ACME Motorcycles & More

**Marketing Analysis by
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Objective

Design a new marketing strategy based on existing sales data.

Steps

1. Data preparation & cleaning
2. Analysis
3. Marketing strategy

Step 1
Data Preparation

Data Preparation & Cleaning

- Identify & impute missing data

- Anomaly detection & correction

- Forecast order disputes

- High level data description

Missing & Incomplete Data

Original territories in data set

- Asia-Pacific (APAC)
- Europe/Middle East/Africa (EMEA)
- Japan
- Unclassified: USA & Canada

Corrective actions

- Merged Japan territory into APAC
- USA & Canada classified into new Americas territory (AMER)
  - 3 observations in CA missing postal codes.
  - Fictional address data, so placeholders introduced.

Data Anomalies: Price/Unit

Product prices for a significant proportion of orders were recorded incorrectly.

Distribution of Product Prices per Order
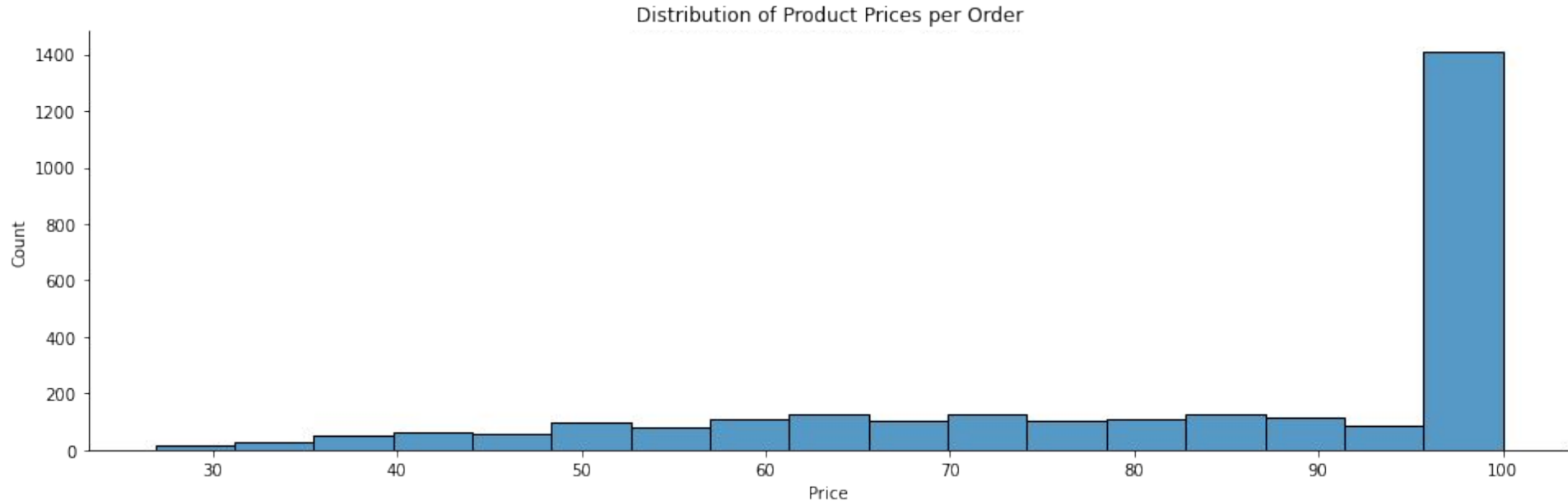
Data Anomalies: Price/Unit

Problem:

Products with a price of exactly $100 were recorded in the data incorrectly.

Correction:

New Price = Total Sales / Quantity

Data Anomalies: Price/Unit

Distribution after correcting mispriced items.

Distribution of Product Prices per Order

Forecasting Order Dispute Rate

Order Status	
Shipped	286
In Process	6
Resolved	4
Cancelled	4
Disputed	3
On Hold	4

$$\text{Dispute Rate} = \frac{(\text{Canceled} + \text{Resolved})}{(\text{Cancel} + \text{Resolve} + \text{Ship})}$$

$$\text{Dispute Rate} = 2.72\%$$

$$\text{Cancellation Rate} = \frac{\text{Canceled}}{(\text{Canceled} + \text{Resolved})}$$
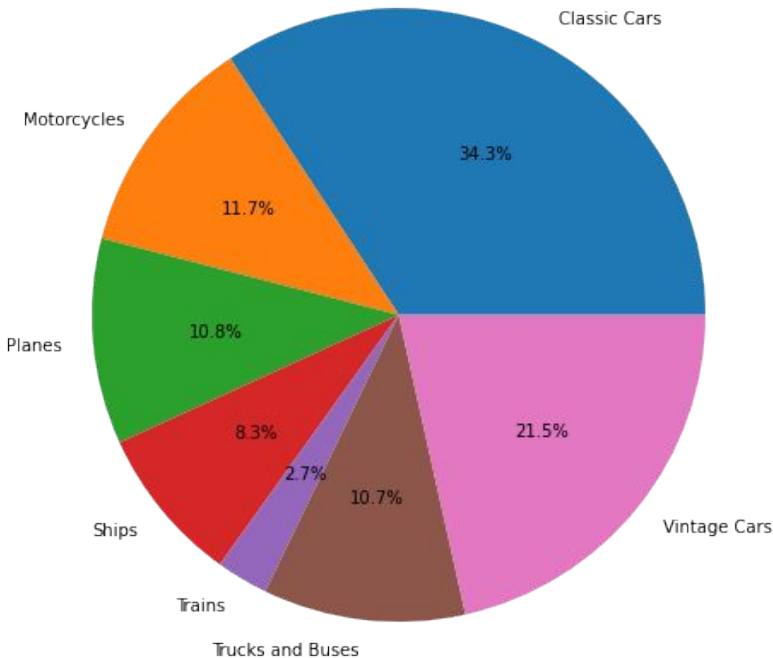
$$\text{Cancellation Rate} = 50.0\%$$

