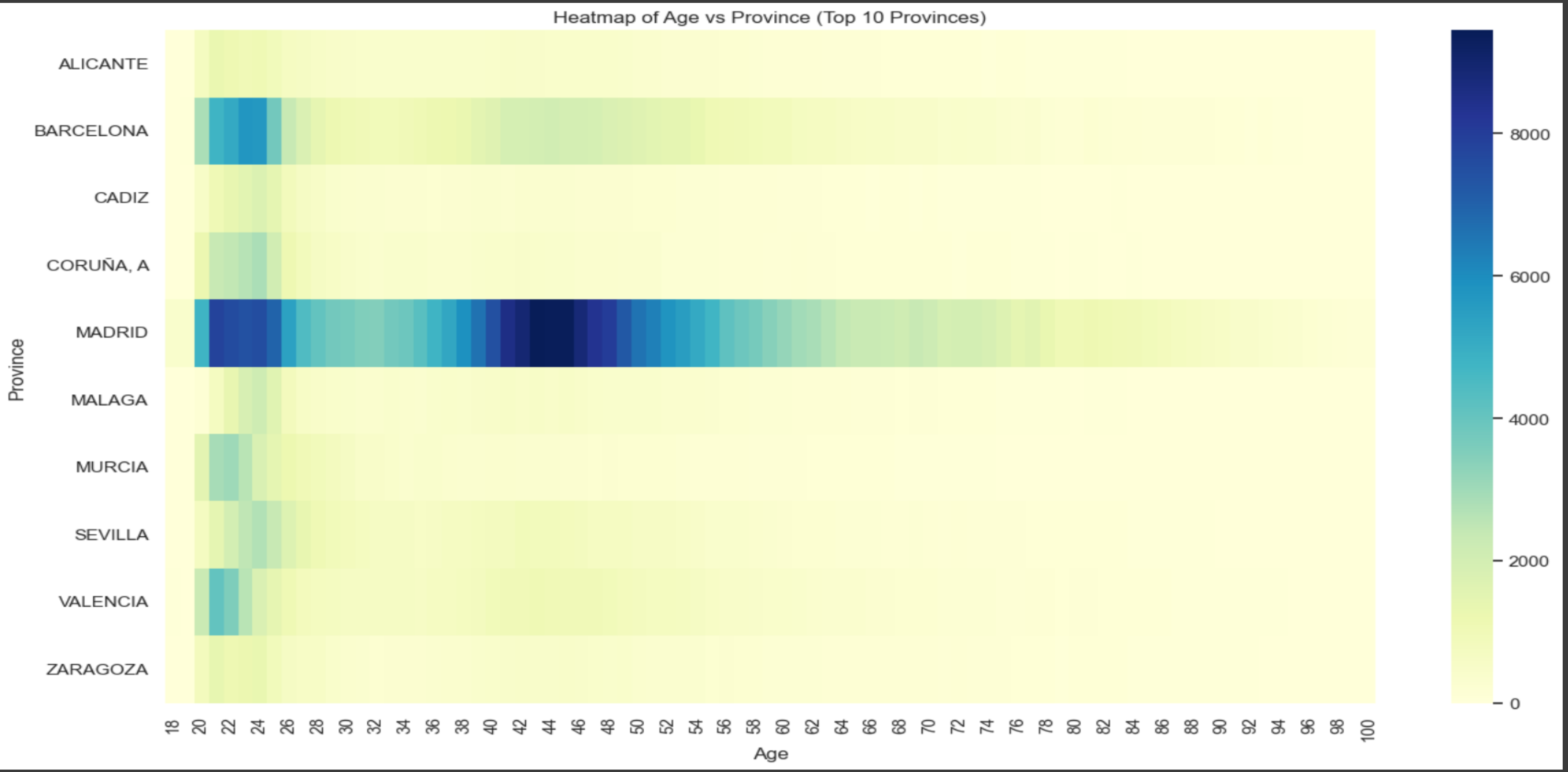

5. Heatmap of Age vs. Province

- Each province shows a **strong concentration around ages 40-55**.
- Useful to identify which regions have a younger vs older customer base.

2. Product Adoption Rates:

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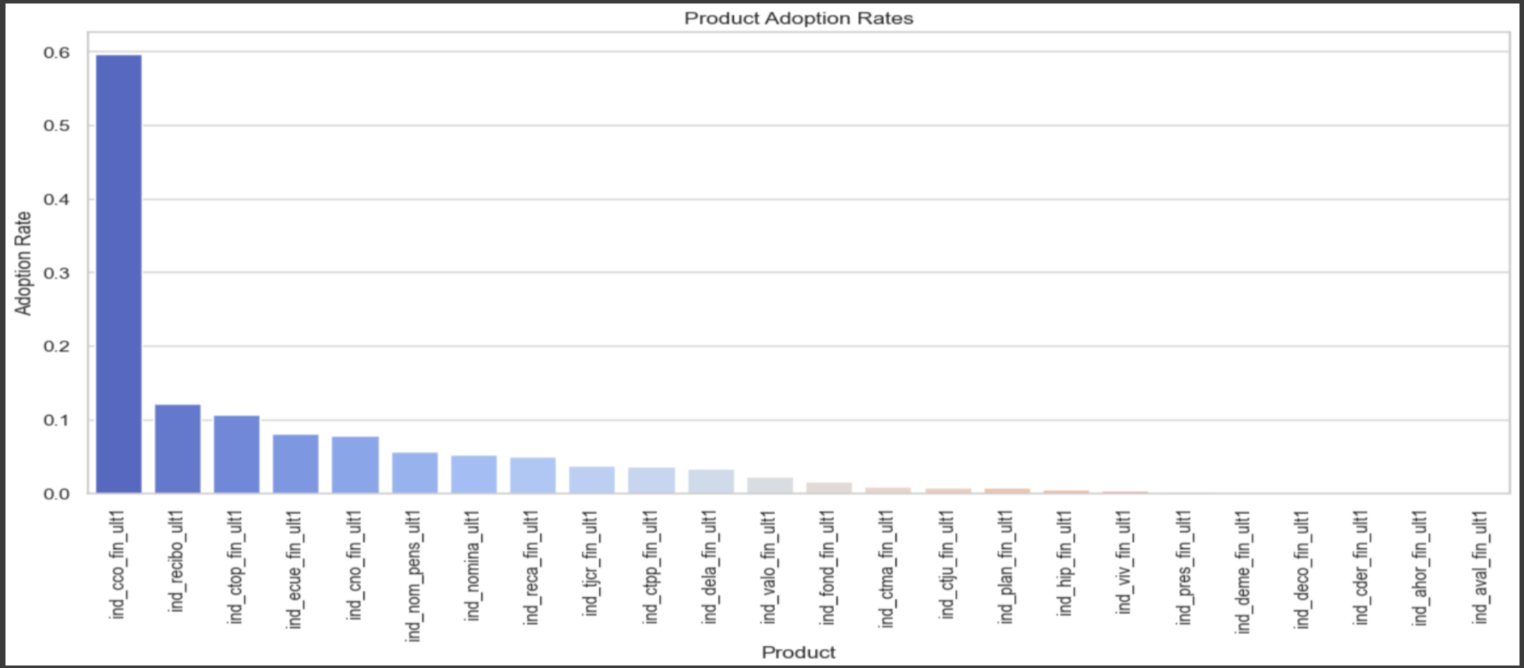

- Most commonly held products:
  - ind_recibo_ult1 (**12.1%**): Utility Bill Payments
  - ind_nom_pens_ult1 (**5.5%**): Pension Deposits
  - ind_nomina_ult1 (**5.1%**): Salary Deposits
  - ind_tjcr_fin_ult1 (**3.8%**): Credit Cards
- Least commonly held products:
  - ind_plan_fin_ult1, ind_pres_fin_ult1, ind_viv_fin_ult1: All below **1%**

