

Analytic Case

**Analysis of Repeat Purchase Behavior for Laundry Detergent (Q1-Q5)
A Five-Quarter Study Using NBD and CTA Models**

Key Findings of the Analysis

Main Repeat Purchase Behavior Insights for Laundry Detergent

💡 Marketing efforts should prioritize **broad reach and penetration** over loyalty programs, as occasional buyers dominate detergent sales.

Marketing Implications

Majority of Sales from Light & Medium Buyers

- 78% of sales in Q5 from buyers purchasing 1–3 times.
- Confirms Ehrenberg’s law: most customers buy infrequently.

Model Overestimation of Heavy Buyers

- NBD model inflated medium/heavy buyer segments
- avoid over-reliance on predictive models for strategy

Volatile Buyer Behavior

- Regression-to-the-mean from Q4 to Q5.
- Heavy buyers often reduce frequency; light buyers fluctuate.
- Brand choice driven by habit and availability—not loyalty.

Prioritize

Prioritize Broad-Reach Marketing

- Focus on increasing penetration among light buyers rather than attempting to increase purchase frequency among heavy buyers.
- Invest in mass-reach advertising, prominent in-store visibility, and strong distribution to maximize product availability.

Integrate

Integrate Real Data with Model Benchmarks

- Use NBD outputs as a diagnostic tool but validate them against observed sales and buyer counts before allocating budgets.
- Adjust expectations for medium and heavy buyer segments to avoid overestimating their long-term revenue contribution.

Build

Build Mental and Physical Availability

- Maintain brand salience through consistent marketing activity and ensure the product is easy to find and purchase.
- Avoid over-reliance on loyalty schemes in FMCG categories where heavy buyers are rare and naturally prone to regression.

Part I

Overview

Across five quarters

1.1 Dominance of Low-Frequency Buyers over five quarters

Dominance of low-frequency buyers

- Majority are non-buyers: 12,292 individuals (occupying 85% of the total) made no purchase in each quarter
- Low-frequency buyers dominate sales: 1,072 bought once; 581 bought two or three times
- Heavy buyers are rare: Only 139 buyers purchased six or more times
- Cumulative percentage curve confirms dominance of low-frequency buyers.

Supports Ehrenberg's Law

- Brands rely heavily on infrequent buyers
- Buyer frequency shows steep decay with increasing purchases (NBD–Dirichlet model confirmed)

