

2.

```
. var rspot rfuture, lag(1/6)
```

Vector autoregression

```
Sample: 8 - 7684          Number of obs   =    7,677
Log likelihood = 77062.5      AIC         = -20.06943
FPE           = 6.59e-12     HQIC        = -20.06136
Det(Sigma_ml) = 6.55e-12     SBIC        = -20.0459
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
rspot	13	.001777	0.0159	124.0308	0.0000
rfuture	13	.002042	0.0211	165.0864	0.0000

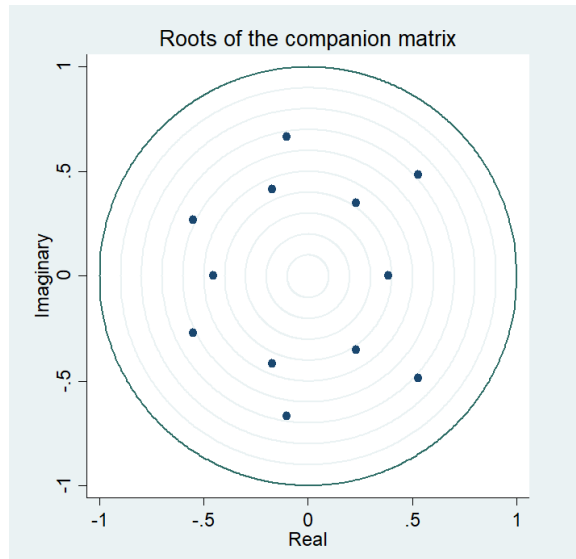
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
rspot					
rspot					
L1.	-.0429887	.0160995	-2.67	0.008	-.0745432 -.0114342
L2.	-.1255145	.0163803	-7.66	0.000	-.1576194 -.0934097
L3.	-.0654555	.0165559	-3.95	0.000	-.0979044 -.0330066
L4.	-.0555308	.0165648	-3.35	0.001	-.0879973 -.0230644
L5.	-.0646528	.0163598	-3.95	0.000	-.0967173 -.0325882
L6.	-.0420281	.0160563	-2.62	0.009	-.0734979 -.0105584
rfuture					
rfuture					
L1.	.1025108	.0140081	7.32	0.000	.0750554 .1299661
L2.	.0827253	.0143869	5.75	0.000	.0545274 .1109231
L3.	.0530446	.0145602	3.64	0.000	.0245072 .081582
L4.	.057478	.0145501	3.95	0.000	.0289603 .0859958
L5.	.0435619	.0143967	3.03	0.002	.0153449 .0717788
L6.	.0372007	.0140183	2.65	0.008	.0097254 .064676
_cons	.0000232	.0000203	1.14	0.252	-.0000165 .0000629
rfuture					
rfuture					
L1.	.2117743	.0185008	11.45	0.000	.1755133 .2480352
L2.	.0743206	.0188235	3.95	0.000	.0374272 .1112139
L3.	.0828566	.0190252	4.36	0.000	.0455679 .1201454
L4.	.0448446	.0190355	2.36	0.018	.0075357 .0821535
L5.	.0674903	.0187999	3.59	0.000	.0306433 .1043374
L6.	.0590473	.0184511	3.20	0.001	.0228838 .0952109
_cons	.0000259	.0000233	1.11	0.266	-.0000198 .0000715

```
. varstable, graph
```

Eigenvalue stability condition

Eigenvalue	Modulus
.5279554 + .4847924i	.716771
.5279554 - .4847924i	.716771
-.1022778 + .6675194i	.67531
-.1022778 - .6675194i	.67531
-.5513603 + .2689237i	.613448
-.5513603 - .2689237i	.613448
-.4536067	.453607
-.1726167 + .4151256i	.449584
-.1726167 - .4151256i	.449584
.2305361 + .3500458i	.419141
.2305361 - .3500458i	.419141
.3837855	.383786

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.



Eigenvalues lies inside unit circle so the stability condition is satisfied.

. vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
rspot	rfuture	82.299	6	0.000
rspot	ALL	82.299	6	0.000
rfuture	rspot	148.42	6	0.000
rfuture	ALL	148.42	6	0.000

From Granger test, all p-value < 0.05, null is rejected so return of spot and return of future are endogenous variable.

3.

```
. irf create order1, order(rspot rfuture) step(6) set(irf01)
(file irf01.irf created)
(file irf01.irf now active)
(file irf01.irf updated)

. irf table irf, impulse(rspot rfuture) response(rspot rfuture)
```

Results from order1

step	(1) irf	(1) Lower	(1) Upper	(2) irf	(2) Lower	(2) Upper	(3) irf	(3) Lower	(3) Upper
0	1	1	1	0	0	0	0	0	0
1	-.042989	-.074543	-.011434	.211774	.175513	.248035	.102511	.075055	.129966
2	-.101957	-.133505	-.070409	.030833	-.00561	.067276	.061675	.034224	.089126
3	-.034997	-.066566	-.003428	.030738	-.005677	.067153	.018216	-.009265	.045697
4	-.02148	-.052956	.009995	.002714	-.033596	.039023	.026291	-.001106	.053688
5	-.033647	-.06485	-.002443	.034962	-.001046	.070971	.01553	-.011653	.042713
6	-.010717	-.041519	.020085	.017646	-.017933	.053226	.006933	-.01982	.033686

step	(4) irf	(4) Lower	(4) Upper
0	1	1	1
1	-.162359	-.19391	-.130809
2	-.057352	-.089063	-.025641
3	-.025324	-.057023	.006376
4	-.004062	-.035665	.027541
5	-.029332	-.060699	.002035
6	-.003566	-.034475	.027344

95% lower and upper bounds reported

- (1) irfname = order1, impulse = rspot, and response = rspot
- (2) irfname = order1, impulse = rspot, and response = rfuture
- (3) irfname = order1, impulse = rfuture, and response = rspot
- (4) irfname = order1, impulse = rfuture, and response = rfuture

