Term Deposit Case Study
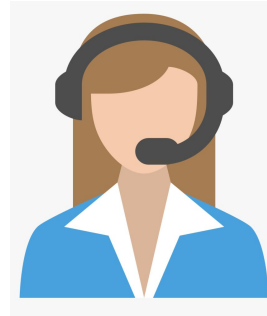
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The Scenario

The bank usually has valuable direct marketing campaigns, via phone, and usually it is more than one call to assess if a customer will subscribe to a term deposit or not
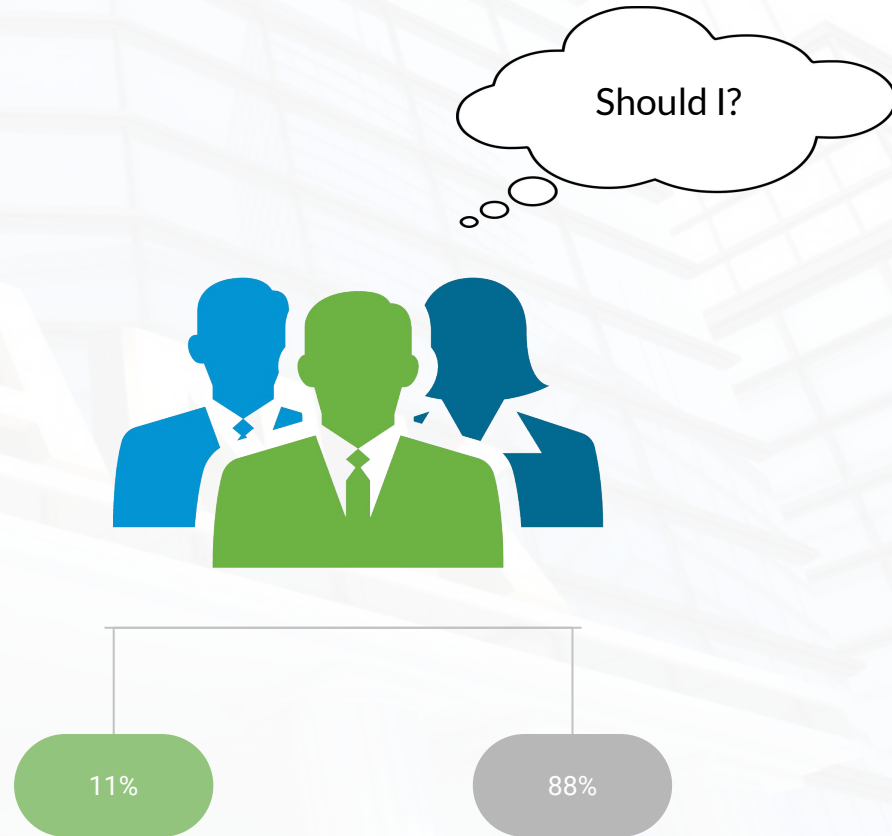
Customer Service

