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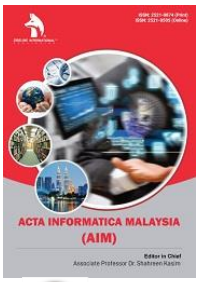

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RESEARCH ARTICLE

LOCKBOX ANALYSIS: EVALUATING REVENUE LOSS DUE TO LOCKING BRANDS IN STORES USING TEST AND CONTROL GROUP METHODOLOGY

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ABSTRACT

Brand withholding at retail stores, in which one brand is restricted from consumer availability or purchase, is employed most often to create exclusivity, maintain supplier agreements, or stimulate private-label options. Although the tactic can have an impact on brand image and consumer behavior, it can also lead to accidental revenue loss. This study examines the financial effect of brand locking through a test and control group analysis to provide empirical evidence for their store profitability results. The results show there is a quantifiable decline in total sales performance for locked brand stores, varying according to product category, substitute existence, and customer loyalty. The results mirror brand locking to cause revenue losses of 5-10% in terms of smaller transaction sizes, smaller basket sizes, and customers switching to substitution stores. Various factors including strategic pricing, special promotions, and the availability of substitution products were found to reduce some of these losses. The paper establishes evidence-based strategy recommendations to enhance brand-locking strategy optimization with a view to avoiding economic loss while still securing competitive gain. Retailers ought to utilize customer analytics, A/B testing frameworks, and forecast models to analyze the long-run sustainability of brand limitations. Follow-up research may also explore brand loyalty dynamics, customer churn dynamics, and category-level effects further to optimize revenue-maximizing actions. Results from this study increase the nuance of describing how brand access impacts consumer behavior and store profitability, allowing retailers to make knowledgeable strategic choices amid chaotic markets.

KEYWORDS

Lockbox analysis, Test and Control, Retailing, Buying patterns, Customer loyalty, Store locking BrandX (LPC)

1. INTRODUCTION

Brand locking within retail outlets, where certain brands are denied access to customers or purchases, is frequently used to create exclusivity, support supplier contracts, or encourage private-label options (Sloot, and Verhoef, 2008). While this tactic can be effective in shaping brand and consumer attitudes, it can also lead to unwanted revenue loss. This research examines the financial effect of brand locking through a test and control group approach to derive empirical evidence regarding its effect on store profitability. Controlled tests were conducted at several store locations, with a few stores having brand limitations (test group) and others having general brand presence (control group). By comparing point-of-sale (POS) information, transaction levels, and customer buying patterns, it is to compare changes in sales trends, customer retention, and revenue variations. Statistical methods, including difference-in-differences (DiD) analysis and regression modeling, were employed in quantifying the loss in revenue caused by brand limitations while controlling for outside market forces (Lambrecht and Tucker, 2015).

2. RELATED WORK

Previous research has examined many variables affecting brand visibility and consumer purchasing behavior. Previous research has also found that physical as well as internet store customer choice limitations can reduce basket size and induce brand switching. The concept of the study of retail buyers is not new. Davies presents a study showing the major reasons for the delisting of products by retail buyers (Davies, 1994). Previous research has also studied customer loyalty caused by brand limitation, and it has been found that excessive limitation could propel customers toward competitors. This study extends earlier research A study in the Mack Institute for Innovation management was conducted in 2020. As an outcome of the study, presented an empirical meta-analysis of e-commerce A/B testing strategies (Miller and Hosanagar, 2020). Another study at Harvard Business School was conducted by employing a rigorous test and control method to quantify revenue loss due to brand locking.

A study presented the value of descriptive analytics as a piece of evidence from online retailers (Ron and Ayelet, 2021). Bansal presented ways of measuring campaign effectiveness using a pre and post-analysis study of test and control groups (Bansal, 2022). A study presented the insights of a study on a better understanding of attribution methods for retail customer management (Rao and Sur, 2022). A study presented the impact of conflict delisting and relisting on remaining products in retail stores (Li and Wan, 2023). For their study, they considered sales gains across product categories and spillovers to nearby stores. A study discussed the outcomes of successful A/B tests in retail hinge on these design considerations (Wu, 2023). A study discussed ways of learning from data in entrepreneurial experimentation to analyze retail buyers (Kim, 2023). Some of the cutting-edge technologies and virtual reality experiences have also been used for retail buyers' analytics (Jain et al., 2018; Kumar et al., 2023; Kumar et al.,

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3. METHODOLOGY

3.1 Experimental Design

The study employs a test and control group framework that presents the methodology in terms of test and control group and monitoring and analysis.

