



**CENTRAL PACIFIC  
FINANCIAL CORP**



# **Ready to Let the Black Box Drive? Machine Learning: the Brain of the Marketing Campaign**

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Data Scientist

# About Central Pacific Bank


- Central Pacific Bank was founded in 1954 by a group of Japanese American war veterans who refused to accept the social inequities that prevailed in Hawaii after WWII.
- With assistance from Sumitomo Bank in Japan, the founders were able to pursue their vision of creating a bank that would serve all of Hawaii's people.
- Currently the fourth largest financial institution in Hawaii with over \$5 billion in assets and 35 branches across the state of Hawaii.





# Pre-approved Unsecured Consumer Loans

- What are unsecured consumer loans? - Loans that are issued and supported only by the borrower's creditworthiness .
- No collateral required.
- Borrowers must generally have high credit ratings to be pre-approved.
- CPB uses the services of a credit bureau to select potential candidates and fulfill direct marketing campaigns.



Pay for all the things you want and need with a Personal Loan from CPB.

**You've been Pre-Approved!**

**\$5,000**

A one-time processing fee will be deducted from loan proceeds if you automatically payment is set up from a CPB personal checking account.

*Even though you've been pre-approved for the loan amount above, lower amounts may be available to you. Ask a branch representative for details.*

<00000000>

<NAME&ADDRESSLINE1>

<NAME&ADDRESSLINE2>

<NAME&ADDRESSLINE3>


Aloha!

Here's good news if you could use some extra cash right now. You've been **pre-approved to borrow \$5,000**. Plus, if you make your loan payments automatically from a Central Pacific Bank personal checking account, you get a low rate of just **5.49% APR\*** (without automatic payment from a personal checking account the APR will be 7.02%\*\* and a \$50 processing fee will apply).

To get your \$5,000<sup>1</sup> you must act quickly. **This limited-time offer will only be available to you until May 25, 2018.** Simply bring in the enclosed Pre-Approved Acceptance Certificate to the Central Pacific Bank branch nearest you. There's no lengthy application to fill out, or lost time waiting for a decision—**you're already pre-approved!**

If you have any questions, please call our Customer Service Center at 544-0500 from Oahu or 1-800-342-8422 from the neighbor islands.

Sincerely,



**P.S. Visit any CPB branch to redeem this offer on or before May 25, 2018.**

You can choose to stop receiving "prescreened" offers of credit from this and other companies by calling toll-free (888) 567-8688. See **PREScreen AND OPT-OUT NOTICE** on the reverse side for more information about prescreened offers.

\*A one-time processing fee will be deducted from loan proceeds if you automatically payment is set up from a Central Pacific Bank personal checking account. \*\*Annual Percentage Rate (APR) is 48 monthly payments of \$116.27 with new or existing Central Pacific Bank personal checking account and automatic loan payment option. \*\*\*Without automatic payment from a Central Pacific Bank personal checking account, interest rate will be 6.49% (7.02% APR) and will be repayable in 48 monthly payments of \$118.54. If automatic loan payment is cancelled, the loan rate will be increased to 6.49% for the remainder of the loan term. This offer is subject to verification of identity and verification that you meet our pre-established credit criteria.

SEE THE REVERSE SIDE FOR ADDITIONAL DISCLOSURES AND TERMS AND CONDITIONS.