2. Product Adoption Rates:

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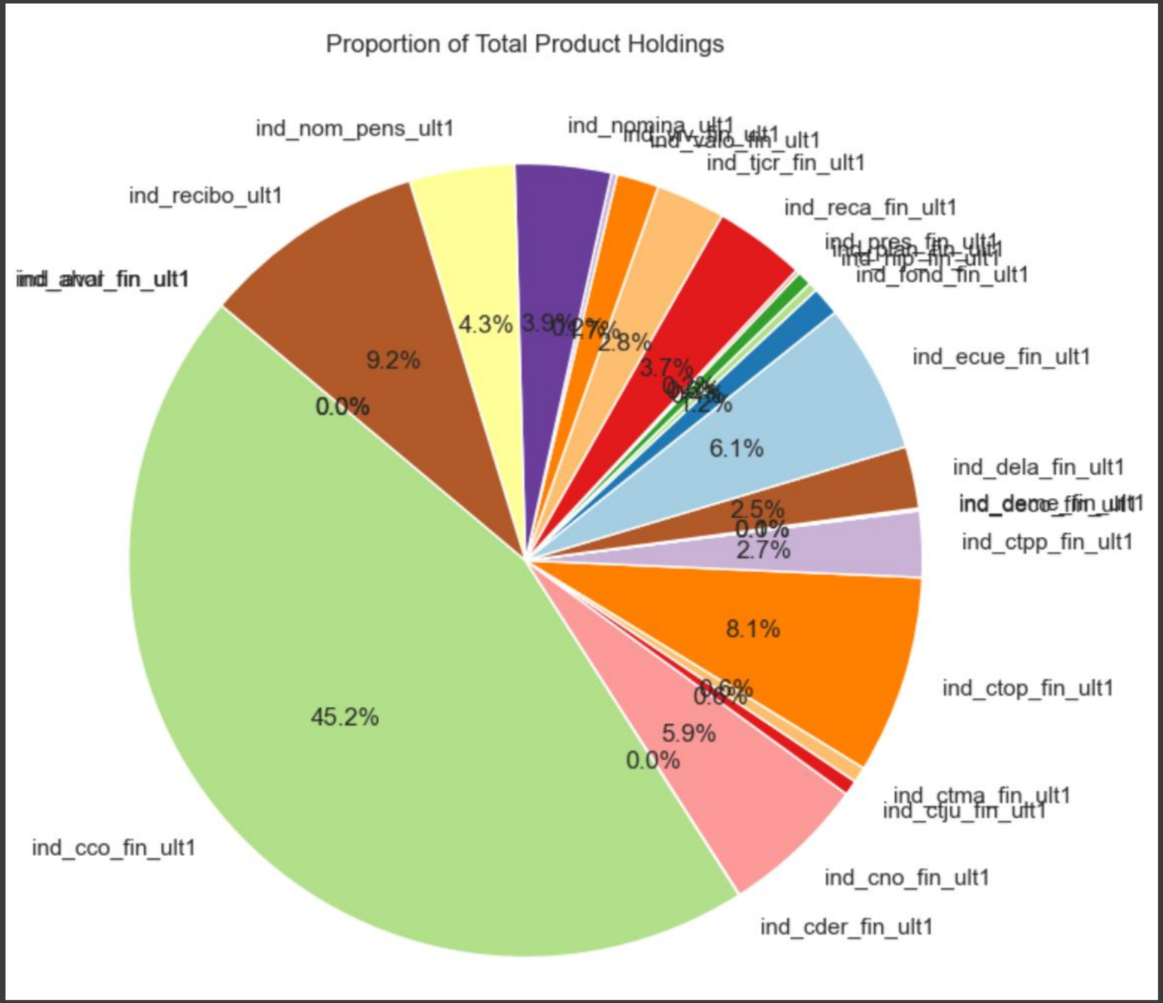

Pie Chart: Total Product Holdings

- A few product types dominate the customer portfolio space.
- Products like **salary/pension deposits** and **recurring payments** represent the bulk of ownership.

3. Product Ownership by Segment:

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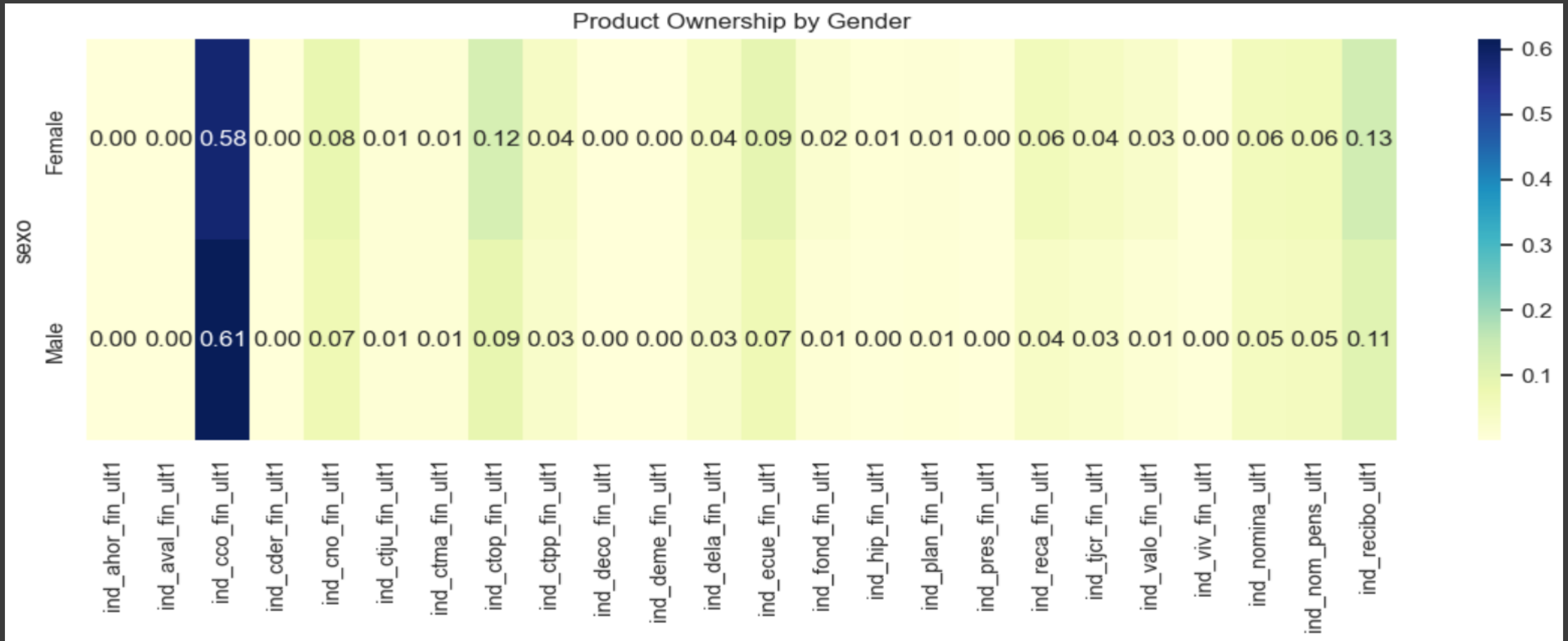

1. Gender-Based Ownership

- **Females** slightly lead in products like:
  - ind_nomina_ult1 (salary deposits)
  - ind_recibo_ult1 (recurring bill payments)

- **Males** show marginally higher ownership in:
  - Investment-related products (ind_valo_fin_ult1, ind_fond_fin_ult1)

