

E-Commerce Returns & Profitability Analysis

- *How returns impact margin beyond return rate metrics*
- Dataset: 450K orders | 80K customers
- Period: 2024–2025
- Role: End-to-End Analysis
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Are returns actually hurting profitability and if so, where?

Is the problem
channel-
specific?

Is it driven by
customer
behavior?

Or by specific
products?

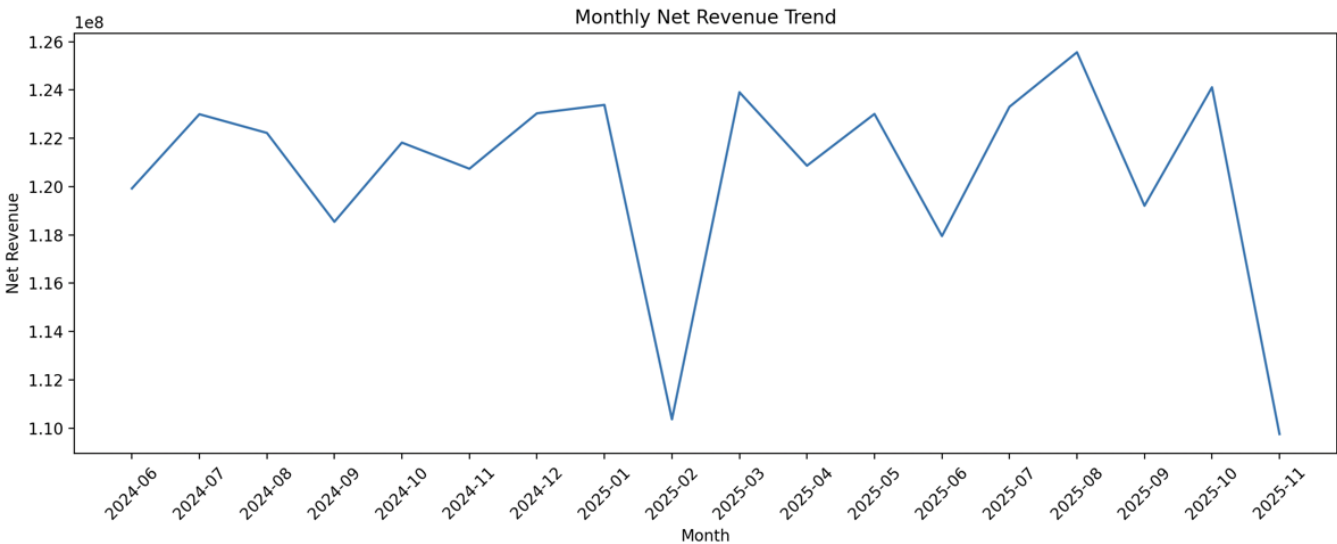
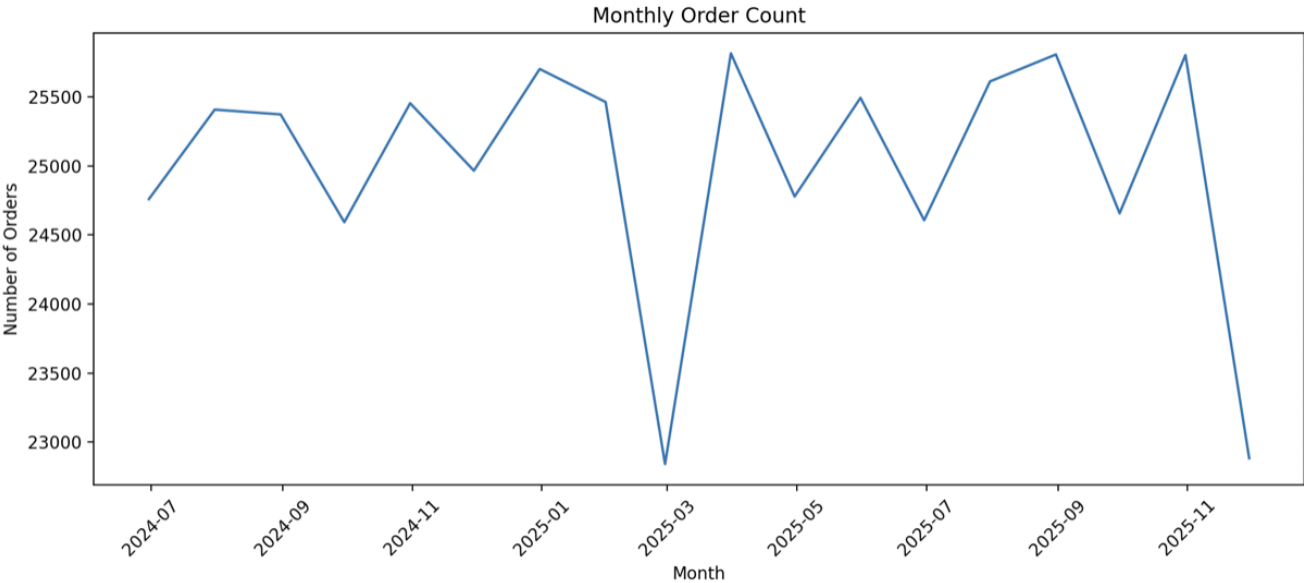
KPIs