Discount In Process & Disputed Sales

Adjusted Sales (In Process Orders) = (1 - Dispute Rate * Cancellation Rate) * In Process Orders

= (1 - (0.027 * 0.50)) * In Process Orders

Adjusted Sales (Disputed Orders) = (1 - Cancellation Rate) * Disputed Orders

= (1 - 0.50) * Disputed Orders

Product Summary

Proportion of Products Sold by Product Line

|	
Date Range	01/06/03 - 05/31/05
Revenue	$9,620,000
Orders	299 with average sales of $32,300
Products	2,719 with average 34 units per sale
Trends	Revenue/day up +39.7%
	Orders/day up +48.1%
	2.7% of orders are disputed
	- 50% of disputes are resolved

Territory Summary

Sales have been made across 19 countries globally. USA, Spain, and Australia are the largest markets in their respective territories.
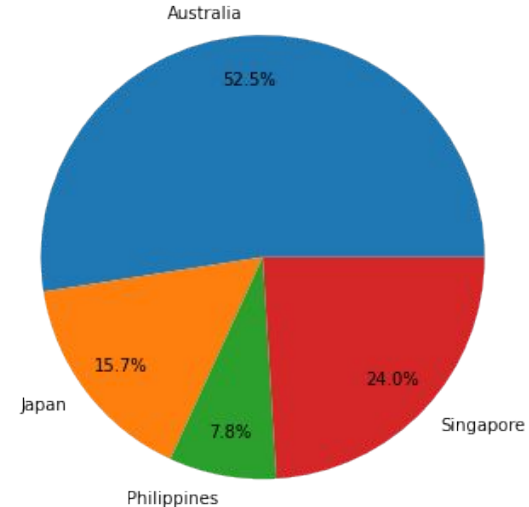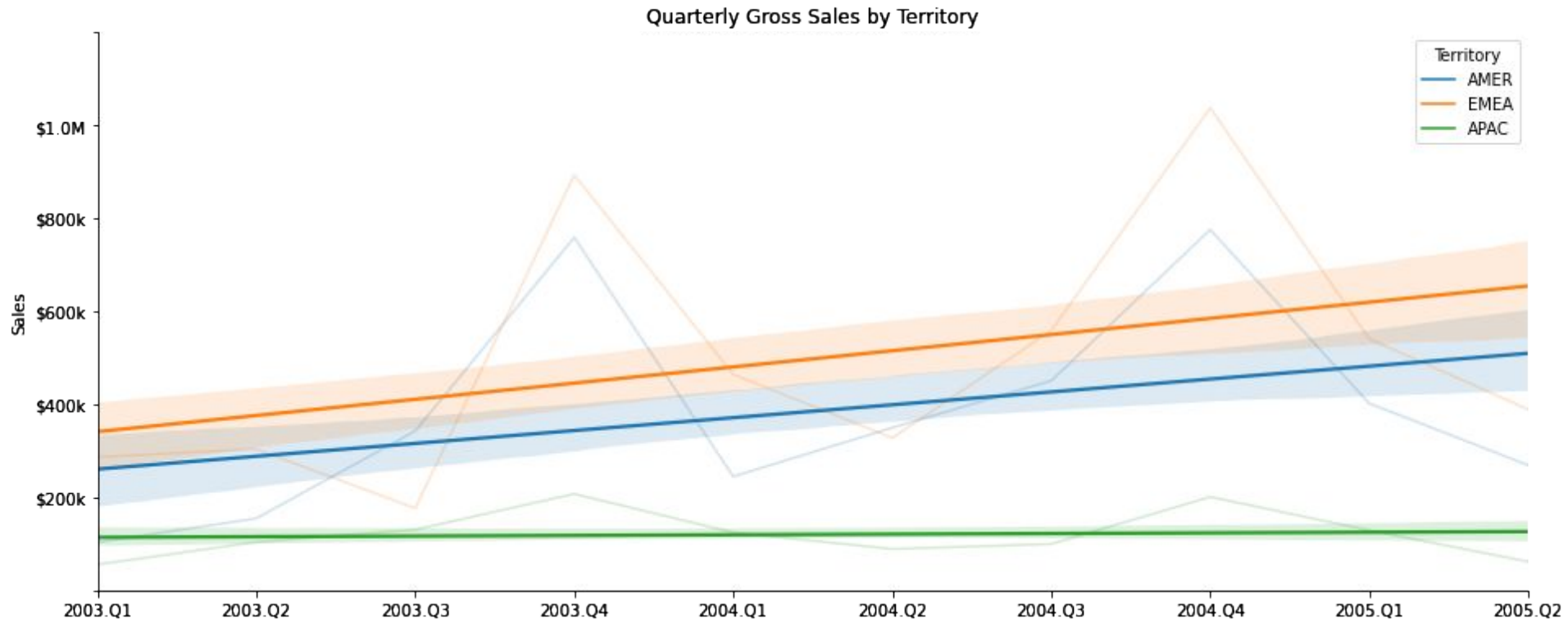

