Competing for your member's business during uncertain times with AI

How well is your credit union positioned?

Can You Hear Me?

- We are audio broadcasting so please plug in your headphones or computer speakers to listen in.
- If your audio is choppy or slow, you may wish to dial into the teleconference:

- **Telephone:** +1 646 558 8656

  Webinar ID: 843 2822 1809

  Passcode: 856887

Slide Link

Today's slides can be found online at:
http://bit.ly/2022-07-20-zest

We Encourage Questions

Use the

Questions Box

located on the bottom of your screen to type your comments or questions.

Tell Us What You Think!

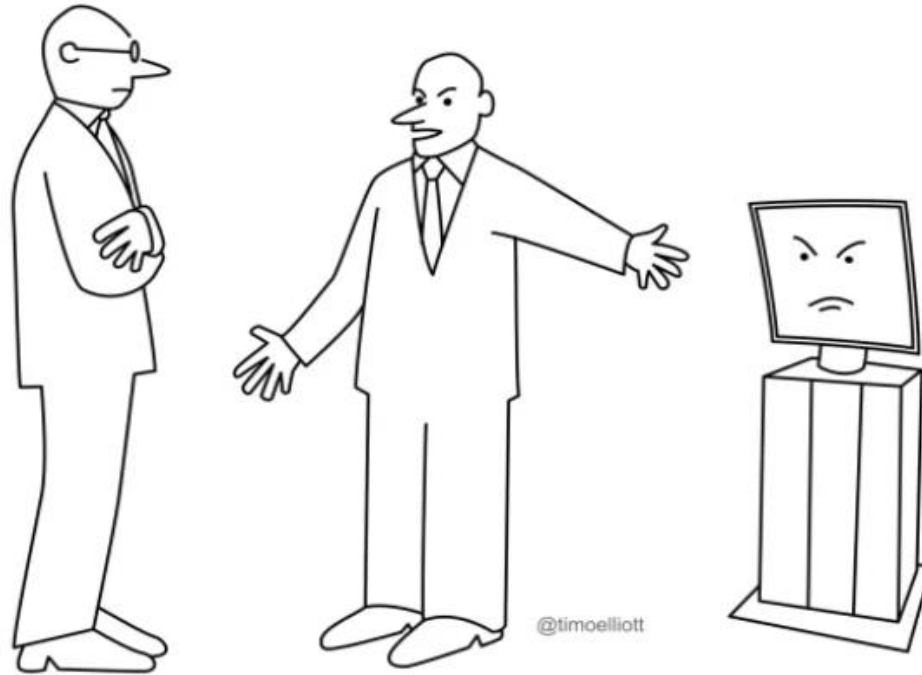**Please take our post-event survey. We value your feedback!**

Agenda

- Demystifying AI/ML
- About Zest AI
- Credit Union Objectives and Challenges
- Process in Building Auto Decisioning Model
- ABC Credit Union Model Result Example
- Q&A

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Demystifying AI and ML

Automated Decisioning

His decisions aren't any better than yours
— but they're WAY faster...

AI decisioning is not....

- Is not a physical robot for the processing of loans
- Is not a technology that allows for continuous learning with a disregard to compliance policies
- Is not technology that is intended to replace human interaction with members

ZEST AI
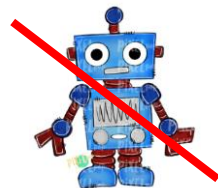
What is AI and ML?

<u>AI (Artificial Intelligence)</u>

The use of faster computing to process massive data and compute more algorithms (better math), to get better insights on data and then act on it.

<u>Machine Learning</u>

Using computing to apply algorithms that are able to learn things from past use cases without programming.

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Automation (AI)examples

- Travel booking system 1985 (DOT)
- Airport Check-in Kiosk 1995
- IBM Deep Blue vs Garry Kasparov 1997 (FIDE)
- Phone book replaced by search engines
- Apple Watch with fall detection

Big computers processing tons of DATA with better math and compliant

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About Zest AI

Who is Zest AI?

We are a CUSO and our mission is to make fair and transparent credit available to all of your members.

Our Automated underwriting platform enables Credit Unions to deploy and monitor powerful, compliant underwriting models swiftly and easily to benefit your members.

History of Zest

- Founded in 2009 by Google CIO

- Hired data scientist to build AI Models for lending

- Pivoted in 2016 focusing on banks, implementing customized AI Models with tools for the data scientist

- Worked closely with the regulatory agencies

Credit Union Pivot

- In 2019 Mike de Vere was announced CEO

- Making fair and transparent credit available to the underserved became Zest's core mission

- Strategy was to leverage the technology developed for banks and make Auto Decisioning (AI) available, scalable, and **affordable** for Credit Unions

Zest Credit Union Pivot

- May 2021 Zest began delievering taylored AI Underwriting Models based on specific membership data and portfolios

- Consulting fees were waived for the Proof-of-Concept (POC) model engagement

- Zest revised the pricing model for Credit Unions

Automated Decisioning Early Adopters

- 2021 40+ Credit Unions

- 2021 CURQL Investment

- 2022 Additional 80-100 Clients

- 2022 CUSO of the Year

Zest's New Clients

MAX Credit Union

Copper State Credit Union

Proceed Finance

Beehive Federal Credit Union

Achieva Credit Union

Redstone Federal Credit Union

GreenState Credit Union

SkyOne Federal Credit Union

Commonwealth Credit Union

First Service Credit Union

MIDFLORIDA Credit Union

PrimeWay Federal Credit Union

Alabama Credit Union

Mainstreet Credit Union

Service Credit Union

Community Choice Credit Union

Golden 1 Credit Union

Verity Credit Union

Clark County Credit Union

TruWest Credit Union

Kinecta Federal Credit Union

Space Coast

FirstLight Federal Credit Union

Farmers Insurance Federal
Credit Union

Pearl Hawaii FCU

Maps Credit Union

Evansville Teachers Federal
Credit Union

Credit Union of Texas

All In Credit Union

Altra Federal Credit Union

ZEST

Delivering 100's Compliant AI Models

- Zest was the first company to **testify before the Congressional Artificial Intelligence Task Force**
- The Federal Reserve **cites our work**, refers to Zest as "gold standard" and hosted Zest on the Fed's podcast
- The OCC adopted Zest talking points in its 2019 report on **risks in the banking system** (see pg 23)
- Zest has trained top bank examiners at FDIC, OCC, Fed Reserve, CFPB, and FHFA on how to **examine ML models**
- The National Fair Housing Alliance endorsed our ML underwriting tools to the nation's top bank CEOs

Regulators deem Zest the

" *Gold Standard in Machine Learning* "

ZEST AI

ZEST AI (NACUSO)

Best in adding value to members, creates an innovative solution to a problem, reduces operational costs and increases income for all credit unions.