Certificate Number: PA10001

Member FDIC

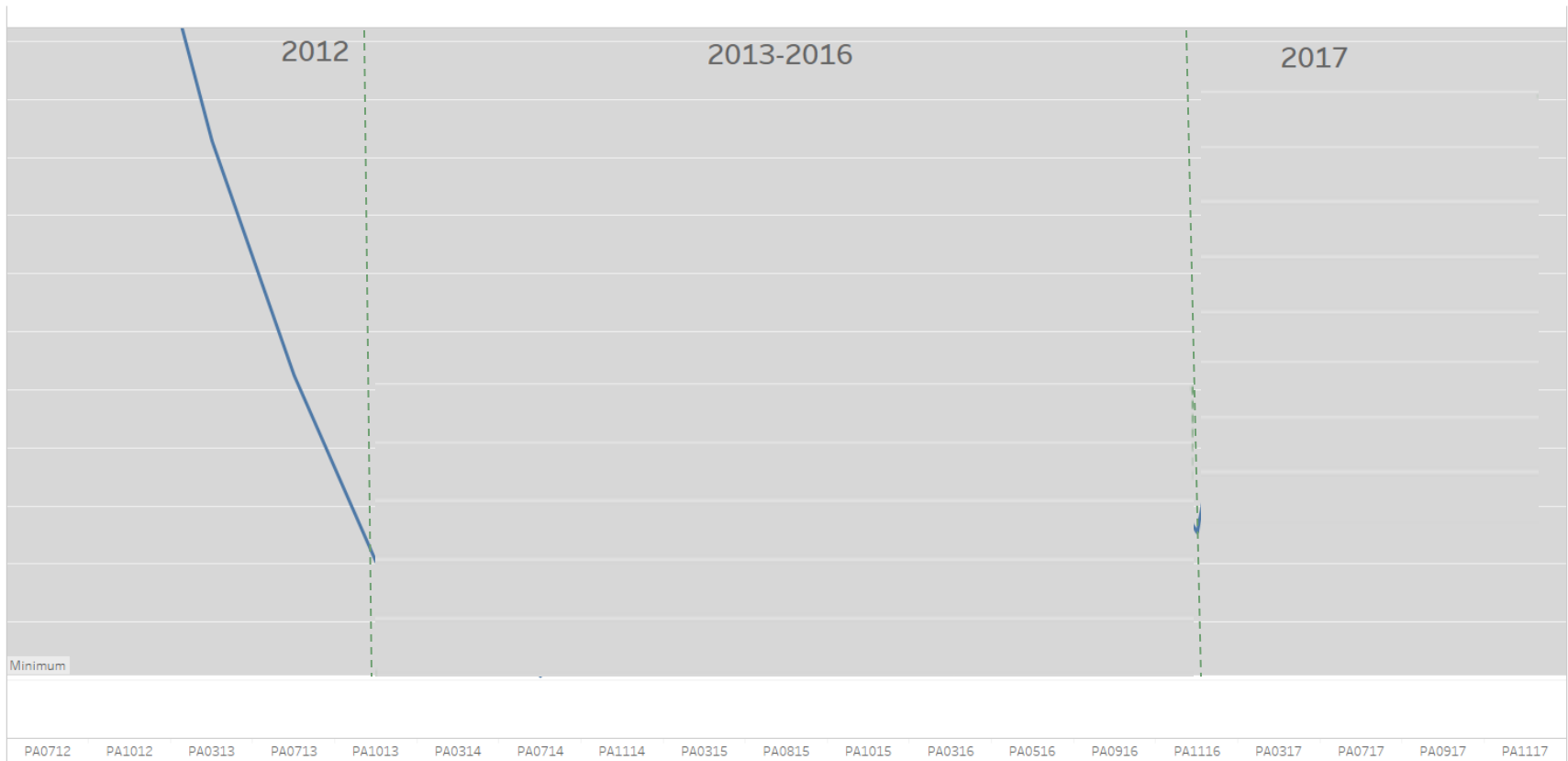
# Target Population

- Population of 1.4 million (2016).
- Roughly 600,000 people with good credit quality (680+ FICO).
- Four major islands – Oahu is home to 70% of the state's total population.
- State unemployment rate of 2.5% is below the national unemployment rate of 4.2% (September 2017).
- Economy driven primarily by tourism, military and real estate construction industries.



