Household Spending Patterns Under Inflation: A Descriptive Analysis Using Receipt Data

Executive Summary

This project presents a descriptive analysis of household spending on essential goods using self-recorded receipt data from two frequently used retail stores in Colombia. The objective is to examine how spending levels and composition evolved during 2025 within an inflationary context.

Using biweekly purchase records, the analysis examines spending trends over time and across product categories. Results indicate a downward trend in nominal spending within the two tracked stores, reflecting changes in purchasing behavior across these specific retailers, and do not imply a reduction in total household consumption, as purchases were also made at other stores not captured in the dataset.

Overall, the project provides a transparent example of applied household-level data analysis, emphasizing careful interpretation of results within known data constraints.

Introduction

Household spending on essential goods represents a recurring and significant financial commitment, particularly in periods of rising prices. In an inflationary environment, understanding how expenditure evolves over time (and how spending is distributed across product categories and purchasing channels) can support more informed household budgeting and decision-making.

This project analyzes household spending using self-recorded receipt data from two frequently used retail stores. Purchases were recorded on a biweekly basis throughout most of 2025, allowing for the examination of spending dynamics across time while reflecting real-world purchasing behavior. The dataset includes information on purchase dates, products, quantities, prices, and total spending amounts, with all values expressed in Colombian pesos (COP).

From an economic perspective, the analysis is grounded in the mechanical relationship between prices and nominal spending: holding quantities constant, increases in prices lead to higher total expenditure. Under inflationary conditions, observed increases in

spending do not necessarily imply higher consumption volumes but may instead reflect rising prices. This theoretical lens is used throughout the project to interpret spending trends without inferring changes in welfare or consumption preferences.

The analysis is intentionally descriptive in nature. It focuses on summarizing spending levels, identifying category-level patterns, and comparing trends within the available store-level data. Rather than forecasting future prices or estimating causal effects, the project aims to document observed spending behavior and interpret it in light of inflationary conditions and household budgeting considerations.

The primary stakeholders for this analysis are household decision-makers, who can use the findings to contextualize spending changes and assess budgeting strategies. The structure and scope of the project reflect common constraints in applied data analysis, such as incomplete coverage and manual data collection, which are addressed explicitly in later sections.

Data & Methodology

Data Sources and Coverage: The analysis is based on self-recorded household purchase receipts from two frequently used retail stores in Colombia: D1 and Mercamio. These receipts capture regular purchases of essential household goods and reflect real-world consumption behavior rather than simulated or third-party data.

The dataset covers purchases made between February and December 2025. Household goods are typically purchased on a biweekly basis; accordingly, each month is divided into a first half (H1) and second half (H2) to align the data with observed purchasing cycles. Due to incomplete or missing receipt information, some months (particularly February, October, November, and December) are partially or fully excluded from certain analyses. As a result, most results rely on the period from March through September, where data coverage is more consistent. All monetary values are expressed in Colombian pesos (COP).

Data Structure and Variables: Each observation corresponds to a receipt line item and includes the following information when available: purchase period (month and half-month), store, product name, quantity (unit-based or weight-based), unit price, and total price. Product names on receipts are often abbreviated, and quantities vary in format depending on store conventions and product type.

The dataset captures spending at the store level only. Purchases made at other retailers that do not provide receipts are not included and are treated as out of scope for this analysis.

Data Preparation and Cleaning: Receipt information was digitized using a combination of automated extraction and manual review. AI-assisted tools were used to transcribe raw receipt data into provisional spreadsheets, with care taken to exclude any personally identifiable information (PII). All extracted values were validated against the original receipts before being incorporated into the main dataset.

Once consolidated, the data was organized in strict chronological order by month and biweekly period. Cleaning steps included reviewing and correcting inconsistent values, trimming blank spaces, standardizing store and product identifiers, and resolving formatting differences across receipt sources. Product names originally recorded in Spanish were translated into English in a cloned version of the dataset to support consistency and accessibility, while preserving the original-language data for reference.

