

# STAT0011 Decision and Risk In-Course Assessment 2025

## Group 5

March 4, 2025

## 1 Individual contributions

**22002200**

- Did this
- Done that

**22002200**

- Did this
- Done that

## 2 Introduction

This report presents the analysis conducted by Group 5 for the STAT0011 Decision and Risk In-Course Assessment 2025. We evaluate the market risk of an equally-weighted portfolio comprising two stock indices, the S&P 500 and the Shanghai Stock Exchange (SSE) Composite Index, using...

## 3 Data Description

We selected the S&P 500 and SSE Composite Index from the six candidate indices provided. Weekly closing prices were obtained from Yahoo Finance for the period spanning January 2000 to December 2023, yielding 1214 observations per index. Log-returns were calculated as follows:

$$\text{ret}_t = \ln \left( \frac{P_t}{P_{t-1}} \right),$$

where  $P_t$  denotes the price at week  $t$ . The datasets are stored in `SP500.csv` and `SSE.csv`.

## 4 Methodology

### 4.1 Modelling of log returns

Something...

### 4.2 Jarque-Bera tests

Something...

### 4.3 PIT

Something...

## 4.4 Estimation and Model Checking

Something...

## 4.5 Kolmogorov-Smirnov test

Something...

## 4.6 Anderson-Darling test

Something...

## 4.7 Error independence

Something...

## 4.8 Copula Modelling

Something...

## 4.9 Value-at-Risk using Monte Carlo simulation

We simulated 100,000 scenarios...

## 4.10 Beautiful table for something

Table 1: Table caption

Conditional Distribution	AIC	BIC
Normal (norm)	-1.934944	-4.901724
Student-t (std)	-4.977397	-4.939430
Skew Student-t (sstd)	-5.009752	-4.967040
Skew Normal (snorm)	-4.988160	-4.950193
Skew Generalized Error (sged)	-5.005165	-4.962453
Generalized Error (ged)	-4.970248	-4.932282

## 5 R Code

Below is the R code used for the analysis:

```
1 # Code to be inserted here
```

## 6 Results

Results to be inserted here

## 7 Conclusion

Using copula-based Monte Carlo simulation, we estimated the 95% and 99% 1-week VaR for an equally-weighted portfolio of S&P 500 and SSE Composite Index. These values reflect...

