**Data Glacier**

Your Deep Learning Partner

# Cross Selling Recommendation

Virtual Internship

15-May-2021

Group Name : LISP-Data-Analysts

Members: Lauro Ribeiro, Buse Gungor , Lasisi Salmah

# Background – Cross Selling Recommendation case study

- XYZ credit union in Latin America is performing very well in selling the Banking products (eg: Credit card, deposit account, retirement account, safe deposit box etc.) but their existing customer is not buying more than 1 product which means bank is not performing good in cross selling (Bank is not able to sell their other offerings to existing customer).

- Objective : Need to inspect the data and suggest what action bank can take to increase cross selling without using ML

The analysis has been divided into four parts:

- Data Understanding

- Recommendations for cross selling

# Data Exploration

- Train dataset was used for analysis.
- 48 Features
- Timeframe of the data:  2015-01-28 to 2016-05-28
- Total data points :13,647,309

train.csv

test.csv

All data
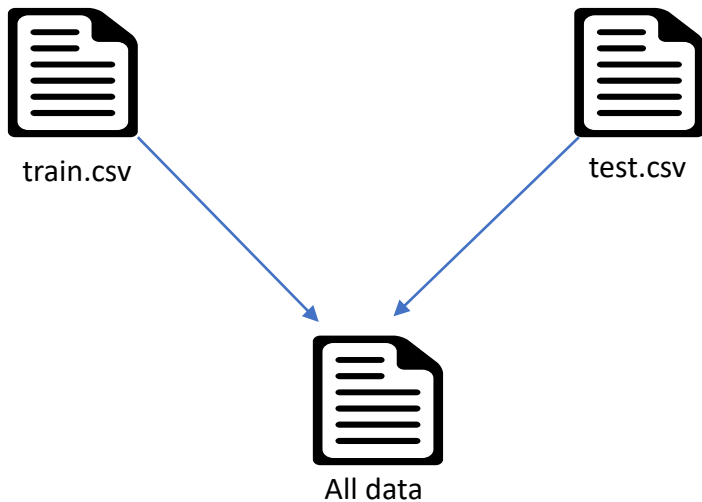
- We faced Null values in some columns.

- There are unused Products Columns that we got rid of them.

- There are outliers in the Age column which led us to further analyse it.

# Dispersion of Age



Dispersion of Age
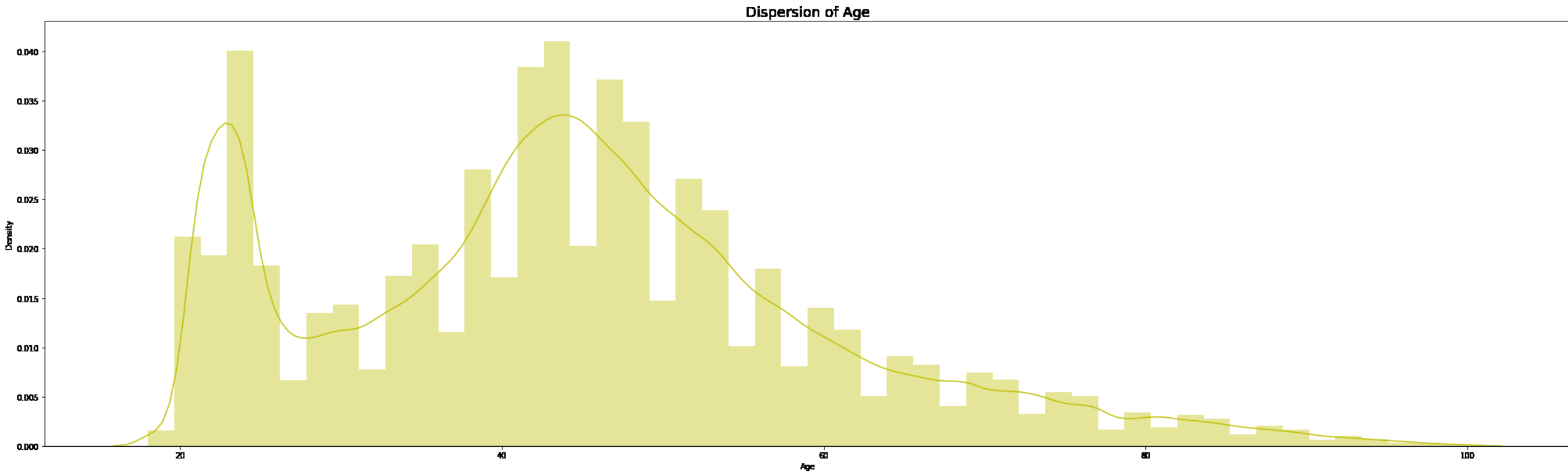
It has been observed that the bank's customers are concentrated in two points. In his twenties and forties. Also, outlier observations should be resolved.

