Grocery Pricing Strategies: An Analysis of Vendor Positioning and Market Dynamics*

Examining Sales Frequency, Price Distribution, and Average Price Levels Across Major Grocery Chains

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This paper examines grocery pricing strategies across major vendors to understand how they position themselves in a competitive market. By analyzing sales frequency, price distribution, and average price levels, we identify distinct approaches used by each vendor to attract customers. Our findings reveal that some vendors, like Metro, rely on frequent promotions to appeal to a broad customer base, while others, such as No Frills and Walmart, prioritize everyday low pricing to cater to budget-conscious shoppers. This analysis highlights the varied tactics grocery vendors use to target different consumer segments, providing insights into the competitive dynamics that shape grocery pricing and customer choices.

1 Introduction

In recent years, competitive pricing and promotional strategies among grocery vendors have created a rich landscape for data analysis. By examining grocery price data collected across multiple vendors, we can gain insights into various aspects of vendor pricing, such as frequency of sales, price distribution, and average price levels. This analysis focuses on several major grocery vendors, comparing their sales frequency, price ranges, and average prices to better understand their market positioning and strategies.

This study investigates the frequency of sales events, the distribution of product prices, and the average price by vendor, highlighting the distinct approaches taken by each vendor to attract and retain customers. Through visualizations such as bar plots and box plots, the analysis reveals trends in vendor pricing strategies, showcasing how some vendors prioritize frequent discounts, while others maintain a steady low-price approach. The findings suggest

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that vendors like Metro employ high-frequency sales with a broad price range, while No Frills and Walmart focus on consistently low prices. These patterns reflect the varied strategies used by grocery vendors to appeal to different consumer segments.

This paper is organized as follows: Section 2 outlines the dataset and its measurement of real-world pricing strategies. Section 3 presents key findings on sales frequency, price distribution, and average price, revealing distinct vendor pricing strategies. Section 4 addresses considerations such as correlation versus causation, missing data, and sources of bias, which are essential for interpreting the analysis accurately.

2 Data

We use the statistical programming language R (R Core Team 2023) and several libraries, including tidyverse (Wickham et al. 2019), DBI (R Special Interest Group on Databases (R-SIG-DB), Wickham, and Müller 2024), RSQLite (Müller et al. 2024), and ggplot2 (Wickham 2016). The data was sourced from Project Hammer (Filipp 2024), a project database created by Jacob Filipp that compiles grocery price data from various vendors.

2.1 Measurement

The dataset used in this analysis captures real-world grocery pricing and promotional strategies from multiple vendors. Each entry, sourced from Project Hammer (Filipp 2024), represents a product listing, with variables such as current_price, old_price, vendor, and nowtime. These fields translate vendor pricing strategies into data points: current_price reflects the active selling price, while old_price denotes any discount or promotional pricing. The vendor field identifies the grocery chain, and nowtime timestamps each entry, allowing us to analyze trends over time. This structure enables an organized examination of pricing tactics across vendors by converting complex market behaviors into measurable data.

2.2 Overview

The key attributes of the data include:

Current Price: The price of each product at the time of data collection, which helps in understanding price distribution across vendors. Sales Frequency: The frequency of discounted prices, indicating how often each vendor holds sales or promotional events. Vendor: The specific grocery store or vendor from which the pricing data was collected, allowing for comparisons between different grocery chains. Using this dataset, we analyzed the pricing and promotional strategies of each vendor, focusing on three main dimensions: frequency of sales, price distribution, and average price by vendor.

Section 3 presents our findings on these aspects and highlights the distinct strategies employed by different vendors.

3 Results

Our results on the frequency of sales by vendor is illustrated in Figure 1, while Figure 2 shows the distribution of prices across vendors. Additionally, Figure 3 highlights the average price by vendor.
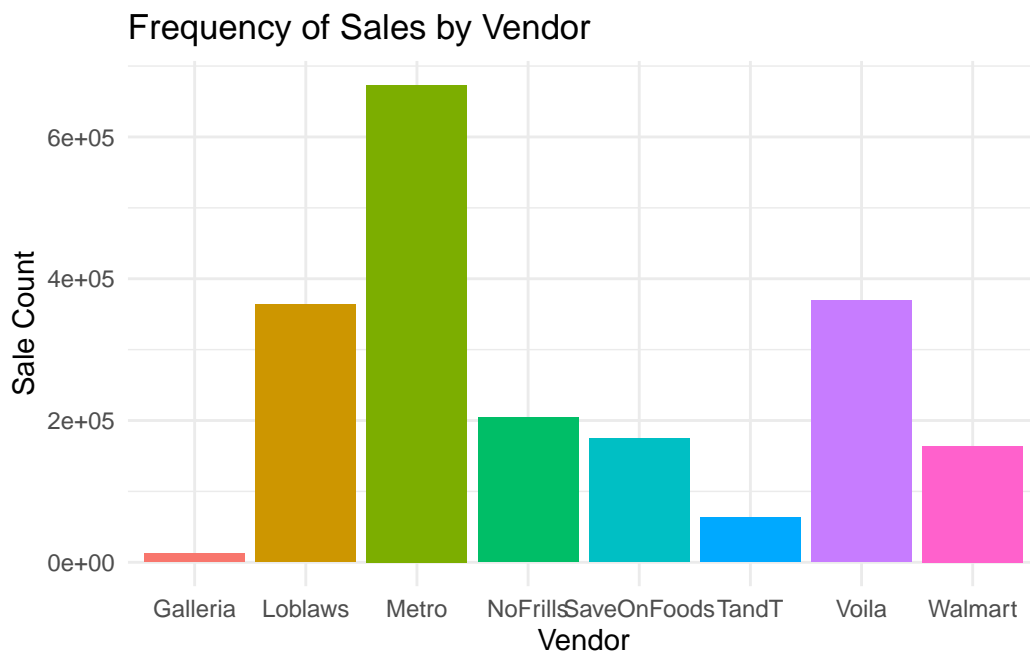

