

SHARE REPURCHASE STRATEGY OPTIMIZATION

Introduction

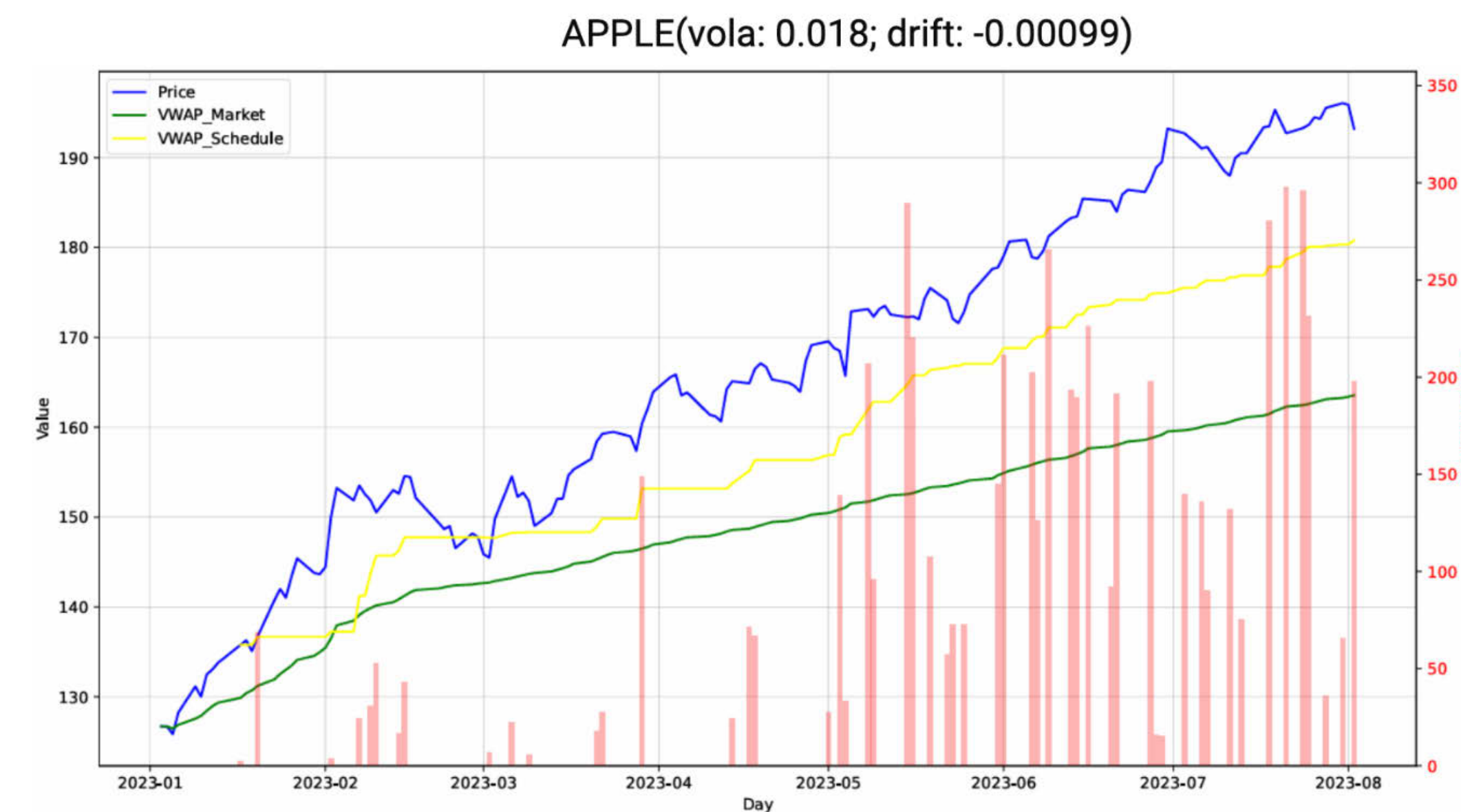
Our study advances the concept of share buybacks, wherein a company reacquires its own stock, a strategy highlighted by Osterrieder and Seigne as a significant opportunity for enhancing shareholder value. Building on this foundational research, our approach focuses on refining buyback scheduling through the use of Genetic Algorithms, demonstrating superior efficacy compared to traditional methods. We have expanded the framework to include the application of real stock data, integrating an ARIMA model to predict forthcoming price movements and mitigate the look-ahead bias inherent in the Genetic Algorithm. Moreover, our research includes a detailed case study examining BNP Paribas's share repurchase activities in 2021 and 2023, providing practical insights into the application of our enhanced buyback strategy under varied market conditions, thereby underscoring the critical role of temporal optionality in optimizing shareholder returns.

