



Bankruptcy Prediction in Taiwan

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Overview

Stakeholder Profit

Taiwanese Hedge Fund

Our Task

Modelling on financials to accurately predict bankruptcy



Purpose

Short selling unstable companies

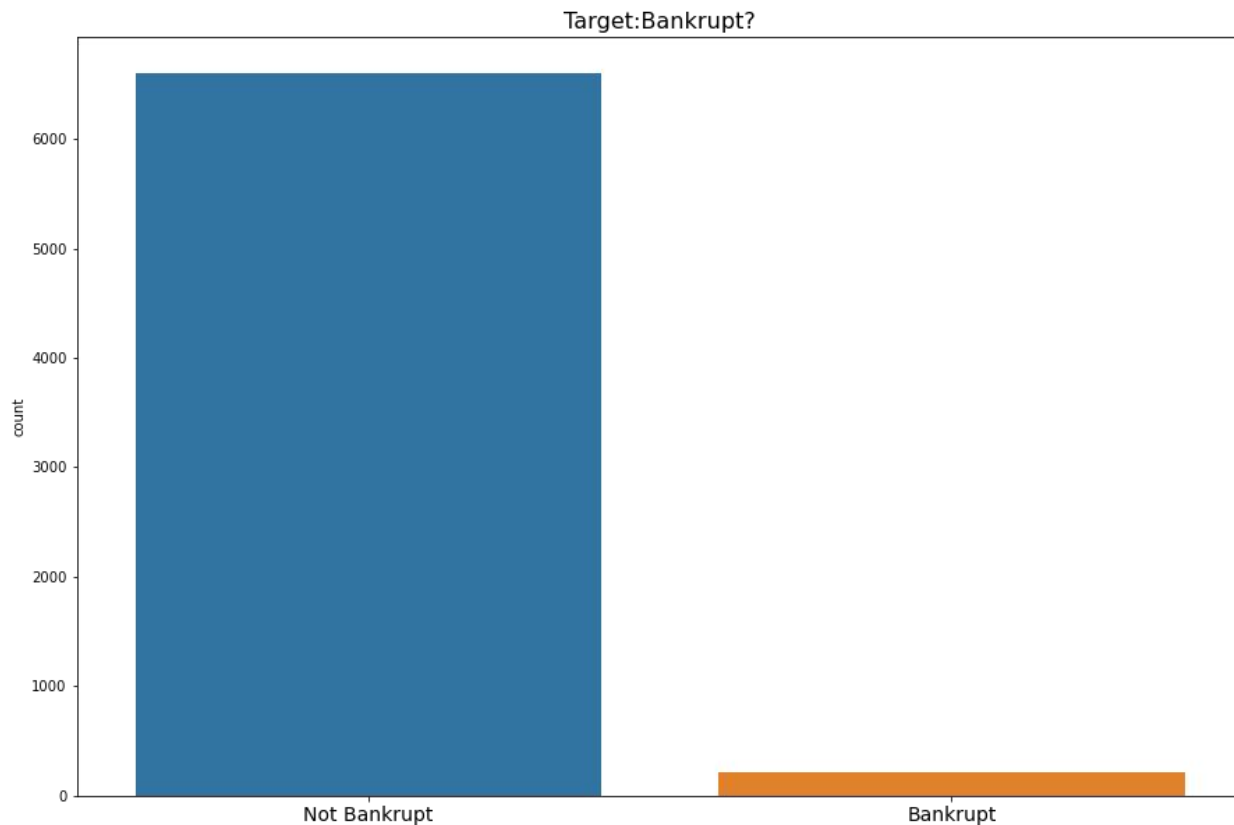
(borrowing and selling a security to buy it back at a lower cost)

Main Focus: Precision

Minimizing Type I errors/False Positives

(Predicted bankrupt when not)