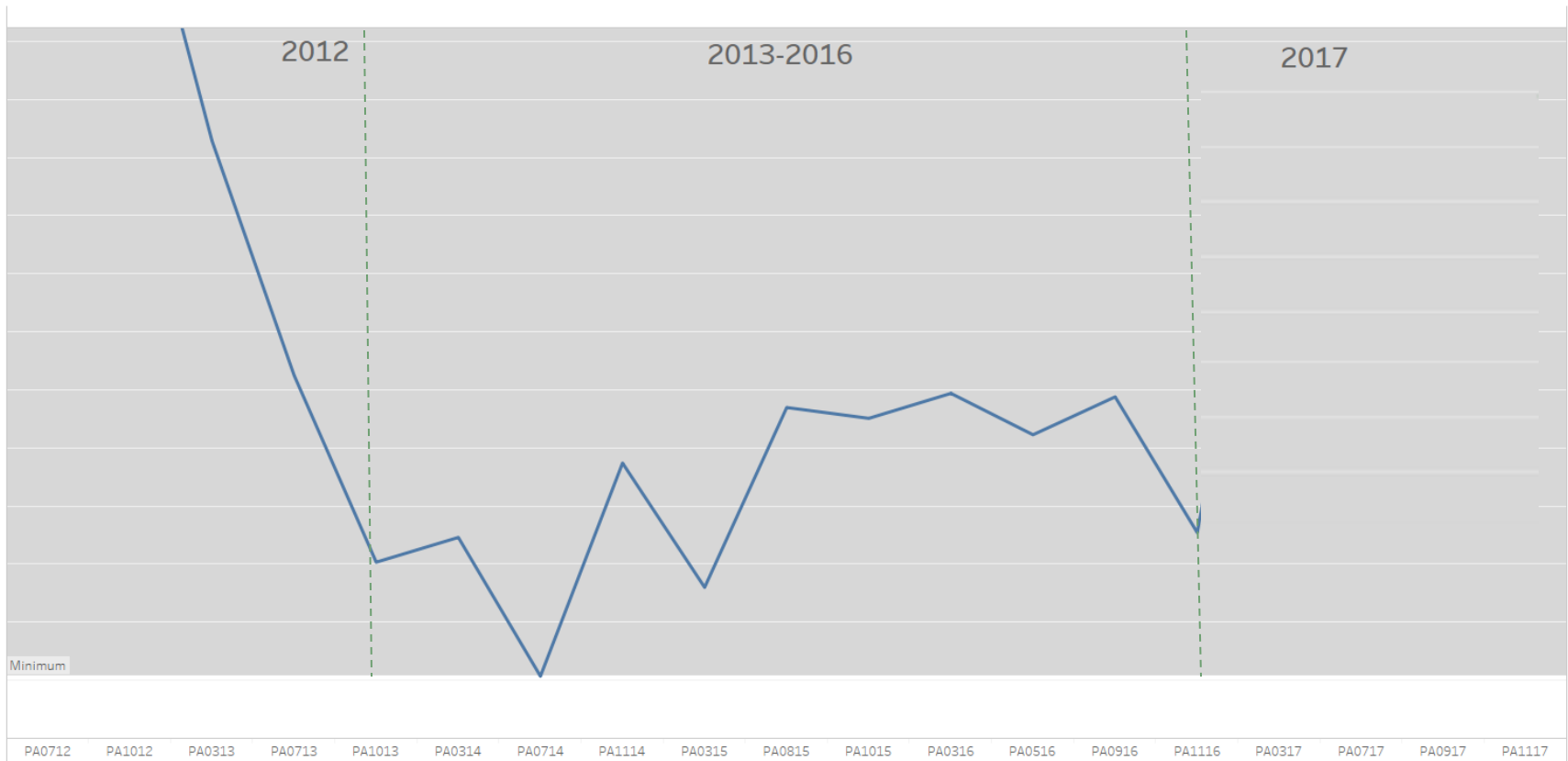
# Response Rate Trend

Response Rate Trend



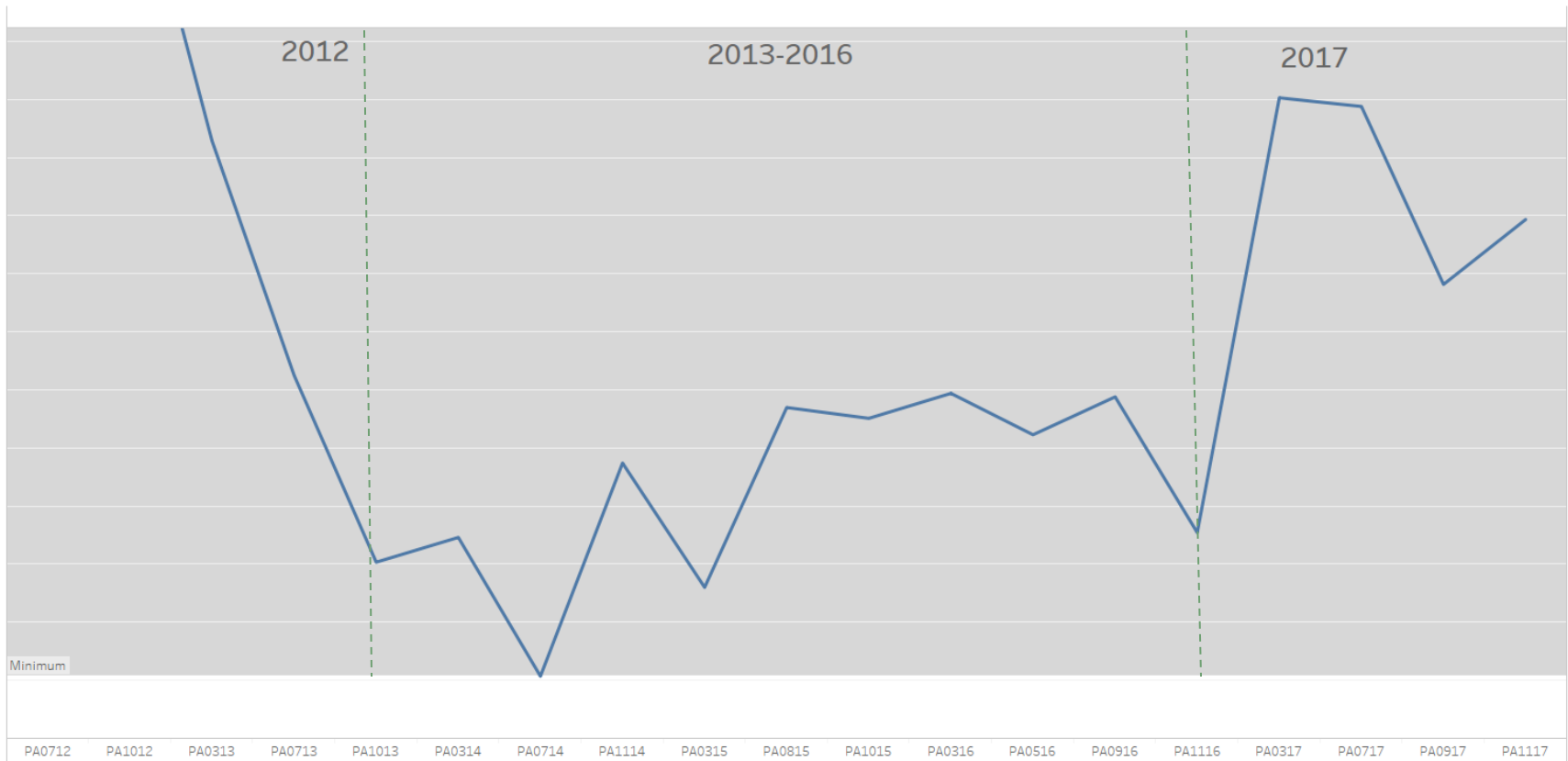
# Response Rate Trend

Response Rate Trend



# Response Rate Trend

Response Rate Trend





# The old way

## Bankruptcy score

FICO score

	400-500	500-600	600-700	700-800	800-900
600-620					
620-640					
640-660					
660-680					
680-700					
700-720					
720-740					
740-760					
760-780					
780-800					
800-850					