Typical purchase pattern

- Most consumers remain inactive in any given period

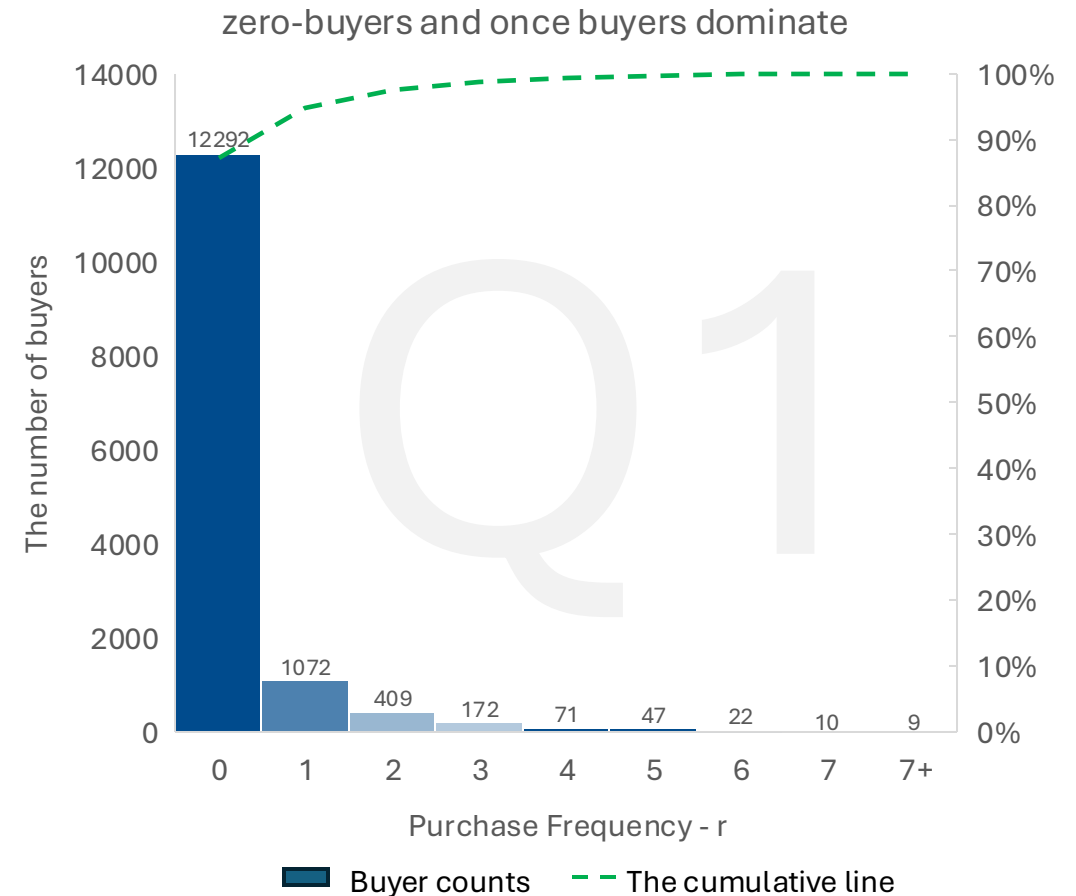
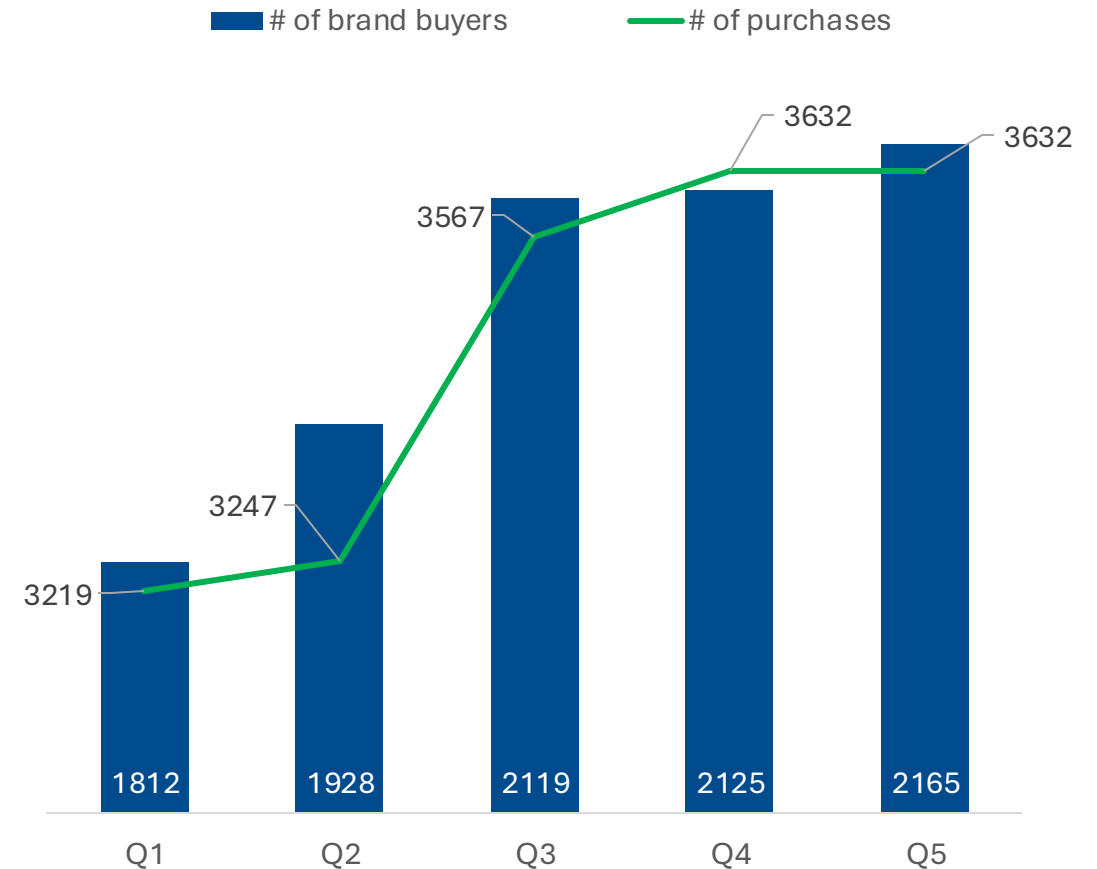