- The business demonstrates strong customer loyalty with an average of 5.6 orders per customer and a high average order value. Despite the premium pricing structure, the return rate remains below 4%, indicating effective product-market fit and operational excellence.

Total Net Revenue	2170688437.56
Total Orders	450000
Average Order Value	5023.823045230157
Orders per Custome	5.64355318108281
Return Rate (%)	3.982444444444445

Time Trend (Revenue & Orders)

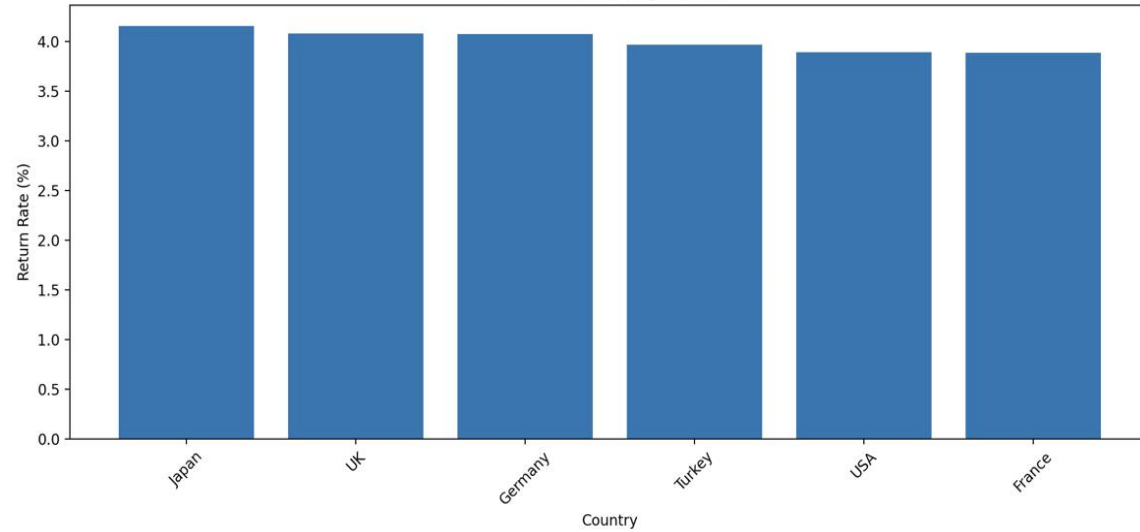
Monthly order volume fluctuates between approximately 23K and 26K. Overall, the volume is stable. There is a significant decrease in March 2025. A further decrease is observed in the final month (November 2025).
Months with declines: Lack of campaigns
Stock/logistics issues Seasonality Or deliberate demand reduction (e.g., to maintain profitability)