DATA

In our analysis, we utilized Apple's adjusted closing prices for 2023 and BNP Paribas data from two specific periods: November 1 to December 6, 2021, and April 3 to August 3, 2023. This dataset included daily share repurchases and dividend-adjusted prices, allowing us to rigorously test our buyback strategies under varied market conditions.

Genetic Algorithm on Real Stock Data

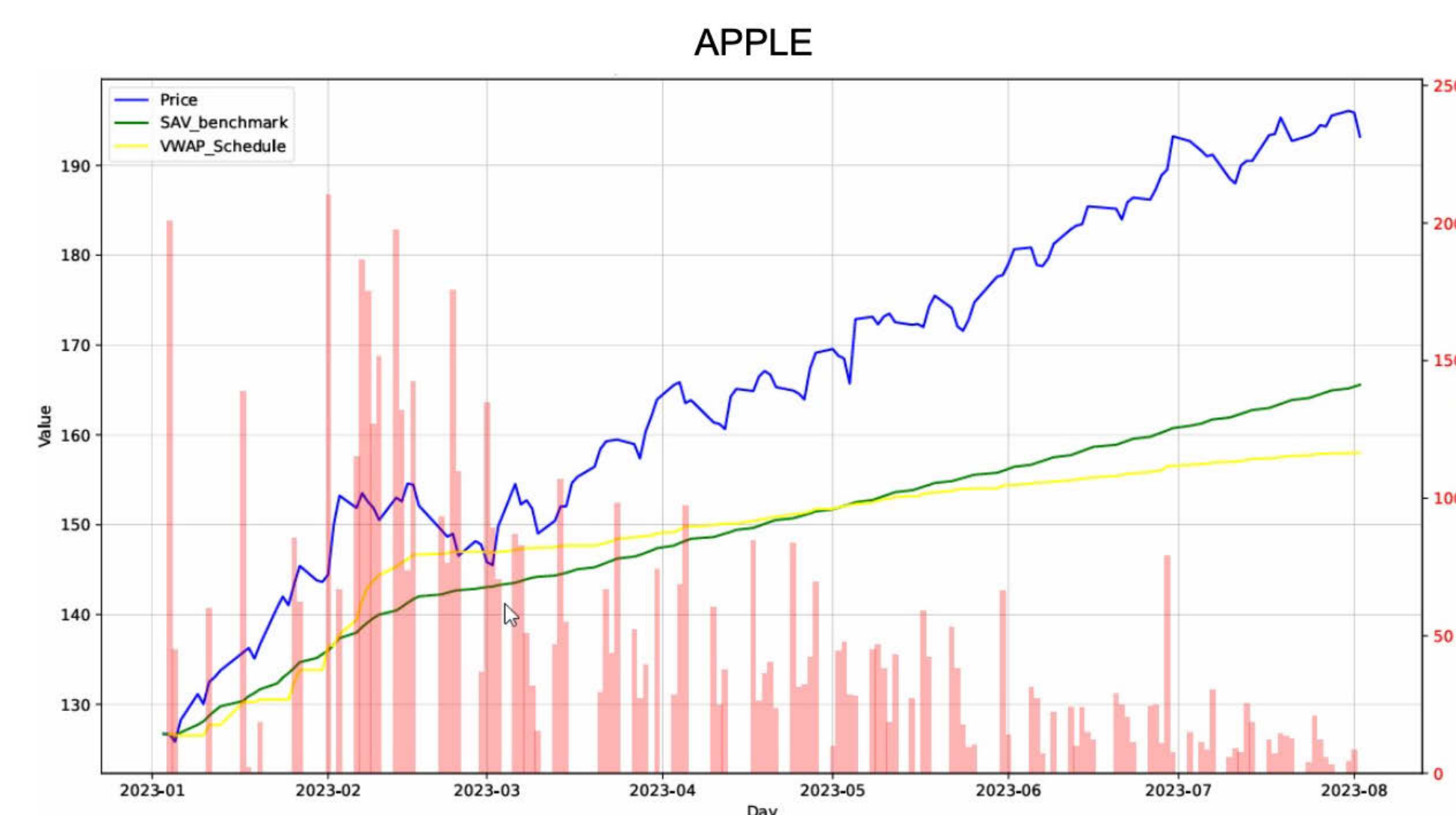
We present an application of the previous Genetic Algorithm when applied to real stock data and compare our strategy with the volume weighted average price of that period. In this case we take AAPL stock as our underlying.