Customers

The Scenario

Usually, the outcome of the campaigns results in **11%** of customers to proceed with a term subscription, while other customers don't.
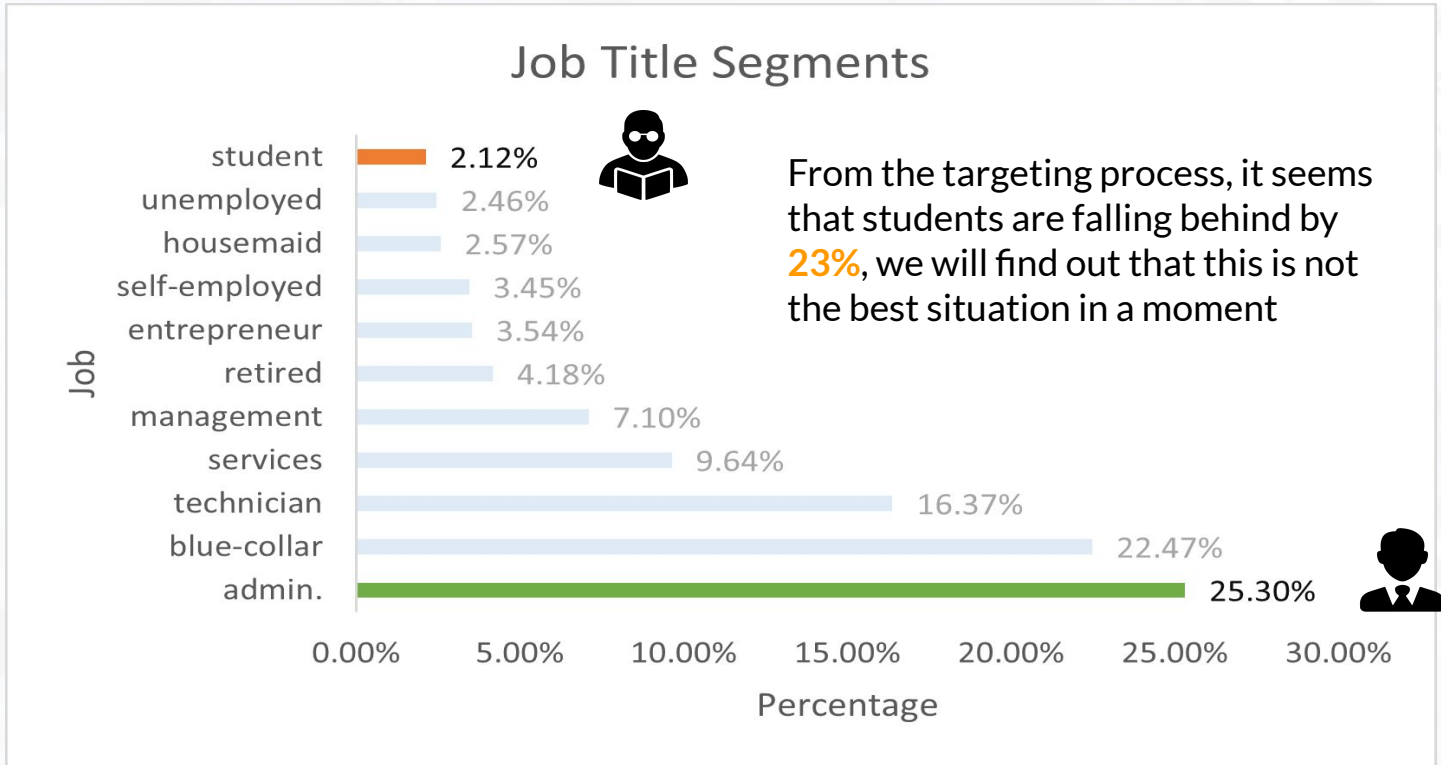
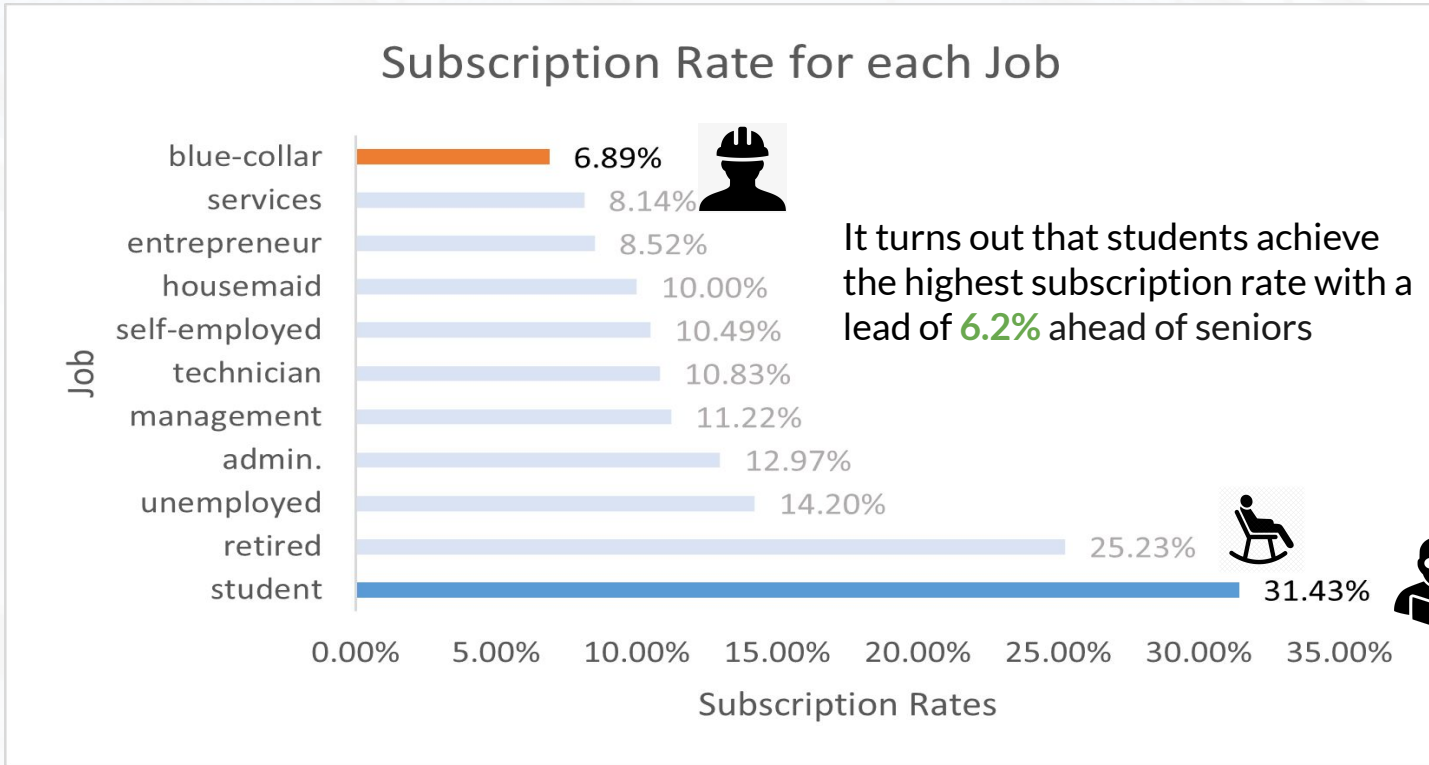In the next slides we will find out key factors.

