McDonald’s Breakfast Promotion Analysis

Business Problem:

Introduction of All-Day Breakfast Promotion

In response to a 5% year-over-year decline in customer numbers for three consecutive years, McDonald's implemented an all-day breakfast promotional scheme on October 6, 2015. This initiative allowed each region to select a breakfast menu item to be served throughout the day, extending beyond the traditional 10:30 AM cutoff. In the Michigan region, which is the focus of this analysis, the McMuffin was chosen as the featured all-day breakfast item since it was their highest selling breakfast item.

Evaluation Criteria

The success of this promotional strategy will be assessed based on three key metrics:

1. Customer acquisition

2. Revenue growth

3. Customer satisfaction

Potential Challenges

Sales Cannibalization: One significant concern is the potential for sales cannibalization. Customers may opt for lower-priced breakfast items instead of regular menu options, potentially impacting overall revenue due to lower margins on breakfast items.

Operational Constraints: The introduction of all-day breakfast presents substantial operational challenges. Limited grill space, fryer capacity, and staff resources may lead to:

- Increased kitchen congestion
- Slower service times
- Potential decline in food quality

While current data is insufficient to fully evaluate these operational impacts, they warrant careful consideration and further investigation by the business.

Decision Points

Based on the outcomes of this analysis, each region must determine whether to:

1. Revert to the previous operational model (discontinue the promotion)

2. Maintain the current promotion (McMuffin available all day)

3. Expand the promotion to include additional breakfast menu items

The final decision should balance the potential benefits of increased customer engagement with the operational and financial implications of the all-day breakfast strategy.

Key Variables for Analysis

Average Daily Transactions (agc)

The 'agc' variable is most directly relevant to the problem at hand, as it represents the average daily transactions for a restaurant. This metric can be closely correlated with customer footfall, assuming each customer places one order per day. Given that the primary goal of the promotion was to address declining customer numbers, this variable is crucial for identifying the promotion's impact.

Important considerations:

- 'agc' is an aggregate measure for the entire restaurant, encompassing all menu items.
- For any given week, 'agc' remains constant across all menu items within a restaurant.
- A new variable, 'weekly transactions', can be derived by multiplying 'agc' by 7, allowing for comparison with other weekly metrics.

Total Units Sold (totunits)

The 'totunits' variable is highly relevant for assessing customer interest in McMuffins. It provides insight into whether the increasing number of customers are specifically drawn to the promoted item.

Units Sales Rate per 1000 Transactions (upt)

'upt' is valuable for understanding the percentage of orders that include the promoted items. Analysing its behaviour post-promotion can offer insights into sustained customer interest. As a normalized variable, it is particularly useful for restaurant-level data analysis.

Weighted Average Price (wavg)

The 'wavg' variable is important for determining sales levels and their post-promotion behaviour.

Redundant Variables

Two variables have been identified as redundant:

1. 'urws' (Units Reported Weekly Sales): This is identical to 'totunits'.

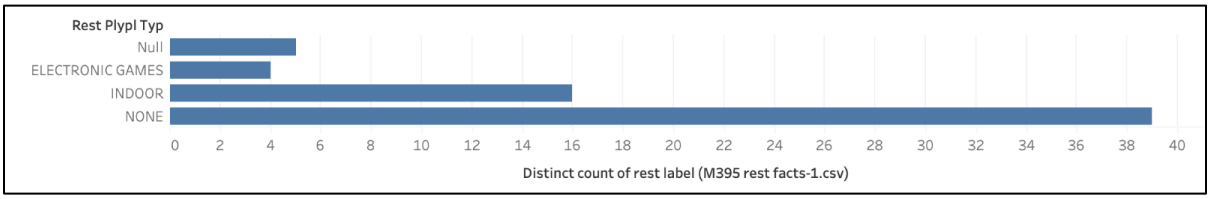
2. 'adus' (Average Daily Units Sold): This can be derived from 'totunits/7'.

Data Quality/ Integrity

This dataset covers restaurants in northern and western Michigan, with a focus on 64 unique restaurants across various cities and counties bringing in a total revenue of approximately $200M. The data includes sales information for 25 menu items, including breakfast and regular menu offerings.

Now, here are some quality concerns with the data at hand:

- The variable 'REST_PLYPL_TYP' has a lot of missing and 'NONE' values which combined make up to 70% of the dataset. So, we have chosen to ignore this variable in the analysis.



- For the restaurant labels 'pgrowthq_label', 'ppop_09q_label', 'lstage_label', 'social_label', 'urban_label' and 'incomeq_label', two restaurants have no label data. So, we have ignored these two restaurants while looking at segmented data based on these labels.

rest label (M395 rest facts-1.csv)	Pgrowthq L..	Incomeq La..	Lstage Label	Urban Label	Ppop 09Q L..	Social Label
36277-WYOMING - CHICAGO AND GODFREY	NA	NA	NA	NA	NA	NA
36302-GRANDVILLE - RIVERTOWN & IVANREST	NA	NA	NA	NA	NA	NA

- Restaurant 36277 also has no sales data before the week of July 6, 2014, while the 36302 has no data before the week of August 11, 2013.

Units summary - 36277-WYOMING - CHICAGO AND GO

Week of Wk Ending

Itemdesc	il 4	13 April 2014	20 April 2014	27 April 2014	4 May 2014	11 May 2014	18 May 2014	25 May 2014	1 June 2014	8 June 2014	15 June 2014	22 June 2014	29 June 2014	6 July 2014	1
Bac Egg Ch ..														42	
Bac Egg Ch ..														30	
Beef Categ..														3,246	
Big Mac														349	
Cheeseburg..														847	
Chicken Cat..														3,261	
Core QP an..														293	
Egg McMuf..														76	
Hamburger														185	
Hashbrown														713	
Large Burg..														771	
McChicken														1,620	
McDouble														859	
Sau Egg Ch ..														43	
Sausage Bi..														114	
Sausage Eg..														38	
Sausage Eg..														138	
Sausage Mc..														215	
Total All Da..														1,638	
Total Bagels														101	
Total Biscui..														212	
Total Break..														884	
Total Fries														3,451	
Total McGri..														94	
Total McMu..														477	

