

## **rk (MLP, RandomizedSearchCV, Refit by ROC-AUC) — VLO Next**

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TRAIN period:  $\leq$  2022-12-31 | TEST period:  $\geq$  2023-01-01

TRAIN size: 2,672 | TEST size: 787

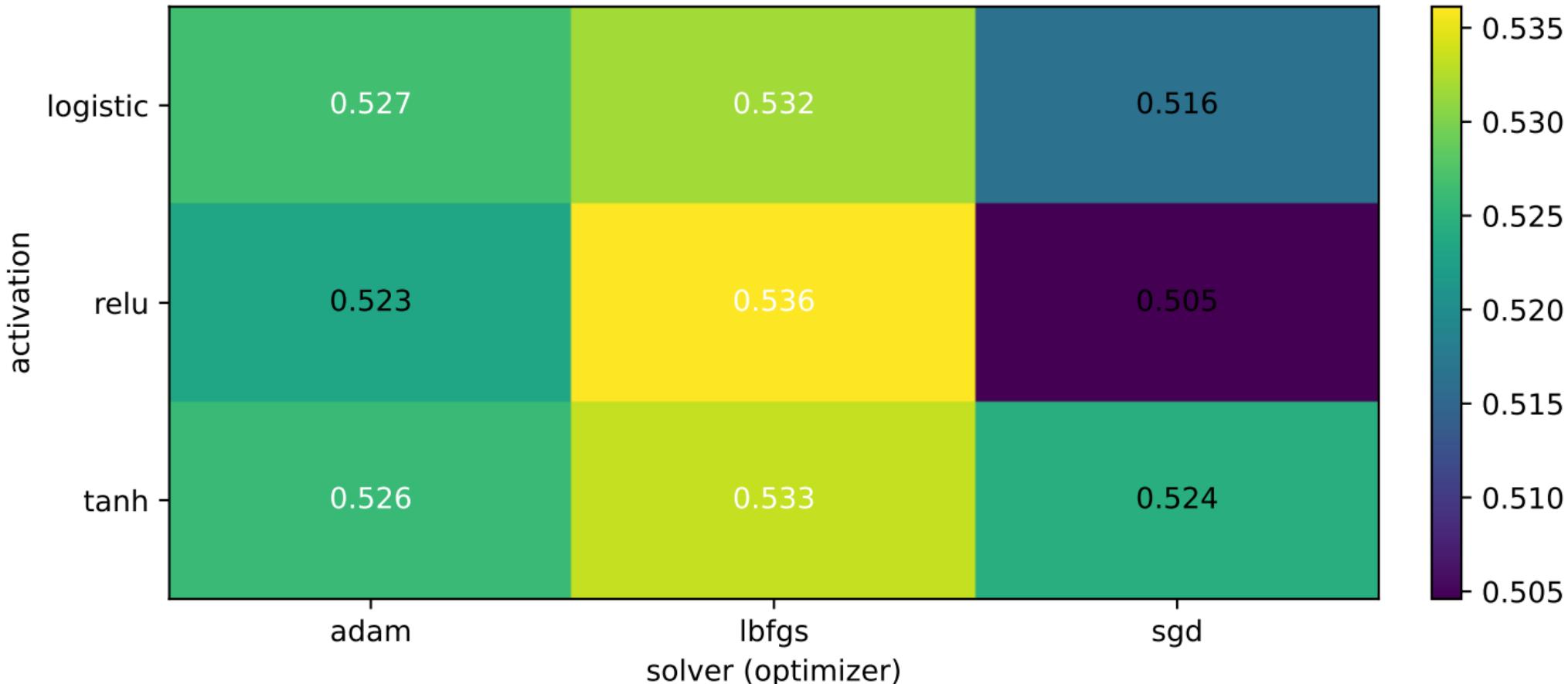
Features — scaled (float + VOL\_\*): 72 | passthrough: 5

RandomizedSearchCV: n\_iter=80, refit='roc\_auc'

'n': False, 'clf\_\_momentum': 0.0, 'clf\_\_learning\_rate\_init': 0.001, 'clf\_\_learning\_rate': 'adaptive', 'clf\_\_hidden\_layer