The Data



**6000+ Company's
Financials**

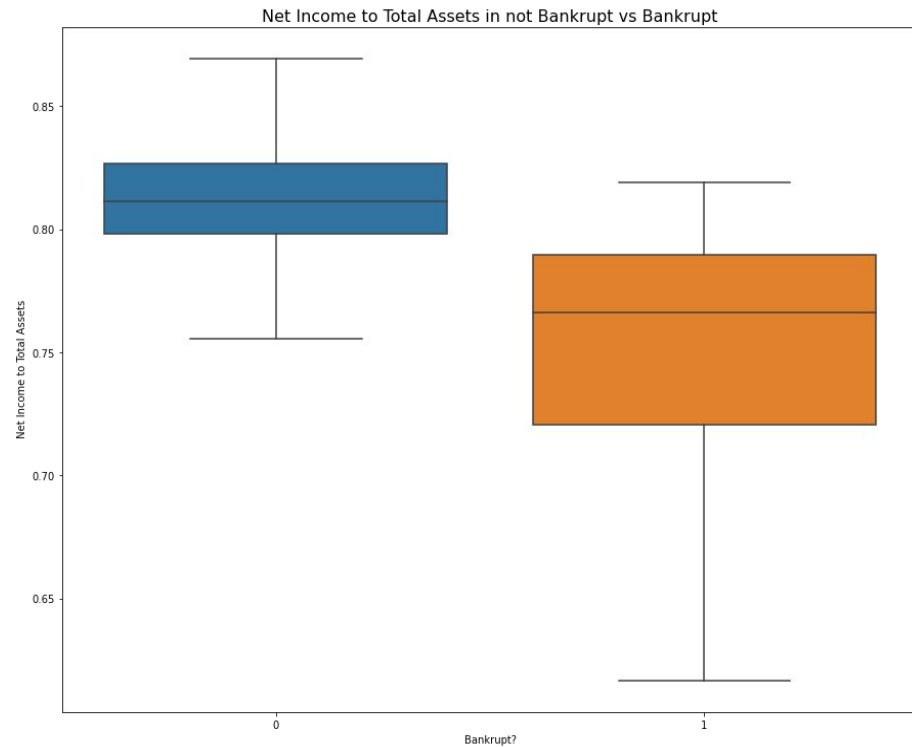
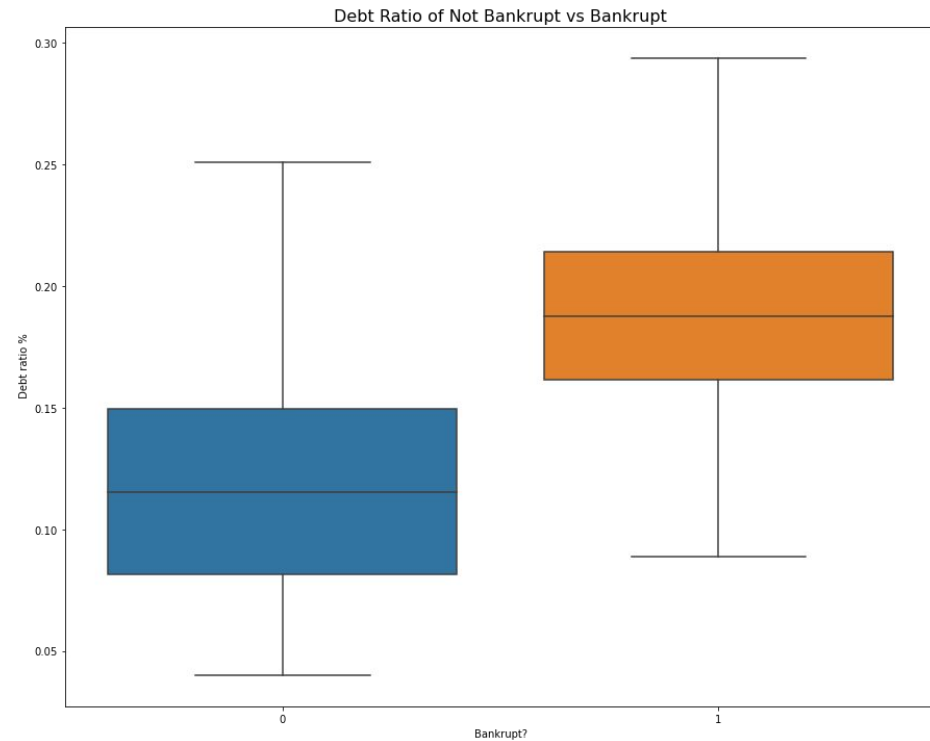
[Taiwanese Economic
Journal\(1999-2009\)](#)