CUSO
of the year!

- Collaboration
- Innovation
- Cooperative heart
- Business acumen
- Inspirational
- Future-focused

Credit Union Objectives and Challenges

Credit Union Core Objectives

Expand Credit & Drive Loan Growth

Increase lending volume and take rates

Safely Manage & Reduce Risk

Reduce loan losses and enable risk-based pricing

Increase Automation & Efficiency

Increase automated decisioning, streamline compliance

Enhance Market Competitiveness

linnovate quickly, identify and respond to trends faster

Drive Fairer Outcomes
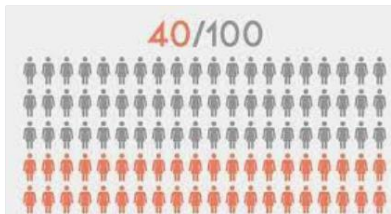
Improve fair lending outcomes and lend more inclusively
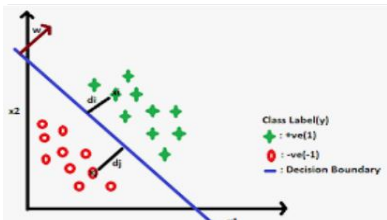
Improve Borrower Experience

Increase member satisfaction

Today's Credit Union Challenges

40%

Of Americans are difficult for lenders to assess accurately

Source: CFPB and Experian

20-40

Year old scoring techniques are out of date

83%

Credit unions take longer than 30 minutes to approve or deny a member loan

Source: Zest NACUSO Survey

50%

Fintech share of personal loans business

Source: Experian and Allied Market Research

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How are Fintechs doing it?

ZEST AI
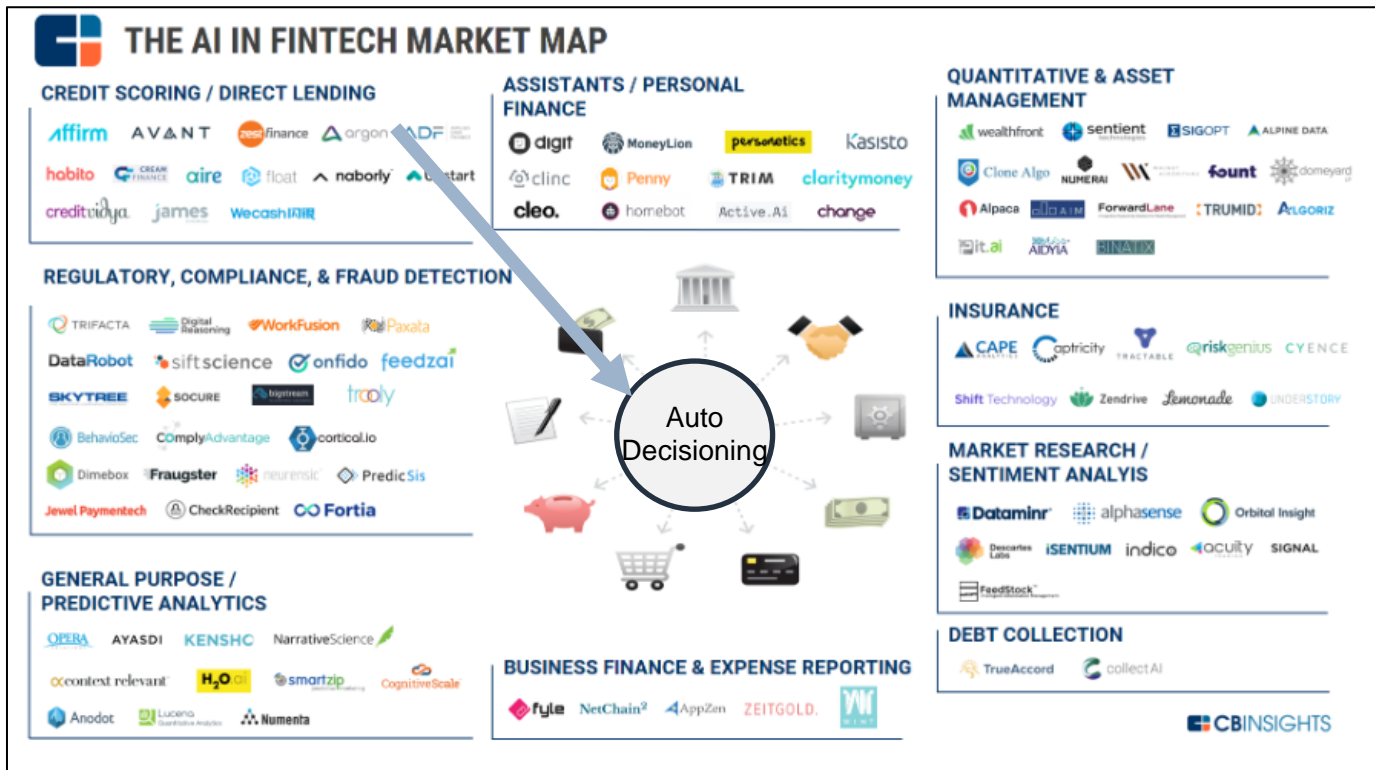
What tiers are Fintechs targeting?

