

VAR 모델

Granger Causality 테스트(KS200, VIX)

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# Granger Causality 테스트 (KS200, VIX)

# 비정상성 차수 추론
target = df_.KS200.copy()
integ_result = pd.Series(sm.tsa.stattools.adfuller(target)[0:4],
                        index=['Test Statistics', 'p-value', 'Used Lag', 'Used Observations'])
Y1_integ_order = 0
if integ_result[1] > 0.1:
    Y1_integ_order = Y1_integ_order + 1

target = df_.VIX.copy()
integ_result = pd.Series(sm.tsa.stattools.adfuller(target)[0:4],
                        index=['Test Statistics', 'p-value', 'Used Lag', 'Used Observations'])
Y2_integ_order = 0
if integ_result[1] > 0.1:
    Y2_integ_order = Y2_integ_order + 1
print('Y1_order: ', Y1_integ_order, 'Y2_order: ', Y2_integ_order)
```

Y1_order: 1 Y2_order: 1

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# Granger Causality 테스트 (KS200, VIX)

print('\n[VIX -> KS200]')
granger_result1 = sm.tsa.stattools.grangercausalitytests(df_.diff(1).dropna().values, maxlag=4, verbose=True)
print('\n[KS200 -> VIX]')
granger_result2 = sm.tsa.stattools.grangercausalitytests(df_.diff(1).dropna().iloc[:, [1, 0]].values, maxlag=4, verbose=True)
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Granger Causality 테스트(KS200, VIX)

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[VIX -> KS200]

Granger Causality
number of lags (no zero) 1
ssr based F test:      F=6.0115 , p=0.0157 , df_denom=114, df_num=1
ssr based chi2 test:   chi2=6.1697 , p=0.0130 , df=1
likelihood ratio test: chi2=6.0125 , p=0.0142 , df=1
parameter F test:      F=6.0115 , p=0.0157 , df_denom=114, df_num=1

Granger Causality
number of lags (no zero) 2
ssr based F test:      F=10.5626 , p=0.0001 , df_denom=111, df_num=2
ssr based chi2 test:   chi2=22.0767 , p=0.0000 , df=2
likelihood ratio test: chi2=20.2094 , p=0.0000 , df=2
parameter F test:      F=10.5626 , p=0.0001 , df_denom=111, df_num=2

Granger Causality
number of lags (no zero) 3
ssr based F test:      F=15.4433 , p=0.0000 , df_denom=108, df_num=3
ssr based chi2 test:   chi2=49.3327 , p=0.0000 , df=3
likelihood ratio test: chi2=41.0505 , p=0.0000 , df=3
parameter F test:      F=15.4433 , p=0.0000 , df_denom=108, df_num=3

Granger Causality
number of lags (no zero) 4
ssr based F test:      F=12.2410 , p=0.0000 , df_denom=105, df_num=4
ssr based chi2 test:   chi2=53.1600 , p=0.0000 , df=4
likelihood ratio test: chi2=43.6344 , p=0.0000 , df=4
parameter F test:      F=12.2410 , p=0.0000 , df_denom=105, df_num=4
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[KS200 -> VIX]

Granger Causality
number of lags (no zero) 1
ssr based F test:      F=0.4443 , p=0.5064 , df_denom=114, df_num=1
ssr based chi2 test:   chi2=0.4560 , p=0.4995 , df=1
likelihood ratio test: chi2=0.4551 , p=0.4999 , df=1
parameter F test:      F=0.4443 , p=0.5064 , df_denom=114, df_num=1

Granger Causality
number of lags (no zero) 2
ssr based F test:      F=0.3106 , p=0.7337 , df_denom=111, df_num=2
ssr based chi2 test:   chi2=0.6491 , p=0.7228 , df=2
likelihood ratio test: chi2=0.6473 , p=0.7235 , df=2
parameter F test:      F=0.3106 , p=0.7337 , df_denom=111, df_num=2

Granger Causality
number of lags (no zero) 3
ssr based F test:      F=1.3912 , p=0.2494 , df_denom=108, df_num=3
ssr based chi2 test:   chi2=4.4441 , p=0.2173 , df=3
likelihood ratio test: chi2=4.3604 , p=0.2251 , df=3
parameter F test:      F=1.3912 , p=0.2494 , df_denom=108, df_num=3

Granger Causality
number of lags (no zero) 4
ssr based F test:      F=2.1120 , p=0.0845 , df_denom=105, df_num=4
ssr based chi2 test:   chi2=9.1721 , p=0.0569 , df=4
likelihood ratio test: chi2=8.8218 , p=0.0657 , df=4
parameter F test:      F=2.1120 , p=0.0845 , df_denom=105, df_num=4
```