Email Marketing Performance Analysis Report

Felipe Chaves
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Context

Recently, we've noticed some fluctuations in email marketing campaign performance. Over the last month, our campaigns have been doing very poorly compared to prior months. The leadership team has asked us a few questions about this dip in campaign performance that we'd like you to look into and recommend a course of action.

- Should we be concerned with the recent dip in performance? Explain why or why not.
- What recommendations do you have about our email marketing strategy based on your findings ?

Executive Summary

Over the past month, we have observed a statistically significant decline in email open rates compared to historical performance ($p = 0.034$). This signals a meaningful drop, indicating that engagement levels have decreased beyond typical fluctuations. However, when isolating December's performance, the decline aligns with seasonal trends and is not significantly different from past Decembers ($p = 0.120$).

Despite lower open rates, click-through rates (CTR) have significantly improved in December 2024 compared to previous years ($p < 0.0001$). This suggests that while fewer recipients are opening emails, those who do engage are interacting at a higher rate.

To address the decline in open rates, we recommend:

- Targeted A/B testing to optimize subject lines and send times.
- List segmentation refinements to ensure high-intent recipients receive priority messaging.
- Leverage December's CTR success by identifying which elements (e.g., CTA placement, email layout, offer positioning) contributed most to engagement and A/B testing these strategies in future campaigns.

Our immediate focus should be on stabilizing open rates while scaling the engagement strategies that drove higher CTR in December. Continued monitoring will be essential to detect whether this trend persists into Q1 2025.

Data Overview

The data contains 300 email campaigns. Overall, the data shows open rates around 30% and CTR around 13.7%. There is some variation in campaign sizes and performance, but no strong relationship was found between the number of emails sent and the open rate or CTR.

- The average number of emails sent per campaign is approximately 12,528 with a standard deviation of about 4,565. This indicates a broad range of campaign sizes, reflecting the diversity in audience reach or campaign scope.
- **Open Rate:** The campaigns average an open rate of around 30% with a standard deviation of approximately 2.5%. This consistency across campaigns suggests that the content or subject lines might be effectively resonating with the target audience.
- **Click-Through Rate (CTR):** The average CTR is approximately 13.7%, with a relatively low spread (standard deviation of 1.7%). While the CTR is healthy, the low variability suggests that once recipients open the email, their likelihood to click does not vary significantly by campaign.



