

DATA+AI
SUMMIT 2022

FutureMetrics

A Deep Learning Project to
Create a Multivariate Time Series
Forecasting Platform for Economic
Strategic Planning



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ORGANIZED BY  databricks

Creating Cutting Edge Data Science at a Traditional Corporation

Route to success is counterintuitive
and required not only top notch
technical skills, but expert level
business acumen



Keys to success



Alignment



Accelerating
Mistakes



Building
Capability

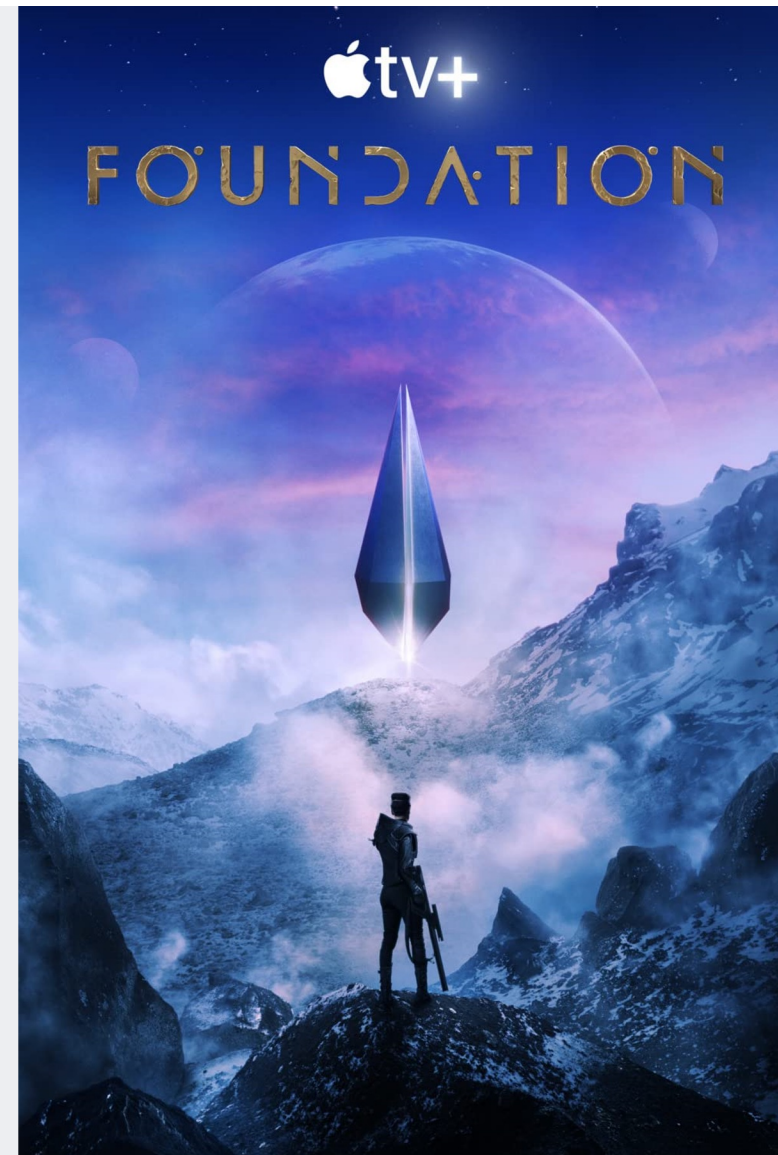
TD Bank

Who we are

- The largest of the Big 5 banks in Canada and one of the ten largest in the US
- Founded in 1955
- Has over \$1.8TN in assets
- Philosophy of trust prioritizes security and stability

Isaac Asimov's Foundation

- Time series forecasts that transcend eras
- Not just scenario modeling but scenario manipulation
- High accuracy long and short timescale of duration from short time period of training data