Rather than imputing missing values or aggressively filtering observations, incomplete or unclear entries (like those regarding brands) were retained where possible to reflect real-world data limitations. No observations were removed solely due to missing values unless they prevented aggregation at the relevant level of analysis.

Analytical Approach: After cleaning, the dataset was structured to support descriptive analysis aligned with the project's core question. Pivot tables were created to summarize spending across time periods, stores, and product groupings, enabling efficient exploration of spending patterns and category-level distributions. Spending is analyzed in nominal terms, without adjusting prices for inflation, to reflect the household's actual budget exposure over time.

Visualizations (including time-series charts and category-level graphs) were developed to support analysis and communicate observed trends clearly. These visuals were used both as exploratory tools during analysis and as final reporting elements to illustrate spending behavior and price dynamics over the year.

No statistical modeling, forecasting, or per capita consumption analysis is performed. Inflation indicators are used for contextual interpretation in later sections but are not mechanically applied to adjust prices or quantities.

Methodological Scope and Interpretation: This methodology is designed to provide a transparent and realistic view of household spending patterns using imperfect but

authentic data. Results are interpreted descriptively and at the store level, with explicit recognition that observed trends reflect purchasing behavior within the tracked retailers rather than total household consumption.

Limitations related to data coverage, manual collection, and scope are addressed explicitly in the Limitations & Assumptions section.

Limitations & Assumptions

This project analyzes household spending using self-recorded receipts from two frequently used stores (D1 and Mercamio). As with most real-world, small-scale datasets, the analysis relies on some assumptions and is subject to important limitations that frame the interpretation of results.

Household and budget assumptions: The analysis assumes a stable household composition throughout the year and broadly consistent purchasing needs over time. A monthly reference budget for household goods was defined at the beginning of the year and did not experience major structural changes, although minor adjustments were possible. All monetary values are expressed in Colombian pesos (COP).

Scope of data coverage: The dataset includes biweekly household purchases (first half and second half of each month) from February to December 2025, based on available receipts. Some months contain incomplete or missing data (particularly February, October, November, and December) and are therefore excluded or clearly flagged in visualizations and summaries to avoid biased conclusions. As a result, most insights rely on the period from March through September, where data coverage is more complete.

Missing receipts		
Stores/Halves	D1	Mercamio
H1 (First half)	November	November
H2 (Second half)	February, October, December	October, November

Store-level interpretation: The analysis is limited to two stores that regularly provide receipts. Observed declines in spending over time refer only to these tracked stores and should not be interpreted as a reduction in total household consumption. Household goods were also purchased from other stores that do not provide receipts, and spending

at those locations is not captured in the dataset. Consequently, this project does not estimate total annual household spending.

Data quality and manual collection: Receipt data was manually transcribed and standardized. Product names may be abbreviated, and quantities may be unit-based or weight-based. While care was taken to ensure accuracy, minor transcription errors may persist.

Before And After Table Summary		
Aspect	**Raw Data**	**Cleaned Data**
Rows	947	820
Missing values	Yes	No
Language	Spanish	English
Naming	Inconsistent	Standardized
Categories	None	Added

Analytical scope: The project focuses on descriptive analysis, including spending aggregation, category patterns, and time-based trends. It does not attempt causal inference, per capita consumption analysis, or nutritional assessment. Discounts and promotions are not systematically analyzed due to inconsistent availability across stores and time periods.

