



# Portfolio Optimization

Team 3

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# Our Solutions



## Predictive Analytics

Analyze and mine structured and unstructured data



## Data Visualizations

Develop datasets and data visualization from compiled data



## Statistical Modeling

Create predictive models to forecast future probabilities and statistical analysis



## Business Intelligence

Develop a range of tools and big data solutions from a suite predictive analytical software platforms and programming languages for process automation

# Problem

Wells Fargo CFO Mike Santomassimo:  
“Home lending revenue declined 8 percent from a year ago, primarily due to lower mortgage banking income driven by lower gain and sale margins and origination volumes...”

“We increased our non-conforming originations in the fourth quarter and have grown our non-conforming portfolio for seven consecutive months, reflecting the improvements in our capabilities as well as the reintroduction of cash out refinancing late in the first quarter of 2021”



## Problem 1

Mortgage loan production fell by 8 percent with 27 percent fewer homebuyers in 2021.



## Problem 2

Closure of 270 branch locations and lay offs of 16,000 employees adds pressure on remaining retail branches.



## Problem 3

Process automation to include mortgage and auto underwriting presents digitization challenges of mortgage servicing and card activities.

# Conforming Loans

- Loans may be sold to Fannie Mae or Freddie Mac
- More likely to be cheaper
- More common
- Limited to \$548,250 in most areas (up to \$822,375 in some high-cost-of-living areas)
- Minimum credit score: 620
- Maximum DTI ratio: 43%
- Minimum down payment required: At least 3%

# Non-Conforming Loans

- Loans may be held by lender, or sold to another lender
- More likely to be expensive
- Less common
- Potentially no limits on loan size
- Minimum credit score: 580
- Maximum loan limit varies by program and lender
- Maximum DTI ratio: varies
- Minimum down payment required: varies, but more likely with 20%

# Market Conditions

Wells Fargo Bank Key Facts

Customers: 69M

Mobile Banking: 26.8M

Market Value of Stock:\$186.1B

Total Assets in US: \$1.75T

No. 1 Home Loan Servicer

No. 2 Auto Lender of EVs

No. 2 Debit Card Issuer

No. 4 Overall Auto Lender



## Trend 1

Housing supply rate falls from 12 months in 2011 to less than 2 months.



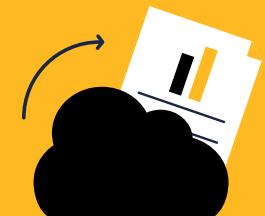
## Trend 2

Fed has signaled increases to prime interest rates with potential increases in residential cash-out refinancing.



## Trend 3

Rocket Mortgage is positioning to overtake Wells Fargo as number one mortgage lender.



## Trend 4

Greater market pressures to cut costs and use of process automation to increase loan production efficiency.

# Project Goals and Objectives

	PROBLEMS WE ARE SOLVING OR OPPORTUNITIES WE ARE GOING AFTER	SUPPORT WE NEED TO ACHIEVE THIS GOAL	HOW WILL ACHIEVING THIS GOAL HAVE A GREAT IMPACT?	KEY METRICS. HOW WILL WE KNOW WE HAVE ACHIEVED THIS GOAL? HOW DO WE KNOW IF WE ARE SUCCESSFUL?
BUILD A TOOL TO ENHANCE WELLS FARGO PORTFOLIOS	In order to maintain a competitive advantage, Wells Fargo needs a automated solution to analyze and predict portfolio performance.	Strong support from the client including access to Wells Fargo internal data and business environment knowledge from experts.	By building and implementing a data science solution, Wells Fargo can reasonably predict portfolio performance and utilize new technology.	Decrease in Net Losses year over year as well as reduction in loan defaults.
PROVIDE INSIGHT ON INTERNAL DATA METRICS	Giving clear visualizations on data elements to assist in business decision making and understanding of the business at large.	Access to Wells Fargo internal data as well as internal knowledge of business objectives and mission goals.	By making data understanding simple, more of the business can align on their awareness. Build a stronger Wells Fargo.	Increase business understanding from all partners across the company.
ENHANCE SPECIFIC LINES OF BUSINESS	As Wells Fargo enters 2022, the need to increase automation tools is critical. Fine tuned tools in specific LOBs provides a higher degree of accuracy across the board.	Allow our data scientists in to each LOBs specific data as well as experts in the business who can provide insight.	As X business increases in 2022, implementing automation tools from the start will help push to reach client business goals.	Aligning with Wells Fargo, we hope to reach about 70% automated decision making across the company, focusing in key LOBs such as Auto Loans.

# Solution

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## Solution 1

Portfolio optimization of existing loans to reduce overall net losses in a tighter housing market.



## Solution 2

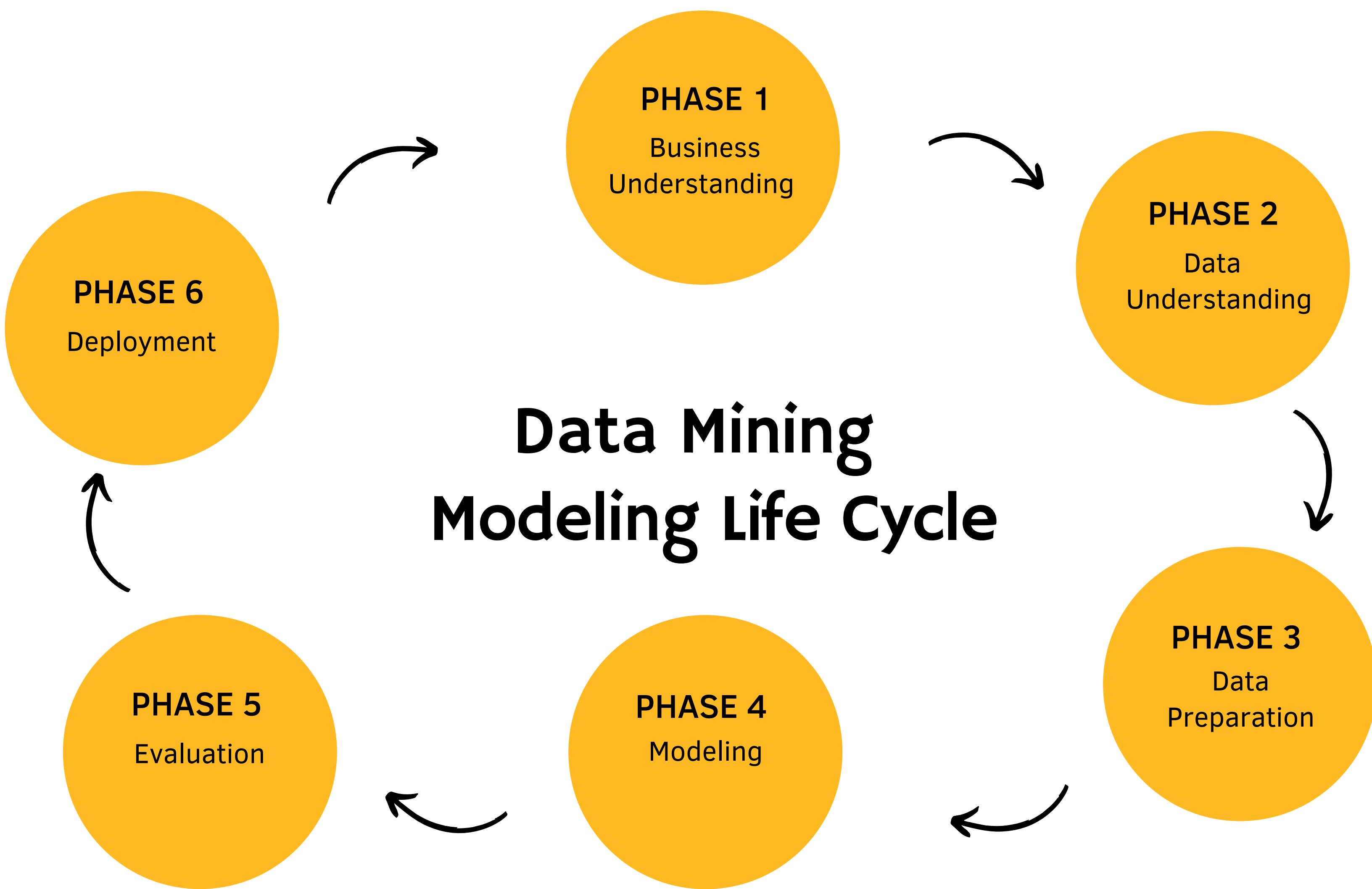
Results from data discovery and modeling approach may be used as preliminary screening of loan applicants.



## Solution 3

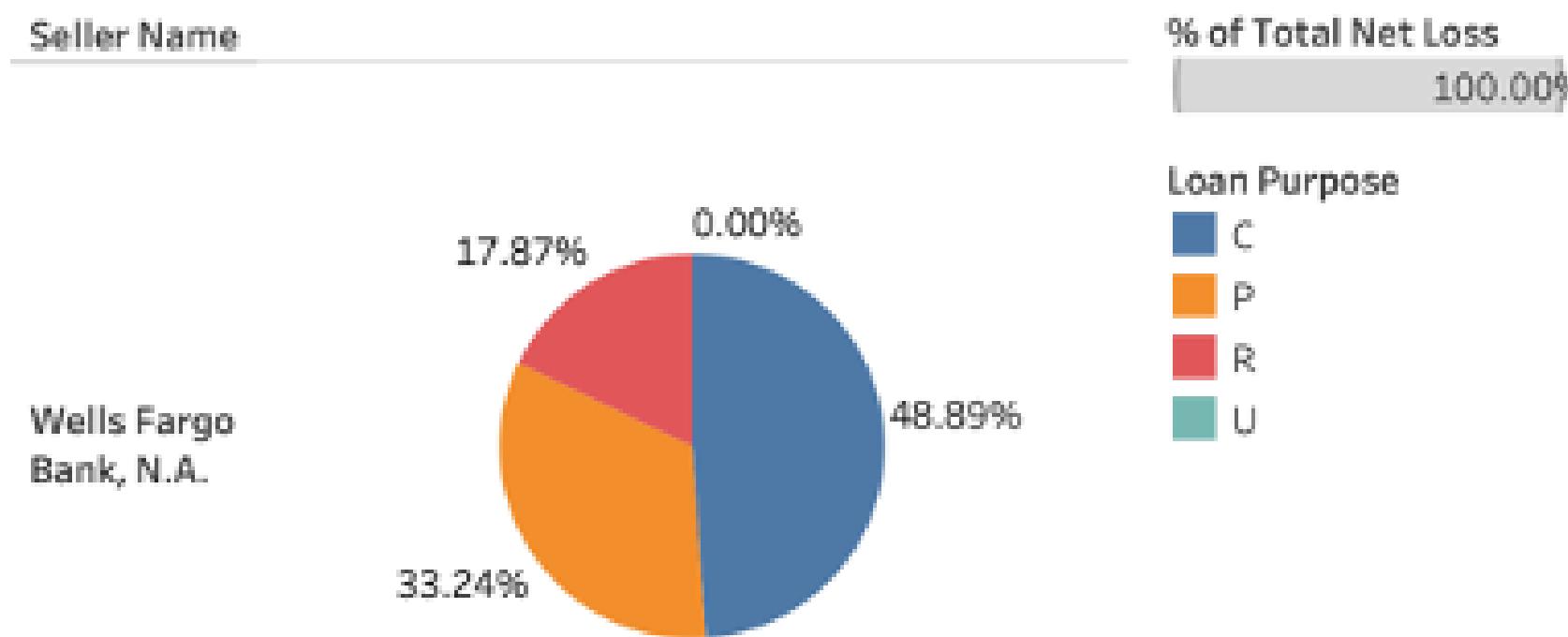
Forecasting models could support underwriting for mortgage and auto lending loans.