Best CV ROC-AUC: 0.5361

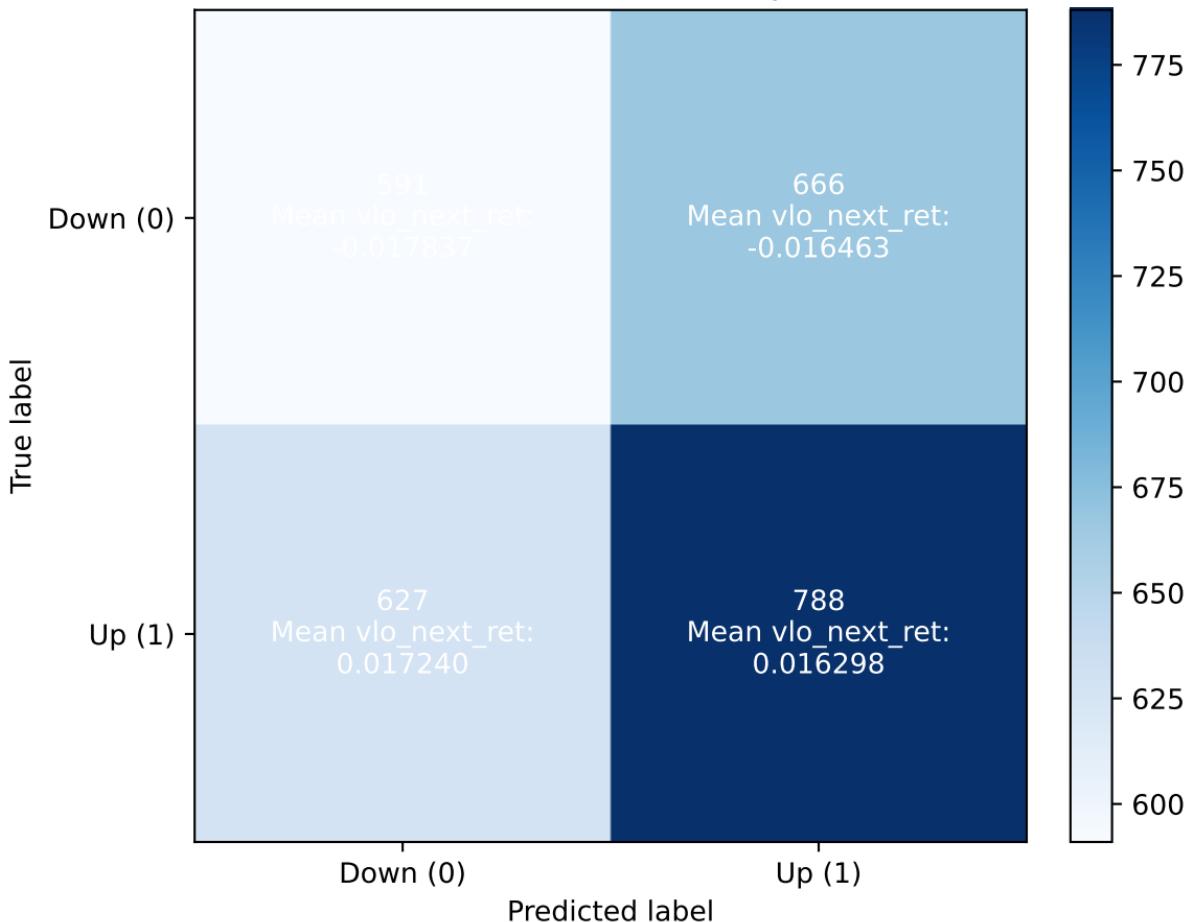
Randomized Search — max mean ROC-AUC over other NN params