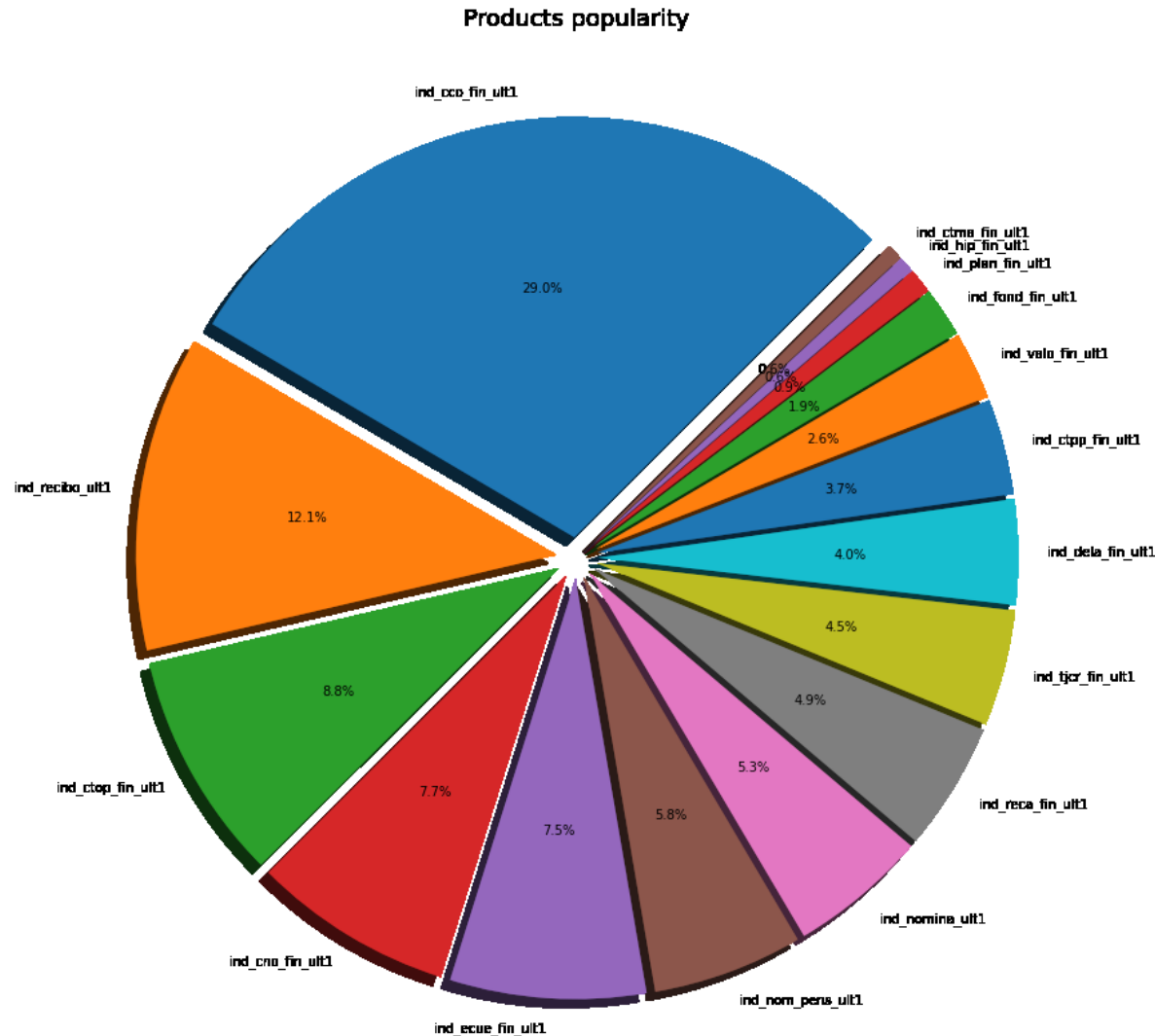# Number of Products by Age


Number of products by age
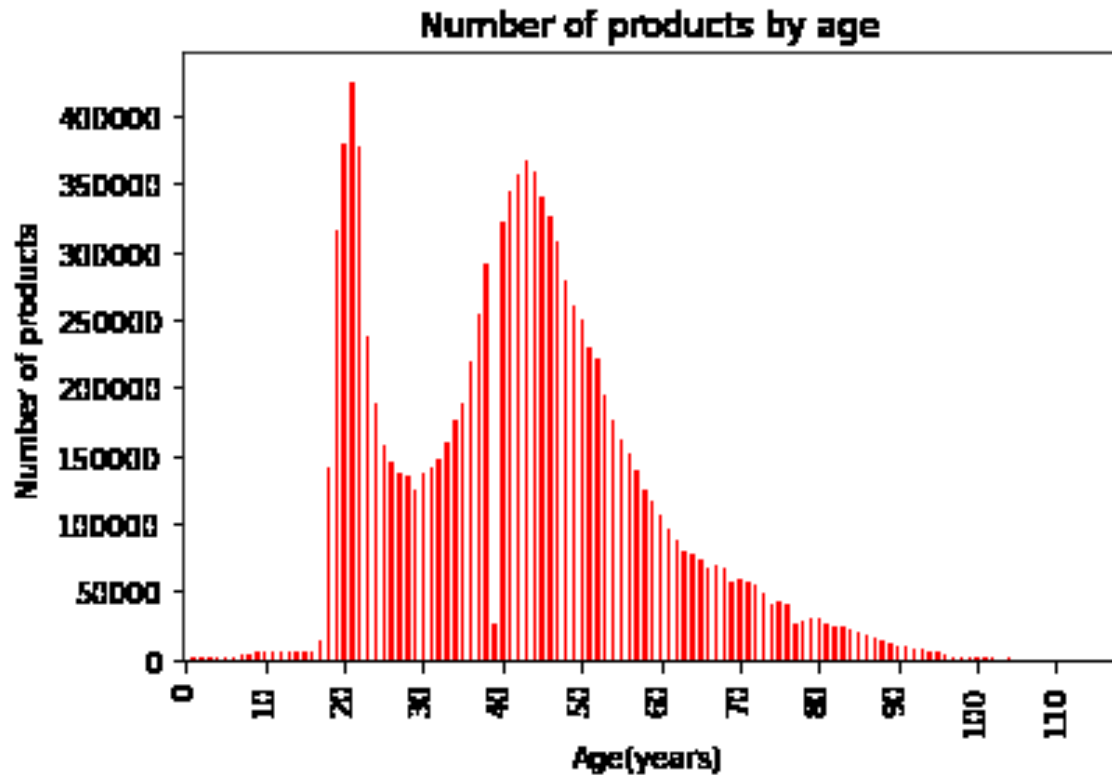
As we see bimodal distribution with most of the products used by middle aged customers between 35 and 55 years old, followed by young customers in their twentieths.