Should I?

11%

88%

Key Factors for Subscription Rate

Targeted Jobs

Job Title Segments

Job	Percentage
student	2.12%
unemployed	2.46%
housemaid	2.57%
self-employed	3.45%
entrepreneur	3.54%
retired	4.18%
management	7.10%
services	9.64%
technician	16.37%
blue-collar	22.47%
admin.	25.30%

From the targeting process, it seems that students are falling behind by **23%**, we will find out that this is not the best situation in a moment

Actual Subscription Rates

Subscription Rate for each Job

It turns out that students achieve the highest subscription rate with a lead of **6.2%** ahead of seniors

blue-collar 6.89%
services 8.14%
entrepreneur 8.52%
housemaid 10.00%
self-employed 10.49%
technician 10.83%
management 11.22%
admin. 12.97%
unemployed 14.20%
retired 25.23%
student 31.43%

Subscription and Employment Rates Across Time


Subscription Rate and Employment Rate W.R.T Time
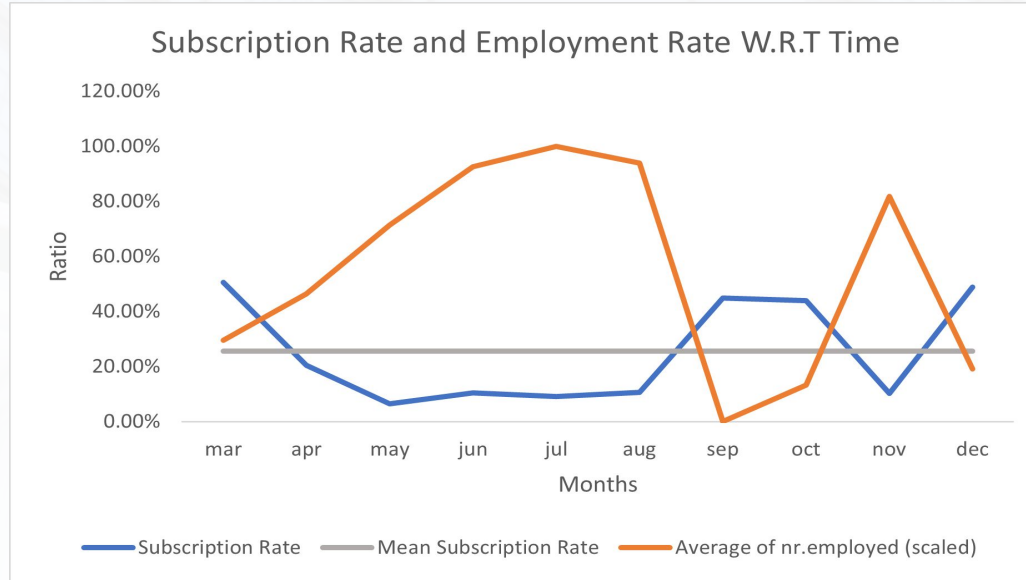
It turns out that the subscription rate varies from month to month, with peaks in **March, September and December**, and troughs in **May, August and November**, with an average of **25%,** it also looks like there can be a strong negative relationship between Subscription and Employment Rates