# Data Mining Modeling Life Cycle



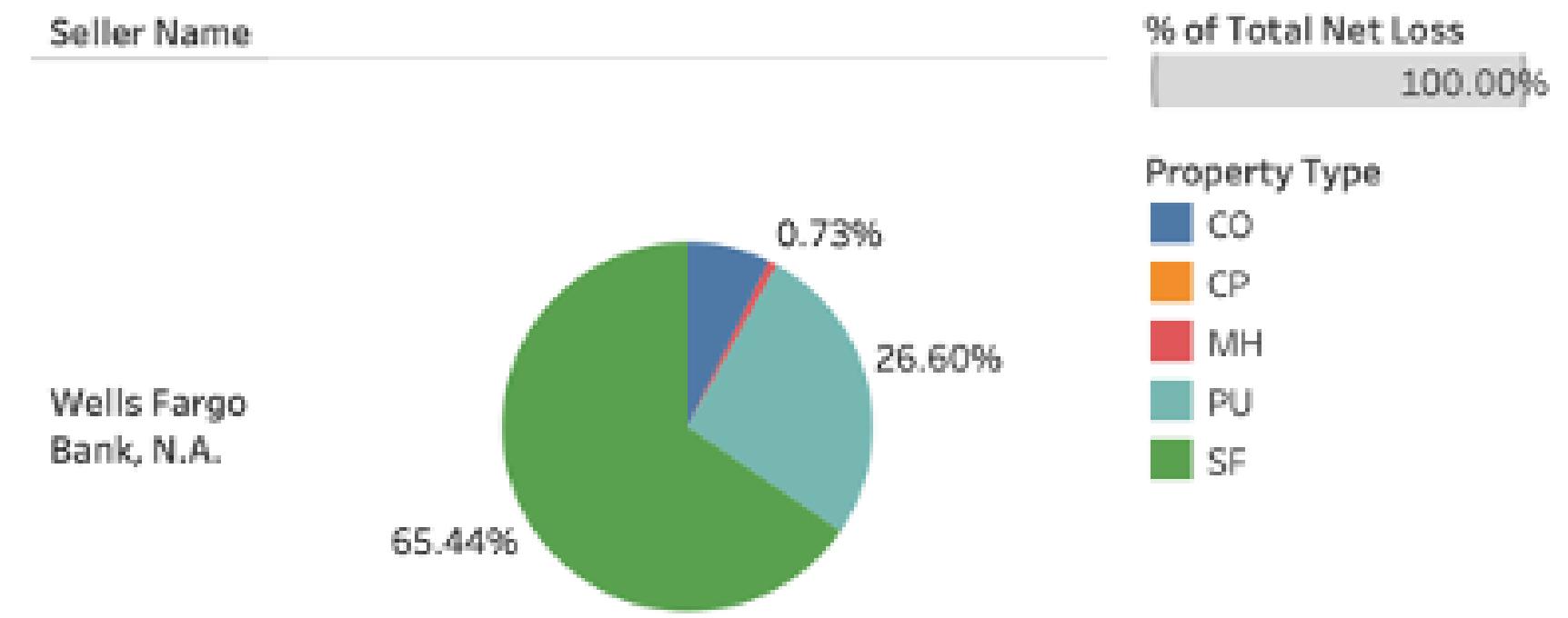
# Wells Fargo Portfolio Analysis

Wells Fargo Loan Purpose Pie Chart



Loan Purpose (color) and % of Total Net Loss (size) broken down by Seller Name. The view is filtered on Seller Name, which keeps Wells Fargo Bank, N.A.. Percents are based on the whole table.

Wells Fargo Property Type Pie Chart



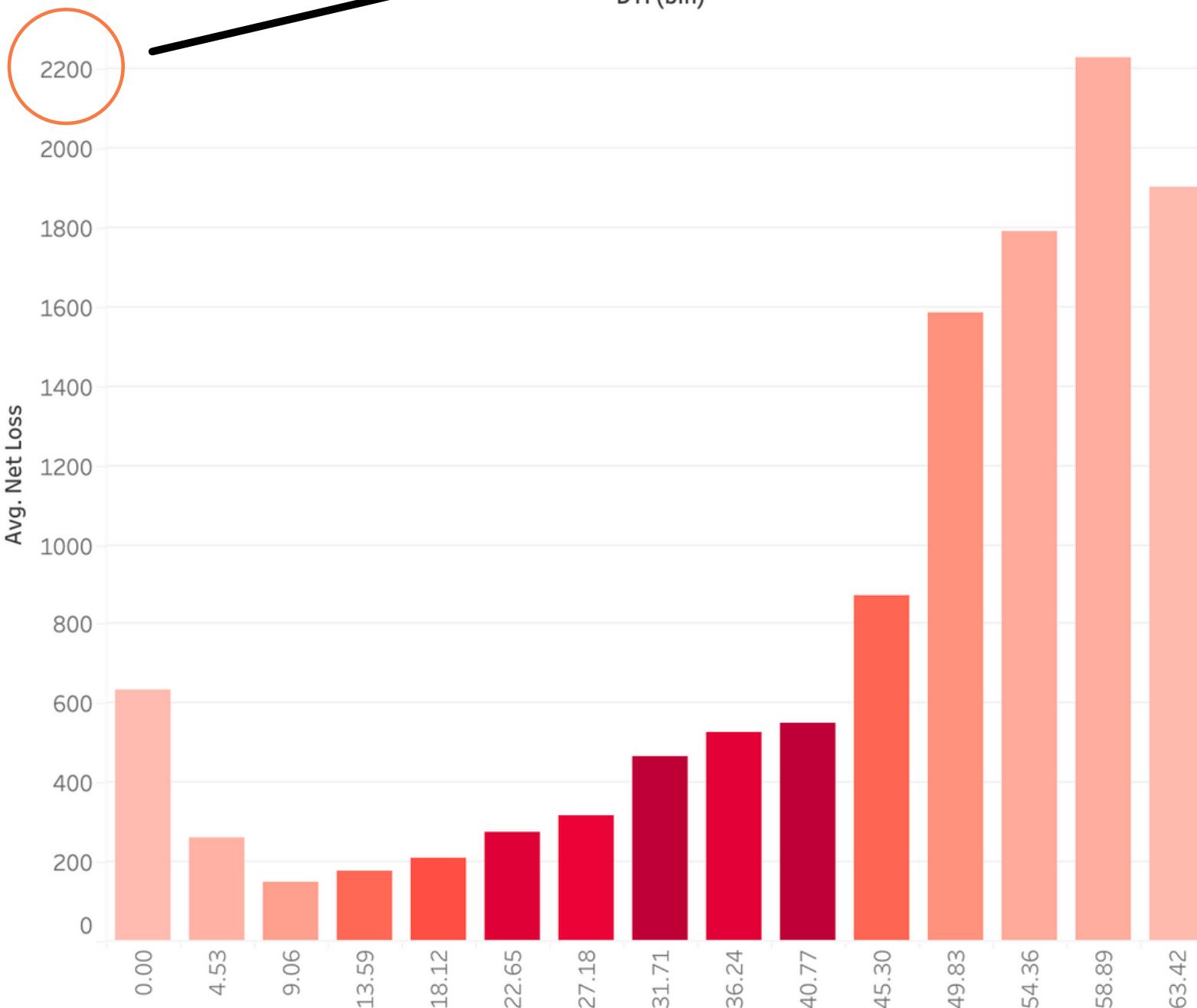
Property Type (color) and % of Total Net Loss (size) broken down by Seller Name. The view is filtered on Seller Name, which keeps Wells Fargo Bank, N.A.. Percents are based on the whole table.

# Wells Fargo Debt to Income Net Loss

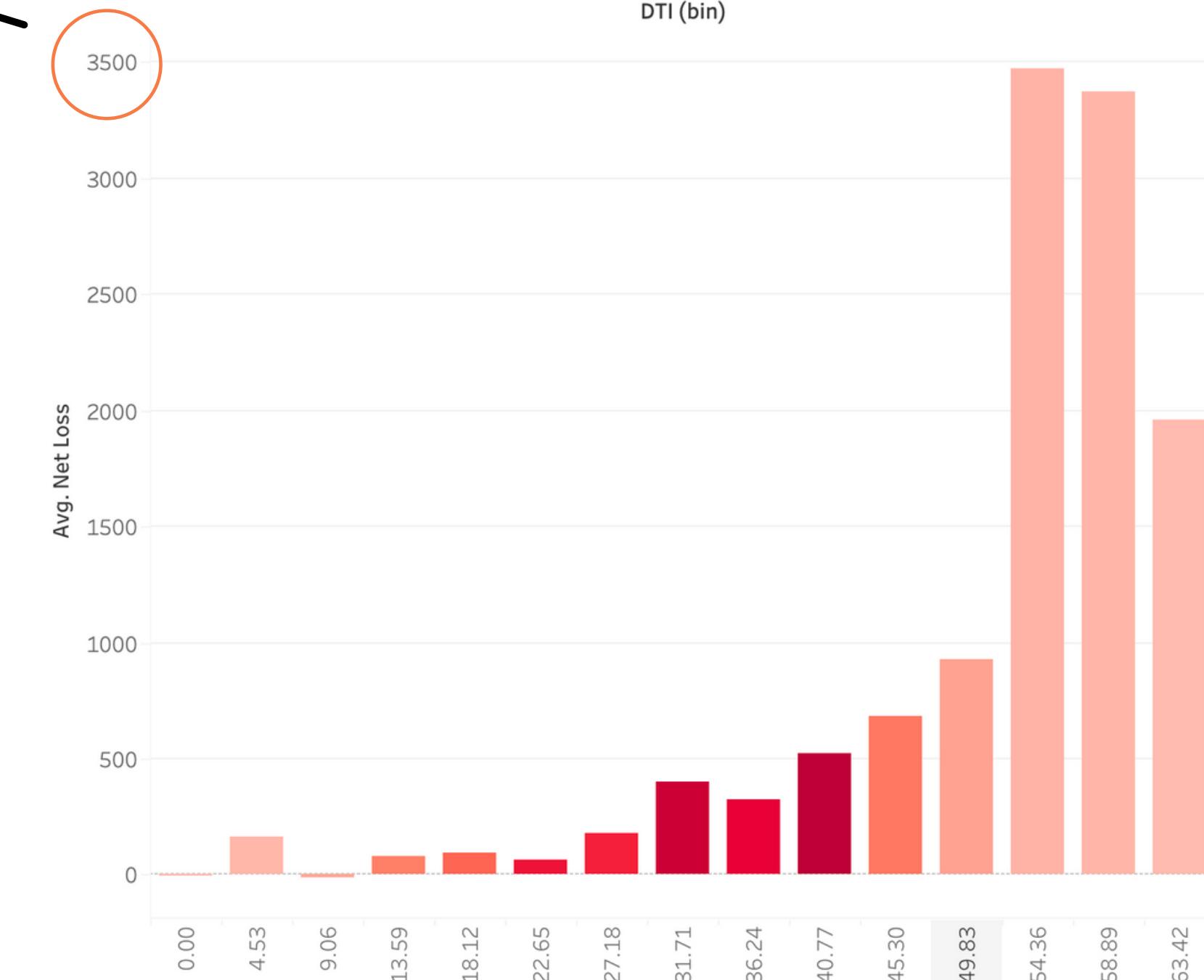
\$220K versus \$350K

(AVG/Loan)

Net Loss by DTI



Net Loss by DTI (Wells Fargo)



# Predictive Analytics Steps



Variable Selection:  
We analyzed several data elements and how they interacted with each other, and how those loans performed. From there, we selectively chose variables we thought were crucial in predicting loan performance



Decision Trees provide step-through analysis of individual loans and creates buckets, which each loan is categorized into.