Proportion of Revenue by Country and Territory

Territory Summary Trend

Quarterly Gross Sales by Territory
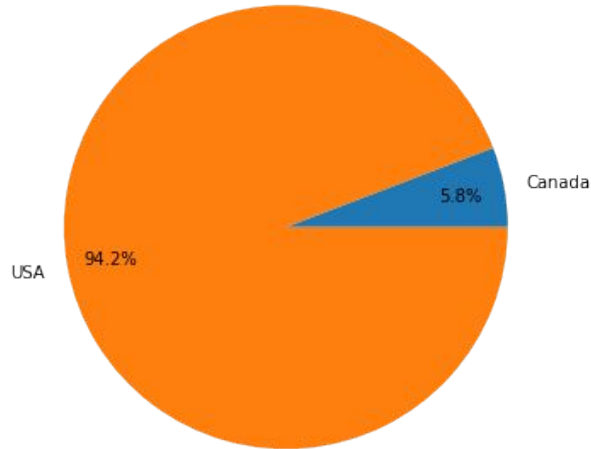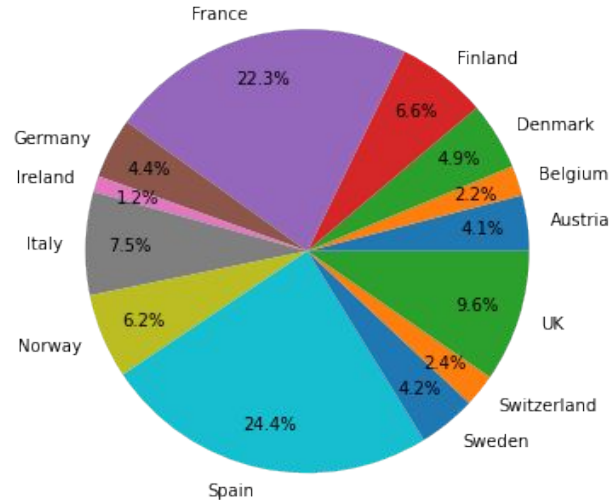
Step 2
Analysis

Analysis

Retrospective analysis of purchase orders
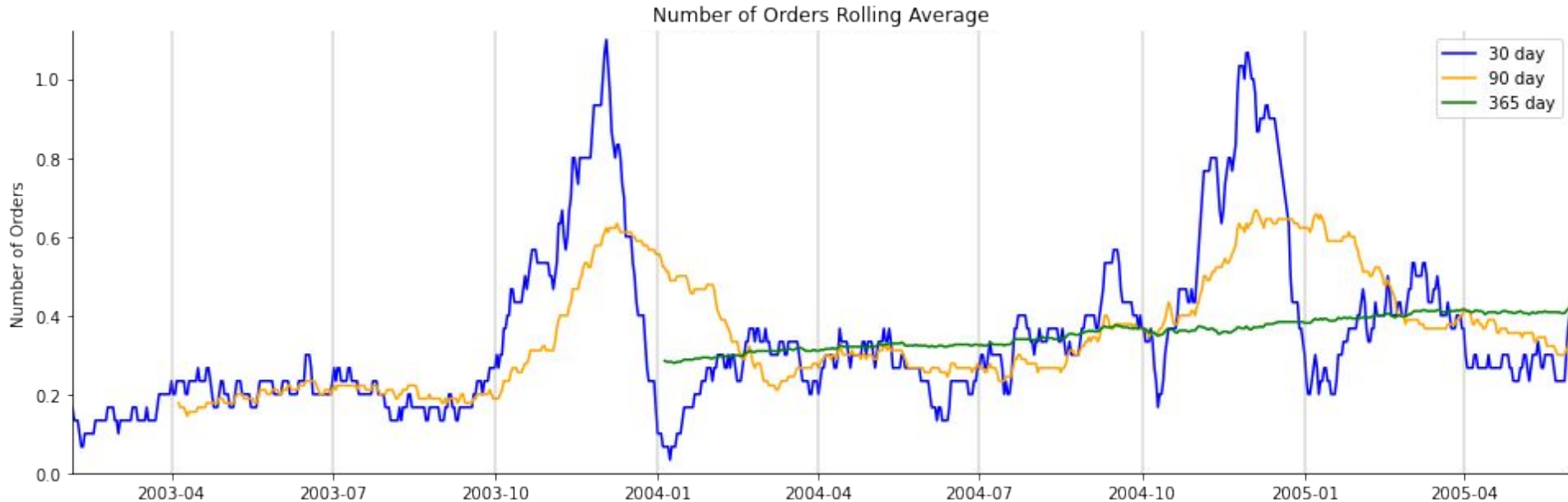
- Determine seasonality
- Identify products with highest profit margins
- Review customer buying patterns

Product Recommender Algorithm

- Product line
- Order volume

- Profitability
- Territory

Seasonality

Clear pattern of seasonality over time.

