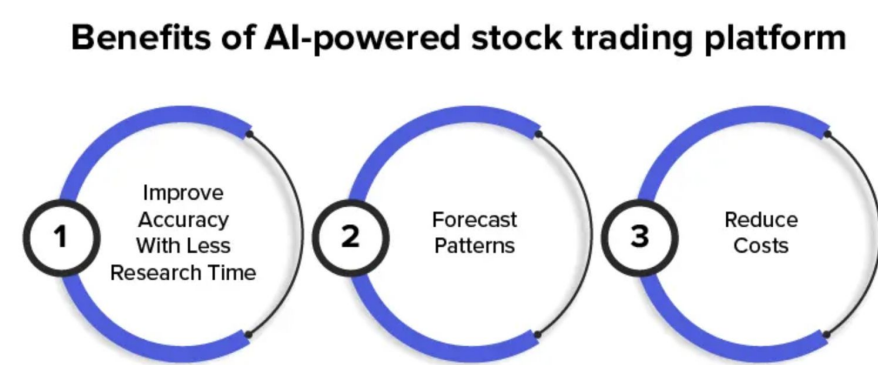# AI Based Firm Analysis and its Application in Trading System
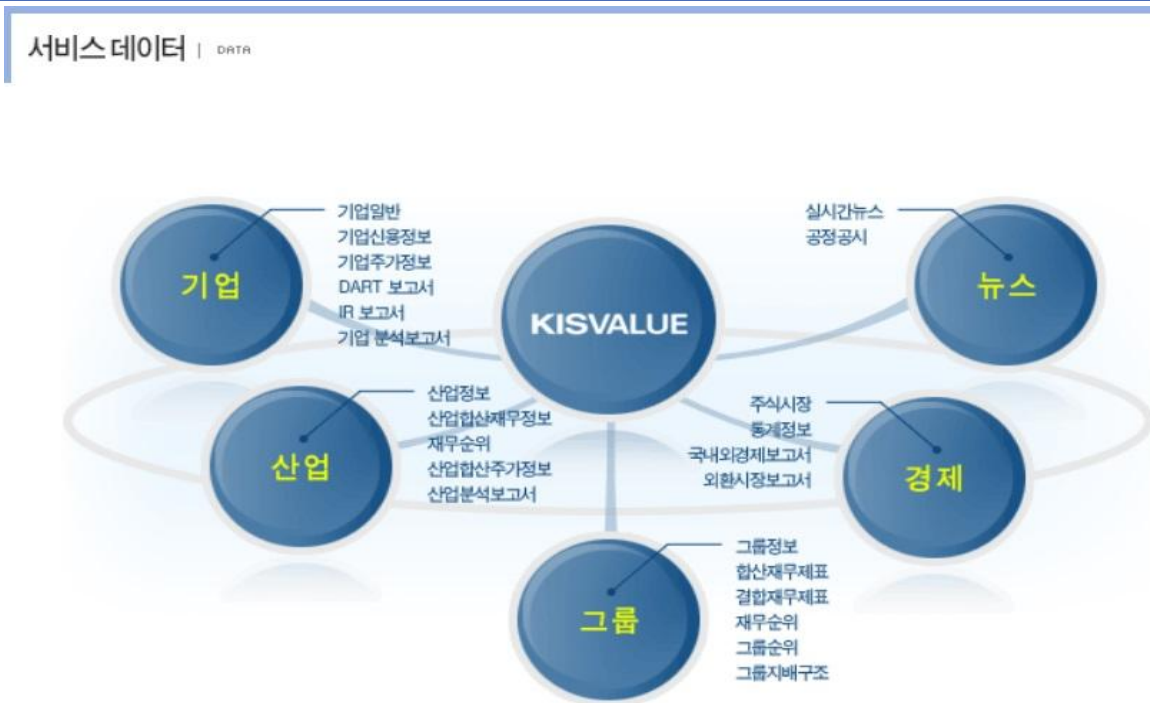
Introduction

Trading is a widely embraced field, and it's evolving rapidly thanks to the integration of Artificial Intelligence (AI). More and more companies are adopting AI to enhance and streamline their trading processes. Here are some benefits of AI-based trading system over human traders:

Benefits of AI-powered stock trading platform

1 Improve Accuracy With Less Research Time
2 Forecast Patterns
3 Reduce Costs

In this research, among all neural network types, **autoencoders** were used for stock detection, and **Sharpe Ratio** was used for creating optimal portfolio that strike the optimal balance between return and risk.