Units summary - 36302-GRANDVILLE - RIVERTOWN &

Week of Wk Ending

Itemdesc	19 May 2013	26 May 2013	2 June 2013	9 June 2013	16 June 2013	23 June 2013	30 June 2013	7 July 2013	14 July 2013	21 July 2013	28 July 2013	4 August 2013	11 August ..	A
Bac Egg Ch ..													87	
Bac Egg Ch ..													42	
Beef Categ..													7,371	
Big Mac													2,200	
Cheeseburg..													819	
Chicken Cat..													3,114	
Core QP an..													2,125	
Egg McMuf..													993	
Hamburger													191	
Hashbrown													975	
Large Burg..													4,496	
McChicken													944	
McDouble													1,257	
Sau Egg Ch ..													277	
Sausage Bi..													131	
Sausage Eg..													51	
Sausage Eg..													441	
Sausage Mc..													228	
Total All Da..													3,504	
Total Bagels													116	
Total Biscui..													272	
Total Break..													2,509	
Total Fries													5,504	
Total McGri..													366	
Total McMu..													1,755	

- Restaurant 16773 has no data for 8 menu items as listed here: Bac Egg Ch Biscuit, Bac Egg Ch McGriddle, Sau Egg Ch McGriddle, Sausage Biscuit, Sausage Egg Biscuit, Total McGriddles. This needs to be investigated if there is an issue with the

data collection or these menu items are not sold at all in this outlet.

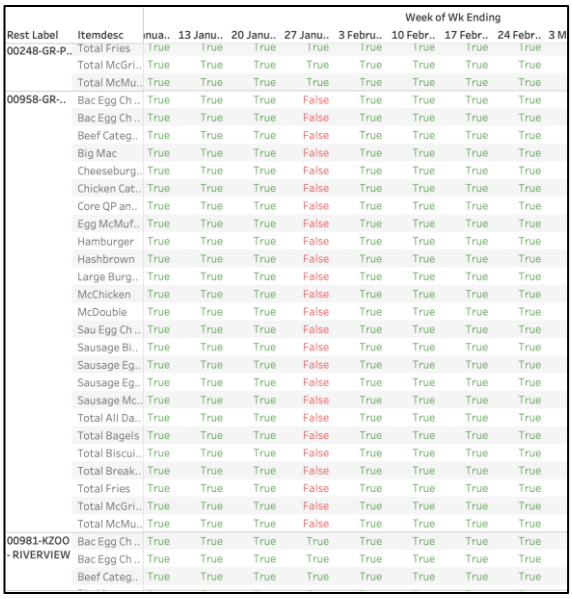
		Week of Wk Ending														
Rest Label	Itemdesc	6 January..	13 January..	20 January..	27 January..	3 Februa ry..	10 Febru ary..	17 Febru ary..	24 Febru ary..	3 March 2013	10 March 2013	17 March 2013	24 March 2013	31 March 2013	7 April 2013	14 Ap 20
16773-THRNAPLE VILLAGE	Bac Egg Ch ..															
	Bac Egg Ch ..															
	Beef Categ..	1,827	1,808	1,779	1,721	1,675	1,736	1,643	1,892	1,772	1,766	1,832	1,719	1,499	1,612	1,7
	Big Mac	153	168	153	176	232	215	192	220	183	158	146	195	126	154	2
	Cheeseburg..	348	316	310	317	290	334	319	403	358	362	470	343	286	309	3
	Chicken Cat..	899	967	938	847	821	809	857	1,159	1,051	1,029	1,184	1,262	1,066	1,321	1,2
	Core QP an..	174	167	193	189	218	231	196	237	174	214	184	208	158	178	2
	Egg McMuf..	197	211	204	223	229	235	248	232	248	266	227	229	238	273	2
	Hamburger	128	165	134	138	111	135	135	173	145	161	194	163	116	155	1
	Hashbrown	369	397	376	349	367	373	389	385	373	366	376	397	400	469	4
	Large Burg..	327	335	346	365	450	446	388	457	357	372	330	403	284	332	4
	McChicken	248	298	284	254	228	240	267	266	274	235	240	266	194	218	2
	McDouble	573	606	599	555	520	545	505	566	644	589	572	556	532	546	5
	Sau Egg Ch ..															
	Sausage Bi..															
	Sausage Eg..															
	Sausage Eg..	209	208	201	232	195	193	210	234	248	224	238	201	223	247	2
	Sausage Mc..	210	247	202	216	226	217	194	220	221	218	206	178	218	240	2
	Total All Da..	1,417	1,507	1,422	1,426	1,385	1,401	1,430	1,630	1,564	1,555	1,696	1,531	1,559	1,731	1,6
	Total Bagels															
	Total Biscui..															
	Total Break..	616	666	607	671	650	645	652	686	717	708	671	608	679	760	7
	Total Fries	1,503	1,493	1,512	1,333	1,397	1,509	1,438	1,591	1,627	1,637	1,498	1,699	1,411	1,493	1,7
	Total McGri..															
	Total McMu..	616	666	607	671	650	645	652	686	717	708	671	608	679	760	7

We've also used the calculation options in Tableau to make sure that formulaic connections between logical columns are valid.

A theoretical relationship exists between average daily units sold and total units sold, where the latter should equal seven times the former. To verify this relationship a calculated field (Equality Check) was created to investigate this equality. We observed some discrepancies at the Restaurant, Item and week level which could have been due to rounding errors. To account for those, we adjusted the equality check to allow up to 5 units of difference.

Similarly, we examined the relationship between 'upt' and 'agc'. Logically, total units should equal (UPT/100) * 7 * AGC. We created a similar 'Equality Check 2' variable with 5 units of buffer. Combining these two checks, we identified clusters of rows where this equality did not hold.

After excluding some atomic cases, instances were found where a restaurant showed more than 5 units of difference for an entire week across the entire menu.



