

Bank Customer Churn Analysis and Retention Insights Using Power BI

This comprehensive project analyzes customer churn patterns in a bank using interactive visual dashboards developed in Power BI. The objective is to understand how many customers are leaving, which customer groups are at highest risk, and what financial or behavioral factors contribute to churn. This analysis enables the bank to adopt data-driven retention strategies to reduce customer loss and maximize lifetime value.

Customer churn is one of the biggest challenges faced by banks. Every customer who leaves results in a loss of lifetime value, reduced deposits, and decreased product usage. This dashboard provides a holistic view of customer segments, churn drivers, and risk areas so management can implement targeted retention strategies.

Business Objectives and Impact



Who is Churning?

Identify customer segments by age, gender, geography, and credit rating most likely to leave



Why Are They Leaving?

Analyze tenure, balance, engagement levels, and products used to understand motivations



What Signals Churn Risk?

Detect financial behaviors and patterns that indicate customers at high risk of leaving



How Can We Reduce Churn?

Generate actionable insights to implement data-driven retention strategies

Banks face significant financial impact when customers close their accounts. This project addresses these critical questions through comprehensive data analysis and visualization. Understanding churn patterns enables proactive intervention, targeted marketing campaigns, and improved customer experience initiatives that drive retention and profitability.

Dataset Overview and Structure

Data Source

The dataset is a structured CSV file containing demographic, financial, and account activity details of bank customers. This comprehensive data enables deep analysis of churn patterns across multiple dimensions.

Key Features

- Unique customer identifiers
- Geographic distribution
- Financial metrics and behavior
- Account activity indicators
- Churn status labels

Column	Description
CustomerID	Unique identifier for each customer
Geography	Country (France, Spain, Germany)
Gender	Male/Female
Age	Customer age
Tenure	Years of relationship with the bank
Balance	Customer's bank balance
EstimatedSalary	Annual salary
CreditScore	Customer's creditworthiness
NumOfProducts	Number of bank products used
IsActiveMember	Active (1) or inactive (0)
Exited	Target variable: 1 = churned, 0 = retained

Data Preparation and Cleaning

Comprehensive data preparation was performed in Power Query to ensure clean, analysis-ready data. This critical step ensures accuracy and reliability in all downstream analytics and visualizations.

1 Data Quality Assurance

- Removed duplicates based on CustomerID
- Checked and replaced null values
- Validated data integrity across all fields

2 Type Standardization

- Whole Number: Age, Tenure, NumOfProducts
- Decimal Number: Balance, EstimatedSalary
- Text: Geography, Gender

3 Data Validation

- Trimmed and cleaned text fields
- Ensured no negative values in financial columns
- Verified consistency across geographic regions

Data Enrichment and Segmentation

Classification columns were created to group continuous variables for easier analysis and pattern recognition. These strategic groupings enable more actionable insights and targeted business strategies.

Age Grouping

- **Young Adults:**
- 0 – 25 years
- **Early Career Adults:**
- 25 – 35 years
- **Mid-Life Group:**
- 35 – 45 years
- **Pre-Retirement Group:**
- 55 – 65 years
- **Senior Customers:**
- 65+ years

Credit Score Categories

- **Very Poor:** 0-400
- **poor:** 400-600
- **Fair:** 600-700
- **Good:** 700-800
- **Excellent:** 800+

Salary Segmentation

- **Low Salary:** \$0k–25k
- **Lower - Middle Salary:** \$25k–50k
- **Medium Salary:** \$50k–75k
- **High Salary:** \$75k–100k
- **Very High Salary:** 100k+

These enrichment columns transform raw continuous data into actionable segments, enabling stakeholders to quickly identify high-risk groups and tailor retention strategies accordingly. The segmentation provides a foundation for targeted marketing campaigns and personalized customer engagement initiatives.

Dashboard Architecture and Key Performance Indicators

Primary KPIs

- Total Customers:** Count of all customers
- Churned Customers:** Count where Exited = 1
- Churn Rate:** Percentage of customers who left
- Average Balance:** Mean balance across accounts

Secondary KPIs

- Churn by Geography
- Churn by Gender
- Churn by Age Group
- Churn by Salary Group
- Churn by Credit Score
- Churn by Account Activity
- Churn by Number of Products

Dashboard Structure

The dashboard is divided into four strategic pages, each focusing on different aspects of customer churn analysis. This multi-page approach allows stakeholders to dive deep into specific areas while maintaining a clear narrative flow from executive overview to detailed behavioral insights.