Single Customers are more likely to Subscribe
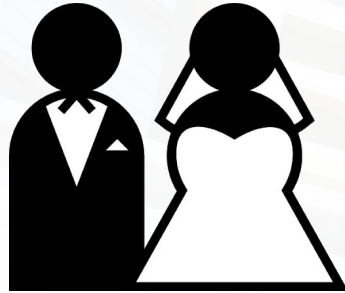
10%

14%

Comparing the marital status, it appears that single people are **more likely** to subscribe a term deposit than married people, maybe we can offer term deposits to married customers where they can have loans to buy apartments or cars
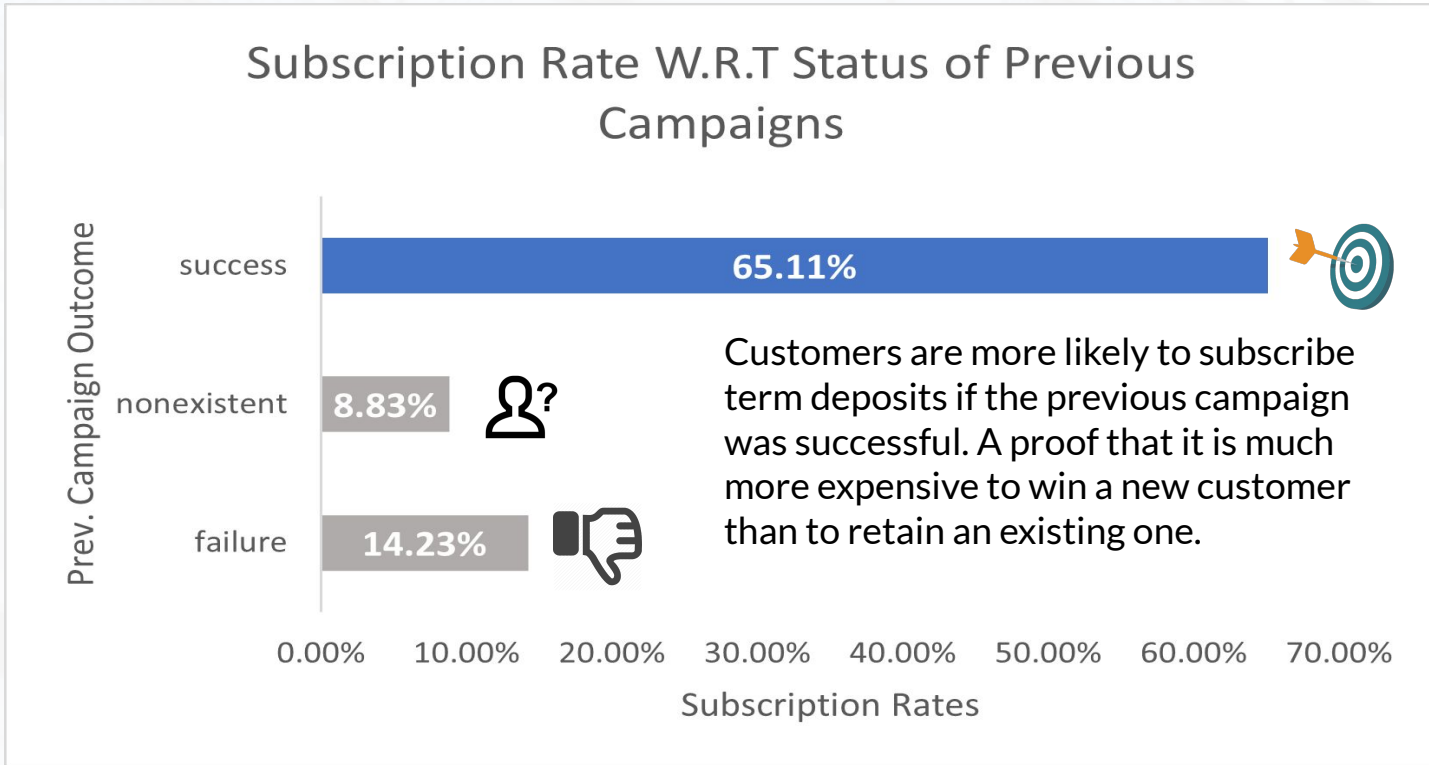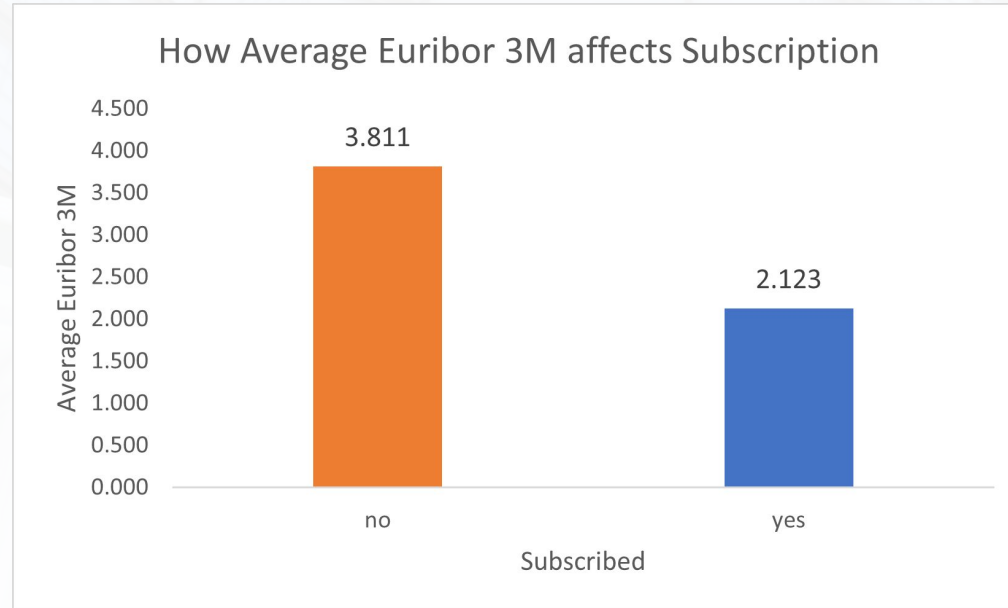
Customers Called via Cellular

