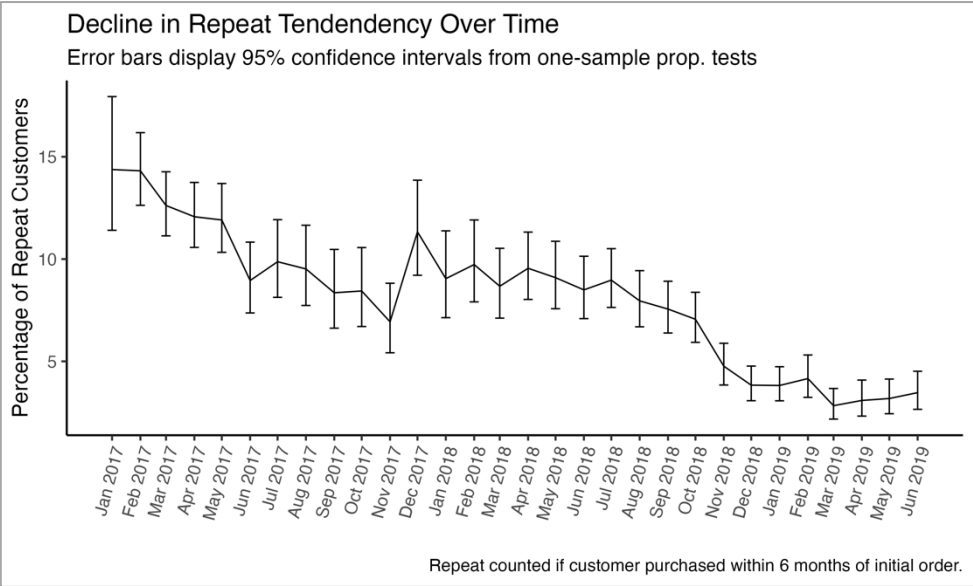


Repeat Purchasing Tendency Over Time

Repeat customers were identified by those who made a second purchase within **six months** of their first order (note: out of all repeat purchases, over 75% occurred within six months of the first order). Customers were then grouped by the month and year of their first order, and the proportion of customers making repeat purchases was measured over time. *Each customer was counted only once, based on the date of their first order.* The figure below presents the percentage of customers making repeat purchases within the follow-up window from January 2017 through June 2019.

It is apparent that repeat purchasing tendency declined throughout the cohort window, as evidenced by the downward trend in the time series plot (*right*). At each month, a 95% confidence interval was estimated based on the number of customers who made first orders in that month (thus, a narrower confidence interval indicates a larger sample size for the month).

Conclusions: Repeat purchasing tendency declined from 14.4% (95% CI: 11-18%) in January 2017 to 3.5% (95% CI 2.7-4.5%) in June 2019. Customers were increasingly *less* likely to make a repeat purchase within the six months after their first order. The decline in repeat tendency is a possible effect of a diminishing returns phenomenon, whereby the “best” customers are acquired earlier in the cohort window, and subsequent customers tended to exhibit lower propensities for repeat purchasing within the firm.



Repeat Purchasing Habits by Product Category

Products were grouped by category and each order was categorized by the product categories that were purchased. Across all first orders (by customer), the probability of making a repeat purchase in each product category was observed. In effect, the accompanying matrix (*left*) represents the **cross product purchasing probabilities** for all product categories. For example, customers who first purchased *Rash* products were very likely to make a repeat purchase in the same category (64.9%) but were also somewhat likely to make a purchase of *Nausea* products (18.5%); the same customers were unlikely to make a purchase of products in the *Fever* category (1.6%).

Product Category of First Order	Product Categories of Repeat Orders										
	Itch	Rash	Pain	Cough	Cold	Flu	Allergy	Headache	Fever	Nausea	Diarrhea
	Itch	92.6%	4.3%	-	2.4%	0.3%	0.9%	0.2%	1.7%	0.3%	0.5%
	Rash	4.7%	64.9%	1.7%	14.5%	2.8%	4.6%	2.5%	4.7%	1.6%	18.5%
	Pain	5.9%	25.0%	36.8%	14.7%	4.4%	7.4%	4.4%	11.8%	7.4%	16.2%
	Cough	3.0%	11.8%	1.0%	90.1%	0.8%	1.6%	0.4%	0.6%	1.0%	3.2%
	Cold	-	20.7%	0.9%	6.3%	74.8%	2.7%	-	3.6%	-	9.0%
	Flu	1.1%	4.8%	0.9%	1.8%	0.4%	81.5%	10.8%	12.7%	1.3%	2.2%
	Allergy	0.6%	4.2%	0.6%	-	-	20.3%	81.3%	4.5%	0.3%	1.9%
	Headache	4.4%	9.3%	1.1%	2.5%	0.8%	16.9%	4.4%	70.6%	2.2%	2.2%
	Fever	5.2%	10.4%	2.2%	7.4%	-	8.9%	3.7%	12.6%	54.8%	5.2%
	Nausea	1.1%	13.0%	0.7%	4.5%	1.4%	2.0%	1.0%	2.0%	1.3%	83.7%
	Diarrhea	-	-	-	4.2%	-	2.1%	-	2.1%	2.1%	91.7%

Conclusions: Several product categories, including *Rash*, *Pain*, and *Allergy*, offer notable opportunities for cross-product marketing, evidenced by high probabilities in the above matrix.