Evaluating our model performance on historical data provides confidence in our ability to predict loan performance at scale.

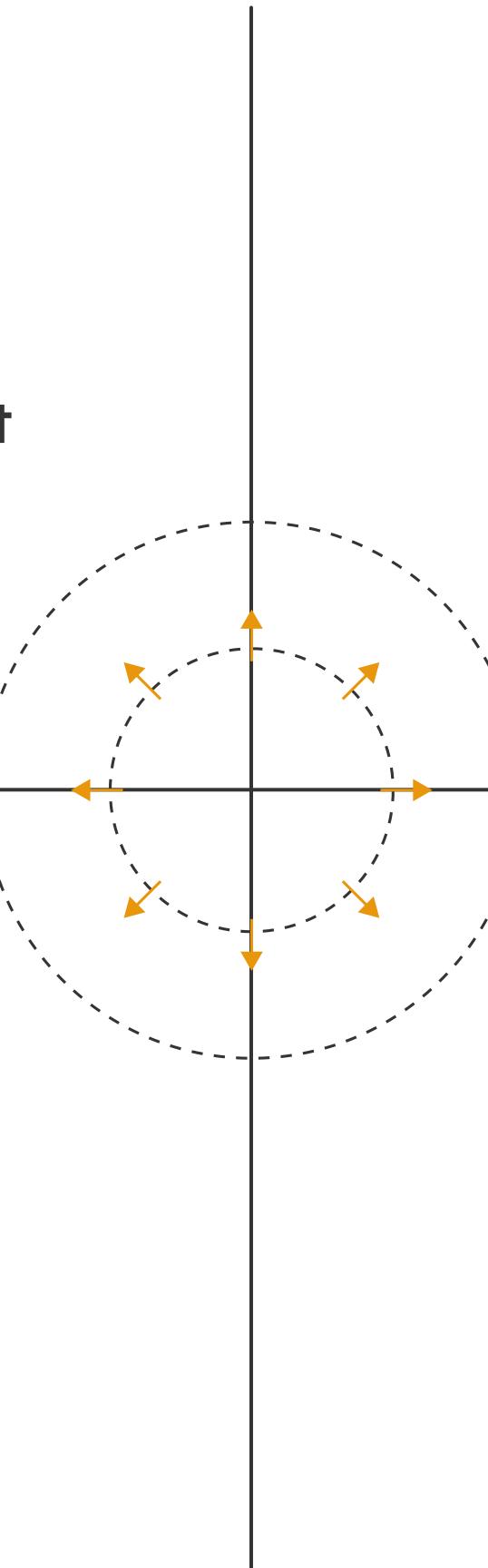
# Modeling Approach

## STEP 1

A decision tree has the benefit of being more easily interpretable. However, as complexity rises, we have to resort to more complex models, hence the introduction of the Boosted Tree model and Random Forest approach.

## STEP 2

During and after evaluation of data elements through our discovery process, we created a formula of key elements and started modeling them. Our approach uses a combination of Random Forest as well as a Gradient Boosted Tree model.



## STEP 3

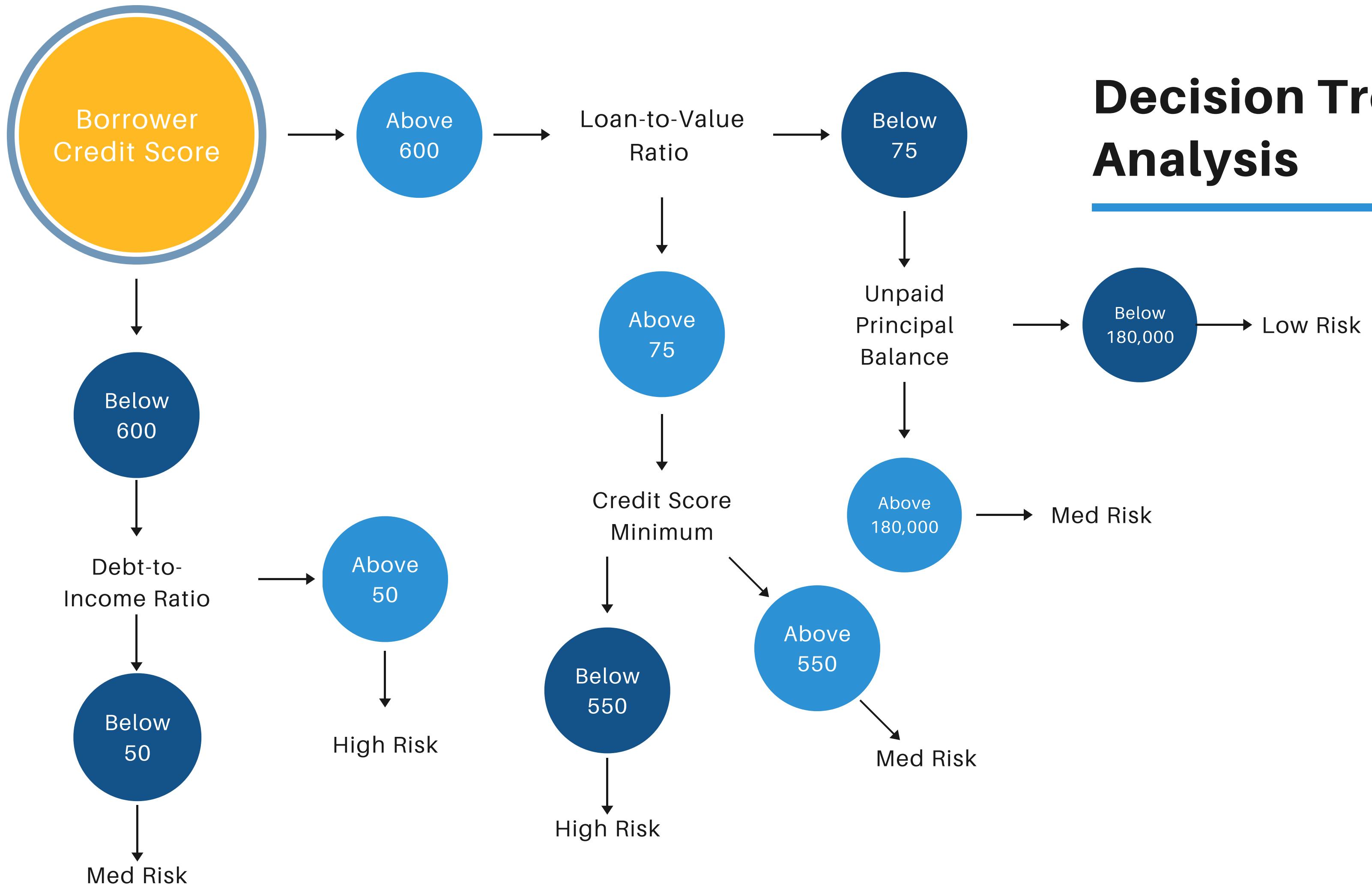
We tune the parameters of our models to find a good fit for the data at hand.

## STEP 4

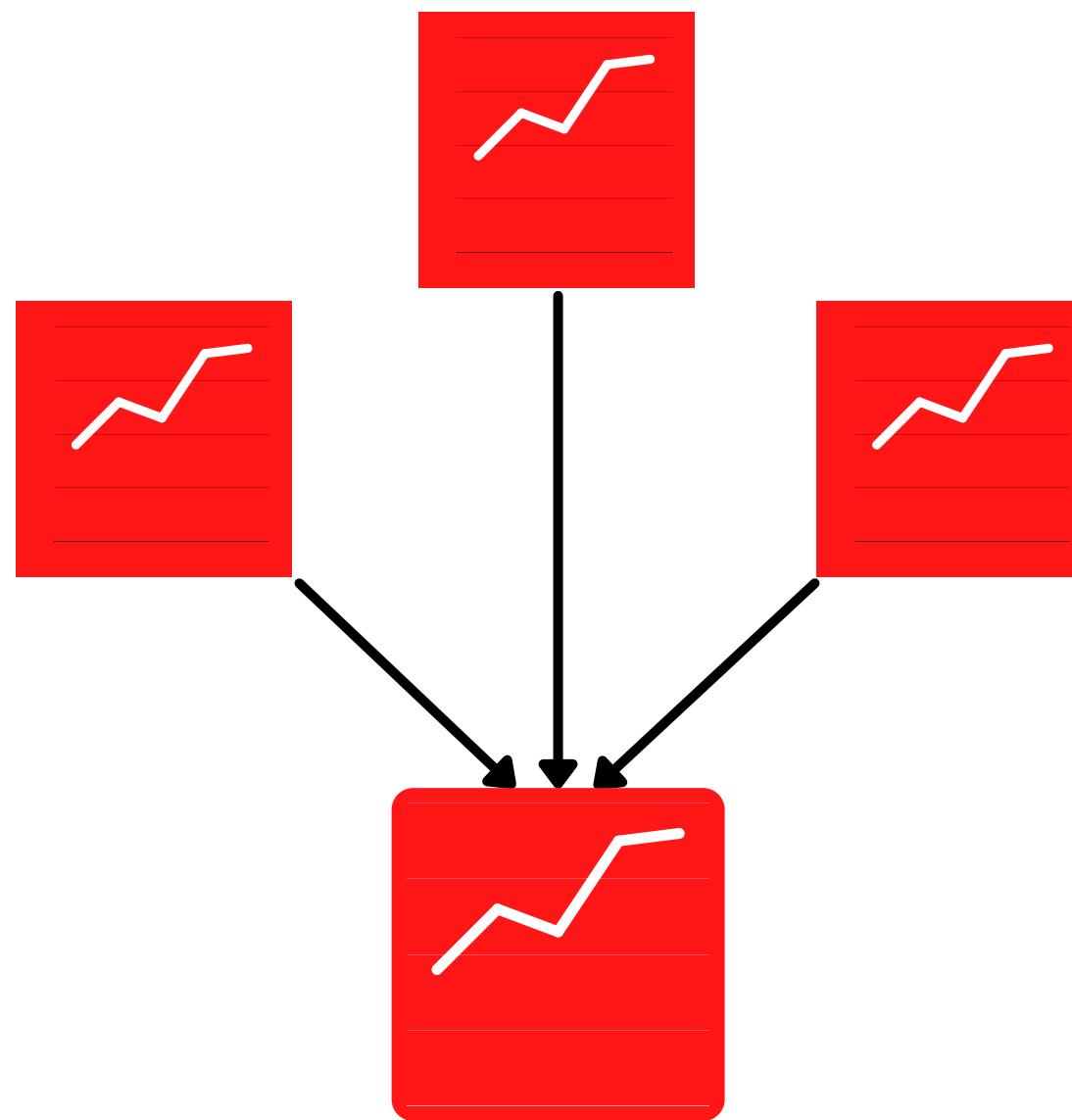
Assemble, analyze, test results, and go back to step 1 if necessary.