Executive Overview

High-level KPIs and financial comparison

Demographics

Age, gender, and geographic analysis



Financial Insights

Balance, salary, and credit analysis

Engagement

Product usage and activity patterns

Executive Overview and Financial Insights

10,000

Total Customers

Total Customers of the Bank

2037

Churn Count

Churn Count of customers

20.37%

Churn Rate

Churn Rate of the Customers

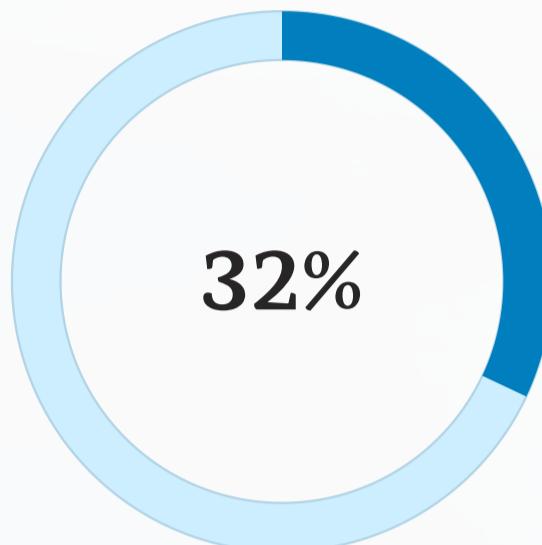
The Executive Overview page presents leadership with high-level business KPIs that summarize the bank's customer base and churn performance. The dashboard highlights that out of **10,000 total customers, 2,037 have churned**, resulting in a **20.37% churn rate**. This indicates that **one out of every five customers is leaving the bank**, signaling a significant retention challenge and the need for targeted interventions to reduce customer loss and improve long-term value.

Interactive Analysis Capabilities

The dashboard includes strategic slicers that enable executives to drill down into specific segments: Gender, Geography, Credit Card Holder status, and Active Member status. These filters allow for rapid exploration of how different customer characteristics impact churn patterns and financial metrics, enabling data-driven decision making at the executive level.

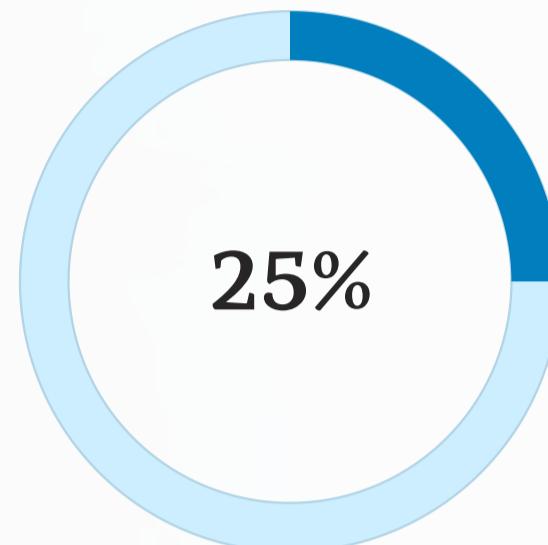
Demographic Churn Patterns and Risk Profiles

Demographic analysis reveals critical patterns in customer churn across age, gender, and geography. Understanding these patterns enables targeted retention strategies for high-risk segments.



