

# Bank Customer Churn Analysis Project

## Project Overview

The Bank Customer Churn Analysis project focuses on leveraging data analytics to understand why customers leave the bank's services.

Through comprehensive analysis of customer data, including demographic information, account details, and transaction patterns, the project aims to uncover key indicators that signal a customer's likelihood to churn. This analytical approach will employ Python programming to process raw data, identify correlations, and create meaningful visualizations that highlight significant patterns in customer behavior.

The project encompasses multiple phases, starting with data cleaning and preprocessing to ensure data quality. It then progresses to exploratory data analysis, where various customer attributes are examined to identify trends and relationships. Using statistical methods and machine learning techniques, the project culminates in developing a predictive model that can forecast potential customer churn, enabling the bank to take proactive retention measures.

**General Objective:** To develop a comprehensive understanding of customer churn patterns and create a predictive model that can identify customers at risk of leaving the bank's services.

**Specific Objectives:**

1. Clean and preprocess the bank customer dataset to ensure data quality and consistency
2. Analyze demographic and transactional patterns to identify key factors influencing customer churn
3. Create meaningful visualizations to communicate insights about customer behavior and churn patterns

4. Develop and evaluate a basic predictive model for customer churn using appropriate machine learning techniques

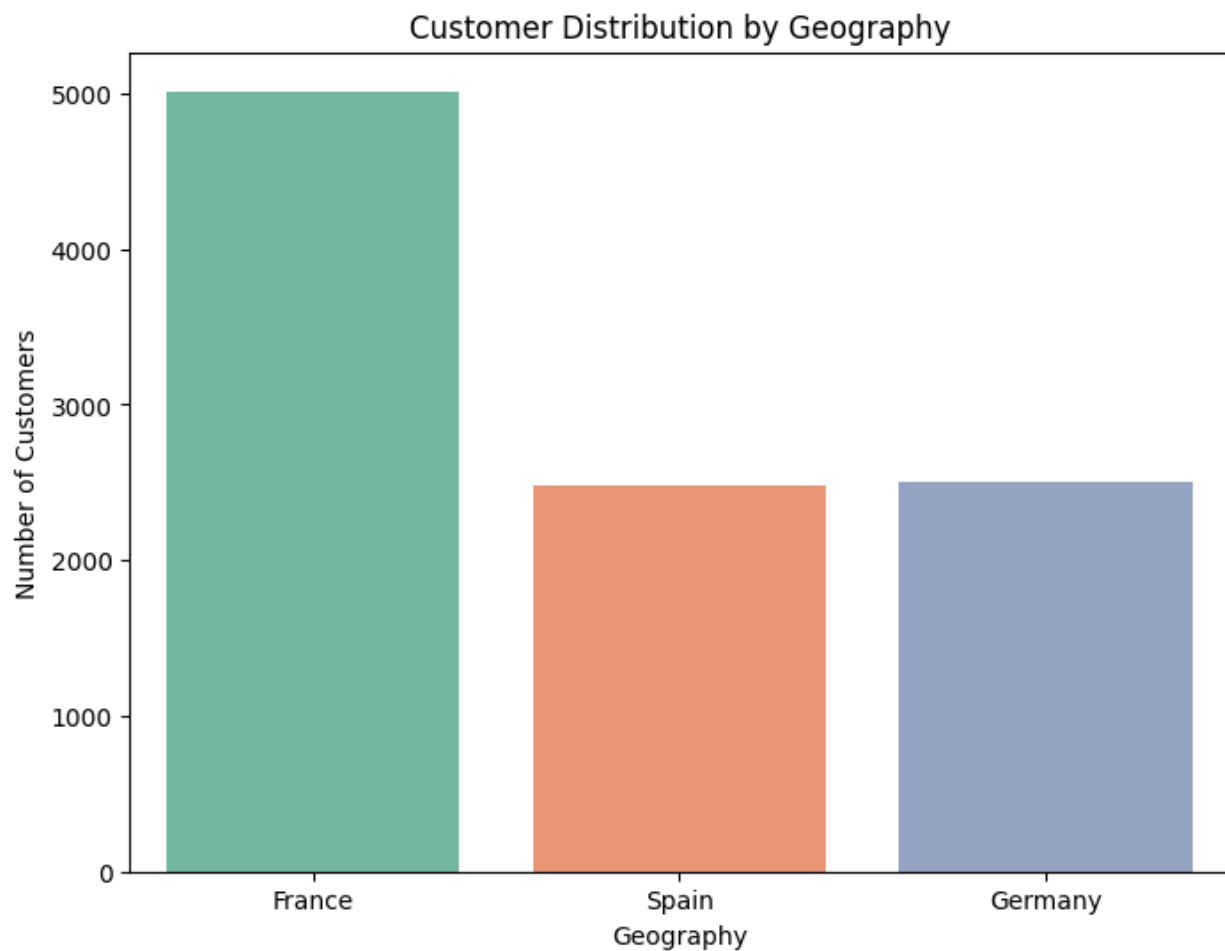
5. Provide actionable recommendations for improving customer retention based on the analysis findings