Figure: Distribution of buyers by purchase frequency (r) in Q1, with similar patterns observed in Q2–Q5.

1.2 Growth in Brand Buyers & Purchases Over Time

- **Steady growth in total buyers** from Q1 (3,219) to Q5 (3,632).
- **Consistent increase in brand buyers** from 1,812 in Q1 to 2,165 in Q5.
- **Brand buyer growth outpaces total buyer growth**, indicating rising brand engagement.
- **Quarter-over-quarter improvement** in both buyer count and brand loyalty.
- **Q3 and Q4 show strong gains**, with brand buyers exceeding 2,100.

The number of brand buyers & purchases go up over the five quarters



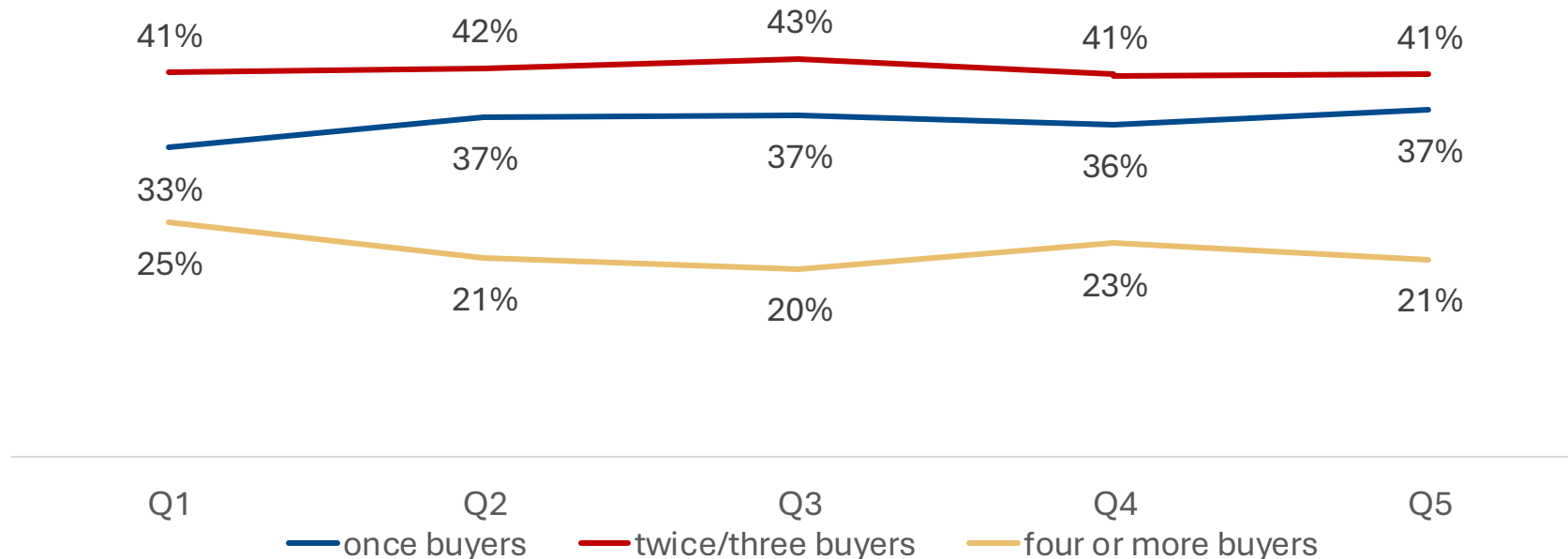
1.3 Sales Shift: Twice/Three Buyers Lead as Heavy Buyers Decline (Q1-Q5)

