



Retaining High Churn-risk Bank Customers

RE6013 Team 10

Ang Wan Qi (U1721634L)
Ma Jiebing (U1722200B)
Justin Peh (U1620687C)
Mark Wei (U1721491K)
Colin Loh (U1721073H)

- 01** **What is Customer Churn?**
- 02** **Why is it important?**
- 03** **How do we define high-risk?**



Customer Churn

Loss of Existing Customers

- % of customers that stopped using our products

Importance of Metric

- Customer Retention Costs (CRC) is typically lower than Customer Acquisition Costs (CAC)
- Reducing customer churn will thus lower overall business costs while maintaining the same volume of Assets Under Management (AUM).



Business Problem / Opportunity Statement

Identify customers who are highly likely to churn and recommend the top personalised remedy action(s) that can make these high-risk customers stay as clients.

Value Distribution of Variables

01

High Net Worth

High net worth individuals
(> \$100,000 estimated
salary)

02

High Retain Rate

About 80% of customers
were retained

03

Location

Most customers are based
in France

04

Number of Products

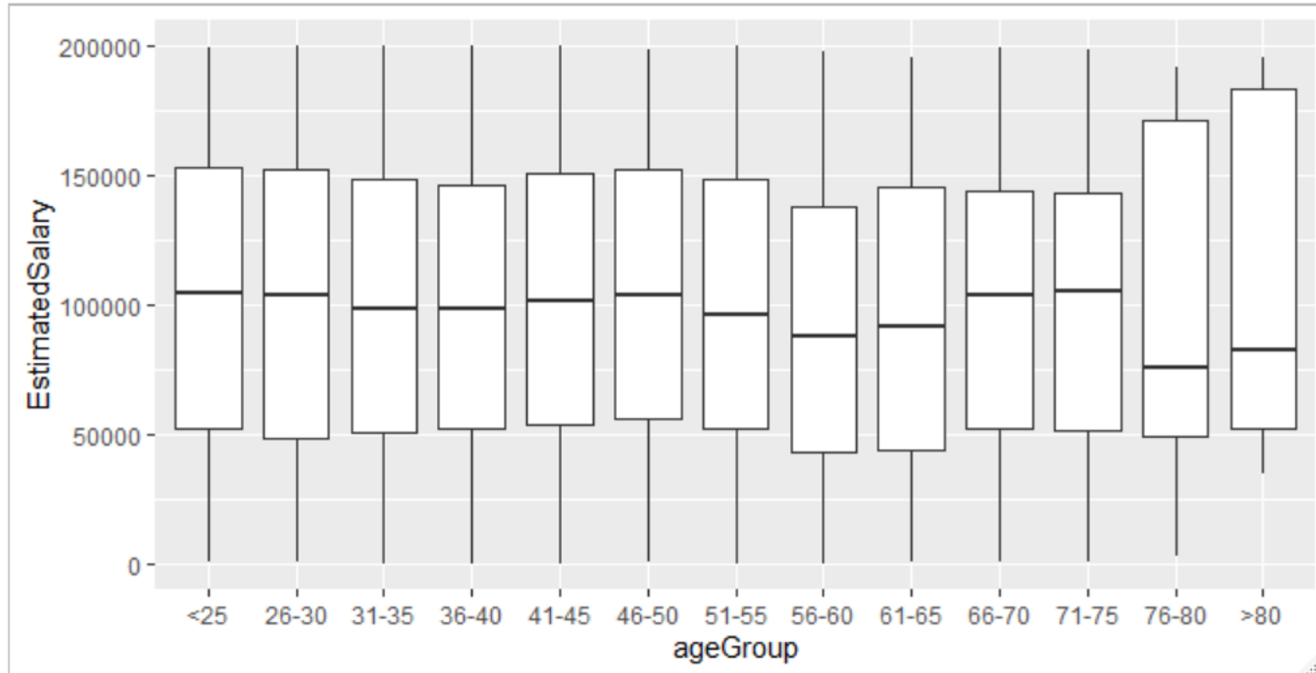
About 97% of customers
use either 1 or 2 products