Rest Label	Itemdesc	nua..	13 Janu..	20 Janu..	27 Janu..	3 Febru..	10 Febr..	17 Febr..	24 Febr..	3 M
		Week of Wk Ending								
00248-GR-P..	Total Fries	True	True	True	True	True	True	True	True	
	Total McGri..	True	True	True	True	True	True	True	True	
	Total McMu..	True	True	True	True	True	True	True	True	
00958-GR-..	Bac Egg Ch ..	True	True	True	False	True	True	True	True	
	Bac Egg Ch ..	True	True	True	False	True	True	True	True	
	Beef Categ..	True	True	True	False	True	True	True	True	
	Big Mac	True	True	True	False	True	True	True	True	
	Cheeseburg..	True	True	True	False	True	True	True	True	
	Chicken Cat..	True	True	True	False	True	True	True	True	
	Core QP an..	True	True	True	False	True	True	True	True	
	Egg McMuf..	True	True	True	False	True	True	True	True	
	Hamburger	True	True	True	False	True	True	True	True	
	Hashbrown	True	True	True	False	True	True	True	True	
	Large Burg..	True	True	True	False	True	True	True	True	
	McChicken	True	True	True	False	True	True	True	True	
	McDouble	True	True	True	False	True	True	True	True	
	Sau Egg Ch ..	True	True	True	False	True	True	True	True	
	Sausage Bi..	True	True	True	False	True	True	True	True	
	Sausage Eg..	True	True	True	False	True	True	True	True	
	Sausage Eg..	True	True	True	False	True	True	True	True	
	Sausage Mc..	True	True	True	False	True	True	True	True	
	Total All Da..	True	True	True	False	True	True	True	True	
	Total Bagels	True	True	True	False	True	True	True	True	
	Total Biscui..	True	True	True	False	True	True	True	True	
	Total Break..	True	True	True	False	True	True	True	True	
	Total Fries	True	True	True	False	True	True	True	True	
	Total McGri..	True	True	True	False	True	True	True	True	
	Total McMu..	True	True	True	False	True	True	True	True	
00981-KZOO - RIVERVIEW	Bac Egg Ch ..	True	True	True	True	True	True	True	True	
	Bac Egg Ch ..	True	True	True	True	True	True	True	True	
	Beef Categ..	True	True	True	True	True	True	True	True	

Rest Label	Itemdesc	April..	5 May 2..	12 May ..	19 May ..	26 May ..	2 June ..	9 June ..	16 June..	23 June..
		Week of Wk Ending								
KZOO-MAPLE HILL	Total McGri..	True	True	True	True	True	True	True	True	True
	Total McMu..	True	True	True	True	True	True	True	True	True
02661-KZO..	Bac Egg Ch ..	True	True	False	True	True	False	True	True	True
	Bac Egg Ch ..	True	True	False	True	True	False	True	True	True
	Beef Categ..	True	True	False	True	True	False	True	True	True
	Big Mac	True	True	False	True	True	False	True	True	True
	Cheeseburg..	True	True	False	True	True	False	True	True	True
	Chicken Cat..	True	True	False	True	True	False	True	True	True
	Core QP an..	True	True	False	True	True	False	True	True	True
	Egg McMuf..	True	True	False	True	True	False	True	True	True
	Hamburger	True	True	False	True	True	False	True	True	True
	Hashbrown	True	True	False	True	True	False	True	True	True
	Large Burg..	True	True	False	True	True	False	True	True	True
	McChicken	True	True	False	True	True	False	True	True	True
	McDouble	True	True	False	True	True	False	True	True	True
	Sau Egg Ch ..	True	True	False	True	True	False	True	True	True
	Sausage Bi..	True	True	False	True	True	False	True	True	True
	Sausage Eg..	True	True	False	True	True	False	True	True	True
	Sausage Eg..	True	True	False	True	True	False	True	True	True
	Sausage Mc..	True	True	False	True	True	False	True	True	True
	Total All Da..	True	True	False	True	True	False	True	True	True
	Total Bagels	True	True	False	True	True	False	True	True	True
	Total Biscui..	True	True	False	True	True	False	True	True	True
	Total Break..	True	True	False	True	True	False	True	True	True
	Total Fries	True	True	False	True	True	False	True	True	True
	Total McGri..	True	True	False	True	True	False	True	True	True
	Total McMu..	True	True	False	True	True	False	True	True	True

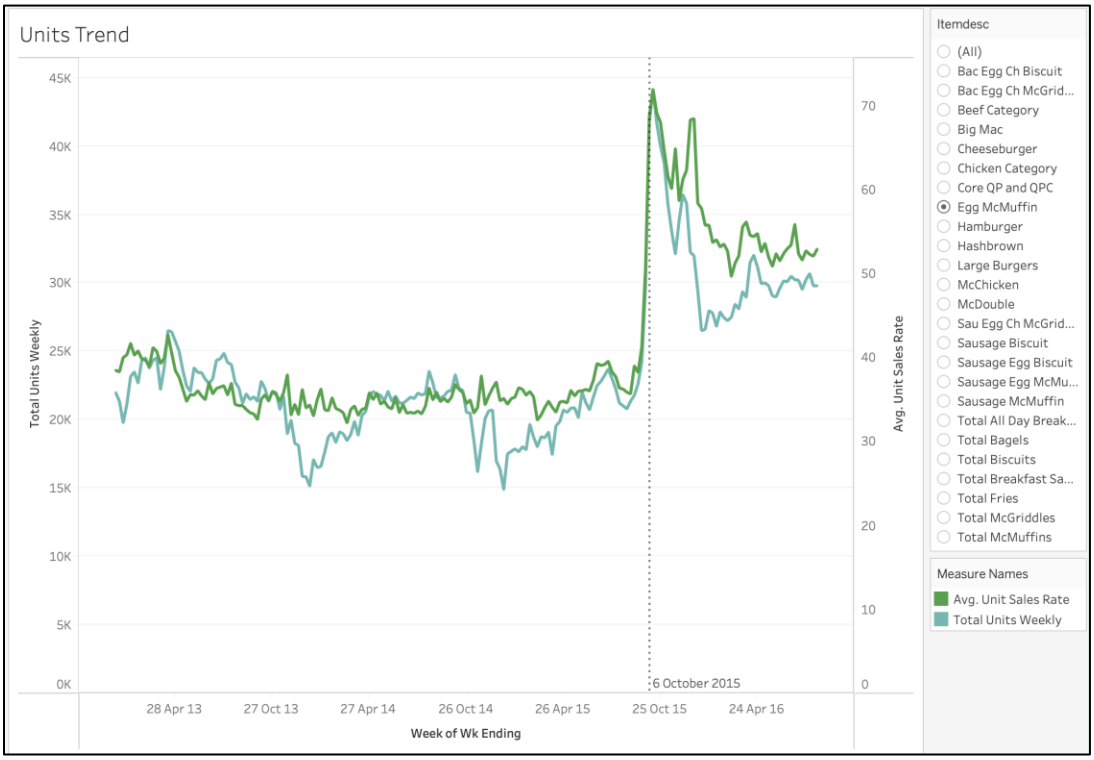
For cases with significant discrepancies, further investigation into calculation methods and data collection processes is needed to ensure data accuracy and reliability.