# Customers Age Distribution of Different Products



Customers age distribution of different products

Legend:
- [0.0, 20.0)
- [20.0, 40.0)
- [40.0, 60.0)
- [60.0, 80.0)
- [80.0, 100.0)
- [100.0, inf)
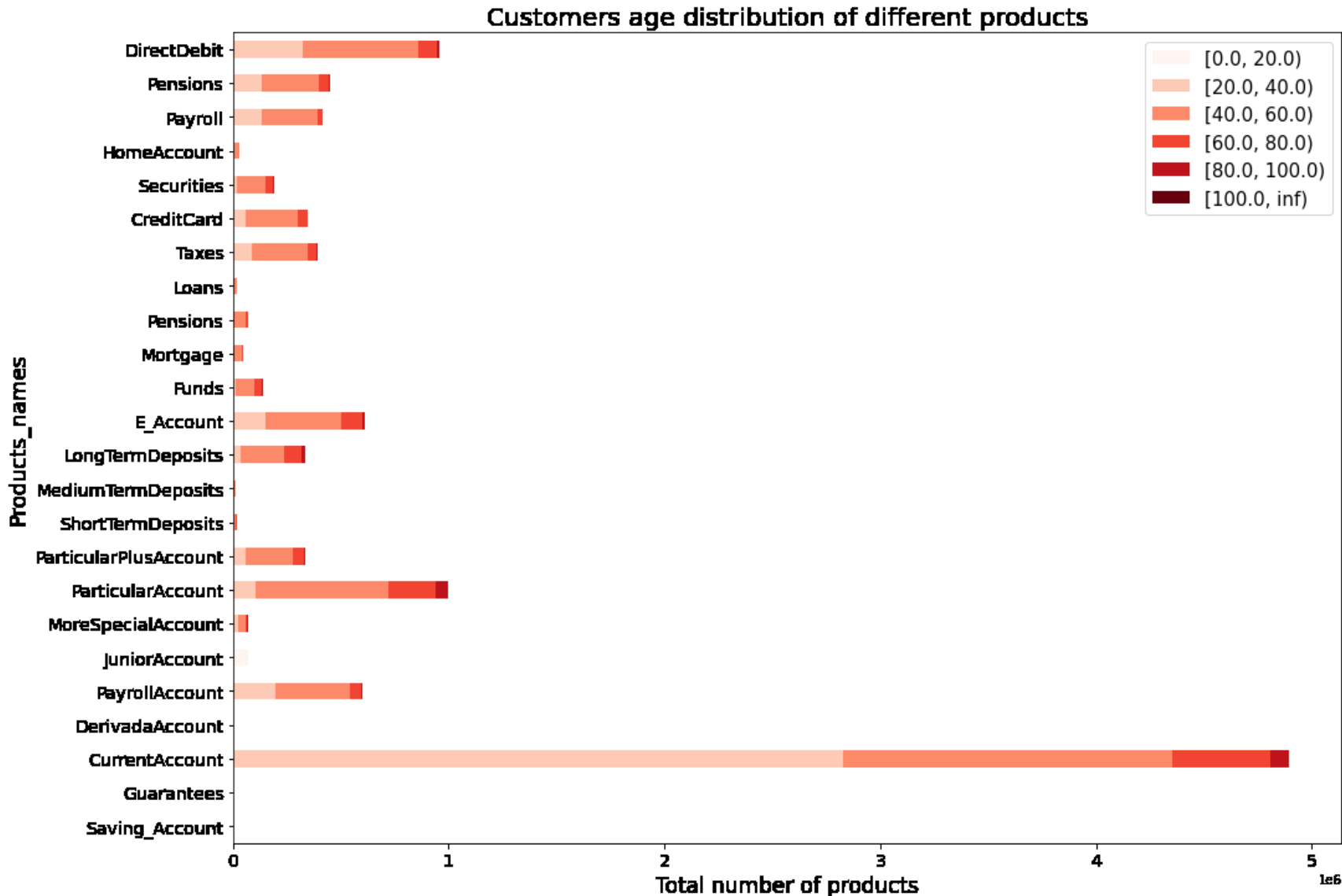
It has been observed which products have the most age groups. As it is known, the 5 most