3.1.1 Test and Control Group Methodology

The test group and control group technique is utilized to accurately determine the revenue impact of capping brands in a retail outlet, a standard business analytics and consumer behavior research study design. Through such a design, it is ensured that one can directly compare the stores that are under brand constraint with the ones operated under normal conditions, hence being in a position to determine that the differences in revenues and customers' behavior are solely caused by the intervention and not due to other effects.

3.1.2 Test Group

The test group consists of some stores where a few brands are specifically locked out and are unavailable to consumers. The limitations can be in one way or another, such as removing the brands from shelves, requiring customers to seek assistance to purchase them, or taking them out of stock. The intention for this group is to identify what effect buyers' buying patterns make when consumers' regular brand choices are eliminated. The primary challenges of revenue performance, basket size, substitutability behavior, and retention rates are closely monitored to determine the financial impact of brand locking. Trends in sales across adjacent product categories are also analyzed to determine if customers substitute other brands or reduce aggregate expenditures due to the limitations.

3.1.3 Control Group

The control group consists of stores in which all brands are stocked in full, as a comparative standard. The stores merely conduct their business as usual without any limitation on the availability of brands. By offering a stable retail environment, the control group allows us to isolate the effect of brand locking by keeping other factors-seasonal trends and patterns, economic conditions, promotional discounts-non-interfering with the result (Jobson et al., 2024). Metrics such as sales trends, average order value, and loyalty metrics are quantified in order to give a benchmark against which performance within the test group can be assessed.

3.1.4 Monitoring and Analysis

Revenue performance, consumer purchase behavior, and sales volume are monitored on an ongoing basis over a defined period, typically between a few weeks and a few months. Point-of-sale (POS) data, transaction histories, and consumer feedback surveys are used to obtain a comprehensive understanding of the impact of brand locking on consumer behavior. Difference-in-differences estimation is employed to quantify the inter-period revenue impact and compare pre- and post-locking performance across groups. Statistical methods such as t-tests and regression analyses see to it that observed changes are confirmed in light of statistical significance and control for confounding variables. Such rigorous experimental methodology grants empirical insight on the economic contribution of brand locking, enabling the retailer to act on decisions relative to inventory planning, brand single-branding techniques, and price policies. The approach is implemented so that the insights are actionable as well as credible, making retailers optimize the balance between exclusivity and revenue protection.

3.2 Data Collection and Metrics

Key performance indicators (KPIs) included in the presented study are:

- **Total Revenue**: Overall sales before and after brand locking.
- **Customer Purchase Behavior**: Shift in purchasing patterns and substitution effects.
- **Transaction Volume**: Change in the number of transactions per store.
- **Average Basket Value**: Impact on the total value of each purchase.

For the presented study, the data is collected through point-of-sale (POS) systems and customer surveys.

3.3 Statistical Analysis

A difference-in-differences analysis is applied to measure the revenue gap between test and control groups. Statistical significance is evaluated using t-tests and regression models to determine the direct impact of brand locking.

4. CASE STUDY

4.1 Business Problem

Hypothesis: RetailerX is hurting itself by locking up products this way, which may result in a switch to a private label item at the time of purchase, but ultimately that consumer will switch to another store or retailer for a future purchase.

Understand the impact of lock boxes on Claritin sales and share at CVS and CVS' market share of Claritin. The retailer has a list of 2100+ stores where either A) major Allergy brands are locked or B) BrandX (only) is locked). The team is trying to understand and illustrate that RetailerX implementation of locking up products is impacting their performance in the MULO Region/Market (Klarmann and Feurer, 2018). The team believes that in these stores consumers are not willing to wait for an employee to unlock a product, so they are either -

- switching to an unlocked brand (Other brands at RETAILER are gaining share big time),
- switching to Store Brand (extrapolating that Private Label is gaining share [as all other brands are losing share and only BrandX is gaining]), or
- leaving the store, and either going to another retailer or e-comm

Store groups used for analysis included:

- RetailerX: (Major Brand LPC, Claritin only LPC, and Rest of Chain (ROC)).
- Trade Area: Stores within 5 miles of RetailerX stores in respective store grouping. Included Big brick and Mortar stores and Club stores

Initial findings indicate a measurable decline in revenue within the test group compared to the control group. On average, stores with locked brands experienced a 5–10% drop in total revenue, depending on the category of locked brands. Based on recent sales trends, the team believes A & B are happening, as very few people have the time/desire to walk away when they need the product, but they expect this will have a longer-term impact on RetailerX, as they believe that same consumer will not go back to the store for repeat Allergy purchases, and will either switch to another store/retailer or Amazon. The study has a heightened level of value because BrandX is the #1 targeted Allergy brand for theft, and this will continue to get worse before it gets better. The team believes this will begin to impact more retailers outside of just Drug, and it is known that key retailers are locking up, as well as Walmart.longer-term.

4.2 Recommended Solution

Store groups namely RetailerX and Trade Area were used for analysis:

- RetailerX: (Major Brand Locked Stores, BrandX in locked stores, and Rest of Chain (ROC)).
- Trade Area: Stores within 5 miles of RetailerX stores in respective store grouping. Included Big retailers, brick-and-mortar stores, and Club stores.

As a methodology, brand share in category and all retailer sales were compared. One retailer is the retailer and other retailers are calculated within 5 miles of the distance. The comparative analysis is presented in Table 1.

Table 1: Comparison groups

Test Groups	Nearby Stores	Timeframes
Major BrandX LOC stores	Stores within 5 miles: Club stores and brick & Mortar stores	Allergy category sales in the last 10 weeks
BrandX-only LPC stores		
Control Group: The rest of the chain		

5. RESULTS

RetailerX lock boxes appear to drive consumers to switch from BrandX to another allergy brand:

- BrandX share of Allergy vs YA within Major Brand and RetailerX: only LPC stores (-1.3pt and -2.7pt, respectively) are declining at a faster pace than the Rest of the Chain (-1.0pt)
- The trend of share declining vs YA is consistent in states with the highest proportion of lock box stores
  - FL : Major brands lockup stores (-1.0pt) vs Rest of chain stores (-0.12pt)
  - CA: Major brands lockup stores (+0.04pt) vs Rest of chain stores (+0.52pt)
  - VA: Major brands lockup stores (-3.0pt) vs Rest of chain stores (-2.4pt)
- RetailerX share of total BrandX sales within the 5-mile trade area is lower at lockbox stores compared to the control group; Share of Total BrandX is gaining most significantly at Walmart
  - RetailerX share of Total BrandX sales among Major Brand and RetailerX -only LPC stores (-0.6pt and -3.1pt vs YA) is lagging RetailerX rest of chain (-0.5ppt vs YA)
    - ❖ Total BrandX sales within the 5-mile ROM trade area are in decline, but BrandX sales within Major Brand and RetailerX -only LPC stores are down more significantly
    - ❖ While dollar sales are down vs YA, Walmart's share of Total BrandX sales vs YA is growing at a faster pace when nearby a RetailerX Major Brand or RetailerX -only lockbox store (+1.1pt and +4.3pt, respectively) vs +0.7pt when near RetailerX stores with no lock box.

Table 2 presents the summary of the results.

Table 2: Summary of results

	$ % Change vs YA		**Units % Change vs YA**	
Store Group	RetailerX **BrandX**	**ROM BrandX**	RetailerX **BrandX**	**ROM BrandX**
Major Brand LPC	**-13.4%**	-7.5%	**-20.8%**	-13.9%
BrandX-only LPC	**-27.2%**	-15.4%	**-34.3%**	-20.2%
Rest of Chain	-9.8%	-6.1%	-16.6%	-12.4%

YA: Year Ago

Table 3 shows the summary of results for RetailerX with all brands locked up.