Number of Orders Rolling Average

Quarterly Change

Q2 has struggled to improve sales.
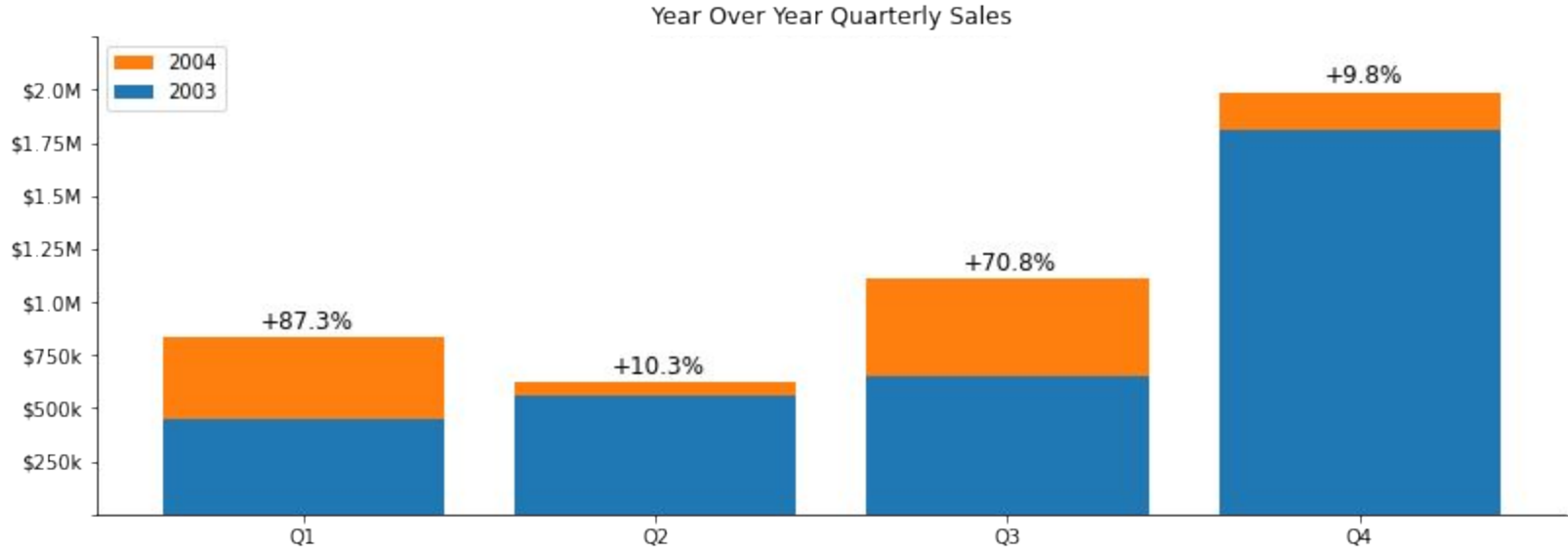
Rate of Change

Rate at which order volume is growing is gradually decreasing year over year (YOY).

Number of Orders Percent Change (YOY) Rolling Average
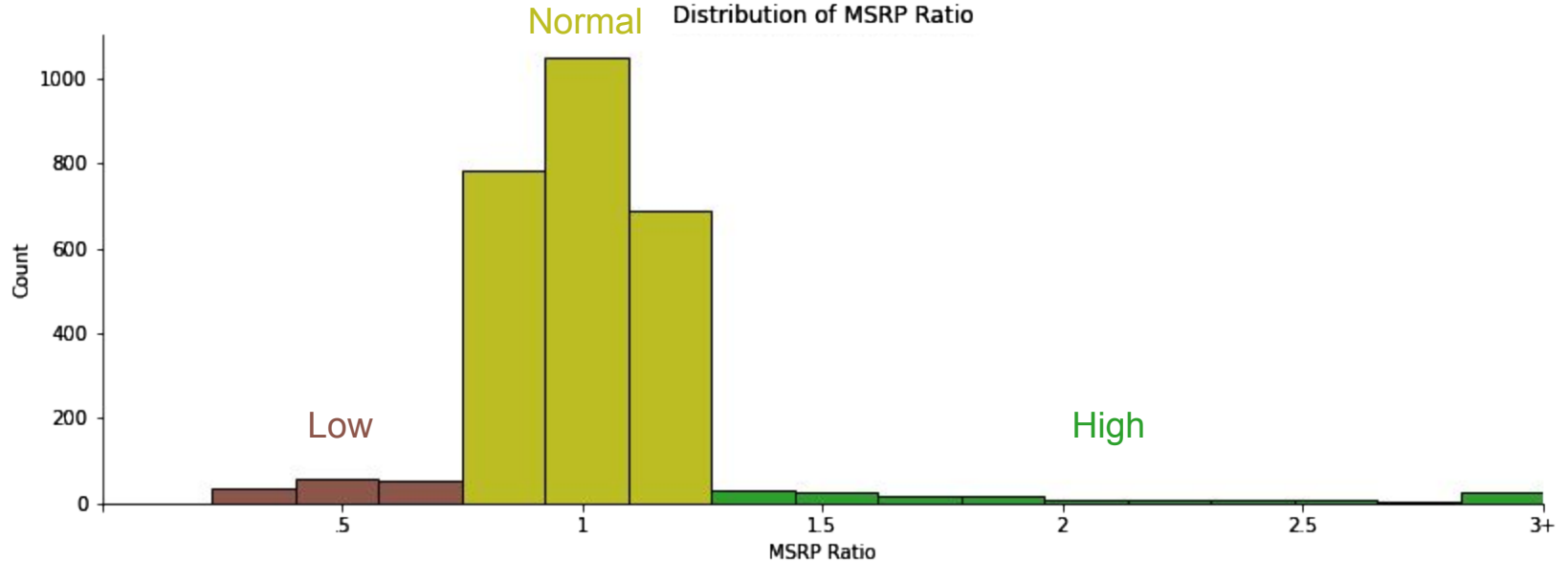
Product Profitability