3. Product Ownership by Segment:

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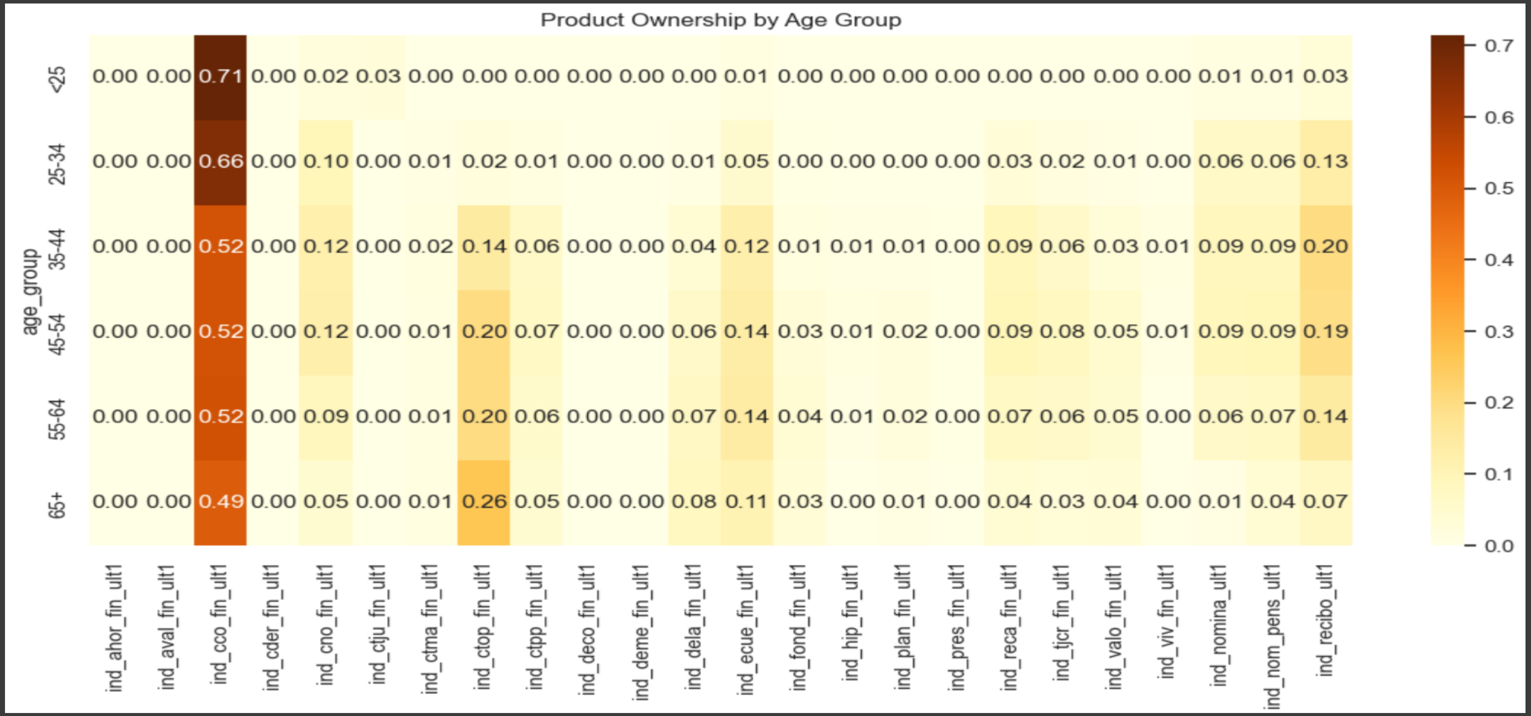
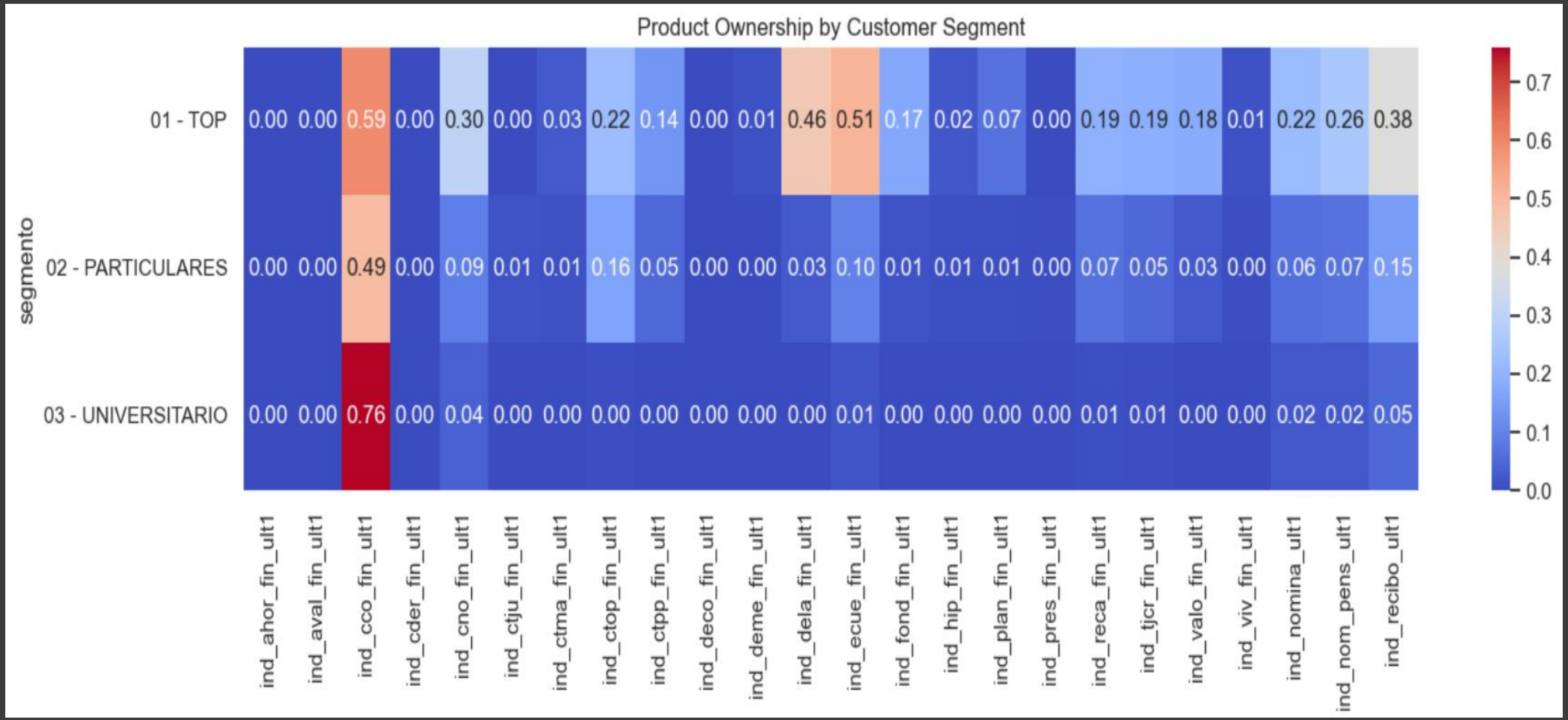


2. Age Group Trends

- **Young adults (<25)** rarely hold any product.
- **Ages 35-54** dominate across almost every product — especially:
    - Salary deposits (ind_nomina_ult1)
    - Credit cards (ind_tjcr_fin_ult1)
- **Older groups (65+)** tend to show less ownership of credit or investment products.

3. Product Ownership by Segment:



3. Segment-Based Trends

- segmento indicates customer types like "01 - VIP", "02 - Individuals", "03 - College students":
  - **VIPs** show highest ownership in multiple financial products, especially credit and investment tools.
  - **College students** exhibit minimal product ownership — mostly basic accounts.

4. Customer Lifetime Value Proxies

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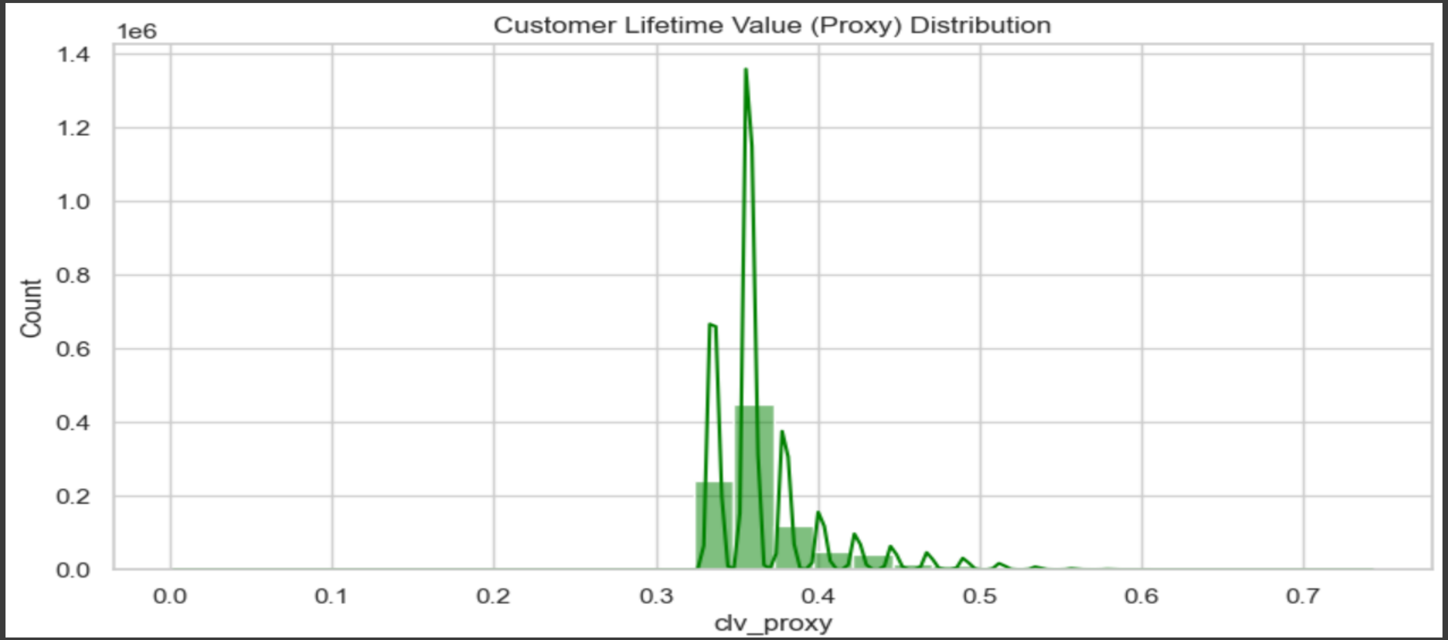

1. Distribution of CLV Proxy

- Most customers fall within **mid** CLV proxy scores.
- Right-skewed: a smaller segment shows high-value potential (top 10–15%).