A summary of findings including:

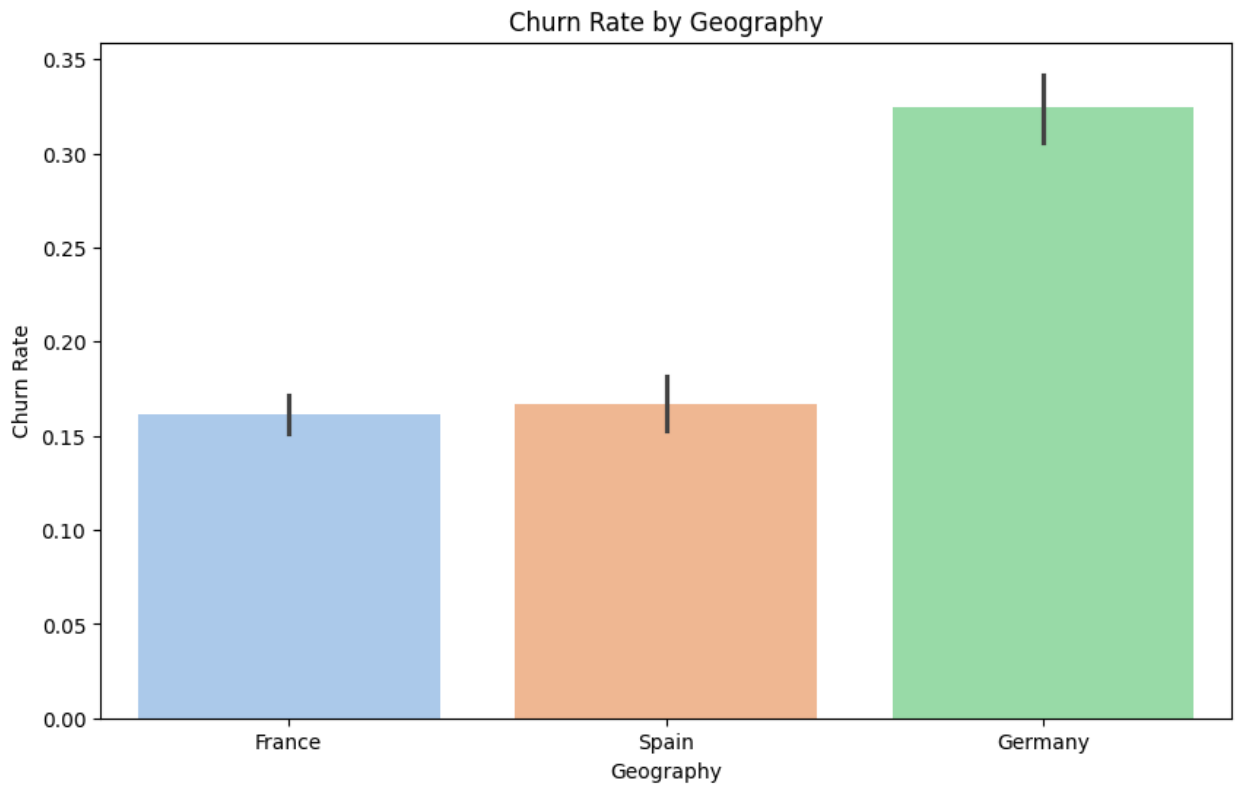
## 1. Customer Demographics Analysis

- **Geography Distribution:**

- Customers are primarily from France, followed by Germany and Spain.

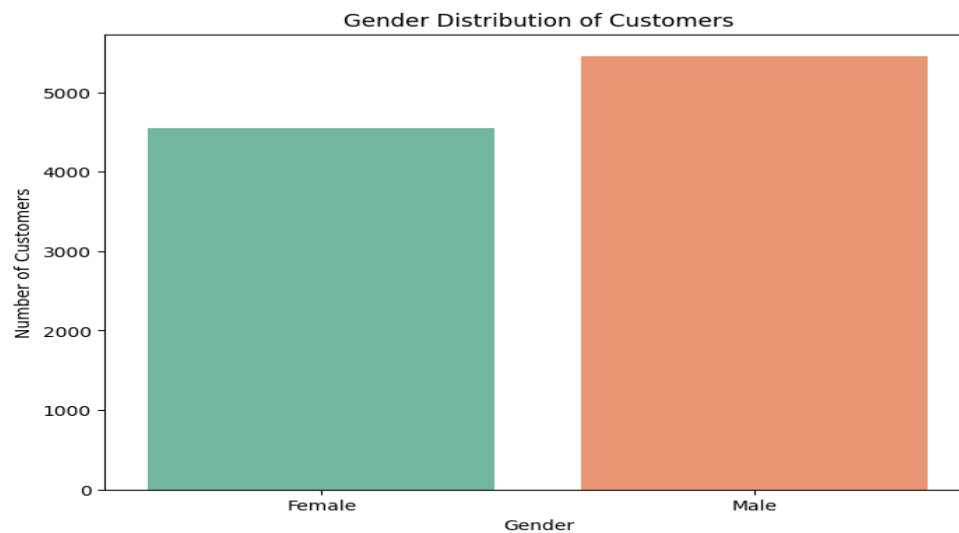


- **Churn rates vary significantly by geography: Germany has the highest churn rate, while France has the lowest.**