SWAPSET RESULTS BY CREDIT TIER

Tier A+ ▲ 2%
Tier A ▲ 11%
Tier B ▲ 39%
Tier C ▲ 36%
Tier D ▲ 115%

Percentage of Total Applicants

Benchmark / Fintech
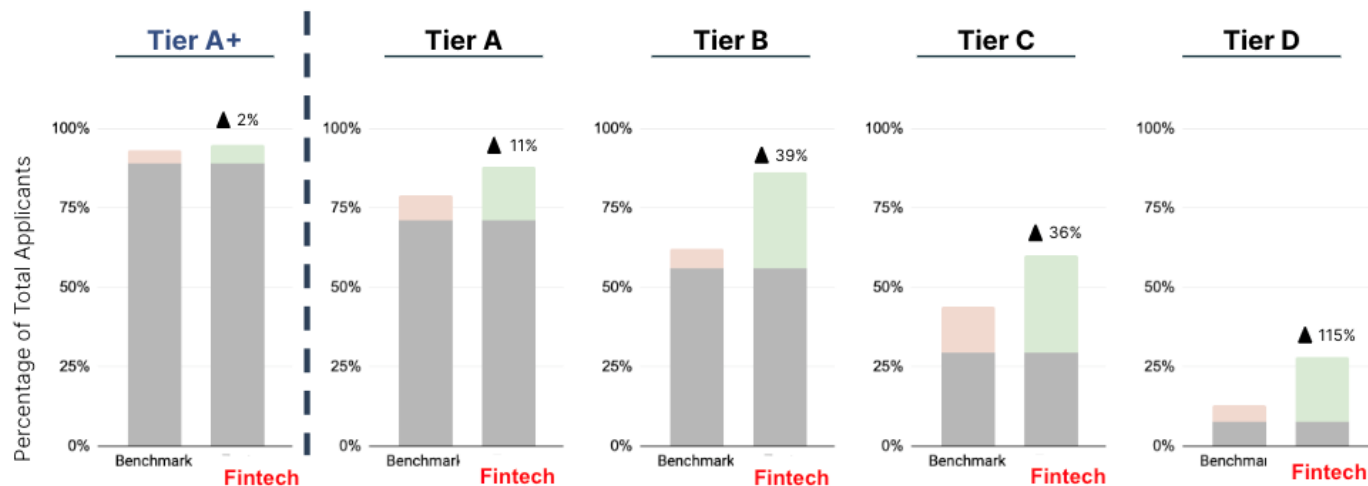
20-30%

Overall approval rate increase versus Benchmark

LEGEND ● In-In ● Swap-Out ● Swap-In

Process in Building Auto Decisioning Models to Compete

Data required to build a model

Organizational Questions										
1. Credit Bureau used:										
2. States the Client is operates in (or would like to operate in the future):										
3. Business goal (Reduce losses, increase approvals, automation)										
4. Current model / scorecard										
a. In house Custom? If yes, Logistic Rregression? App features/non-std Bureau data?										
b. Vendor Custom? If yes, Logistic Regression? Who? App features/non-std Bureau data?										
c. Primarily FICO Score										
d. Primarily Vantage Score										
e. Other:_____										
5. Current LOS:										
6. Product Specific Credit score distribution (if custom feel free to create own matrix):										

Product Line Information Direct Auto	Portfolio Level Statistics	Credit Tier Stratification (Use whatever makes sense)							
		Credit Tier A+	Credit Tier A	Credit Tier B	Credit Tier C	Credit Tier D	Credit Tier E	Credit Tier F	NO SCORE
	Portfolio Total	Superprime	Prime	Prime	Near Prime	Subprime			
FICO/Vantage Range									
Total Applications (#)									
Auto Approvals (#)									
Auto Denials (#)									
Total Approved (#)									
Total Funded (#)									
Total Origination ($)									
Average Funded Amount									
# of loans charged off									
Average Amount Charged off ($) per Bad									
Average Value of a Good Loan									
Average Interest rate charged									
Average Loan Term									
Average Loan life									

ZEST AI

Modeling starts with a LOT of data

Pool of data from the relevant bureau

- National Sample
- Multiple Loan Products
- All Credit Tiers
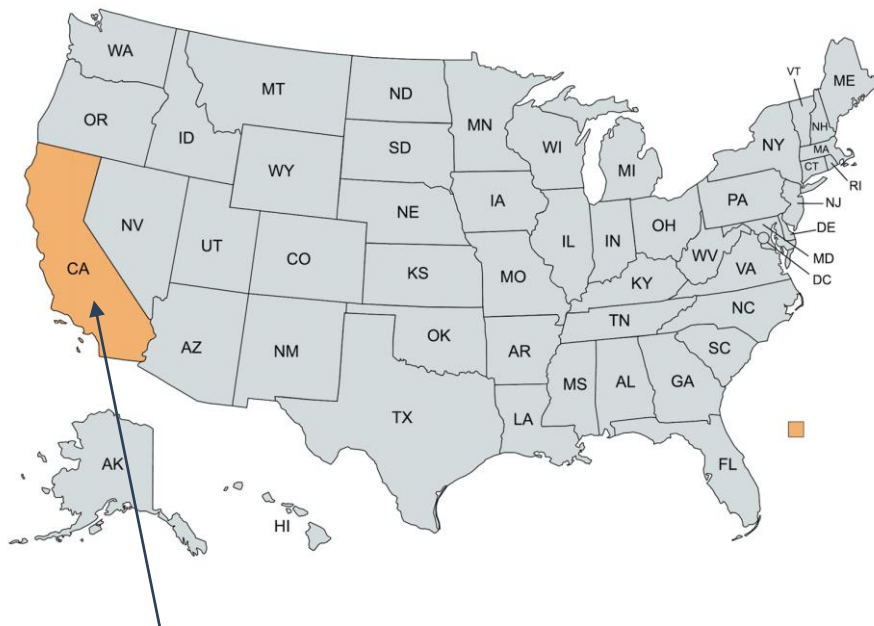
ZEST

Preliminary Model

Profile of Current + Future Customers

Pool narrowed down to your:

- Geography
- Specific loan product(s)
- Credit tiers distribution

Built using a large, representative sample of lookalike bureau data

The lookalike sample will mirror the demographics of the communities served today and hope to serve in the future

Using a lookalike sample allows the model to learn from millions of records

Preliminary model performance will be compared to FICO / Vantage Scores

ZEST AI

Model optimized & validated with CU specific data
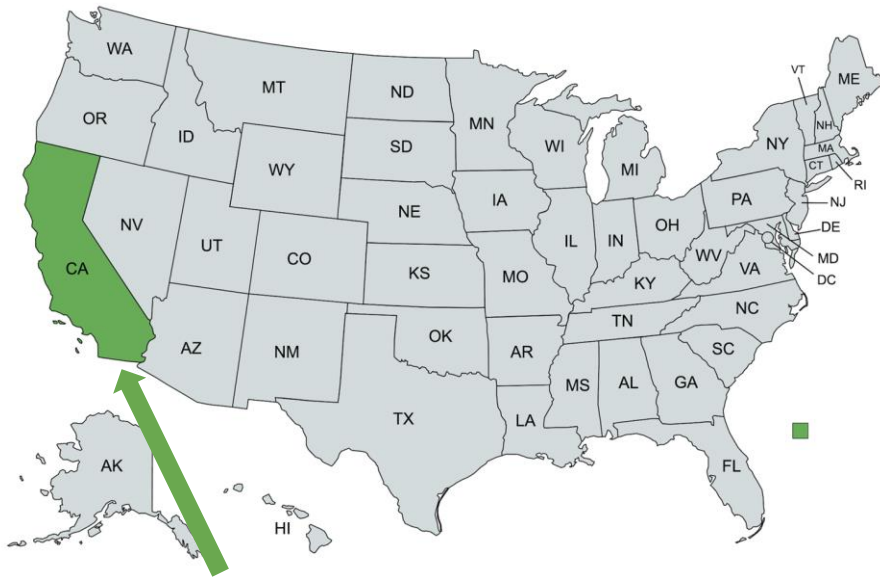
Member historic data included for:

- Validation
- Optimization

Lender specific data
The final model will include bureau sourced loan performance data (including reject inference) & member application data

Fully compliant MRM including
economic benefit, swap set analysis, fair lending analysis, and deployment plan

Full access to Model Management System
The final model is available within the MMS in 30-45 days following receipt of lenders data.