purchased products: Current Accounts, Direct Debits, Particular Accounts, Payroll Accounts, E-Accounts. Looking at the age groups, while 20-40 years old have the most Current Accounts, customers between the ages of 40-60 constitute the majority in all other products.
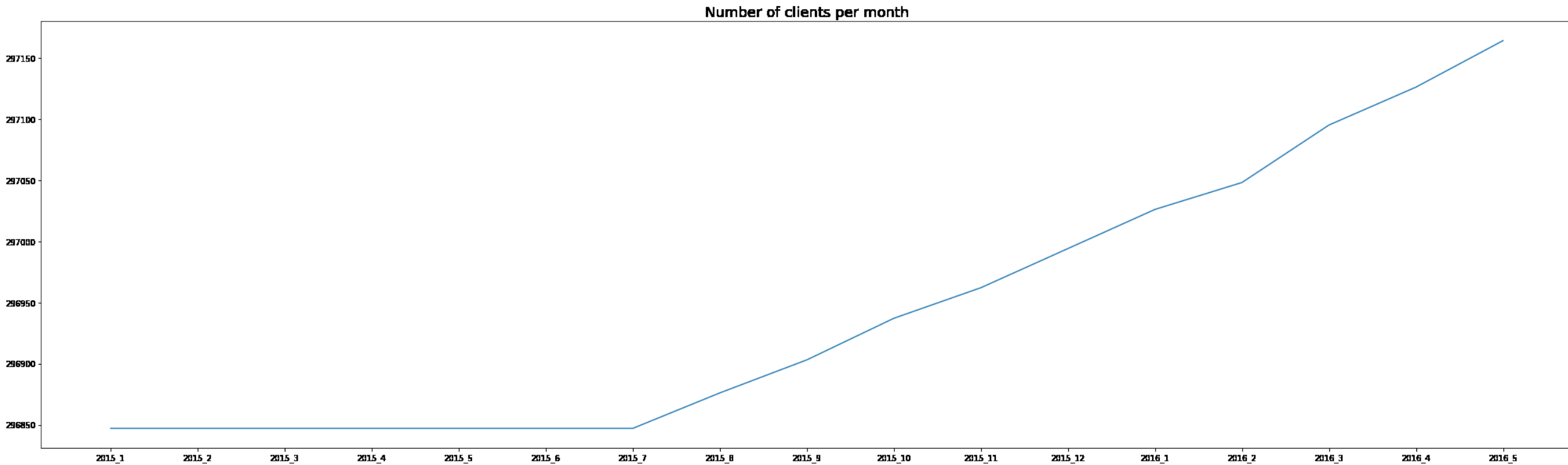
# Profit Popularity



