Customer Churn Analytics

Analyzing customer behavior in the banking sector using PostgreSQL

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Objective

To present insights derived from SQL analysis on Customer Churn, highlighting key factors influencing churn and recommending strategies for improvement.

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Customer Churn Overview

What is Customer Churn?

Customer churn refers to the rate at which customers stop doing business with a company.

In the banking industry, this metric is vital as it directly impacts profitability. Understanding churn involves analyzing various factors

- customer satisfaction,
- competition,
- service quality, and
- customer engagement.

CUSTOMER CHURN

Importance of Churn Analytics

Churn analytics is critical for identifying at-risk customers and understanding the underlying reasons for their potential departure. By leveraging data to analyze churn, banks can implement targeted retention strategies, enhance customer satisfaction, and improve overall service offerings, thereby reducing churn rates and increasing lifetime value.

Impact on Business Performance

High customer churn can severely impact a bank's bottom line. When customers leave, the institution loses not only their immediate transactions but also the potential for future business. Additionally, the cost of acquiring new customers to replace those who have churned can be significantly higher than retaining existing ones. By analyzing churn rates, banks can prioritize retention efforts, target marketing campaigns effectively, and develop customer loyalty programs to enhance engagement.

PostgreSQL Analytics

Dataset Overview

📦 Source:
Bank Customer Churn dataset (imported via pgAdmin from CSV : Bank_Churn_Dataset.csv)

📄 Records:
10,000 Customers

🔢 Table Name:
bank_churn

📃 Columns:
CustomerId, Surname, CreditScore, Geography, Gender, Age, Tenure, Balance, NumOfProducts, HasCrCard, IsActiveMember, EstimatedSalary, Exited

Tools & Approach

- PostgreSQL tool is used for EDA

- use a variety of DDL and DML commands to explore the various segments of customers in the given dataset

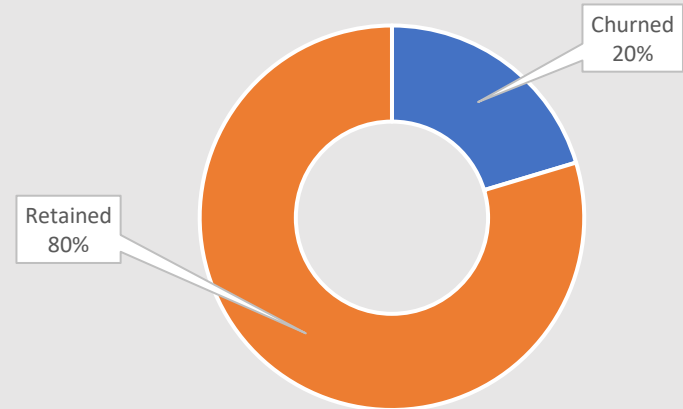- performed EDA to explore insights

Churn Overview

🧮 Churn Breakdown:
Total Customers: 10,000
Churned: 2,037 (20.37%)

📊 Insight:
A significant portion of the
customer base has churned.
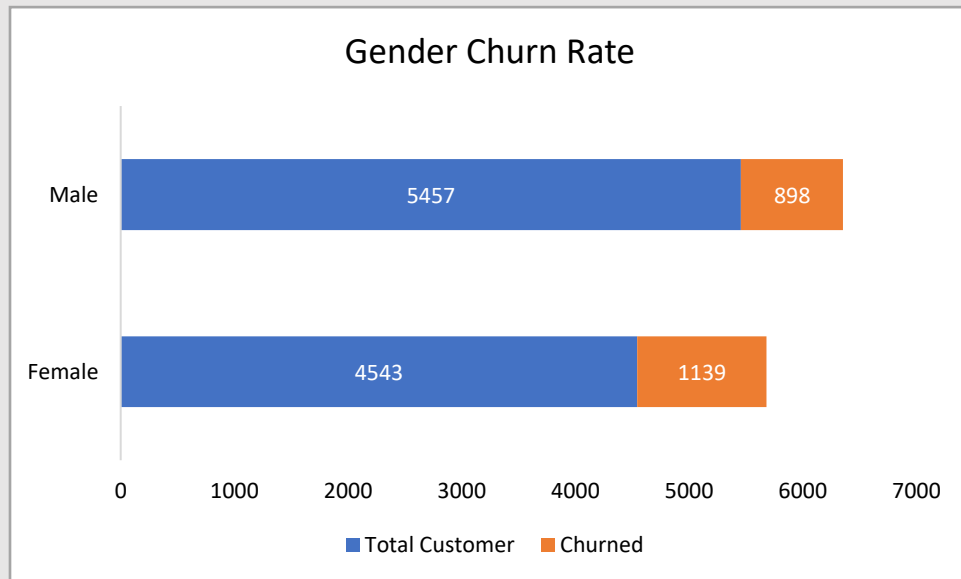
Churn vs Retained

