

## Assignment 2

FINA 5250 Empirical Methods in Finance

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### Question 1

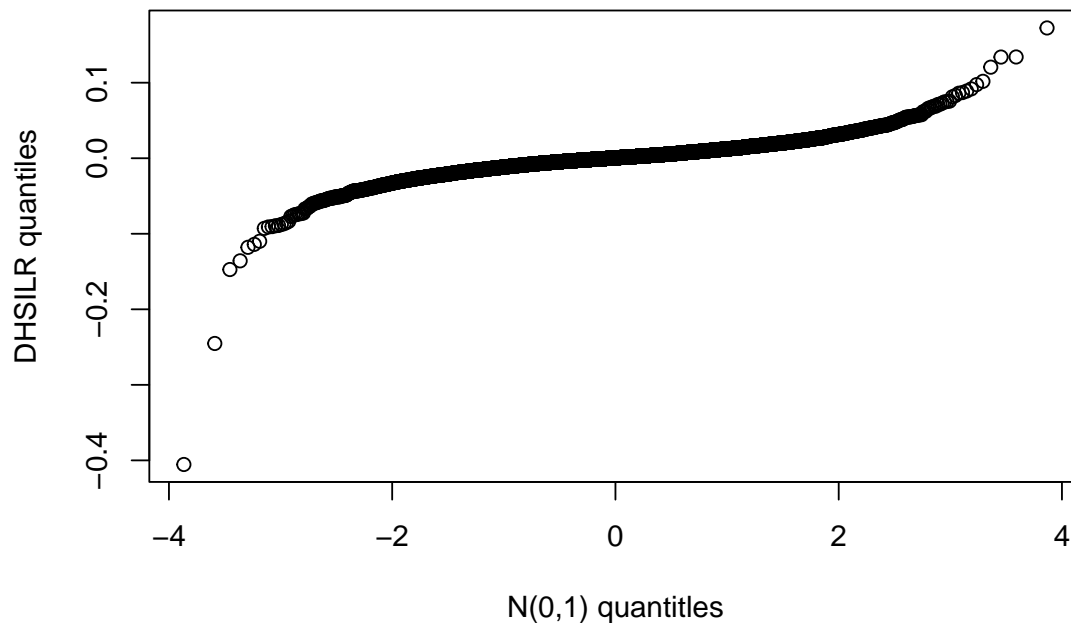
#### 1.1

Compute VaR and expected shortfall under normal assumption for  $q = 0.01$  and  $0.001$ .

```
## VaR(q=0.01) = 0.0379280773377616
## ES(q=0.01) = 0.0435567428546343
## VaR(q=0.001) = 0.0504536060267089
## ES(q=0.001) = 0.0559727876180996
```

#### 1.2

**Empirical QQ plot for DHSILR vs N(0,1)**



The distribution of log returns has a heavier tail than normal distribution.

#### 1.3

Compute empirical VaR and empirical expected shortfall for  $q = 0.01$  and  $0.001$ .

```
## VaR(q=0.01) = 0.0432004501839053
## ES(q=0.01) = 0.0674977851182838
## VaR(q=0.001) = 0.0904547477271284
## ES(q=0.001) = 0.155001873334411
```

## Question 2

### Plot 1

The tails of Y are **heavier** than the tails of the Gaussian distribution.

### Plot 2

The upper tail of Z is **Gaussian**.

The lower tail of Z is **heavier than Gaussian**.