4. Customer Lifetime Value Proxies

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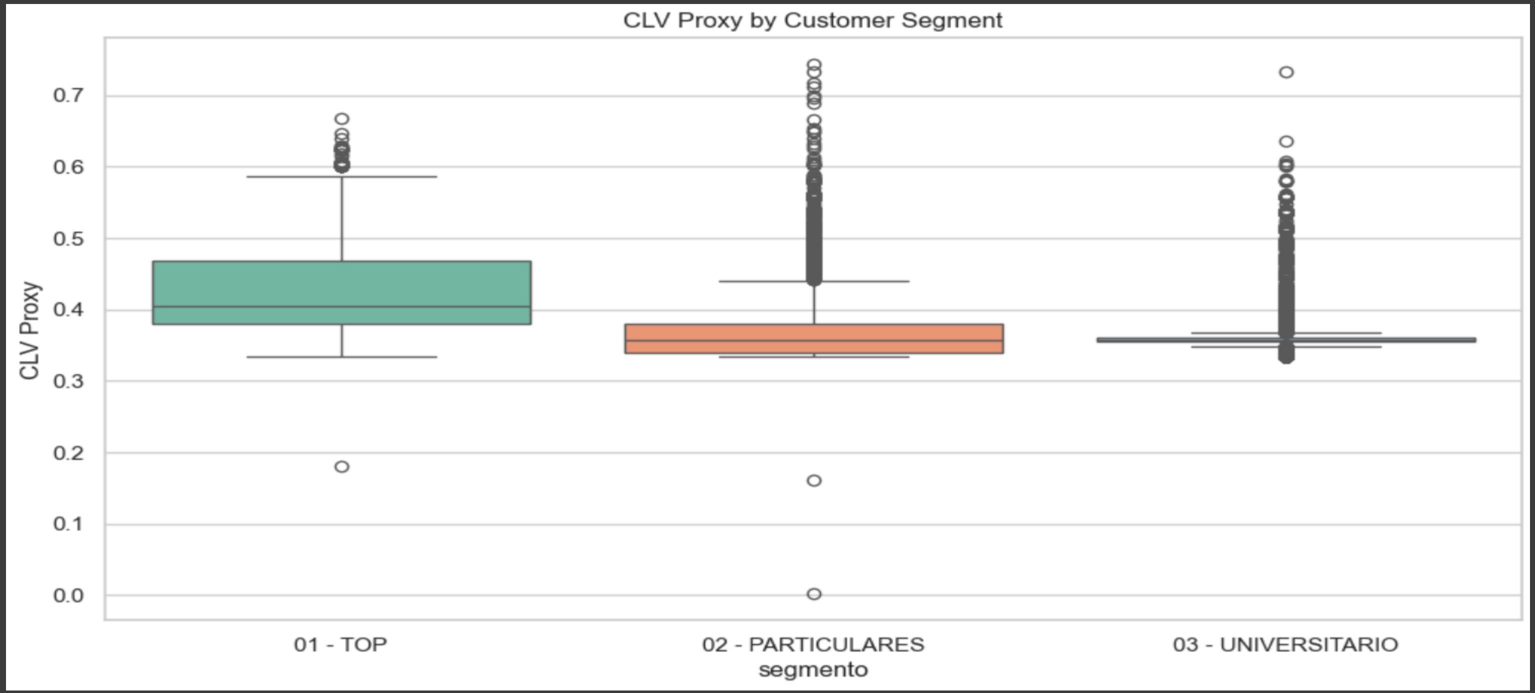

2. Boxplot by Segment

- **VIPs** (01 - VIP) have the highest median and spread of CLV.
- **College students** (03 - UNIVERSITARIO) score lowest in CLV — expected due to low tenure, product count, and income.
- **Mass Market Individuals** (02 - PARTICULARES) span the full spectrum, indicating a diverse customer base.

4. Customer Lifetime Value Proxies

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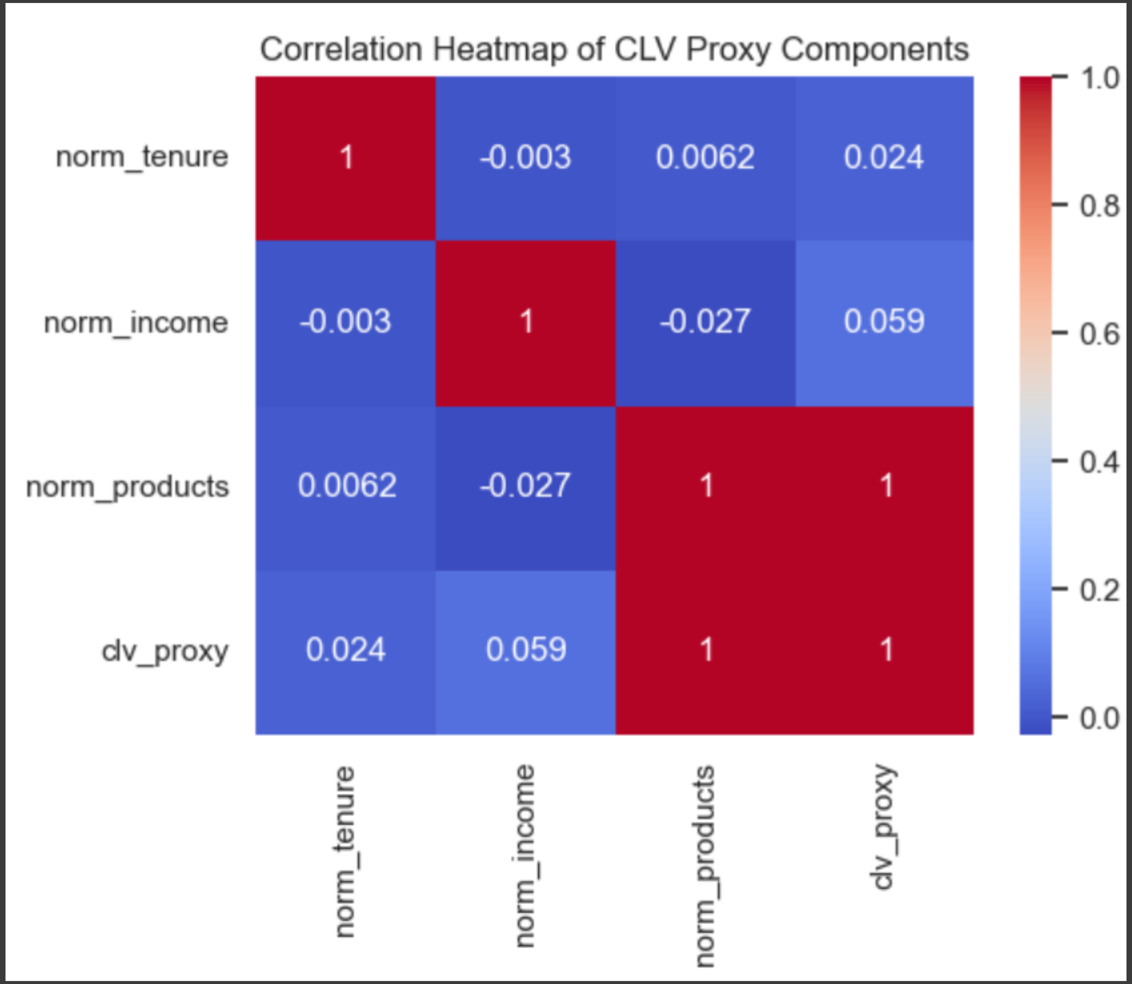

3. Correlation Heatmap

- **Product count** (norm_products) is most strongly correlated with overall CLV score.
- **Income and tenure** also contribute but less dominantly.

5. Churn Indicators

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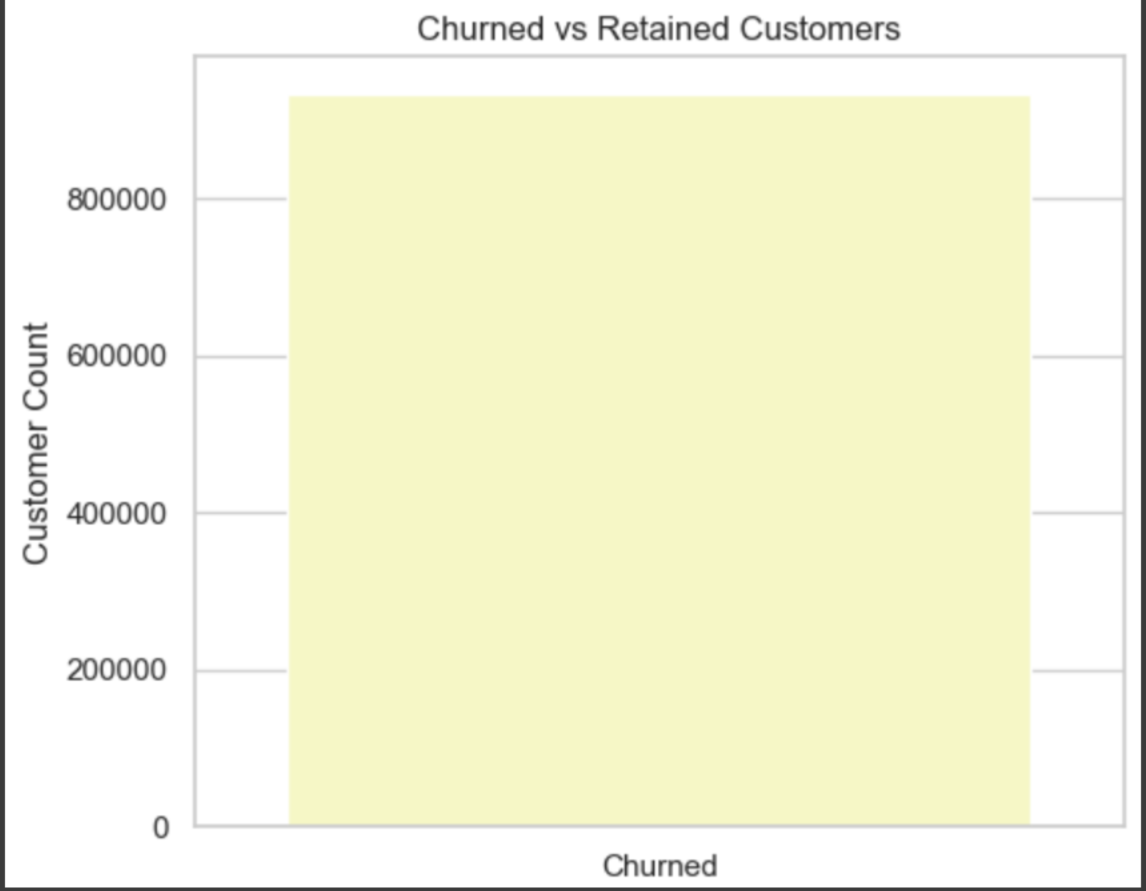

1. Churned vs Retained Customers

- A **very small fraction** of the customers is marked as "churned".
- Indicates the dataset mostly includes **active customers**.