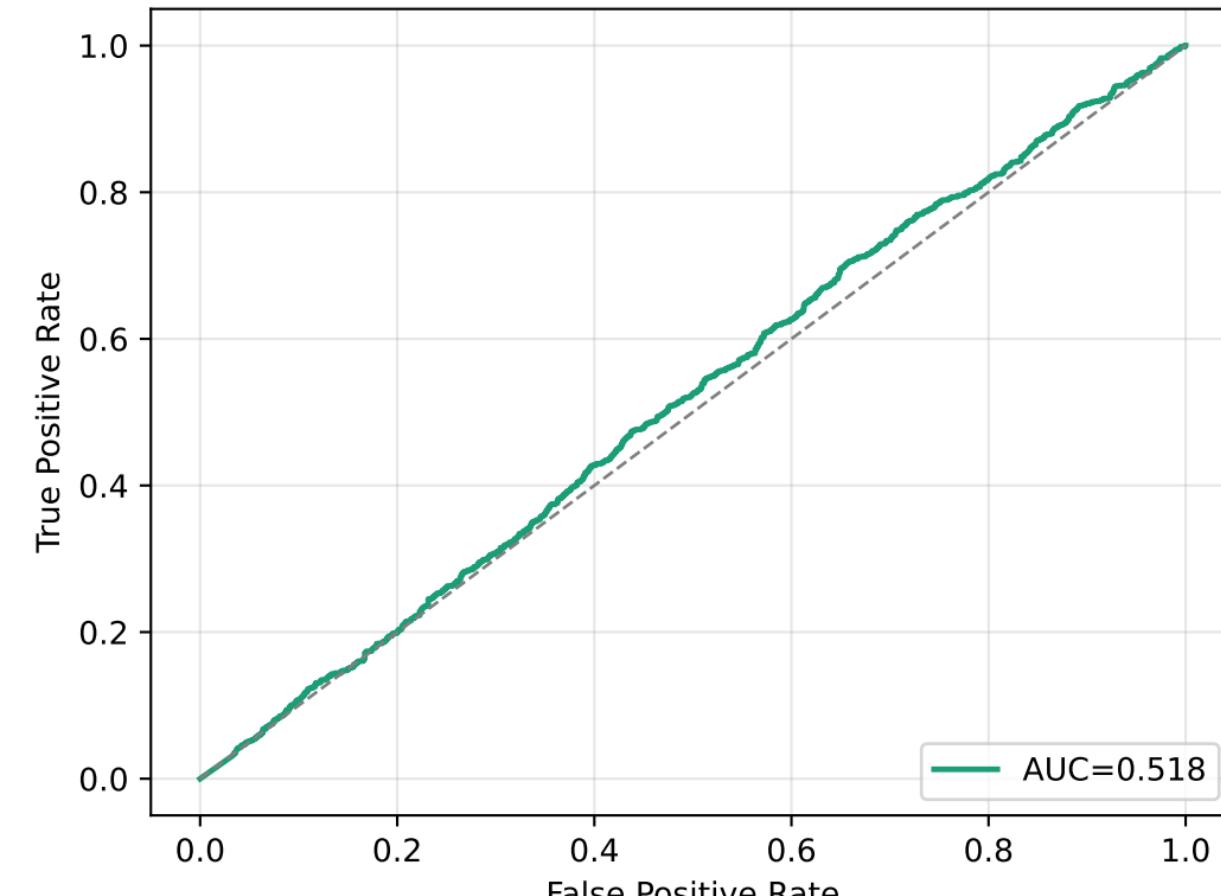
## Cross-Validation ROC-AUC — Training Set ( $\leq$ 2022-12-31)

metric	value
mean ROC-AUC (CV folds)	0.5218
std ROC-AUC (CV folds)	0.0246

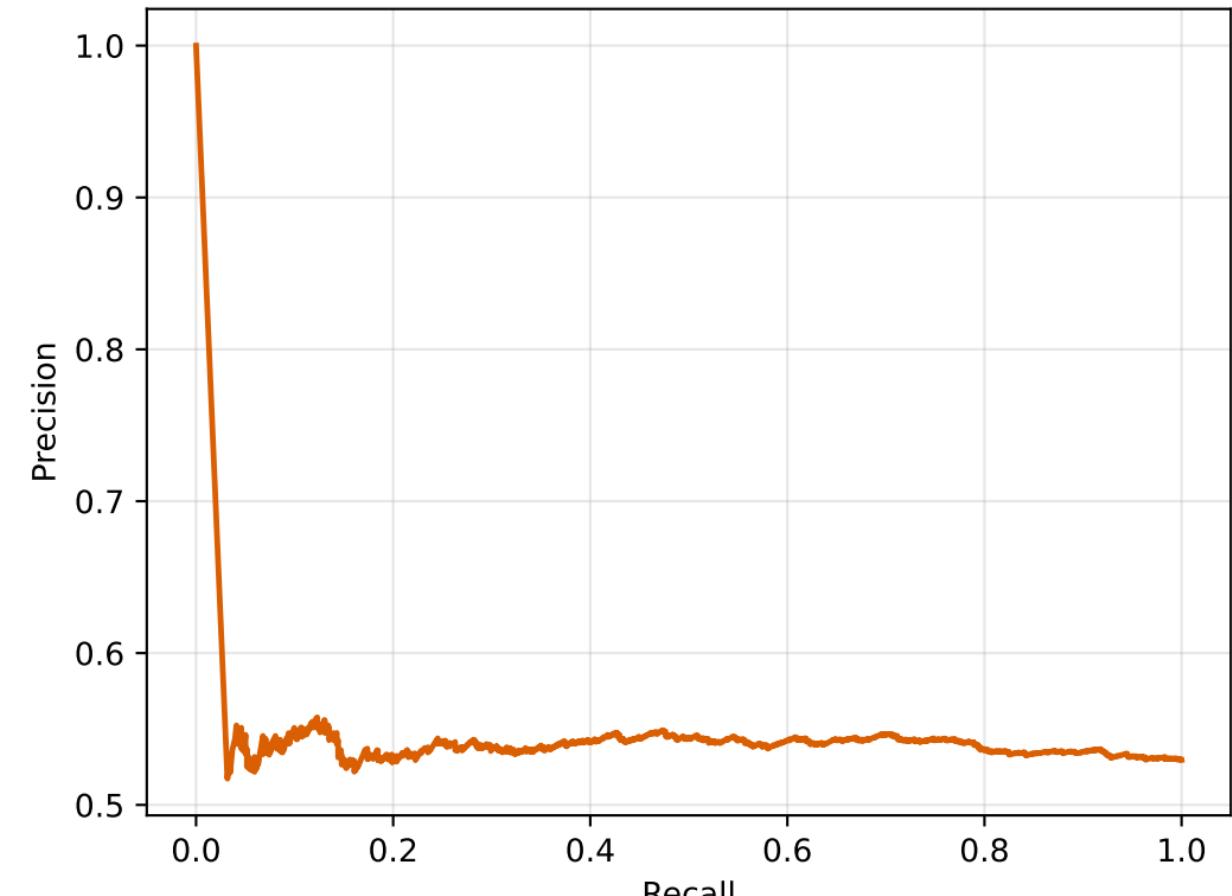
### Confusion Matrix — TRAIN (CV predictions)