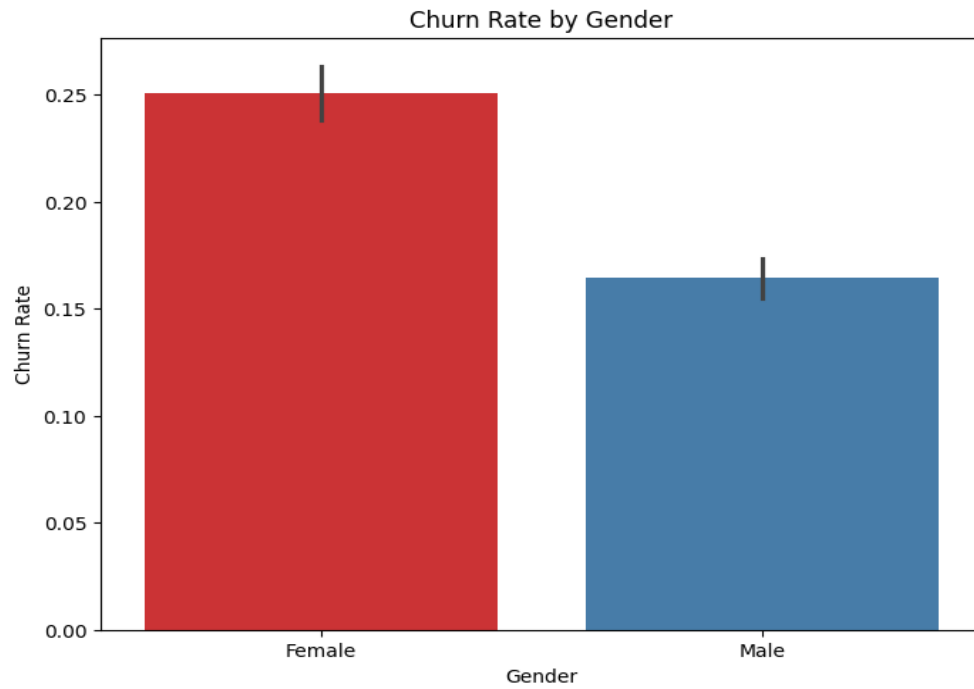


### **Gender:**

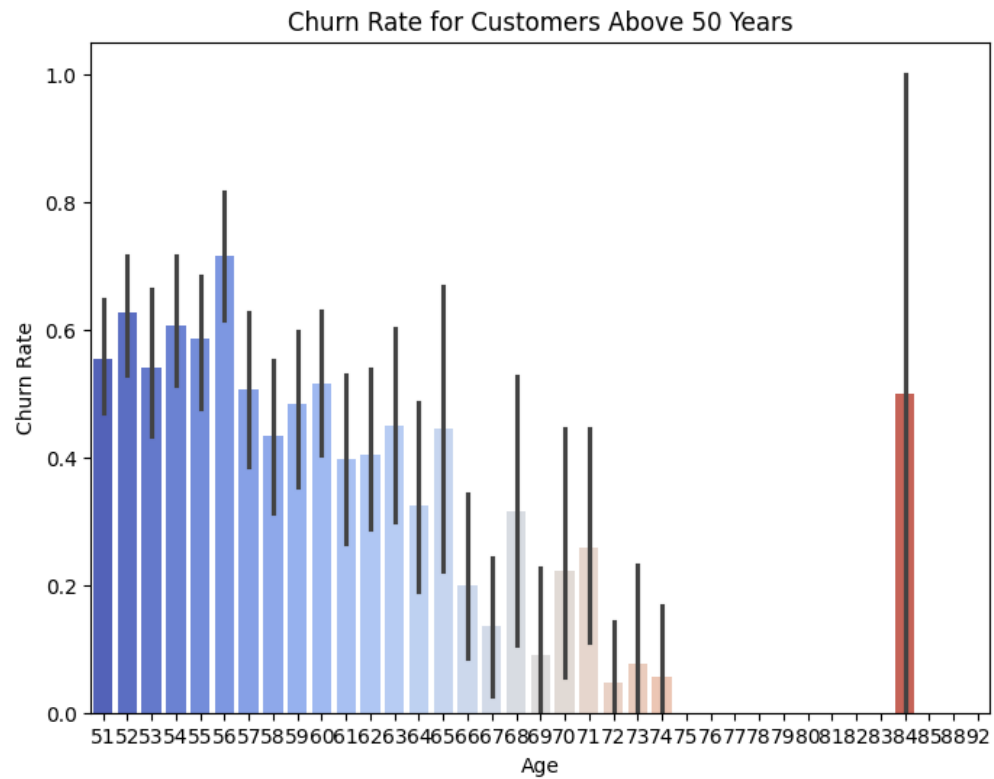
- **There is more Males than females represented in the dataset.**