Post-Promotion Impact Analysis

Analysis of Egg McMuffin Sales Post-Promotion

Upon examination of Egg McMuffin sales data, we have observed significant changes in consumer behavior following the implementation of promotional activities. At the restaurant level, both total weekly unit sales and unit sales rates for Egg McMuffin

demonstrate a notable peak subsequent to October 6th, coinciding with the promotion rollout. Although this surge was transient, sales have stabilized at a higher level compared to pre-promotion figures. We posit that this increase may be attributed to extended availability during post-breakfast hours, indicating a previously unmet demand for Egg McMuffin beyond traditional breakfast timeframes.

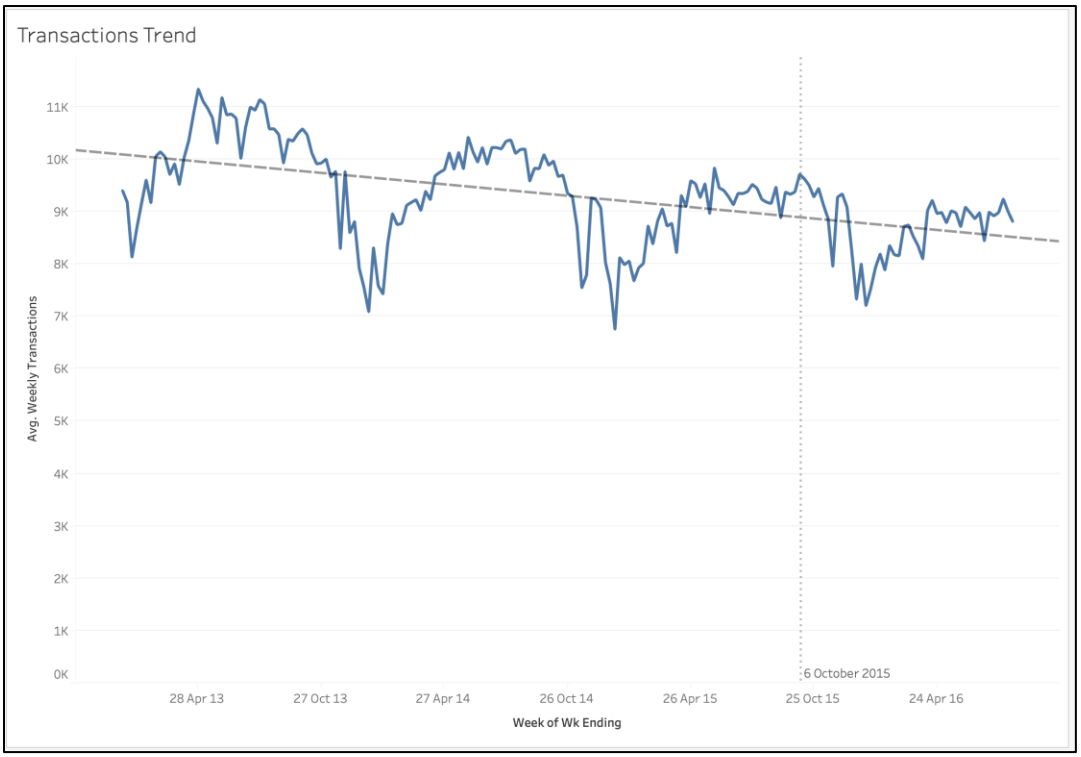


<u>Impact on Overall Transactions</u>

It is pertinent to investigate whether the increase in Egg McMuffin sales correlates with a rise in overall transactions. A significant increase in transactions would suggest the acquisition of a new customer base, potentially comprising individuals who prefer McMuffins but were previously unable to purchase them before 10:30 AM.