05

Tenure Duration

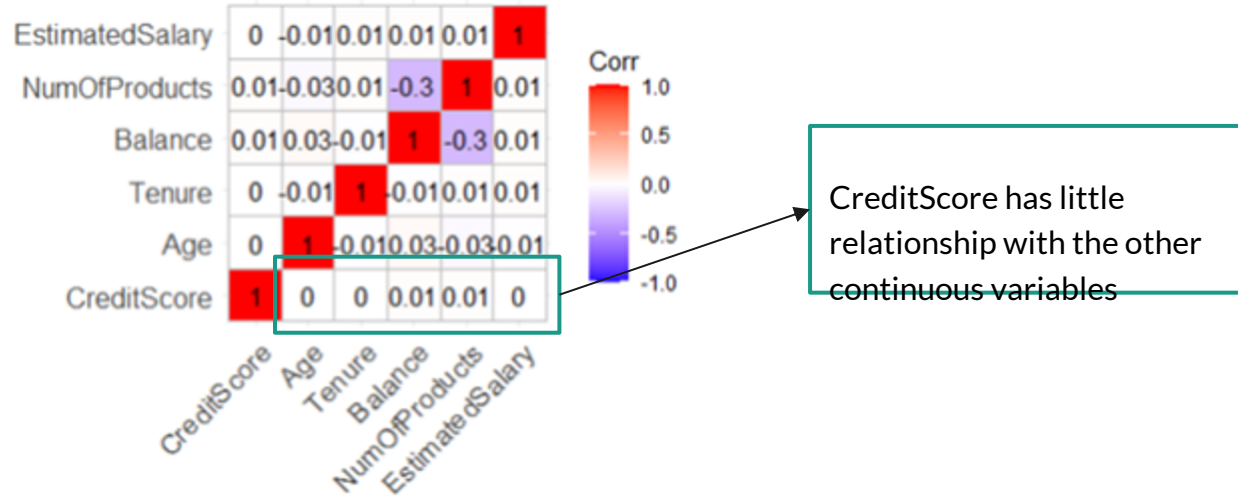
Number of customers for
each tenure duration
evenly distributed.

Estimated salary range of each age group

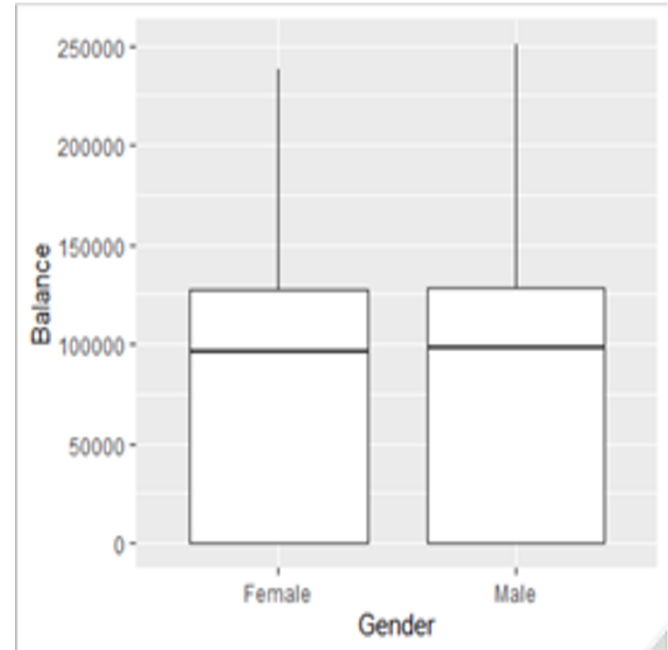
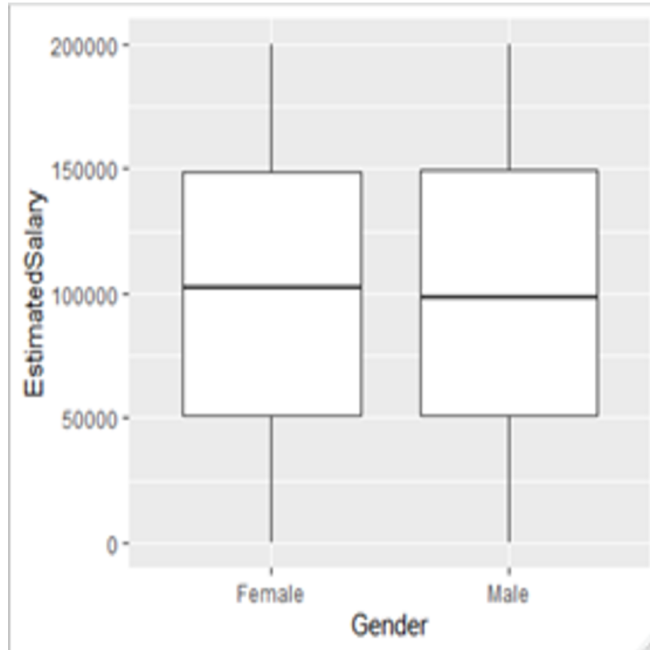