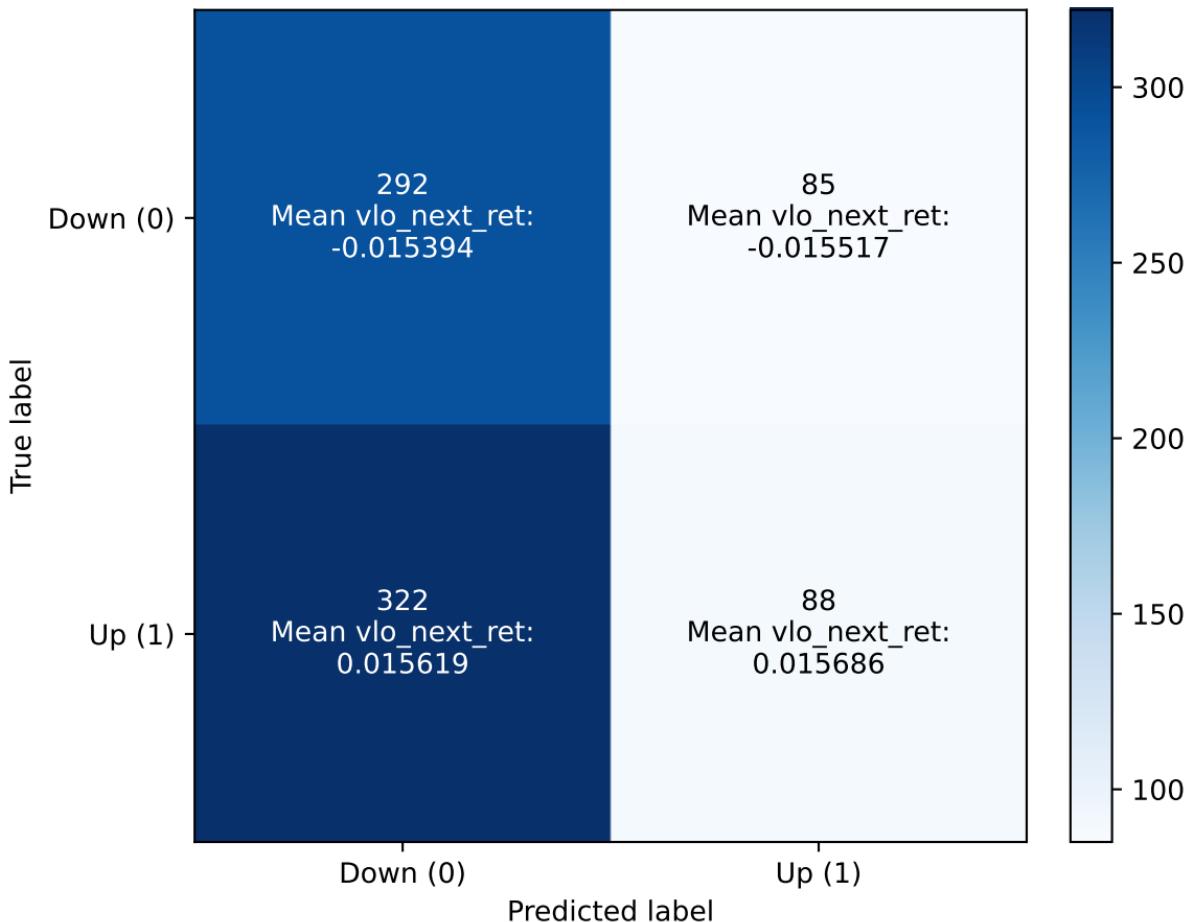
ROC Curve — TRAIN (CV pooled)