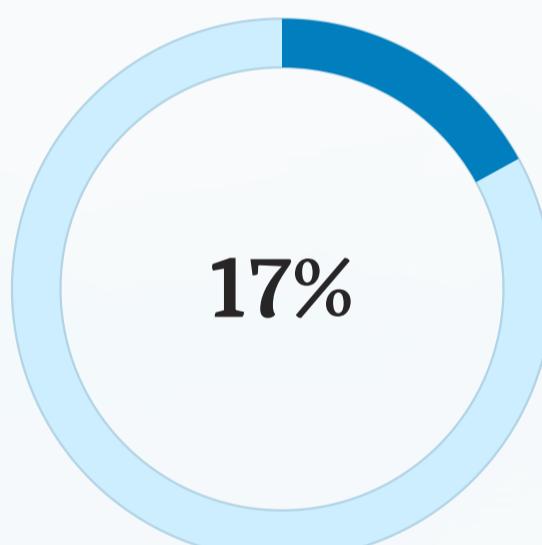
Germany Churn Rate

Highest risk region requiring immediate attention



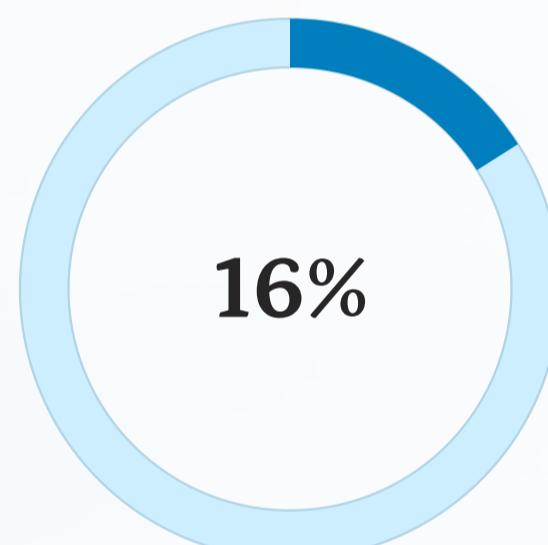
Female Churn Rate

Women exhibit higher churn compared to 16% for men



Spain Churn Rate

Mid-range churn requiring monitoring



France Churn Rate

Lowest churn rate showing better retention

Age-Related Churn Dynamics

Churn rate analysis by age reveals a critical pattern: churn significantly increases between ages 40–60, peaking around 50–55. Middle-aged and senior customers demonstrate the highest probability of leaving the bank. This insight suggests that life stage events, financial reassessment, and competitor offerings may be particularly influential for this demographic segment.

Key Geographic Insight

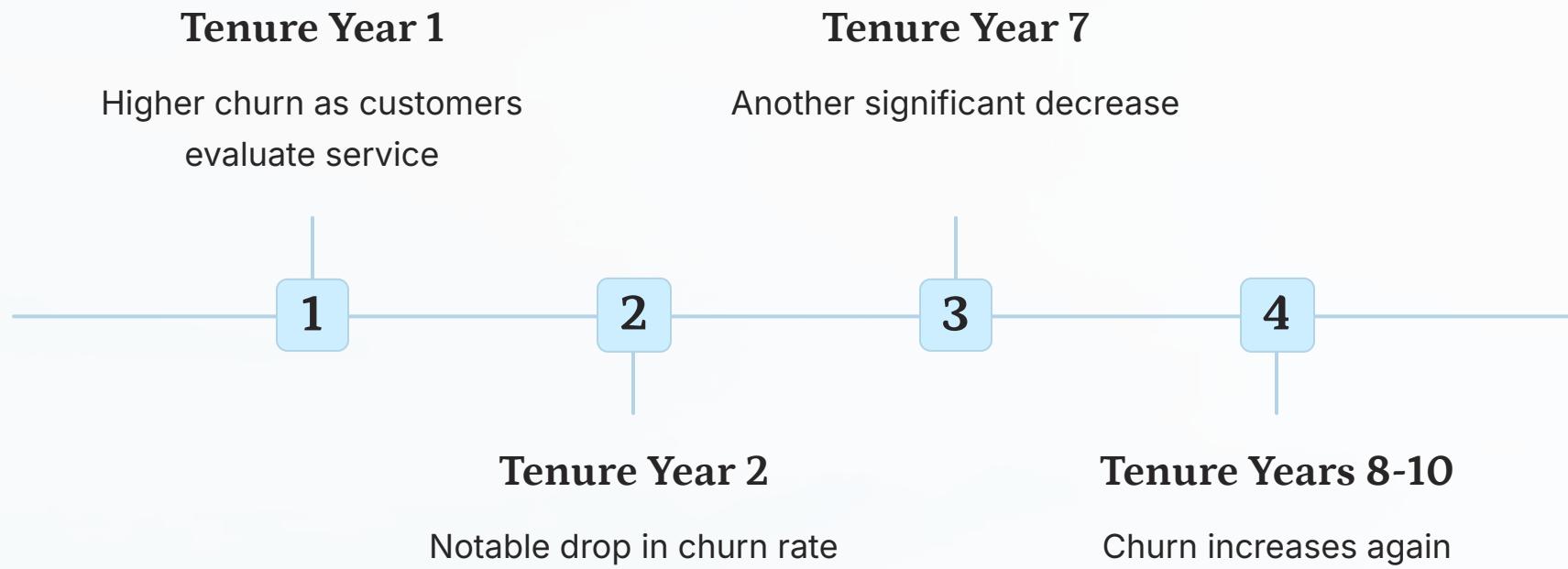
Germany emerges as the most at-risk region with a 32% churn rate—double that of France at 16%. This substantial difference indicates potential market-specific challenges such as increased competition, regulatory factors, or service quality issues requiring immediate investigation and tailored retention initiatives.

Gender Disparity

Female customers show a 25% churn rate compared to 16% for male customers. This 9-percentage-point gap suggests potential service gaps or unmet needs in the bank's offerings for female customers, warranting gender-specific retention strategies and product development.

Financial Stability and Behavioral Churn Drivers

Financial metrics and customer behavior provide powerful predictors of churn risk. This page analyzes tenure patterns, credit ratings, and salary segments to identify stability indicators and warning signs.