Correlation between variables

Correlation between Continuous Variables

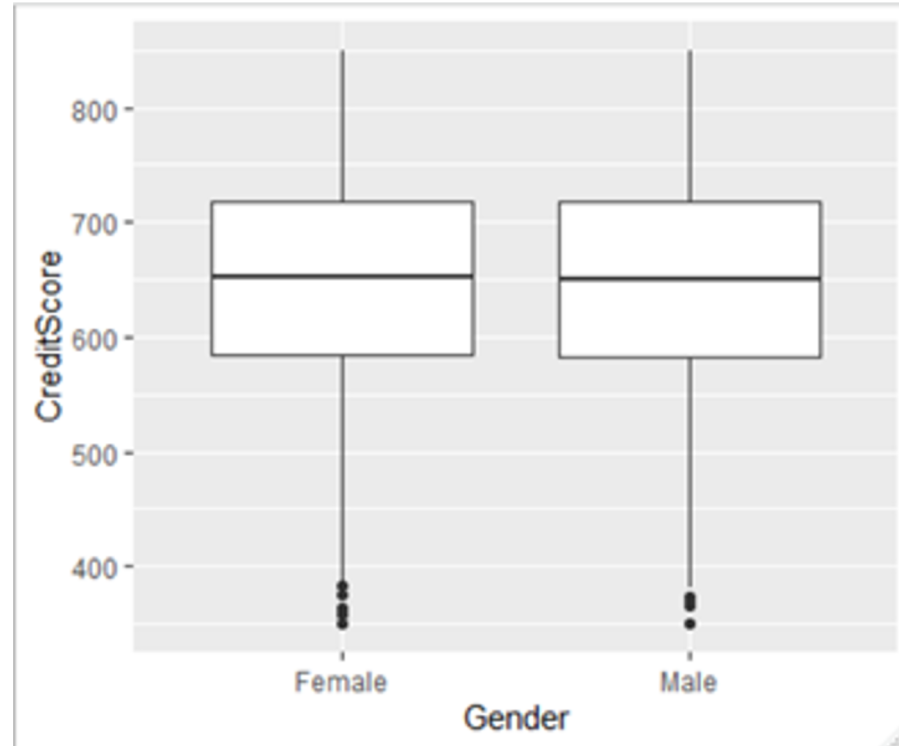


Correlation between Gender, Estimated Salary and Balance



Annual salary and bank balance are similar across both genders

Correlation between Gender and CreditScore