Overview

Who we are



Building models



Liquidity



MLOps



Enterprise Analytics

Who We Are

Transform- Differentiate-Lead

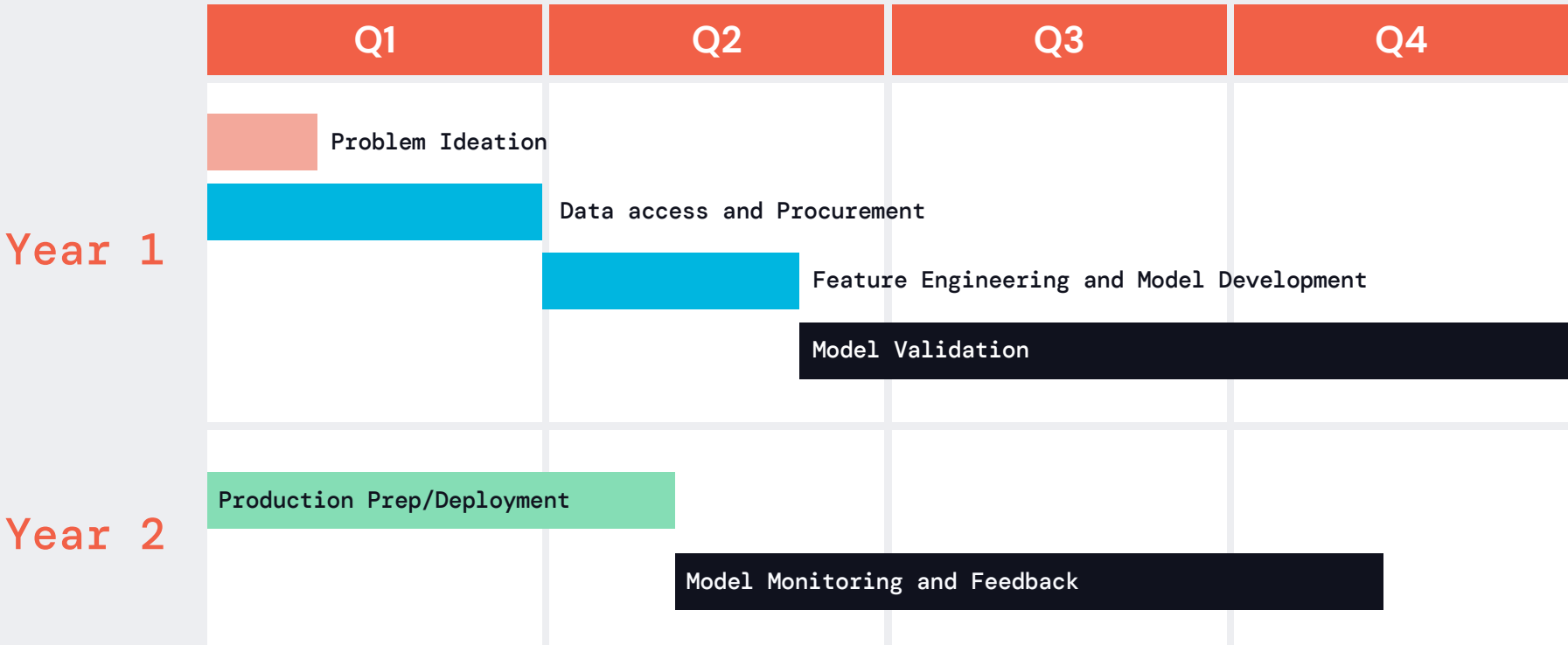
Center of Excellence Team dedicated to building the best in data science capability and delivering it across the enterprise.

Priorities

Deliver on high value targets with high adoption rates.

- 1. Drive Value**
- 2. Adopt Enterprise Platforms and Processes**
- 3. Simplify and Optimize**
- 4. Grow Our Talent**

Model Lifecycle



Liquidity

Liquidity

The bank within the bank



\$500BN

Total assets requiring forecasting

\$5BN buffer

Small buffer due to expense of holding excess cash

90-day time horizon

Federal mandate

Stages of liquidity forecasting

A small piece of a much larger puzzle

Product Growth

How much product volume will be available for loans?

Stickiness

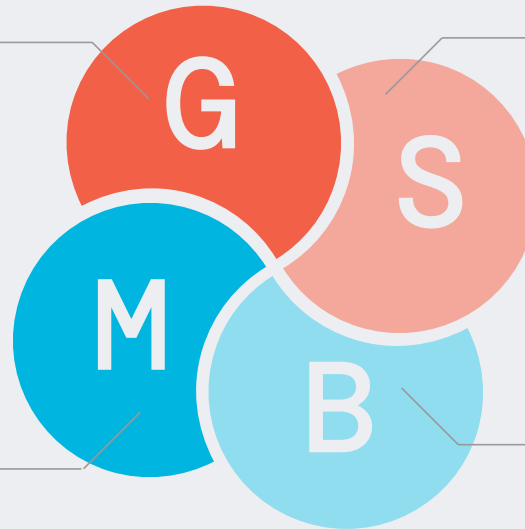
Which deposits can we rely on?

Scenario Modeling

Can the bank handle a run?

Bond Market

How many bonds do we have to sell to cover the rest?



