

# PROFIT LEAKAGE & TRUE UNIT ECONOMICS ANALYSIS

E-commerce Business Case Study – by [Mohsin Raza](#)

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## 1. EXECUTIVE SUMMARY

This project analyses **true unit economics and profit leakage** for an e-commerce business using transactional data.

The objective was to move beyond revenue and blended metrics and identify **where profitability is actually created or diluted** across categories and customers.

The analysis reveals that while overall profitability appears healthy at an aggregate level, **profit concentration and cost structure risks emerge when examined more granularly**, particularly at the customer level.

This report is designed as an **internal decision-support analysis**, not a descriptive dashboard.

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## 2. BUSINESS PROBLEM

Many startups and mid-sized e-commerce companies face the following challenge:

- Revenue is growing
- Average margins look strong
- Yet long-term profitability remains uncertain

The core problem is **over-reliance on blended averages**, which can mask:

- cost-driven profit leakage
- uneven customer value
- hidden downside risks in growth strategies

This project addresses three key questions:

1. Where does profit actually go after all costs?
  2. Are some categories structurally weaker than others?
  3. Are all customers equally valuable, or is profit highly concentrated?
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### 3. DATA OVERVIEW

The analysis is based on e-commerce transactional data including:

- Orders and order items
- Customer purchase history
- Logistics and fulfilment costs
- Payment gateway fees
- Allocated customer acquisition cost (CAC)

All heavy transformations, joins, and unit economics logic were handled in **SQL (PostgreSQL)** to ensure correctness and scalability.

Power BI was used strictly for **semantic modeling and visualization**, not ETL.

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### 4. METHODOLOGY

#### 4.1 Cost & Profit Modeling

Net profit was calculated using two CAC approaches:

- **Blended CAC:** CAC averaged across all orders
- **Aggressive CAC:** CAC allocated only to first-time orders

This allowed stress-testing of acquisition cost assumptions and avoided relying on a single averaged view.

#### 4.2 Analysis Levels

The analysis was conducted at three levels:

1. **Business-level overview** – overall health and cost structure
2. **Category-level diagnosis** – structural profitability differences
3. **Customer-level analysis** – profit concentration and long-tail risk

Each level was designed to answer a distinct business question.

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## 5. KEY FINDINGS

### 5.1 Business-Level Insights

- The business is profitable under both blended and aggressive CAC assumptions
- Cost structure is dominated by logistics and fulfillment expenses
- CAC reallocation has limited impact on overall profitability in this dataset

This indicates that **operational costs, not marketing costs**, are the primary profitability driver.

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### 5.2 Category-Level Insights

- Category rankings remain largely unchanged under aggressive CAC allocation
- No category is structurally loss-making
- Logistics cost intensity explains most margin variation

#### Key takeaway:

Profitability differences across categories are **cost-driven**, not acquisition-driven.

This suggests limited benefit from reallocating marketing spend across categories without addressing fulfilment efficiency.

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### 5.3 Customer-Level Insights

- Customer profitability is highly uneven
- A significant portion of customers generates low or negative profit
- A smaller subset contributes a disproportionate share of total value

This reveals a critical risk:

Growth without customer quality control can dilute unit economics, even when category-level metrics look strong.

Customer-level analysis exposes risks that are invisible in aggregated dashboards.

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## 6. BUSINESS IMPLICATIONS

Based on the analysis, the following implications emerge:

1. **Blended metrics are insufficient**

They hide customer-level risk and overstate stability.

2. **Operational efficiency matters more than CAC optimization**

Logistics and fulfilment improvements would have a larger impact on profit.

3. **Customer segmentation is critical for sustainable growth**

Not all customers should be treated equally in acquisition or retention strategies.

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## 7. TOOLS & TECH STACK

- **SQL (PostgreSQL)** – data modeling, joins, unit economics logic
- **Power BI** – measures, business logic, executive dashboards
- **DAX** – profit calculations, CAC stress testing

The focus was on **robust fundamentals**, not tool complexity.

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## 8. LIMITATIONS

- The dataset contains limited granularity for paid marketing spend
- CAC values are understated compared to real D2C environments
- Results should be interpreted as **directional insights**, not absolute benchmarks

These limitations were acknowledged deliberately rather than hidden.

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## 9. CONCLUSION

This project demonstrates how looking beyond revenue and averages reveals **structural risks and concentration effects** in e-commerce unit economics.

While the business appears healthy at an aggregate level, **profit sustainability depends on cost control and customer quality**, not just growth.

The analysis reinforces a simple but often ignored truth:

Revenue is easy to measure.

Profitability requires judgment.