ARIMA Model to mitigate look ahead bias

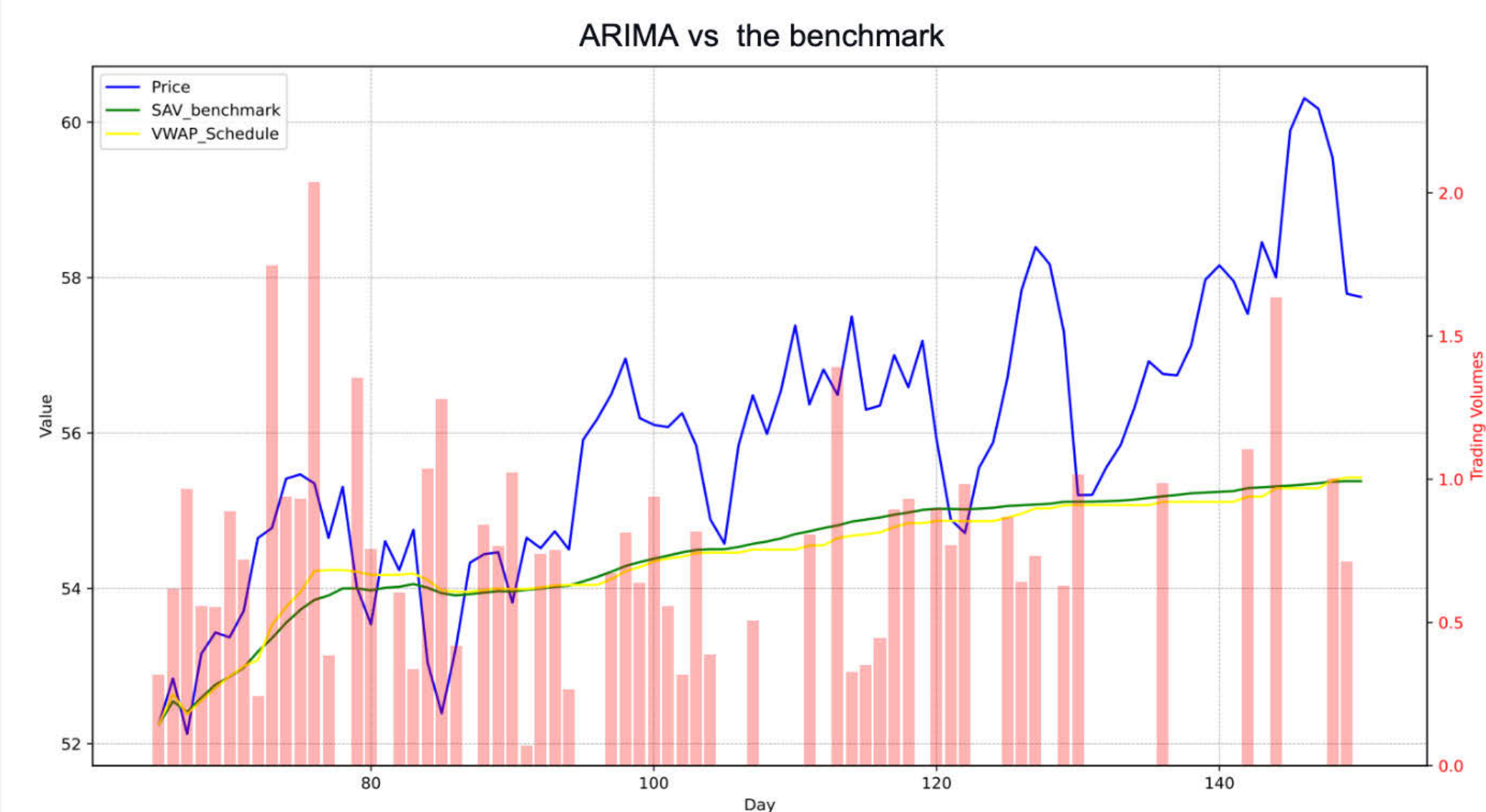
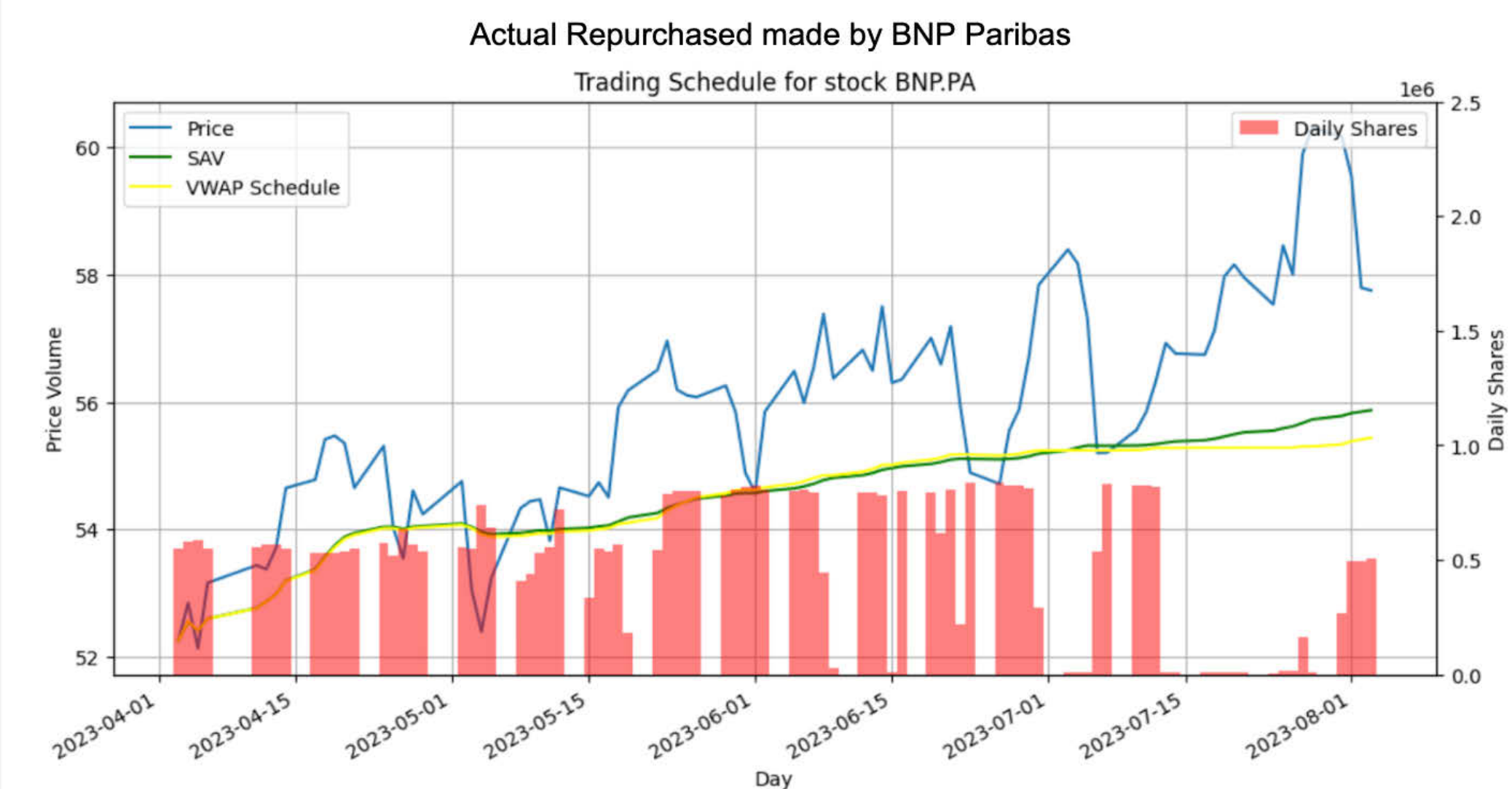
Approach:

- ① On every single day during the buyback period, use ARIMA to predict the price of the rest days in the trading period.
- ② Optimize the buyback schedule of the whole period with GAs based on the predicted price.
- ③ Then buy the quantity of today indicated by the optimal schedule.

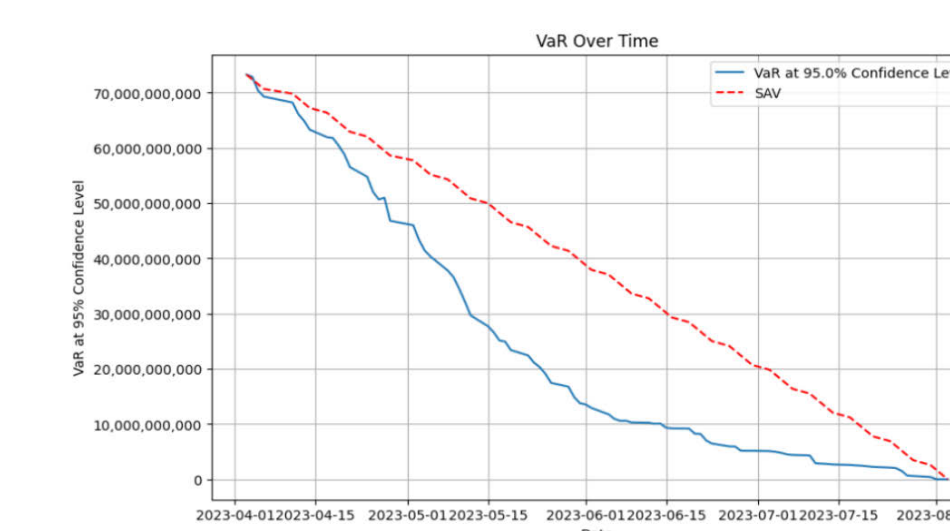


BNP Paribas Case Study

In our research, we feature a focused case study on _BNP Paribas during the period from April 3 to August 3, 2023. This data highlights how our repurchase strategy adapts to market changes, showcasing the practical application and benefits of enhanced temporal optionality in dynamic environments.



VAR 95%



Cum. Trading Volume