What This Comes Out Of

TBSM Project: Improve liquidity forecast, make better funding decisions



Opportunity

- Liquidity needs inferred from business targets
- Biased & large errors
- Dependent on legacy data tools (Vision)



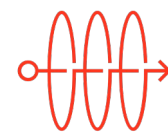
Solution

- Data pipes for 70%+ of deposit & loan products
- State of the art models, accessible to unskilled users
- “Perfect information” valuation framework



Results

- Operationalized univariate models
- Model 19% more accurate than business
- Near zero bias
- ~\$12MM annual value



Next

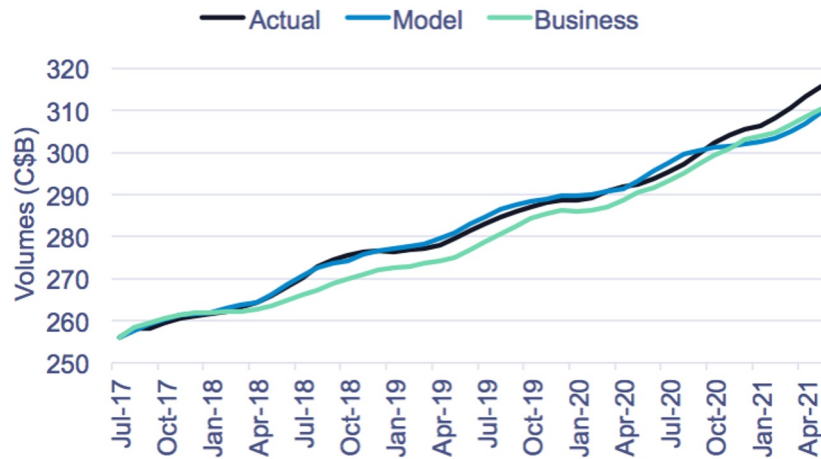
- TBSM capability
- Add products (personal loans, credit cards)
- **PoC multivariate (+5MM annual value)**