Data Imbalance

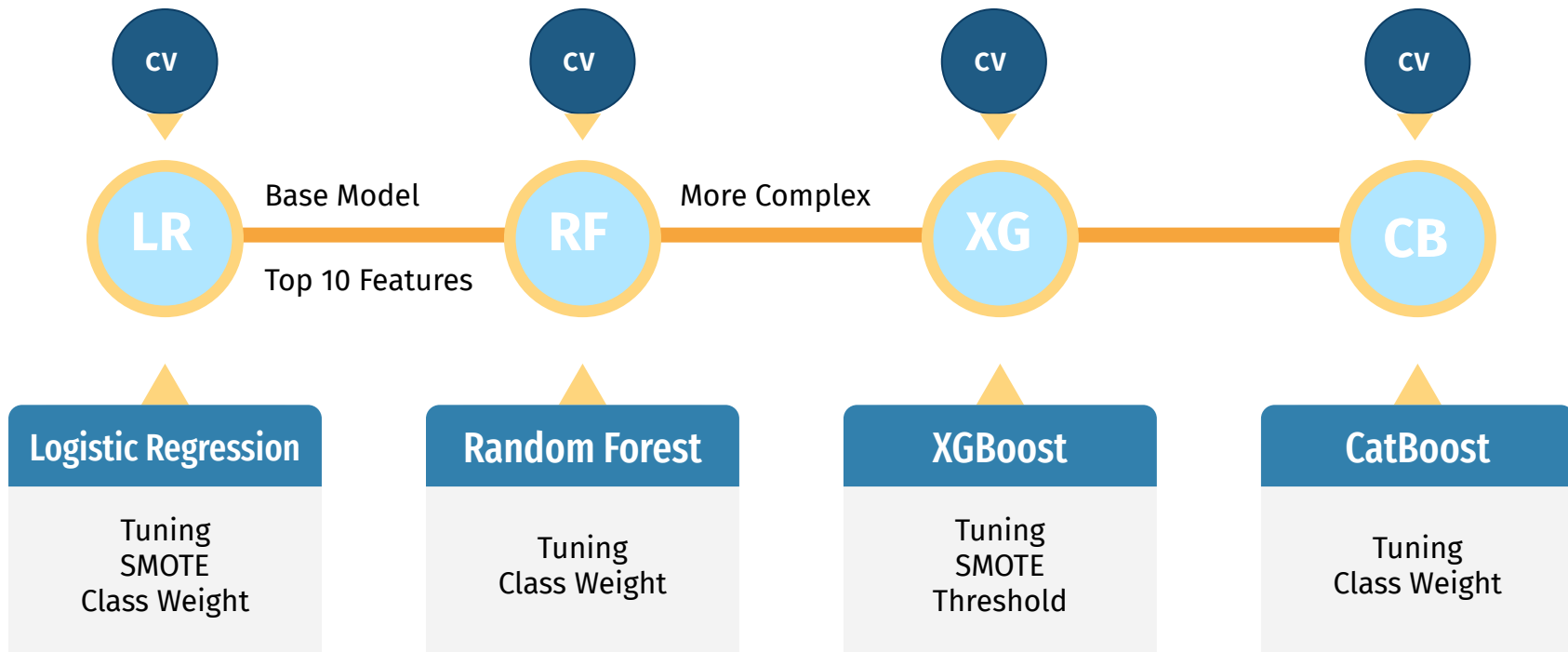
Only 3% bankrupt

**90+ Features to
Explore**

Target Comparisons in Features



Model Development

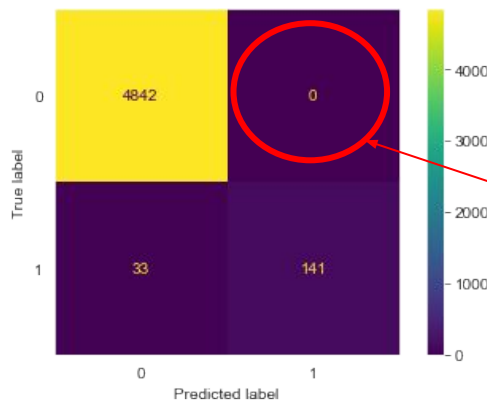


Goal is Precision!