# Decision Tree Analysis

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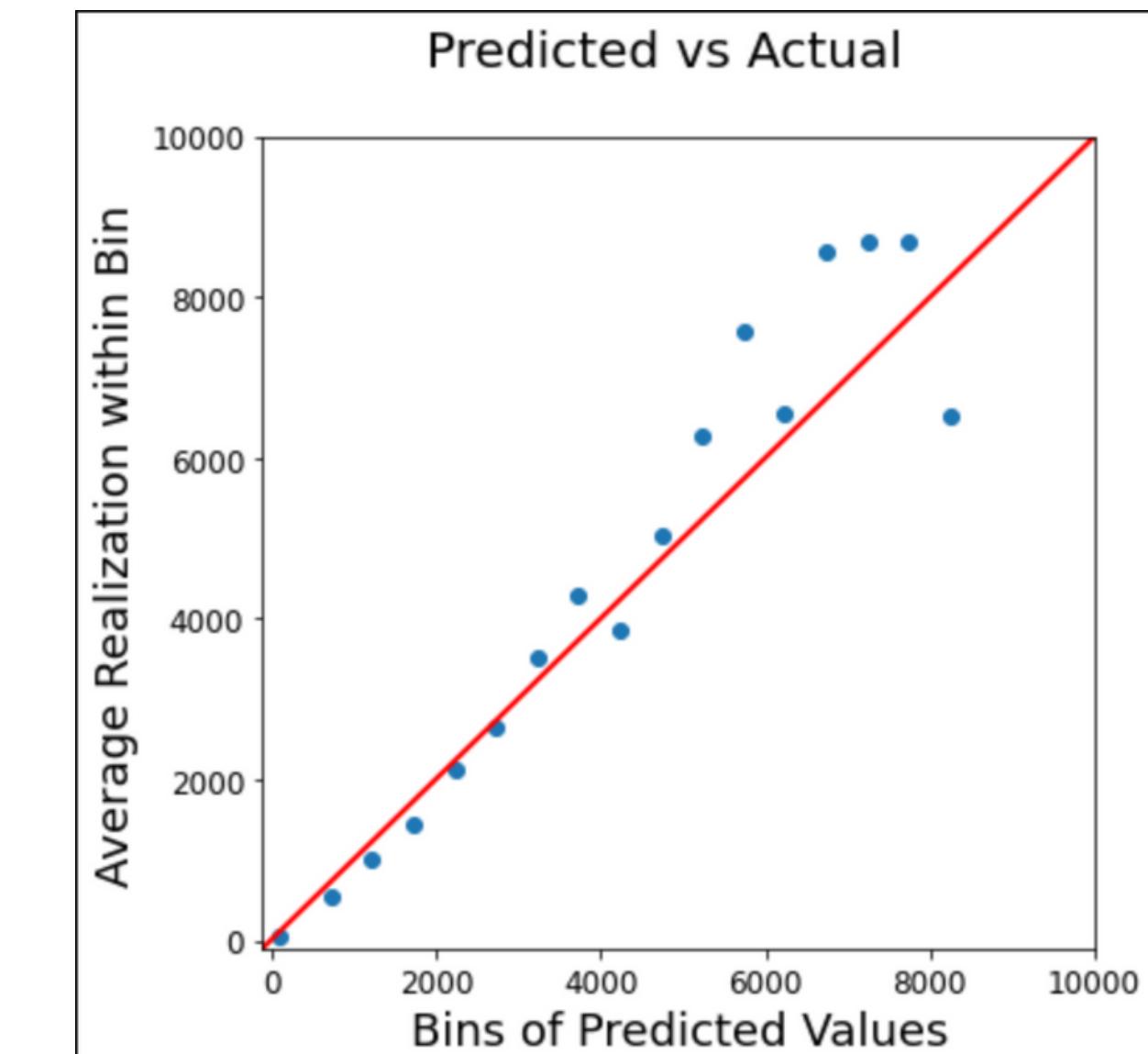


# Predictive Model Results



Our model is a combination of other models. By aggregating models together, we find an average which helps eliminate biases and weaknesses in individual models

With our combined models, we can start comparing our predicted losses vs the historical losses and see how strong our predictions are



# Confidence in Different Data

We run and test our model multiple times, on different data pulls, to build confidence in our predictive capabilities. The more we know about the data, the stronger we can predict.

RMSE	Naive - RMSE
6947.961538	177.647847

RMSE	Naive - RMSE
7093.012042	153.736767

RMSE	Naive - RMSE
7190.282860	174.222957

RMSE	Naive - RMSE
6967.965199	157.644186

# Summary/Key Takeaways

Our plan for supporting Wells Fargo's goals for loan portfolio optimization and process automation.

PROBLEMS WE ARE SOLVING OR OPPORTUNITIES WE ARE GOING AFTER	SUPPORT WE NEED TO ACHIEVE THIS GOAL	HOW WILL ACHIEVING THIS GOAL HAVE A GREAT IMPACT?	KEY METRICS. HOW WILL WE KNOW WE HAVE ACHIEVED THIS GOAL? HOW DO WE KNOW IF WE ARE SUCCESSFUL?	CHALLENGES WE'RE ANTICIPATING
<p>Loan Portfolio Optimization - Purchase, Cash Out Refinance, Purchase, and Refinance.</p> <p>To maintain a competitive edge, fine-tuned tools in specific LOB will enhance business understanding and decision making.</p>	<p>Predictive Forecasting-Support process automation for mortgage and auto lending underwriting.</p> <p>Having top down, bottom up support from Wells Fargo through individual LOB data and professional knowledge ensures mission success.</p>	<p>Risk Management and Net Loss Reductions-Development of Data Analytics for Better Decision Making.</p> <p>Through the use of new technology and implementation of a data science solution, Wells Fargo will continue to achieve high internal performance metrics and customer satisfaction.</p>	<p>Financial Results, Credit Quality of Loan Portfolios, Reduced Credit Losses for Loans and Model Repurposing</p> <p>Through a reduction of net losses in specific LOB and a reduction in loan defaults, as well as 70% automation of decision making across the company.</p>	<p>Potential Increases in Residential Cash Out Refinancing-Interest Rates</p> <p>Lending practices for VA and FHA Loans along with FICO Scores and DTIs are key considerations in future positive modeling results.</p>

## Objective

Increase portfolio performance in an automated fashion that allows the business to spend less time on assessing borrowers and more time on future growth and business solutions to more complex problems in alignment with the Q4-21 Wells Fargo Financial Report

## Data about Data

We are utilizing Fannie Mae data as part of a proof of concept. Evaluation of the market and data elements provide guidance on key variables important to good investments.

## Cost Structure

Our consulting team and strong data scientists will efficiently build models that can work and operate effectively well after our team has separated. Our goal is to build a lasting automated process that Wells Fargo can rely on.

## Solution

A combination of various decision tree models provides a level of predictability on loans based on values in the borrowers profile.

## Key Elements

As part of our discovery, both in the data and in the market, key variables are big indicators of a loans performance. Debt-to-Income Ratio, Borrower Credit Score, Loan to Value Ratio, Loan Term, and more end up being important metrics critical to understanding good loan issuance.

## Unique Value Proposition

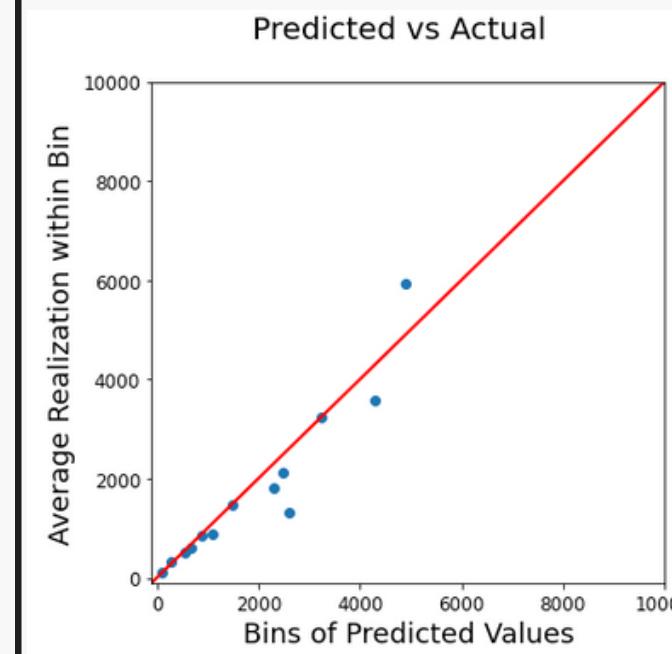
Setting Wells Fargo up for a stronger automated future with greater efficiency in their non-conforming loan portfolios, auto lending, and residential underwriting.

## High Level Concept

With Wells Fargo support, setting up automated models across all Lines of Business, and creating standards that are consistent across the business

## Predictability Provides Confidence

By proving model effectiveness, and by proving predictability, this allows our client to rely on automation tools and focus efforts towards future development and planning.



## Customer Segments

Residential Loans  
Auto Loans  
Single Family home buyers  
Cash-Out Refinancing

## Competitive Advantage

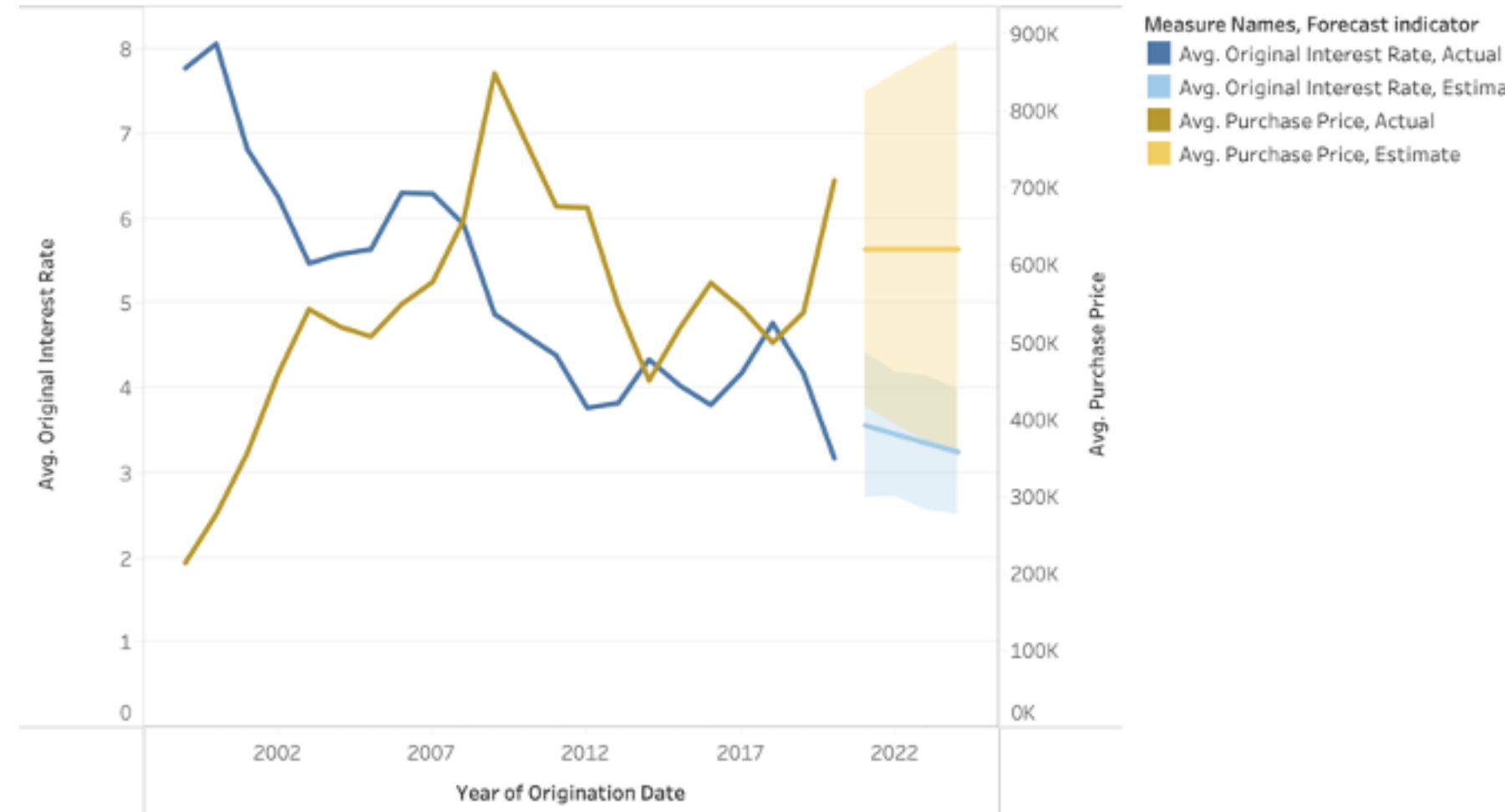
An automated approach gives us consistency which we can rely and plan on, as well as being faster than any human could.

