

Don't play the market, play the odds

Predicting the settlement amount of a class-action lawsuit



Faculty advisor: Nikos Trichakis

Project sponsor : Michael Densham

Guillaume Allègre

Valentin Pinon

Problem Statement

Who is Banyan ?

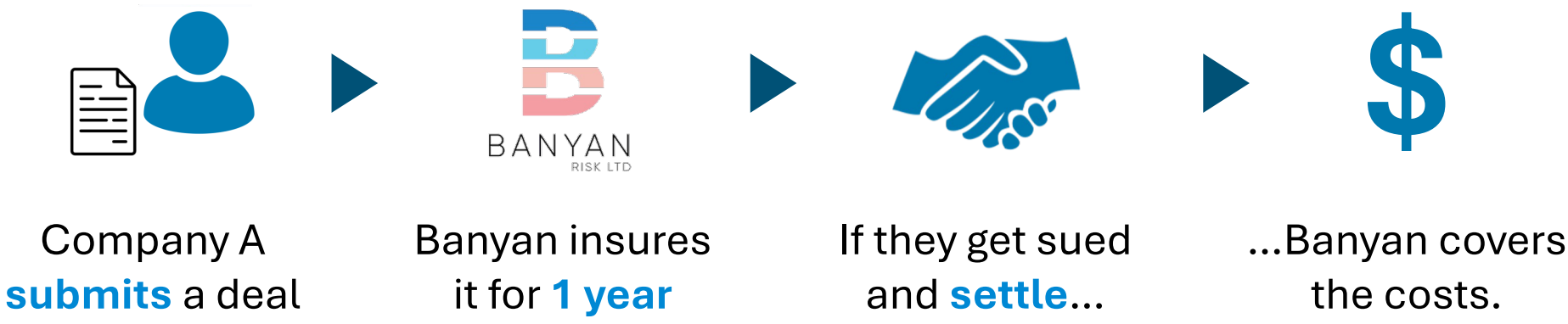
What are security class action claims?

Lawsuits filed by shareholders against a company when they have been misled and suffered **financial losses** (due to stock plummeting).

What is Banyan's role in this?

In the case of security class action claims, Banyan Risk provides **Directors and Officers (D&O) insurance**, which covers settlement costs, thereby reducing the financial impact on the company.

What happens during a deal?



Problem

How does Banyan make money ?

Each deal in Banyan's portfolio generates a premium. The overall value is driven by:

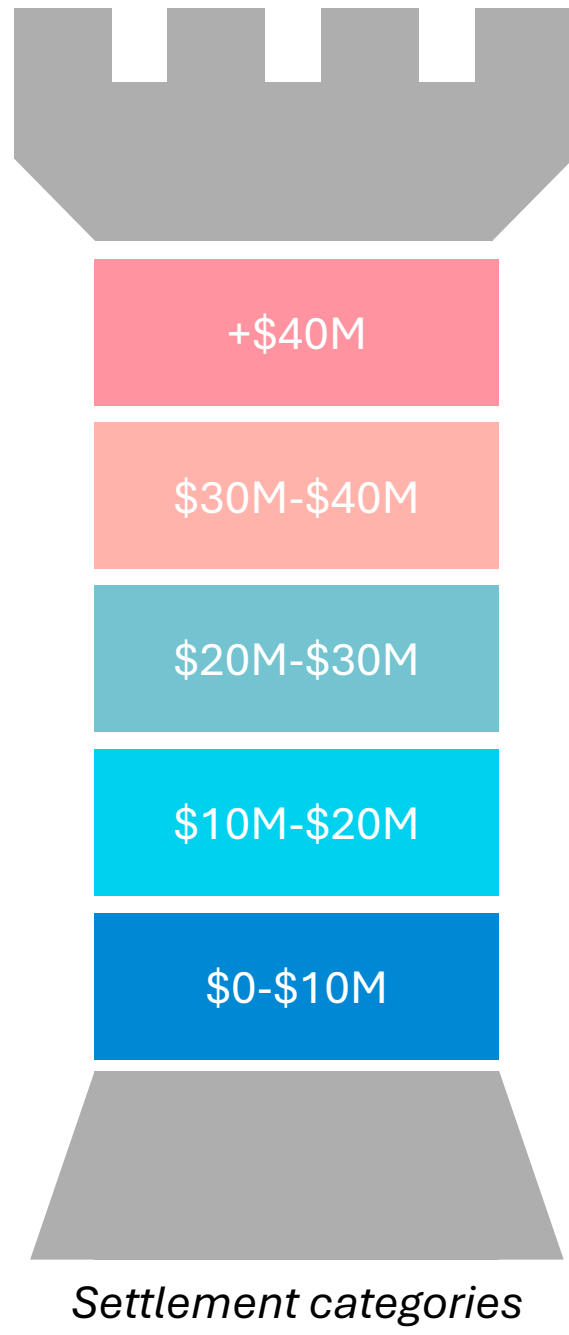
$$\text{Premium} = (\text{Probability settlement} \times \text{Settlement amount})$$