Monthly Email Performance Dashboard
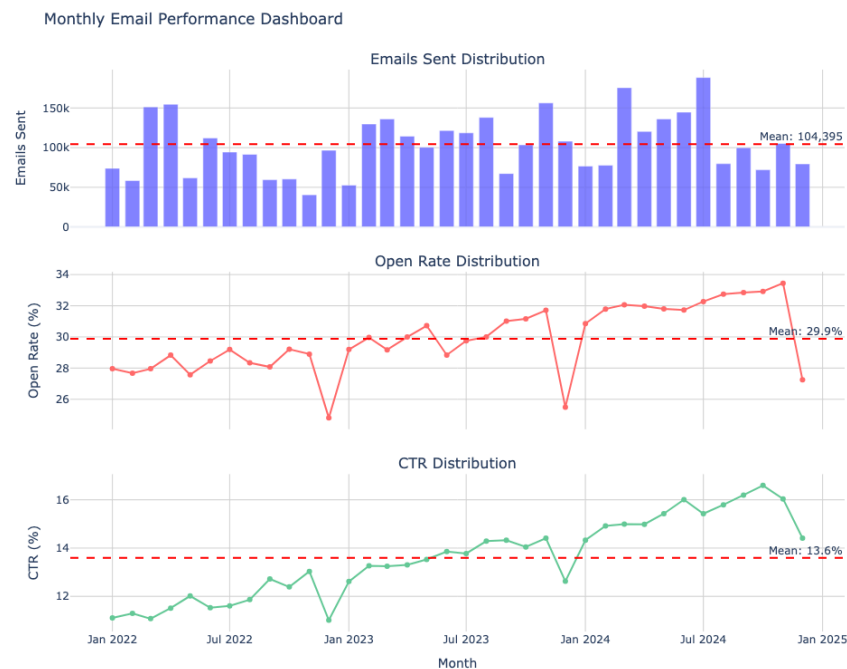
Distribution of Campaign Performance Metrics
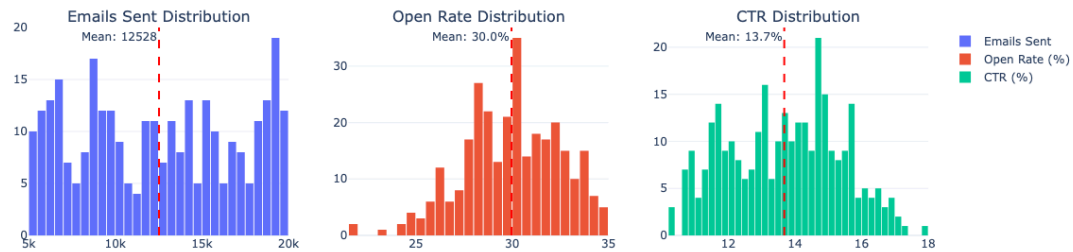
- A weak positive correlation (approximately 0.11) exists between the number of emails sent and the open rate. This suggests that while larger campaigns might experience slightly higher open rates, the relationship is minimal.
- An even weaker positive correlation (around 0.07) is found between the number of emails sent and the CTR, indicating that campaign size does not significantly impact the rate at which recipients engage by clicking.
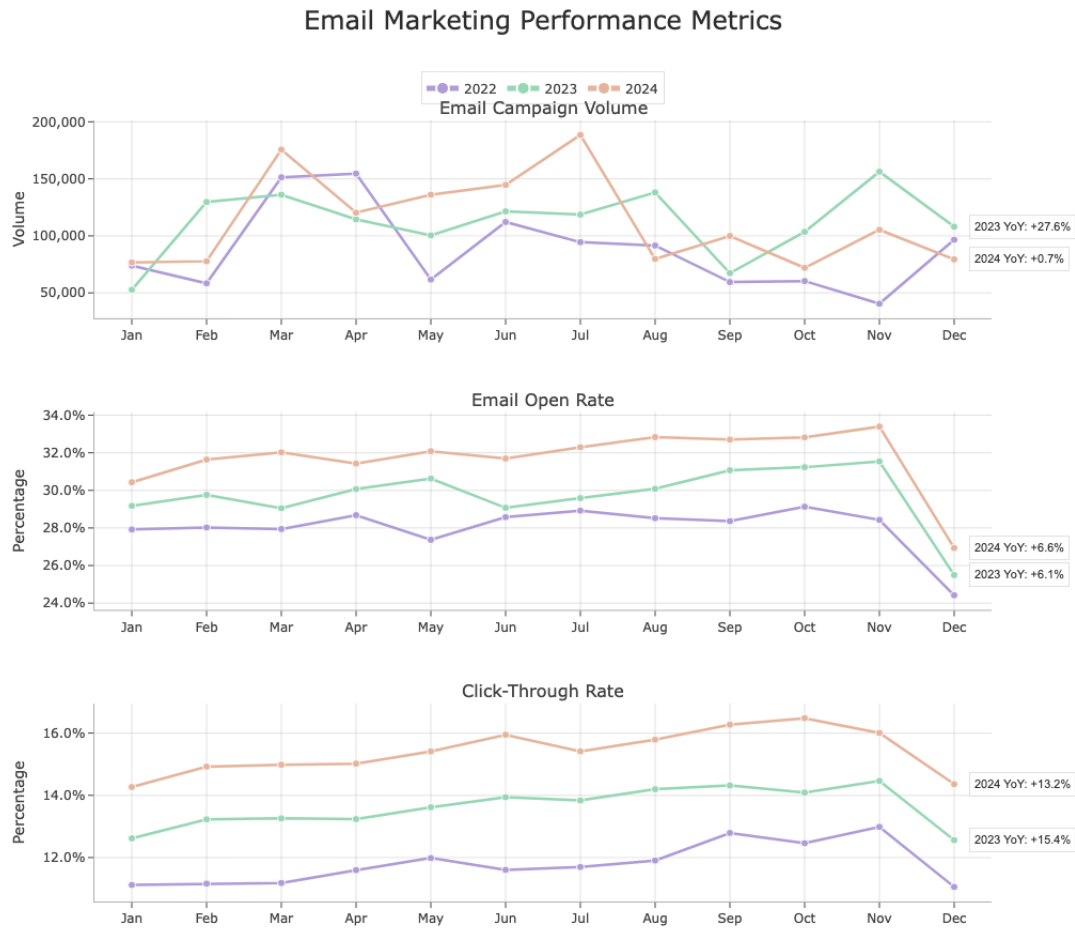