## Revenue Streams

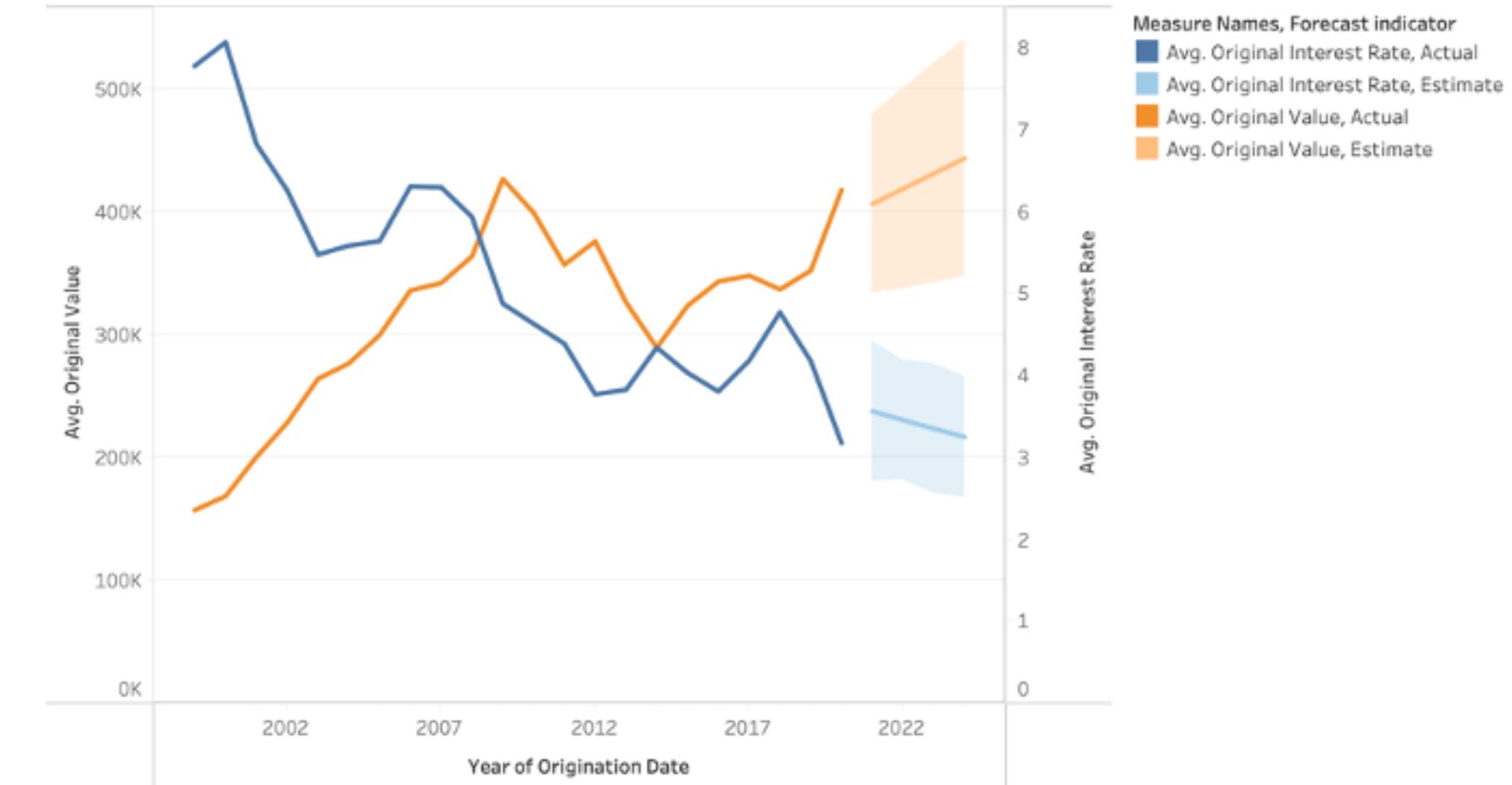
Predictability in our models allows Wells Fargo to project out their revenue streams and growth with confidence

# Wells Fargo Portfolio Analysis- Interest Rates

Wells Fargo Interest Rate Purchase Price



Wells Fargo Original Value Interest Rate

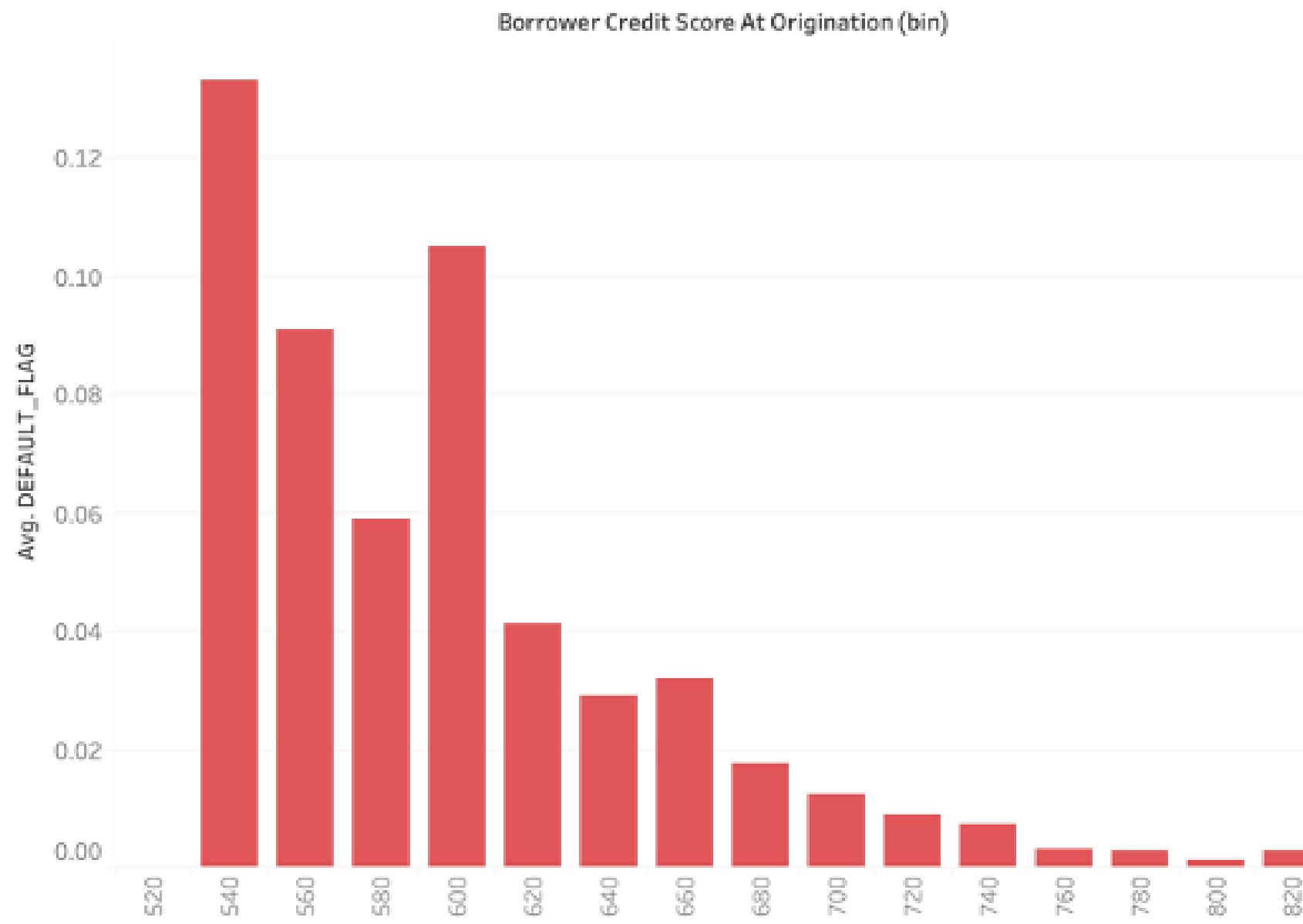


The trends of Avg. Original Interest Rate and Avg. Purchase Price for Origination Date Year. Color shows details about Avg. Original Interest Rate, Avg. Purchase Price and Forecast indicator. The data is filtered on Seller Name, which keeps Wells Fargo Bank, N.A..

The trends of Avg. Original Value and Avg. Original Interest Rate for Origination Date Year. Color shows details about Avg. Original Value, Avg. Original Interest Rate and Forecast indicator. The data is filtered on Seller Name, which keeps Wells Fargo Bank, N.A..

