

# FX Risk Sentinel: AI and Econometrics for Predictive Risk Analysis



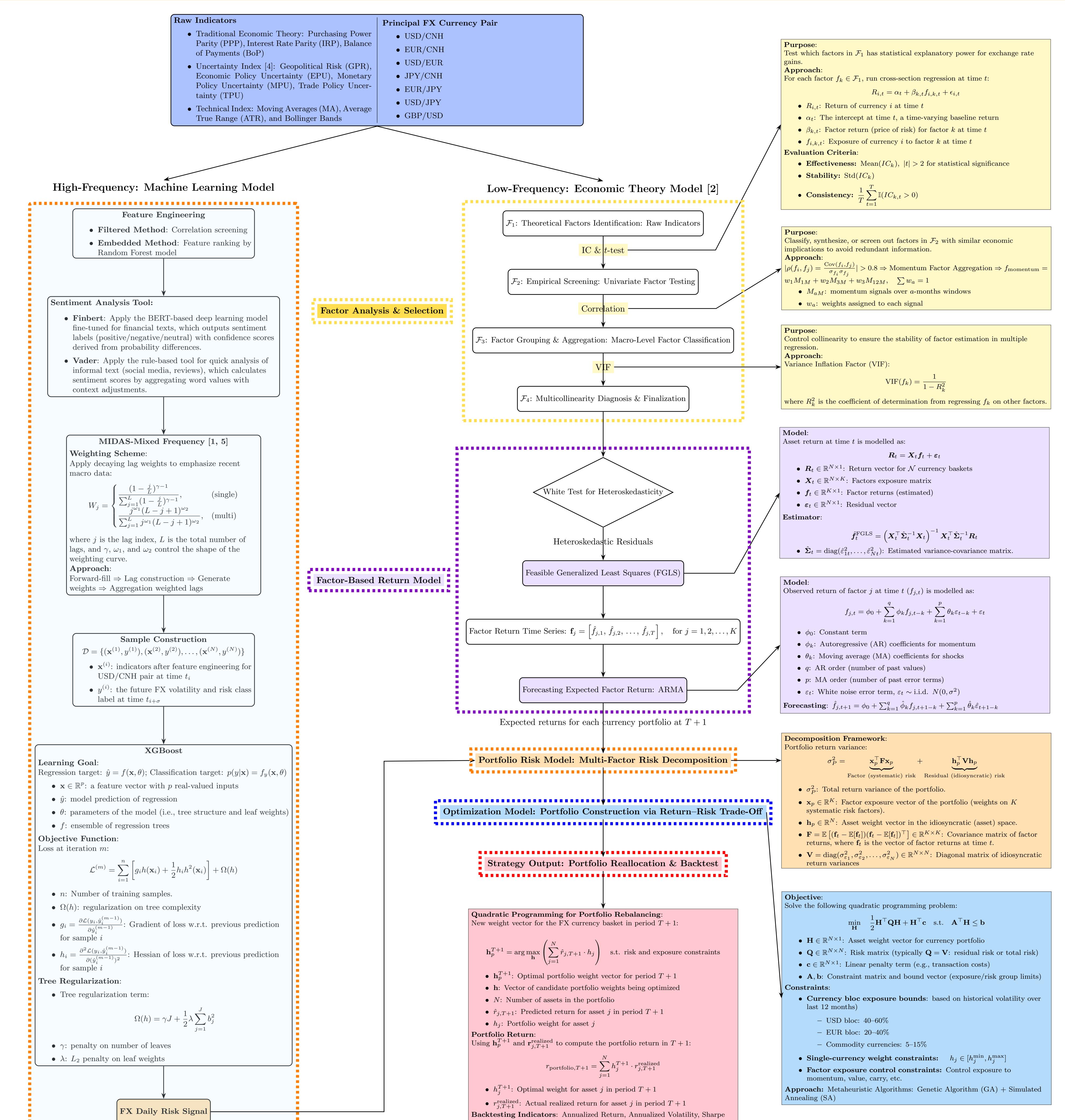