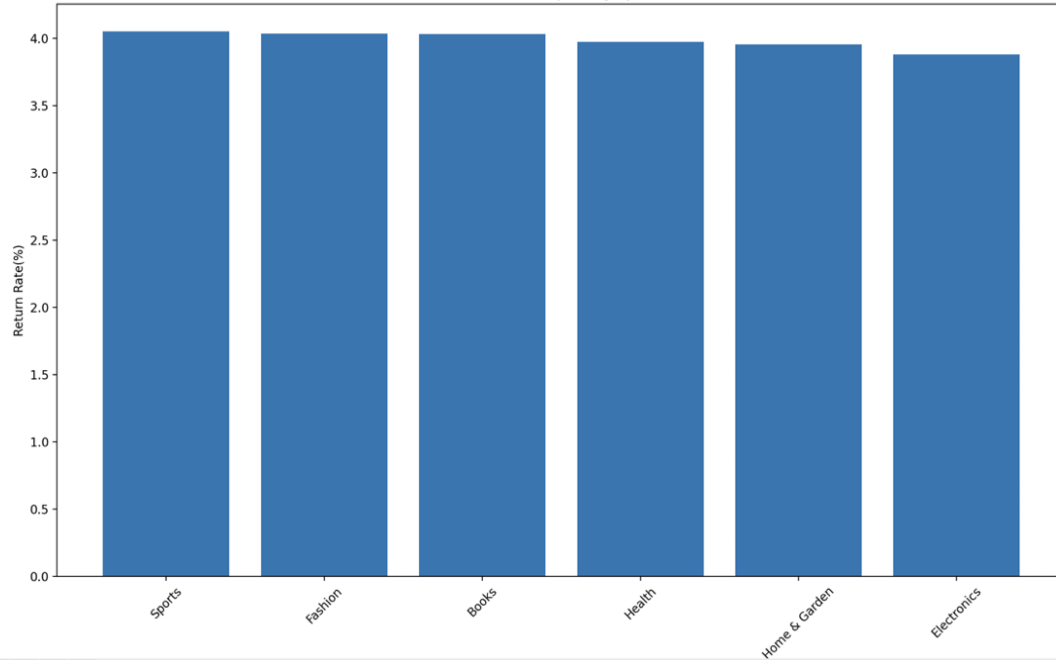
Monthly net revenue shows a stable performance with seasonal fluctuations. A significant drop observed in February 2025 indicates a potential operational or campaign-related issue, followed by a strong recovery. Summer months demonstrate consistently higher revenue levels, suggesting seasonal demand patterns. The sharp decline in November 2025 is likely due to incomplete monthly data.

Return Rate Is NOT the Problem

Return Rate by Country (%)