5. Churn Indicators

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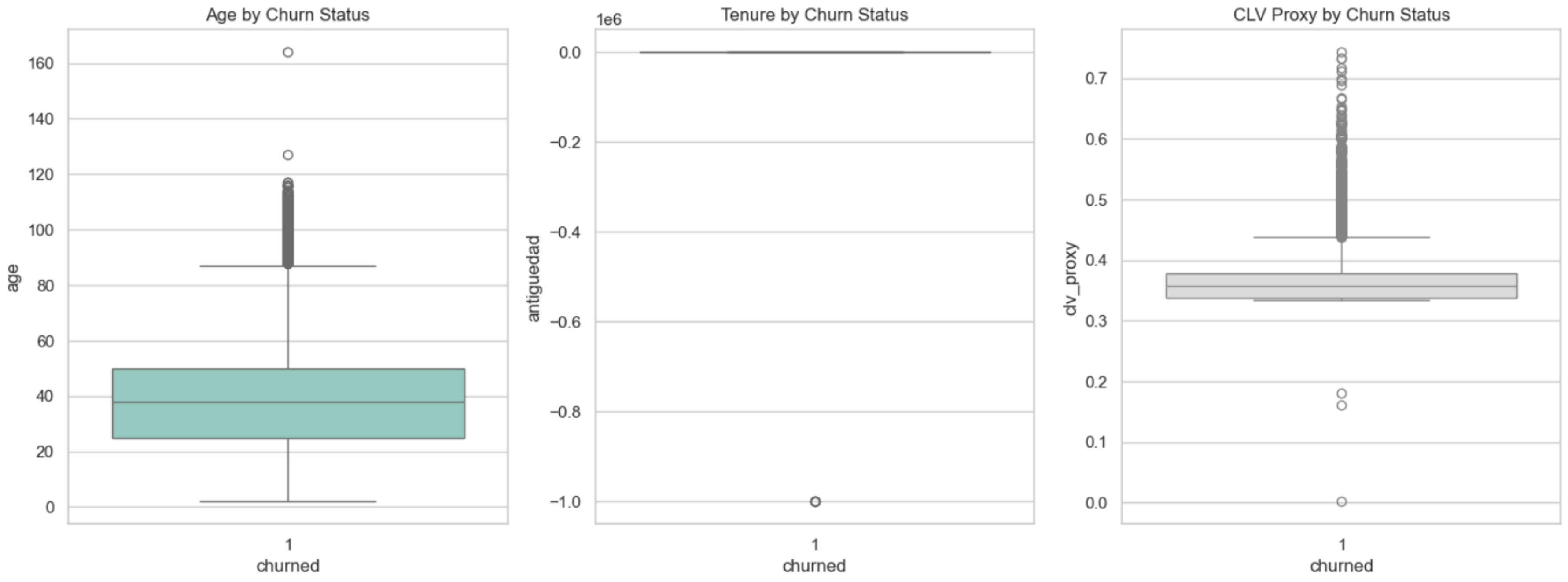
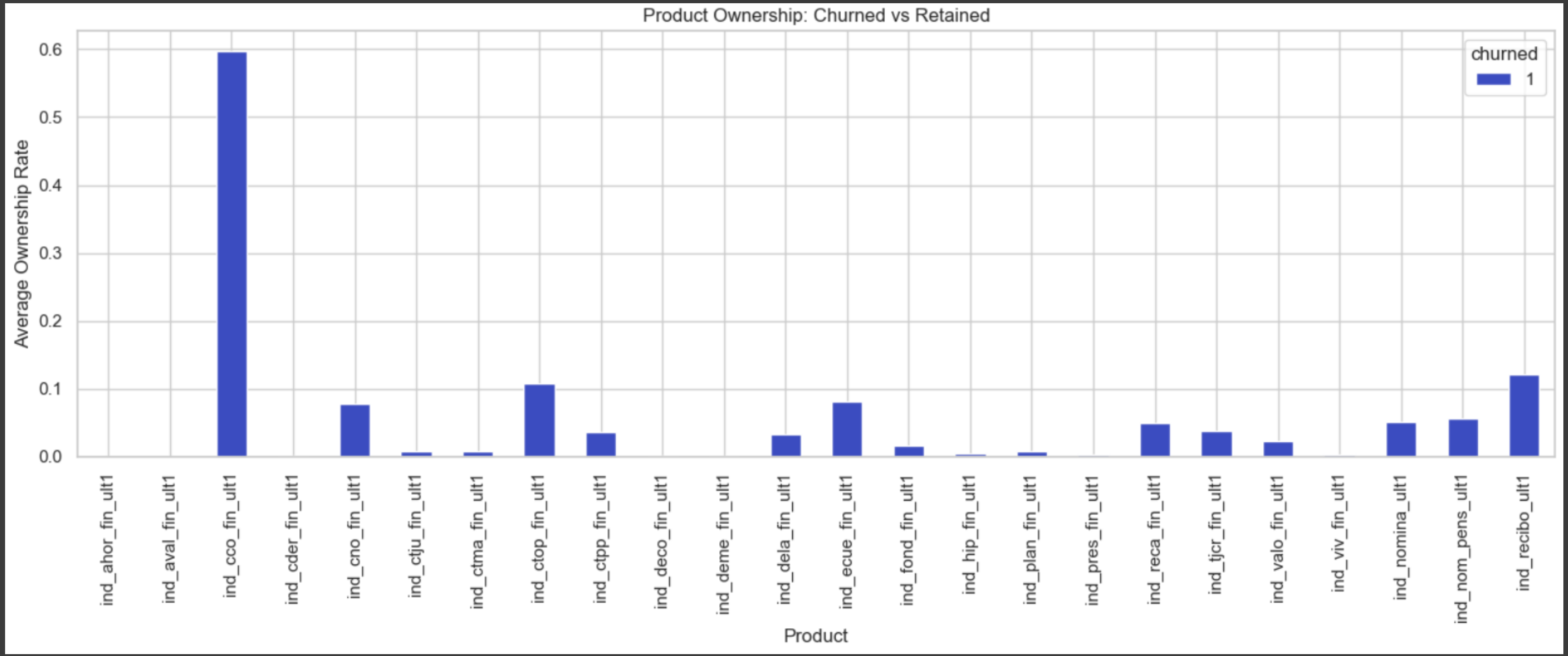


2. Age, Tenure, and CLV Comparisons

- **Churned customers** tend to:
  - Be **older on average**
  - Have **shorter tenure** (surprising — might reflect new users abandoning)
  - Have **lower CLV scores** overall
- Retained users dominate in higher tenure and product count distributions.

5. Churn Indicators



3. Product Ownership Drop-Off

- Churned users have **lower ownership rates across nearly all products**.
- Largest relative drop in products like:
  - Credit Cards (ind_tjcr_fin_ult1)
  - Salary/Pension Accounts