Assumption:

As Price to MSRP ratio increases, so too does the product's profit margin.

Objective:
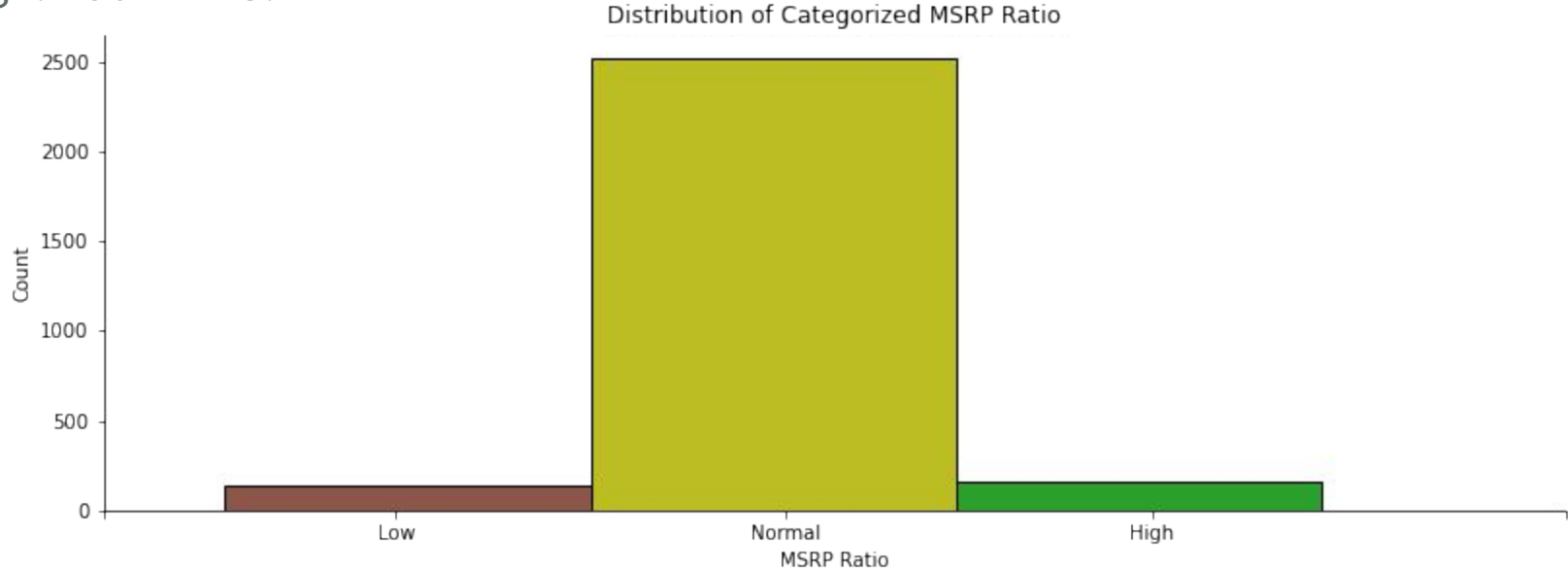
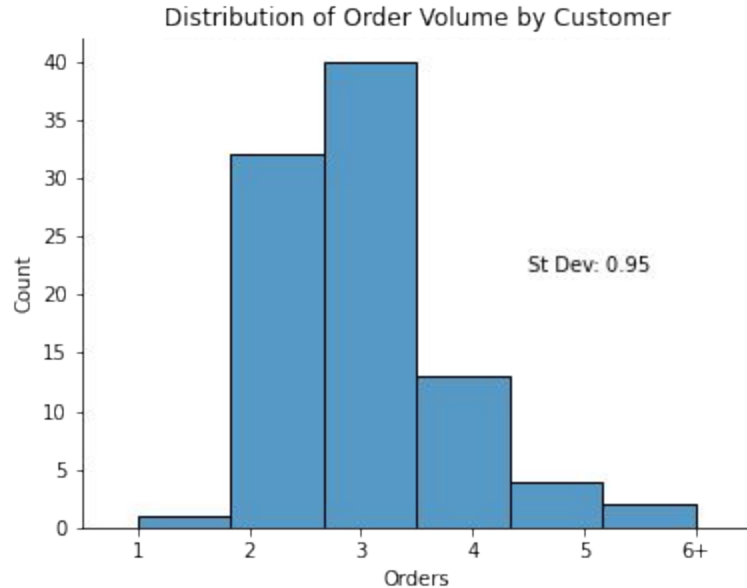Identify products with highest potential for profit.

