DRM Semester 1 : 2024-25

DRM Assignment – Details and Deliverables – Course Weightage 20 per cent

Due date for submission 15ᵗʰ November 2024 11.59 p.m. (IST)

ECON F 354 – Hedging a Portfolio of Stocks – Comparing Stock and Index futures

Each student is assigned "4" stocks and groups are assigned at random "8" stocks from NIFTY 500 universe https://www.nseindia.com/products-services/indices-nifty500-index

The following are the deliverables of the Assignment and go through the description thoroughly and reach out in case if you have any doubts.

The student/ group is expected to construct a portfolio of stocks (with condition that no stock should have a weightage of more than 40% in the entire portfolio by value). The size of the portfolio is not restricted.

Aim of the assignment: To hedge portfolio of stocks using stock futures and index futures available of National Stock Exchange, India for a hypothetical portfolio for a period of three months starting from July 2024 to September 2024.

- The look back period is 30ᵗʰ June 2022 to 30ᵗʰ June 2024 (2 years data). [Consider nearest trading day if there is no trading day on specified dates – mention the dates used clearly]

- The trading window or hedging horizon is from July 2024 to September 2024.

- You shall use the last two years (look back period) data and carry out hedging for 3 months.

Note: The daily stock and futures prices data **should be** obtained from NSE website (historical data or daily bhav copy).
https://www.nseindia.com/report-detail/eq_security
https://www.nseindia.com/all-reports-derivatives
https://www.nseindia.com/all-reports (explore)

The assignment has four parts

1. **Part 1: Portfolio construction, descriptive statistics, returns**
   Define the portfolio- amount, weightage of stocks assigned in the portfolio, snapshot description of the portfolio – company, sector, market capitalization etc. (**table**).
   Returns – Compute the daily, weekly, monthly returns for the stocks individually and the portfolio- compare it with the returns from NIFTY 50 index. (**table & graph**)
   Correlation Plots – Compute the correlations between stocks and NIFTY 50 index returns [clearly show the correlation plots]. Does the time horizon of returns impact correlations? How does portfolio return correlate with NITFY 50 index returns? Identify the underlying correlation patterns [**positive, negative, neutral**]

2. **Part 2: Hedging using Stock futures.**
   In this part consider you are hedging the individual stocks using appropriate stock futures – either the own stock futures or based on appropriate cross hedging stock futures.

- Compute the optimal hedging ratio (OHR) using daily, weekly, monthly prices of the underlying stocks and futures **(ignore the daily settlements)**. Compute the OHR using 1 year's data [June 2023 to June 2024] 2 years data [June 2022 to June 2024]. How does OHR depend on time frame of analysis. Give a summary table depicting OHR for each stock and time frame of analysis. [You should submit excel sheet supporting the calculations and data should be consistent and valid for independent verification]

Using 1 year data			
OHR	Day Returns	Weekly Returns	Monthly Returns
Stock 1			
Stock 2			
Stock 3			
Stock 4			
Using 2- years data			
OHR	Day Returns	Weekly Returns	Monthly Returns
Stock 1			
Stock 2			
Stock 3			
Stock 4			

- Subsequently, depending on the value of your position in the specific stocks of your portfolio compute the optimal number of the contracts using optimal hedging ratio computed based on OHRs computed above.

Using 1 year data			
Optimal Contracts	Day Returns	Weekly Returns	Monthly Returns
Stock 1			
Stock 2			
Stock 3			
Stock 4			
Using 2- years data			
Optimal Contracts	Day Returns	Weekly Returns	Monthly Returns
Stock 1			
Stock 2			
Stock 3			
Stock 4			

Note: All excel sheets/ computation files need to be submitted along with the assignment.

From the above consider the optimal hedging ratio based on daily returns and 2-year data for hedging the stocks in your portfolio. You should enter an appropriate futures contract on 1st July 2024 and close the position on 25th September 2024 (reference period) for each stock in your portfolio. Establish the hedging position (short or long) and take position on stock futures. **[Remember to ignore the daily settlement, margin requirements if any on the hedging]**

3. **Part 3: Hedging using Stock Index futures for the entire portfolio**

   - Using capital asset pricing model (CAPM) and the 2 year and daily return data compute the portfolio "beta" of your portfolio. For this purpose, use portfolio returns, NIFTY 50 returns and consider 1 year (364 day) T-bill rate as the risk-free rate. [12-month T-bill rate file is attached]. <u>You should submit excel sheet supporting the calculations and data should be consistent and valid for independent verification.</u>

   - Using the above information compute the portfolio optimal contracts for hedging using NIFTY 50 futures. Establish an appropriate hedge position on your portfolio. Enter the contract as on 1st July 2024 and close the position as on 25th September 2024 (Reference period). [Ignore dividends, daily settlements etc.]

   - Compute the profits from your portfolio and futures positions on the final date (25th September 2024, considering 1st July 2024 as the reference point). Evaluate whether hedging using optimal hedging ratio and stock index futures resulted in protecting the portfolio value. Also, assume there is no dividend yield in your portfolio or ignore the cash dividends paid if any

   - Depict a visual representation of how excess returns from your portfolio are related to the excess returns from market portfolio (NIFTY 50).

4. **Part 4: Conclusion**

   - Compute the profits from your stock holdings and futures positions on the final date (25th September 2024, considering 1st July 2024 as the reference point). Evaluate whether hedging using optimal hedging ratio and stock futures resulted in protecting the portfolio value.

Using Stock Futures	Stock Profits	Hedge Profits	Overall Profit
Stock 1			
Stock 2			
Stock 3			
Stock 4			
Portfolio			
Overall Return			
Using Stock Index Futures	Portfolio Profits	Hedge Profits	Overall Profit
Portfolio			
Overall Return			

   - Comment about the effectiveness of the strategy in terms of hedging using individual stock futures and stock index futures.

Note: The format and guidelines for submitting the assignment will be uploaded shortly.