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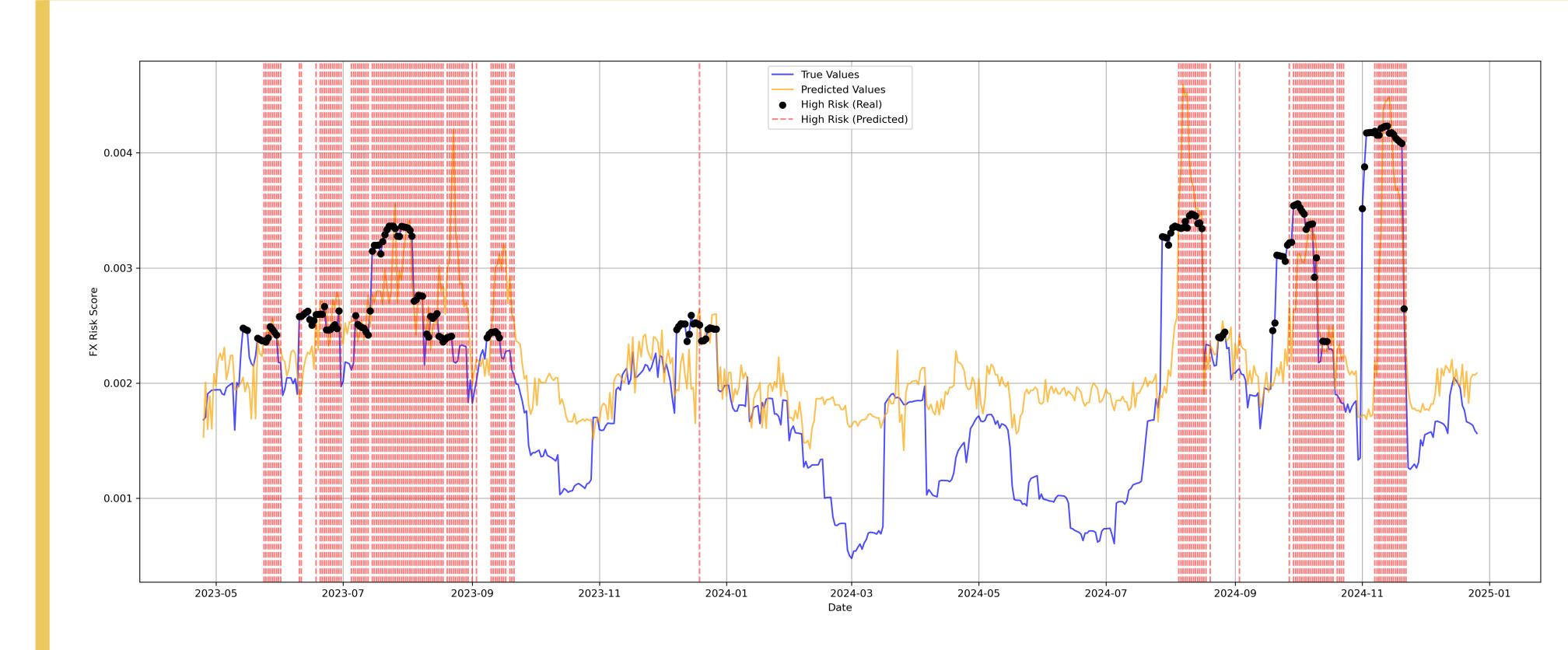
## Abstract