Current State of the Art

Univariate Model beats business intuition

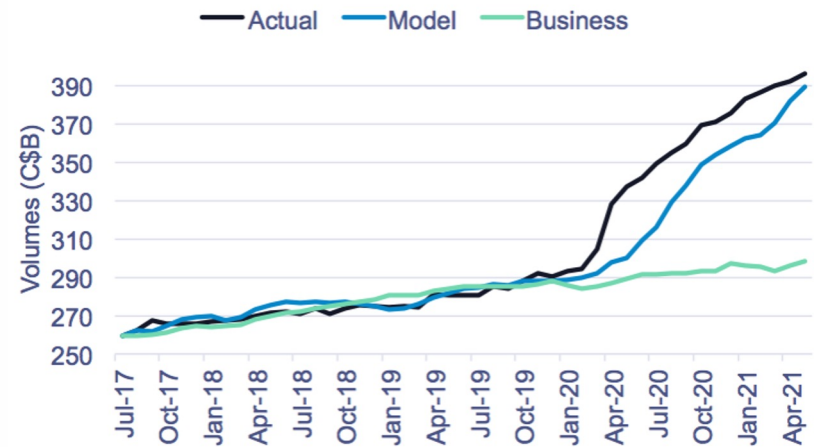
Retail Loans

RESL Volumes: Actual vs Cumulative Growth Forecasts



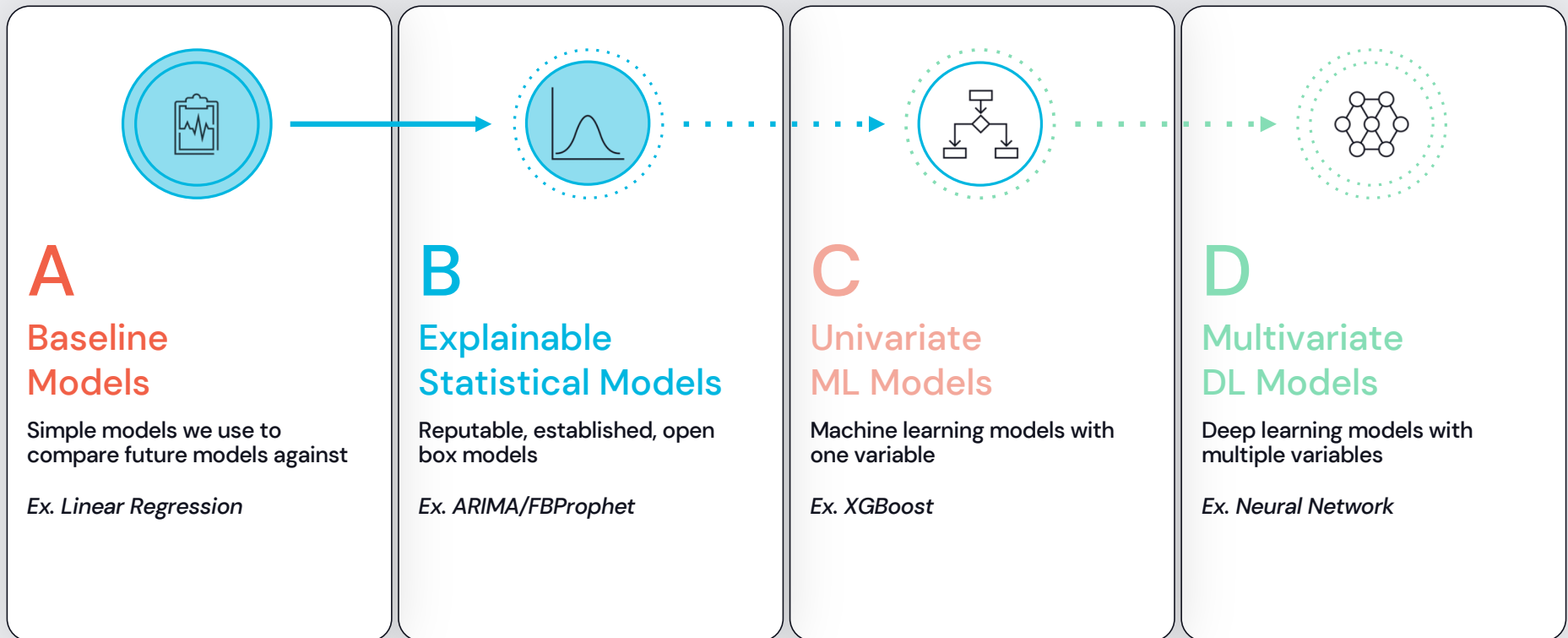
Deposit Volumes