Emails Sent vs Open Rate
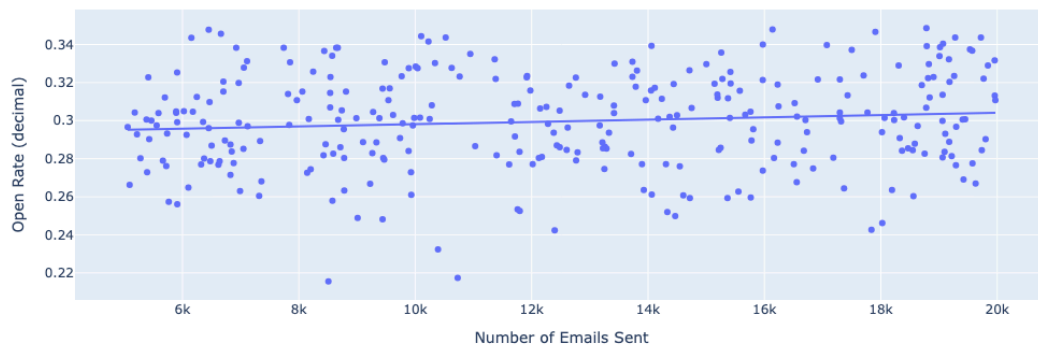
Emails Sent vs CTR
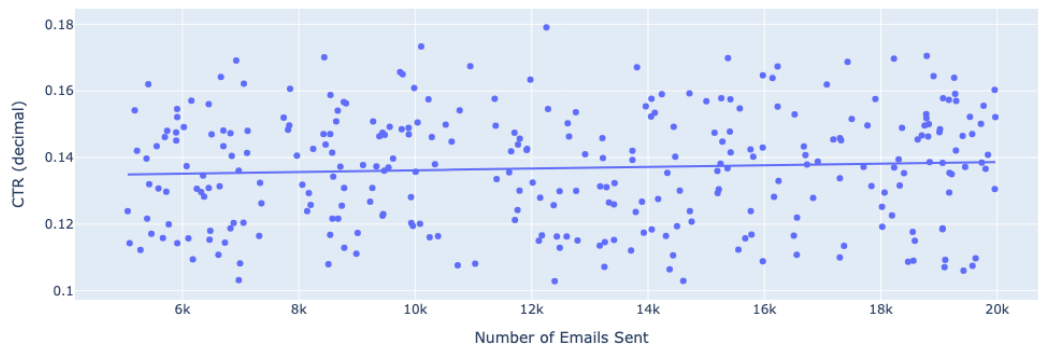
Is December Performance Natural?

After reviewing the complete dataset, we observe that December campaigns historically tend to have lower engagement metrics relative to other months.

Lower Open Rates:
- December 2022: Campaign open rates in December 2022 ranged between about 21.5% and 27%, noticeably below our overall average (~30%).
- December 2023: Open rates were similarly subdued, mostly hovering in the 24–26% range.
- December 2024: Although a few campaigns (for example, campaign 298 at 30.1%) reached higher open rates, most December 2024 campaigns still reported figures around 25–28%.