*Summary: The **twice/three buyers segment dominates sales**, but **heavy buyers are declining**, while **once buyers are rising**. This suggests a need to **re-engage heavy buyers** while nurturing newer customers.*

- **Twice/Three Buyers** are the **largest segment**, contributing **41-43%** of sales consistently across all quarters.
- **Four or More Buyers** show a **declining trend**, dropping from **33% (Q1) to 21% (Q5)**.
- **Once Buyers** remain the smallest segment but **grow slightly** from **25% (Q1) to 37% (Q5)**.

Over time, **once buyers** are gaining share, while **heavy buyers (four or more)** are losing influence.

sales contribution by different buyer class across five quarters



Part II

Comparison of Observed & Theoretical results on buyer counts and sales contribution

2.1 Comparison of Buyer Counts (Observed & Theoretical) by NBD benchmarks

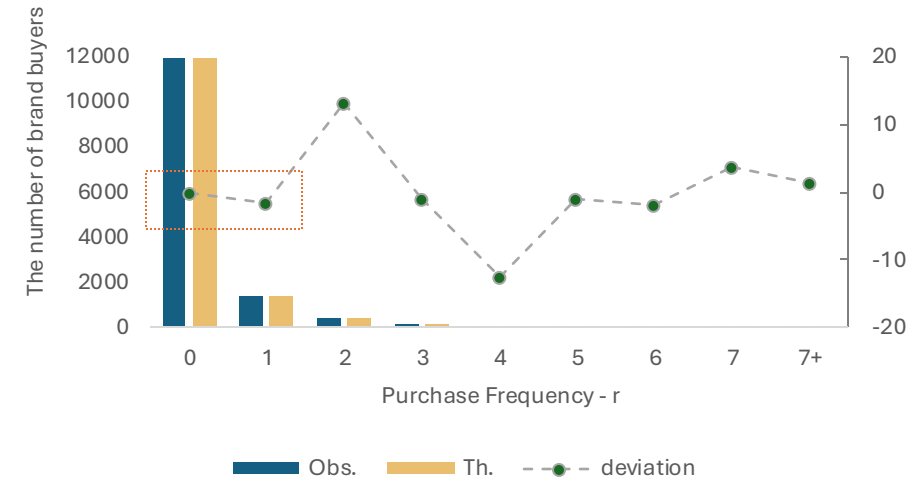
Model insights

- Limitation on NBD model: reliable for modeling light buyers, rather than medium and heavy buyers
- Most consumers are occasional buyers
- Light and Medium buyers dominate: the majority of sales came from occasional buyers, both in numbers & revenue contribution

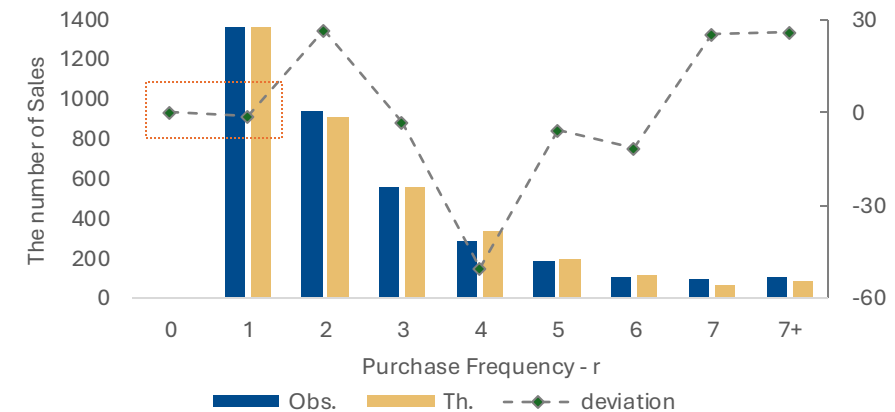
Marketing Implications

- Broad-reach marketing: capture light and medium buyers
- Do not just focusing solely on loyalty programs for heavy buyers