In the market score to select records



# Leveraging Consumer Credit Report

## Scoring models

FICO

Vantage

Bankruptcy

In the market

## Credit attributes

Personal loan/line

Credit card

Auto loan

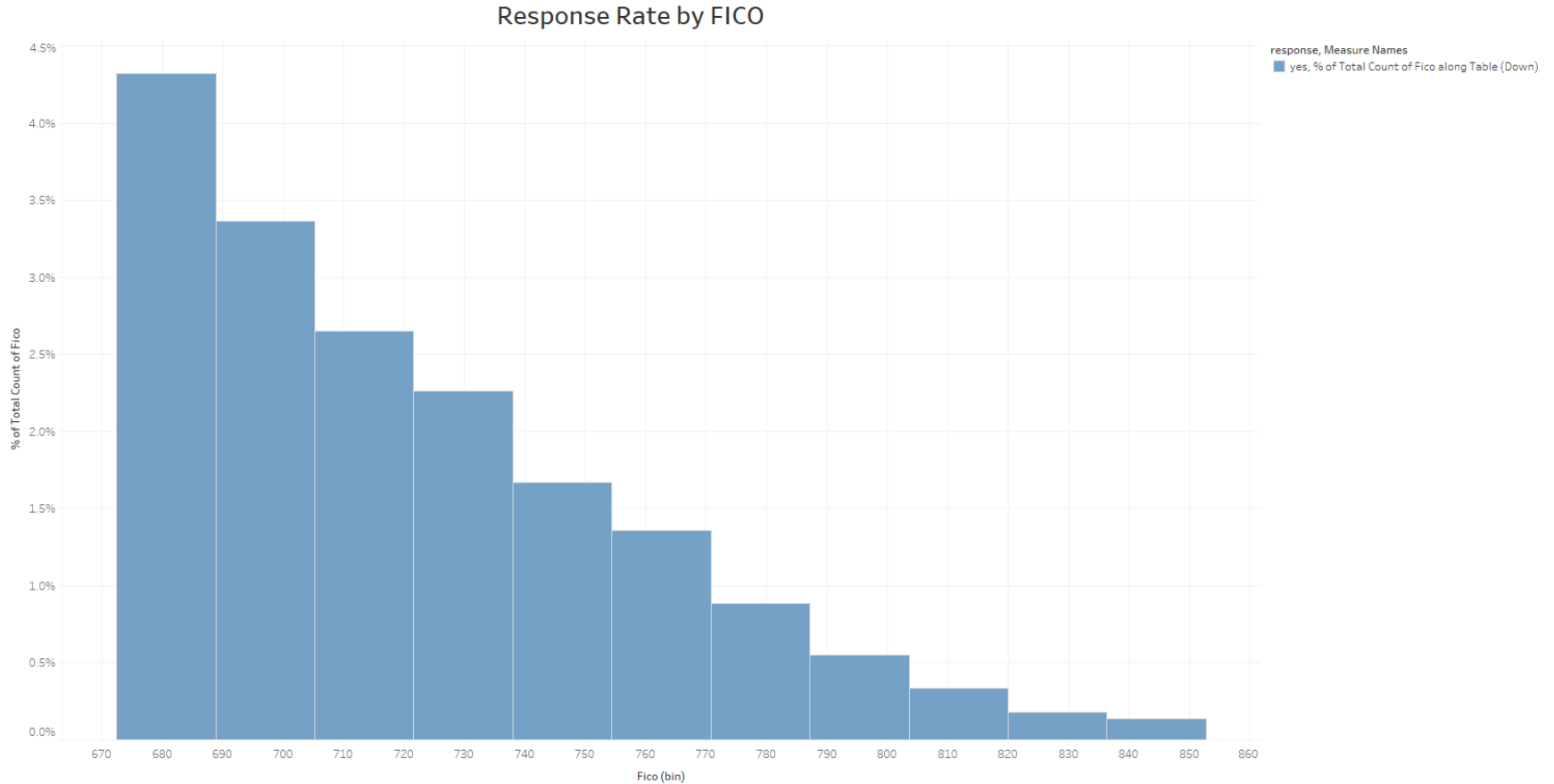
HELOC

Mortgage

# Data Exploration

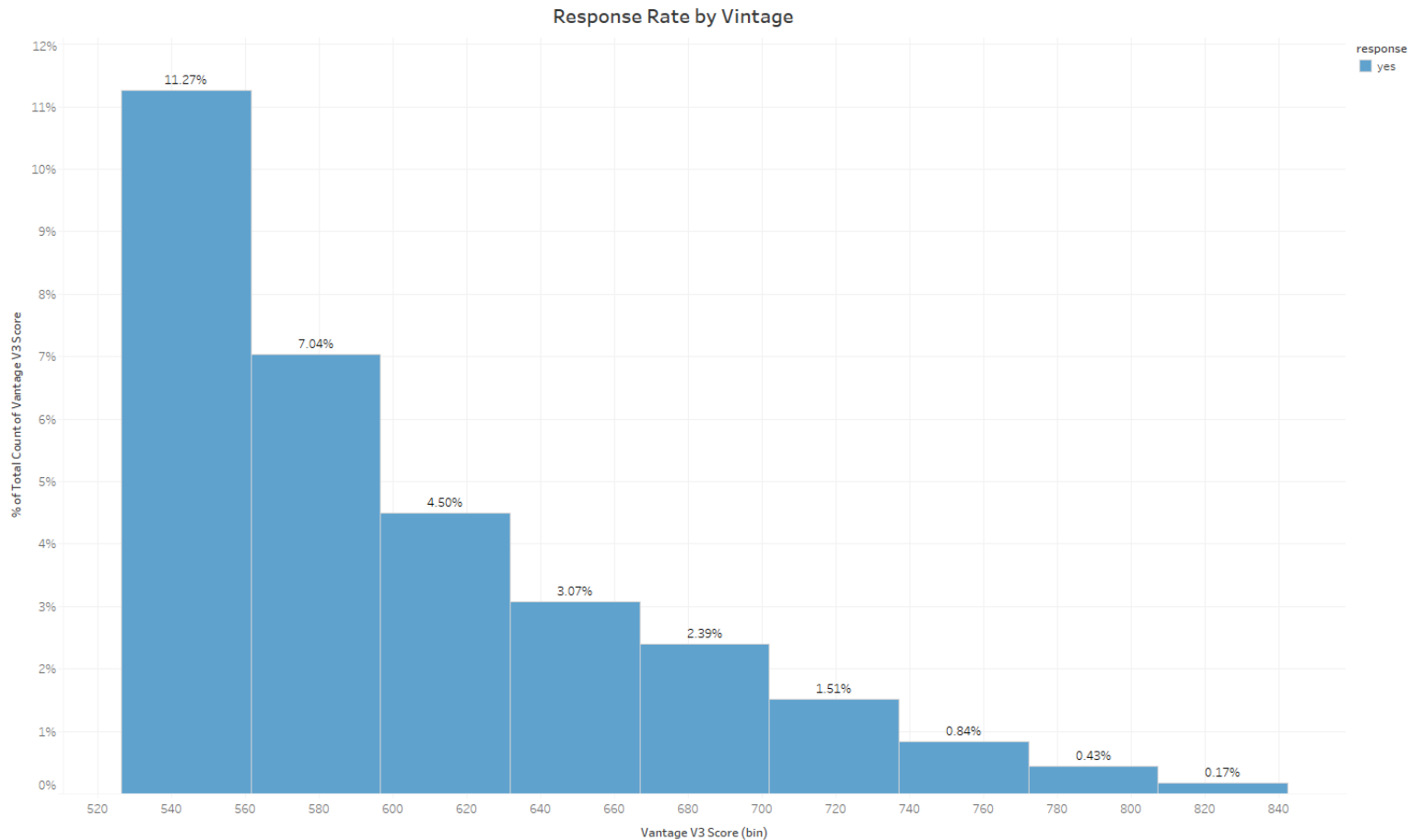


# Single score/attributes response rate



The trend of % of Total Count of Fico along Table (Down) for Fico (bin). Color shows details about response and % of Total Count of Fico along Table (Down). The data is filtered on Fico, which ranges from 680 to 850.