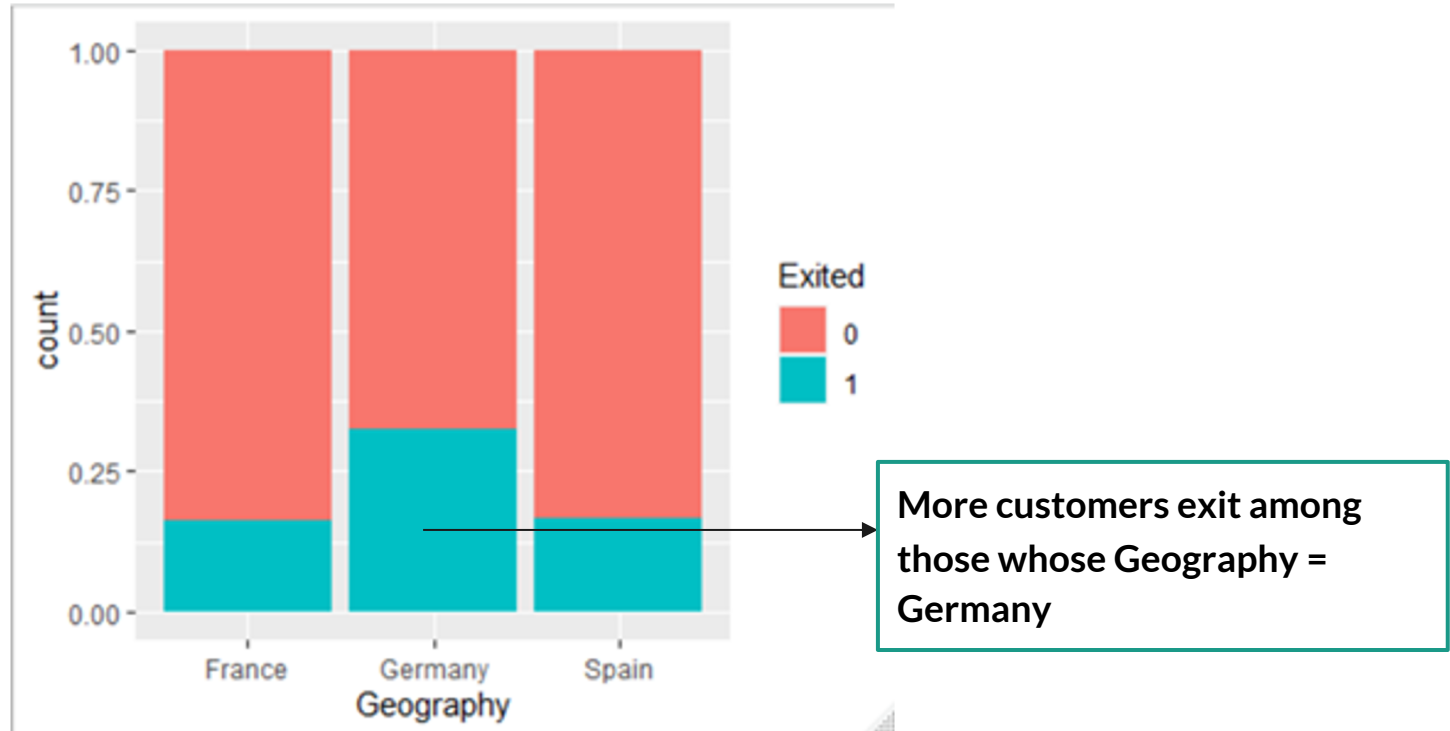
Since salary and bank balances are similar across both genders, creditworthiness should likewise be similar.

Otherwise, it may suggest gender discrimination.

Given these findings, Gender can be regarded as independent from EstimatedSalary, Balance and CreditScore.