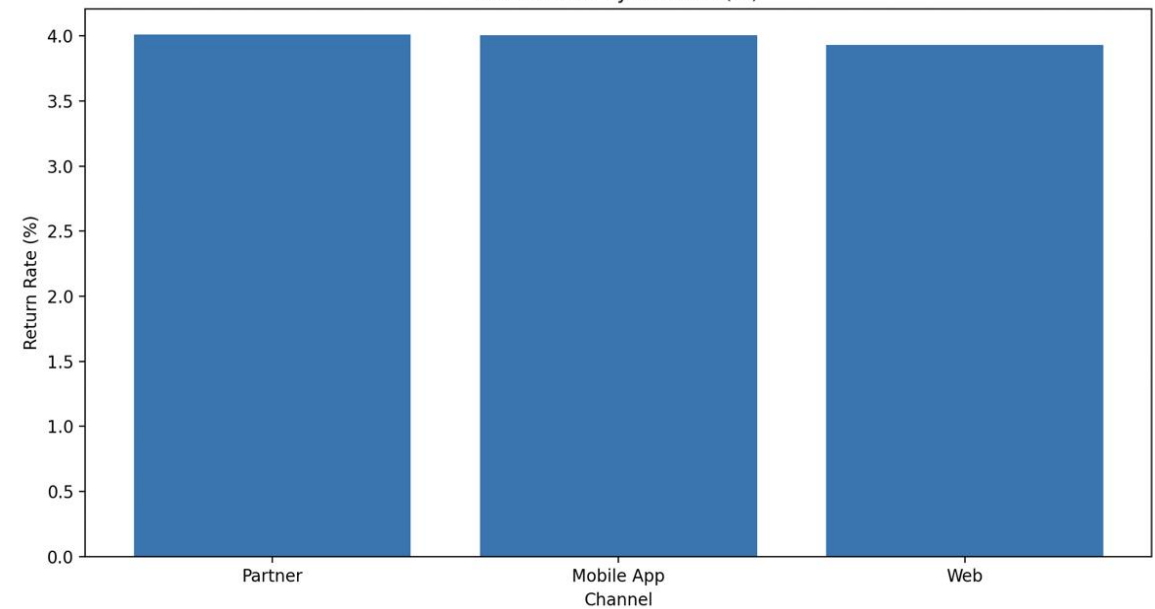


Return Rate by Category (%)



Return rates are remarkably consistent across categories, countries, and channels (4%), indicating no structural or operational bottlenecks. However, this consistency shifts the focus from return frequency to return impact, making revenue loss analysis the critical next step.

Return Rate by Channel (%)



Product-Level Impact

Margin Loss Most Risk Products

product_id	total_orders	returned_orders	returned_revenue_y	returned_margin	returned_items
PROD_2558	400	32	126831.90	50732.50	65
PROD_0676	385	26	123288.10	49315.50	65
PROD_2074	363	26	115555.04	46221.78	59
PROD_2769	426	23	106461.60	42584.64	56
PROD_1788	402	27	103563.59	41425.33	53

Top 5 products alone cause 230K USD margin loss.

A small subset of high-margin products accounts for a disproportionate share of total margin loss. While overall return rates appear healthy across categories, countries, and channels, a product-level analysis reveals that a small subset of high-margin products accounts for a disproportionate share of total margin loss.

Customer Return Behavior

- Number of customers who made returns: 16,059
- Total customers: 80,000
- **Only 20% of customers make returns**
- Returned Orders Median 50%: 1
- 75% : 1
- Max : 4
- **No evidence of systematic return abuse**
Returns are isolated events, not behavioral patterns
Financial impact is driven by high-value products, not frequent returners

Customer behavior

	returned_orders	returned_margin	returned_revenue
count	16059.000000	16059.000000	16059.000000
mean	1.115947	2249.048929	5622.623472
std	0.351686	1556.757483	3891.894025
min	1.000000	4.380000	10.950000
%25	1.000000	1067.290000	2668.225000
%50	1.000000	2011.140000	5027.820000
%75	1.000000	3111.200000	7777.935000
max	4.000000	12969.320000	32423.380000

Segment-Based Profitability

High Value – No Return → by far the highest total turnover

Low Value – No Return → second place

Returned segments → a smaller portion of total turnover

	returned_orders	customers	avg_returns_per_customer
High Value - No Return	0	31885	0.000000
High Value - Returned	8904	7984	1.115230
Low Value - No Return	0	31793	0.000000
Low Value - Returned	9017	8075	1.116656

The ranking is almost identical to revenue.