Buyer Counts Comparison



Sales Volume Comparison



2.2 Comparison of Brand Sales Contribution

Occasional buyers drive most sales, reinforcing the value of broad-reach marketing

Results Match Closely

- Observed vs. Theoretical Sales

Sales Dominated by Light and Medium Buyers

- Majority of revenue comes from occasional buyers

Marketing Implication

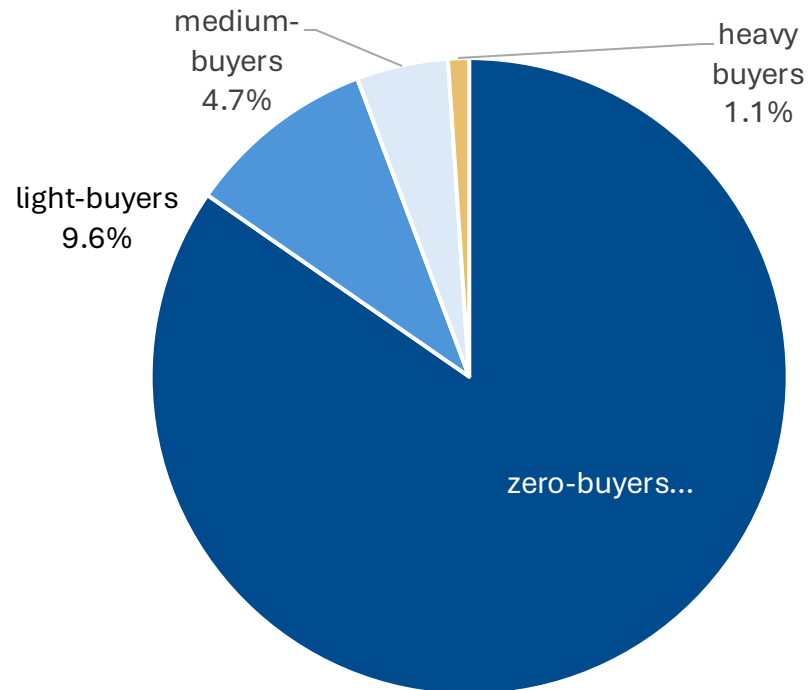
- broad-reach marketing
- Loyalty programs for heavy buyers are less impactful

Buyer Class	Obs. values	The. values
Zero	0	0
Once	37%	38%
Twice/three	41%	41%
Four or more	21%	22%

Part III

Buyer segmentation

3.1 Unlocking Growth: Converting Non-Buyers into Light and Medium Buyers



The biggest growth opportunity lies in activating the large base of non-buyers rather than loyal customers