Credit Rating Impact

Credit score analysis reveals alarming patterns. Customers with "Very Poor" credit ratings exhibit 100% churn, though this represents a small sample size. Other credit categories show approximately 20% churn rates. This finding underscores the critical importance of financial health indicators in predicting customer retention and suggests that customers facing financial difficulties require specialized support and engagement strategies.

Salary Segment Analysis

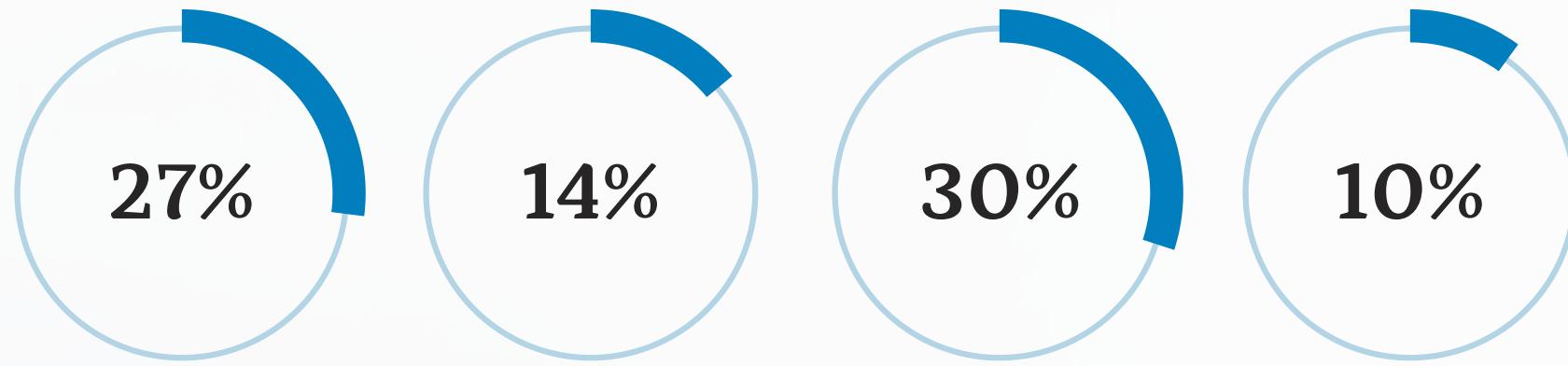
The \$50k–75k salary segment demonstrates the highest churn rate at approximately 21%, while the \$75k–100k segment shows lower churn. This pattern suggests a potential "squeezed middle" effect where customers in this income bracket may be particularly price-sensitive or attracted to competitive offerings.

Tenure Patterns

Churn behavior varies inconsistently across tenure, with notable spikes around years 1, 8, and 10. The first-year spike reflects initial service evaluation, while later spikes may indicate changing life circumstances or increased receptivity to competitive offers after long-term relationships.

Engagement Patterns and Strategic Recommendations

Customer engagement emerges as one of the strongest predictors of churn. Active participation in banking services dramatically influences retention outcomes.



Inactive Members	Active Members	Single Product	Two Products
Nearly double the churn rate of active customers	Strong engagement drives retention	Customers with only one product show high churn	Ideal product portfolio shows lowest churn

High-Risk Customer Profile Summary

- Demographics:** Middle-aged (40–60), German residents, Female customers
- Behavior:** Inactive members, single product users
- Financial:** "Very Poor" credit scores, \$50k–75k salary range
- Engagement:** Low account activity, minimal product cross-sell

Strategic Action Plan

01	02	03
Activate Inactive Members Launch targeted engagement campaigns for inactive customers—the 27% vs 14% churn gap presents the single largest retention opportunity	Promote Second Product Adoption Focus on moving single-product customers to two products through personalized recommendations and bundled offerings	Germany Market Intervention Conduct deep-dive analysis of German market dynamics and implement region-specific retention programs to address 32% churn rate
04	05	06
Female Customer Experience Enhancement Develop gender-specific products and services to address the 9-percentage-point churn gap between female and male customers	Mid-Life Customer Support Create specialized programs for 40–60 age group addressing life stage financial needs and competitor vulnerability	Credit Health Improvement & Risk Mitigation Strategy Offer credit health improvement programs and provide personalized repayment assistance also monitor low credit score customers more closely
07	08	09
Middle-Income Customer Value Enhancement Provide value-driven financial products with lower fees and improve product transparency and benefits for this segment.	High-Value Customer Retention & Experience Enhancement Provide priority customer service and dedicated wealth advisors and offer premium loyalty programs and relationship banking perks	Early & Long-Term Customer Retention Strategy For new customers (<1 year): improve onboarding experience and offer welcome benefits and account setup support For long-tenured customers (8–10 years): introduce loyalty-based rewards and conduct periodic account reviews.