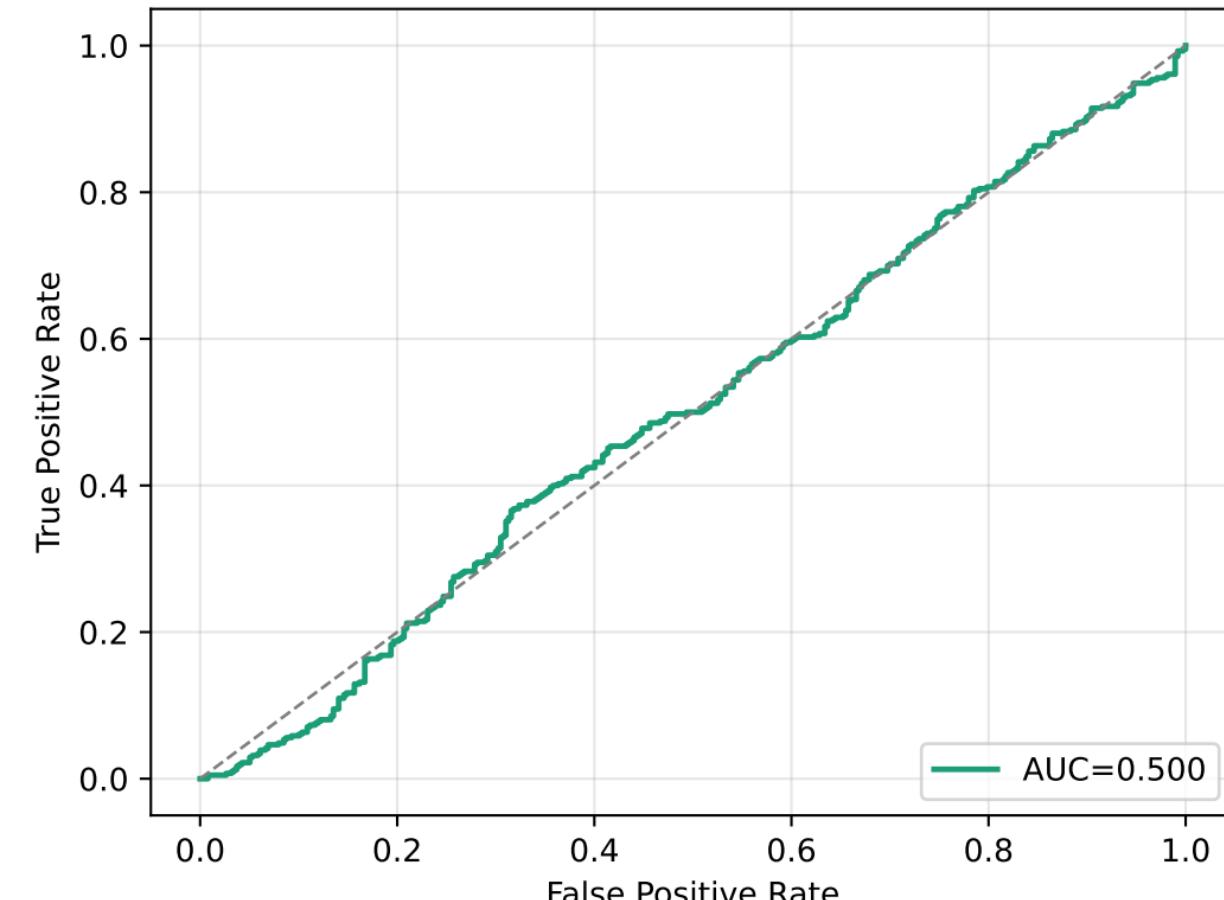
Precision-Recall — TRAIN (CV pooled)