Our interdisciplinary team, with members from the School of Mathematics and Physics, the School of Advanced Technology, and the International Business School Suzhou, developed a robust foreign exchange risk signal detection system. Combining **high-frequency machine learning** with **low-frequency economic models** grounded in mathematical theory, we built a backend-to-frontend solution, including a website and an iOS app. This model detects daily risk signals, triggers immediate alerts, and adjusts hedging strategies to optimize returns and risk, yielding effective backtesting outcomes. The strategy is evaluated across four black swan events from 2006 to 2025, which proves to be a reliable tool for crisis resilience.

## Methodology

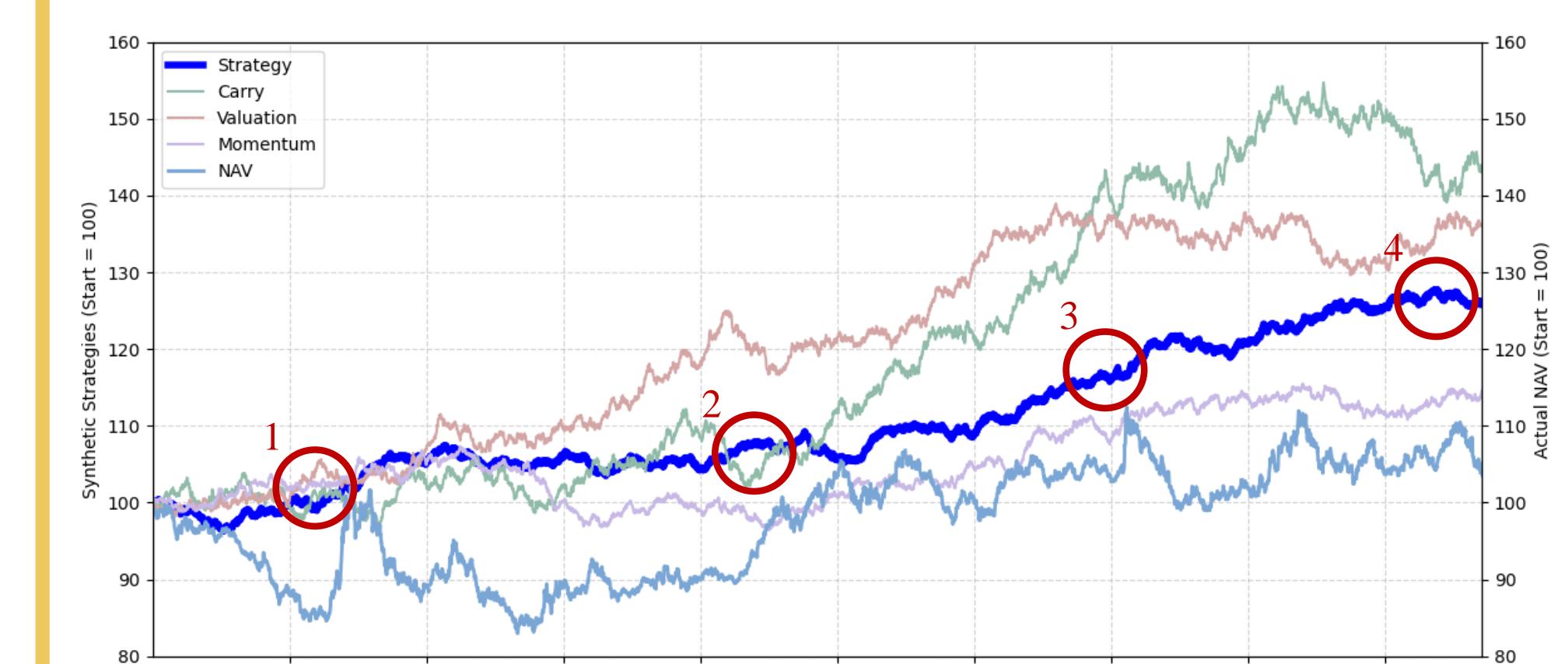


## Results



**FX Risk Signal Detection for High Risk Class**

- Period:** Test set ranging from May 2023 to Jan 2025
- Labels:** Black dots-real risk & Red lines-predicted risk
- Performance:** 76% Precision & 0.70 F1-score



