Project 2: OPTIMIZE SOMETHING

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1 INTRODUCTION

Implement metrics including cumulative return, sharp ratio, average and standard deviation of daily return, to evaluate and analyze portfolio performance. Use SciPy optimization function to determine optimal stock allocations in a portfolio based on a specific metric.

2 IMPLEMENTATION AND RESULTS

Sharp ratio $= \sqrt{252} \times \frac{mean(daily\ returns - daily\ risk\ free\ rate)}{std(daily\ returns)}$

Optimizer: initialize with uniform allocation and target to minimize sharp ratio.

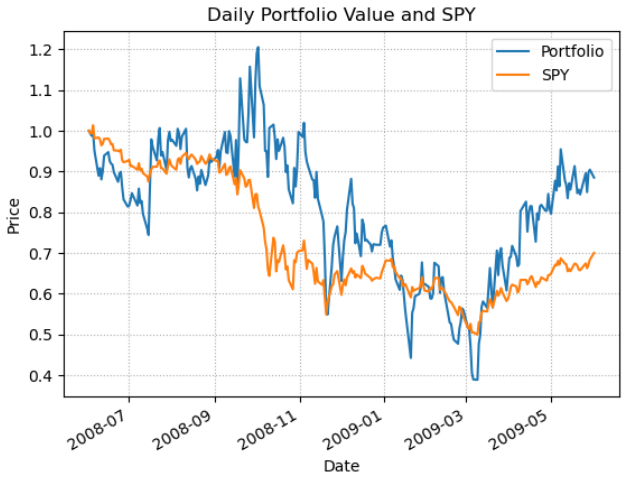

Figure 1 — Normalized daily value of portfolio ['IBM', 'X', 'GLD', 'JPM'] vs. SPY from 2008-06-01 to 2009-06-01

From 2008-06-01 to 2009-06-01, the optimal allocation for portfolio ['IBM', 'X', 'GLD', 'JPM'] is [0, 0, 0, 1]. Figure 1 and Table 1 show the performance of this portfolio.

Table 1 — Statistics of portfolio ['IBM', 'X', 'GLD', 'JPM'] from 2008-06-01 to 2009-06-01.

Sharp ratio	Volatility	Average Daily Return	Cumulative Return
0.42	0.069	0.0018	-0.11