Forward-looking context: High-level inflation context and directional references for 2026 are discussed using publicly available information, but no formal forecasting models or price adjustments are applied. These references are intended to support interpretation rather than generate precise predictions.
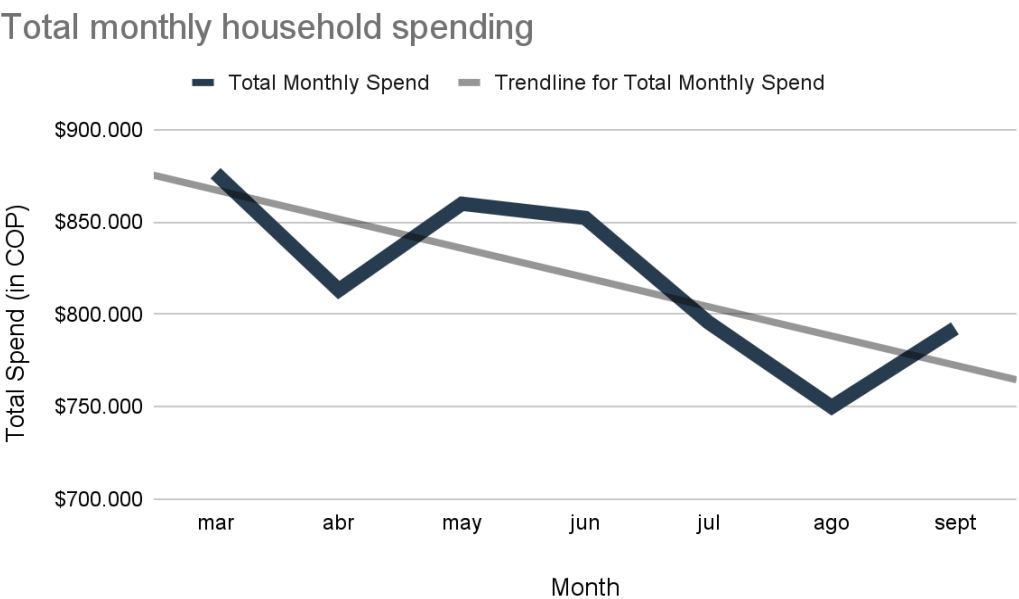
Results & Analysis

Note on the cleaned dataset and workflow: As mentioned before, the cleaned dataset includes line-item observations extracted from household receipts and consolidated into a structured spreadsheet. Automated extraction was complemented by manual review to remove PII, standardize product names, and validate values. Brands were omitted from the analysis level reported here due to inconsistent labeling on receipts; the focus is on category- and store-level spending (some duplicates that survived the cleaning process are products from different brands). Pivot tables were used to aggregate spending by biweekly period, month, store, and product category. Incomplete months were excluded from specific visuals where appropriate (see Data & Methodology and References for full processing details and sources).

Spending trends and timing: store-level decline and intra-month concentration

Aggregated nominal spending across biweekly periods shows a general downward trend over the year within the stores included in this dataset. While an inflationary environment provides context, the observed decline inside the tracked retailers suggests behavioral responses such as tighter budgeting, substitution across stores, or modest quantity adjustments. Importantly, this finding is limited to purchases recorded at D1 and Mercamio and does not capture purchases made at other retailers that did not provide receipts.