Products popularity

**T  he top 5   products are:**
- Current Accounts : 29%
- Direct Debits: 12.1%
- Particular Accounts: 8.8%
- Payroll Accounts: 7.7%
- E- Accounts: 7.5%

# Number of Clients per Month
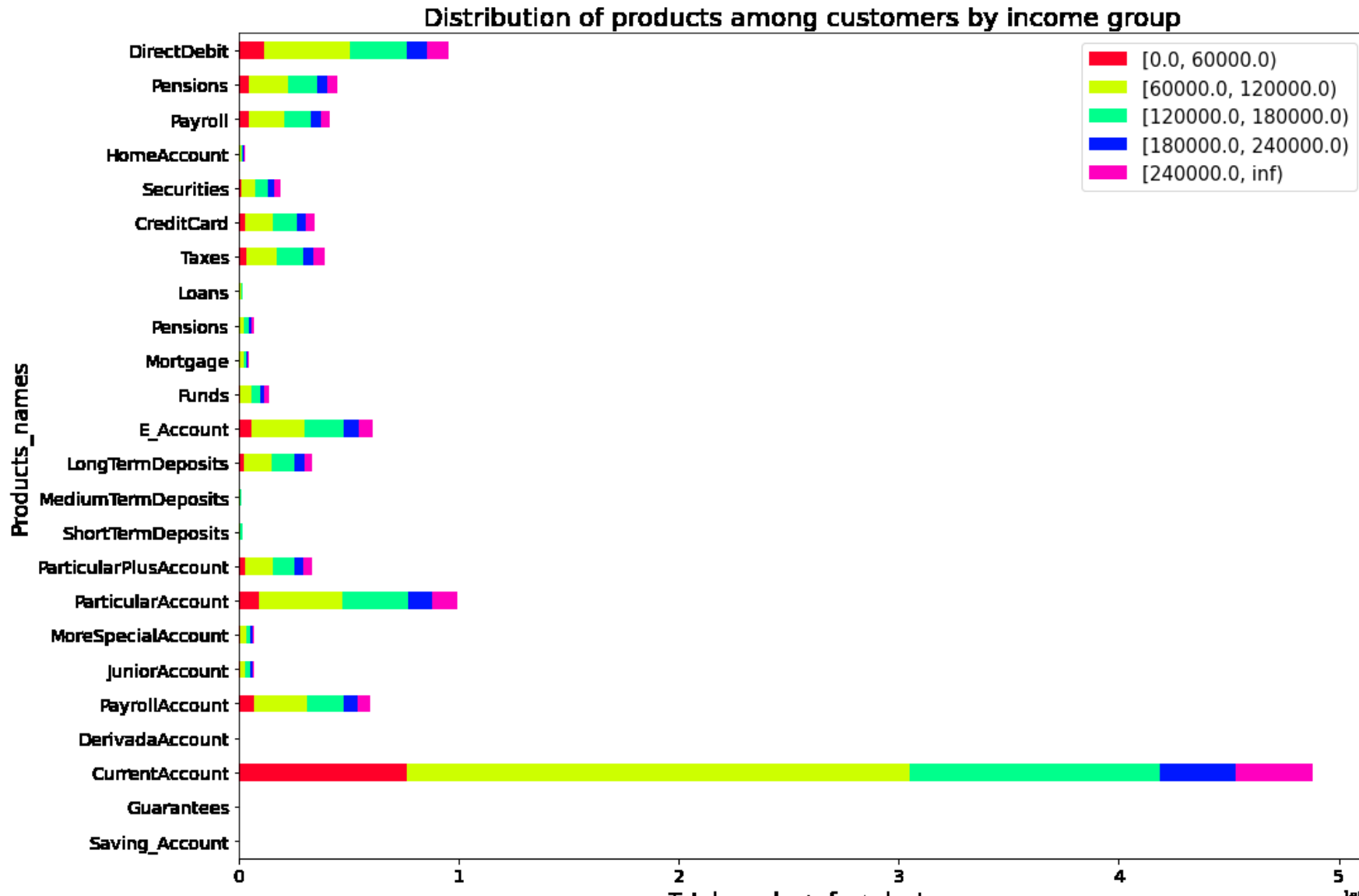


Number of clients per month
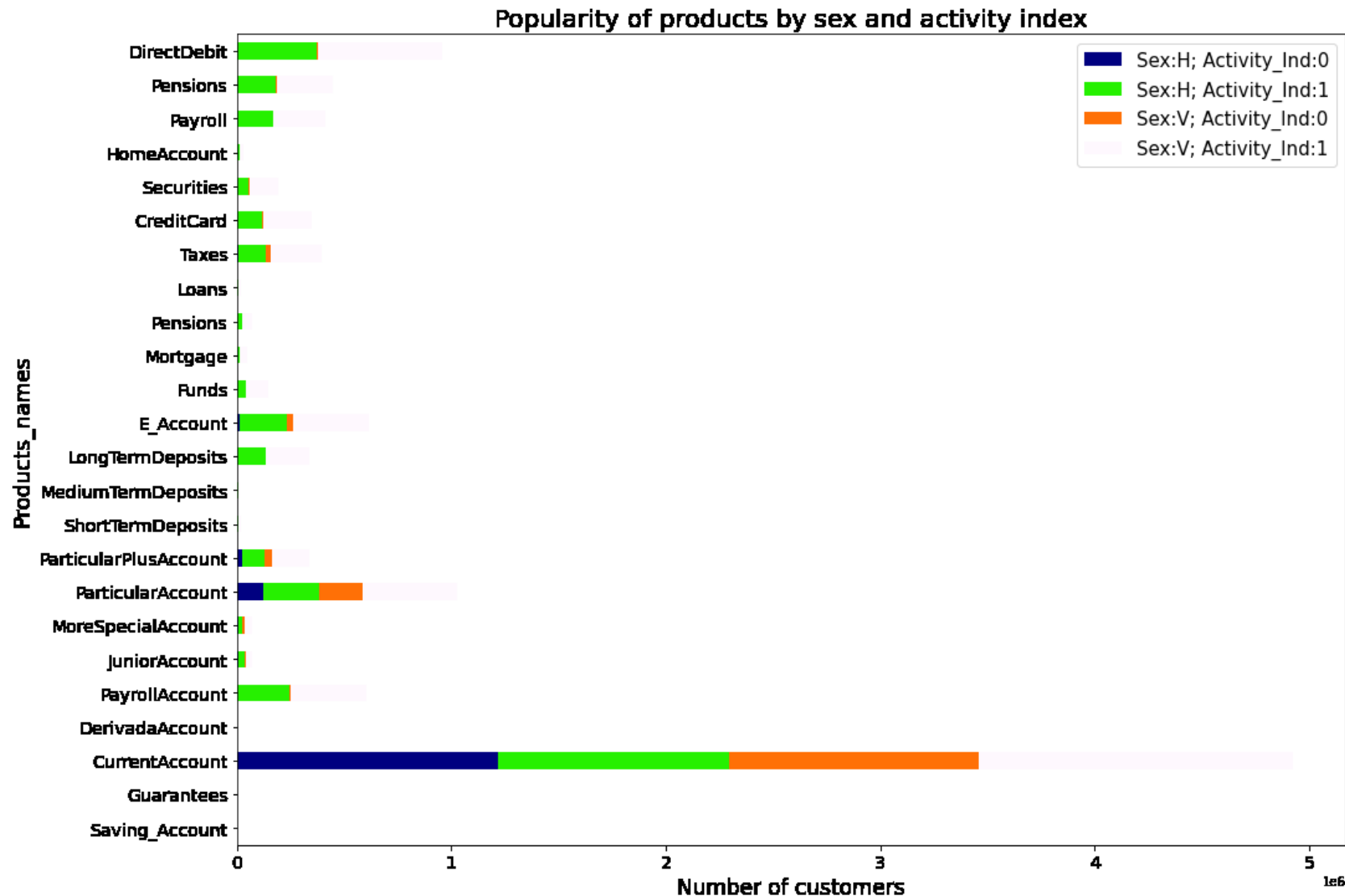
After July 2015, the bank had an exponentially growth