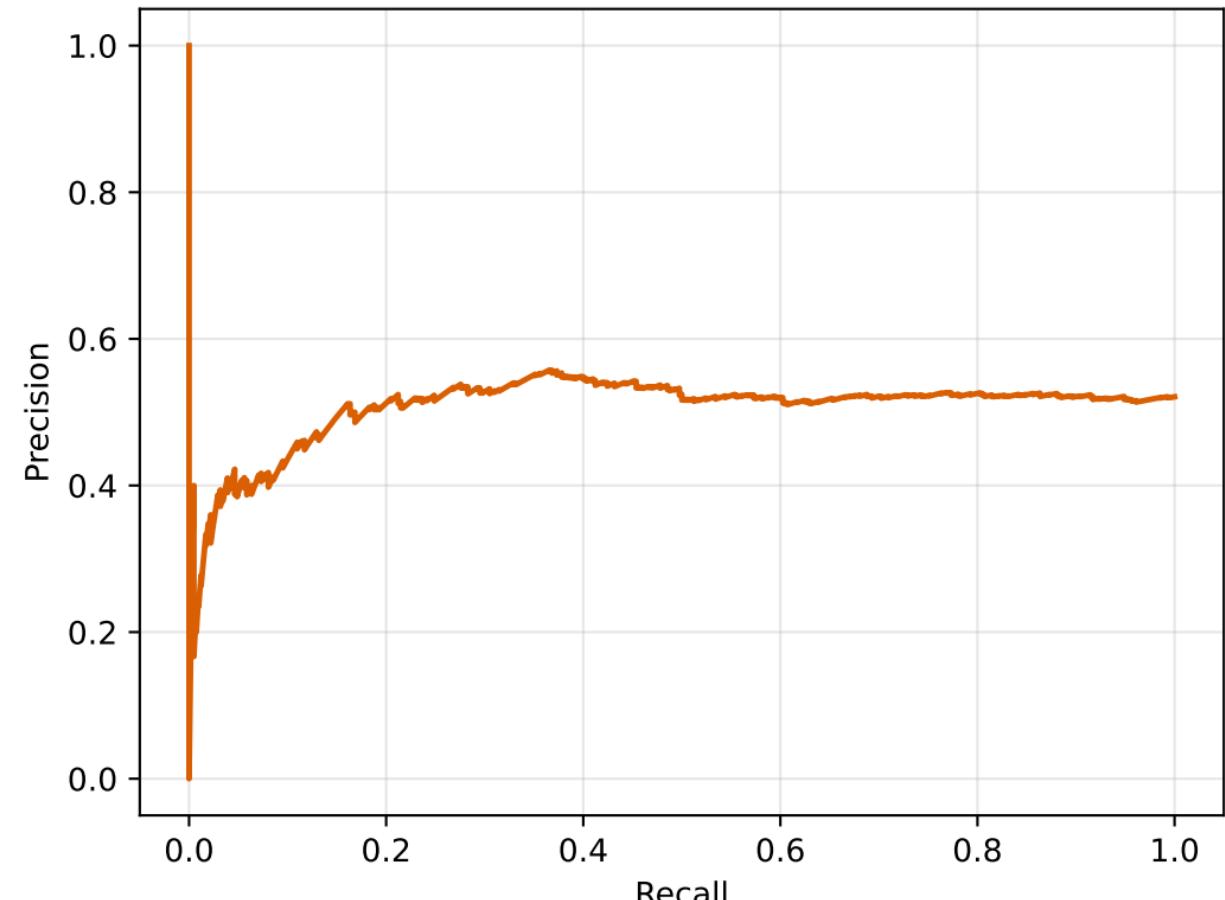
### Confusion Matrix — TEST (2023+)