ZEST AI

Status Quo Score vs. Zest Score

ML consistently outperforms traditional methods

Traditional Scorecards /Logistical Regression	Machine Learning / Artificial Intelligence
Limited to 10-50 variables One-way static	**Use 100s or 1000s of variables with ML**
Relationships must be monotonic (move only in one direction)	Can model more realistic, non-monotonic relationships
Variables must be independent and be uncorrelated	No independence assumption made, no data constraints required
Results	
Status Quo Charge-Off and Approval Rates Unchanged Same Results	**10-25% increase in approval rate, serving the underserved. Allows CU to price competitively in the mid-tiers**
More sensitive to input fluctuation because fewer inputs are used	Models are more stable and less sensitive to changes in variables

ZEST AI

Gain a clearer picture of every borrower

Incorporate more data
Often data you already have

Model more variables
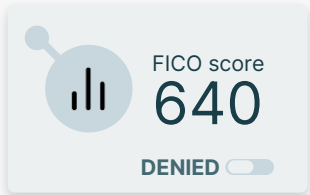Hundreds of variables and interactions boost accuracy and resiliency

Swap risky borrowers for good ones
Custom scores and analyses boost performance

Current Process

FICO score
760
APPROVED

accounts owned

late payments of 30-60 days

new credit accounts

years credit history

credit mix

FICO score
640
DENIED

Automated Underwriting

FICO score
760
APPROVED
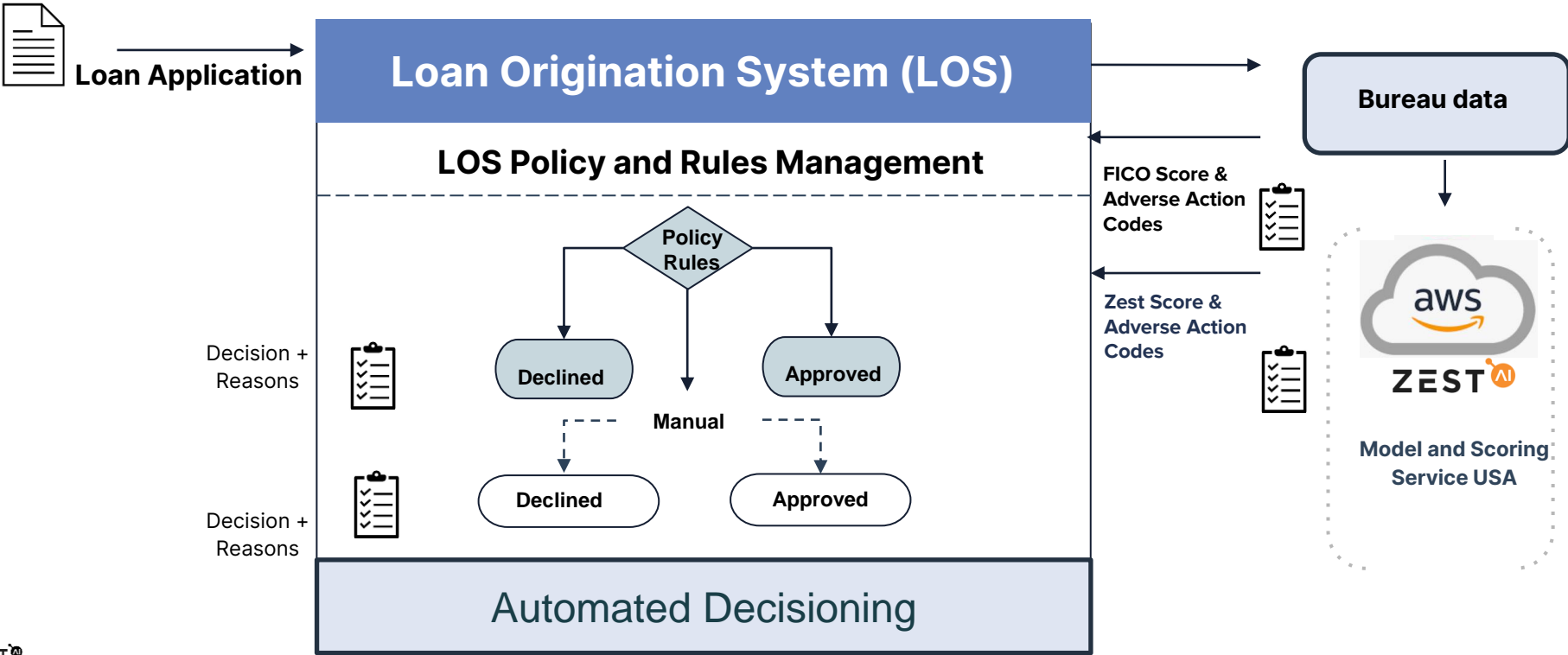
accounts owned

late payments of 30-60 days

new credit accounts

years credit history

credit mix

% of trades reported last month

# of loans never delinquent

Overall balance to credit amount

Present status on all trades

$ total available credit limit

FICO score
640
APPROVED

Maximum single balance

ZEST AI

Integrate Model with your LOS

Zest is Compliant

FCRA

Legislation passed in 1970 outlining rules for credit reporting and information management

ECOA Reg B

Legislation passed in 1974 barring discrimination in lending based on protected classes

SR 11-7

A supervisory letter from the Federal Reserve on proper development, implementation, and use of risk models in lending.

Adverse Action Notices

This is important for model explainability and presents a challenge to many ML solutions. A model must be able to determine which key factors led to loan decision.

Fair Lending & Disparate Impact

This is important for model inputs and outcomes analyses to ensure a lender is not intentionally or inadvertently discriminating against a protected class.

MRM Criteria & Guidelines

This requires extensive documentation regarding how a model was built, including validation exercises. It also includes how the model will be implemented and managed. Plus, compliance officers require separate fairness documents to ensure satisfactory model management.