Our primary goal is to create two types of portfolios: one driven by standard autoencoders and the other by conditional autoencoders. We will conduct a comparative analysis to evaluate the performance of these portfolios, with the objective of determining the effectiveness of autoencoders and conditional autoencoders in generating optimal investment portfolios.

Data Collection

KisValue is korean financial and investment information platforms. It provides below functions for investors.

1. Financial Data Provision: KisValue offers a wide range of financial data related to the . KOSPI and KOSDAQ.

2. Stock Information and Charts: KisValue provides detailed, real-time or historical information about individual stocks, allowing investors to access stock charts, price history, stock analysis, performance data, and key metrics.

3.Stock Screening and Screener: Investors can use KisValue to search for stocks that meet specific criteria or to screen for stocks that match their investment strategies. This helps investors find stocks that fit their investment approach.

4. News and Research Reports: KisValue offers financial news and company research reports, providing investors with insights into market trends and company analysis.

Factors Information	
Closing Price	종가
Opening Price	시가
High Price	고가
Low Price	저가
Settlement Price	대용가
Trading Volume	거래량
Trading Value	거래대금
PER	주가 수익 비율
PSR	주가 매출 비율
PBR	주가 순자산 비율
PCR	주가 현금흐름 비율
P/EBITDAPS	주당 EBITDA 비율
Dividend Yield	배당수익률
Volatility	변동성

Methods & Results
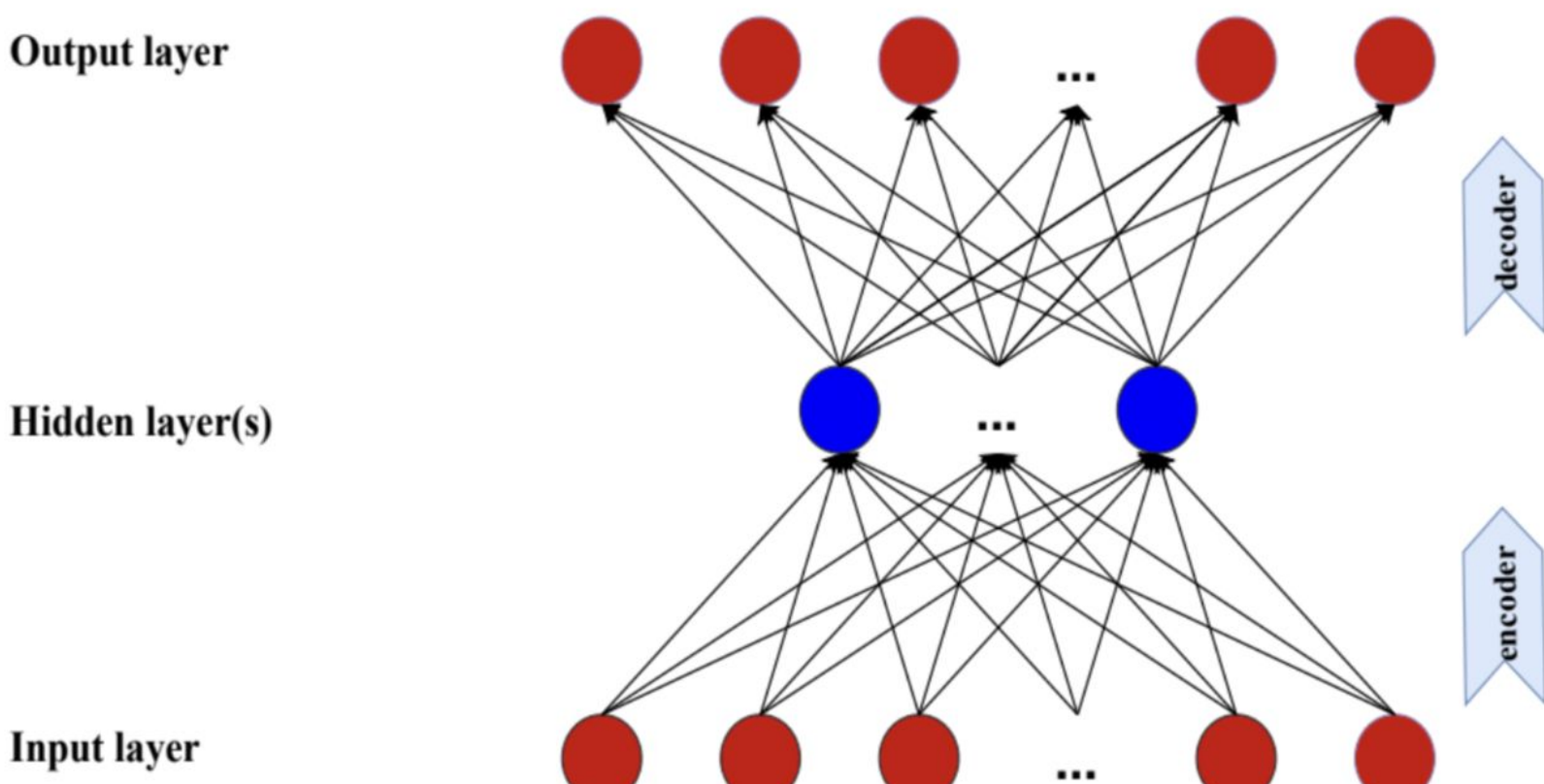
Research method:

1 Identifying stocks using autoencoder

2 Determining optimal stock portfolio using sharpe ratio

3 Daily code execution and weekly result analysis.

1. **In the stock selection, two AutoEncoder models were used: The Standard AutoEncoder and Conditional AutoEncoder, as shown in figure 1 and 2.**
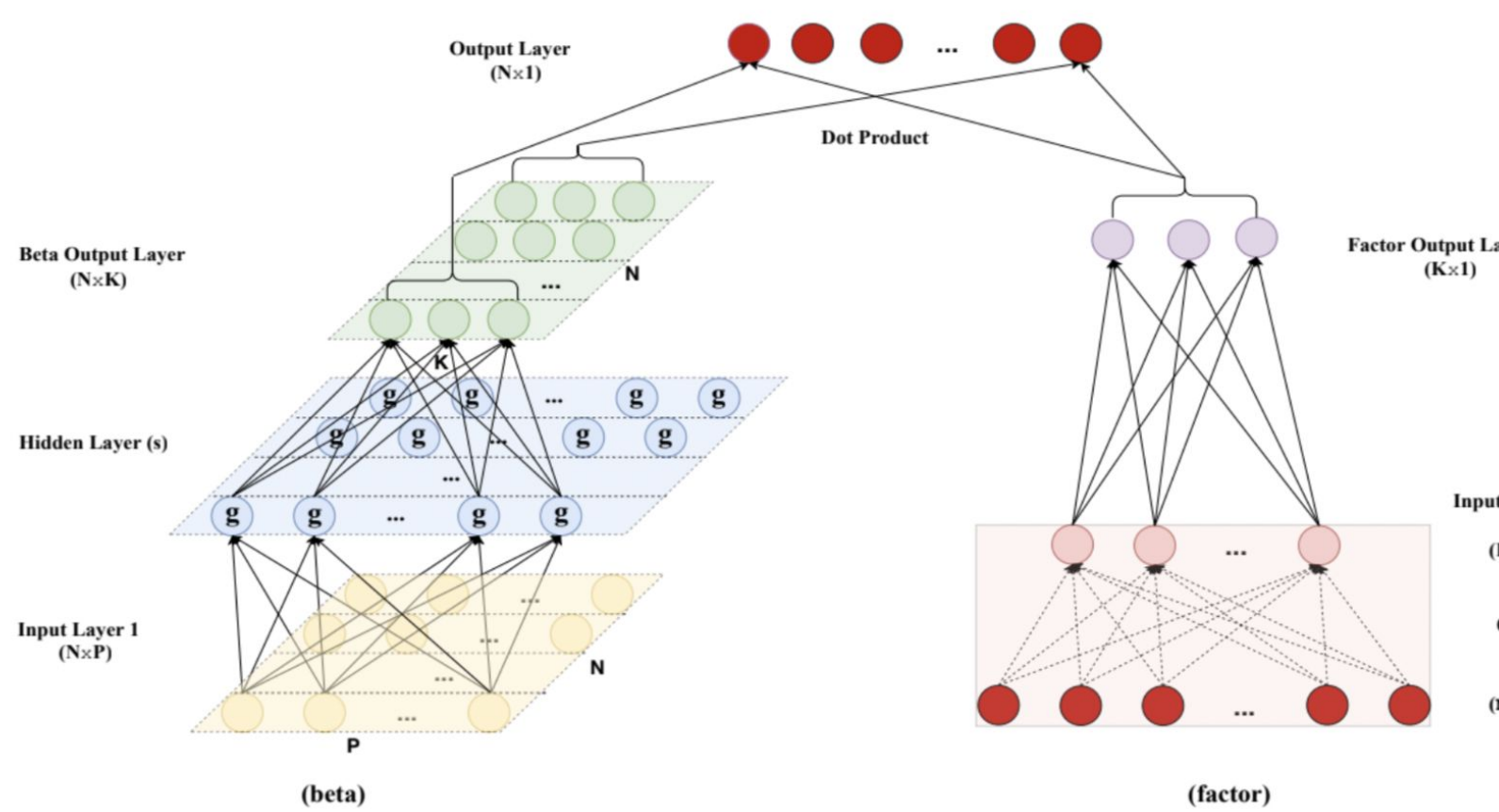
The application of the Traditional AutoEncoder in our stock selection methodology centers on the exclusive consideration of profit rate and final price attributes. This