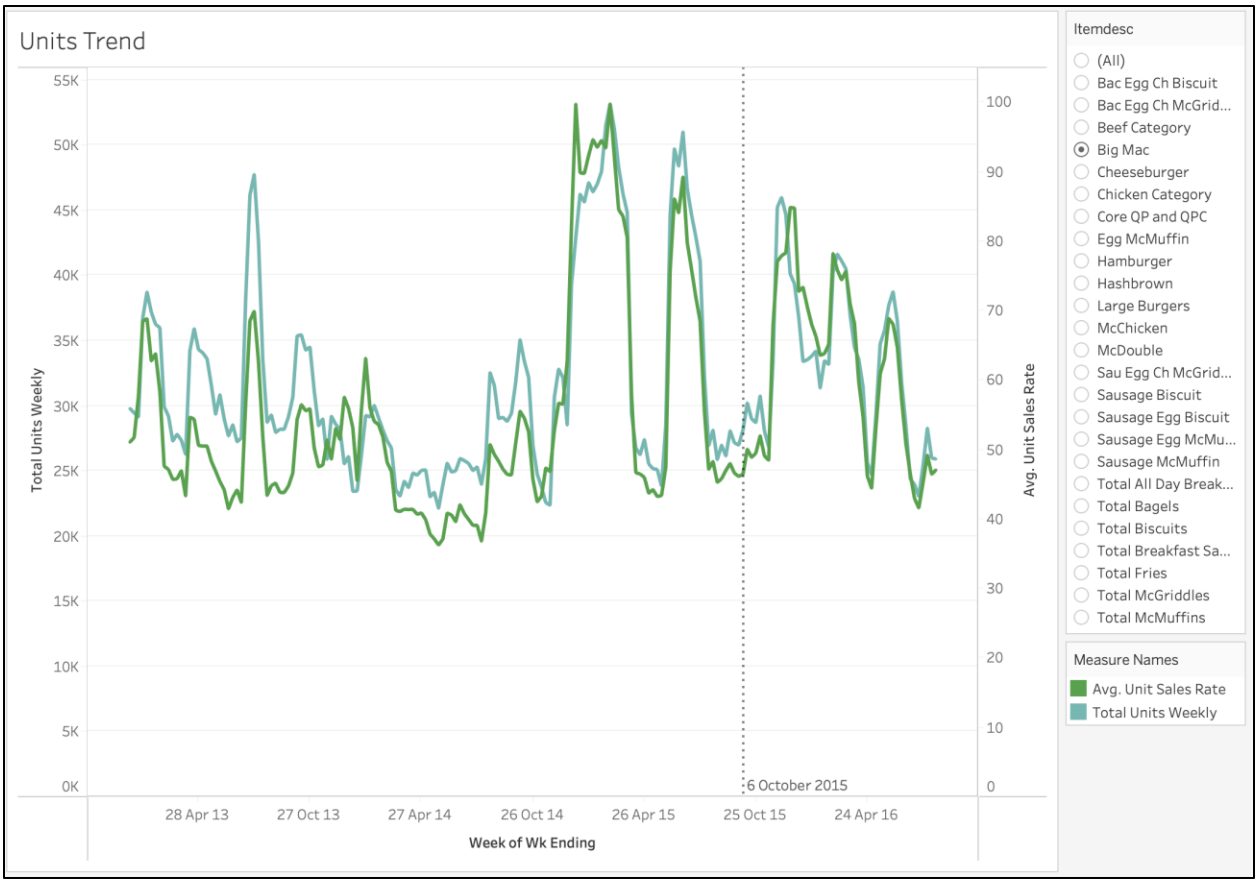
We also observe a dip in sales in the first half of January which can be attributed to the seasonality of the sales. We can observe that there is a seasonal dip in sales in similar periods over the last 3 years (2013 to 2015) probably related to the end of the holiday season.

However, analysis of transaction data reveals only a marginal increase in overall transaction volume. It is important to note that transaction figures are aggregated at the restaurant level, encompassing all menu items. Consequently, it is crucial to determine whether the increased McMuffin sales have resulted in a corresponding decrease in sales of other menu items.

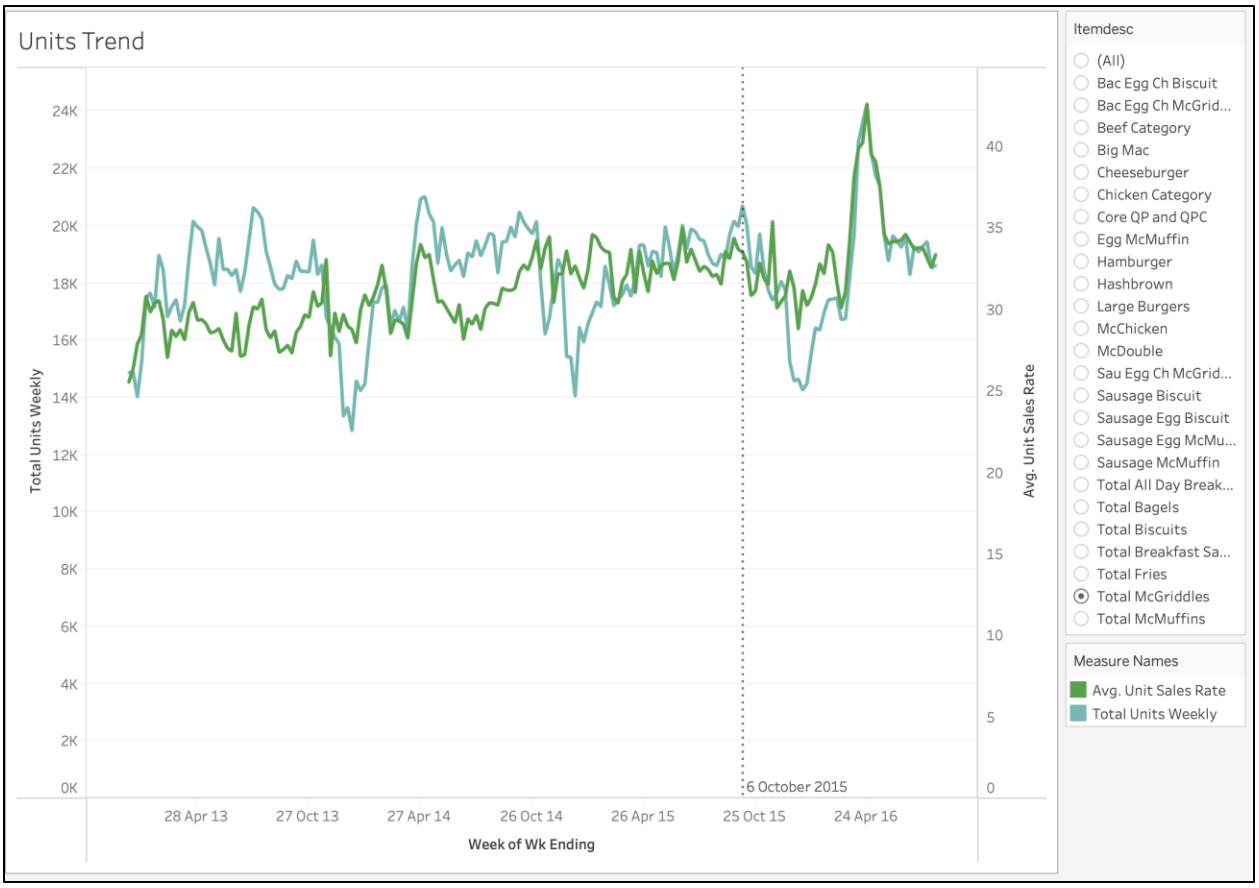


Effect on Other Menu Items

Examination of sales data for other popular menu items, such as Big Mac, reveals no substantial decline in sales. In fact, some restaurants exhibit a slight improvement in Big Mac sales. Similar trends are observed for other items such as Fries and McChicken.