This overall dip is consistent with our expectations for December—during the holiday season, consumers face heavier inbox competition (from seasonal promotions and communications), which naturally puts downward pressure on open rates.
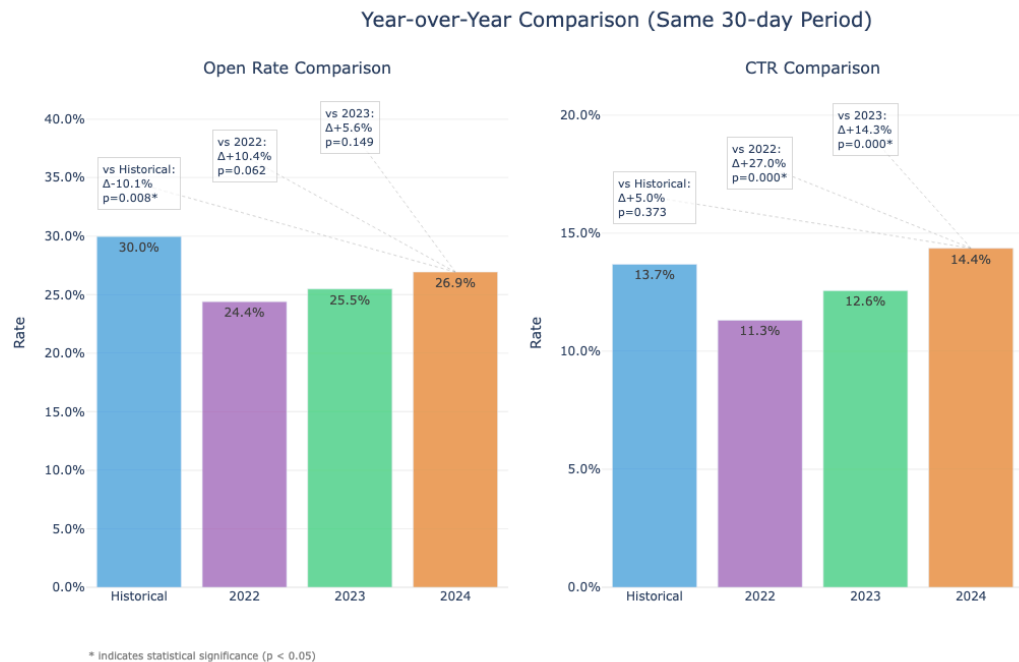
Click-Through Rates (CTR):
- In December 2022 and 2023, CTR values generally ranged from about 10% to 13.5%.
- In December 2024, the CTRs tend to be slightly higher (roughly 13.6 -- 15%), which may indicate that while fewer recipients are opening emails during December, those who do engage might be more inclined to click.

How Does 2024 Compare to Previous Years?

When comparing December 2024 to earlier Decembers, we see a mixed picture:

- Open Rate Comparison:
    - Overall, though, the December open rate dip in 2024 appears roughly on par with prior years, suggesting that these declines are likely driven by natural seasonal effects rather than a unique downturn.
    - Both December 2023 and December 2024 show depressed open rates relative to the overall yearly average. Whereas December 2023 appeared to consistently fall in the mid-20% range, December 2024 shows slightly more variability—with some campaigns hitting near 30% and others matching or falling below the lower end.

- CTR Comparison:
    - The CTR in December 2024 seems to be slightly improved relative to previous Decembers. This could imply that even though the overall number of opens is lower, the quality of engagement (once the email is opened) may have improved or that our content resonates better with the audience during the later part of the season.

Year-over-Year Comparison (Same 30-day Period)

Open Rate Comparison

vs Historical: Δ-10.1% p=0.008*
vs 2022: Δ+10.4% p=0.062
vs 2023: Δ+5.6% p=0.149

Historical 30.0% | 2022 24.4% | 2023 25.5% | 2024 26.9%

CTR Comparison

vs Historical: Δ+5.0% p=0.373
vs 2022: Δ+27.0% p=0.000*
vs 2023: Δ+14.3% p=0.000*

Historical 13.7% | 2022 11.3% | 2023 12.6% | 2024 14.4%

* indicates statistical significance (p < 0.05)

Conclusion

Natural Seasonal Dip:
- Conclusion: The lower engagement in December is largely in line with historical trends. Holiday saturation and increased competition during this time normally result in lower open rates. Although December 2024 shows a dip, it does not necessarily indicate a systemic issue.

Year-Over-Year Trends:
- Observation: December 2024's open rates—and even its variability—remain comparable to those seen in December 2022 and 2023. The slight improvement in CTR may be a positive sign, but the overall seasonal dip in open rate continues to be evident.
- Recommendation: Maintain a close watch over December and early-January campaigns. Consider special tactics such as tailored content, adjusting send times, or enhanced segmentation during holiday periods to help mitigate this expected drop.