MSRP Ratio

Distribution of MSRP Ratio

MSRP Categories

Low: Ratio <= 1:2

High: Ratio >= 3:2

Distribution of Categorized MSRP Ratio

Customer Analysis

The frequency and size of customer orders both appear to be mostly normally distributed.

Distribution of Order Volume by Customer

St Dev: 0.95

Distribution of Average Order Price by Customer

St Dev: $10,587

Recommender Algorithm

Objective:

Identify product similarity based **profitability**, **location**, **volume**, and **product line**. Recommend most profitable products to target customers.

Features chosen in an attempt to capture the above metrics:

Metric	Feature
Profitability	MSRP Class
Location	Territory
Volume	Quantity Purchased
Product	Product Line

Step 3
Marketing Strategy

Marketing Strategy

Goal

    Increase year over year sales trend

Approach

1. Identify target customers
2. Set campaign window
3. Predict profitable products that target customers are likely to purchase
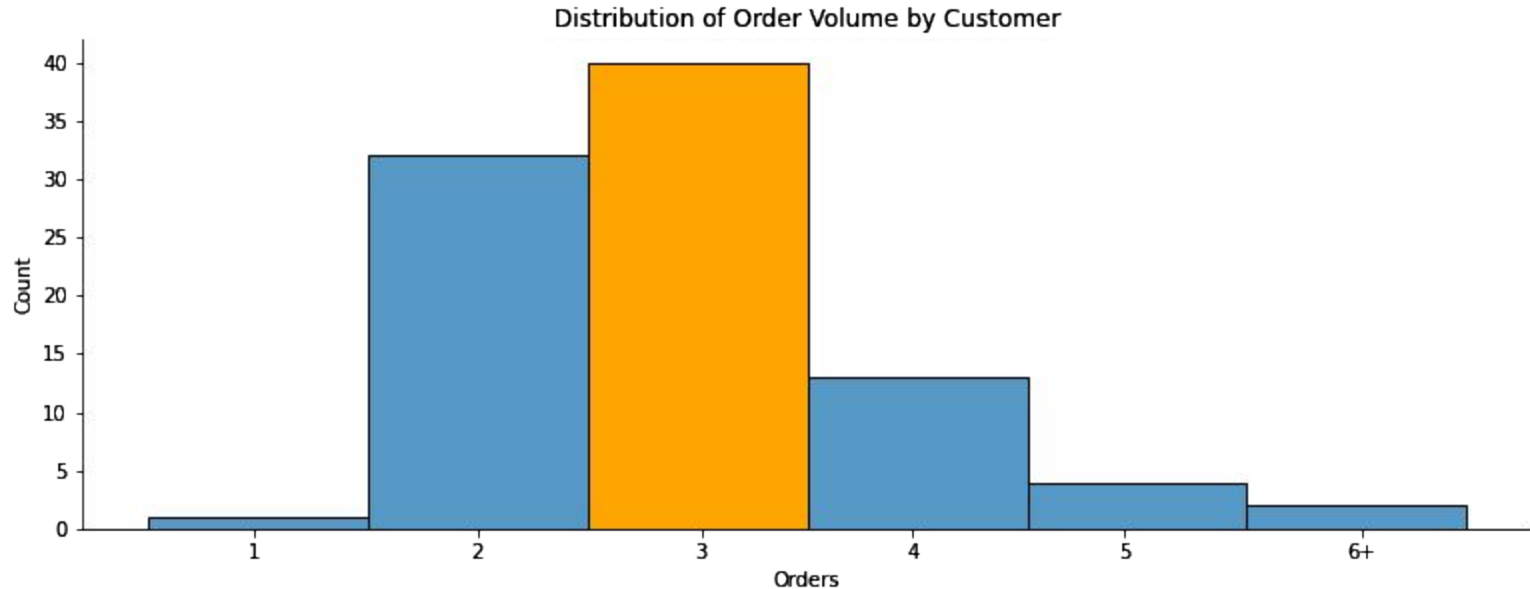
Measure success