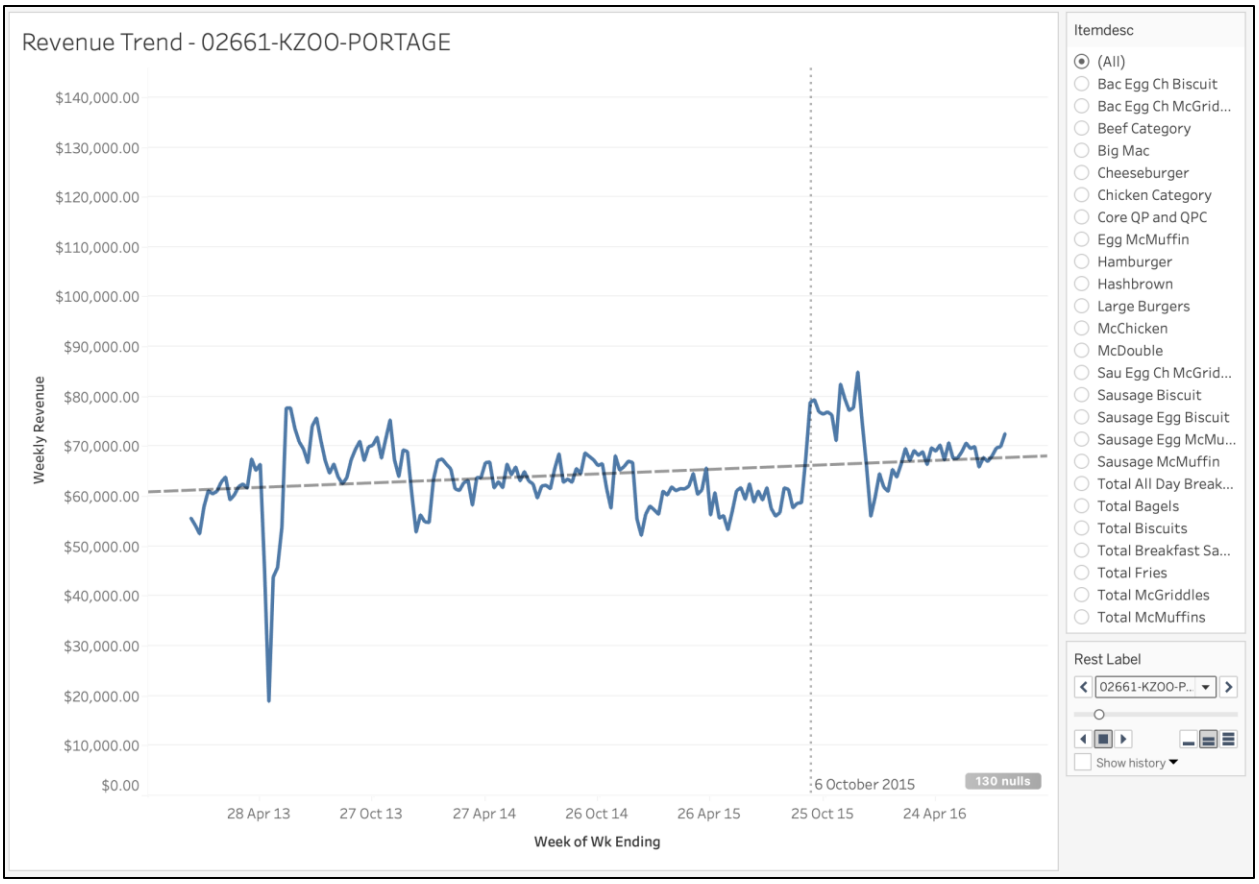
Interestingly, other breakfast items, including McGriddles and Hash Browns, demonstrate sales spikes comparable to those of McMuffin. This suggests that the promotion may have stimulated customer interest across the entire breakfast menu, rather than being limited to McMuffins exclusively.