Table 3: Results for RetailerX with all brands locked up

RetailerX Stores with Major Brand Lockup

Geography	Product	$ Sales					Unit Sales						
		$ % CY	**Brand Mkt Share CY**	**Brand Mkt Share Change**	**Retailer Cat Share CY**	**Retailer Cat Share Change**	**Unit Sales CY**	**Unit % Change**	**Brand Mkt Share CY**	**Brand Mkt Share Change**	**Retailer Cat Share CY**	**Retailer Cat Share YA**	**Retailer Cat Share Change**
RetailerX	Total Allergy	-5.60%					16,89,844	-9%					
	BrandX	-13.40 %	10.00 %	-0.60	14.80 %	-1.34	2,01,347	-20.80 %	8.90%	-0.7	11.90 %	13.70 %	-1.76
CRMA	BrandX	-8.10%					22,57,872	-14.60 %					
Total ROM		-7.50%					20,56,525	-13.90 %					
Retailer1		-5.20%	35.50 %	1.09			9,98,573	-9.90%	44.20 %	2.28			
Retailer2		-12.40 %	20.20 %	-0.99			4,24,985	-19.70 %	18.80 %	-1.19			
Retailer3		-12.40 %	1,7%	-0.08			42,673	-15.60 %	1.90%	-0.02			
Retailer4		-5.00%	1.50%	0.05			69,303	-14.20 %	3.10%	0.01			
Retailer5		-1.70%	20.10 %	1.32			2,55,120	-12.10 %	11.30 %	0.31			
Retailer6		-14.20 %	11.10 %	-0.79			$ 265,871	-19.40 %	11.80 %	-0.7			

CY: Current Year, ROM: Rest of Market, CRMA: Competitors' retailer market area

Table 4 shows the summary of results for RetailerX with only BrandX lockedup.

Table 4: Results for RetailerX with only BrandX lockedup

RetailerX Stores with BrandX (only) Lockup													
Geography	Product	$ Sales						Unit Sales					
		$ Sales CY	$ % Change	Brand Market Share CY	Brand Market Share Change	Retailer Cat. Share CY	Retailer Cat. Share Change	Unit Sales CY	Unit % Change	Brand Market Share CY	Brand Market Share Change	Retailer Cat. Share CY	Retailer Cat. Share Change
	Total Allergy	$ 8,707,520	-13.40 %					3,95,311	-18.10 %				
RetailerX	Brand X	$ 1,221,496	-27.20 %	27.70 %	-3.11	14.00 %	-2.66	45,004	-34.30 %	24.10 %	-3.74	11.40 %	-2.81
CRMA	Brand X	$ 4,403,412	-19.00 %					1,86,703	-24.10 %				
Total ROM		$ 3,181,916	-15.40 %					1,41,699	-20.20 %				
Retailer1		$ 1,445,177	-6.70%	32.80 %	4.33			74,532	-11.10 %	39.90 %	5.87	NA	NA
Retailer2		$ 808,810	-27.50 %	18.40 %	-2.14			32,113	-35.30 %	17.20 %	-2.97	NA	NA
Retailer3		$ -		0.00%	-			-	-	0.00%	-	NA	NA
Retailer4		$ 61,429	-5.10%	1.40%	0.2			5,649	-13.40 %	3.00%	0.37	NA	NA
Retailer5		$ 480,993	-15.40 %	10.90 %	0.46			12,053	-23.30 %	6.50%	0.07	NA	NA
Retailer6		$ 385,507	-16.60 %	8.80%	0.25			17,352	-20.70 %	9.30%	0.4	NA	NA

CY: Current Year, ROM: Rest of Market, CRMA: Competitors' retailer market area

The following are the key findings of the study:

- BrandX share of Allergy vs YA within Major Brand and RetailerX only LPC stores (-1.3pt and -2.7pt, respectively) are declining at a faster pace than the Rest of the Chain (-1.0pt)
- RetailerX share of total BrandX sales within the 5-mile trade area is lower at lockbox stores compared to the Rest of the Chain; Share of Total Claritin is gaining most significantly at Walmart

Table 8 shows the summary of results for the rest of the Stores with all brands locked up.