### ROC Curve — TEST (2023+)

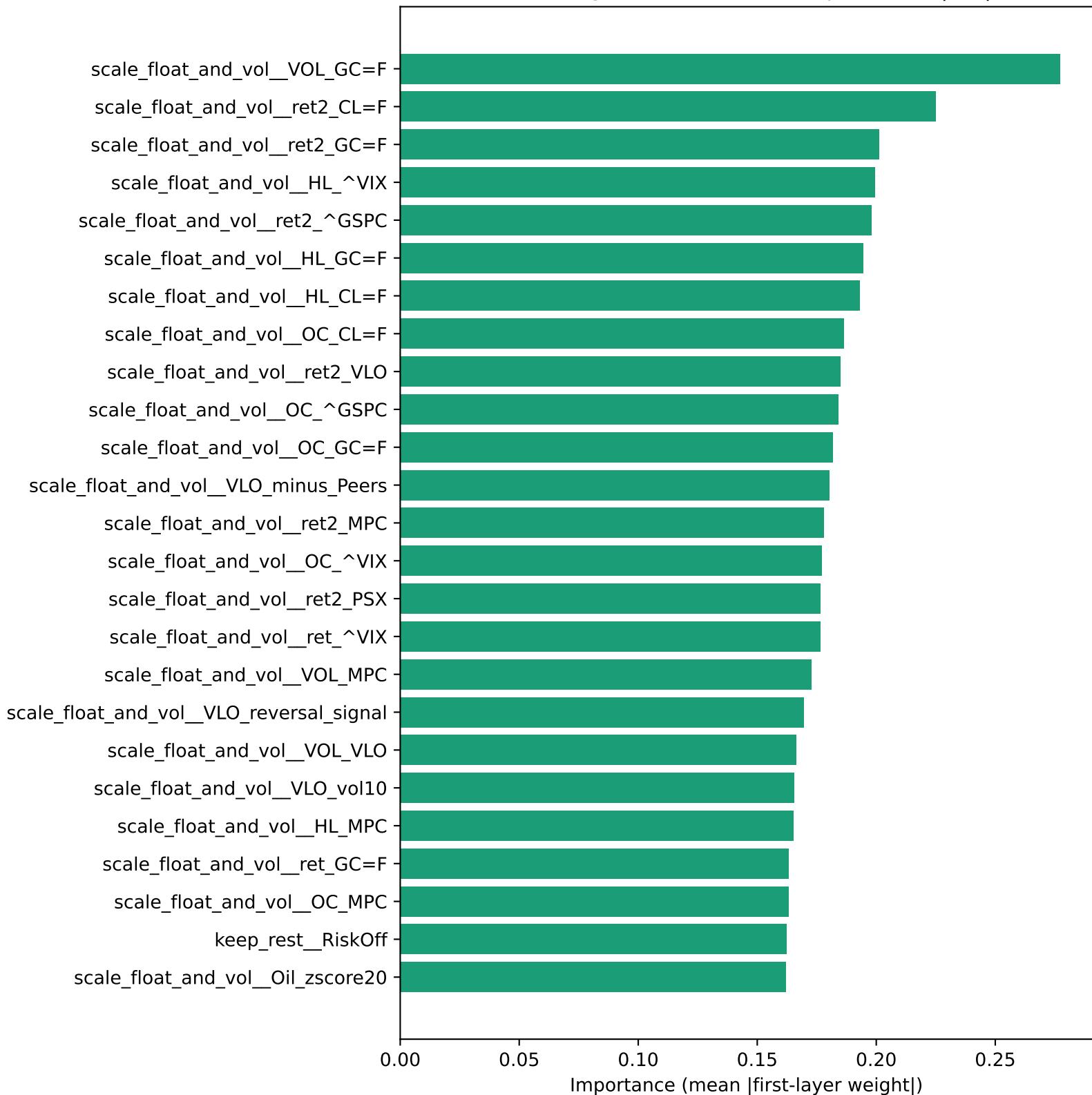


### Precision-Recall — TEST (2023+)

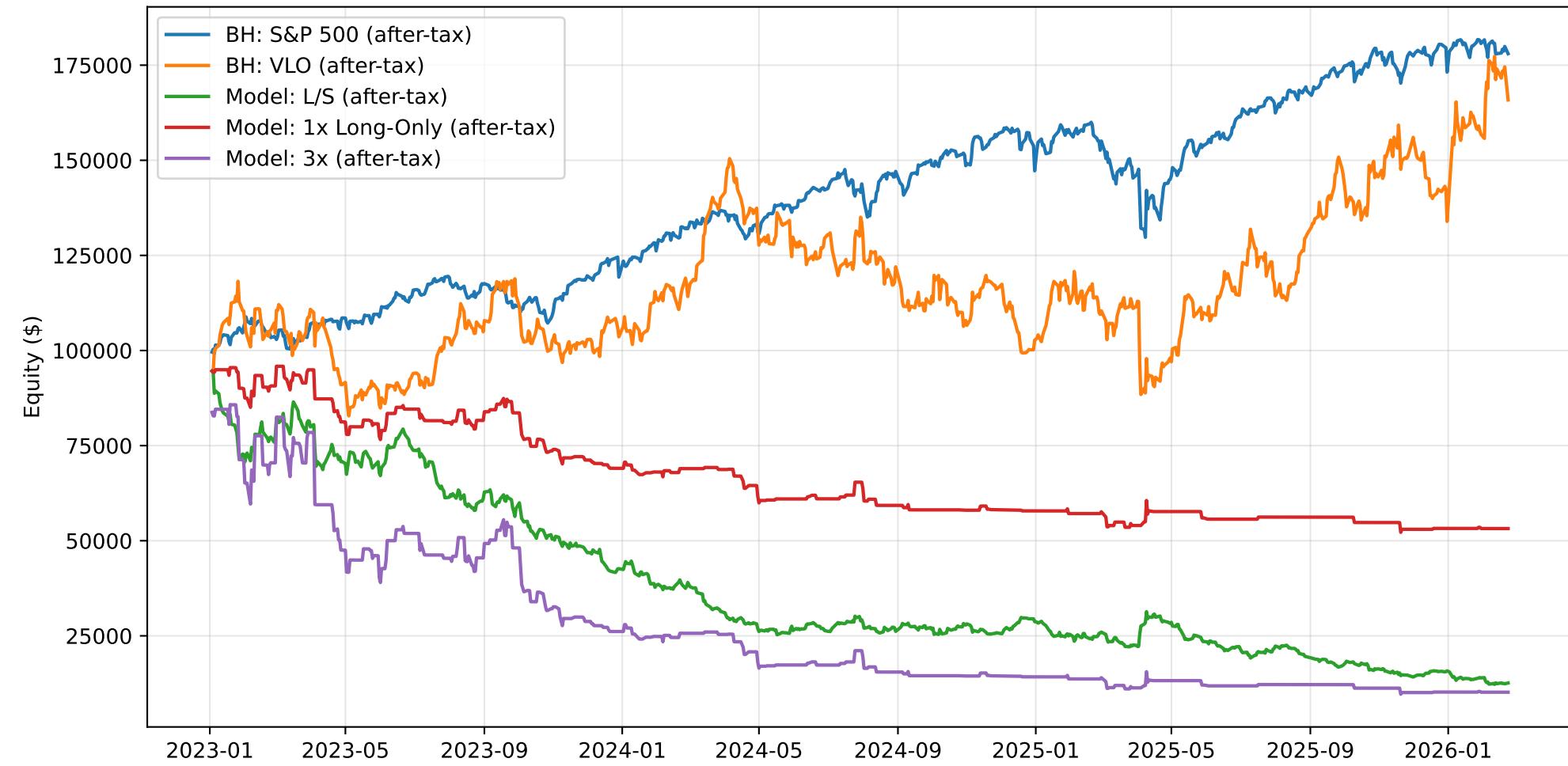


## Classification Report — TEST (2023+)

	precision	recall	f1-score	support
0	0.476	0.775	0.589	377
1	0.509	0.215	0.302	410
accuracy			0.483	787
macro avg	0.492	0.495	0.446	787
weighted avg	0.493	0.483	0.440	787

Neural Net Weight-Based Feature Importance ( $|W_0|$  mean)

## After-Tax Equity Curves — TEST: 2023 to most recent



# Annual After-Tax Performance (2023+), incl. Average

	BH: S&P 500 (after-tax)	BH: VLO (after-tax)	Model: L/S (after-tax)	Model: 1x Long-Only (after-tax)	Model: 3x (after-tax)
2023	19.78%	9.50%	-54.92%	-27.02%	-68.79%
2024	19.21%	-3.45%	-32.28%	-16.22%	-45.61%
2025	13.32%	29.79%	-44.77%	-7.96%	-28.15%
2026	-0.32%	16.09%	-18.96%	-0.06%	-0.31%
Average	13.00%	12.98%	-37.73%	-12.82%	-35.71%

## Run Metadata & Time-Split Summary

```
Report saved: /mnt/batch/tasks/shared/LS_root/mounts/clusters/dvandyk1/code/Users/dva