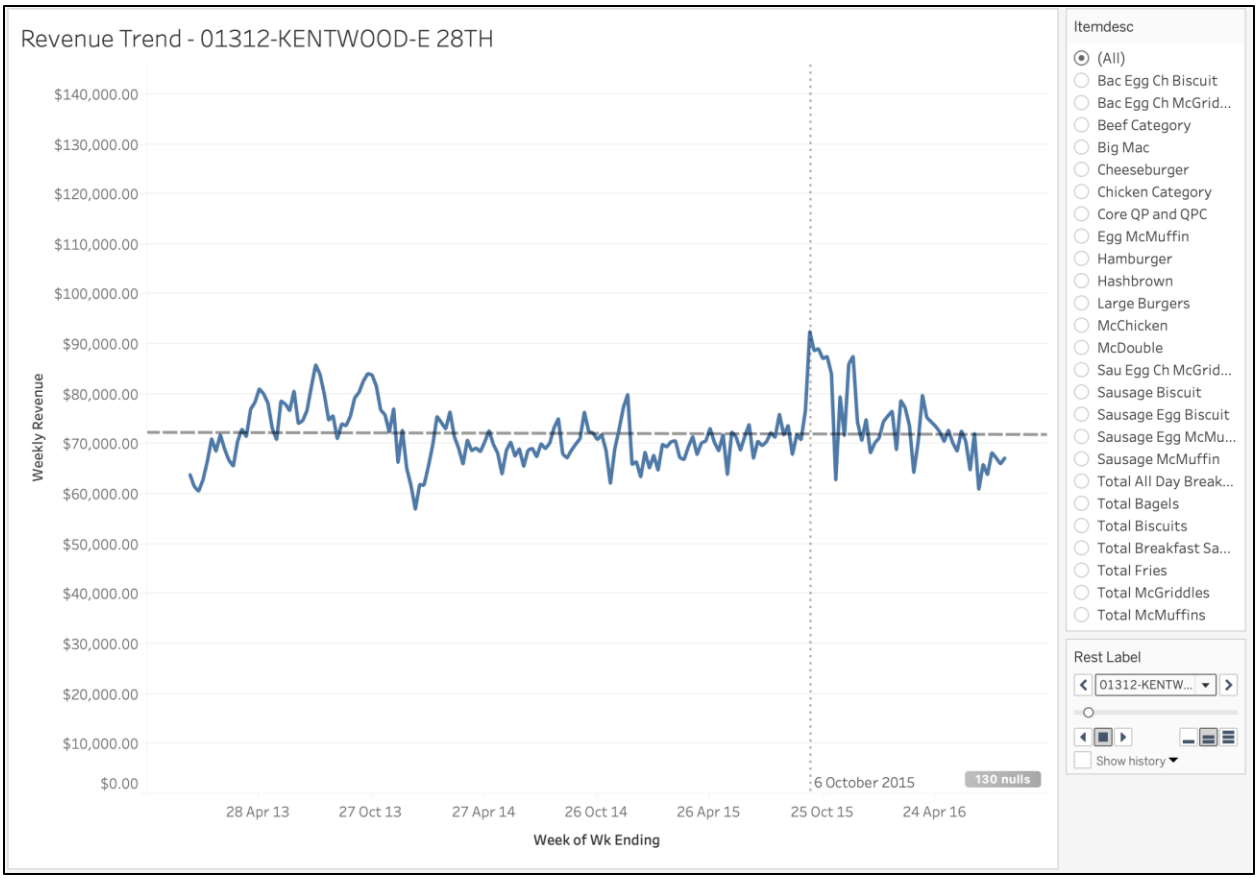
Based on these observations, we hypothesize that customers visiting after traditional breakfast hours may have ordered McMuffins as supplementary items, driven by curiosity. As this represents additional revenue, we anticipate an improvement in overall restaurant revenue.

Revenue Analysis

To verify this hypothesis, we have analyzed revenue trends over time. Revenue calculations are based on total units sold multiplied by the weighted average price. The resulting data indicates a discernible improvement in sales for a subset of the restaurants under examination.



But also, there are restaurants, where the trend has not improved at all post promotions.

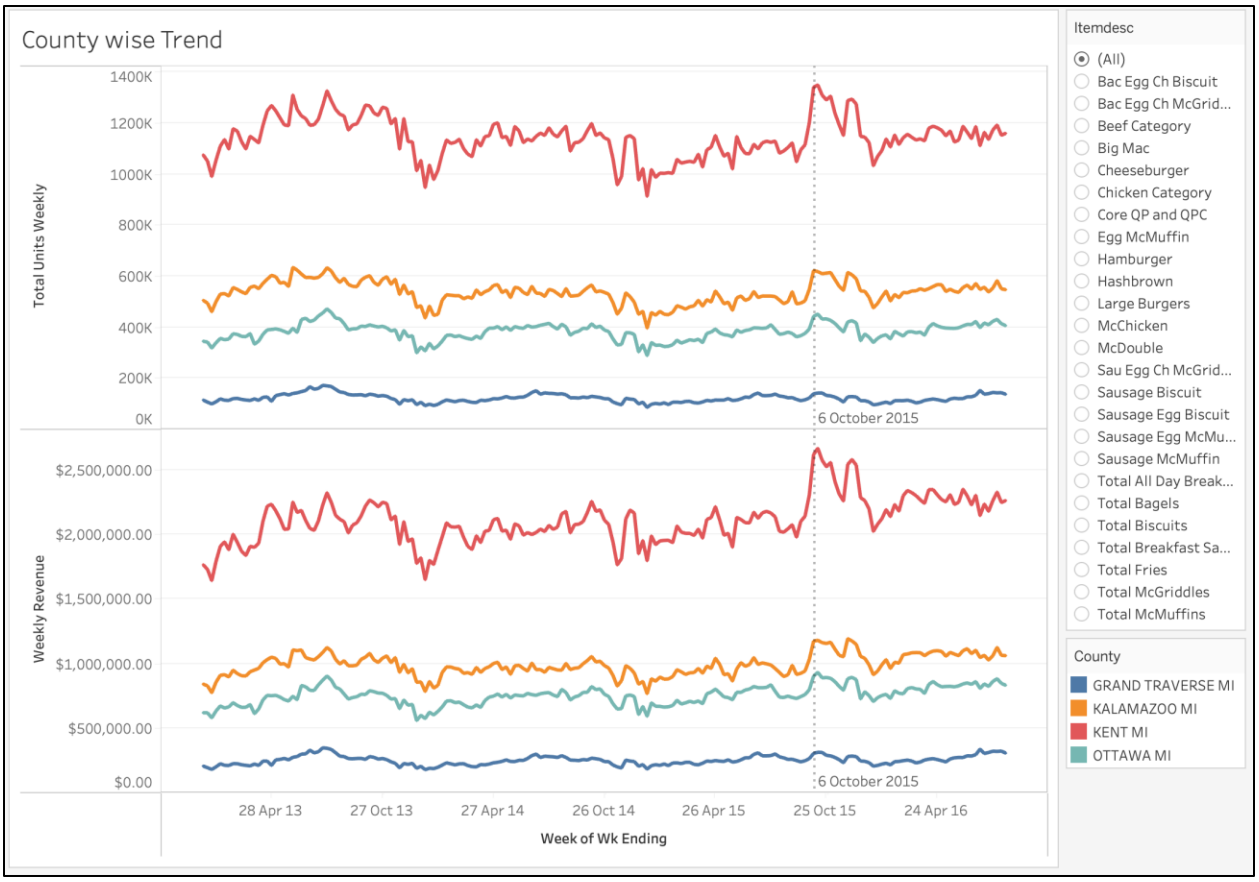


Given the heterogeneous patterns observed in sales and revenue across individual restaurants, it is prudent to investigate whether additional variables such as income levels, ethnic demographics, or other relevant factors may elucidate discernible clusters or patterns in the data.