Investigating high churn rate in Germany

Disproportionally high churn rate in Germany

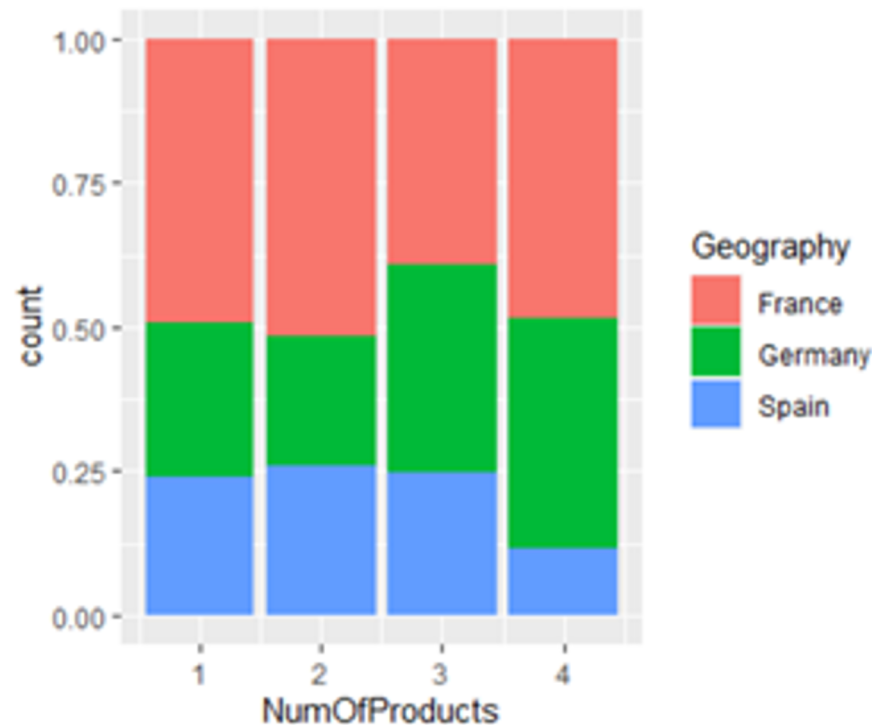


Comparing values distribution between countries



- Histogram plots done for the following variables:
 - Age
 - Balance
 - Tenure
 - CreditScore
 - HasCrCard
 - **NumOfProducts**
- Only **NumOfProducts** show significant deviation

NumOfProducts histogram diagram



Germany-based clients make up 25% of all clients.

Among clients with 3 products, Germany-based clients make up 37%.

Among clients with 4 products, Germany-based clients make up 40%.

Impact of Product Range on Churn

Impact of our Product Range on Churn

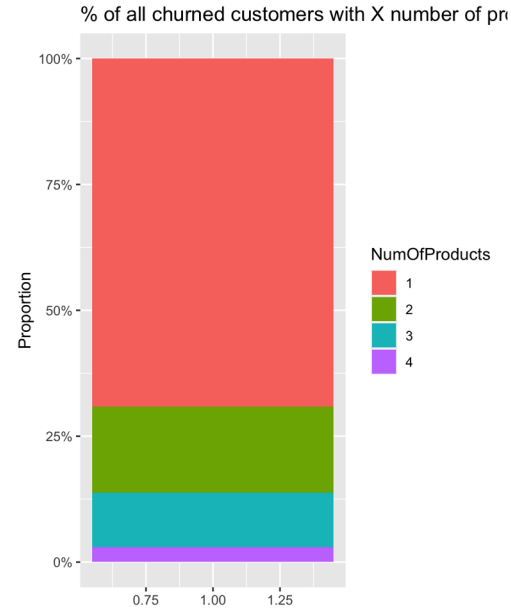
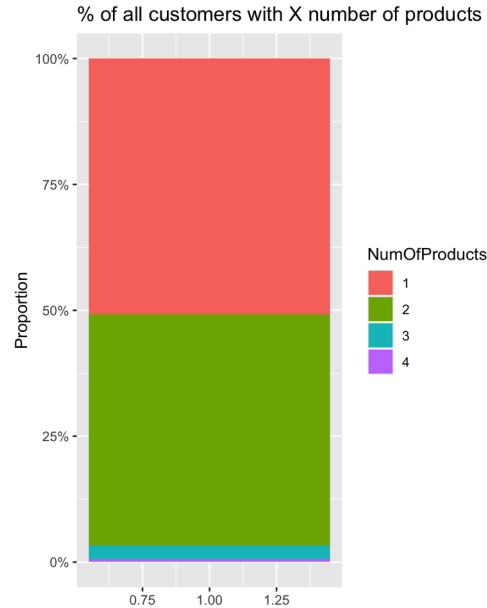
Number of Products Used (NumofProducts)	Customer Count (Total = 10000)
1	5048
2	4590
3	266
4	60