Layer structure of the insurance

- The insurance industry is structured in **layers**: each insurance company covers a particular layer
- In general, **the higher the layer, the lower the risk** of paying, but also the **lower the premium**
- Banyan wants to understand the risk associated to each layer, to better **manage their portfolio** and **price their deals**

Goals

- Predicting the layer** in which the settlement is going to fall
- Identifying the key risk factors** that contribute to the overall risk profile



Modelling approach

1. Data

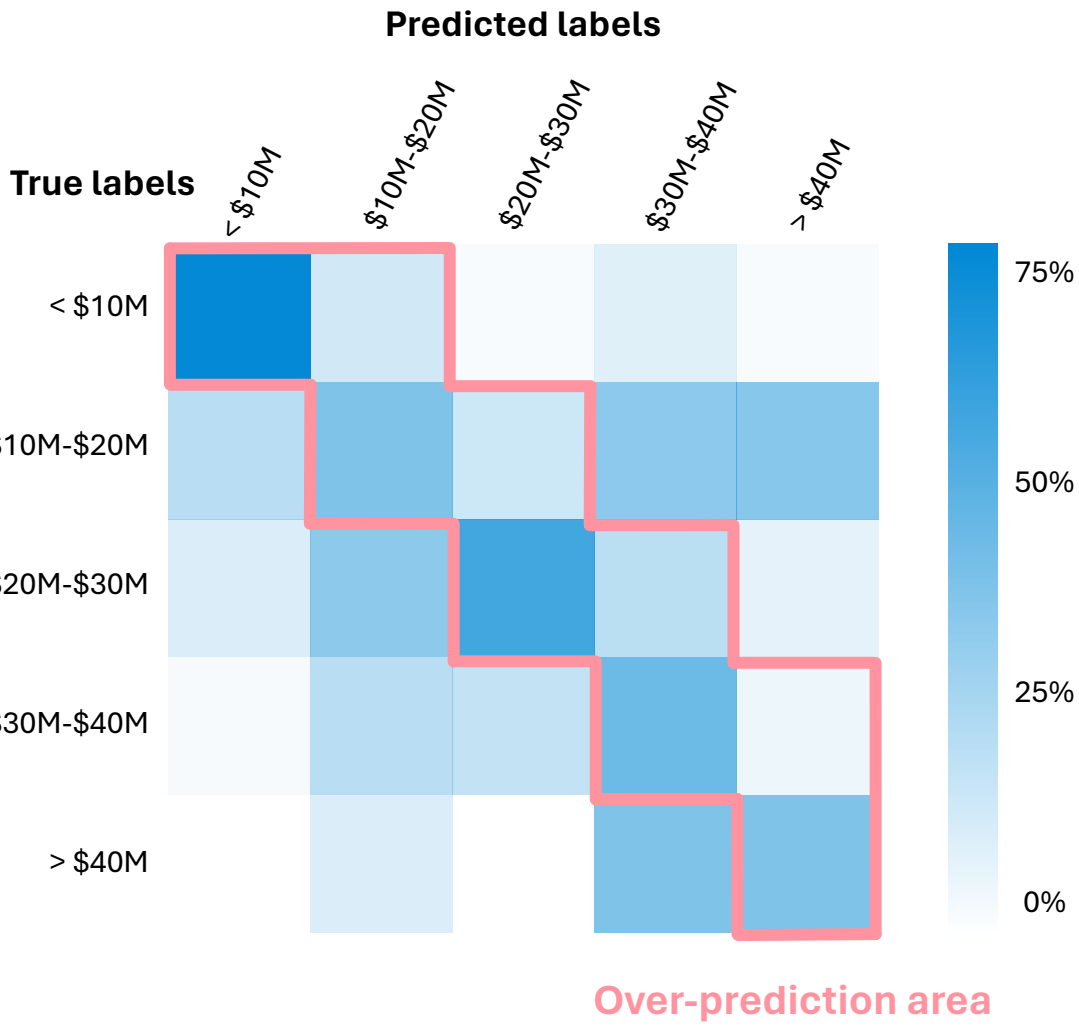
Financial data
Stock spikes and drops, market cap

