1.Result

$\widehat{\beta_J}$

```
==========================================================
beta_hat
          Estimate
        0.24602183
x_dfy  -0.81627730
x_infl -0.25872644
x_svar -0.19365928
x_tms  -0.24649239
x_tbl  -0.25348610
x_dfr   0.27006370
x_dp    0.05099741
x_ltr   0.13180038
==========================================================
```

$s(\widehat{\beta_J})$

```
==========================================================
s_beta_hat:
          Estimate
        0.04265661
x_dfy   0.59660216
x_infl  0.63135837
x_svar  0.38033409
x_tms   0.18030425
x_tbl   0.09817880
x_dfr   0.14728129
x_dp    0.00912120
x_ltr   0.07367261
==========================================================
```

$s^w(\widehat{\beta_J})$

```
==========================================================
s_beta_hat_hetero:
          Estimate
        0.045786860
x_dfy   0.820993132
x_infl  0.657849477
x_svar  0.810762836
x_tms   0.188770481
x_tbl   0.107648965
x_dfr   0.240869076
x_dp    0.009811133
x_ltr   0.098061658
==========================================================
```

2.Results of each alpha

Critical value of each alpha

```
================================================
alpha rejection 1% level: 2.585798
alpha rejection 5% level: 1.964768
alpha rejection 10% level: 1.647938
================================================
```

Alpha = 1%

```
=========================================================
Reject at 1% level:
       Reject_H0
            TRUE
x_dfy      FALSE
x_infl     FALSE
x_svar     FALSE
x_tms      FALSE
x_tbl      FALSE
x_dfr      FALSE
x_dp        TRUE
x_ltr      FALSE
=========================================================
```

Alpha = 5%

```
=========================================================
Reject at 5% level:
       Reject_H0
            TRUE
x_dfy      FALSE
x_infl     FALSE
x_svar     FALSE
x_tms      FALSE
x_tbl       TRUE
x_dfr      FALSE
x_dp        TRUE
x_ltr      FALSE
=========================================================
```

Alpha = 10%

```
=========================================================
Reject at 10% level:
       Reject_H0
            TRUE
x_dfy      FALSE
x_infl     FALSE
x_svar     FALSE
x_tms      FALSE
x_tbl       TRUE
x_dfr       TRUE
x_dp        TRUE
x_ltr       TRUE
=========================================================
```

3.Results of Jarque-Bera test and Comparison between N(0, 1) and error-tern distribution

a.

```
==========================================================
Skewness: -0.4241804
Kurtosis: 4.687167
Jarque-Bera statistic: 74.89123

Critical value at 1% level: 9.21034
Critical value at 5% level: 5.991465
Critical value at 10% level: 4.60517

Reject at 1% level: TRUE
Reject at 5% level: TRUE
Reject at 10% level: TRUE
==========================================================
```

Refer to the outputs of the calculation, we can observe that H0 is rejected by all types of alpha, which indicates that the residuals are not normally distributed.

We can also find out that skewness is -0.42 and kurtosis is 4.86, where normal distribution is 0 and 3, respectively. The negative skewness means the distribution has a longer tail on the left side. On the other hand, kurtosis is over 3 , which convey its leptokurtic property of this distribution. These two properties just match the visualization result down below.

b.