Market Segmentation

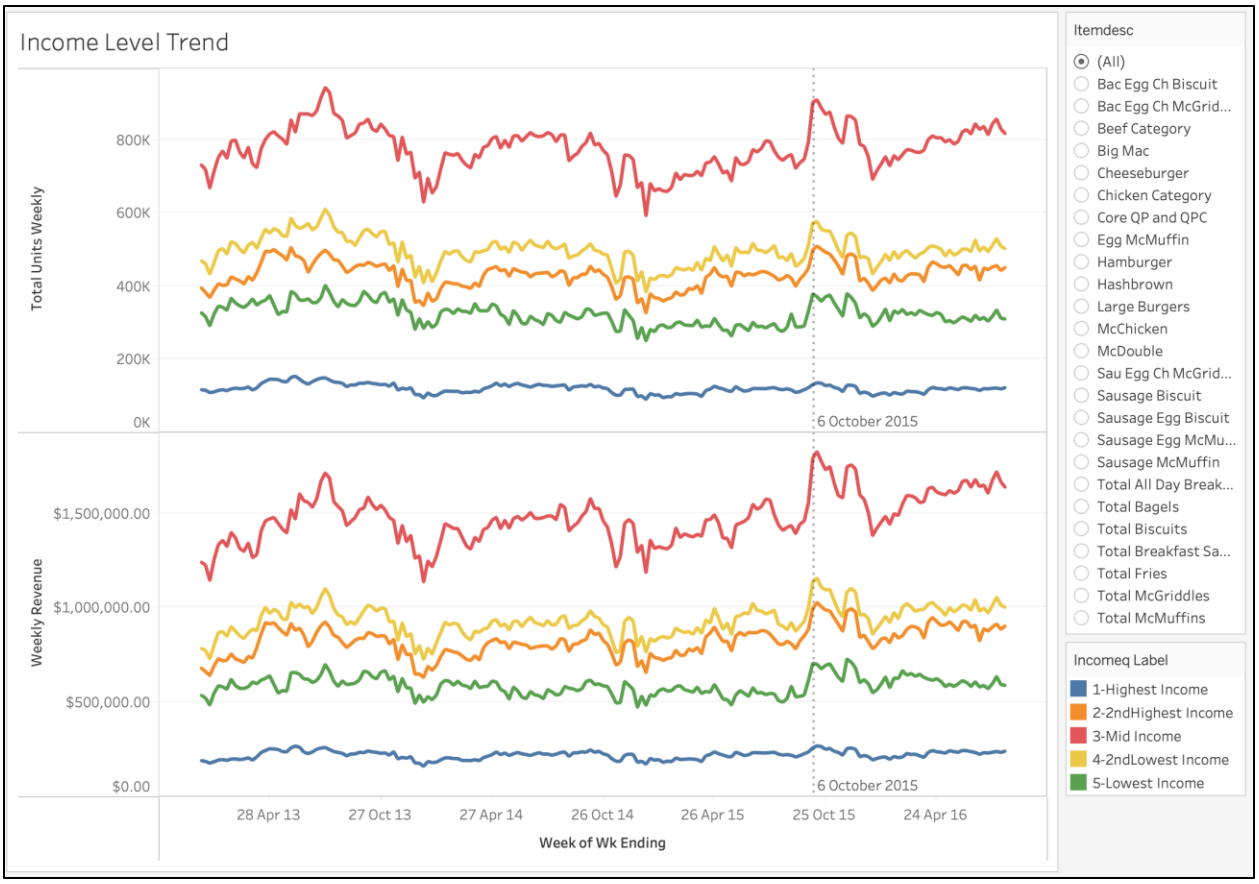
County Level Segregation

Upon examination of sales and revenue data aggregated at the county level, we observe a consistent pattern across all four counties under consideration. The data reveals a pronounced peak in sales following the implementation of promotional activities, subsequently stabilizing at a level marginally higher than pre-promotion figures. Additionally, this growth % in these number of total units sold is 10% for Kent MI, 11% for Kalamazoo MI, 12% for Ottawa MI and 17% for Grand Traverse MI between September 6th, 2015, to August 14th, 2016. This means that the growth % declines as you analyze counties with more restaurants.



Income Level Segregation

We see a similar pattern when we aggregate unit sales based on Income Level Labels.



We can observe that the Mid-Income restaurants bring in the highest combined revenue in the specified region. This is followed by 2nd Lowest Income, 2nd Highest Income, lowest income and highest income. This directly relates to the distribution of the restaurants which have these labels. Looking at our initial analysis, the greatest number of restaurants are tagged in the Mid Income category.

Further, looking at the trend post-promotion, we see the most growth for the Mid Income restaurants between September 6^{th,} 2015, to August 14^{th,} 2016, at 13% while it ranges from 7.5% to 12% for the rest of the categories.

Data Segmentation based on other factors like Growth label, social label, etc. reveal similar insights but not any additional details or explanations.

Insights Summary

Based on these data observations, we can safely assume that the promotional scheme has attracted more sales and revenue for the company. But some additional factors need to be considered before any decision is made regarding the promotional scheme.

- In order to understand if the promotions and the consequent revenue increase is sustainable in the long run, we need to understand how the profits of the company have changed after October 6th. To do this, we need to include the profit margins of the products into our analysis.
- The management needs to strategize on the operational feasibility of the entire campaign since the promotions essentially mean expanding an already huge menu to an even larger one within the limited grill and kitchen space. Additionally, the staff needs to be trained to handle orders from both regular menu and the breakfast menu.

Further Steps

Below are a few steps to enrich the analysis and provide more directed results.

- Incorporate the profit margins for all the menu items which will help us analyse the impact on profits the promotion may have caused.
- Customer level data like customer age, income category might be useful in understanding customer behaviour more closely rather than those at a restaurant level.
- It's possible that the sales and revenue peaks post October 6th were because of some other factors altogether. Considering this, explore any others factors that could have contributed to the trends we've observed.