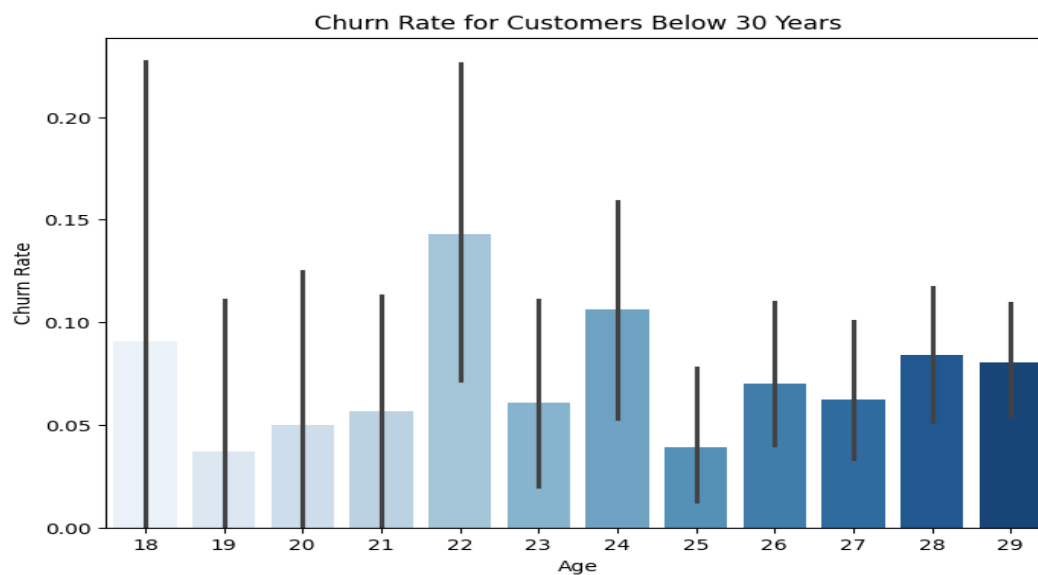
- **Females show a slightly higher churn rate compared to males.**



- **Age:**
  - **Older customers (above 50 