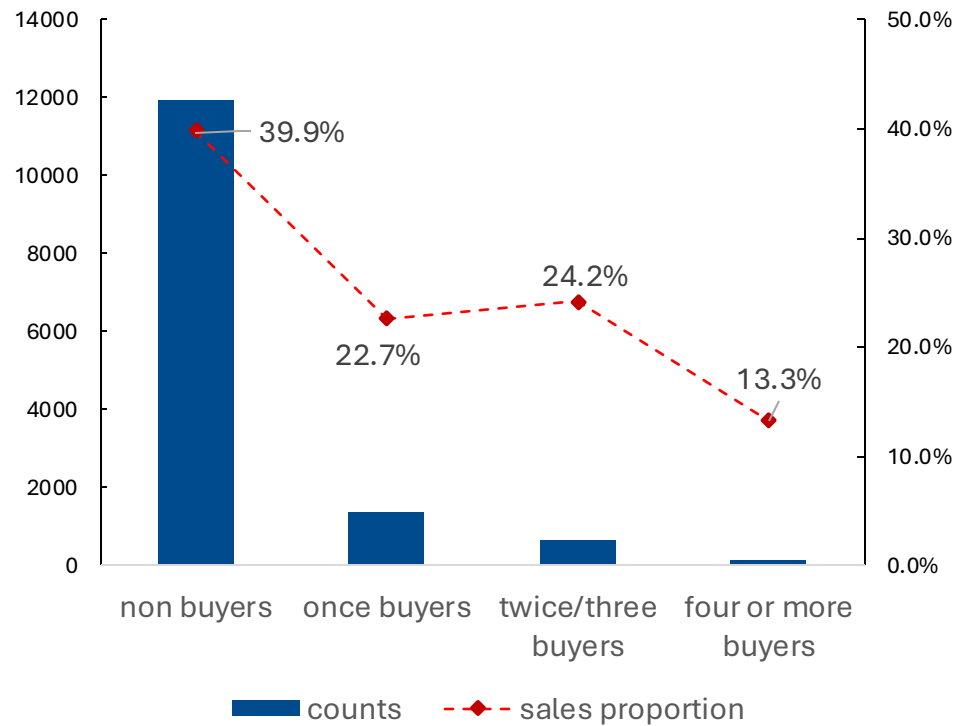
- Majority of category buyers made no purchases
- Repeat and high-frequency buyers are rare
- Light and medium buyers offer the greatest potential for sales uplift.
- Strategic focus should shift from loyalty alone to penetration growth
- Marketing and outreach efforts should aim to convert zero-buyers into occasional buyers



3.2 Buyer Segmentation Insights & Strategic Recommendations

While heavy buyers are valuable, most sales come from light and occasional buyers—making penetration, not loyalty, the key to sustainable growth

Compares buyer frequency segments with their respective sales contributions



Non-Buyers

Largest group by count
Still contribute **39.9%** of total sales—likely due to past purchases or stock-up behavior

Once Buyers

Moderate count
Contribute **22.7%** of sales—indicating trial but limited retention.

Twice/Three Buyers

Smaller group
Contribute **24.2%**—showing strong value per customer

Four or More Buyers

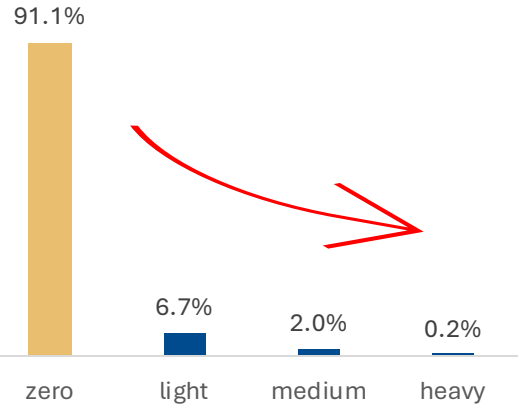
Smallest segment
Still contribute **13.3%**—high loyalty, high value density

Part IV

Analysis of Buyer Transitions

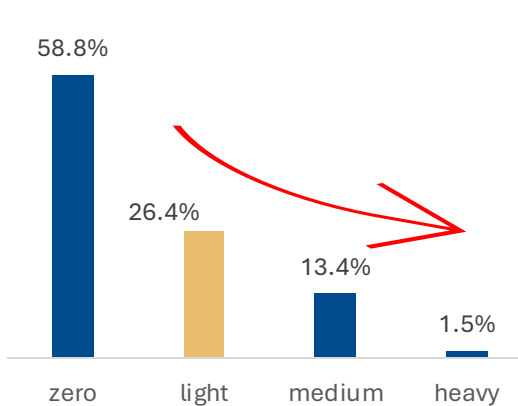
4.1 Most buyers don't retain their prior purchase level

Q4-Q5 transition of **zero** buyers



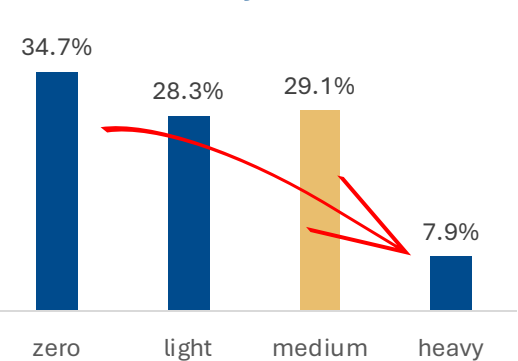
Zero buyers display strong behavioural inertia, with 91.1% remaining non buyers. Only small proportions move into active buying.