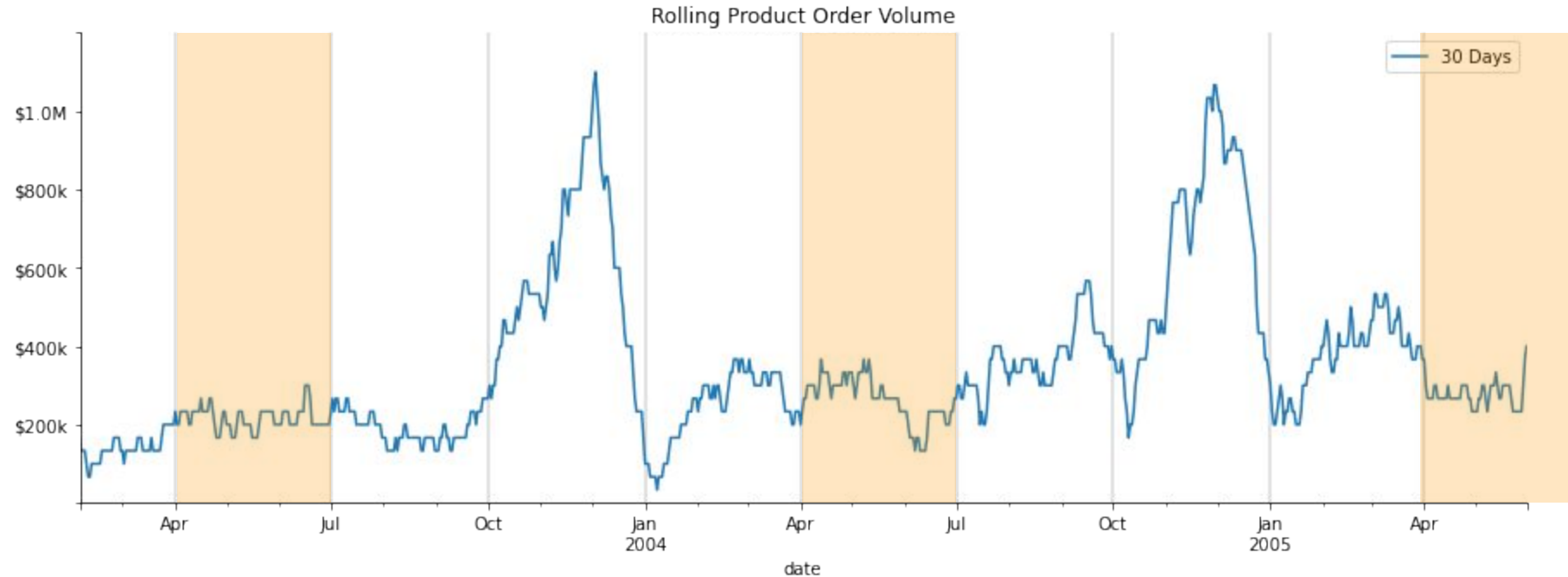   Define success & guardrail metrics

Target Customers

35% of customers (40 total) have previously placed exactly 3 orders.

½ standard deviation on either side of mean/mode

Distribution of Order Volume by Customer

Campaign Window

Proposed window: Q2 (April 1st - June 30th)

Rolling Product Order Volume

Recommended Products

Example recommendations for two target customers

Customer	Mode Purchase	Rec. Product ID	Rec Prod. Line	MSRP Ratio
AV Stores, Co.	Classic Cars S24_2887	S32_1268	Trucks & Bus	1.09
		S18_1889	Classic Cars	1.08
Alpha Cognac	Vintage Cars S18_3856	S18_4522	Vintage Cars	1.03
		S24_2300	Trucks & Bus	1.00

Measuring Success

Success metric

- Increase product sales by 30% or more during Q2.

Guardrail metric

- Average per customer total order price.
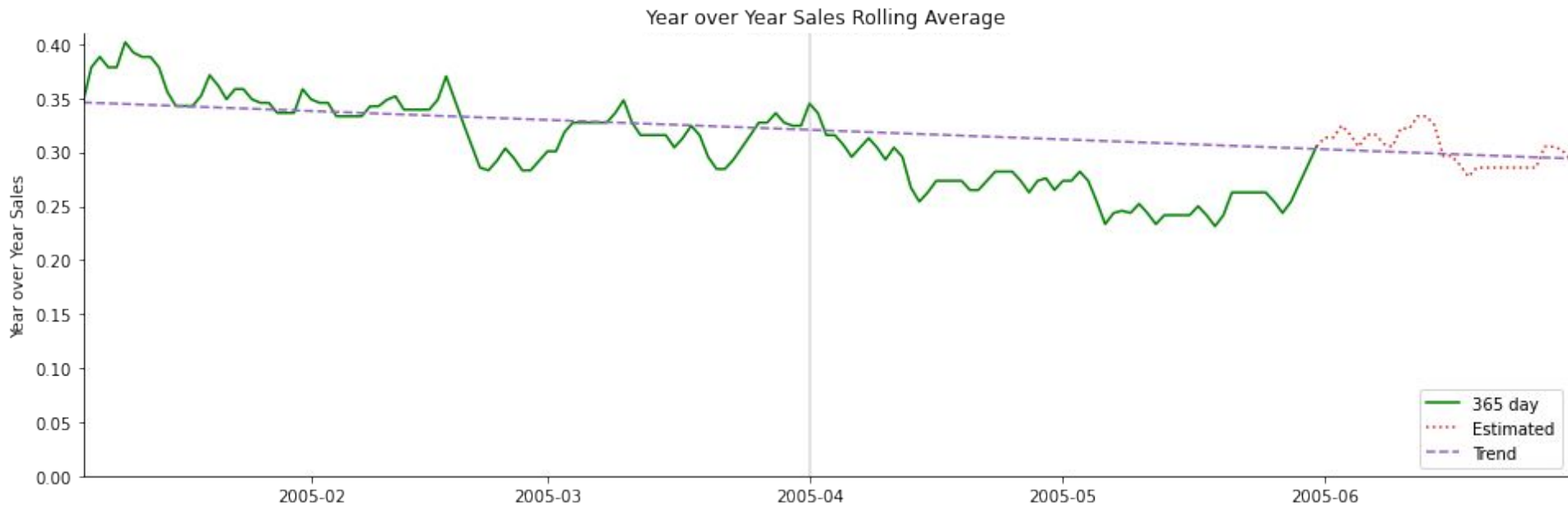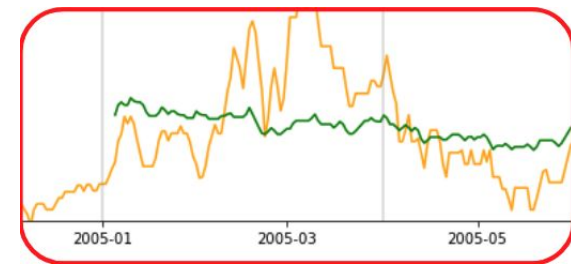   - Goal is <u>new</u> orders. Size should remain consistent.