## 8 Figures

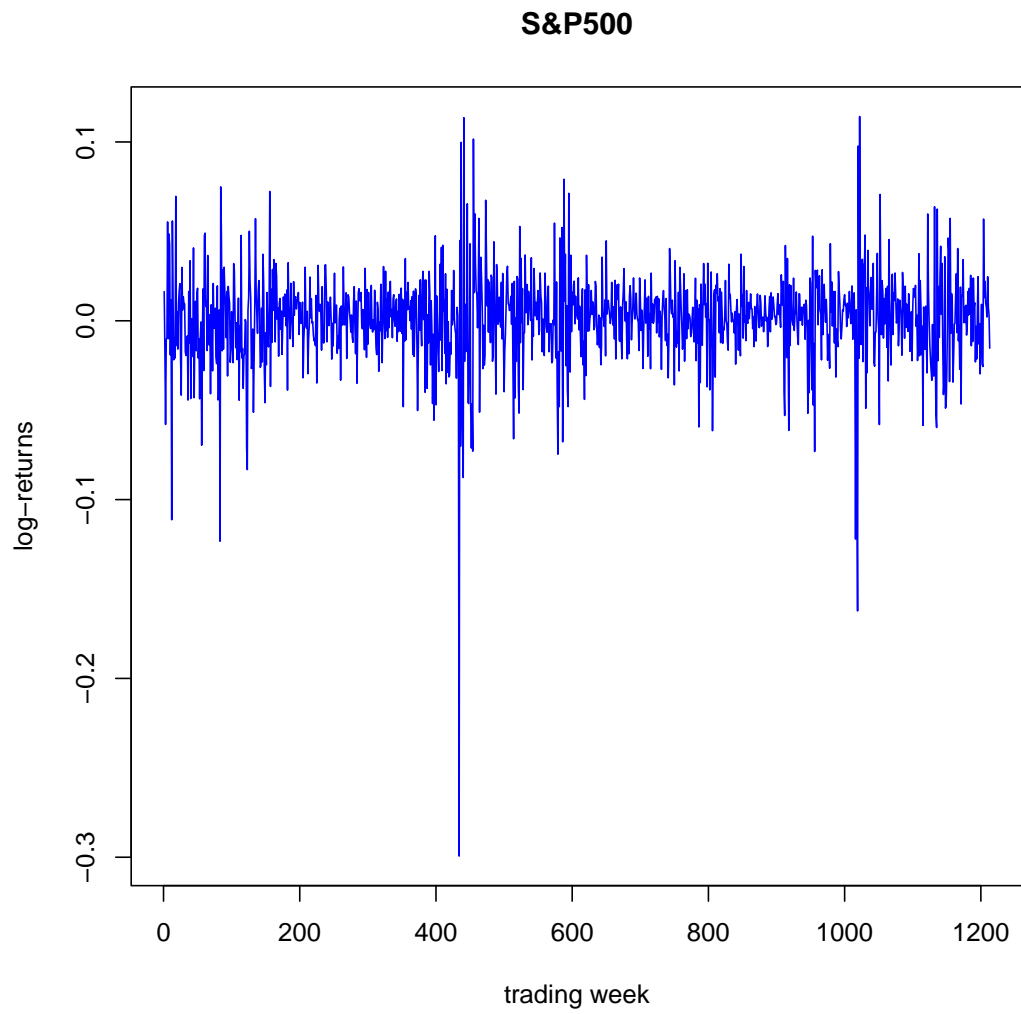


Figure 1: First plot from R analysis of the S&P 500 and SSE Composite Index log-returns.