Graph 1: Total nominal spending by month across 2025
Nominal spending (COP) by month, showing the downward trend within tracked stores.
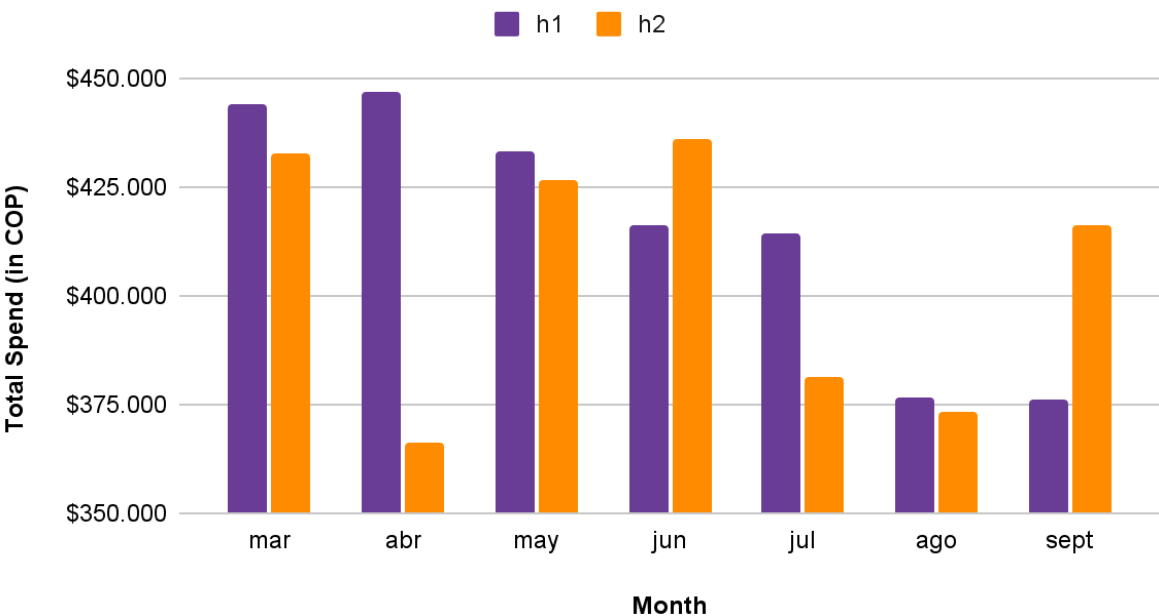
Timing patterns reveal a consistent intra-month rhythm: core, planned purchases tend to occur in the first half of the month (h1), while second-half (h2) spending is smaller on average and appears more reactive. This regular timing aligns with household budgeting cycles and supports targeted recommendations about purchase timing and promotions.

Graph 2: Monthly aggregation: H1 vs H2 spending shares
Share of monthly spending that occurs in H1 vs H2, illustrating the concentration of core purchases early in the month.
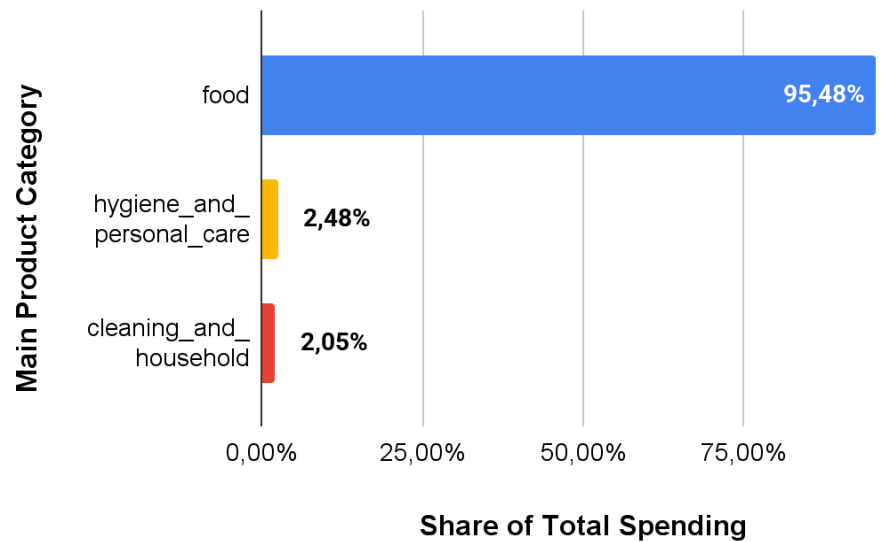
H1 vs H2 comparison

Food spending: dominance, monthly variability, and concentration within staples

Category-level aggregates indicate that food represents the overwhelming share of recorded household goods spending, and month-to-month fluctuations in total spending are largely explained by changes in food expenditure; non-food categories such as hygiene or cleaning remain comparatively stable.