Scaler/Normalizer saved: /mnt/batch/tasks/shared/LS_root/mounts/clusters/dvandyk1/cod
Model saved: /mnt/batch/tasks/shared/LS_root/mounts/clusters/dvandyk1/code/Users/dva

TRAIN period: ≤ 2022-12-31 | TEST period: ≥ 2023-01-01
TRAIN size: 2,672 | TEST size: 787
CV folds: 5
RandomizedSearchCV n_iter: 80
Scaled columns (float + VOL_*): 72
Passthrough numeric columns: 5
Best params: {'pre_scale_float_and_vol': RobustScaler(), 'clf_solver': 'lbfgs', 'cl
Best CV ROC-AUC (refit metric): 0.5361
TEST ROC-AUC: 0.4999 | TEST Accuracy: 0.4828

Backtest assumptions (TEST period only, AFTER-TAX curves shown):
Initial capital: $100,000
Tx cost per side: 2.00 bps
Taxes (annual on positive P&L, loss carry-forward):
- Long-term (buy & hold): 20.0%
- Short-term (active): 37.0%
Short borrow APR (L/S shorts): 0.30%
3x long-only daily cost (financing+expense): 0.0595%
Stop-loss: NOT APPLIED

Feature exclusions (pre-model): vlo_next_ret, vlo_next_dir
```