Customer Churn & Retention Analysis

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1. Project Overview

The goal of this analysis is to identify key drivers of customer churn, validate marketing offers through statistical testing, and provide a financial justification for a targeted retention program.

2. Customer Base & Financial KPIs (Pivot Analysis)

A comprehensive audit of 4,225 customers revealed a highly stable product with a **Refund Ratio of only 0.06%**.

- **Total Revenue:** $12.95M.
- **Contract Distribution:** 51.9% of customers are on high-risk **Month-to-Month** contracts.
- **Revenue Leader:** Long-term "Two Year" contracts generate the highest revenue ($5.44M), despite having fewer customers than the monthly segment.

Contract	Total Revenue	Total Refunds	Refund Ratio	Count of Customer ID
Month-to-Month	**$3,806,875.37**	**$3,330.68**	**0.000874912**	**2193**
No offer	$2,129,698.56	1876.15	0.000880946	1236
Offer A	$55,161.92	0	0	6
Offer B	$774,499.67	325.56	0.000420349	146
Offer C	$374,407.59	284.68	0.000760348	128
Offer D	$350,006.85	455.62	0.001301746	248
Offer E	$123,100.78	388.67	0.003157332	429
One Year	**$3,704,942.01**	**$1,882.32**	**0.000508057**	**904**
No offer	$1,958,133.86	1145.05	0.000584766	493
Offer A	$439,537.19	200.28	0.000455661	60
Offer B	$1,004,184.88	176.29	0.000175555	189
Offer C	$230,924.34	169.85	0.000735522	83
Offer D	$64,728.23	121.24	0.001873062	58
Offer E	$7,433.51	69.61	0.009364351	21
Two Year	**$5,441,225.99**	**$3,042.00**	**0.000559065**	**1128**
No offer	$2,772,930.86	1937.6	0.000698755	595
Offer A	$1,741,683.96	572.77	0.00032886	253
Offer B	$801,604.73	311.67	0.000388808	180
Offer C	$79,352.81	151.82	0.001913228	40
Offer D	$36,077.48	68.14	0.001888713	35
Offer E	$9,576.15	0	0	25
Grand Total	**$12,953,043.37**	**8255**	**0.000637302**	**4225**

3. A/B Testing: Offer Performance Validation

To optimize revenue, a t-test was conducted to compare **Offer A** vs **Offer B** based on Monthly Charges (ARPU).

- **Offer A ARPU:** $77.53 | **Offer B ARPU:** $70.30
- **P-Value:** 0.0011 (Significant at α = 0.05)
- **Conclusion:** Offer A is statistically superior. It is recommended to prioritize Offer A for high-value segments to maximize revenue.

Metric	Offer A	Offer B
Sample Size	319	515
Average Monthly Charge (ARPU)	$77.53	$70.30
Variance	959.8109	951.8685

T-Statistic	
Significance Level (Alpha)	0.05
P-value	0.0011

Statistical_Validation	
Metric	**Value / Interpretation**
ARPU Difference	**$7.23**
P-Value	*0.0011*
Statistical Significance	**Yes (p < 0.05)**
Conclusion	**Offer A generates significantly higher ARPU than Offer B.**

4. Retention Analysis: Tenure vs. Contract Type

A heatmap analysis of customer tenure (0–72 months) shows a direct correlation between contract length and loyalty (p. 1).

- **Churn Risk:** 1,104 customers on "Month-to-Month" contracts have a tenure of <1 year (p. 1).
- **Loyalty Benchmark:** 56% of customers with 5+ years of tenure are on **Two Year** contracts (p. 1).
- **Insight:** Converting customers to annual plans within the first 12 months is the most effective way to extend Customer Lifetime Value (CLTV).

Count of Customer ID	Tenure in Months					
Contract	0-11	12-23	24-35	36-47	48-59	60-72
Month-to-Month	1104	427	272	190	136	64
One Year	64	118	147	171	196	208
Two Year	70	65	78	116	163	636

p.1 Heatmap analysis of customer tenure

5. Predictive Modeling: High-Risk Segment Identification

Using a Churn Score (0-100) generated via Python, we identified specific customers for immediate intervention.

- **Critical Segment:** Customers in **San Diego** and **Los Angeles** with Churn Scores >90.
- **Targeting:** Most high-risk customers currently have **"No Offer"** applied, representing a missed opportunity for automated retention triggers.

Customer ID	City	Contract	Offer	Churn Score
9776-CLUJA	Sacramento	Month-to-Month	No offer	96
9840-DVNDC	Lancaster	Month-to-Month	No offer	96
9158-VCTQB	Los Angeles	Month-to-Month	No offer	96
8699-ASUFO	Nuevo	Month-to-Month	No offer	96
8375-DKEBR	Hermosa Beach	Month-to-Month	Offer E	96
8111-SLLHI	San Jose	Month-to-Month	No offer	96
7488-MXJIV	Armona	Month-to-Month	Offer E	96
7580-UGXNC	Culver City	Month-to-Month	No offer	96
5028-GZLDO	Moraga	Month-to-Month	No offer	96
6015-VVHHE	Los Angeles	Month-to-Month	No offer	96
5565-FILXA	Escondido	Month-to-Month	No offer	96
4729-XKASR	San Jose	Month-to-Month	No offer	96
4826-XTSOH	Moss Landing	Month-to-Month	No offer	96
3776-EKTKM	Burbank	Month-to-Month	No offer	96
3927-NLNRY	Long Barn	One Year	Offer B	96
3208-YPIOE	La Mesa	Month-to-Month	Offer C	96
3415-TAILE	Johannesburg	Month-to-Month	No offer	96
2685-SREOM	Rancho Cucamonga	Month-to-Month	No offer	96
2754-XBHTB	Amador City	Month-to-Month	No offer	96

6. Financial Justification (What-If Analysis)

To prove the business value of retention, a simulation was built to estimate the ROI of a $10 retention incentive.

- **Target:** 5% reduction in churn.
- **Saved CLTV:** $247,166.56.
- **Program Cost:** $560.50.
- **Estimated NET ROI: $246,606.06**.

Key Metrics

Metrics	Values
Average Monthly Charge ($)	$64.91
Average CLTV ($)	$4,409.75
Average Churn Rate	0.265
Amount of Churned Clients	1121

Input Parameters

Parametrs	Values
Target Churn Rate Reduction (%)	5%
Retention Offer Cost	$10.00

Result

Metrics	Values
Additional Customers Saved	56.05
Recovered CLTV	$247,166.56
Total Retention Investment	$560.50
Estimated ROI NET	$246,606.06

7. STRATEGIC RECOMMENDATIONS

1. **Migrate Segments:** Launch a campaign to migrate "Month-to-Month" users to "One Year" plans after their 6th month.
2. **Scale Offer A:** Replace underperforming Offer B with Offer A across all digital channels.
3. **Deploy ROI-Focused Retention:** Implement the $10 retention offer specifically for customers with a **Churn Score >85** to achieve the projected $246k profit.