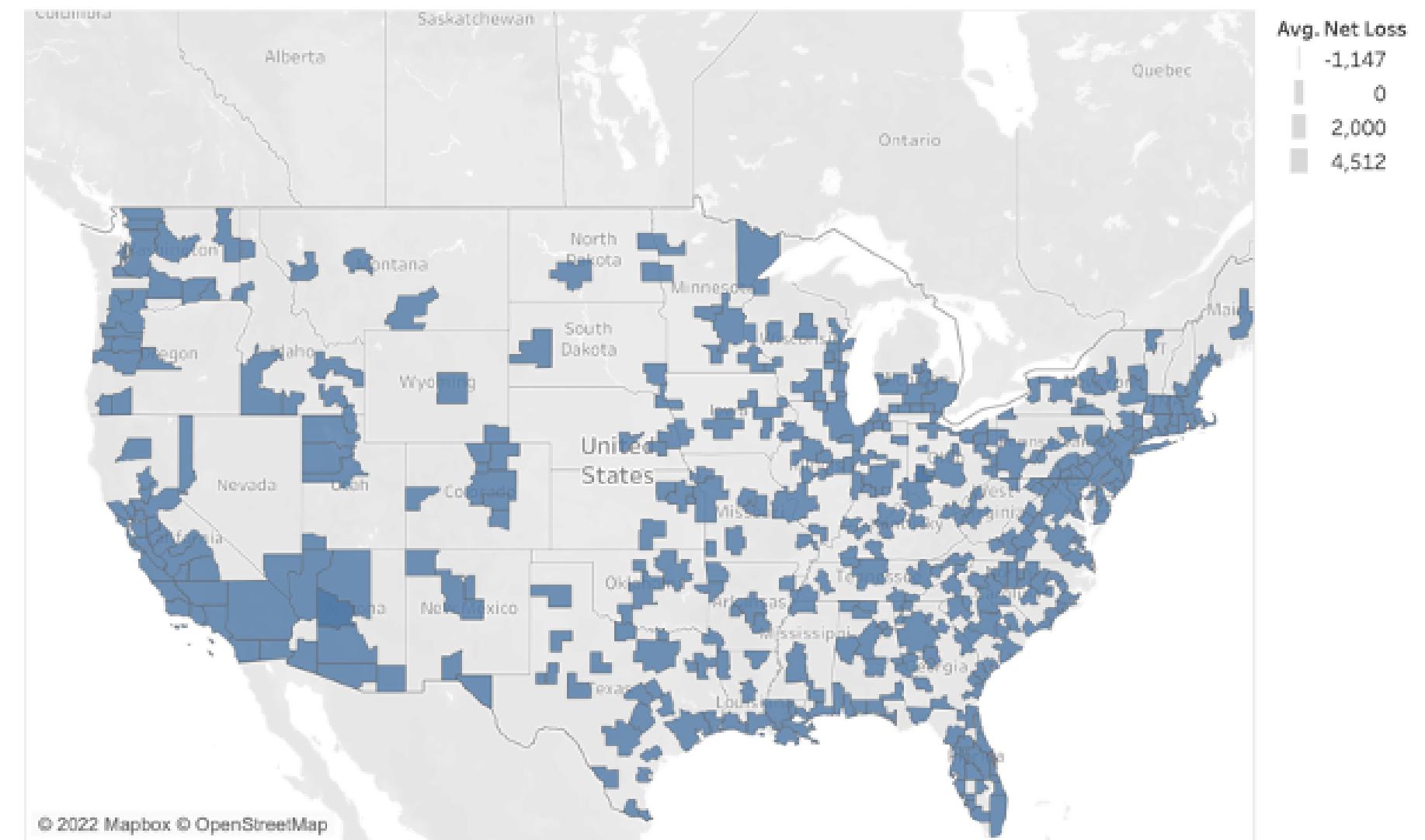
# Wells Fargo Default and Net Loss

Wells Fargo Default Credit Score



Average of DEFAULT\_FLAG for each Borrower Credit Score At Origination (bin). The data is filtered on Seller Name, which keeps Wells Fargo Bank, N.A.. The view is filtered on Borrower Credit Score At Origination (bin), which excludes Null.

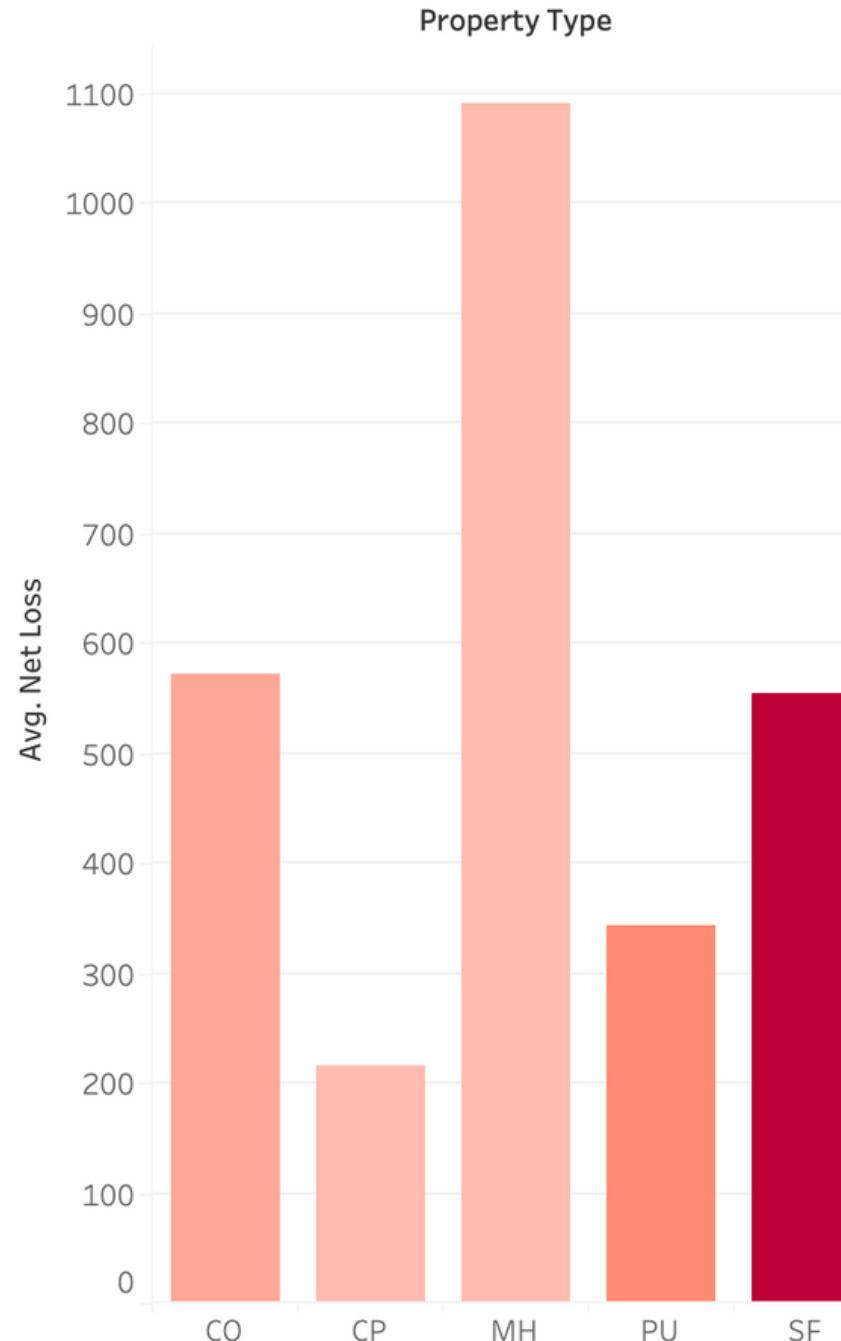
Wells Fargo Net Loss Map



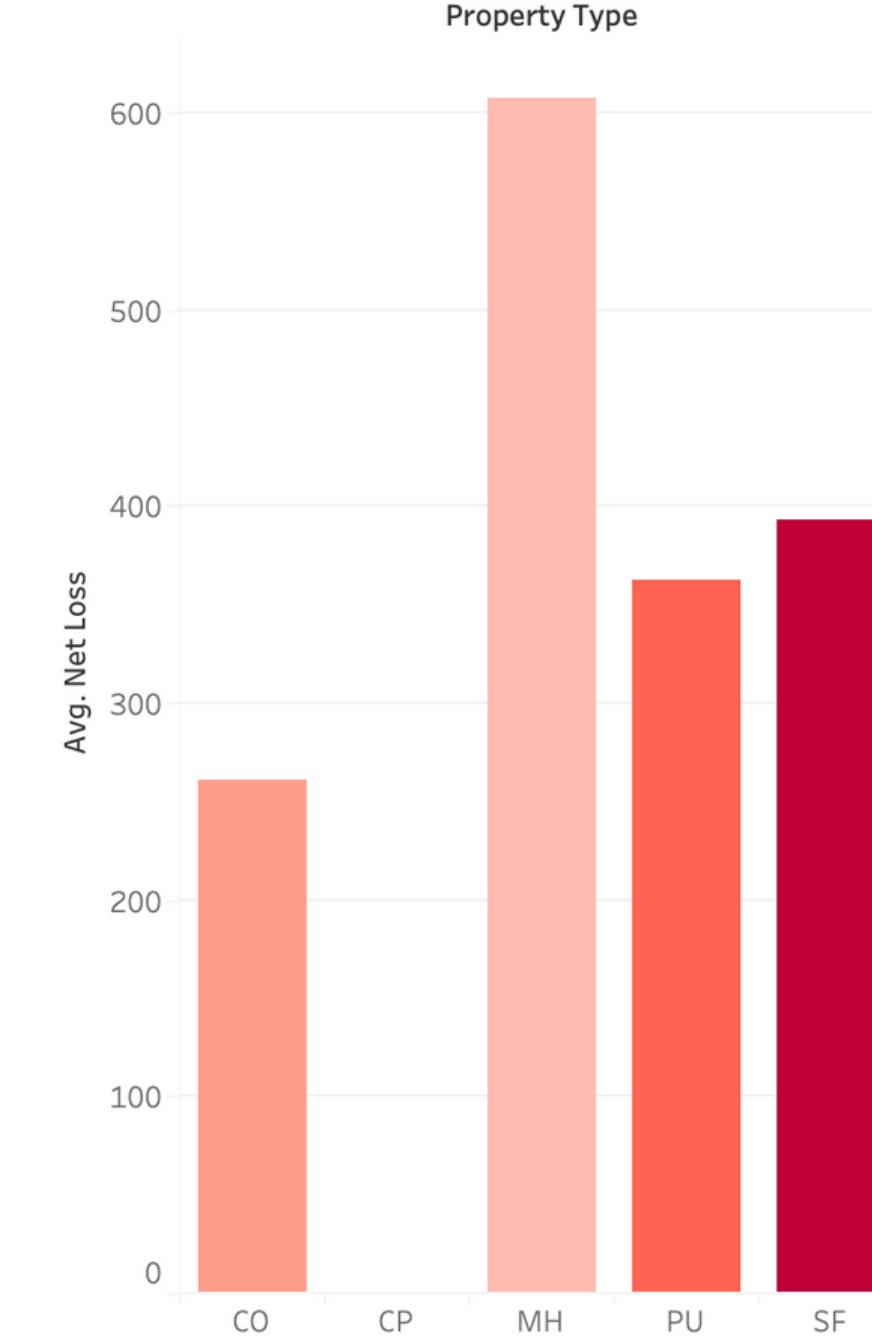
Map based on Longitude (generated) and Latitude (generated). Size shows average of Net Loss. Details are shown for MSA and Msa Name. The data is filtered on Seller Name, which keeps Wells Fargo Bank, N.A..