Recommendations

Actionable Recommendations Moving Forward:

- Monitor & Compare: Continue to monitor monthly performance, segregating December performance from the rest of the year, so that any deviations beyond the typical seasonal dip can be flagged.
- A/B Testing for Seasonal Campaigns: Enhance tests during December to determine whether alternative content, subject lines, or send times can combat the seasonal dilution.
- Leverage the CTR Insight: Since December 2024's CTR is slightly higher despite lower open rates, explore what factors (content, call-to-action design, or audience segmentation) could be encouraging the engaged users to click. Replicating these tactics in other months might boost overall performance.

Appendix

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Email Marketing Metrics Analysis
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Number of campaigns analyzed: 300

Open Rate Performance Thresholds:
25th: 28.3%
Median: 30.1%
75th: 31.9%

Open Rate Key Statistics:
Mean: 30.0%
Standard Deviation: 2.5%
Range: 21.6% - 34.9%

CTR Performance Thresholds:
25th: 12.2%
Median: 13.8%
75th: 14.9%

CTR Key Statistics:
Mean: 13.7%
Standard Deviation: 1.7%
Range: 10.3% - 17.9%
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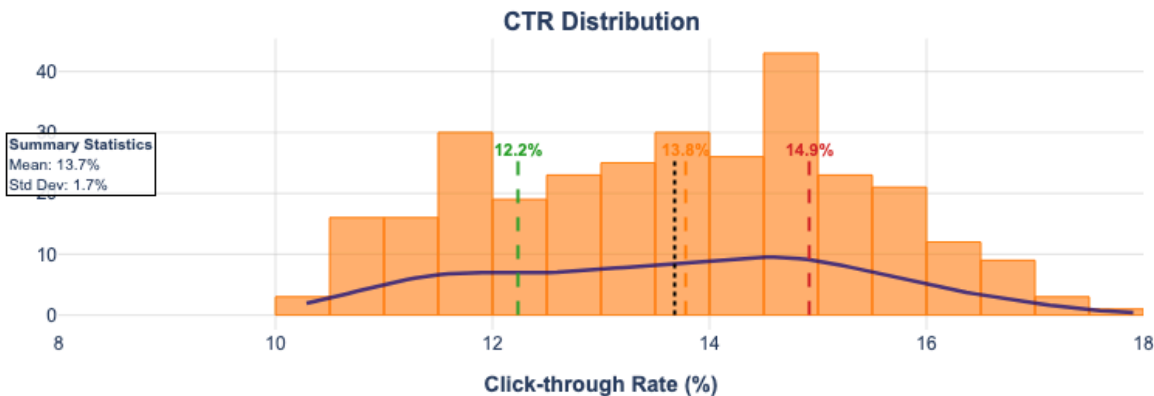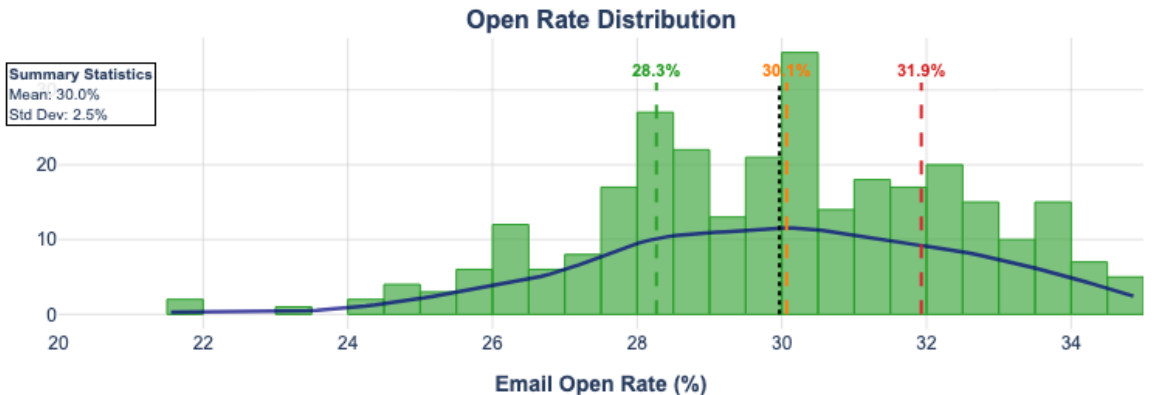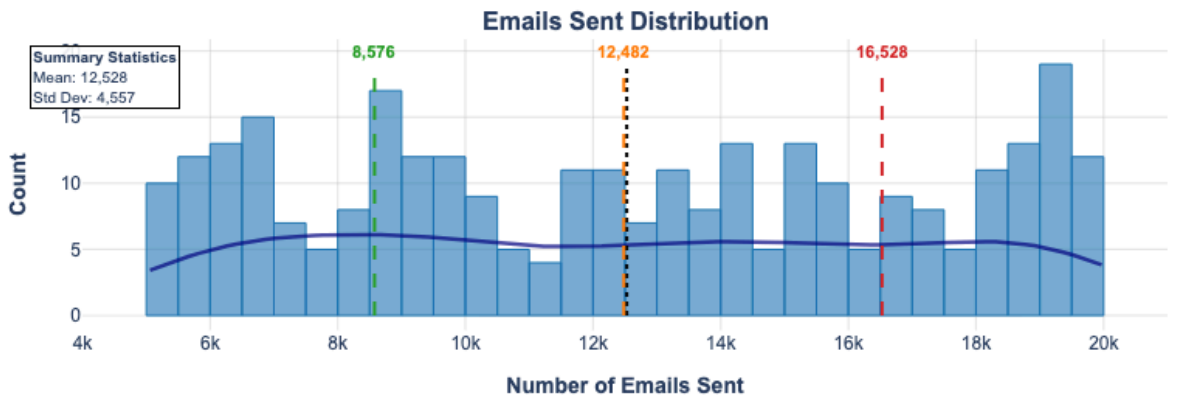
Distribution of Campaign Performance Metrics