Graph 3: Composition of total spending by category
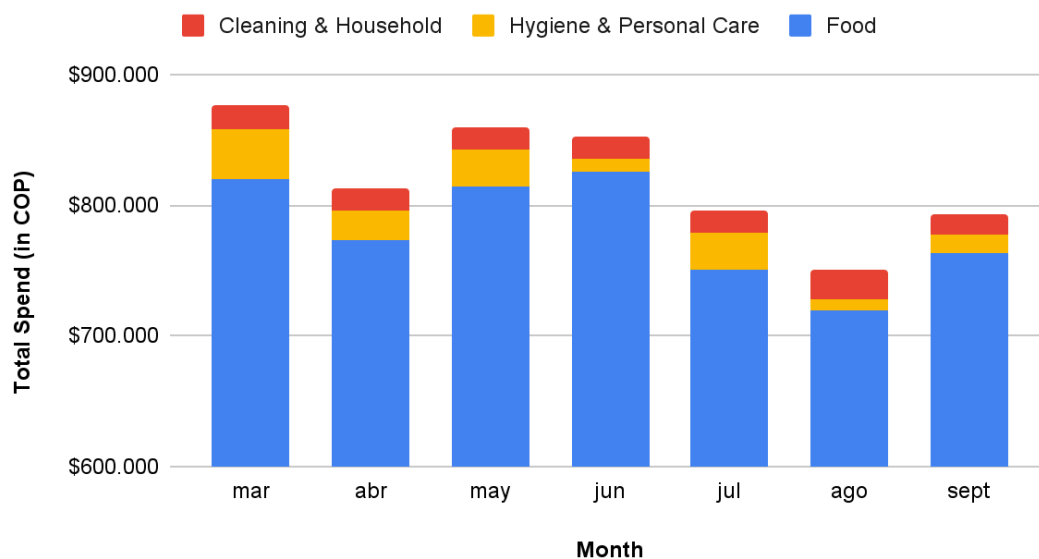Share of total tracked spending by category, highlighting the dominance of food.

Category contribution to total spend

Main Product Category

Category	Share
food	95,48%
hygiene_and_personal_care	2,48%
cleaning_and_household	2,05%

Share of Total Spending: 0,00% — 25,00% — 50,00% — 75,00%

Graph 4: Month-to-month change decomposition: food vs non-food
Contribution of food and non-food categories to monthly spending variability.

Monthly spending by main category

■ Cleaning & Household ■ Hygiene & Personal Care ■ Food

Total Spend (in COP): $600.000 — $700.000 — $800.000 — $900.000
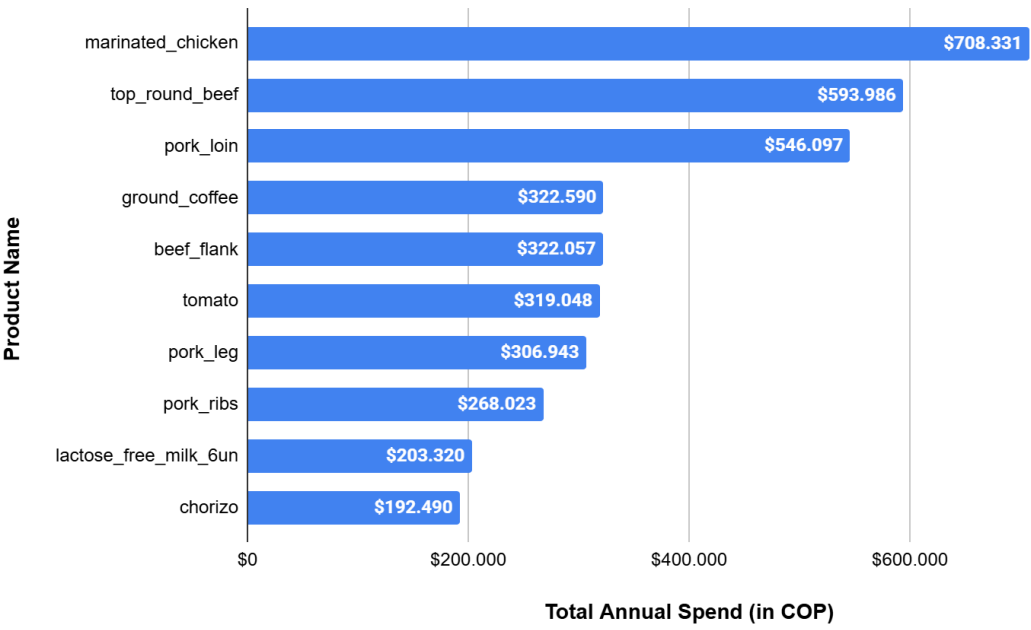
Month: mar, abr, may, jun, jul, ago, sept