Highly differentiated intellectual property, with underlying tools accepted by regulators and lenders

Zest IP assets

Fair Lending

- ✓ Automated disparate treatment and disparate impact testing
- ✓ Less discriminatory alternative search
- ✓ Adversarial de-biasing
- ✓ Adverse action

Explainability

- ✓ Human-readable descriptions explaining why model decided to approve/deny
- ✓ Feature importance & partial dependence plots
- ✓ Explaining stacked and heterogenous models

Comprehensive, automated documentation

Regulator Acceptance

- ○ Regulators deem Zest AI as the "**Gold Standard**" in ML

- ○ Zest AI clients' have **passed risk management audits** with Federal regulators

- ○ Zest AI is a **supervised service-provider to covered entities**, and is under the purview of the CFPB

- ○ Zest AI has trained top bank examiners at FDIC, OCC, Fed Reserve, CFPB, and FHFA on how to **examine ML models**

ZEST AI

Proof of Concept Model Results

ABC Credit Union

Data sheet to build preliminary model

Product Line Information Direct Auto	Portfolio Level Statistics	Credit Tier Stratification (Use your actual credit tiers)							
		A+	A	B	C	D	E		
	Portfolio Total	Super prime	Prime	Prime	Near Prime	Subprime	Subprime		
FICO/Vantage Score Range		720+	690-719	660-689	640-659/No score	600-639	<=599		
Total Annual Applications (#)	1774	1035	200	150	148	96	145		
Automated Decision %	0								
Total Annual Approved (#)	1299	877	169	106	68	54	46		
Total Annual Funded (#)	1276	867	139	106	66	51	45		
Total Annual Origination ($)	$ 27,455,511.39	$ 20,225,509.27	$ 2,926,577.71	$ 1,923,112.39	$ 991,069.75	$ 747,754.44	$ 641,487.83		
Average Funded Amount	$ 21,516.85	$ 23,247.21	$ 21,054.52	$ 18,142.57	$ 15,016.21	$ 14,661.85	$ 14,579.27		
Average Interest rate charged	3.52	2.37	3.51	5.1	6.37	9.67	10.94		
Average Loan Term	63								
Average Loan life	24								

Product Line Information Indirect Auto	Portfolio Level Statistics	Credit Tier Stratification (Use your actual credit tiers)							
		A+	A	B	C	D	E		
	Portfolio Total	Super prime	Prime	Prime	Near Prime	Subprime	Subprime		
FICO/Vantage Score Range		720+	690-719	660-689	640-659/No score	600-639	<=599		
Total Annual Applications (#)	3369	966	315	381	470	466	771		
Automated Decision %	0								
Total Annual Approved (#)	1150	670	142	130	92	79	37		
Total Annual Funded (#)	710	336	93	80	76	63	62		
Total Annual Origination ($)	$ 18,146,720.00	$ 8,869,221.00	$ 2,678,208.00	$ 2,146,759.00	$ 1,585,391.00	$ 1,493,228.00	$ 1,373,912.00		
Average Funded Amount	$ 25,416.00	$ 26,396.00	$ 28,798.00	$ 26,834.00	$ 22,051.00	$ 23,702.00	$ 22,160.00		
Average Interest rate charged	5.25	2.97	3.99	5.46	7.14	10.53	11.72		
Average Loan Term	67								
Average Loan life	29								

ZEST AI

ABC CU's Automation Goals

- Saying "Yes" to more members

- More fairness to all members regardless of class

- Keeping risk constant in targeted lower tiers

- Compliant for all applicants

ZEST

ABC CU Economic Analysis

Increase Approvals Safely

Using more data and better math

Results for ABC Credit Union

Expand Signal

280

Features from raw credit report data allow for a more complete assessment of risk

Grow Safely

19%

Weighted average additional approvals compared to the Benchmark without additional risk

Increase Originations

$86M

Annual increase in originations from the Zest model thanks to 4,812 additional loans made per year

Increase Value

$4.5M

Additional interest income from the Zest model per annual vintage

Auto-Decision

80%+

Power of AI model, better prediction of borrower risk and higher confidence to auto-decision

ZEST

Model Inputs

Bureau-only model trained using over 1 million borrowers

Modeling Target

Bad = DQ60+ in 24 months

---

*DQ60+ in 24M shows a **high true positive** rate and a **low false positive** rate versus charge-off. Longer seasoning window less of a concern given large sample size.*

Bureau Tables

1. Tradelines
2. Inquiries

***Tens of millions of individual data points** across these two bureau tables provide the model ample information from which to learn repayment patterns.*

Train & Test Splits

SET	TIME PERIOD
Train	January 2016 - June 2018
Test	July 2018 - December 2018

---

*Millions of borrowers in Training represents **a massive improvement** over Client data alone. Test set provides unbiased view of model lift and stability.*

ZEST AI

Statistical Accuracy

KS comparison indicates massive lift over the National Credit Score across credit tiers
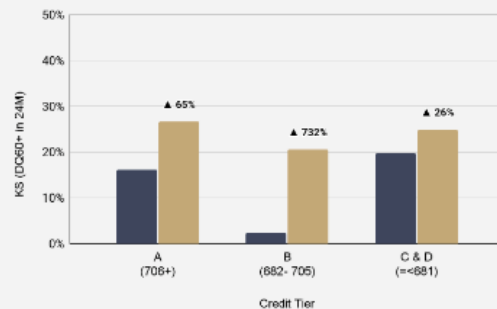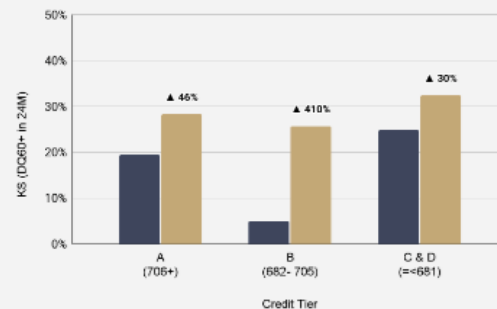