Deposits Volumes: Actual vs Cumulative Growth Forecasts



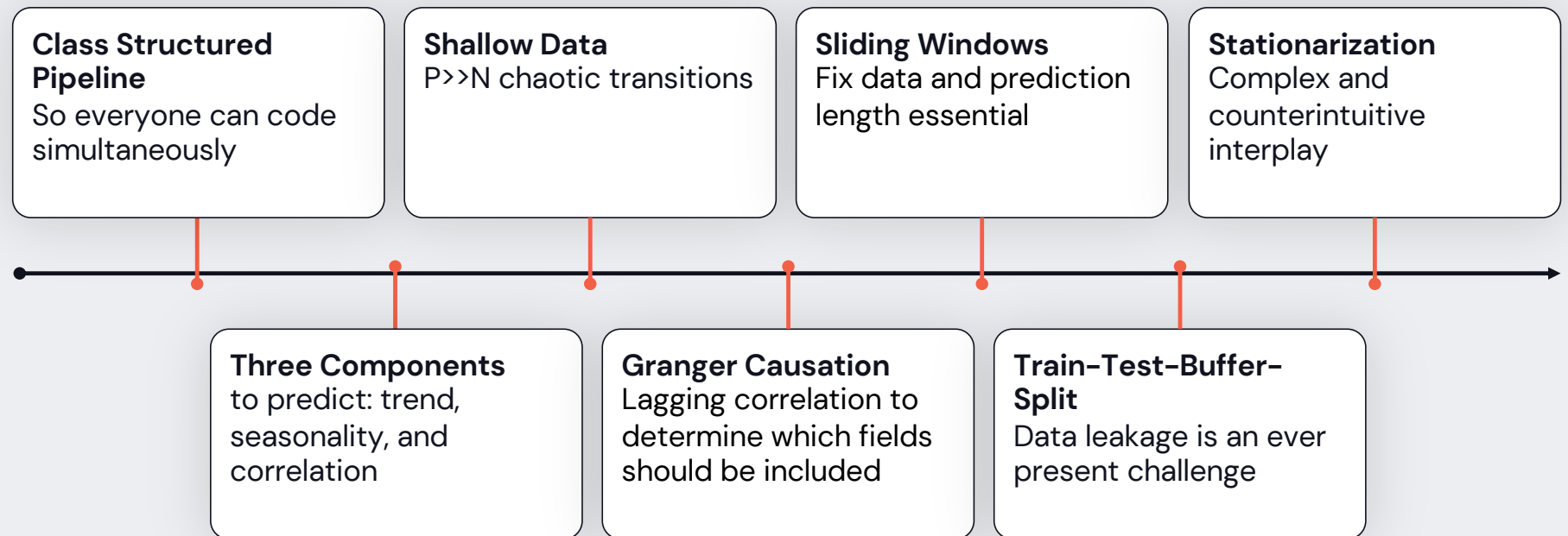
Building Models

For Time Sequence Modeling, a Performance Hierarchy Is Well Established



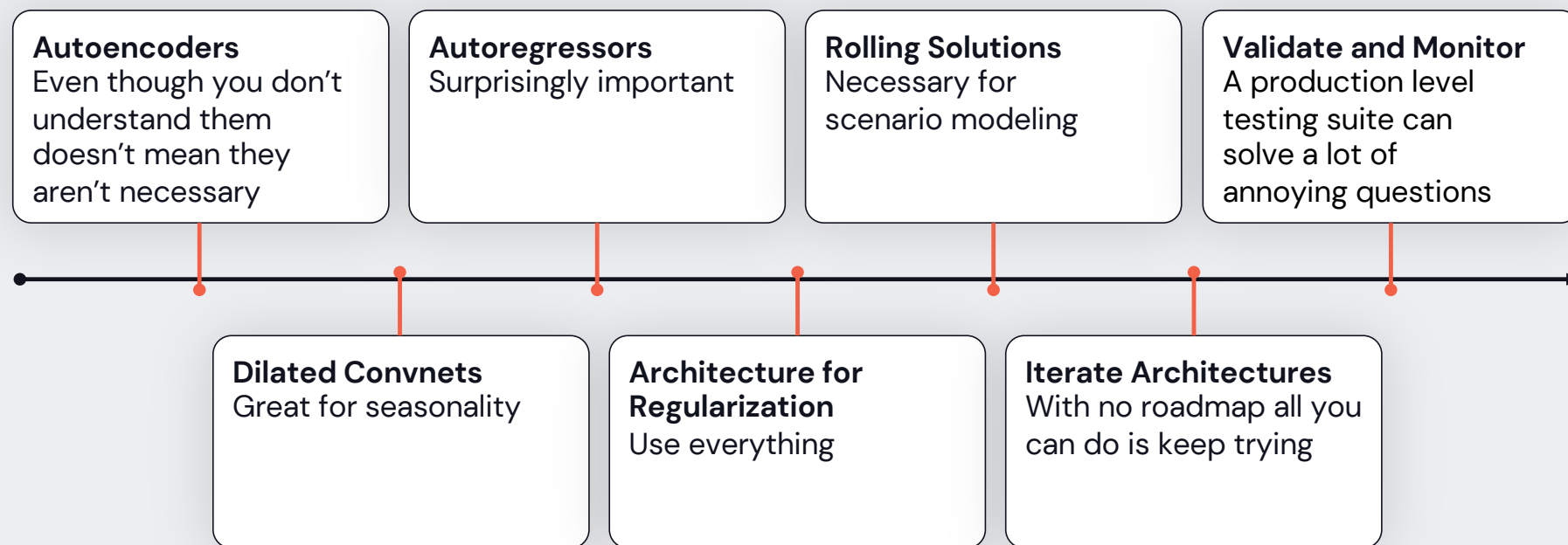
Working Smarter