Churned
20%

Retained
80%

Churn by Gender

👱‍♀️ Female Churn Rate: ~25%

👱‍♂️ Male Churn Rate: ~16%

📊 Insight:

- Females have a significantly higher churn rate

Gender Churn Rate

Churn by Age Group

- **Older customers (Over 50)** tend to churn more, while younger ones stay longer

	age_group text	total_customers bigint	churned bigint	churn_rate numeric
1	Over 50	1261	563	44.65
2	30-50	7098	1350	19.02
3	Under 30	1641	124	7.56

Churn by Geography

🌍 Country-wise Churn Rate:

- Germany: ~32%
- France: ~16%
- Spain: ~16.5%

📍 Insight:

- Germany shows the highest churn and needs targeted retention campaigns.

Churn by Financial Profile

💳 Credit Score (Average)
- Exited: ~619
- Not Exited: ~652

💰 Balance (Average)
- Exited: ~$91,000
- Not Exited: ~$72,000

🔍 Insight:
- High balance and low credit score customers are more likely to leave.

Churned rate based on customer activeness with total products

- Strong indicator — inactive users are more likely to leave. Engagement is key to retention

- Customers with 2 or more products and low activity are at higher risk of churn

	IsActiveMember integer	NumOfProducts integer	total bigint	churned bigint	churn_rate numeric
1	0	4	31	31	100.00
2	1	4	29	29	100.00
3	0	3	153	135	88.24
4	1	3	113	85	75.22
5	0	1	2521	924	36.65
6	1	1	2563	485	18.92
7	0	2	2144	212	9.89
8	1	2	2446	136	5.56

Churned rate based on Geography and Gender

- Germany shows high rate of risk as Female and Male are exiting more
- Female customers slightly edge out male customers in churn rates.

	Gender text	Geography text	total_customer bigint	retained_customer bigint	churned_customer bigint	churn_rate_percent text
1	Female	Germany	1193	745	448	37.55%
2	Male	Germany	1316	950	366	27.81%
3	Female	Spain	1089	858	231	21.21%
4	Female	France	2261	1801	460	20.34%
5	Male	Spain	1388	1206	182	13.11%
6	Male	France	2753	2403	350	12.71%

Churned based on Geography, Gender and Financial Profile

German People shows strong financial banking but also exit faster

Need to harp more on Germany region as it is impacting overall churn rate

	Geography text	Gender text	avg_credit_score numeric	avg_balance numeric	churn_rate_percent numeric
1	Germany	Female	653.09	119145.97	37.55
2	Germany	Male	649.97	120259.67	27.81
3	Spain	Female	651.77	59862.09	21.21
4	France	Female	649.19	60322.67	20.34
5	Spain	Male	650.99	63352.83	13.11
6	France	Male	650.06	63546.28	12.71

Customer Segmentation

👈 High-Value Customers:

• Criteria: Balance > $100,000

📌 Action:

• Prioritize retention for this segment through exclusive benefits or targeted engagement programs.

```sql
UPDATE bank_churn
SET customer_segment = CASE
    WHEN "Balance" > 100000 THEN 'High'
    ELSE 'Standard'
END;
```

Summary Statistics

We calculated key statistical metrics for two primary financial indicators

💳 **Credit Score**

- Average: 650.53
- Median: 652.0
- Min–Max: 350 – 850
- Standard Deviation: 96.65