# Wells Fargo Portfolio Analysis

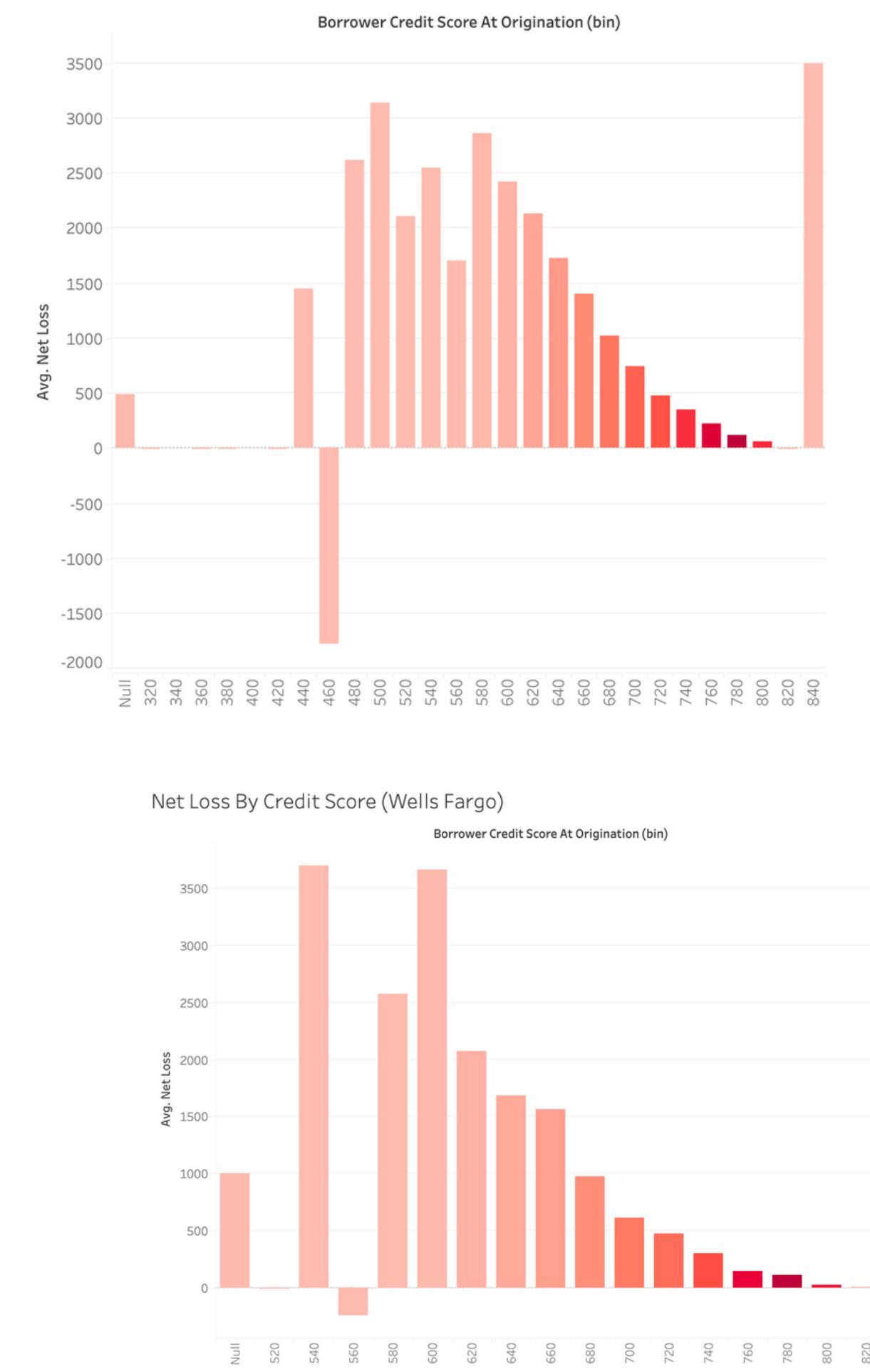
Net Loss By Property Type



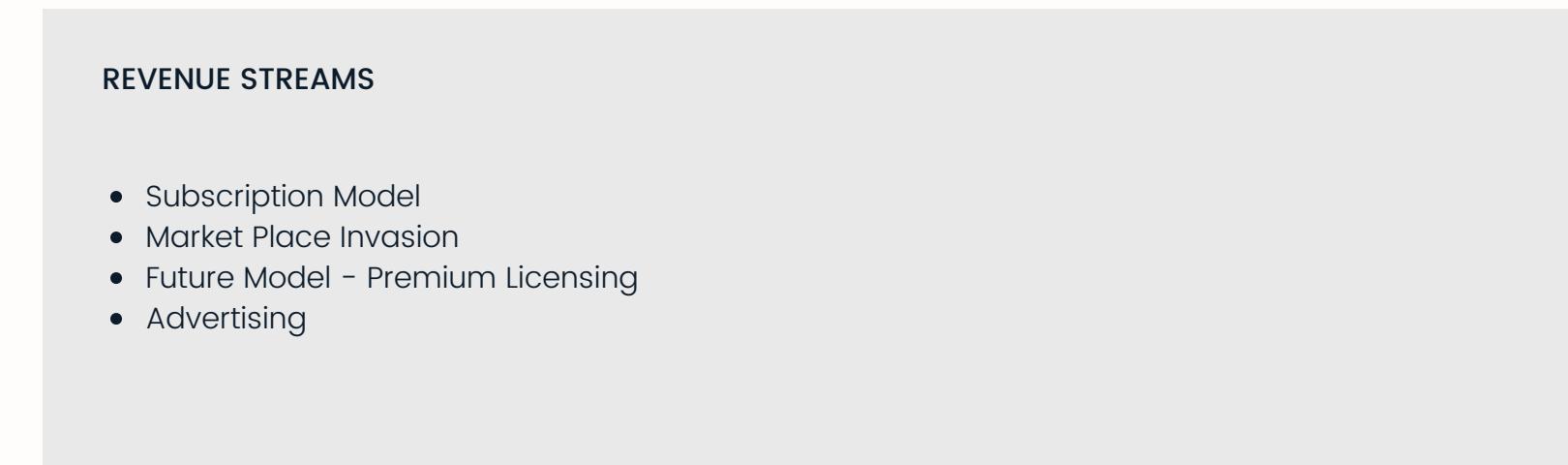
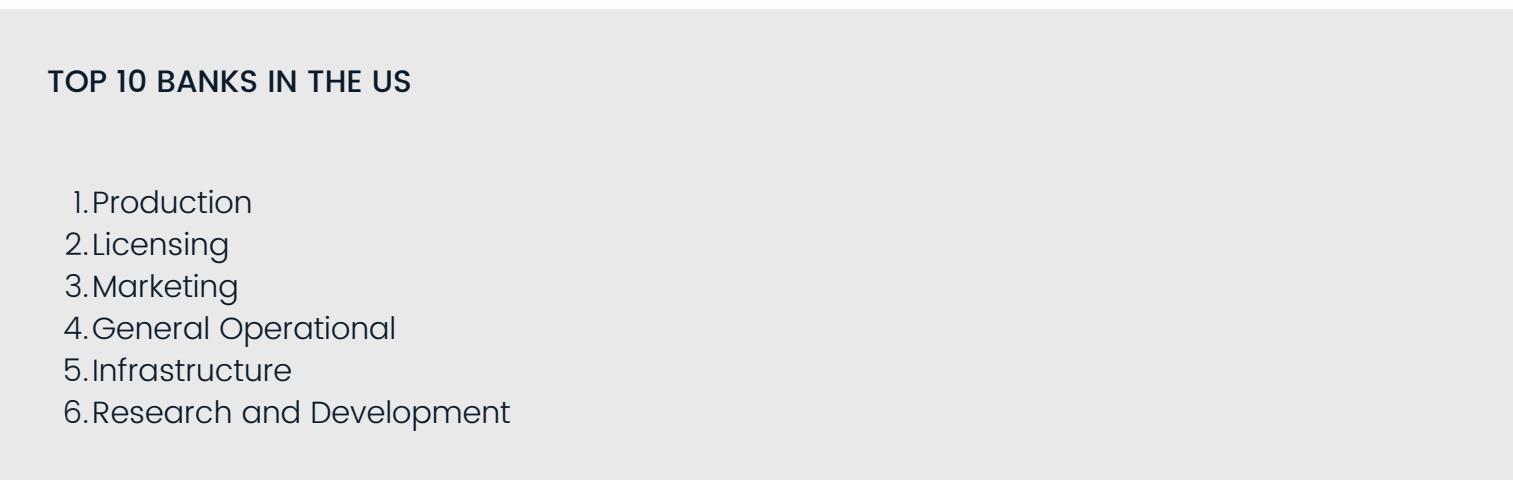
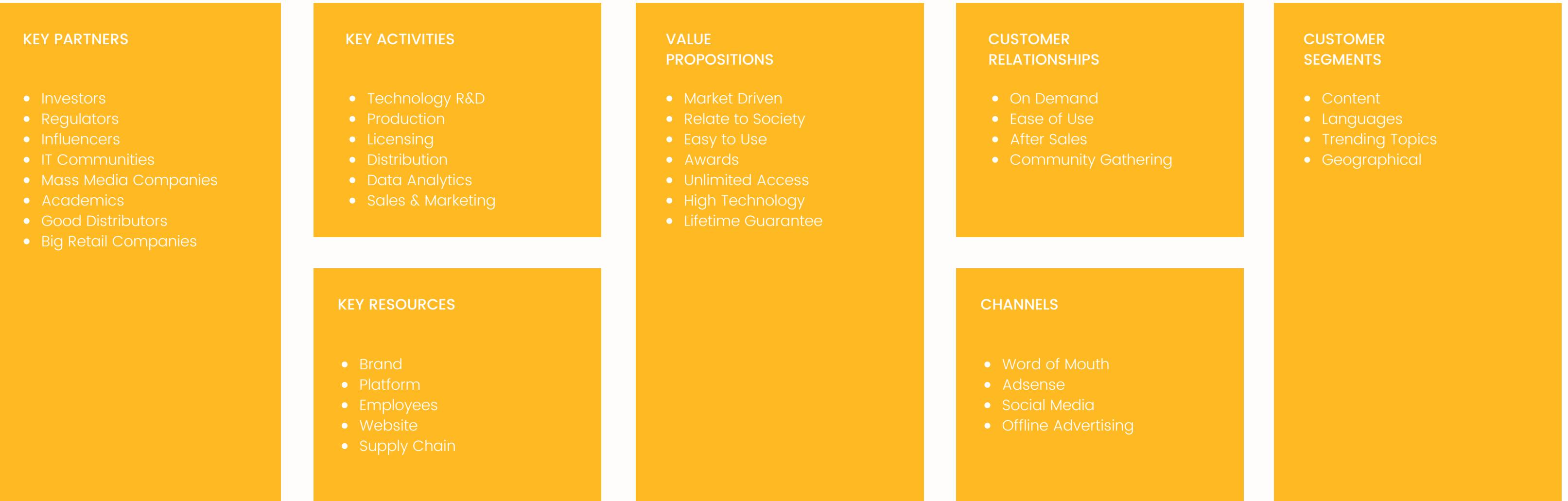
Net Loss By Property Type (Wells Fargo)



Net Loss By Credit Score



# Wells Fargo Bank Key Facts



# Timing

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List the reasons that it's the right time for your product or service.

## Reason 1

OnTimeApps is positioned to offer our services to reduce credit risk and lower net losses through portfolio optimization.

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## Reason 2

What are the trends these days that make your product or service possible?

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## Reason 3

Detail the opportunities in the market that have arisen that will make this possible.