Majority:
1 & 2 products

Impact of our Product Range on Churn

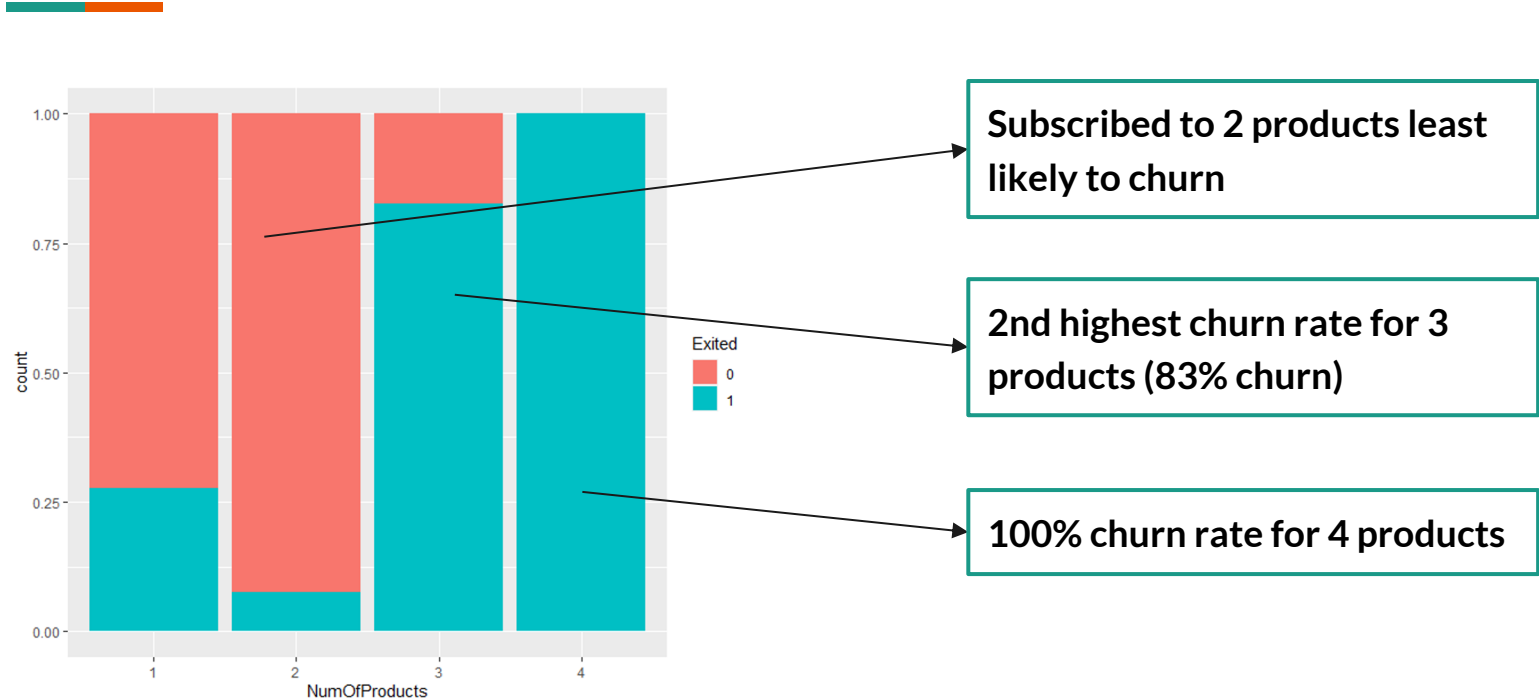


**% of customers
with X number
of products**



**% of all churned
customers with
X number of
products**

Impact of our Product Range on Churn





Assumption about products used by clients

**Most customers
with the same
number of products
are using the same
products.**



Assumptions about products used by clients

01

Most customers with 1 product are using Product A

02

Most customers with 2 product are using Product A and Product B

03

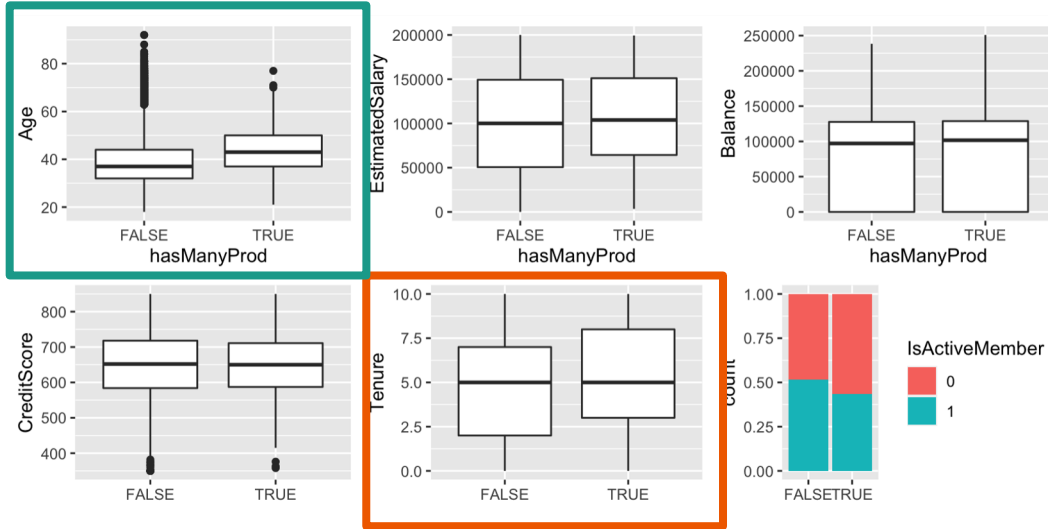
Most customers with 3 or 4 products are using Products A and B, as well as Product C (and D).

Terminology



- **hasManyProducts == TRUE if NumOfProducts ≥ 3**
- **Many-Product-Customers (MPCs): customers where hasManyProducts == TRUE**
- **Few-Product-Customers (FPCs): customers where hasManyProducts == FALSE**

Many- vs Few-Product-Customers



- MPCs are generally older
- MPCs have longer tenures
