Vendor Performance Analysis Report

Business Problem Statement:

Vendors purchase products from us and resell them in their markets. Effective inventory and sales management are critical for optimizing profitability in this industry. Our company needs to ensure that we are not incurring losses due to inefficient pricing, poor inventory turnover, or vendor dependency.

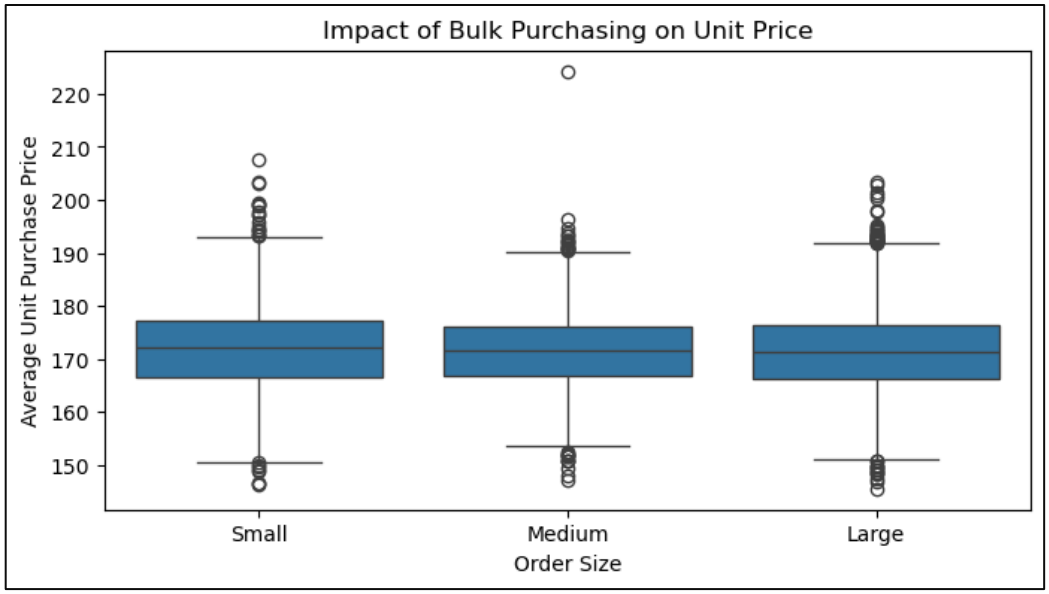
The goal of this analysis is to:

- Bring together messy, real-world data into a single relational framework
- Analyze pricing behaviour, vendor patterns, profitability, and product movement
- Recommend business-level pricing and commercial improvements

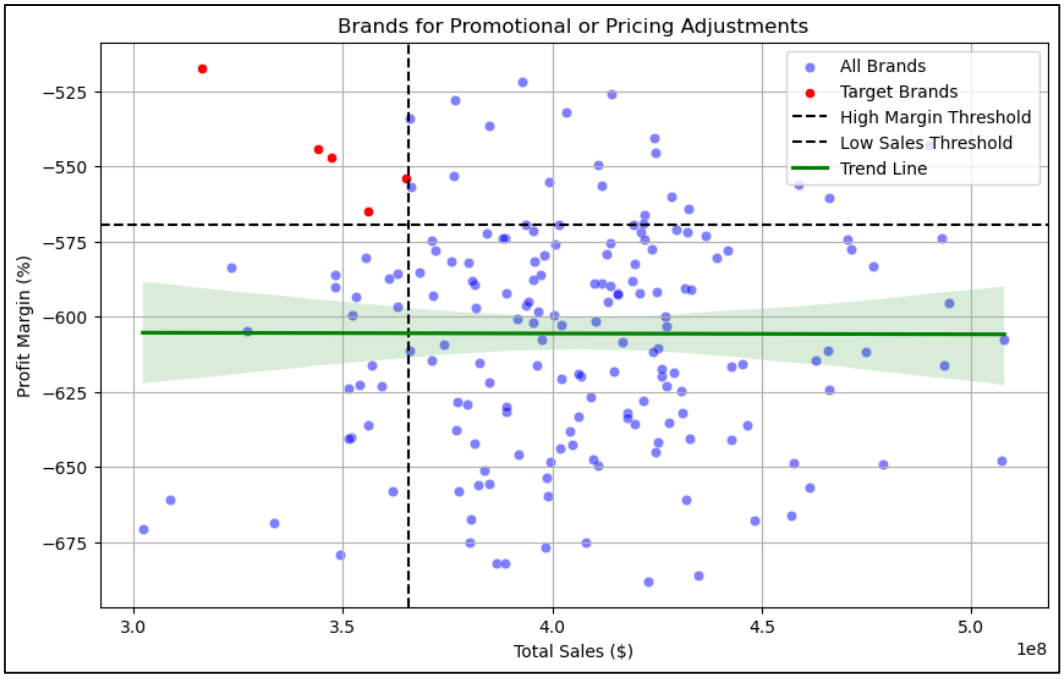
Key Insights:

1. All vendors purchased below the actual market price, with an average discount of **14–15%**, reaching highs of **19–20%** for some brands.
    - Our wholesale pricing strategy is not differentiated. "Discount" has become the baseline, and **isn't a lever or an incentive for vendors** + it's a loss-making strategy as we are giving away margin even where it may not not drive higher sales, loyalty, or volume.