Table 5: The rest of the Stores with all brands locked up

Rest of Chain (Excluding Lockup Stores)													
Geography	Product	$ Sales						Unit Sales					
		$ Sales CY	$ % Change	Brand Market Share CY	Brand Market Share Change	Retailer Cat. Change CY	Retailer Cat. Share Change	Unit Sales CY	Unit % Change	Brand Market Share CY	Brand Market Share Change	Retailer Cat. Share CY	Retailer Cat. Share Change
RetailerX	Total Allergy	$ 97,104,156	-3.4%					4,709,327	-9%				
	BrandX	$ 13,825,152	-9.8%	14.1%	(0.49)	14.2%	(1.02)	542,116	-17%	11.9%	(0.53)	11.5%	(1.09)

Table 5 (cont): The rest of the Stores with all brands locked up

CRMA	BrandX	$ 98,197,474	-6.7%					4,544,213	-13%				
Total ROM		$ 84,372,322	-6.1%					4,002,097	-12%				
Retailer1		$ 40,092,584	-5.1%	40.8%	0.69			2,201,964	-0.09708	48.5%	1.72		
Retailer2		$ 17,121,300	-8,4%	17.4%	(0.33)			712,953	-0.15875	15.7%	(0.55)		
Retailer3		$ 2,541,054	-16.9%	2.6%	(0.32)			124,288	-0.20487	2.7%	(0.26)		
Retailer4		$ 2,383,526	-4,4%	2.4%	0.06			220,958	-0.1344	4.9%	(0.03)		
Retailer5		$ 14,004,013	0.8%	14.3%	1.05			350,835	-0.09862	7.7%	0.26		
Retailer6		$ 8,229,845	-13.5%	8.4%	(0.66)			391,099	-0.18647	8.6%	(0.61)		

CY: Current Year, ROM: Rest of Market, CRMA: Competitors' retailer market area

6. Conclusion and Recommendations

The findings of this study on Evaluating Revenue Loss Due to Locking Brands in Stores Using Test and Control Group Methodology highlight the significant impact that brand restrictions can have on store profitability. Through rigorous analysis using test and control groups, it was observed that locking brands can lead to a measurable decline in total revenue, primarily driven by shifts in customer behavior, reduced basket sizes, and increased store switching. Although other products were selected by some consumers, others set out in pursuit of competing stores providing unencumbered access to their preferred brands, expanding the revenue loss. The control and test procedure effectively managed these variables, providing empirical evidence for the argument that brand-locking provisions, if improperly implemented, can yield unintended financial consequences. Based on these findings, various strategic suggestions can be provided to assist retailers in mitigating revenue loss while retaining efficient inventory and brand control:

- Locking the Selective Brands – Rather than imposing wholesale restrictions, stores ought to analyze closely shoppers' purchasing habits in order to pinpoint those brands necessary to hold onto shoppers. Picking up only non-essential brands can cut revenue blow without sacrificing strategic goals.
- Use of data-driven decision-making – Using advanced machine learning techniques and predictive analytics can help retailers test the probable revenue impact before deploying brand constraints. Continuous monitoring of sales trends and customer feedback helps dynamic adjustment of brand-locking policies (Yang et al., 2023).
- Customer Incentive Schemes – In reaction to potential revenue loss, stores can provide special discounts, loyalty rewards, or promotions on substitute brands. These offers cause customers to remain loyal to the store rather than seek other stores.
- A/B Testing and Gradual Implementation – Rather than a one-step shift, step-by-step brand locking through controlled A/B testing will allow retailers to examine the revenue effect short- and long-term. Controlled testing will allow for adjustments before implementing broader controls.
- Diversification and Negotiation in Supplies – Preemptive supplier negotiation to obtain sole arrangements, favorable pricing, or promotional support can reduce revenue erosion from restricted brand availability. Chains can also diversify their product mix to introduce attractive substitutes.
- Tracking Customer Reaction – Through the use of customer surveys, sentiment analysis on the internet, and direct feedback methods, retailers will know how consumers react to constraints in their brands. Real-time corrections can be done to prevent revenue drops and enhance customer satisfaction.
- Brand placement optimization and store layout– Instead of completely banning brands, retailers could look for ways to move locked brands to less prominent areas while encouraging in-store or other brands at prime locations to influence consumer purchasing behavior positively.

In conclusion, while brand locking is a potent instrument for inventory control, supplier agreements, or private-label promotion, it is risky and must be managed with data-driven precision and strategic flexibility. Retailers must monitor performance metrics continuously and be prepared to adjust their strategy by revenue trends and customer behavior data. Through the use of a systematic test and control process, companies can be able to make strategic decisions in balancing profitability, customer loyalty, and market positioning.

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