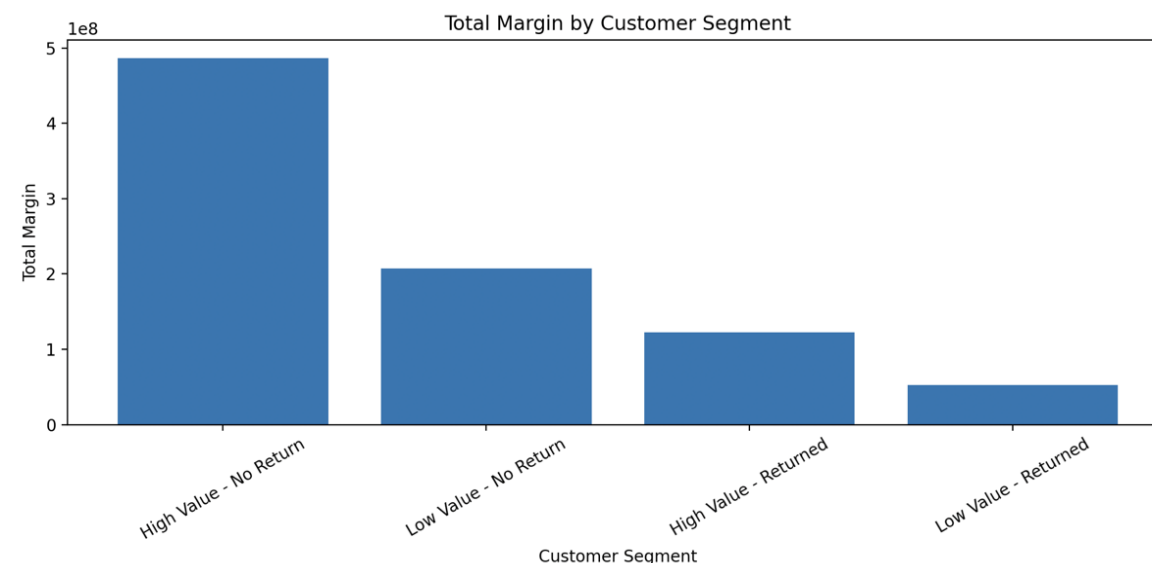
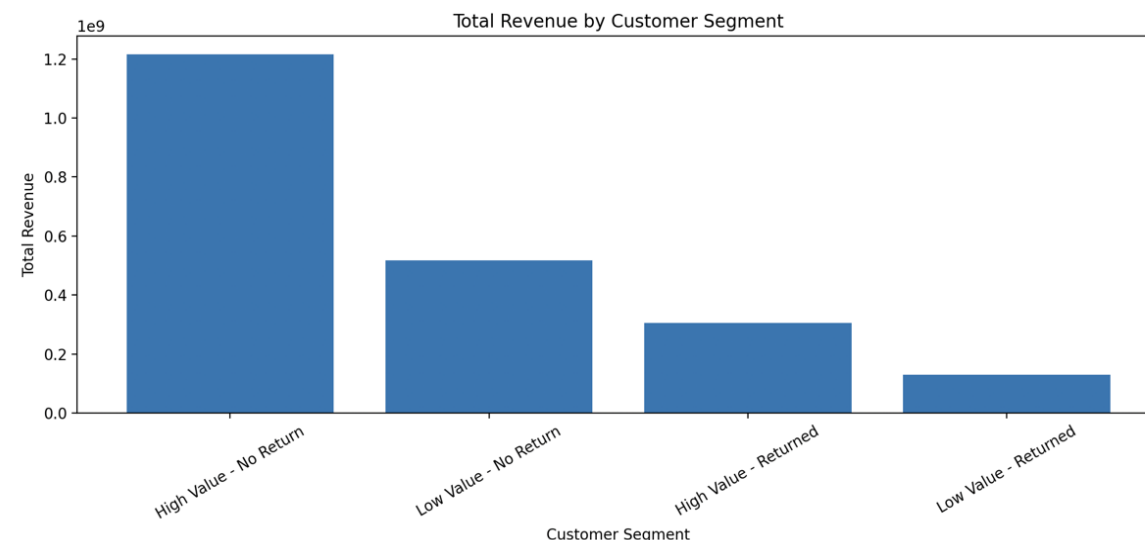
High Value customers → still very profitable even if they return customers

Low Value – Returned customers → both low turnover and low profit

The main risk group is Low Value – Returned.

These are: It spends little. It makes returns. It creates operating costs.

It has a weak margin contribution.