At the product level, a small set of regularly purchased items contribute a large portion of food spending, and three subcategories (proteins, vegetables, and dairy) together account for the majority of food expenditure. The stability of the core product set across high- and low-spending months suggests that households tend to maintain similar

product choices while adjusting quantities, brand, or store of purchase when managing cost pressure.

Graph 5: Product-level concentration within food (top 10 products by annual spend)

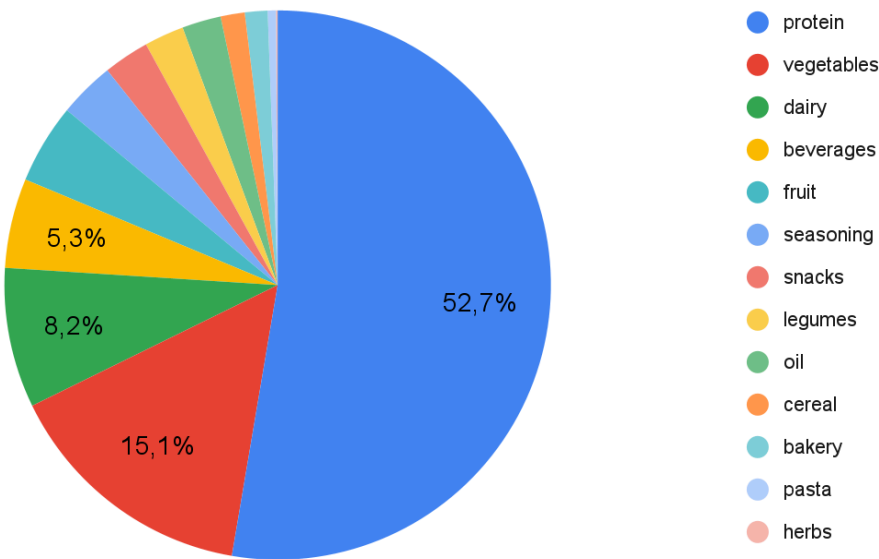Top contributors to food spending, repeated across months and driving overall variability

Top products driving spending increases

Graph 6: Food subcategory breakdown

Share of food spending by subcategory; proteins, vegetables, and dairy account for the bulk of expenditure.