years) exhibit a significantly higher churn rate.**



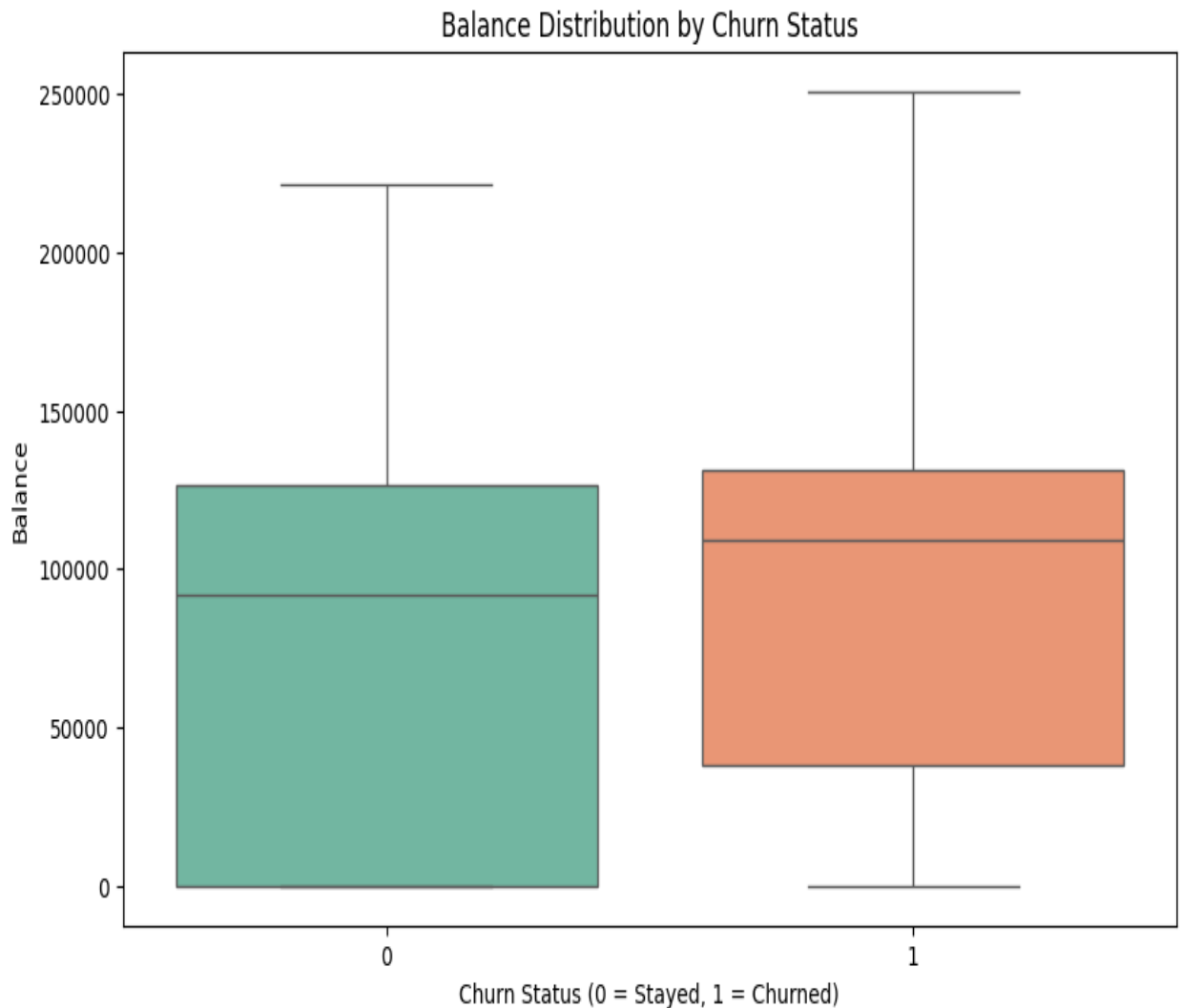
- **Younger customers (below 30 years) are less likely to churn.**