💰 **Balance**

- Average: $76,015.55
- Median: $97,650.0
- Min–Max: $0.0 – $250,898.09
- Standard Deviation: $62,972.35

🔍 Insights:
- The median balance is significantly higher than the mean, indicating a left-skewed distribution.
- High standard deviation in balances confirms wide spread due to outliers.
- Credit scores appear more normally distributed

Key Metrics for Churn Analysis

Metric	Why It Matters
Age	Older customers tend to churn more, possibly due to lower digital engagement or changing needs.
Balance	A high balance might indicate a valuable customer. If such customers churn, it's a bigger financial risk.
IsActiveMember	Strong indicator — inactive users are more likely to leave. Engagement is key to retention.
Geography	Some regions (like Germany) show consistently higher churn rates — may reflect local issues or competition.
CreditScore	Lower credit scores can be correlated with financial distress or higher dissatisfaction.
NumOfProducts	Customers with fewer products might not be deeply integrated with the bank and may churn easily.
Tenure	Longer-tenured customers might have higher loyalty — but plateauing value could lead to churn if engagement drops.
Gender	Minor difference, but including it may help target messaging more effectively.

✅ Targeted Retention Strategies

•*Proactively Engage Inactive Customers*
Launch personalized campaigns for users marked as inactive (IsActiveMember = 0)
e.g., push notifications, reward points for logins.

•*Target High-Value Customers with High Balance*
Offer loyalty benefits (e.g., better interest rates, relationship managers) to customers with large
balances who are showing signs of disengagement.

•*Focus on At-Risk Demographics* (Age > 50, Germany)
Provide tailored financial products and onboarding assistance for older users, especially those in
high-churn geographies like Germany.

•*Cross-Sell to Customers with Few Products*
Promote bundled offerings (credit cards, investments) to customers with only 1 product — integrated
users are less likely to leave.

•*Reward Long-Term Customers with Tiered Perks*
Introduce milestone rewards based on tenure (e.g., perks at 5+ years) to reinforce loyalty and
emotional connection.

SQL Highlights

```sql
ALTER TABLE bank_churn
ADD COLUMN customer_segment TEXT;
```

```sql
SELECT
    CASE
        WHEN "Age" < 30 THEN 'Under 30'
        WHEN "Age" BETWEEN 30 AND 50 THEN '30-50'
        ELSE 'Over 50'
    END AS age_group,
    COUNT(*) AS total_customers,
    SUM("Exited") AS churned,
    ROUND(100.0 * SUM("Exited") / COUNT(*), 2) AS churn_rate
FROM bank_churn
GROUP BY "age_group"
ORDER BY "churn_rate" DESC;
```

```sql
SELECT
    ROUND(AVG("CreditScore"), 2) AS avg_credit_score,
    PERCENTILE_CONT(0.5) WITHIN GROUP (ORDER BY "CreditScore") AS median_credit_score,
    MIN("CreditScore") AS min_credit_score,
    MAX("CreditScore") AS max_credit_score,
    ROUND(STDDEV("CreditScore"), 2) AS stddev_credit_score,

    ROUND(AVG("Balance"), 2) AS avg_balance,
    PERCENTILE_CONT(0.5) WITHIN GROUP (ORDER BY "Balance") AS median_balance,
    MIN("Balance") AS min_balance,
    MAX("Balance") AS max_balance,
    ROUND(STDDEV("Balance"), 2) AS stddev_balance
FROM bank_churn;
```

Interpreting Analytical Results

Interpreting the results of churn analysis involves identifying patterns and trends that indicate why customers leave. Utilizing PostgreSQL's analytical functions, banks can segment customer data to uncover insights related to demographics, account usage, and service interactions. This deep dive analysis enables the bank to take proactive measures tailored to specific customer groups, ultimately aiding in churn reduction.

Conclusions

Understanding customer churn through comprehensive analysis not only helps in retention strategies but also enhances overall business performance. Utilizing PostgreSQL for analytics allows banks to dissect complex data and derive actionable insights, fostering a more customer-centric approach that drives loyalty and profitability in the competitive banking landscape.

Thank you!