Doesn't mean making less mistakes—means making more mistakes quicker

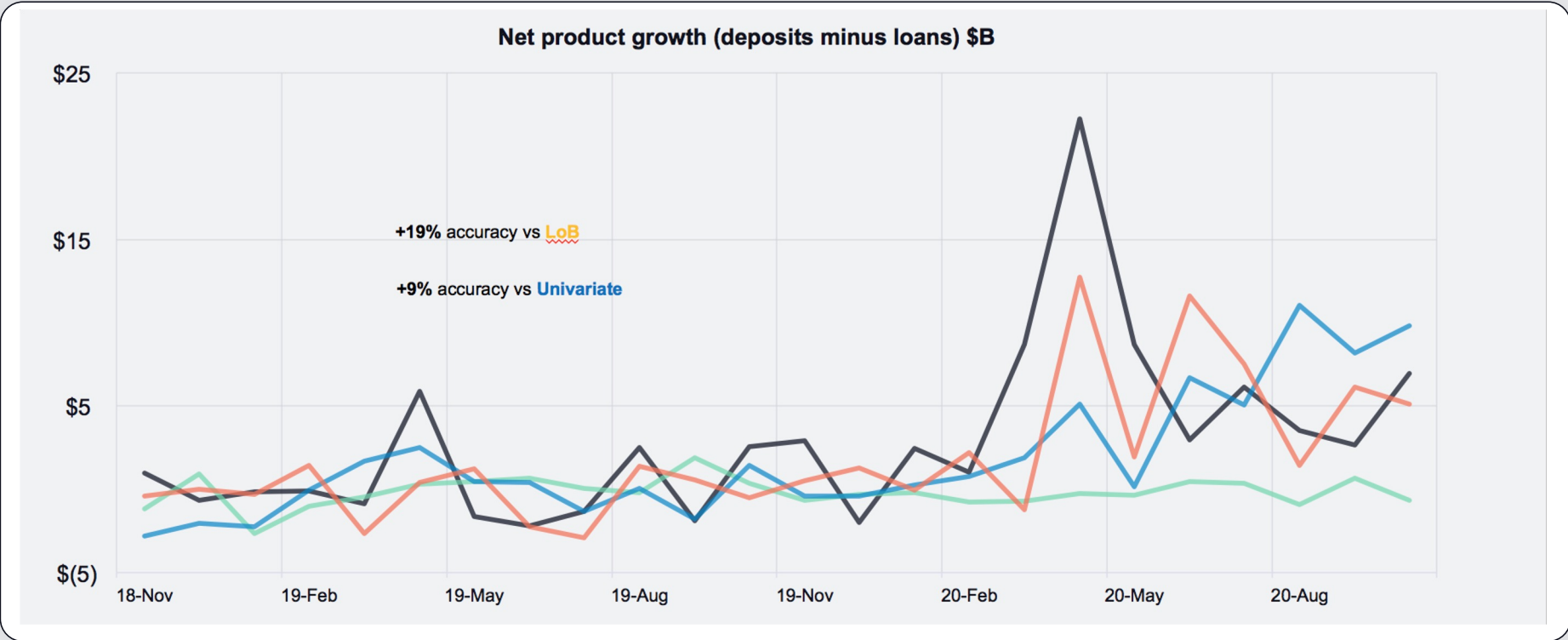


Working Smarter, Part 2

They don't stop



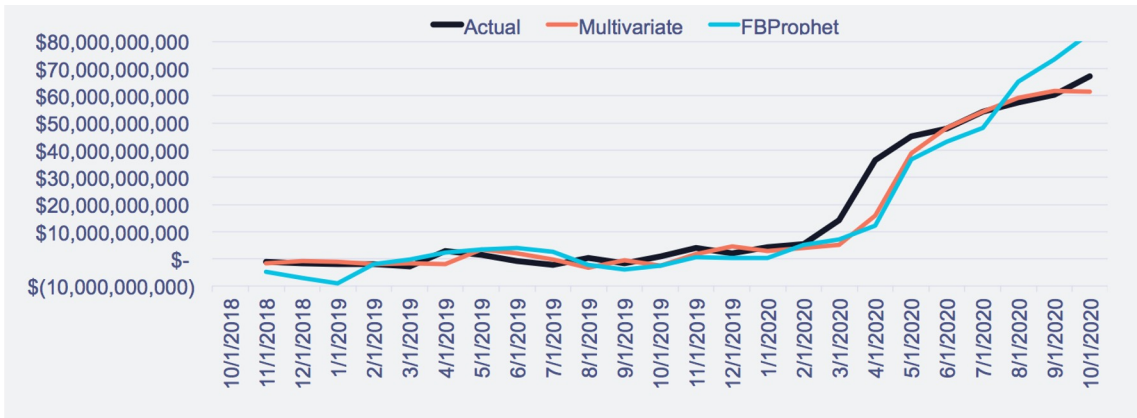
Quarterly Rolling Projection



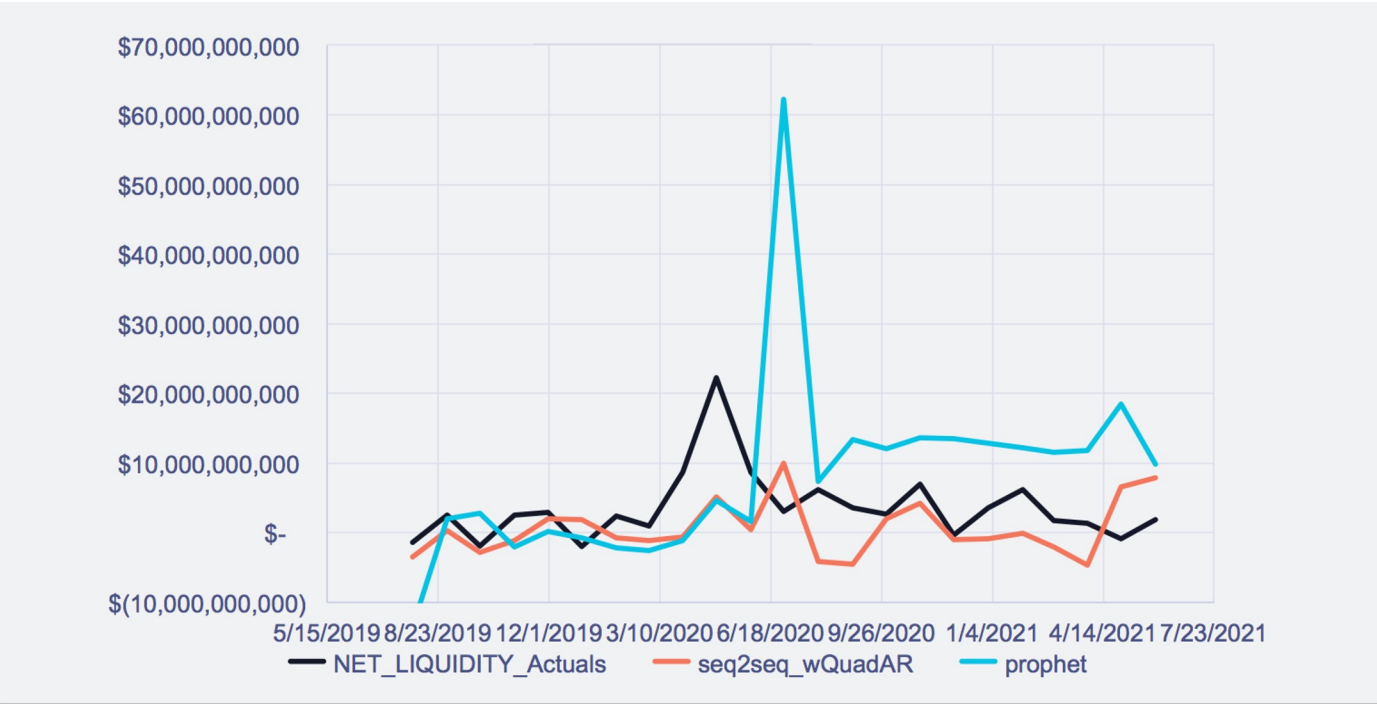
So what is going on?