**Backtesting Performance on Black Swan Events**

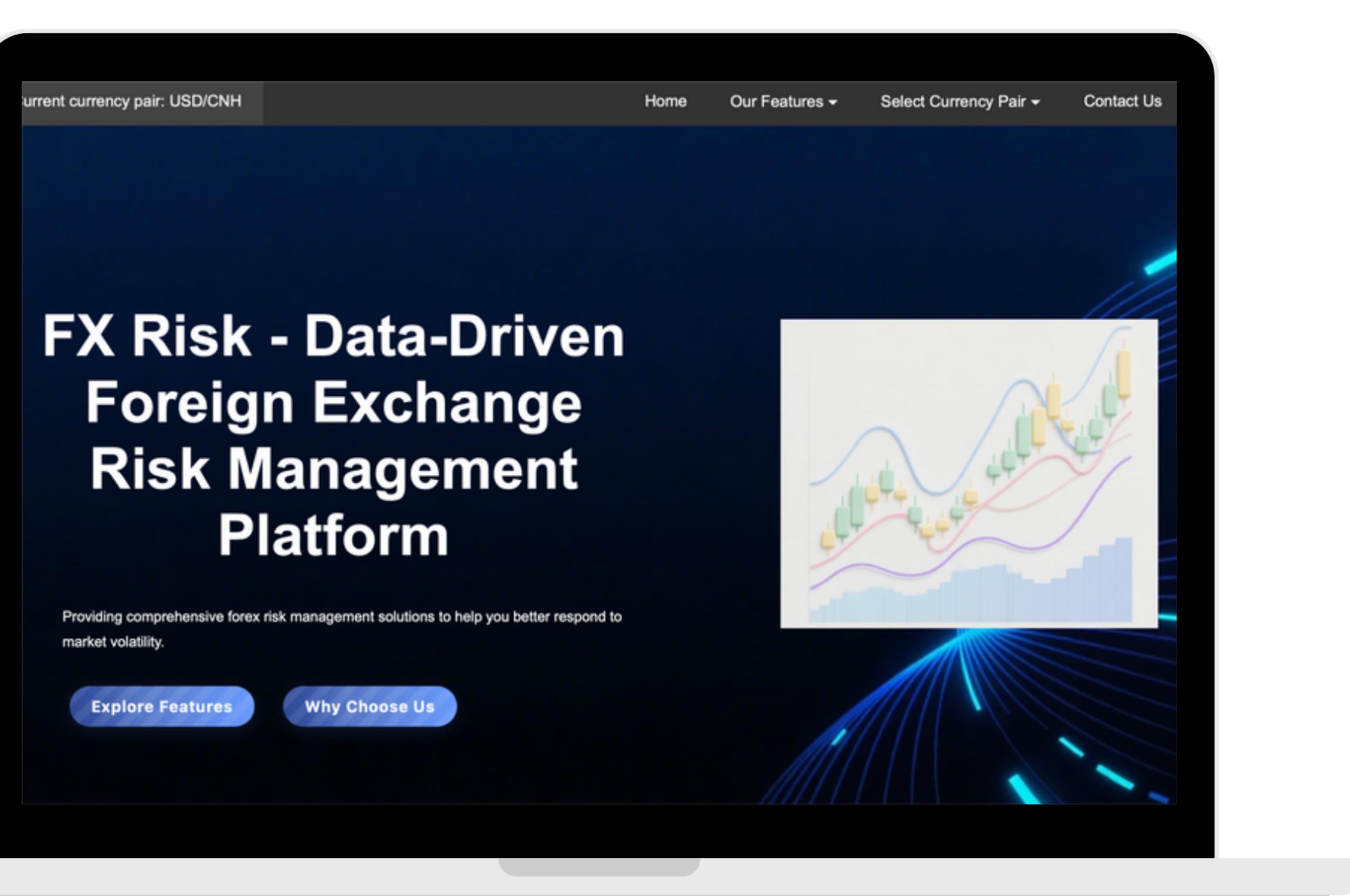
- Tail Event 1(2008):** Global Financial Crisis (GFC)
- Tail Event 2(2015):** China's 2015 Market Turbulence
- Tail Event 3(2020):** COVID-19 Pandemic Shock
- Tail Event 4(2024):** Trump Re-election Shock