Figure 1: The Frequency of Sales by Vendor

3.1 Frequency of Sales by Vendor

In Figure 1, Metro stands out with a noticeably higher frequency of sales compared to all other vendors. This suggests that Metro might be employing an aggressive pricing strategy, using frequent sales promotions to attract a large customer base. In contrast, Loblaws and Voila follow at a second tier, with sales frequencies approximately half that of Metro. This moderate level of sales activity indicates a competitive, but less aggressive, approach. No Frills, Save-On-Foods, and Walmart have similar and relatively low frequencies, at around half the level of Loblaws and Voila. This low frequency suggests that these vendors may focus less on frequent promotional events and more on maintaining stable pricing or lower base prices.
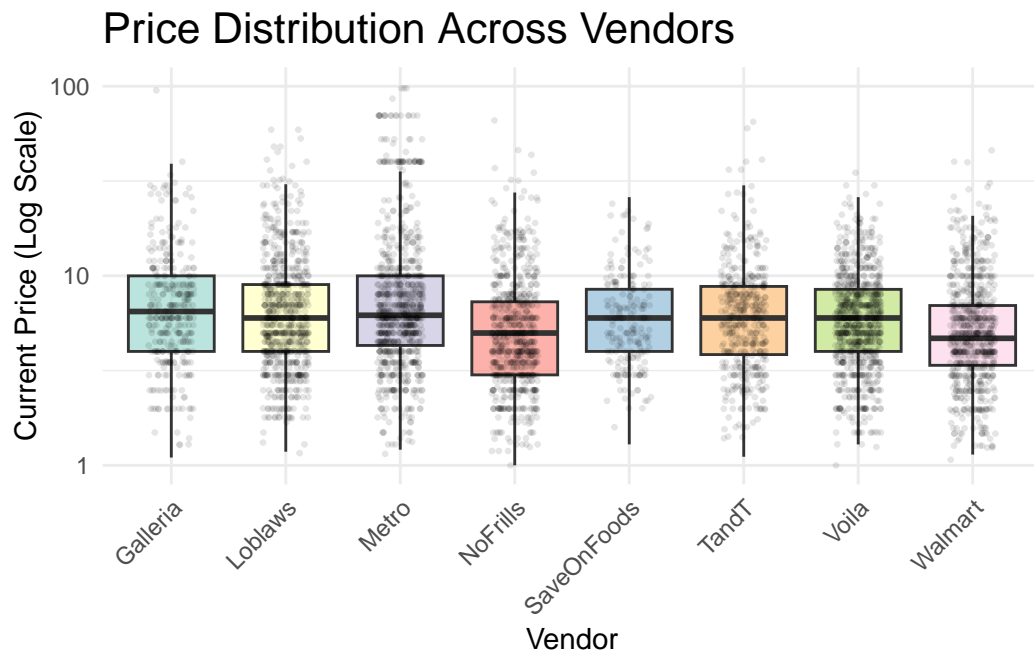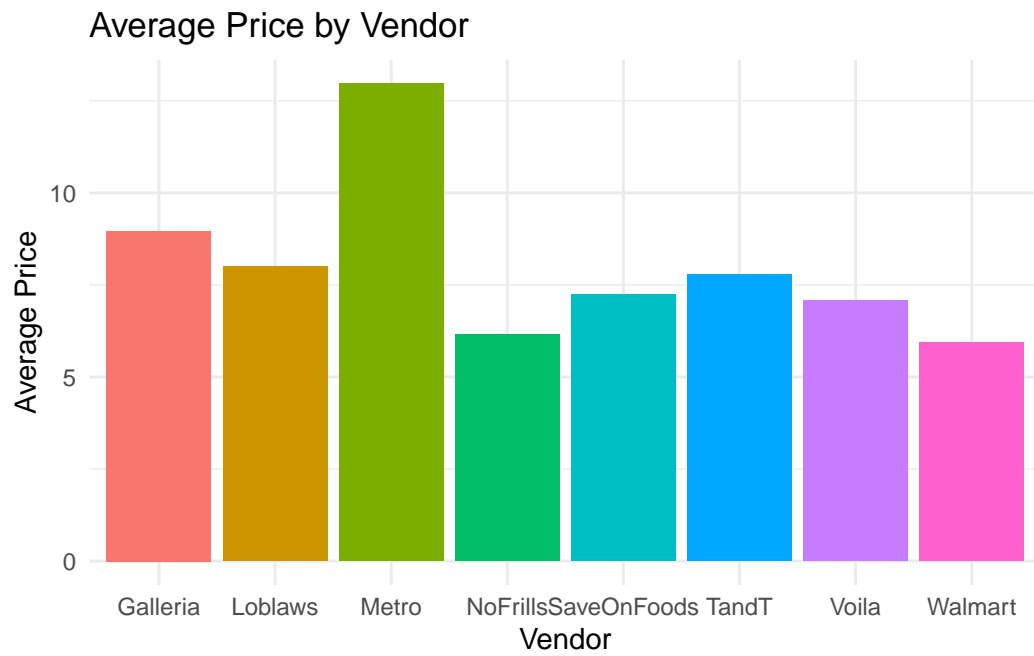
Figure 2: The Price Distribution Across Vendors