## 2. Churn Rate Patterns

- **Balance:**

- Customers with very high balances are more likely to churn, possibly indicating dissatisfaction despite financial security.

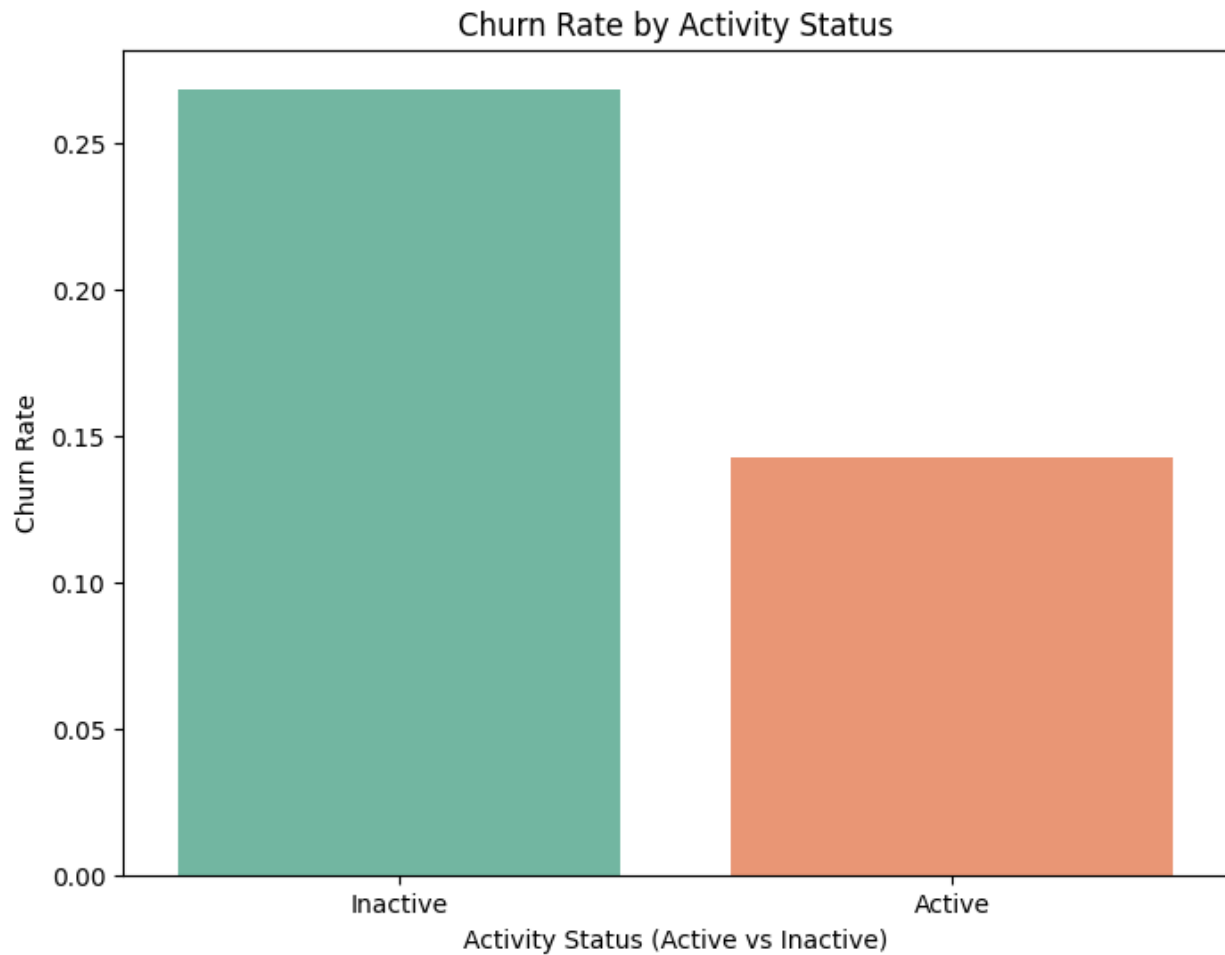


- **Number of Products:**

- Customers with only 1 product are more likely to churn, while those with 3 or more products show a much lower churn rate.

- **Activity Level:**

- Active customers churn less frequently than inactive customers.