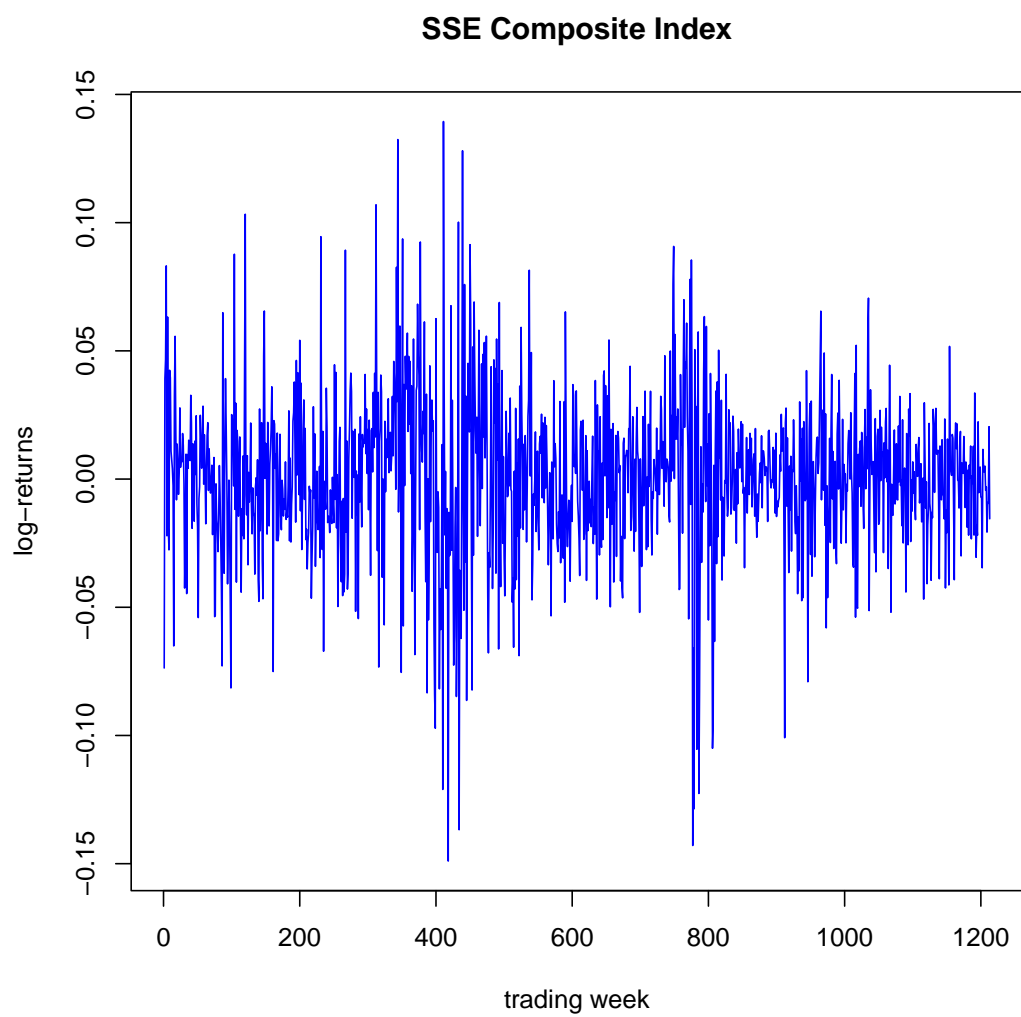


Figure 2: Second plot from R analysis.

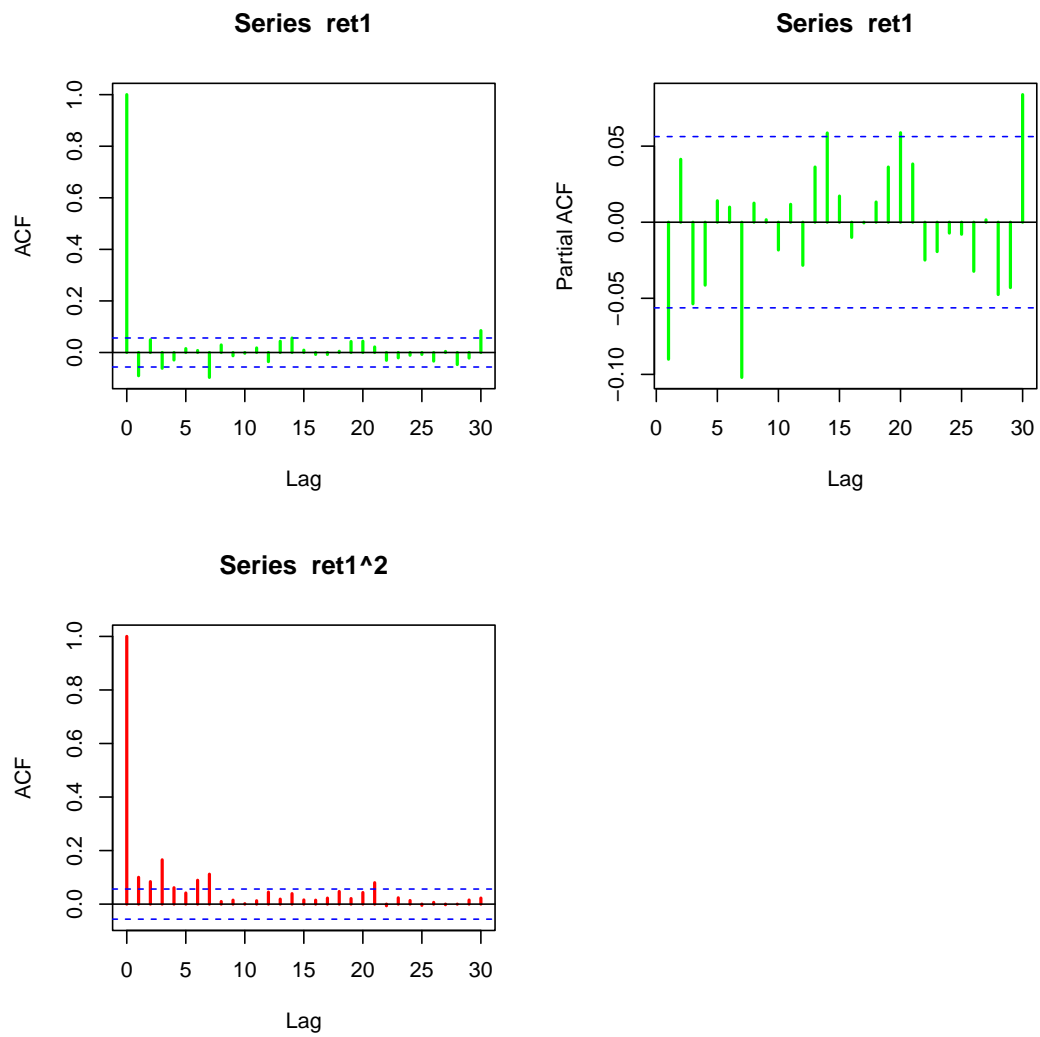


Figure 3: Third plot from R analysis.