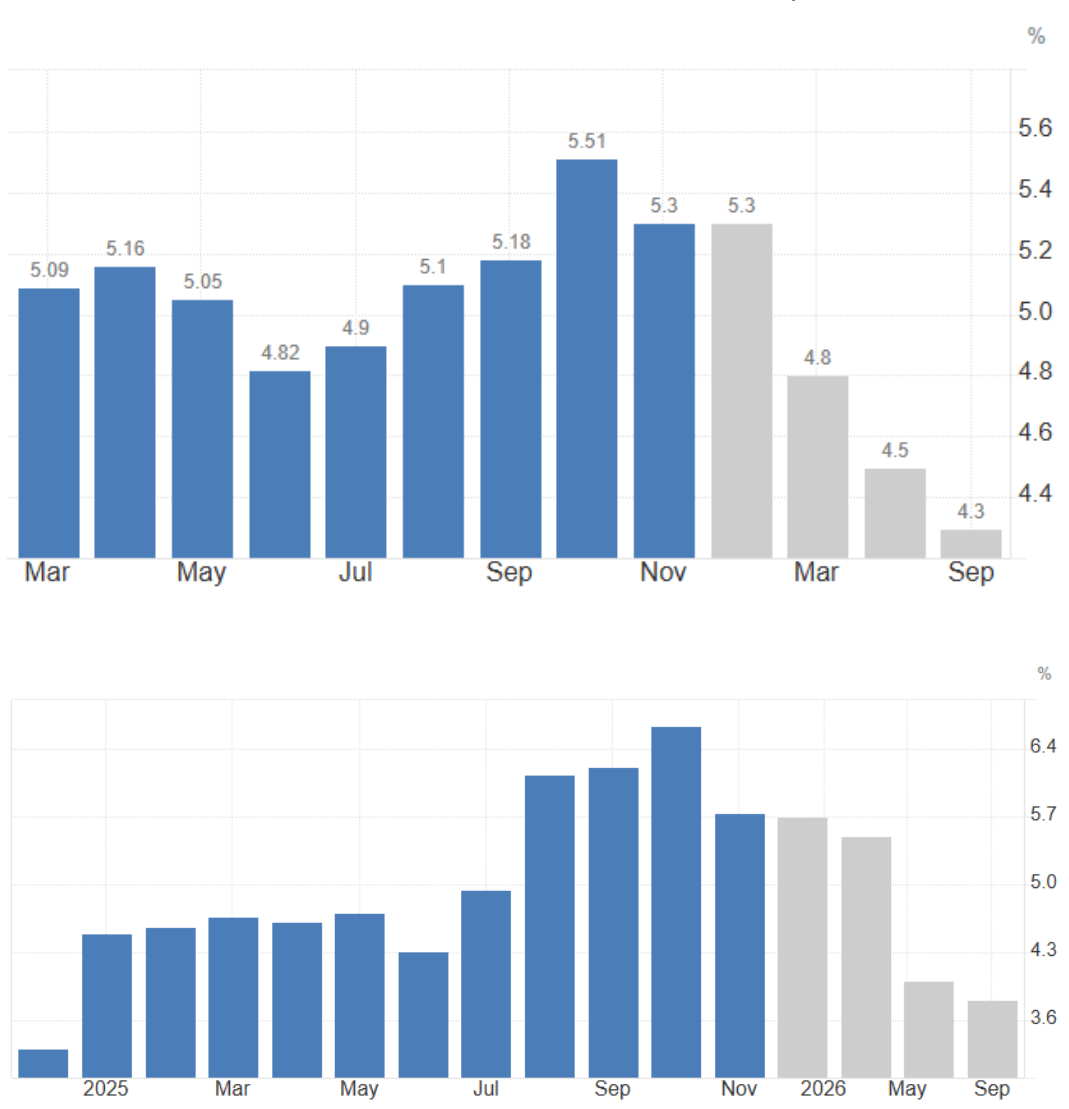Top food categories driving spending increase

Short cross-check with inflation context

National inflation indicators for 2025 show elevated price growth that helps explain upward pressure on nominal costs; food prices are a relevant part of that context.

However, the decline observed in spending at the tracked stores indicates behavioral adjustments rather than a direct, proportional pass-through of inflation into nominal household spending at these retailers. Inflation series are therefore used as a contextual reference for interpretation in Conclusions and Recommendations but were not applied to adjust nominal spending in the core descriptive analysis.

Graph 7: Headline and food inflation series (2025–early 2026)
Headline and food inflation indicators used for contextual interpretation.

Reproducibility Note

This analysis was conducted using a self-collected dataset of household spending receipts, manually recorded over multiple months. The data represents regular purchases of consumer goods and reflects real consumption behavior rather than simulated or third-party datasets.

All receipt information was transcribed into a structured spreadsheet, where product names, quantities, categories, dates, and total spending amounts were standardized. Data cleaning included correcting inconsistent product naming, harmonizing categories across stores, and handling missing values where receipt information was partially unreadable.