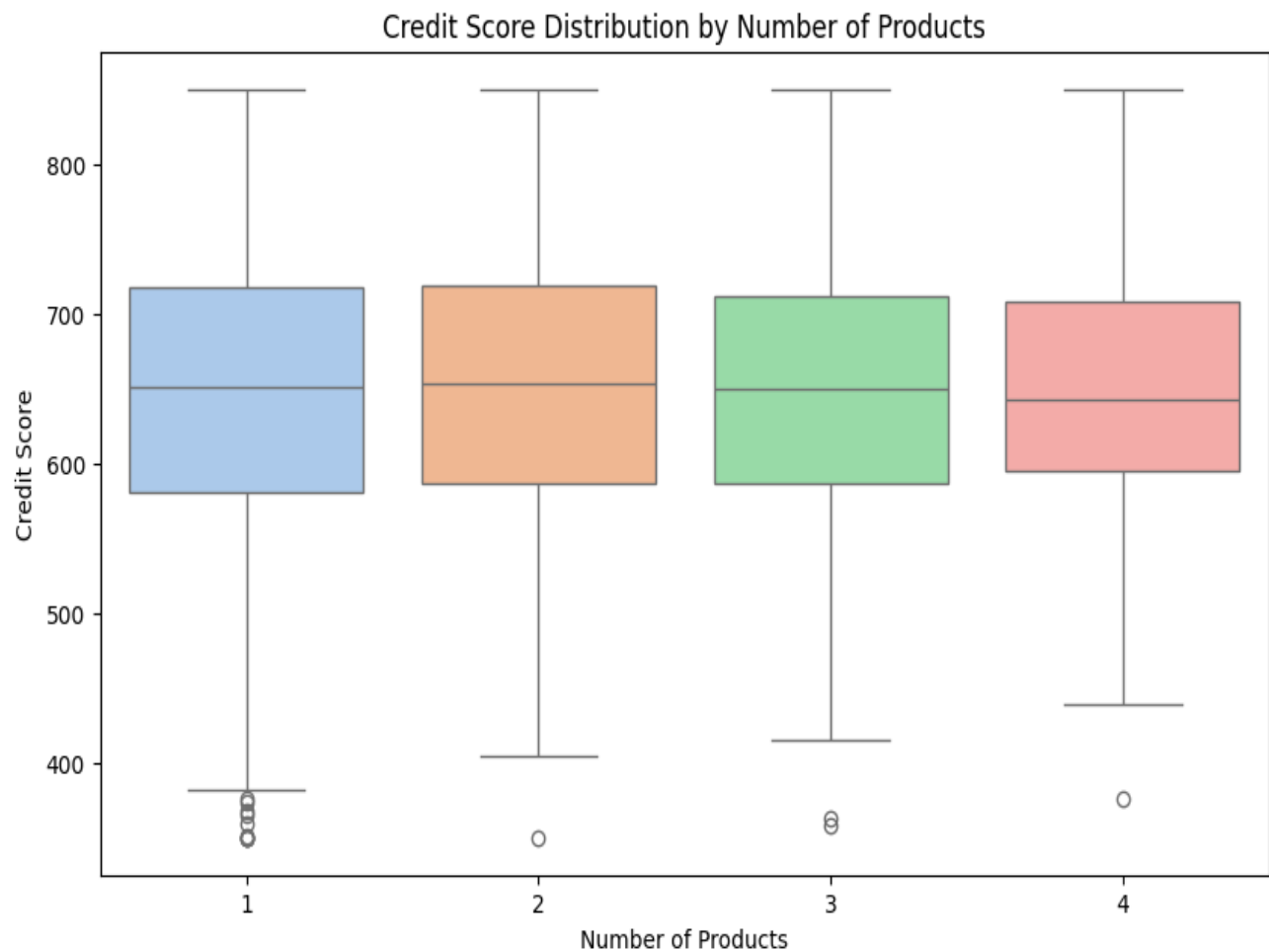


- **Credit Score:**
  - There's no strong correlation between credit score and churn, but customers with very low or very high credit scores have slightly higher churn rates.

### 3. Risk Factors for Customer Churn

- **Geographic Location:**
  - Customers in Germany are at the highest risk.
- **Customer Age:**
  - Older customers, especially those nearing or above retirement age, are more likely to leave.

- **Activity Level:**
  - Inactive customers are at a much higher risk of churn.
- **Product Engagement:**
  - Customers with only one product have a high likelihood of leaving, suggesting lower engagement with the company's offerings.
- **High Balance:**
  - Customers with large account balances may churn despite their financial standing, potentially indicating dissatisfaction with service or unmet expectations.



## 4. Recommendations for Reducing Churn

1. **Target High-Risk Groups:**
  - Focus retention efforts on older customers and those in Germany.



- Implement loyalty programs and personalized engagement strategies for these demographics.
2. **Improve Customer Engagement:**
    - Encourage customers with only 1 product to adopt more products through bundled offers, incentives, or educational campaigns on the benefits of using multiple services.
  3. **Address Inactivity:**
    - For inactive customers, introduce targeted campaigns to re-engage them, such as offering personalized offers, discounts, or check-ins to understand their needs.
  4. **Enhance Customer Experience:**
    - Conduct surveys to understand why customers with high balances or high credit scores churn.
    - Address service gaps or dissatisfaction to retain these valuable customers.
  5. **Geography-Specific Strategies:**
    - Identify reasons for the high churn rate in Germany and tailor marketing or service strategies to meet the specific needs of this region.
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## **Conclusion**

By focusing on the key risk factors such as age, geography, and engagement level, and implementing targeted retention strategies, the company can significantly reduce churn rates and improve customer satisfaction.