AUTO
Zest vs. National Credit Score
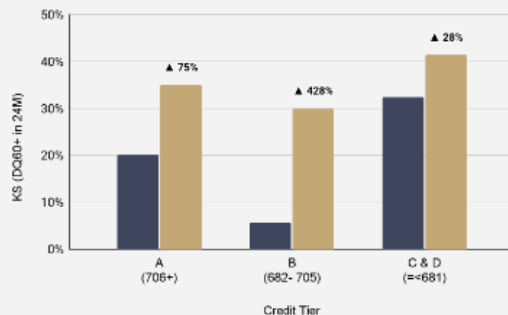
PERSONAL LOAN
Zest vs. National Credit Score
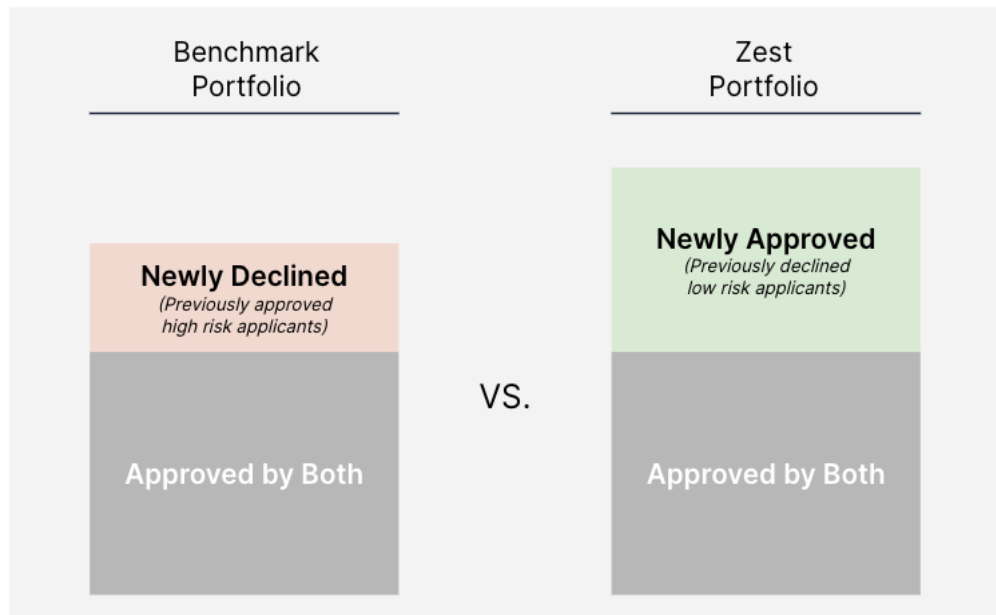
CREDIT CARD
Zest vs. National Credit Score

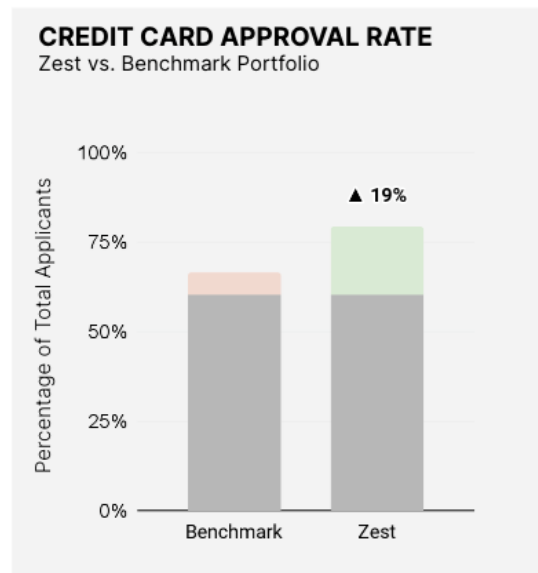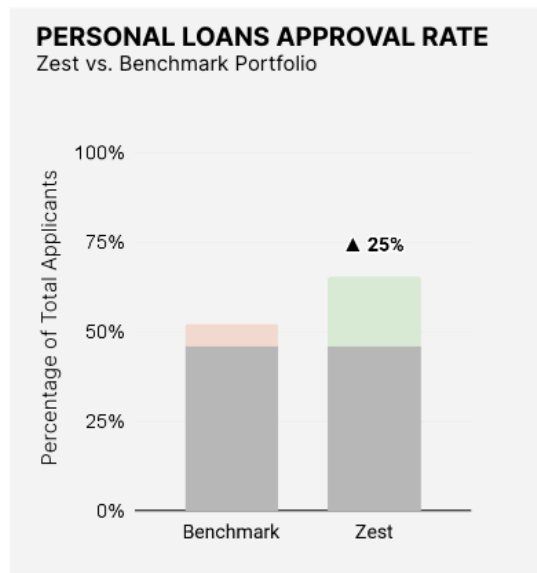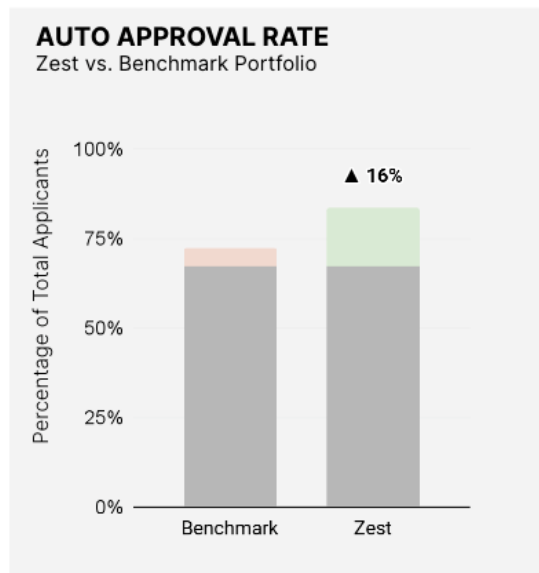LEGEND ● National Credit Score ● Zest

Approve more good borrowers

Economic value is estimated by comparing the size of the Benchmark portfolio to the Zest portfolio

Benchmark Portfolio	Zest Portfolio

Newly Declined
(Previously approved high risk applicants)

Newly Approved
(Previously declined low risk applicants)

VS.

Approved by Both | Approved by Both

By **replacing high risk borrowers with low risk ones**, you can approve significantly more borrowers without increasing risk.
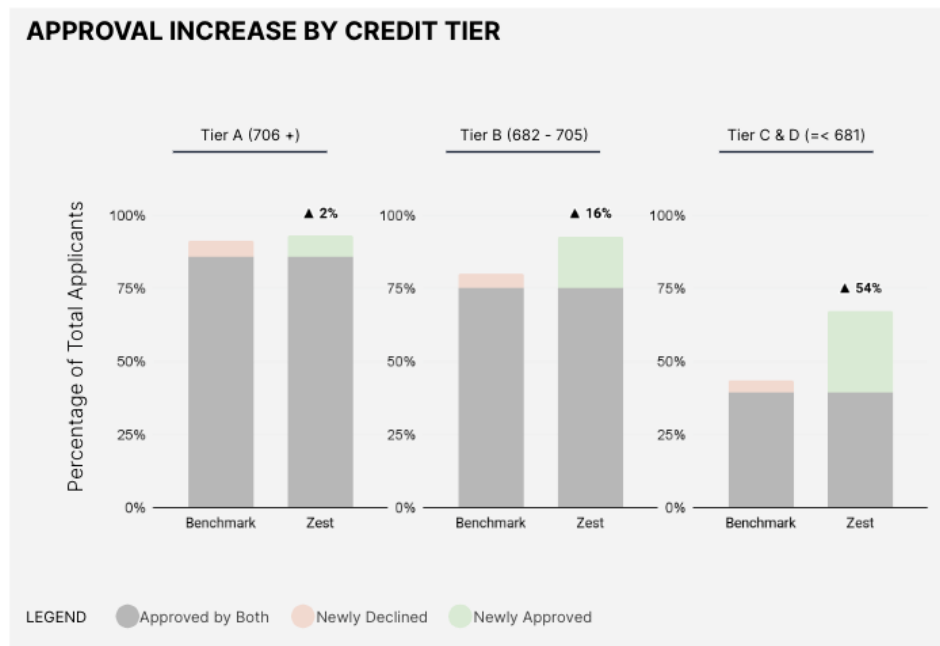
ZEST