6. Channel Effectiveness

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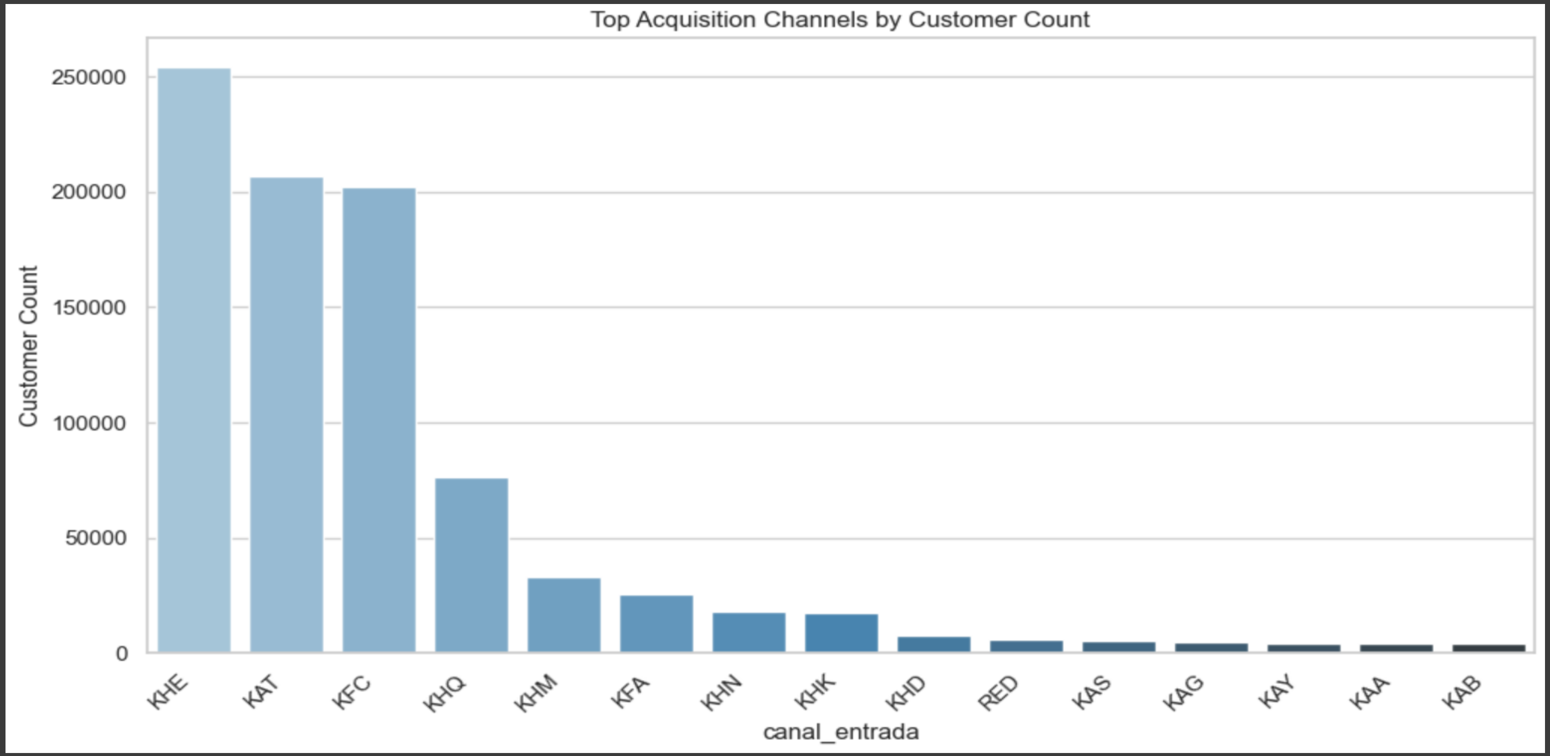
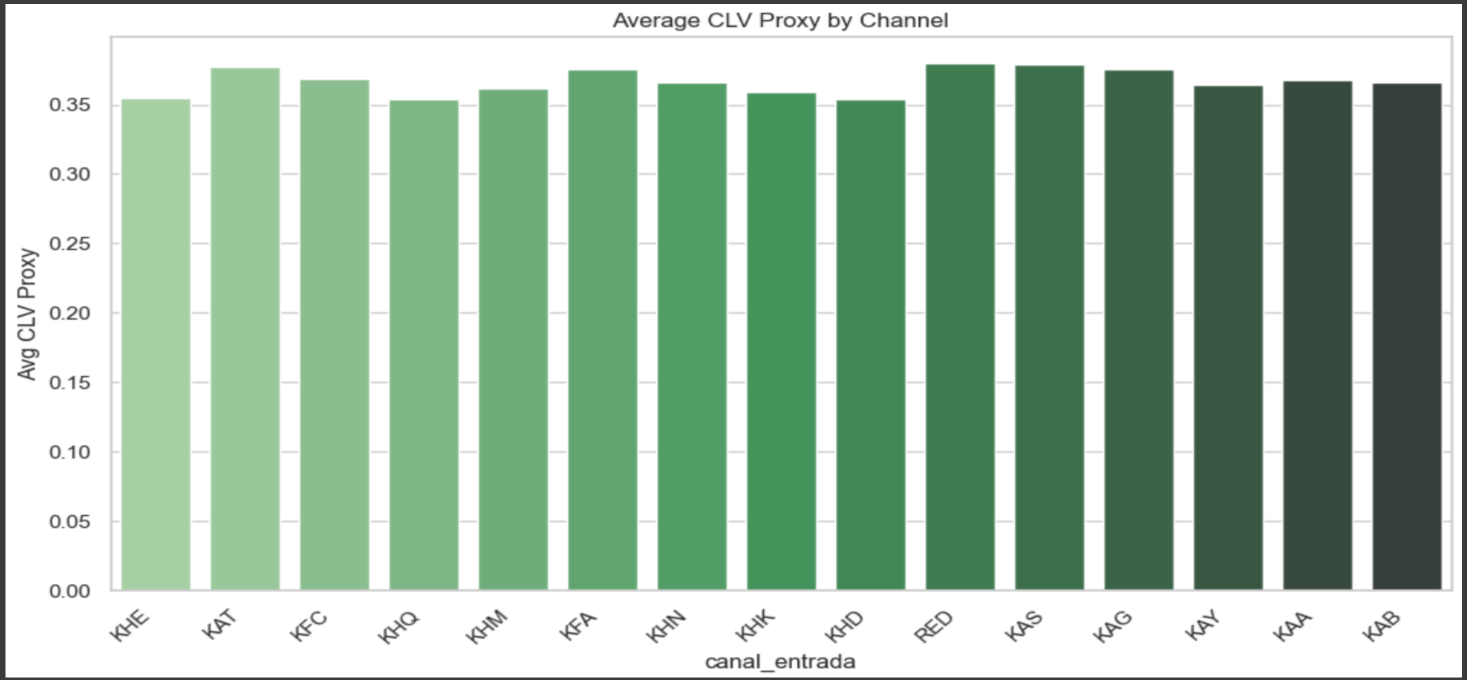


1. Top Acquisition Channels by Customer Count

- A few channels dominate customer acquisition:
    - KHE, KAT, and KFC are among the most used.
- These likely represent physical or digital acquisition pathways.

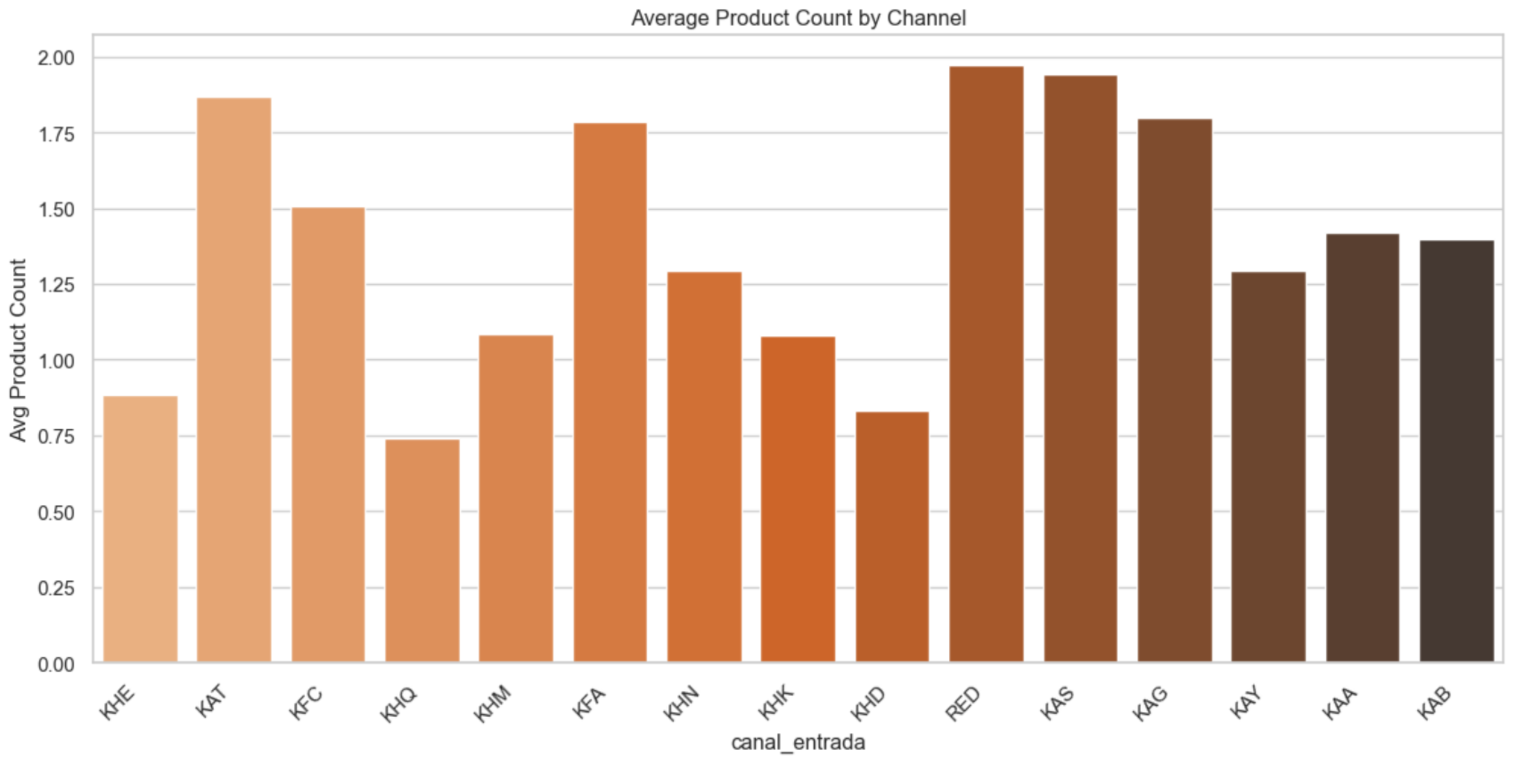
6. Channel Effectiveness



2. Average CLV Proxy by Channel

- High customer volume **does not always mean high value**:
    - Channels like KAT and KFA show **higher CLV**, despite smaller customer bases.
- Mass channels may acquire many users, but **niche or referral-based ones attract higher value clients**.