Q4-Q5 transition of **light** buyers



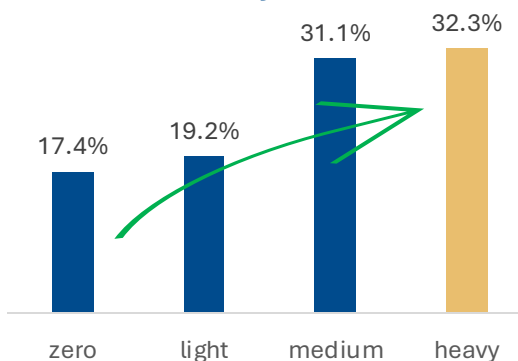
While 26.4% remain in the same category, 58.8% revert to zero purchases and only a small minority progress to medium or heavy buying.

Q4-Q5 transition of **medium** buyers



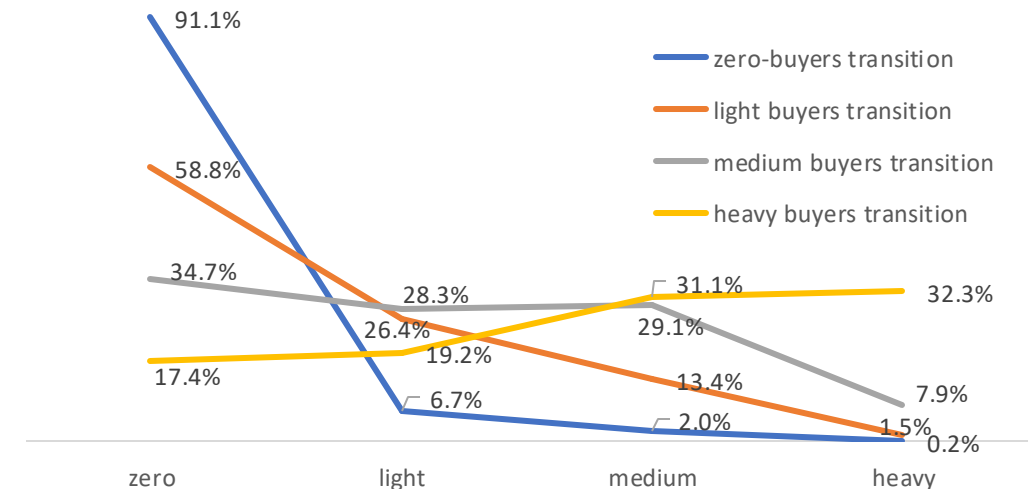
29.1% remain in the same category, while 34.7% drop to zero and 28.3% move down to light.

Q4-Q5 transition of **heavy** buyers







Only 32.3% retain their status, while 31.1% move to medium and 19.2% drop to light.

- **Buyer classes are fluid**, not fixed
- **Buyer retention decreases** as purchase frequency increases; heavy buyers are more likely to regress.
- **Zero and light buyers dominate** the population but contribute less to total sales
- **Purchase fluctuations are systematic** and largely driven by **randomness**, not deliberate switching or dissatisfaction.



4.2 Shifting Buyer Dynamics – Acquisition Success vs. Retention Gaps (Q4 vs. Q5)

Buyer class	Q5 Proportion of total buyers	Q5 relative sales contribution (%)	Q4 contribution
zero	84.6%	39.9% 	0
light	9.6%	22.7% 	36.0%
medium	4.7%	24.2% 	41.4%
heavy	1.1%	13.3% 	22.5%

Acquisition Wins, Retention Fails

- New customer activation worked, but **loyal buyers declined significantly**.
- Combined **27% drop** in high-value segments (twice/three + high-frequency).

Marketing Implications

- **Differentiated retention strategies** needed per segment.
- Balance **broad reach (acquisition)** with **stronger loyalty incentives**.



THANKS