Rate of Change

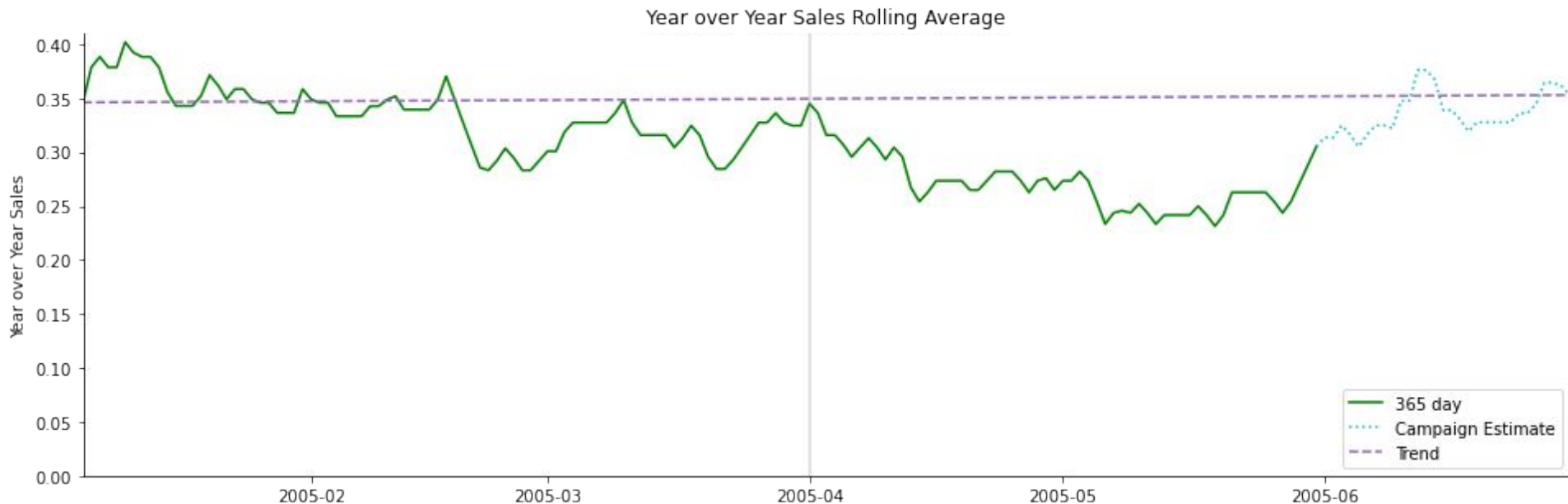Recall: Rate at which order volume is growing is gradually decreasing.

Number of Orders Percent Change (YOY) Rolling Average

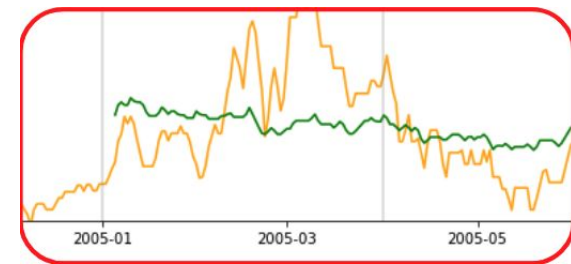# Q2 Sales

Year over year sales projected forward with current trend

Q2 Sales

Marketing campaign with estimated 30% increase in orders.

Year over Year Sales Rolling Average

Summary

Strategy Summary

Past

- Sales data follows consistent seasonality.
- Customer purchasing behavior consistent across regions.
- Rate at which sales are increasing is slowly decreasing over time.
    - Quarter 2 struggling to grow at all.

Future

- Campaign objective is to increase repeat customer order volume.
- Begin marketing campaign in quarter 2.
- Use customer purchase history to make recommendations of most profitable products.
- A successful campaign will boost Q2 orders by 30% without reducing average order price.

Thank you