specific focus isolates the importance of these financial variables, leaving aside the incorporation of additional contextual features in the decision-making process.
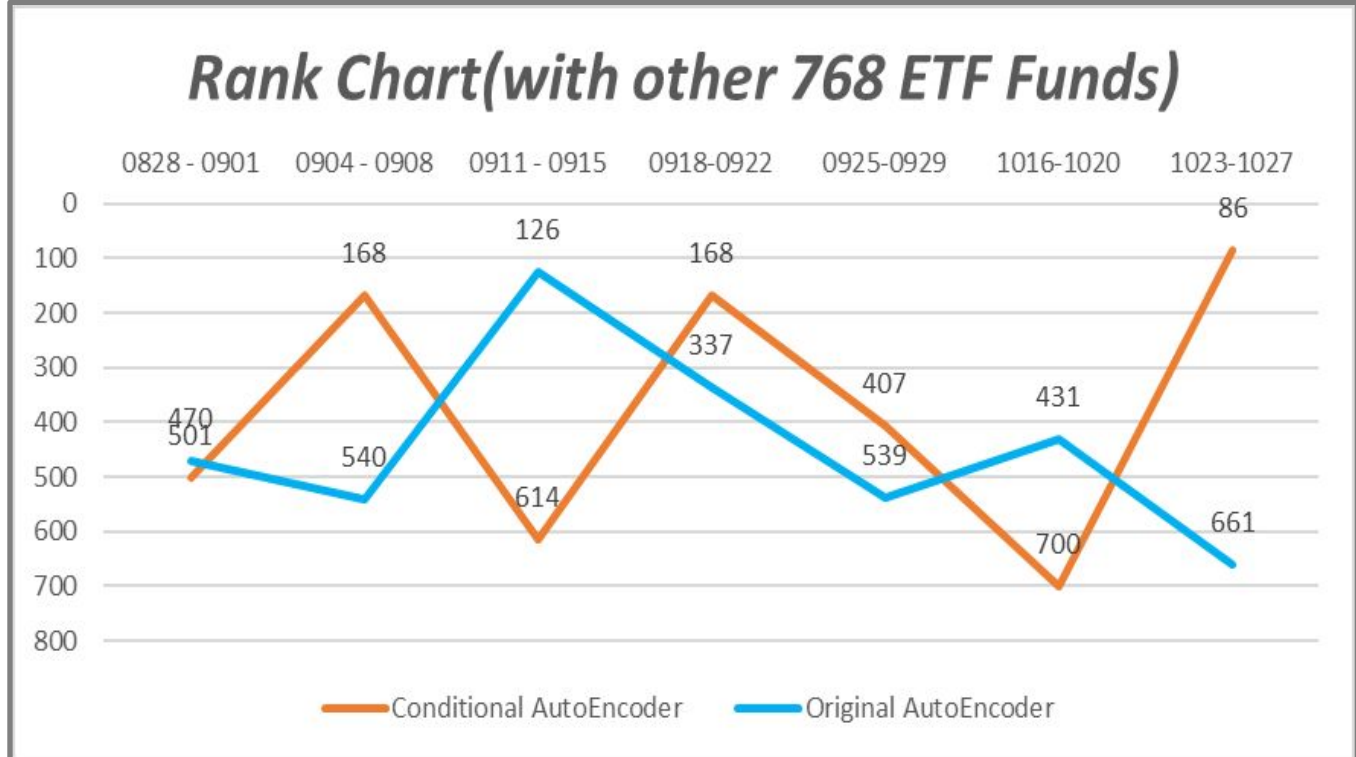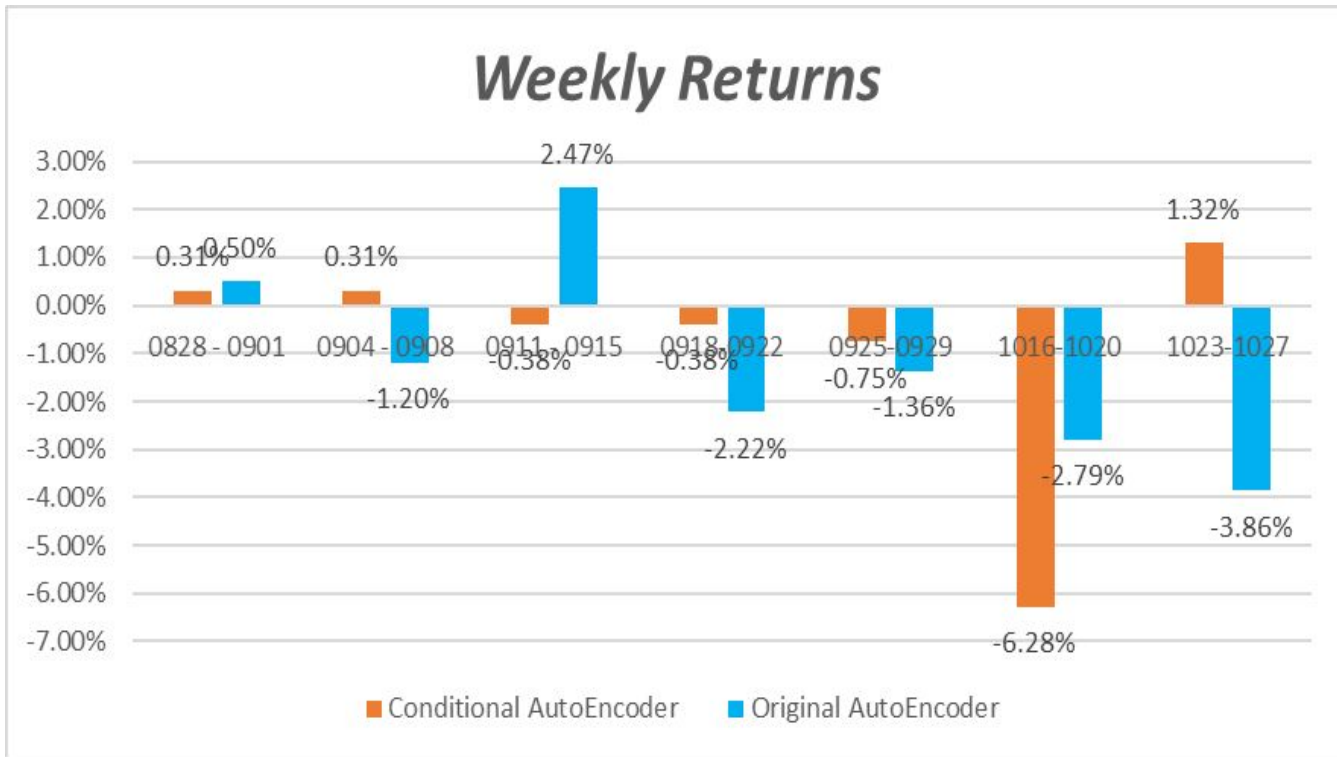