5%

14%

People who are called via cellular phones are **more likely** to subscribe than people who are called via telephones, we need more data to assess the quality of calls via telephone.

What Happened in the Previous Campaign

Subscription Rate W.R.T Status of Previous Campaigns

success — **65.11%**

nonexistent — **8.83%**

failure — **14.23%**

Prev. Campaign Outcome

Subscription Rates

0.00% 10.00% 20.00% 30.00% 40.00% 50.00% 60.00% 70.00%

Customers are more likely to subscribe term deposits if the previous campaign was successful. A proof that it is much more expensive to win a new customer than to retain an existing one.
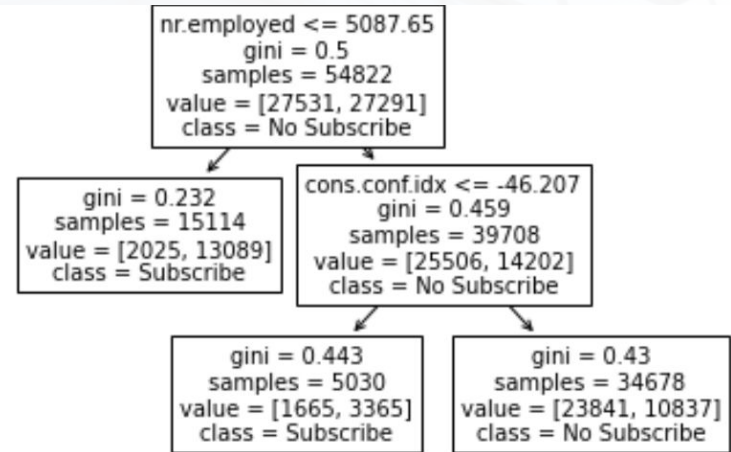
Average Interest Rate (Central Bank)

Average Euribor 3M can affect the decision to subscribe or not, as there is much more interest, on the decision **not to subscribe.**

A Decision Tree to Predict Subscription

The Decision Tree

- Easy to interpret, rule based model.
- Feature importances can be retained, as we will see later.
- Achieved good results on test data.