Company data
Location, type of shareholders

Legal data
Settlement amounts, lawsuits

4. Results

The model-evaluation relied on two metrics: **accuracy** and **over-prediction ratio**. Balancing these metrics is critical, as incorrectly labeling high-risk companies **increases Banyan's exposure**.



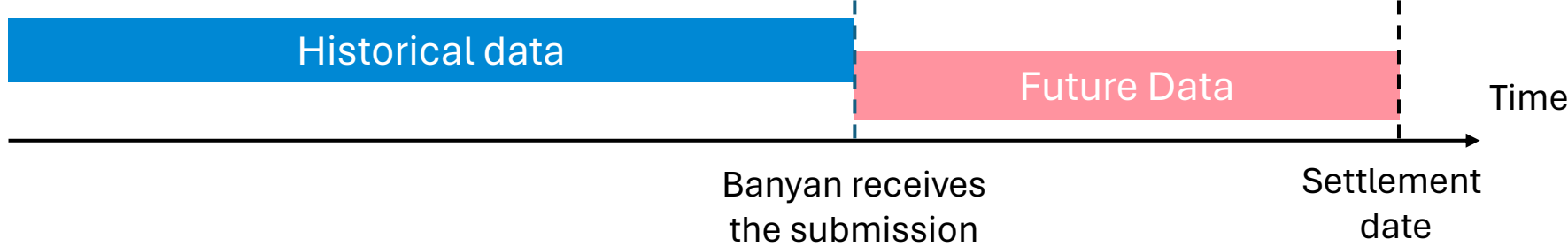
54%
Accuracy

+74%
vs baseline

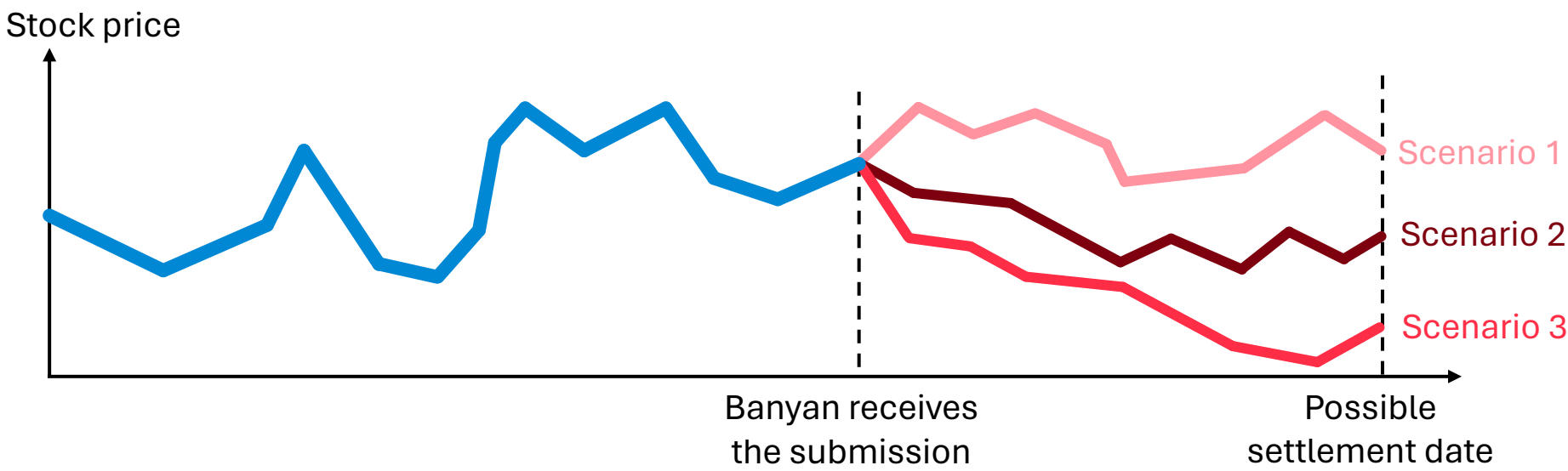
60%
Over-prediction ratio

2. Scenarios

The submission can arrive **up to 1 year before** the settlement



We account for **potential future stock price drops** by generating hundreds of potential scenarios



3. Models

Scenario Generation
Monte-Carlo simulation
Neural network (LSTM)

Classification
Random Forest, SVC, LGBM

Interpretability
Shapley values, error tree