Figure 1: Standard Autoencoder Model

Output layer

Hidden layer(s)

Input layer

Unlike standard AutoEncoder, the conditional AutoEncoder takes consider a profit feature or a final price feature including unique characteristics of other features. This enhances the utility of the data by considering a broader range of features.
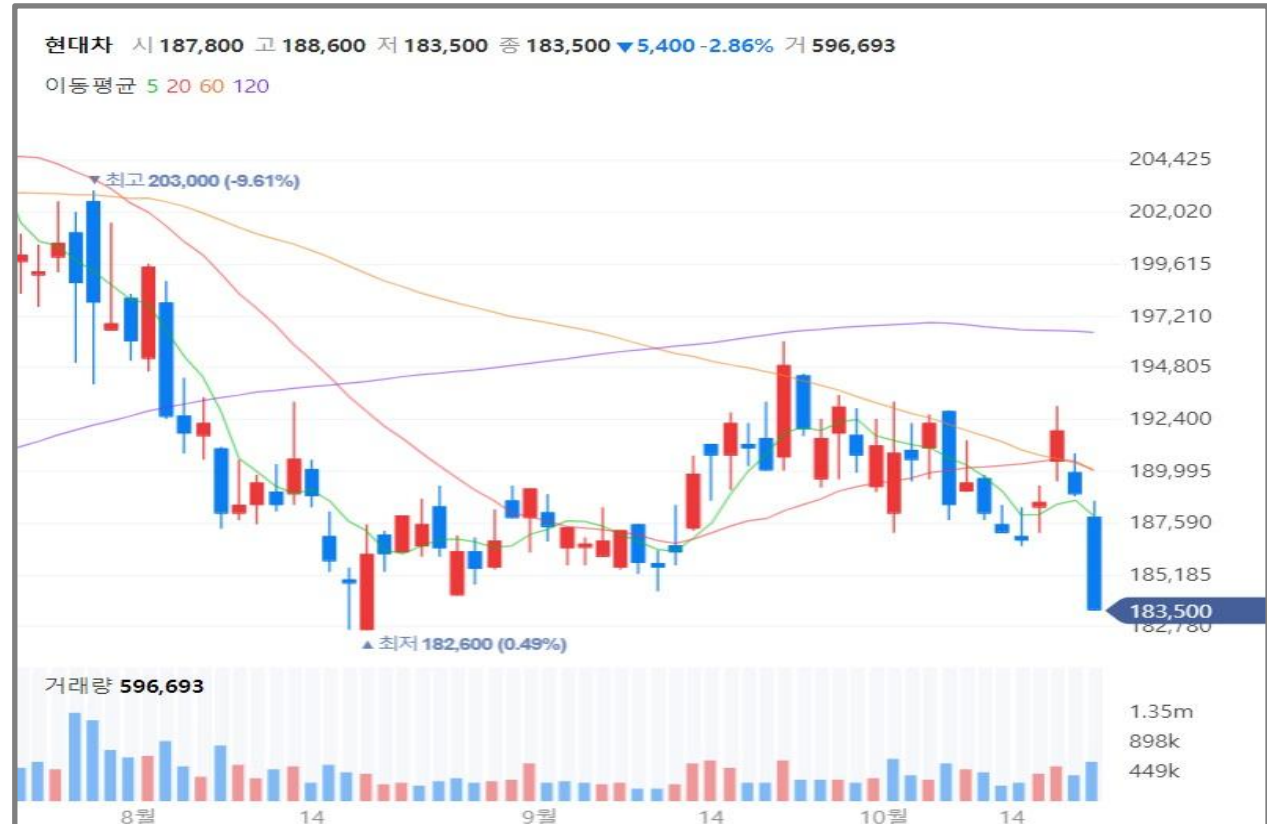

Figure 2: Conditional Autoencoder Model

2. This code generates 10,000 random portfolios with asset weights, and identifies the optimal portfolio with the highest Sharpe ratio, incorporating a risk-free rate. The result includes the optimal portfolio's expected return and Sharpe ratio. After investments, we compared weekly returns and weekly rankings with other ETF.

Weekly Returns

Rank Chart(with other 768 ETF Funds)

Further Analysis

Case 1: Hyundai Motors

Case 2: LG Household & Health Care

Why both stocks suffer decreasing prices? – case of micro factors

Case 1:
Hyundai Motor - Stock Reflecting Market Trends

1. Short selling due to a peak-out after recording the highest earnings in the second quarter.
2. Slower transition to electric vehicles for Hyundai.
3. Uncertainty in the global economic environment.
4. Vehicle defect and potential recall concerns

Case 2:
LG Household & Health Care - Stock Contrary to Market Trends

1. Earnings shock in the second quarter.
2. Cost increases due to inflation.
3. Branding failures impacting future prospects.
4. Decreasing popularity in Chinese market - It lose market share in China.

Why both stocks suffer decreasing prices? – case of macro factors

1. 10-year U.S. Treasury yields rose to near 5%.
2. Aftermath of Palestine-Israel conflict
3. Market leader stocks' earning shock
4. Won/Dollar Exchange Rate rises on strong U.S. Dollar