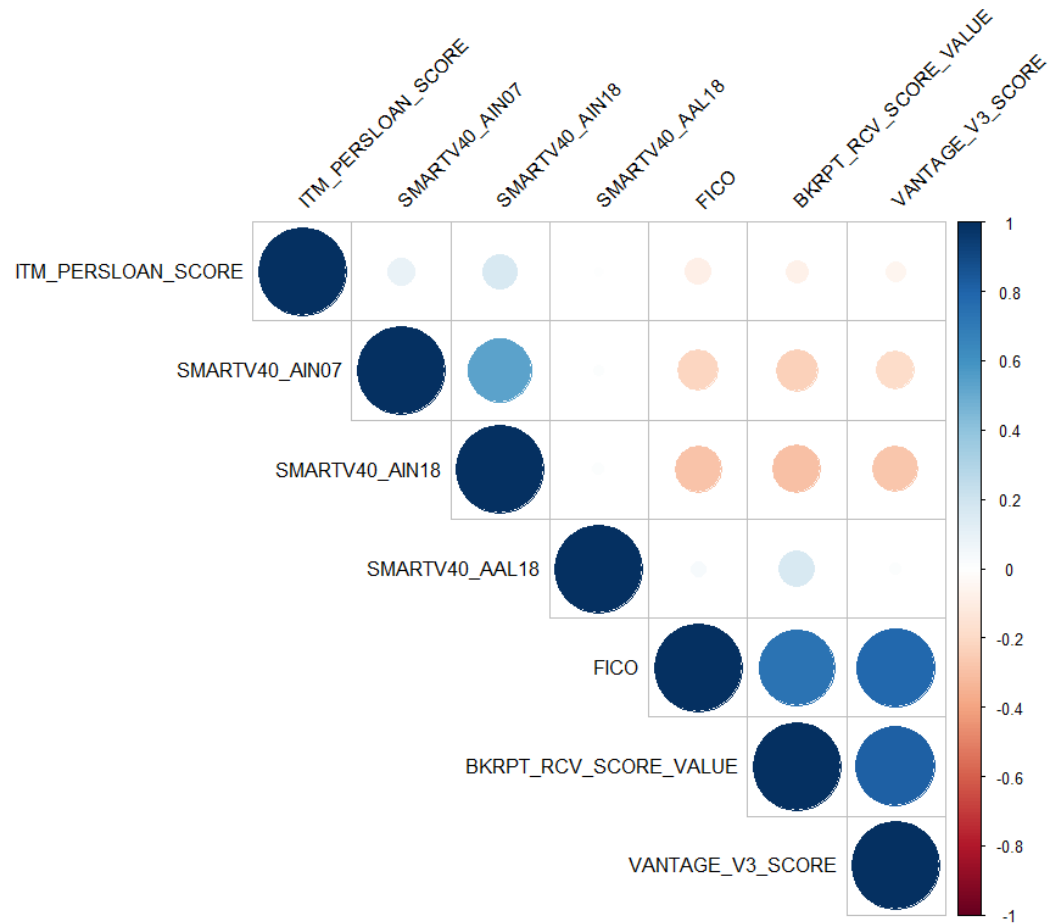
# Single score/attributes response rate



The trend of % of Total Count of Vantage V3 Score for Vantage V3 Score (bin). Color shows details about response. The data is filtered on Vantage V3 Score, which ranges from 500 to 839.



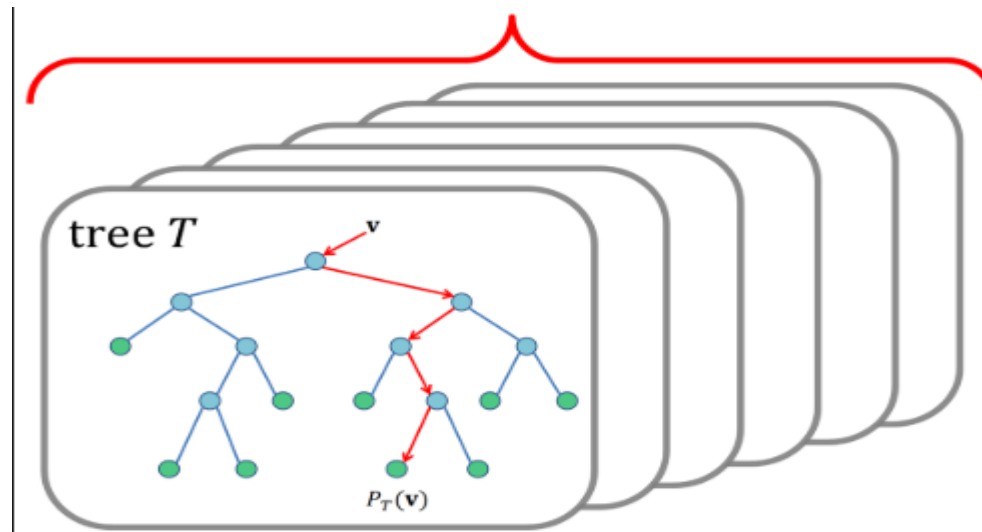
# Correlation Matrix



# Classification model

- Goal: predict borrower's likelihood of taking an offer.
- Data: Historical campaign results