Emails Sent Distribution

Summary Statistics
Mean: 12,528
Std Dev: 4,557

8,576   12,482   16,528

Count

Number of Emails Sent

Open Rate Distribution

Summary Statistics
Mean: 30.0%
Std Dev: 2.5%

28.3%   30.1%   31.9%

Email Open Rate (%)

CTR Distribution

Summary Statistics
Mean: 13.7%
Std Dev: 1.7%

12.2%   13.8%   14.9%

Click-through Rate (%)

Performance Indicators   ······ Mean   — — 25th Percentile   — — Median   — — 75th Percentile

December Open Rate Comparison Across Years
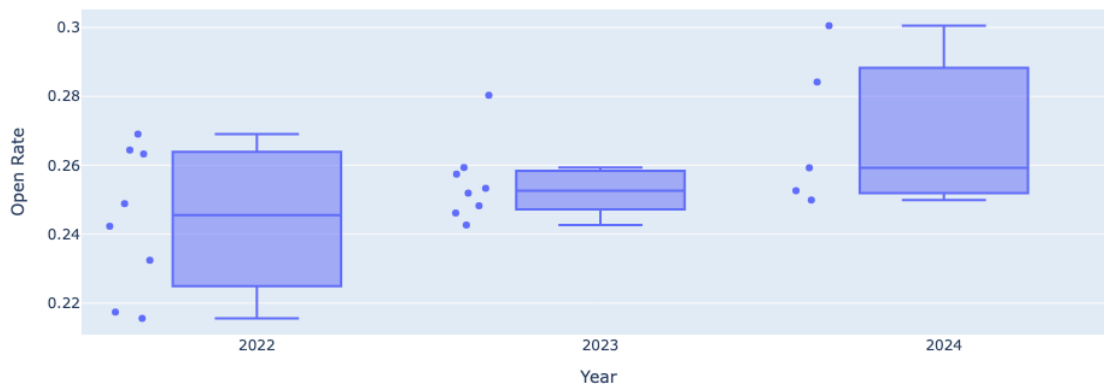
ANOVA Test Results: F = 2.9273170450280532 , p = 0.07930447835888224

Interpretation:

- If p < 0.05: There is a statistically significant difference in open rates between at least two of the December months across different years
- If p > 0.05: There is no statistically significant difference in open rates between the December months across years

The test helps determine if any observed differences in December open rates across years are meaningful or just due to random variation in the data.