- Salaries, credit score, balance and proportion of active members are similar

Hypothesis



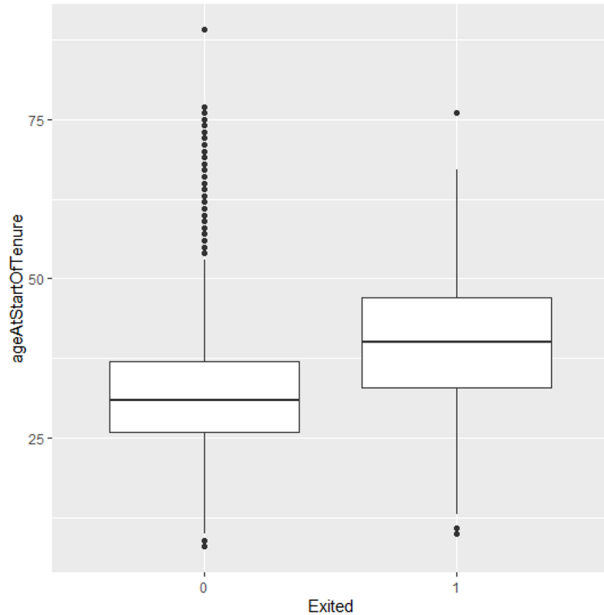
- **MPCs who take up Product C and D found them unable to satisfy their financial needs --> churn**
- **There are FPCs who took up C and D (rather than A and B) --> equally unsatisfied --> churn**

Testing our hypothesis



- Created new variable: ageAtStartOfTenure (derived using Age-Tenure)
- Represents age of customer when he/she first joined the bank

Single-Product Customers



- Single-product customers who churned tended to start their tenure when they are older (mean = 40 years old) than those who remained (mean = 32 years old)
- Similar to age distribution of MPCs (mean = 38.6 years old)

Proposed theories to explain churn

Possible theories



- **Single product churners who started their tenure late are actively comparing between banks for offerings similar to Product C or D**
- **Higher flight risk due to intense comparison and/or Product C is inadequate by industry standards**