Two events at play:

1. A one-time pulse of money
 - Not predictable
2. A change in economy
 - Predictable at least in part



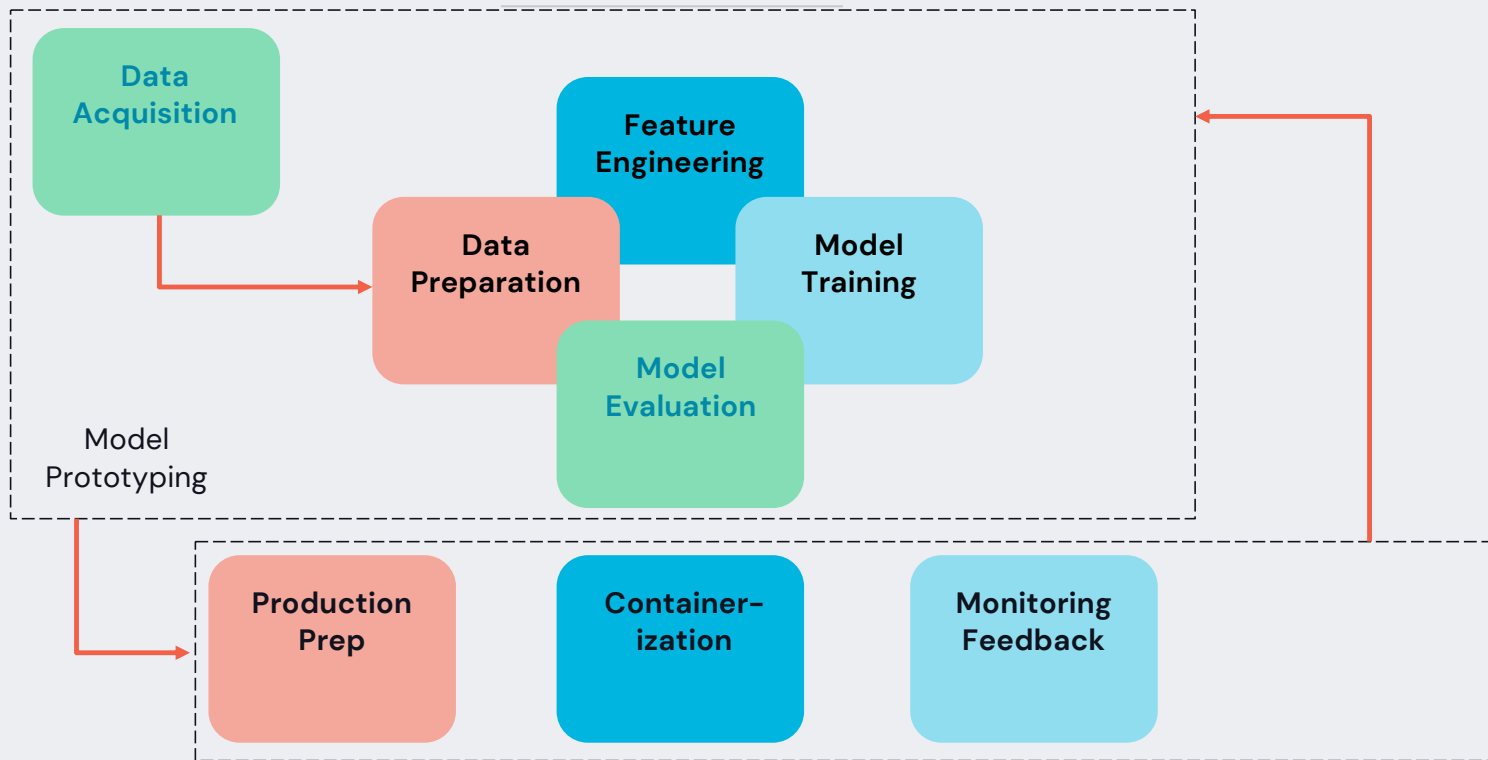
Long term models show similar increase in performance