Impact and Future work

Business Impact

Reducing time spent by underwriters on unsuccessful deals

Evaluating the **risk** associated with Banyan's **portfolio and new submissions**

Understanding the **factors** that contribute to the **risk profile** of companies

+30M\$/year

Estimated premium generated through productivity improvement

User Interface (Future work)

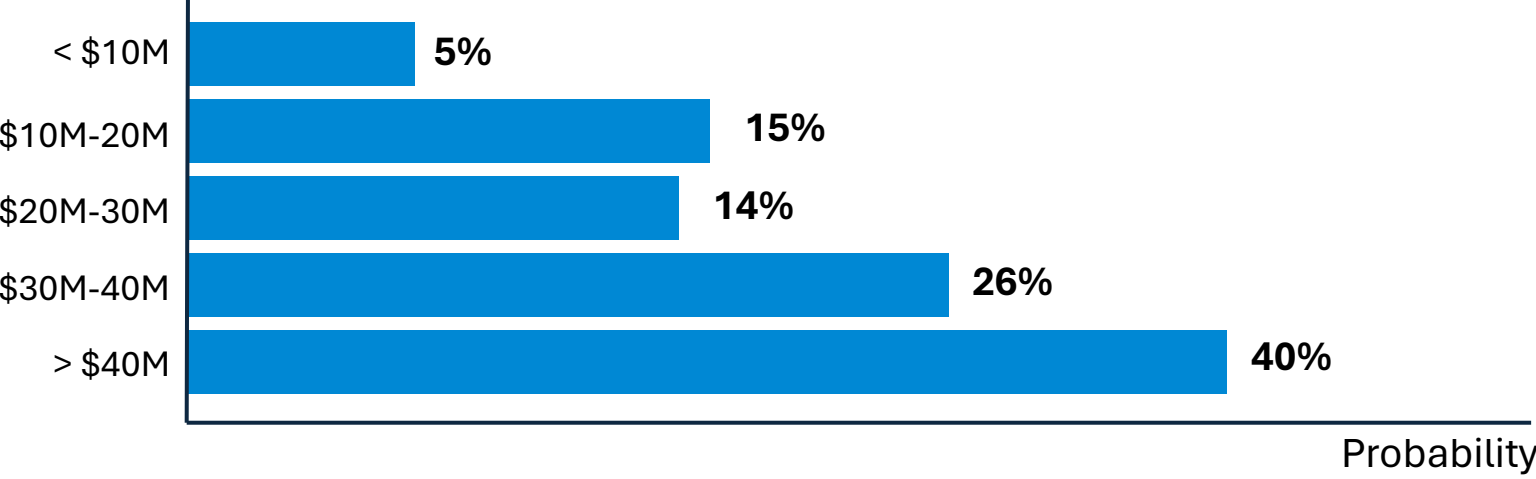
Company selection

Ticker: **BA**
Drop Size: **20-30%**
Time Forecast: **180 days**

Company Found

The Boeing Company
Market Capitalization: \$110B
Headquarters: Virginia
Number of employees: 170k
Sector: Industrial

Settlement amount probability



Feature analysis

Market Capitalization (\$110B)
Drop size (20%)
Sector (Industrial)
Drop Frequency (Every 7 days)