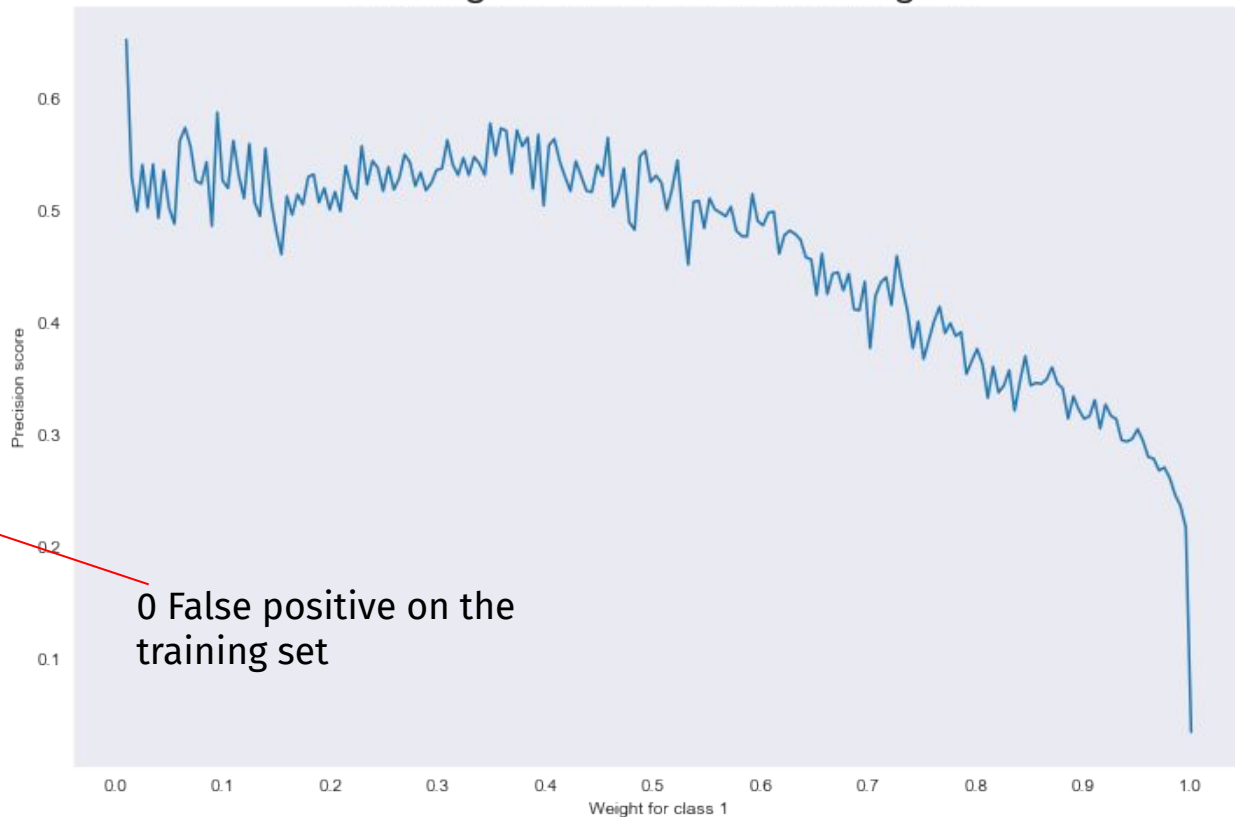
Class Imbalance with Class Weights

Why Class Weight?