All Products: Approvals

Significant approvals across product portfolios while holding benchmark risk constant

AUTO APPROVAL RATE
Zest vs. Benchmark Portfolio

▲ 16%

PERSONAL LOANS APPROVAL RATE
Zest vs. Benchmark Portfolio

▲ 25%

CREDIT CARD APPROVAL RATE
Zest vs. Benchmark Portfolio

▲ 19%

LEGEND ● Approved by Both ● Newly Declined ● Newly Approved

Auto: Increase approvals by 16%

Holding risk constant, we calculate the auto approval rate increase per tier enabled by the Zest model

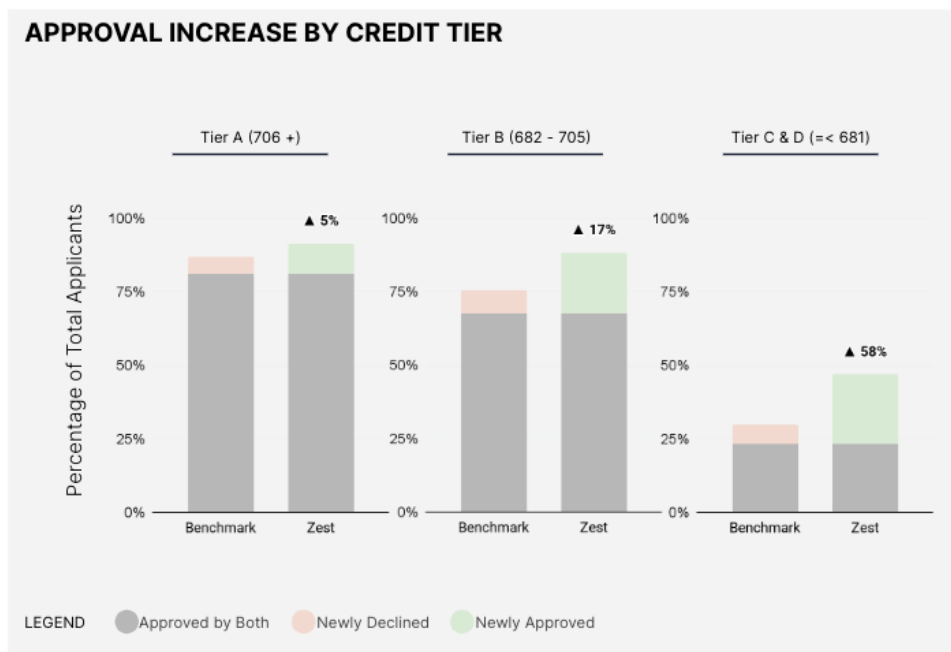**APPROVAL INCREASE BY CREDIT TIER**

16%

Overall approval rate increase versus Benchmark

Personal: Increase approvals by 25%

Holding risk constant, we calculate the auto approval rate increase per tier enabled by the Zest model


APPROVAL INCREASE BY CREDIT TIER

25%

Overall approval rate increase versus Benchmark

Credit Card: Increase approvals by 19%

Holding risk constant, we calculate the auto approval rate increase per tier enabled by the Zest model
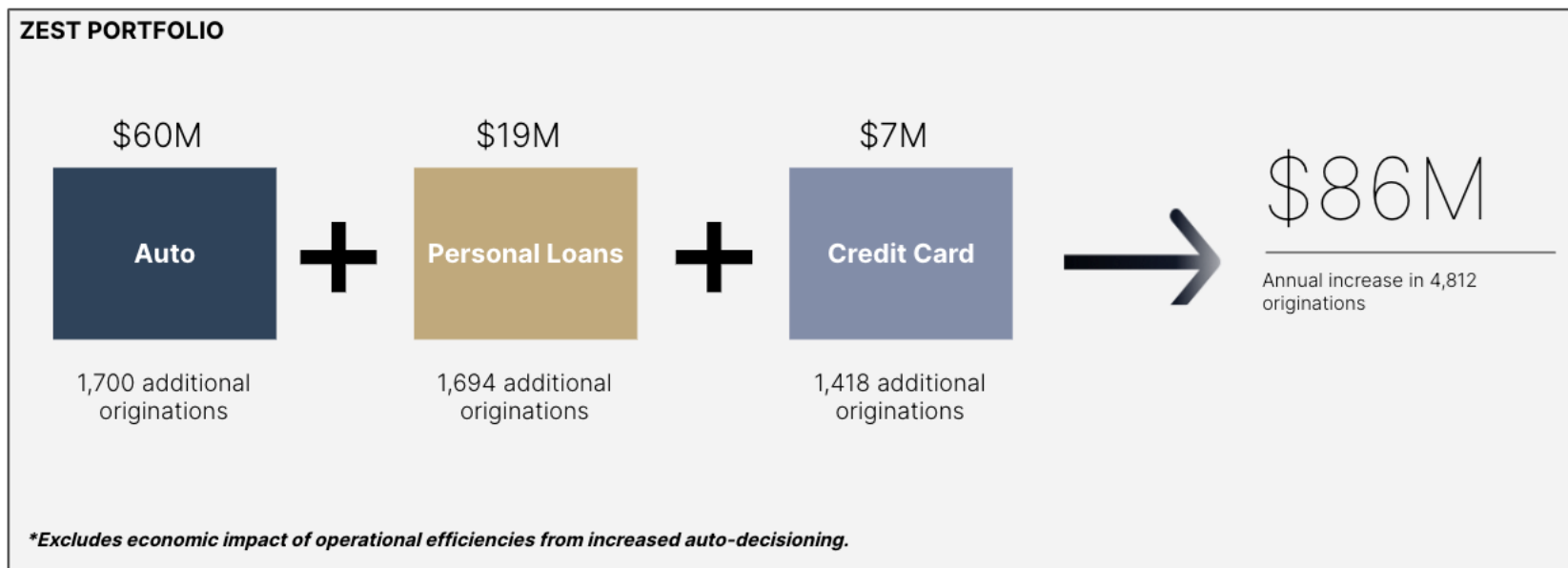