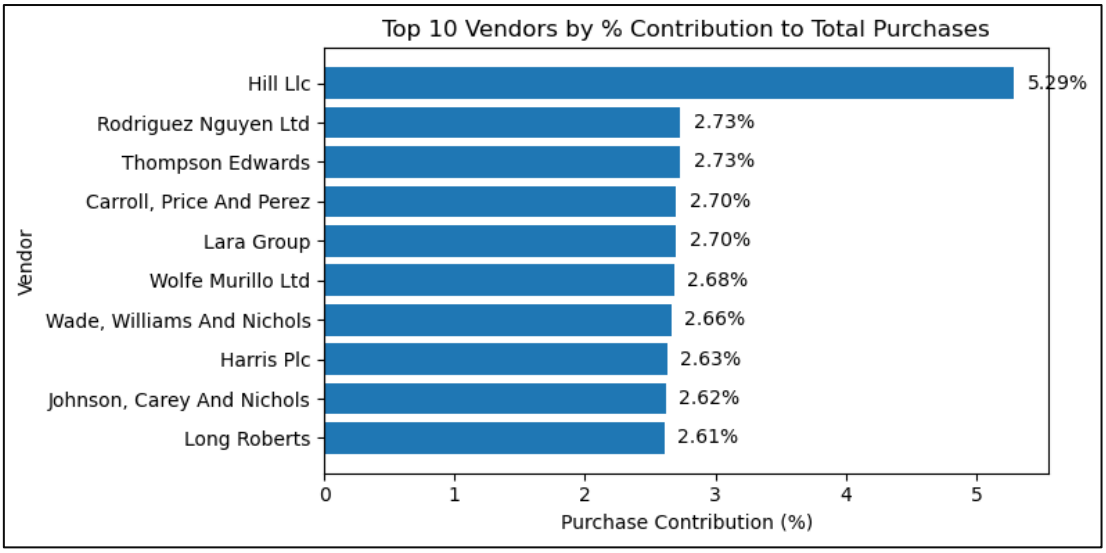
2. Vendors buying in large quantities pay almost the same price as those buying minimal quantities. **Unit price across order size tiers stays clustered** around the same value (approx. 170 $) signaling:
    - No incentive to grow account value
    - No tiered pricing maturity



3. Profitability does not correlate with either vendors' purchase behaviours or sales volume.
    - **High-volume vendors aren't getting better margins** OR not using margin to sell more i.e. even vendors who buy in larger volumes (i.e. purchase stock in cores) than others are **unable to scale their sales proportionately**, (i.e. sales stagnate in lakhs) leading to locked inventory/ working capital and increasing costs



4. The **top 10 vendors contribute only ~29% of total purchases** — the largest vendor accounts for just ~5%. The remaining vendors contribute <= 2% each
    - We don't have anchor/strategic buyers driving volume consistency
    - Revenue model depends on many small vendors



Recommendations for Way Forward:

- ***Strategic partnerships*** with top vendors are necessary. Introduce tier-based pricing model and establish predefined thresholds based on customer service, procurement volume, sales history, growth projections
- Focus on ***margin governance and discount approva***l mechanisms to reduce unnecessary discount leakage
- Prioritize ***forecast-based purchasing*** for all vendors to reduce locked working capital and improve inventory turnover

Problem-Solving Approach:

1. ***Understanding the Data structured in 8 tables:***
    - **Begin_Inventory:** contains inventory data at the start of the year.
    - **End_Inventory:** contains inventory data at the end of the year.
    - **Purchases:** info about the procurements made by the Vendors from the company along with Transaction Details (Invoice Dates, Payment Dates, Transaction Value i.e. Dollars), Product (Brand) Prices ($), Quantity procured.
    - **Purchase_Prices:** The purchase price column is derived from the purchase_prices table, which provides product-wise actual and purchase prices. In addition to the Product, Brand, it provides info like Volume.
    - **Vendor_Invoice:** aggregates data from the purchases table, summarizing Quantity and Dollar amounts, along with an additional column for Freight.
    - **Sales:** contains the sales transactions for the year- Product Info, Brands purchased by vendors, Volume, SalesQuantity, SalesPrice, SalesDollars (revenue earned).

2. ***Data Loading:*** Data was ingested into an SQLite database using Python and SQLAlchemy for efficient querying.

3. ****Data Cleaning:***

    - Fixed inconsistent date formats using string engineering
    - Standardized text fields (Brand, Vendor Name, City)
    - Handled missing data using rules and domain logic
    - Removed duplicates and identified anomalies

4. ***Data Integration:*** Joins across Vendor, Product, Brand, Purchase & Sales enabled unified insight extraction.

5. ***Feature Engineering:***
   Created metrics such as:
    - **% Price Difference:** Purchase Price – Actual Market Price
    - **Profit Margin:** Gross Profit ÷ Sales
    - **Stock Turnover:** Sales Quantity ÷ Purchase Quantity

   These new variables power the business insights.

Jupytr Notebook Link for Steps 1-2:
http://localhost:8888/lab/tree/Data%20Analysis%20Projects/ETL_Project/ETL_Project%20x%20Loading%2BCleaning.ipynb

Jupytr Notebook Link for Steps 3-5:
http://localhost:8888/lab/tree/Data%20Analysis%20Projects/ETL_Project/ETL_Project%20x%20Insight_Generation.ipynb