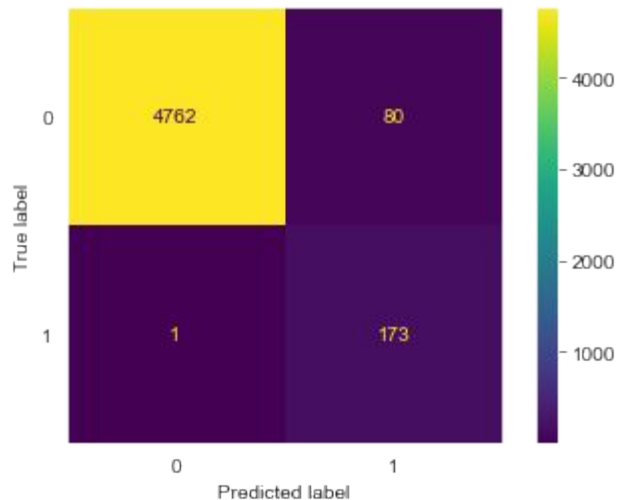
We want to deal with class imbalance while maintaining a low number of false positive



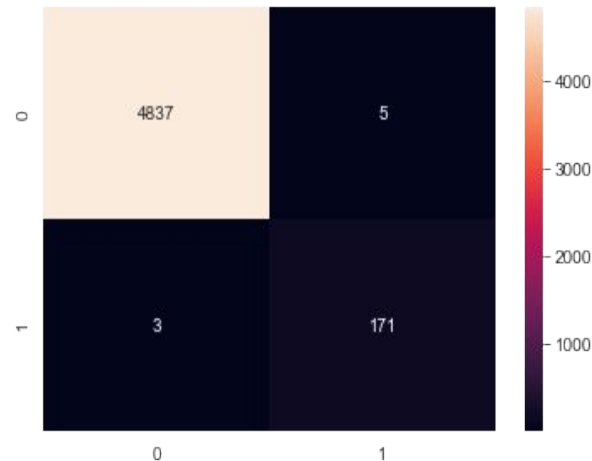
Scoring for different class weights



Optimizing Precision with Threshold Adjustment



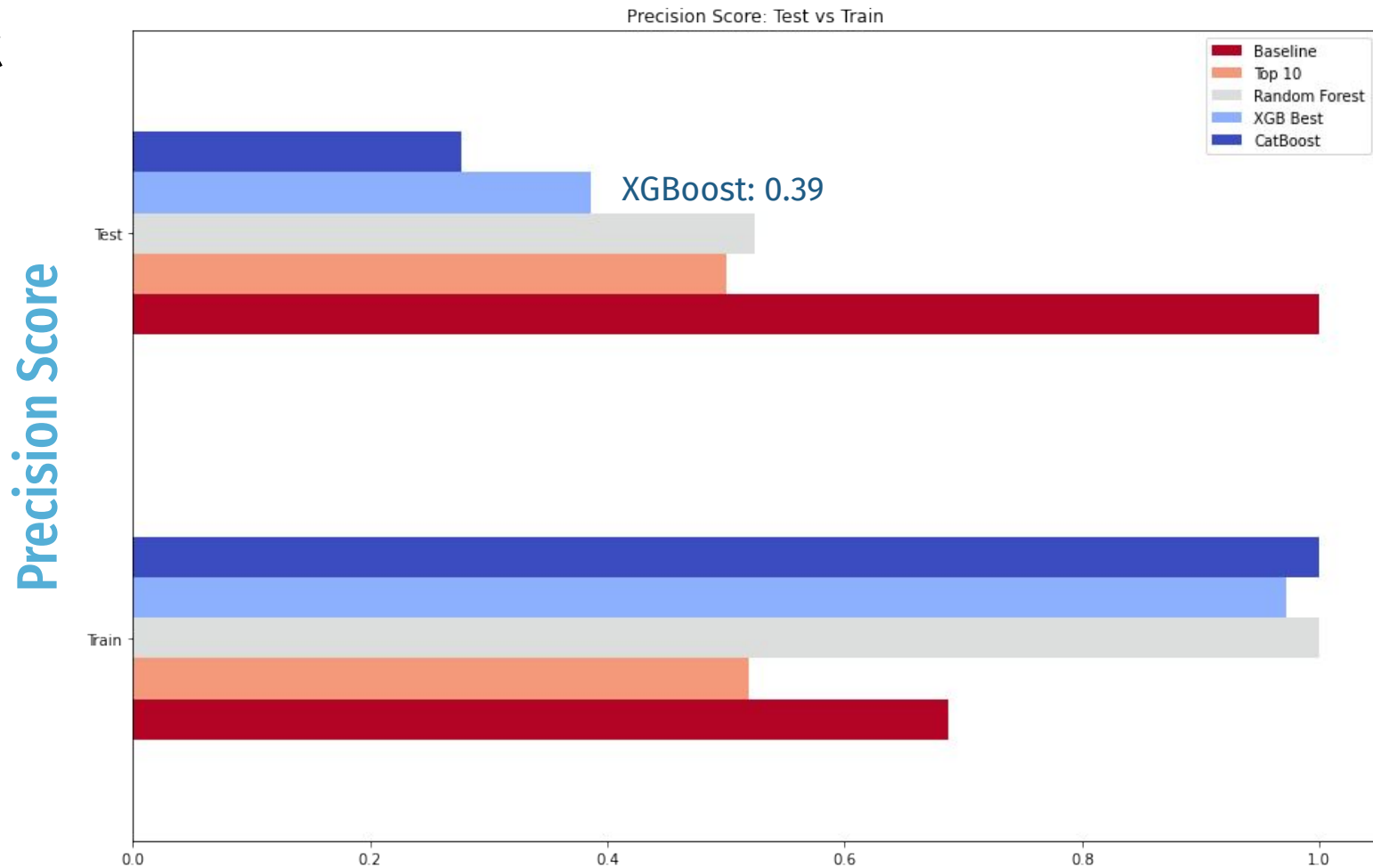
XGBoost with Default
Threshold



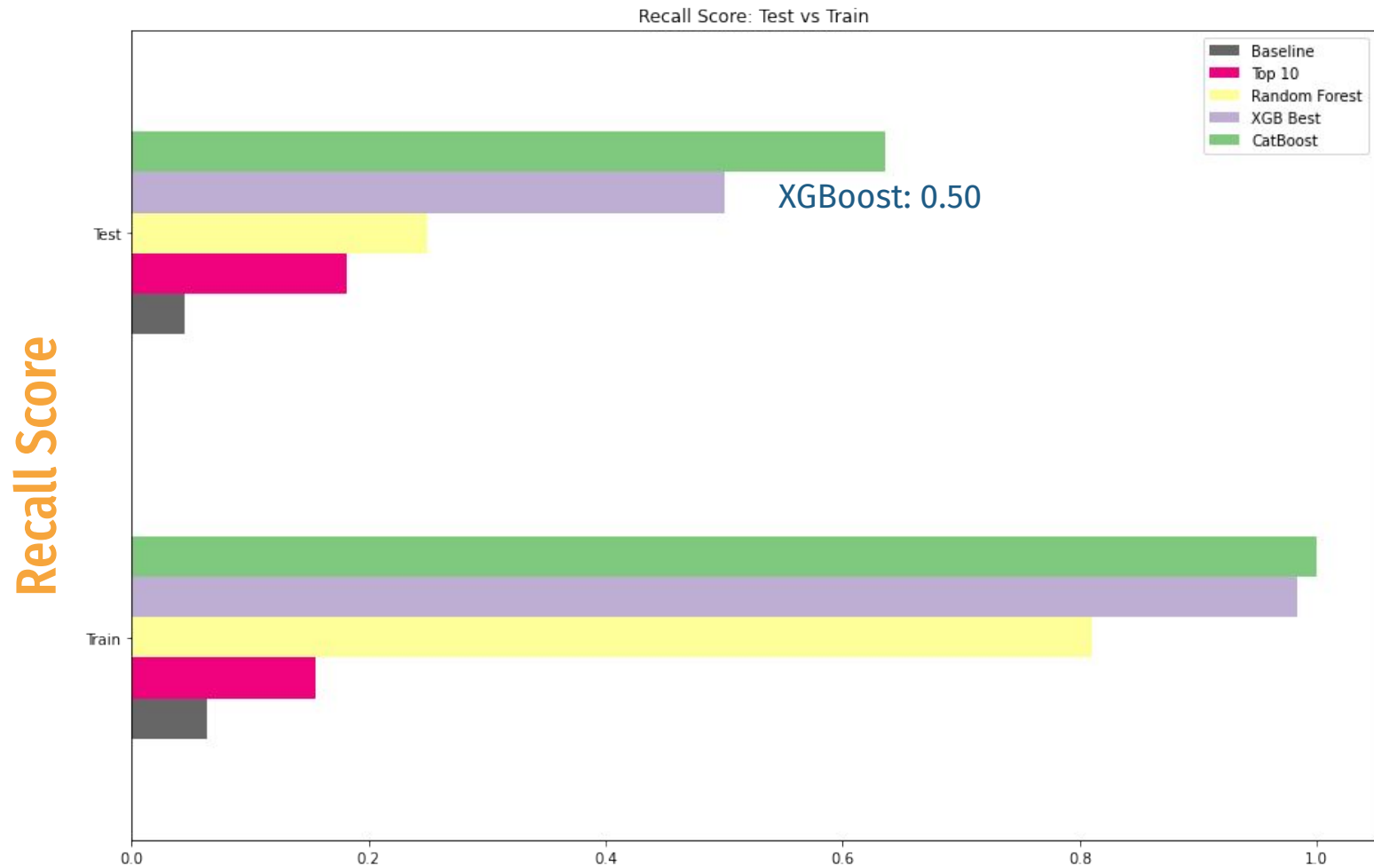
XGBoost with 0.8
Threshold

We choose **XGBoost** as our
predictive model

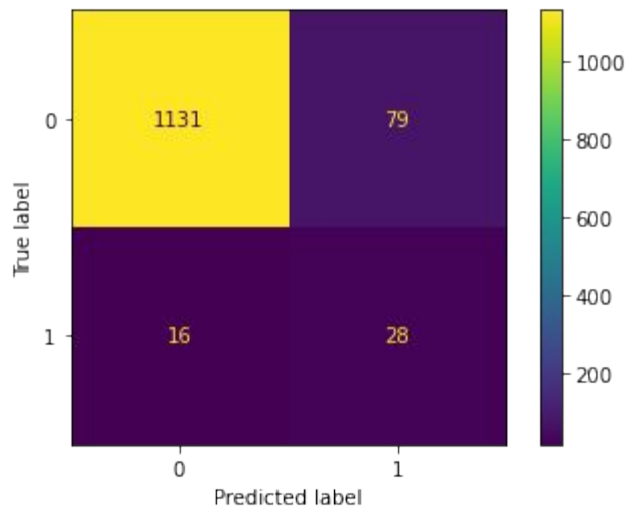
Result



Result



Threshold Adjustment in Test set



XGBoost with Default Threshold



XGBoost with 0.8 Threshold

Feature Importance

XGBoost

Features	importance
Persistent EPS in the Last Four Seasons	0.30
Net Income to Total Assets	0.15
Retained Earnings to Total Assets	0.10
Net worth/Assets	0.10
Net profit before tax/Paid-in capital	0.09
ROA(A) before interest and % after tax	0.08
Per Share Net profit before tax (Yuan ¥)	0.07
ROA(C) before interest and depreciation before...	0.07
ROA(B) before interest and depreciation after...	0.05
Debt ratio %	0.00



CatBoost

Features	Importance
Net worth/Assets	13.81
Retained Earnings to Total Assets	13.15
Debt ratio %	10.98
ROA(A) before interest and % after tax	10.47
Net Income to Total Assets	10.04
Net profit before tax/Paid-in capital	9.49
ROA(B) before interest and depreciation after...	9.23
Persistent EPS in the Last Four Seasons	8.82
ROA(C) before interest and depreciation before...	7.19
Per Share Net profit before tax (Yuan ¥)	6.83

Conclusion

Our XGBoost doesn't perform well as we thought



Results

Limitation



Manually adjust threshold for Cross-validation

Feature engineering
Hyperparameter tuning



Next Steps

Thoughts



"We're not dumb, we're just inexperienced"

THANK YOU!

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