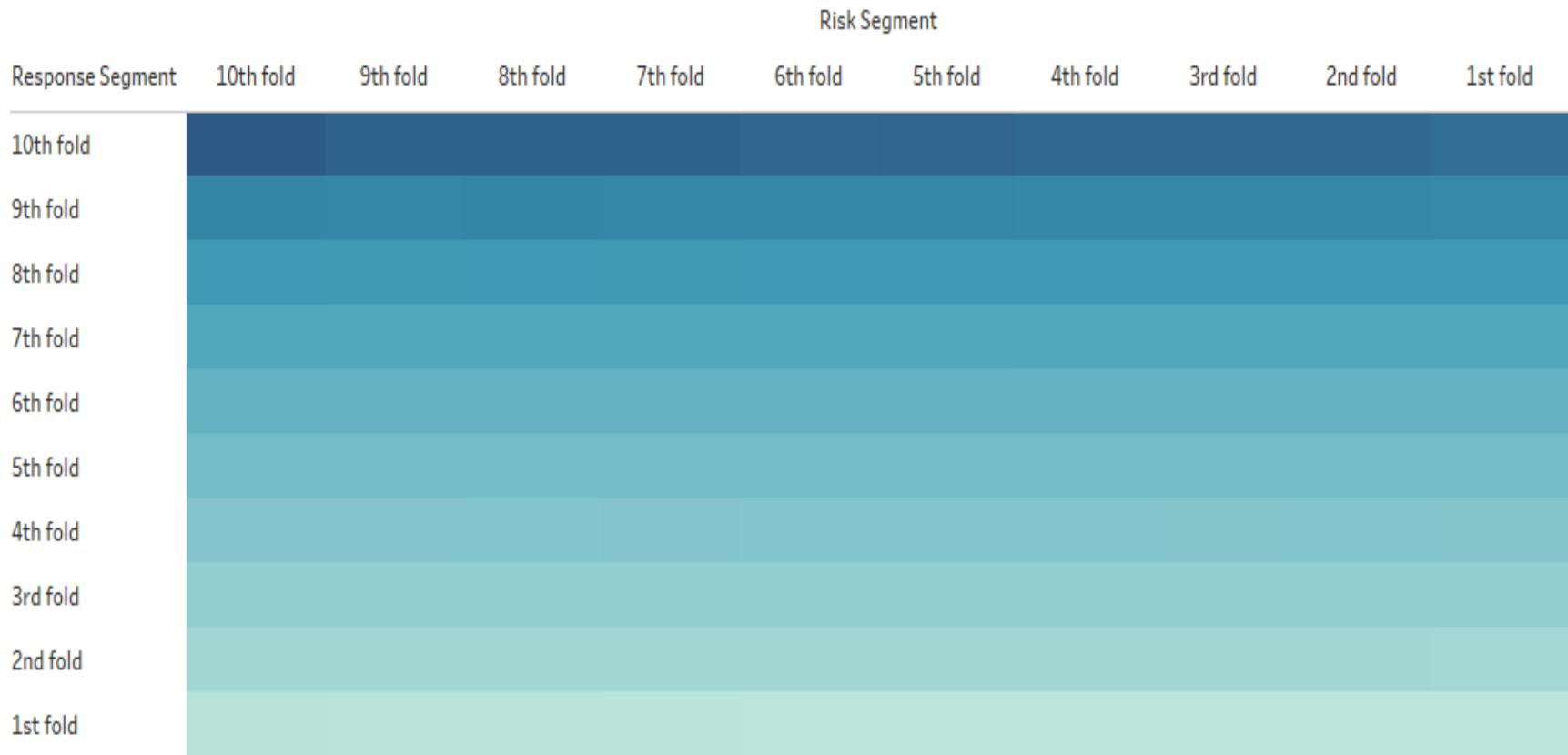
## Random Forest



# Technical details

- Training/validation split
- Unbalanced data
- Compare model performance

# Binning and select cutoff





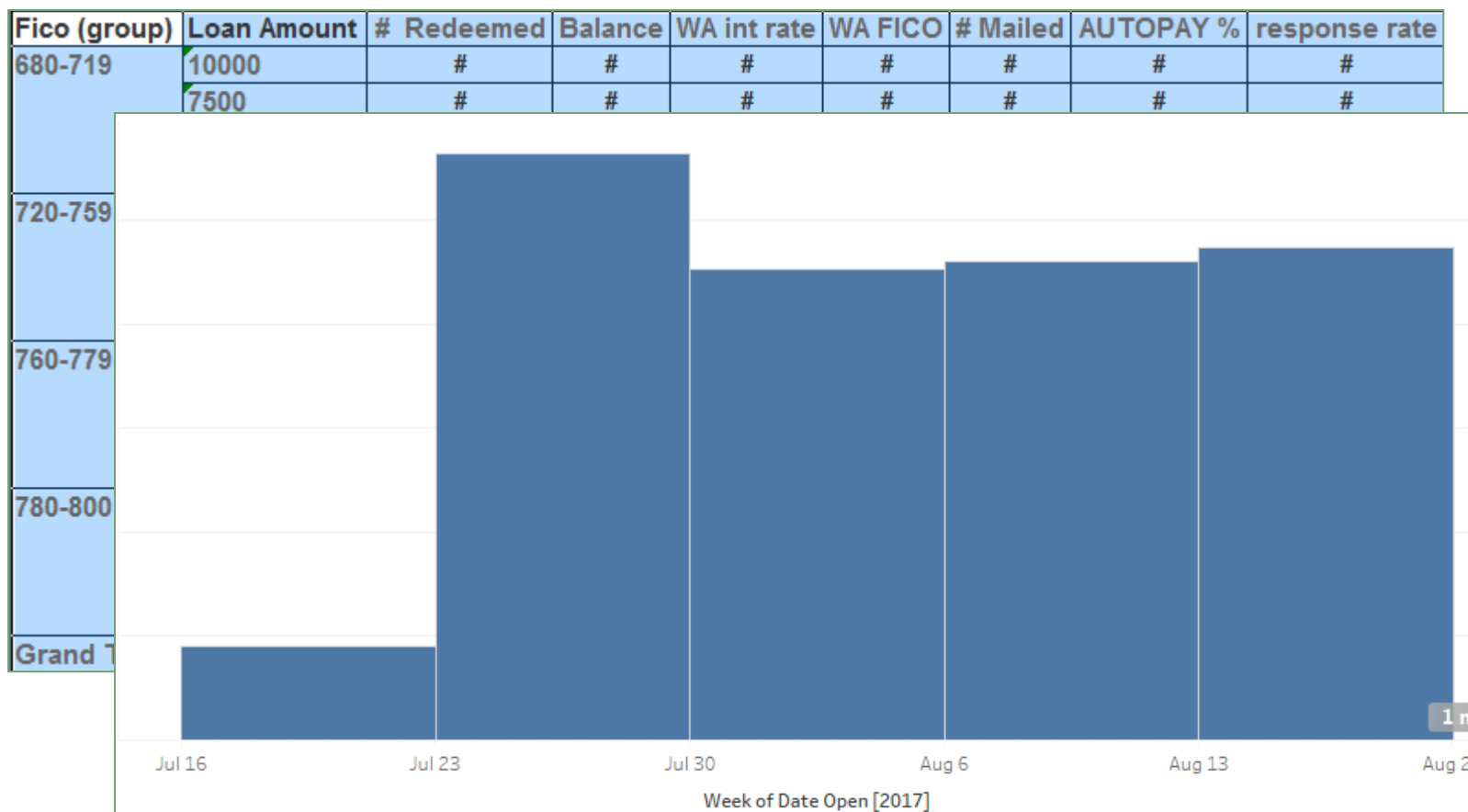
# More testing



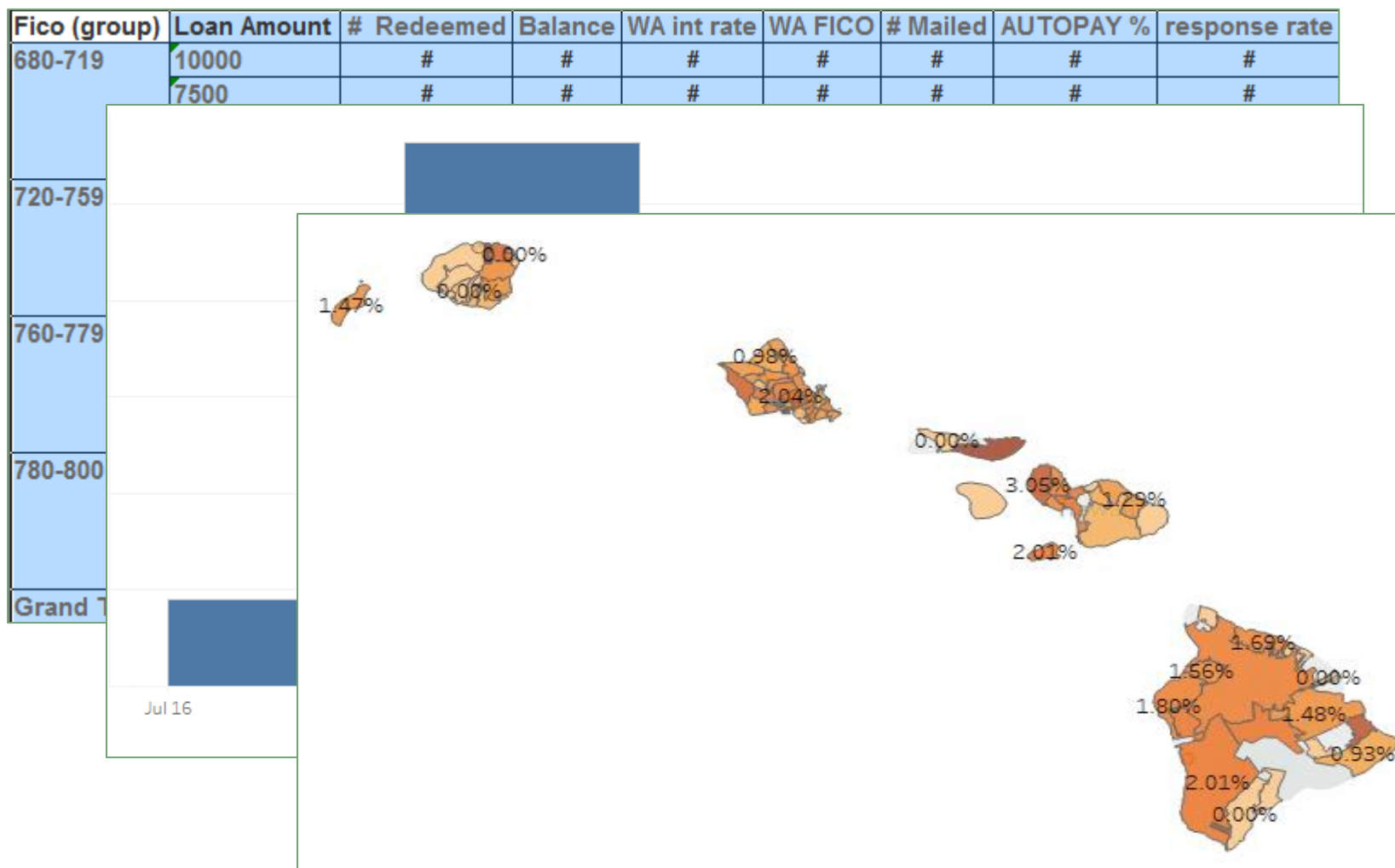
# Implementation/result tracking

Fico (group)	Loan Amount	# Redeemed	Balance	WA int rate	WA FICO	# Mailed	AUTOPAY %	response rate
680-719	10000	#	#	#	#	#	#	#
	7500	#	#	#	#	#	#	#
	5000	#	#	#	#	#	#	#
	Total	#	#	#	#	#	#	#
720-759	10000	#	#	#	#	#	#	#
	7500	#	#	#	#	#	#	#
	5000	#	#	#	#	#	#	#
	Total	#	#	#	#	#	#	#
760-779	15000	#	#	#	#	#	#	#
	10000	#	#	#	#	#	#	#
	7500	#	#	#	#	#	#	#
	Total	#	#	#	#	#	#	#
780-800	15000	#	#	#	#	#	#	#
	10000	#	#	#	#	#	#	#
	7500	#	#	#	#	#	#	#
	Total	#	#	#	#	#	#	#
Grand Total		#	#	#	#	#	#	#

# Implementation/result tracking



# Implementation/result tracking





# Challenge and Future use cases

## Challenge

- Performance deterioration
- Balance response and charge-off risk

## Future use case

- Price based on risk model
- Test different loan amount
- Test different loan terms
- Test different rate