Average Margin and Revenue per Customer Segment

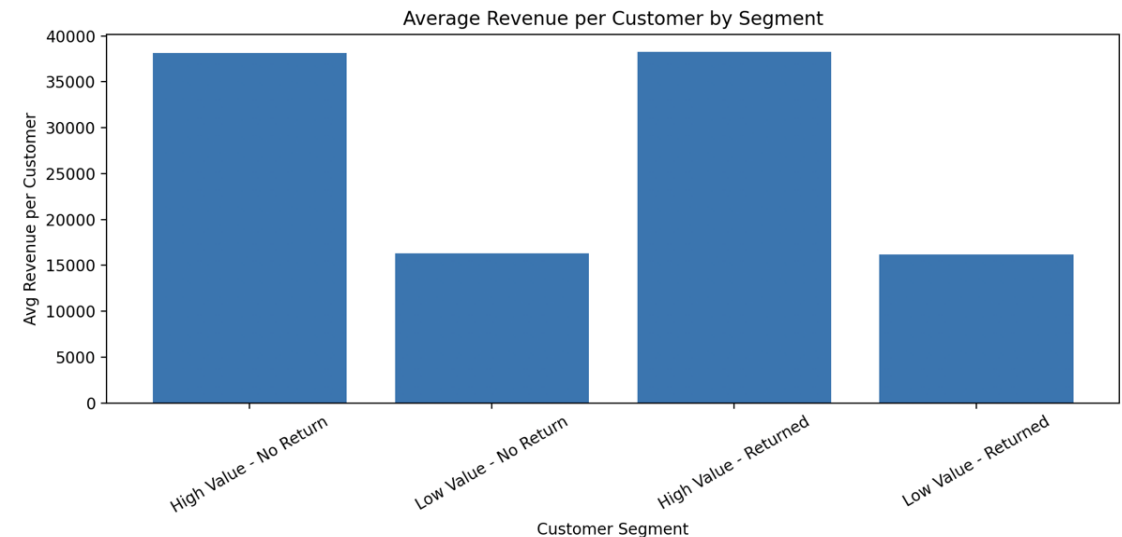
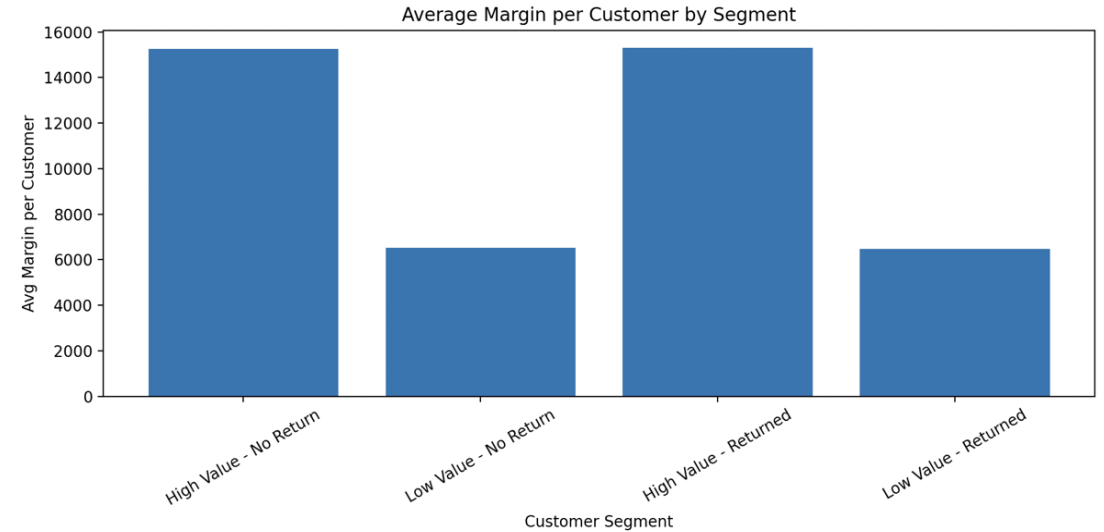
The return problem is not general, but concentrated in a specific customer group.
High Value segments: Returned / No Return difference is negligible.
Low Value segments: Already low margins Even more problematic with returns.

High Value – Returned / High Value – No Return
Average customer revenue is almost the same.

Return behavior is not related to spending power.

This customer spends a lot but sometimes returns
This customer spends a lot and never returns → spending potential is the same

This distinction is strategic: High Value You don't want to lose returning customers But you might want to soften their behavior



Action Plan

- **The right approach Let's take segment-based action**
- **Action Recommendations by Segment**
- **High Value-No Return**
- VIP program , Loyalty rewards , Early access, premium support
- **High Value-Returned**
- Improving product descriptions , Size/fit guide ,
- Exchange instead of return incentive,
- Proactive customer support
- **Low Value-Returned**
- Free shipping / return limit,
- Minimum basket amount ,
- Return fee tests ,
- Stricter return policy
- **Low Value - No Return**
- Upsell / cross-sell ,
- Carry the campaign to High Value