Distribution of products among customers by income group

The most used service is Current Account which individuals with income between 60,000 and 120,000 per year are the biggest group, they represent the professionals.

# Popularity of Products by Sex and Activity Index



Popularity of products by sex and activity index

Legend:
- Sex:H; Activity_Ind:0
- Sex:H; Activity_Ind:1
- Sex:V; Activity_Ind:0
- Sex:V; Activity_Ind:1

Products_names (y-axis): DirectDebit, Pensions, Payroll, HomeAccount, Securities, CreditCard, Taxes, Loans, Pensions, Mortgage, Funds, E_Account, LongTermDeposits, MediumTermDeposits, ShortTermDeposits, ParticularPlusAccount, ParticularAccount, MoreSpecialAccount, JuniorAccount, PayrollAccount, DerivadaAccount, CurrentAccount, Guarantees, Saving_Account

Number of customers (x-axis): 0, 1, 2, 3, 4, 5 (1e6)

Most of the customers used only one product which is the current account.

# Channels Used by The Customers to Join and Associated Product Uses



Channels used by the customers to join and associated product uses
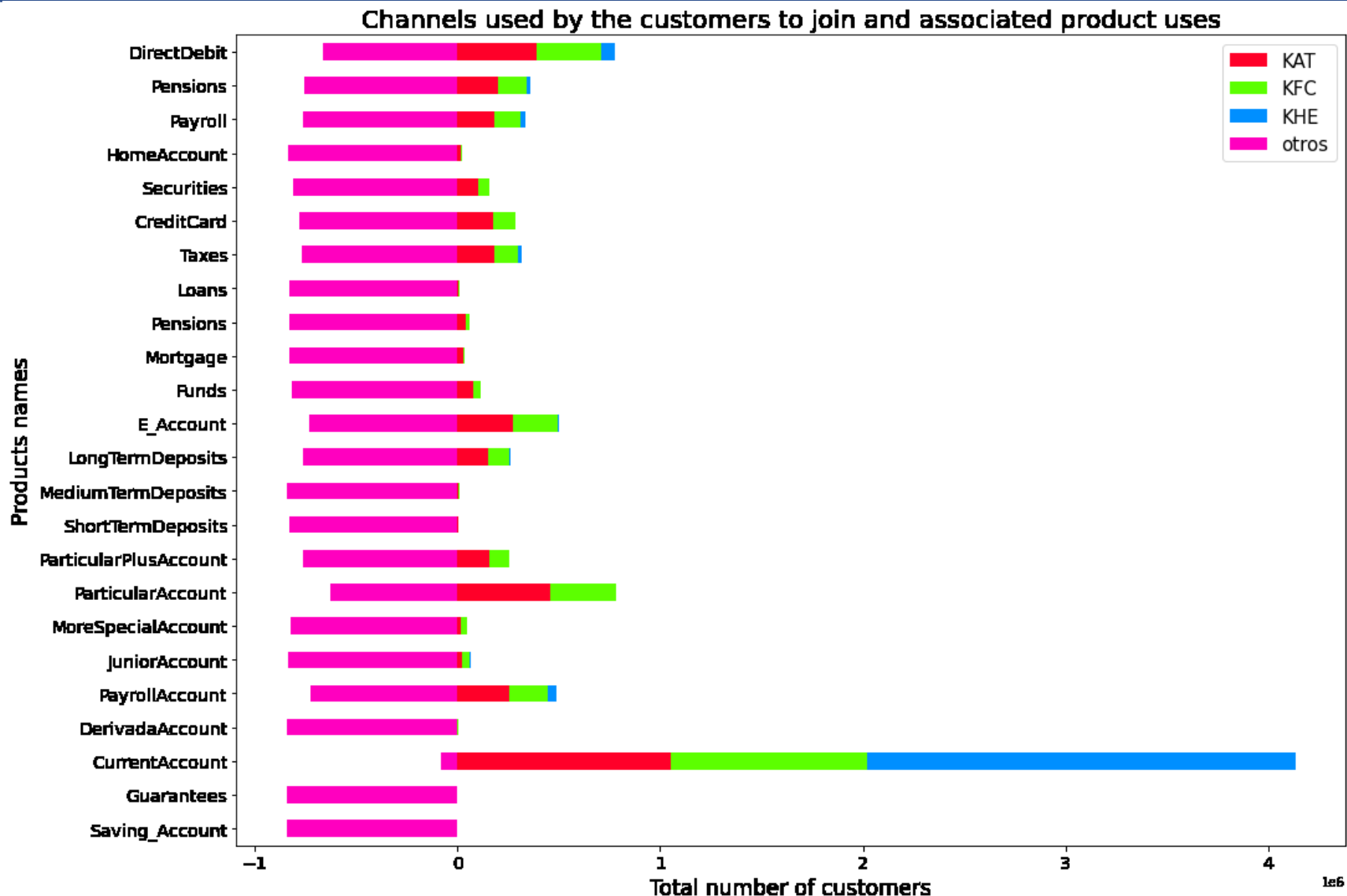
The majority of customers have joined through three major channels. When channels used by the customers were filtered, the most used channels were determined and then it was determined which products used which channels.

# Recommendations

- Since the data given to us belong to old dates, with the emergence of Covid, we can expect an increase or advertise for E-account, especially between the ages of 20-40.
- An increase in credit cards can be seen as the purchasing power of people decreases with increasing unemployment and poverty.
- The communication channels must vary during this time, to reach more people as we are more on-line nowadays.
- Better Policies implementations for debit card, online banking, mobile banking, direct deposit, bill pay, automatic savings transfer, personal line of credit and security solutions such as privacy protection.
- Understand customer`s segments and age based on their most used services.
- In a period where women's initiatives and gender equality are emphasized, their contribution can be increased by drawing appropriate images.
- In addition, "Junior Count" can be recommended to the age of 0-20, as is known, agreements can be made with social media such as E-games, Netflix, Spotify.
- For the 20-40 age group, "Saving account" can be recommended for their future investments after starting work.

We created a Dashboard to Simplify our Recommendations:
https://public.tableau.com/profile/lauro.cesar.ribeiro#!/vizhome/SantanderBankCustomerAnalysis_16209233059500/Insights

Thank You