## Strategy Performance Statistics

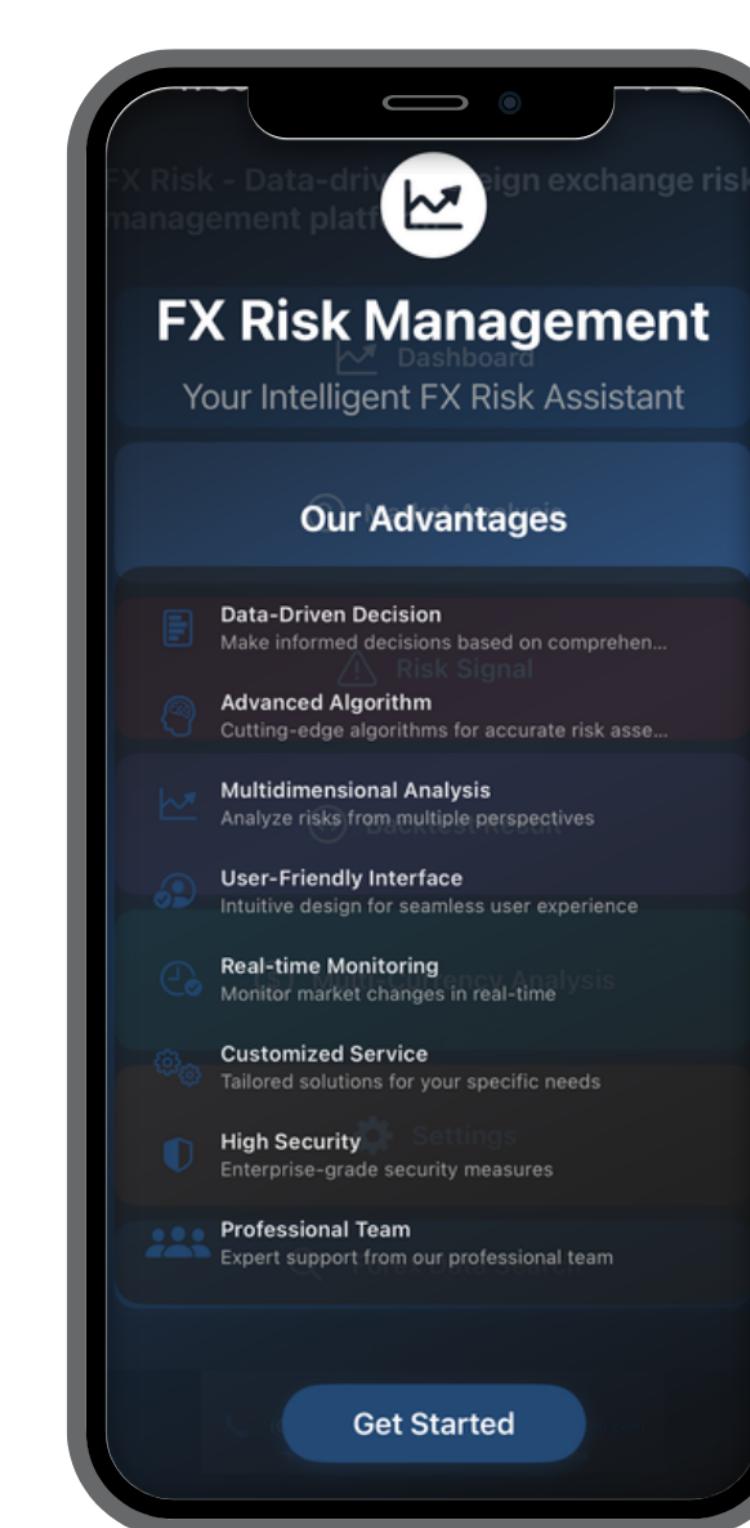
	Carry	Momentum	Valuation	Strategy
Anualized Total Return in USD	7.00%	2.37%	7.70%	5.78%
Anualized Excess Return	4.77%	3.00%	3.22%	3.31%
Anualized Volatility	5.47%	5.75%	8.97%	5.29%
Sharpe Ratio	1.36	0.23	0.34	1.63
Correlation Daily Returns to Strategy	-0.17	-0.44	-0.40	-0.49
% Down months	31.17%	42.88%	45.39%	36.37%
% Up months	68.83%	57.12%	54.61%	63.63%
Biggest Monthly Gain	8.13%	14.37%	8.24%	10.33%
Mean Monthly Return	0.19%	0.20%	0.27%	0.24%
Biggest Monthly Loss	-14.08%	-6.95%	-6.95%	-6.95%
Longest Profitable Streak (Months)	17	1	12	12
Run-up	46.02%	26.97%	19.99%	31.21%
Longest Losing Streak (Months)	13.00%	15.19%	12.35%	12.35%
Maximum Drawdown	-36.17%	-37.83%	-26.00%	-4.83%

The data, except for the strategy, are sourced from Deutsche Bank (2006.1 – 2025.6) [3].

## Product Development



Please scan for the website demo video.



Please scan for the iOS demo video.



## REFERENCES

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