6. Channel Effectiveness



3. Average Product Count by Channel

- Channels with higher CLV also typically yield **more product engagement**.
- KFA and KAT again appear as effective **quality acquisition routes**.

7. Income Analysis

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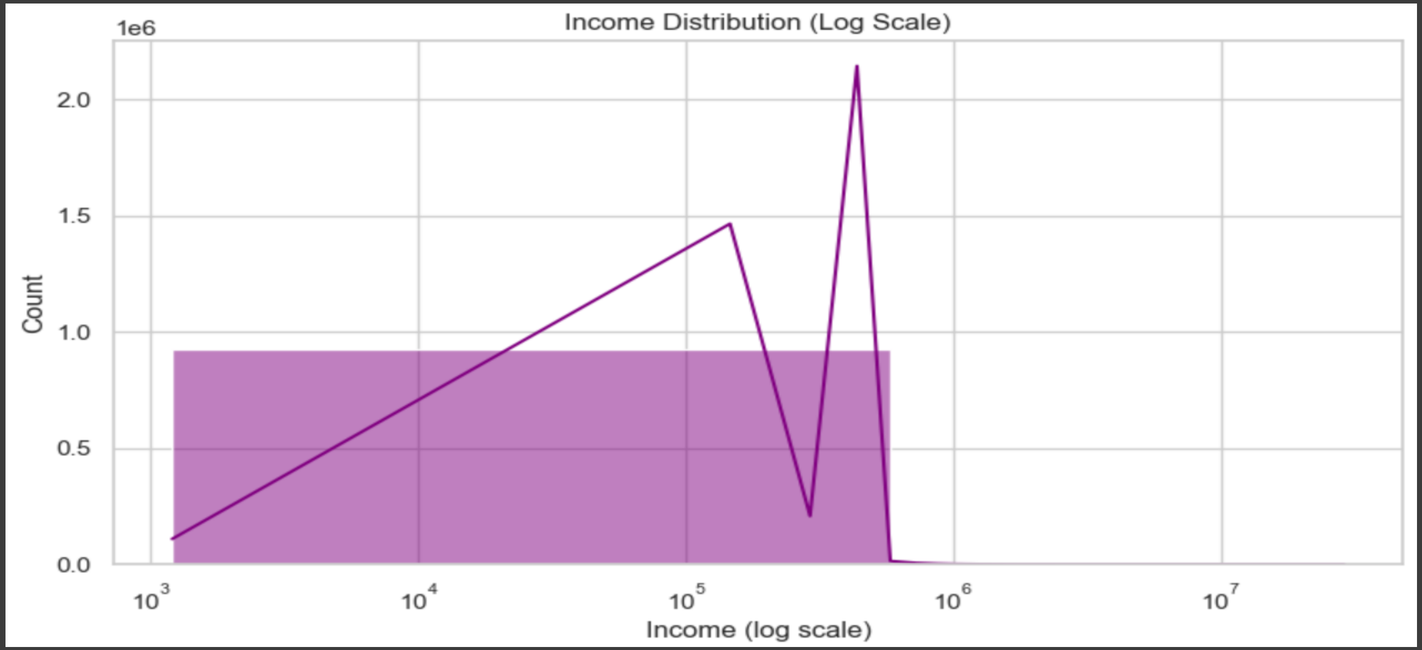

1. Income Distribution (Log Scale)

- Highly **right-skewed**: majority of incomes lie below ~60,000.
- A few customers report **extremely high income** (>100,000), suggesting income outliers.

7. Income Analysis

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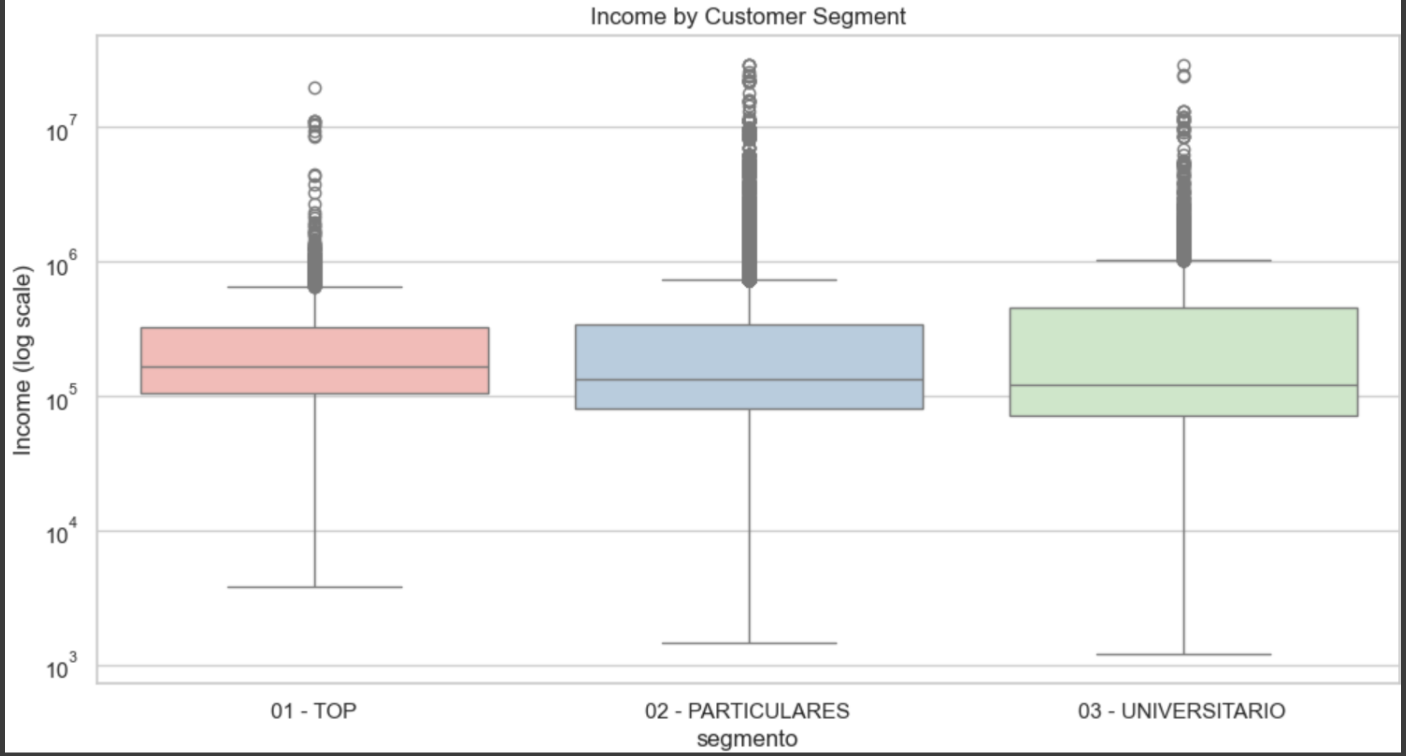
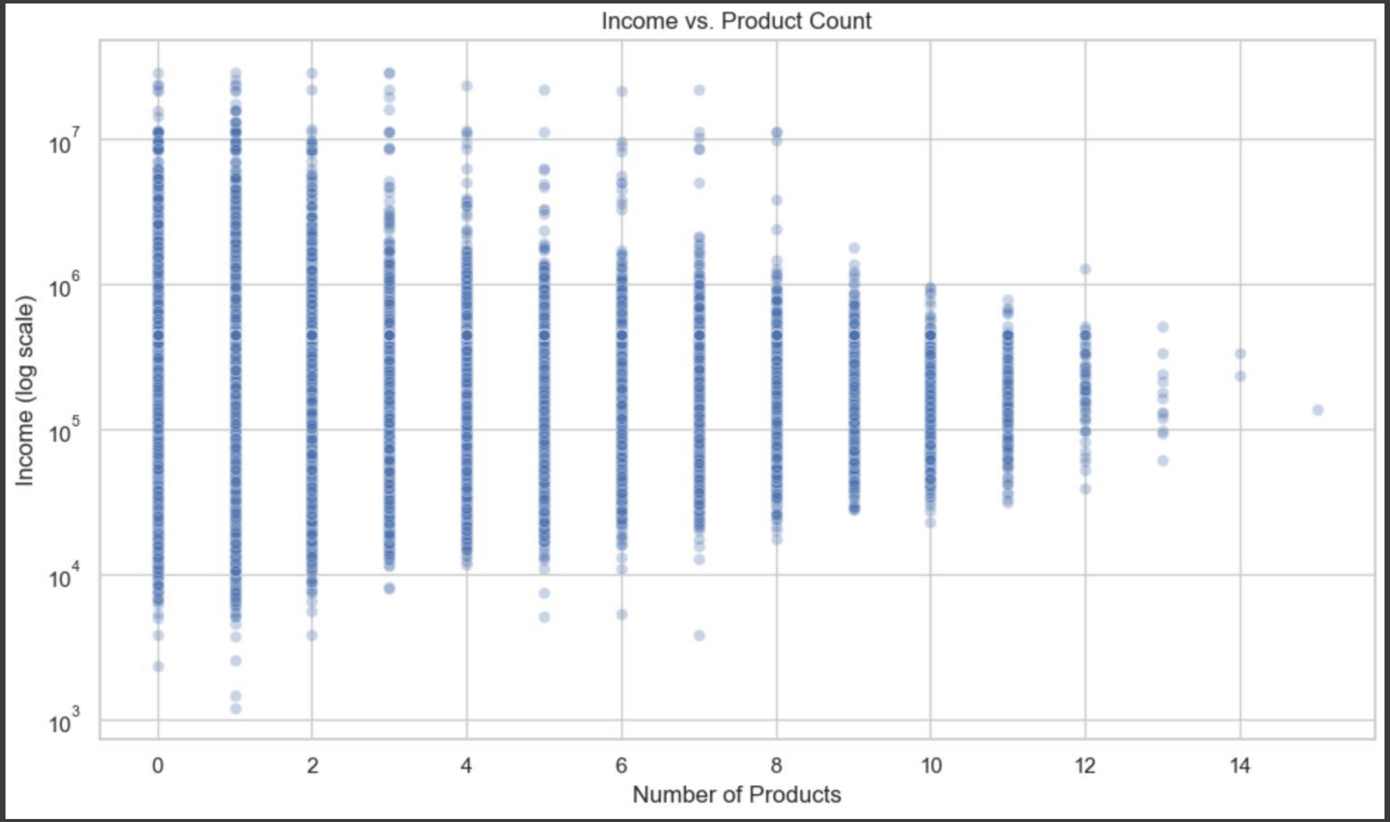