# Our Roadmap



Build a product  
accessible on all  
devices

**OUR ROADMAP SHOWS THE FIVE SMALL GOALS  
WE NEED TO ACHIEVE WITHIN A YEAR.**

**1**

**January Goal:**  
Mobile app support

**4**

**August Goal:**  
Offline support

**2**

**January Goal:**  
Mobile app support

**5**

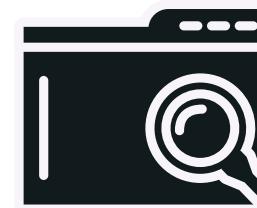
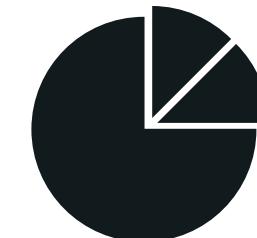
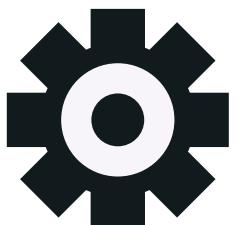
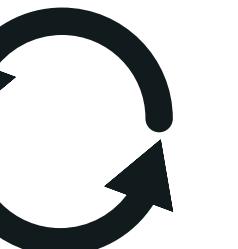
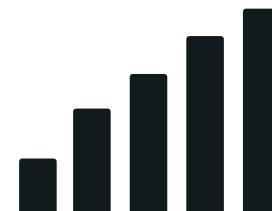
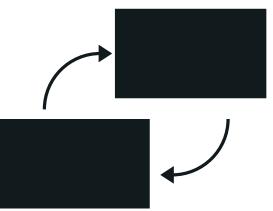
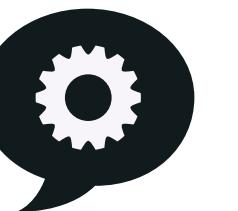
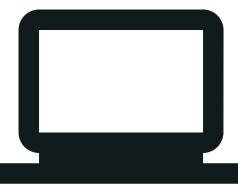
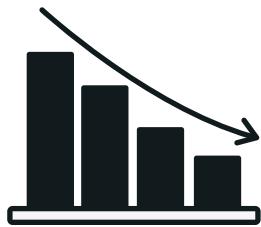
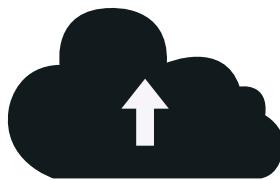
**November Goal:**  
Offline support

**3**

**May Goal:**  
Tablet computer support

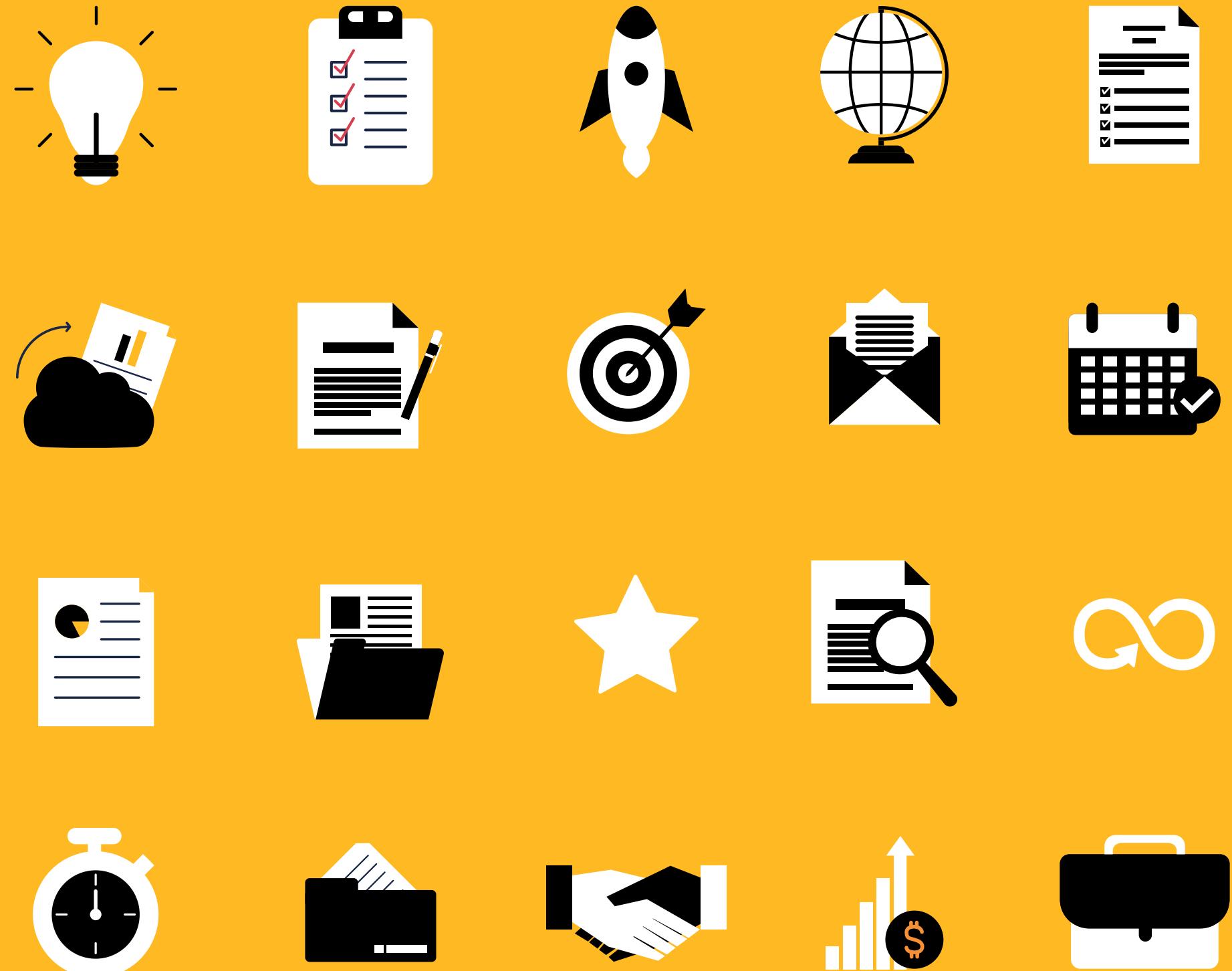
# Free Resources

Use these free, recolourable icons and illustrations in your Canva design.

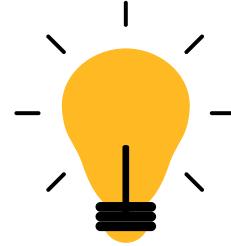


# OnTime Apps Resource Page

Use these icons and illustrations in your Canva Presentation.  
Happy designing!



# Our Solutions



**Provide digital transformation and product engineering services**



**Offer tailored products and subscription services to improve decision-making processes**



**Provide superior customer service and data-driven solutions**

# Wells Fargo Business Profile

**69,000,000**

**Provider  
partnerships**

Target number of  
new partner providers  
by end of 2025

**\$12.3 M**

**Client  
subscriptions**

Target revenue of client  
subscriptions earned  
by end of 2025

**123,456,789**

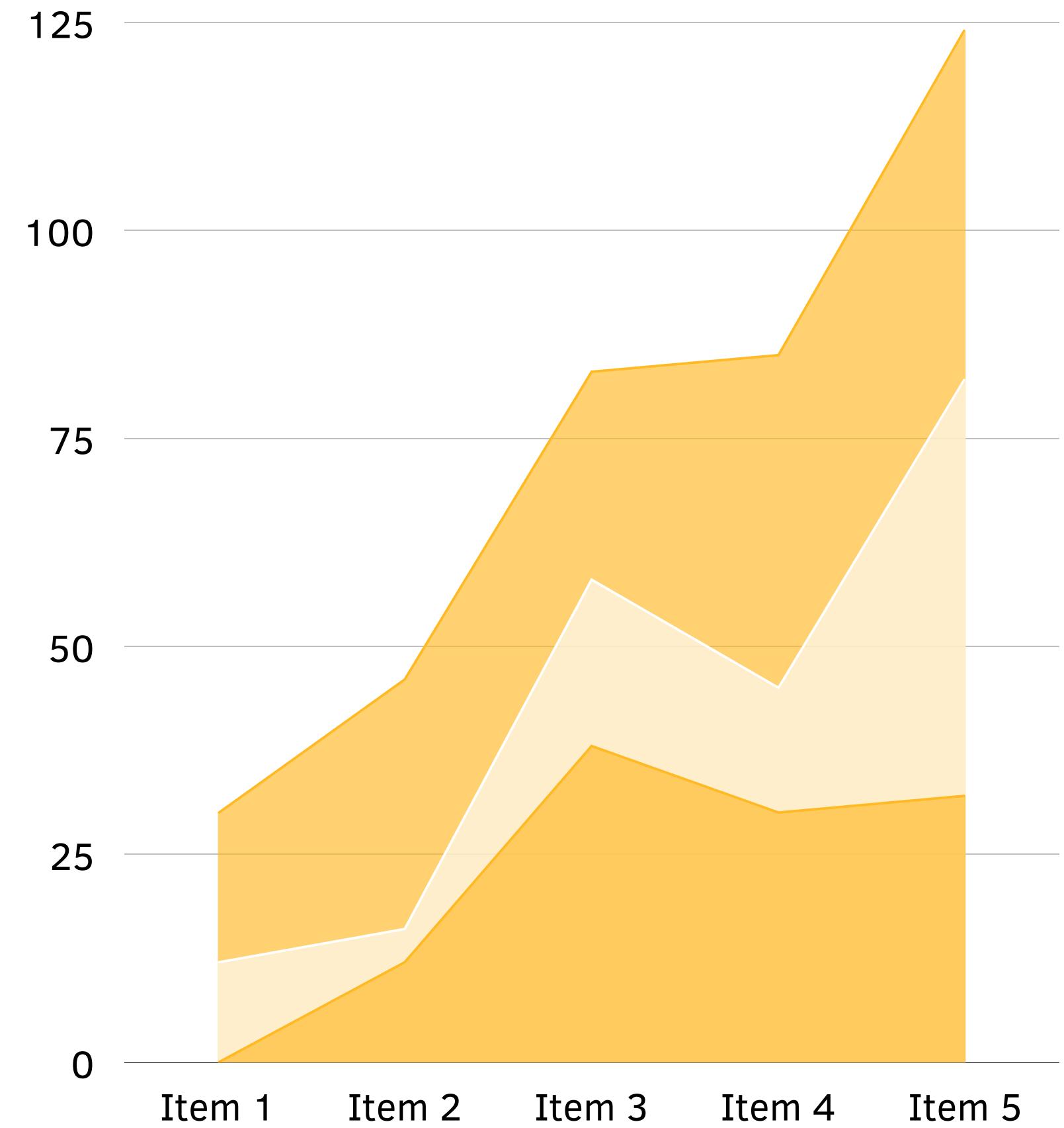
**Interactive virtual  
experiences**

Target number of new  
interactive virtual  
experiences by 2025



# OnTime Apps Traction

Where is your company currently at?  
Visualize with a graph to highlight  
significant developments.





# Data Analysis Target Market

Who are the customers you want to cater to?

## ■ Target Market 1

What are their profiles and visual personas?

## ■ Target Market 2

Visualize the people who will turn to you for solutions.



# Size the Market

Apply the two ways to size the market - top-down or bottom-up.  
Sizing jargon includes TAM, SAM, and SOM.

**20.9 Billion**

Total Available Market (TAM)

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**53 M**

Advanced Plan

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**\$40**

Premium Subscription Plan

# Direct Competitors



JP Morgan



Rocket Mortgage



Bank of America

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# Indirect Competitors



Write a company name here



Write a company name here



Write a company name here

# Competitive Advantages

Premier Predictive Data Analytics  
for Financial Institutions



## **Advantage 1**

Data Analytic Subscription Service  
your competitive advantages using a  
quadrant for easy scanning.

## **Advantage 2**

How is the landscape differentiated,  
and what makes you different.

## **Advantage 3**

What can you do better than your  
competition? How will you  
outperform them?

## **Advantage 4**

A company with strong competitive  
advantages is likely to survive in the  
long term.



# Competitor Approach

## Approach 1

Subscription Modeling Service for Banks

How will you set your company apart from the competition?

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## Approach 2

What's your path to reach your customers?

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## Approach 3

Events, partnerships, ads —

list the effective ways to reach them.

# Business Model

Show the ways your company plans to make money.

- Through a graph, timeline, or chart, present the viability of your product or service and tell how your company will make money and achieve goals.
- If you have plenty of ways to make money, focus on one main method, such as subscription or ads.
- Touch upon key metrics here, such as Life Time Value (LTV) and Customer Acquisition Cost (CAC).

# Meet the Team



**WILHELM KAMPTNER**

Chief Executive Officer

**SAMUEL THOMAS**

Chief Finance Officer

**WILL JACKSON**

Chief Operating Officer



# Data Analysis Subscription Service



Write an intriguing summary of what your company does.



# Future Roadmap

Data Analysis of Wells Fargo

What are your next steps and goals?

How much support do you need from investors, and what will it get you?



**STEP 1**

Q1 2025

**STEP 2**

Q2 2025

**STEP 3**

Q3 2025

**STEP 4**

Q4 2025