Building Capability

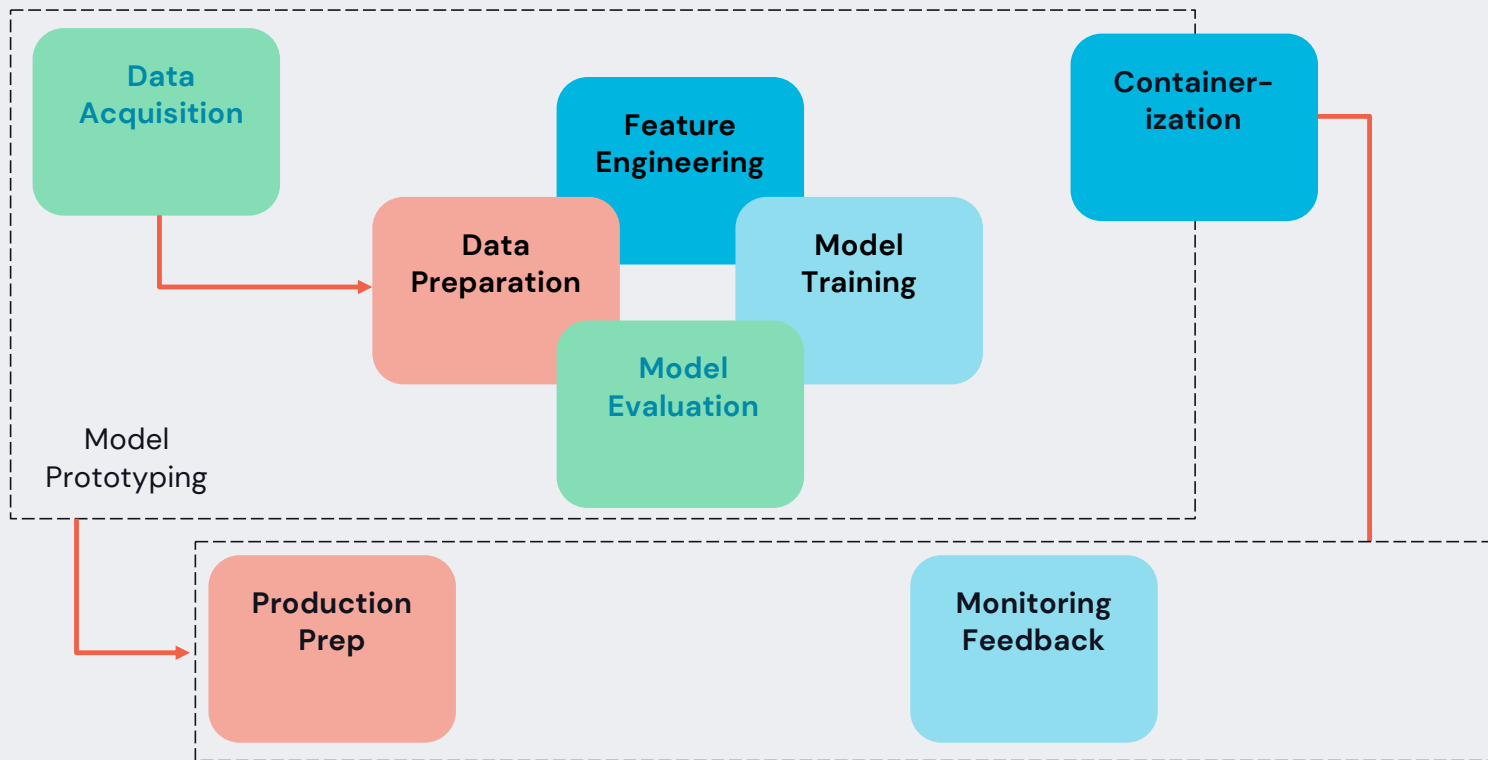
MLOps

Functionalizing platforms to build capability



MLOps

Functionalizing platforms to build capability



Summary

Alignment

Walk a mile in your client's shoes.

Accelerate Mistakes

Obstacles are not barriers to the path, they are the path.

Build Capability

Your team is the priority, make their lives as easy as possible.

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Thank You



Matthew Wander
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