APPROVAL INCREASE BY CREDIT TIER

19%

Overall approval rate increase versus Benchmark

LEGEND — Approved by Both — Newly Declined — Newly Approved
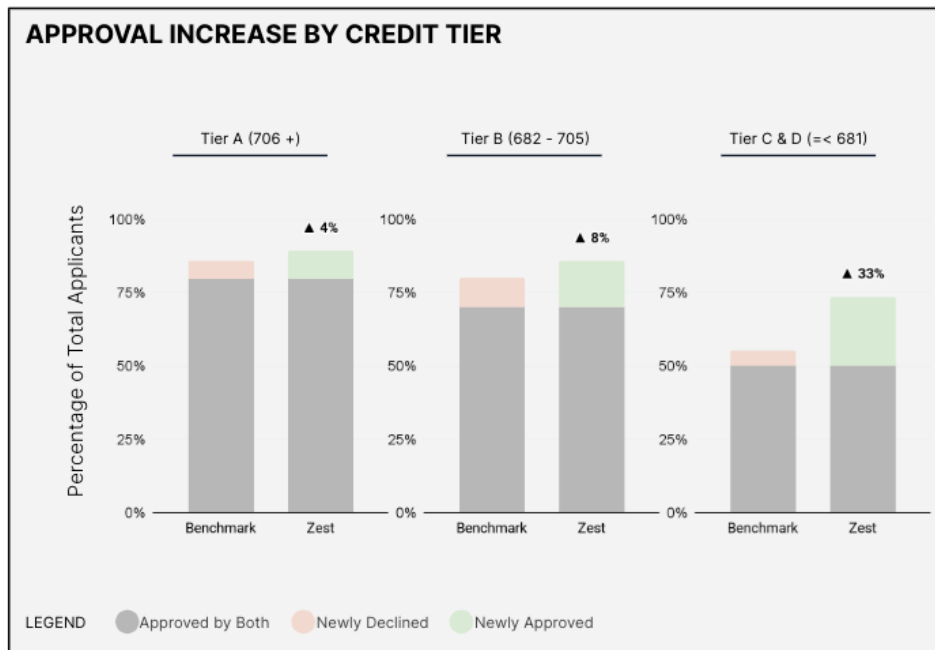
ABC CU Says "Yes!" to more members

Approval increases across product portfolios equates to 4,812 more loans without increasing risk

ZEST PORTFOLIO

$60M **+** $19M **+** $7M **→** $86M

Auto	Personal Loans	Credit Card	
1,700 additional originations	1,694 additional originations	1,418 additional originations	Annual increase in 4,812 originations

*Excludes economic impact of operational efficiencies from increased auto-decisioning.

Note: Applications figure based on EECU's data. Booking rates also assumed to be held constant.

ABC Credit Union's Economic impact

We then measure the total economic impact of the approval increase in the auto, personal loans, and credit card portfolios

ZEST PORTFOLIO

$2.5M — **Auto** + $909K — **Personal Loans** + $1.1M — **Credit Card** → $4.5M

Additional interest income per annual vintage from the Zest model

$3.2M increase in good new loans
-
$713K increase in bad loans

$1.7M increase in good new loans
-
$746K increase in bad loans

$1.5M increase in good new loans
-
$437K increase in bad loans

Excludes increased profitability from expanding down credit spectrum.

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Automation increases ABC CU's approval rates for protected borrowers – with no increase in risk

Zest will increase Hispanic & Black approvals by +40% and Female approvals by 36%
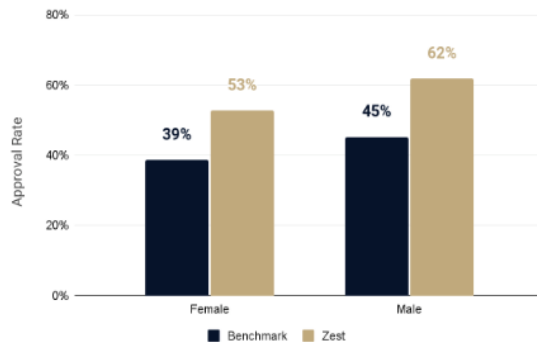

Race/Ethnicity: Approval Comparison
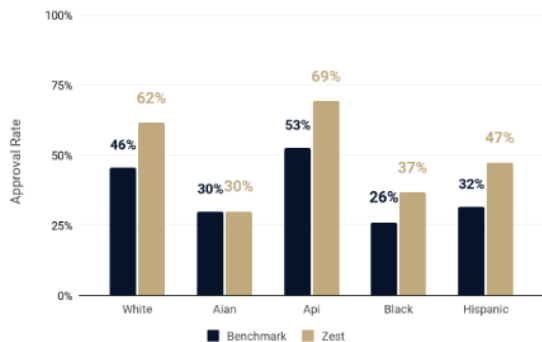
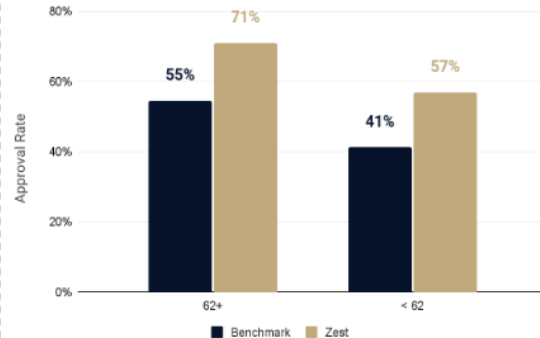49% Increase in Hispanic approvals
41% Increase in Black approvals
31% Increase in AAPI approvals

Gender: Approval Comparison

36% Increase in female approvals

Age: Approval Comparison

30% Increase in elderly approvals

POC Evaluation Process

1. Provide Zest with data sheet (1-3 days)
2. Zest builds auto decisioning model (30-days)
3. Present CU specific model to stakeholders (1 day)
4. If CU proceeds, we then enhance model with member specific data and historical [5 years] (30 days)
5. Integrate to LOS (2-15 days)

ZEST

Summary

Evaluating Auto Decisioning Solutions

- **Compliance**- CFPB, ECOA, SR 11-7, FCRA
- **PII**- Protection of your members PII of being accessed off-shore or unkown by 3rd parties
- **Data Consultants-** Access to data consultants
- **LOS Integration**- Partnership Agreements with LOS vendors or authorization to access LOS via API

ZEST

Summary

- AI and ML are not robots, but the processing of more data with better math

- Implementing auto decisioning is NOT disruptive unlike a LOS or Core conversion

- Auto decisioning should be your CU's highest priority in 2022 so you can say yes to more members in 2023 and be well positioned for the uncertain times ahead

ZEST

Questions?

Contact Craig Peterson
cmp@zest.ai