2. Income by Customer Segment

- **VIPs** (01 - VIP) predictably show the **highest income range**.
- **College students** (03 - UNIVERSITARIO) have the lowest and most compact income distribution.
- Segments are well-separated, validating the segmentation strategy by income

7. Income Analysis



3. Income vs. Product Count

- Positive trend: **higher product count tends to correlate with higher income**.
- However, some **high-income customers own few products**, indicating potential for upselling.

8. Product Co-Ownership Patterns

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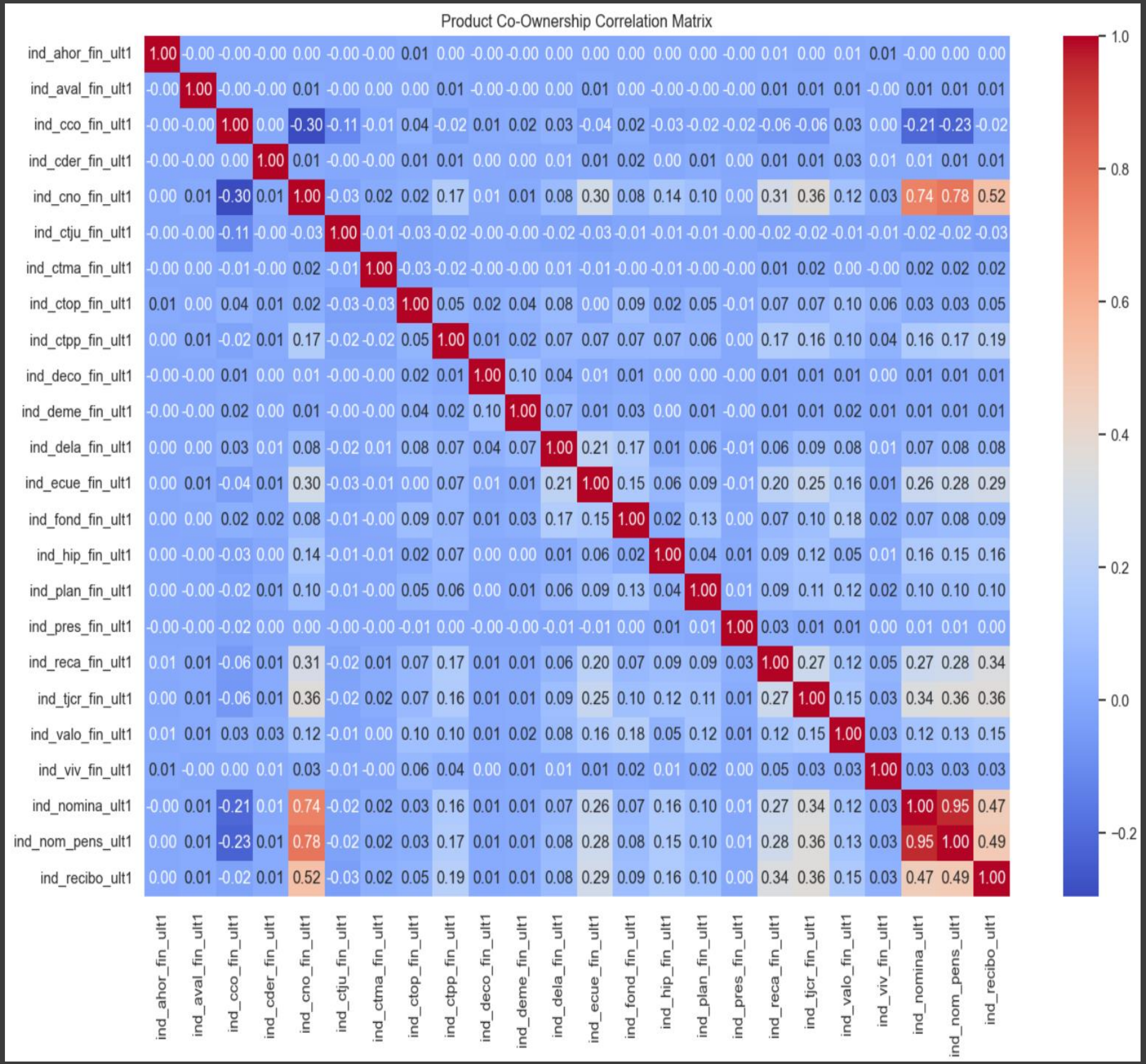

Key Product Correlations

- **High Positive Correlation Pairs**:
  - ind_nomina_ult1 (salary) ↔ ind_recibo_ult1 (bill payments): 0.66
    ➤ Customers receiving salaries tend to set up recurring payments.
  - ind_nom_pens_ult1 (pension) ↔ ind_recibo_ult1: 0.45
    ➤ Similar trend with pension-based income.
- **Investment-related Products** like ind_fond_fin_ult1, ind_valo_fin_ult1, ind_deco_fin_ult1 are often held together:
  - Moderate correlations (~0.3–0.5), indicating bundled behaviours.
- **Minimal or Near-Zero Correlations**:
  - Savings accounts (ind_ahor_fin_ult1) and insurance (ind_plan_fin_ult1) don't strongly align with others.

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Final Recommendations

Final Recommendation:

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Product Adoption Patterns

- High adoption in salary deposits, bill payments, and credit cards.
- Very low adoption of investment and insurance products.
- ***Cross-sell opportunity***: Promote underutilized products like investment funds to salary account holders.

Demographic & Segment Analysis

- Females slightly lead in essential banking services; males show more interest in investments.
- Ages 35-54 dominate product holdings.
- VIPs hold diverse product portfolios; students are underpenetrated.
- ***Cross-sell opportunity***: Bundle investment and savings products for VIPs and the 35-54 age group.

CLV-Based Targeting

- Higher CLV is linked with tenure, income, and product count.
- CLV proxy helps identify top-tier clients for premium services.
- ***Cross-sell opportunity***: Upsell additional products to high CLV clients with moderate product usage.

Final Recommendation:

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Channel Performance

- Mass acquisition channels deliver volume but not value.
- Channels like KAT and KFA yield higher CLV and product engagement.
- ***Cross-sell opportunity***: Invest in quality acquisition channels for better LTV.

Product Pairing Insights

- Salary accounts strongly correlate with bill payments.
- Investment products are frequently co-owned.
- ***Cross-sell opportunity***: Automate bundled recommendations (e.g., salary + bills + investment starter).

Behavioral & Anomaly Insights

- Users with zero product ownership and high income are prime cross-sell targets.
- Anomalous age and income entries should be reviewed.
- ***Cross-sell opportunity***: Trigger onboarding flows for dormant accounts.

Final Recommendation:

Strategic Recommendations

- Prioritize high-CLV customers for personalized upselling.
- Develop segment-specific product bundles.
- Promote low-adoption products through targeted campaigns.
- Use acquisition channel metrics to guide marketing investments.
- Launch proactive outreach to zero-product customers with entry-level offers.

Thank You

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