Model Performance

- For this model we have chosen 4 metrics:
  - Accuracy.
  - Precision.
  - Recall.
  - F1 Score.
- For this problem Precision is very important, as we want to be sure that the customer will be positive and subscribe
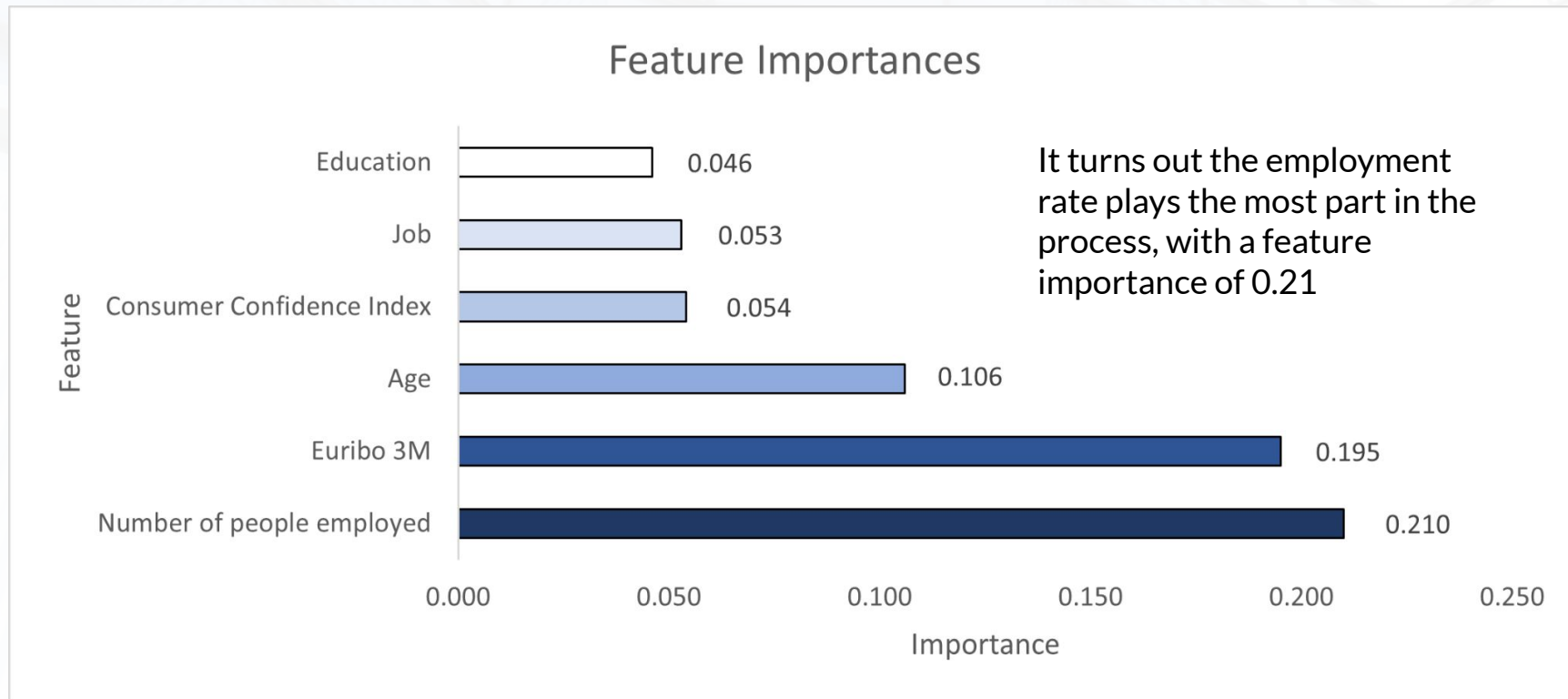
Accuracy
88.5%

Recall
87.7%

Precision
89.9%

F1 Score
88.8%

Feature Importances

Feature Importances

Education — 0.046
Job — 0.053
Consumer Confidence Index — 0.054
Age — 0.106
Euribo 3M — 0.195
Number of people employed — 0.210

Feature (y-axis)
Importance (x-axis): 0.000, 0.050, 0.100, 0.150, 0.200, 0.250

It turns out the employment rate plays the most part in the process, with a feature importance of 0.21

Thank you!