```
. irf table coirf, impulse(rspot rfuture) response(rspot rfuture)
```

Results from order1

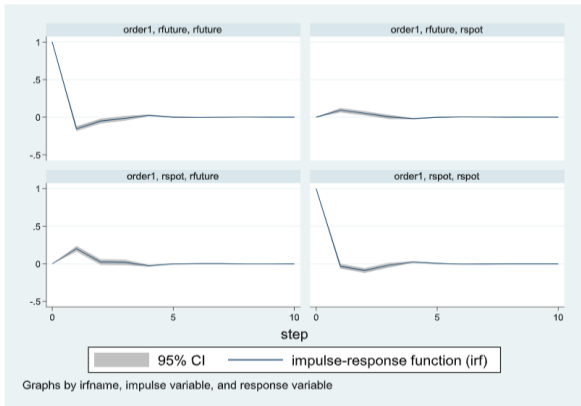
step	(1)			(2)			(3)		
	coirf	Lower	Upper	coirf	Lower	Upper	coirf	Lower	Upper
0	.001775	.001747	.001803	.001444	.001404	.001483	0	0	0
1	.001847	.001798	.001896	.001585	.001527	.001644	.000148	.000108	.000187
2	.001755	.001691	.001819	.001557	.001484	.00163	.000237	.00018	.000294
3	.001719	.001644	.001794	.001575	.001491	.001659	.000263	.000194	.000332
4	.001719	.001635	.001803	.001574	.00148	.001668	.000301	.000223	.000379
5	.001682	.001589	.001774	.001594	.001491	.001697	.000323	.000238	.000409
6	.001673	.001573	.001772	.00162	.001509	.001731	.000333	.000242	.000424

step	(4)		
	coirf	Lower	Upper
0	.001441	.001419	.001464
1	.001207	.001158	.001257
2	.001125	.001059	.00119
3	.001088	.00101	.001166
4	.001082	.000995	.00117
5	.00104	.000945	.001136
6	.001035	.000934	.001136

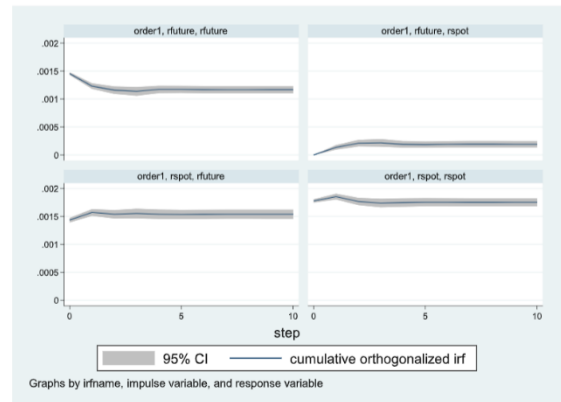
95% lower and upper bounds reported

- (1) irfname = order1, impulse = rspot, and response = rspot
- (2) irfname = order1, impulse = rspot, and response = rfuture
- (3) irfname = order1, impulse = rfuture, and response = rspot
- (4) irfname = order1, impulse = rfuture, and response = rfuture

```
. irf graph irf, impulse( rspot rfuture ) response( rspot rfuture )
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```
. irf graph coirf, impulse( rspot rfuture ) response( rspot rfuture )
```



From IRF, rspot has more impact than rfuture since the shaded area of rspot on rfuture is greater than r future.

4.

```
. irf table fevd, impulse(rspot rfuture) response(rspot rfuture)
```

Results from order1

step	(1) fevd	(1) Lower	(1) Upper	(2) fevd	(2) Lower	(2) Upper	(3) fevd	(3) Lower	(3) Upper
0	0	0	0	0	0	0	0	0	0
1	1	1	1	.500791	.484986	.516596	0	0	0
2	.993131	.989465	.996798	.496679	.480799	.512558	.006869	.003202	.010535
3	.990693	.98638	.995006	.495972	.480066	.511879	.009307	.004994	.01362
4	.990483	.986145	.994821	.495855	.479951	.51176	.009517	.005179	.013855
5	.990038	.98565	.994426	.495851	.479947	.511756	.009962	.005574	.01435
6	.989888	.985487	.994289	.495689	.479783	.511594	.010112	.005711	.014513

step	(4) fevd	(4) Lower	(4) Upper
0	0	0	0
1	.499209	.483404	.515014
2	.503321	.487442	.519201
3	.504028	.488121	.519934
4	.504145	.48824	.520049
5	.504149	.488244	.520053
6	.504311	.488406	.520217

95% lower and upper bounds reported

- (1) irfname = order1, impulse = rspot, and response = rspot
- (2) irfname = order1, impulse = rspot, and response = rfuture
- (3) irfname = order1, impulse = rfuture, and response = rspot
- (4) irfname = order1, impulse = rfuture, and response = rfuture

From FEVD, the impact of rspot to rfuture is more than the impact of rfuture to rspot.