Figure 3: The Average Price by Vendor

3.2 Price Distribution Across Vendors

Figure 2 reveals further distinctions in pricing strategy and positioning among the vendors. No Frills and Walmart show consistently lower price distributions, aligning with a budget-friendly image. This pattern suggests that these vendors aim to attract price-sensitive customers by offering lower-cost items, with minimal overlap into higher price ranges. Metro, on the other hand, displays a much wider price range, with a significant number of higher price points that are not seen in other vendors. This broad range suggests that Metro caters to a wide spectrum of customers, from budget-conscious shoppers to those willing to pay for premium products. Other vendors, such as Loblaws and Voila, show moderate price distributions, which are less spread out than Metro's but still cover a range that suggests a balanced approach rather than strictly budget or premium positioning.

3.3 Average Price by Vendor

Figure 3 aligns with the previous observations, highlighting Metro's position as the highest-priced vendor on average. This high average price, combined with Metro's wide distribution range, reinforces the notion that Metro offers a variety of products, including higher-priced or premium items. Galleria follows Metro with a relatively high average price, indicating a potential focus on specialty or premium goods. No Frills and Walmart emerge as the lowest-priced vendors on average, solidifying their positioning as budget-friendly options. The other vendors, such as Loblaws, Save-On-Foods, T&T, and Voila, occupy a middle ground, with average prices slightly above the lowest-priced vendors and below Galleria, suggesting a balanced pricing approach that caters to both cost-conscious and mid-range consumers.

4 Discussion

The results of this analysis offer valuable insights into the pricing and promotional strategies of various grocery vendors. However, several methodological considerations need to be addressed to ensure an accurate interpretation of the data. Understanding the distinction between correlation and causation, handling missing data, and accounting for potential sources of bias are essential to refining the conclusions drawn from this study. Each of these factors is discussed in the following subsections.

4.1 Correlation vs. Causation

In analyzing grocery pricing and promotional strategies, it's important to distinguish between correlation and causation. While our data reveals correlations—such as a relationship between high-frequency sales and lower average prices in certain vendors—these associations do not imply causation. For example, Metro's high sales frequency correlates with its broader price

range, but this does not necessarily mean that frequent sales cause price diversity, or vice versa. Factors like target market segmentation, inventory management, and strategic pricing decisions can all influence these metrics independently. Therefore, while the analysis highlights patterns in how different vendors structure pricing and promotions, it does not establish causative relationships between these variables.

4.2 Missing Data

The dataset may contain missing values, particularly in fields such as current and old prices. These missing values can affect the accuracy of the analysis, especially in sections where price distribution and averages are calculated. For example, if a vendor has missing values during high promotional periods, their frequency of sales may be underestimated. Similarly, missing prices for premium products could bias the average price calculation downward. To mitigate this, we addressed missing data by filtering out incomplete rows for critical analyses; however, the absence of data for certain time periods or products still limits the representativeness of our findings.

4.3 Sources of Bias

Several potential sources of bias could affect the analysis and interpretation of grocery pricing data. First, the data is derived from a limited selection of vendors, which may not represent all grocery stores in the region, particularly smaller, independent stores. Second, the data is based on specific geographic regions and may not account for regional pricing variations. Finally, since the data was collected from website listings, it may not reflect in-store promotions or exclusive discounts for loyalty program members, thus potentially underestimating actual promotional frequencies. These sources of bias should be considered when interpreting the results, as they may influence conclusions about vendor strategies and market positioning.

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