Possible theories



- Product A and B are likely saving/checking accounts and bank loans --> lower customer expectations --> less dissatisfaction --> less churn
- Product C and D are niche products, likely retirement plans --> more urgent financial needs --> higher expectations --> more dissatisfaction --> higher churn

Impact of Customers' Financial Habit on Churn

Impact of Customers' Financial Habits on Churn



hasManyProd	meanSavingToSalaryRatio
FALSE	0.8680552
TRUE	0.3552866

hasManyProd	meanDepositRate
FALSE	18776.66
TRUE	17373.45

Exited	meanSavingToSalaryRatio
1	1.9466603
0	0.5711469

Exited	meanDepositRate
1	22732.25
0	17707.34

No conclusive relationship between a customer's financial habits and their propensity to churn.

Predicting Churn

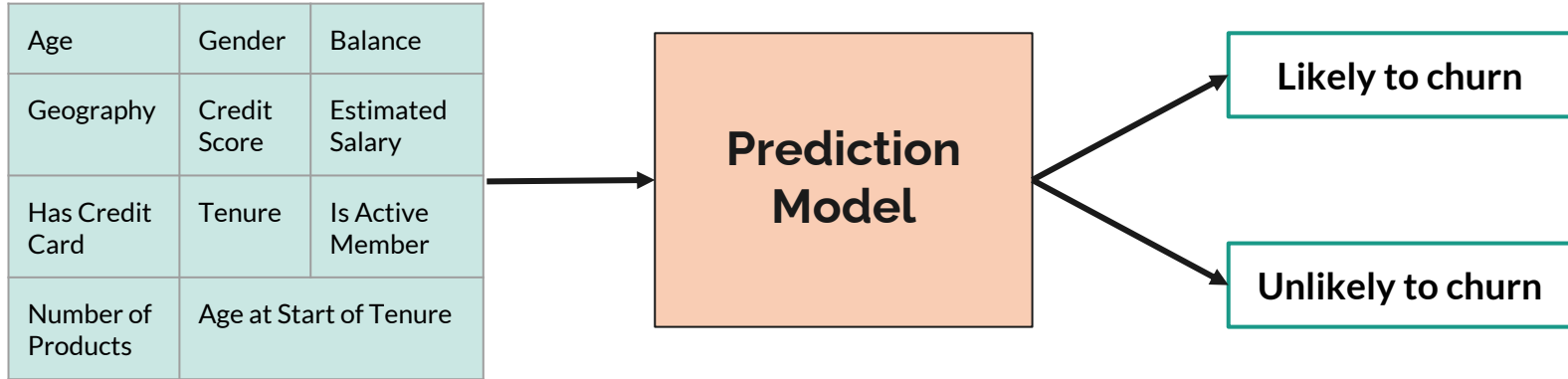
How do we predict customer churn?



**Logistic
Regression**

CART

Variables Used in Prediction



Results for Logistics Regression

Confusion Matrix

n = 3000	Predicted: 0 - Not Exited	Predicted: 1 - Exited
Actual: 0 - Not Exited	2317	72
Actual: 1 - Exited	376	235

Metric	Value
Precision	$235 / (72 + 235) = 235 / 307 = 0.7654$
Prevalence	$(376 + 235) / 3000 = 611 / 3000 = 0.2037$
Accuracy	$(2317 + 235) / 3000 = 2552 / 3000 = 0.8507$
Misclassification Error	$(72 + 376) / 3000 = 448 / 3000 = 0.1493$

Results for CART




Confusion Matrix

	Predicted 0 (Not Exited)	Predicted 1 (Exited)
Actual 0 (Not Exited)	2317	72
Actual 1 (Exited)	357	254

Testset Accuracy

85.7%



Which factors have more impact on Customer Churn?

- 01 Age of Customer
- 02 Number of Products
- 03 Age at Start of Tenure

Remedy Recommendation

Proposed Remedies



- Target marketing efforts towards prospects between 18 to 43 years old
- Improve their offerings that are targeted at clients who are > 40 years old
 - E.g. packaging such products with better deals
- Lower priority remedy:
 - Close down Germany-based branches and consolidate in France
 - Or improve banking services in those branches

Thank you!