The analysis was performed using spreadsheet tools and data analysis workflows focused on descriptive statistics, time trends, and category-level aggregation. Inflation context was incorporated using publicly available inflation indicators for Colombia (2025 and early 2026) to support interpretation, though inflation values were not mechanically applied to adjust prices.

Because the dataset relies on manual data entry and real purchase behavior, exact replication of the raw data is not possible without access to the original receipts. However, the data processing steps, analytical logic, and visualizations are deterministic: given the same cleaned dataset and methods, results and conclusions would be fully reproducible.

This project prioritizes transparency and realism over perfect replicability, reflecting common constraints in applied household-level data analysis.

Conclusions

Household spending patterns in 2025 evolved within a context of sustained inflation in Colombia, with food prices playing a central role in shaping expenditure dynamics. Given the importance of food in the household budget, changes in food prices had a meaningful influence on observed spending patterns across the year.

From an economic perspective, rising prices would mechanically be expected to increase nominal spending if quantities consumed remained constant. However, the analysis shows a downward trend in spending within the two tracked stores over the year, despite ongoing inflation. This indicates that purchasing behavior adjusted in response to price pressures rather than following a purely mechanical

price–expenditure relationship. Such adjustments likely included tighter budgeting, quantity moderation, product substitution, and a reallocation of purchases toward other stores not captured in the dataset.

Food expenditure consistently dominated household spending and accounted for much of the variation across periods. At the same time, the relative stability of core food products across higher- and lower-spending months suggests that changes in spending were driven more by spending intensity and purchasing choices than by shifts in the underlying product mix.

Early inflation data for 2026 points to a moderation in inflation growth relative to 2025, though uncertainty around price dynamics remains. As a result, household spending behavior is likely to continue reflecting cautious adjustment rather than a return to pre-inflation patterns. Overall, the findings highlight the role of adaptive household behavior in managing spending under persistent price pressure.

Recommendations for 2026

Prioritize Food Spending Control, Especially Core Staples: Food accounts for the majority of household spending and explains much of the observed variability across periods. Given the central role of food prices in shaping overall expenditure, cost-control efforts in 2026 should focus primarily on essential food categories such as proteins, vegetables, and dairy. Even modest price or quantity changes in these staples can have a noticeable impact on total spending, making regular monitoring of these categories an effective budgeting lever.

Maintain Conservative Budgeting Despite Early Signs of Disinflation: Although inflation shows signs of moderation in early 2026, this reflects a slowdown in price growth rather than a decline in price levels. Price dynamics remain uncertain and comparable to those observed in recent years, suggesting that premature budget relaxation could increase financial pressure if inflation stabilizes or reaccelerates. Setting monthly budgets based on late-2025 spending levels provides a prudent baseline while allowing for gradual adjustments as inflation trends become clearer.

Leverage Substitution Within Food Categories: The relative stability of core food purchases across higher- and lower-spending periods suggests that overall consumption patterns remain consistent over time. Within this structure, substitution among comparable products (particularly across protein sources and seasonal produce) offers a practical way to manage costs while preserving dietary habits. Adopting flexible

purchasing choices, such as rotating protein options or prioritizing seasonal vegetables, can help smooth spending fluctuations without materially changing consumption levels.

Optimize Purchase Timing Within the Month: Biweekly purchasing patterns suggest that the timing of household goods purchases can meaningfully affect total spending. Where feasible, aligning purchases with promotional periods or temporary discounts (particularly for frequently purchased or storable items) may help offset inflationary pressure without reducing consumption volumes. This approach is most effective when combined with prior planning and price awareness across purchase cycles, considering that spending tends to be higher in the first half of the month.

Track Inflation Trends Alongside Household Spending: Because household spending on essential goods is closely linked to broader price dynamics, monitoring inflation indicators can help contextualize observed changes in expenditure. Regularly reviewing headline and food-specific inflation trends provides useful signals for anticipating potential budget pressure and adjusting spending expectations. Incorporating these indicators into quarterly budget reviews during 2026 supports more informed and timely household budgeting decisions.

References

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