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Advanced Statistical Analysis Results
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1. Open Rate Model
R-squared: 0.644

Top factors affecting Open Rate (positive/negative impact):
year_2024    0.034929
month_11     0.022813
month_10     0.020142
month_9      0.016525
year_2023    0.014883
dtype: float64

Top negative factors:
day_of_week_3    -0.003466
day_of_week_5    -0.006702
day_of_week_2    -0.007400
day_of_week_1    -0.008329
month_12         -0.034782
dtype: float64

2. Click-through Rate Model
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R-squared: 0.882

Top factors affecting CTR (positive/negative impact):
year_2024    0.036624
year_2023    0.018701
month_9      0.017891
month_11     0.017706
month_10     0.017154
dtype: float64

Top negative factors:
month_12          0.000166
day_of_week_4    -0.000175
day_of_week_2    -0.000230
n_sent           -0.000365
day_of_week_1    -0.000378
dtype: float64

3. Hypothesis Tests

Open Rate - Recent vs Historical:
t-statistic: -3.094
p-value: 0.034
Significant difference: True

CTR - Recent vs Historical:
t-statistic: 2.851
p-value: 0.030
Significant difference: True

December Open Rate - 2024 vs Past Years:
t-statistic: 1.833
p-value: 0.120
Significant difference: False

December CTR - 2024 vs Past Years:
t-statistic: 7.917
p-value: 0.000
Significant difference: True
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Key Findings

Advanced Statistical Analysis Results

Open Rate Model
- R-squared: 0.644 (moderate predictive power)
- Top Factors Increasing Open Rate:
    - year_2024 (+0.0349) → Open rates improved in 2024
    - month_11 (+0.0228) → November campaigns performed well
    - month_10 (+0.0201) → October campaigns also showed strong engagement
    - month_9 (+0.0165) → September had positive impact
    - year_2023 (+0.0149) → 2023 was also slightly strong

- Top Factors Decreasing Open Rate:
  - month_12 (-0.0348) ❗ → December campaigns had the lowest engagement
  - Certain weekdays (Tuesdays, Wednesdays, Fridays) also showed slightly lower engagement

Click-through Rate (CTR) Model
- R-squared: 0.882 (strong predictive power)
- Top Factors Increasing CTR:
  - year_2024 (+0.0366) → CTR improved in 2024
  - year_2023 (+0.0187) → 2023 also showed a positive trend
  - month_9, month_10, month_11 → Strong months for CTR
- Top Factors Decreasing CTR:
  - month_12 → December had the weakest CTR but with minor impact
  - Certain weekdays (Monday, Tuesday, Thursday) had slight negative effects
  - Higher email volume (n_sent) had a very small negative effect

Hypothesis Tests (Statistical Significance)

Open Rate - Recent vs. Historical
- t-statistic: -3.094
- p-value: 0.034 ($p < 0.05$)
- Significant Difference: Yes
- Insight: Recent open rates are significantly lower than historical data.

CTR - Recent vs. Historical
- t-statistic: 2.851
- p-value: 0.030 ($p < 0.05$)
- Significant Difference: Yes
- Insight: CTR has significantly improved in recent campaigns.

December Open Rate - 2024 vs Past Years
- t-statistic: 1.833
- p-value: 0.120 ($p > 0.05$)
- Significant Difference: No
- Insight: December 2024 open rates are not significantly different from past years.

December CTR - 2024 vs Past Years
- t-statistic: 7.917
- p-value: 0.000 ($p < 0.05$)
- Significant Difference: Yes
- Insight: December 2024 CTR is significantly better than previous Decembers.

Key Takeaways
1. Recent open rates are significantly lower than in the past (statistically significant).
2. CTR has significantly improved in recent campaigns (good engagement).
3. December open rates follow historical trends (no major decline or improvement).

4. December 2024 CTR is significantly better than in previous years (engaged users are clicking more).
5. December remains the worst month for open rates (seasonal trends confirmed).