

Graphs by irfname, impulse variable, and response variable

(R)

Statistics/Data Analysis

User: Keisi Kapaj
Project: Thesis - Part 3

1 . varbasic IndiumPrice IndiumProduction REA1, lags(1/2) step(8) irf

Vector autoregression

Sample: 1970 - 2014	Number of obs	=	45
Log likelihood = 53.95139	AIC	=	-1.464506
FPE = .0000468	HQIC	=	-1.150203
Det(Sigma_ml) = .0000182	SBIC	=	-.6213969

Equation	Parms	RMSE	R-sq	chi2	P>chi2
IndiumPrice	7	.17337	0.1870	10.35263	0.1106
IndiumProduction	7	.093334	0.1307	6.768214	0.3428
REA1	7	.376775	0.4694	39.81101	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
IndiumPrice						
IndiumPrice						
L1.	.3913282	.1396921	2.80	0.005	.1175368	.6651196
L2.	-.2774656	.1426399	-1.95	0.052	-.5570345	.0021034
IndiumProduction						
L1.	-.0736547	.2702025	-0.27	0.785	-.6032418	.4559325
L2.	.0490905	.2710923	0.18	0.856	-.4822407	.5804217
REA1						
L1.	.098126	.0662785	1.48	0.139	-.0317774	.2280295
L2.	-.0645198	.0669777	-0.96	0.335	-.1957937	.0667541
_cons	.0056514	.0260893	0.22	0.829	-.0454827	.0567855
IndiumProduction						
IndiumPrice						
L1.	.1121667	.075203	1.49	0.136	-.0352285	.2595618
L2.	.0591405	.0767899	0.77	0.441	-.091365	.209646
IndiumProduction						
L1.	-.1347798	.1454631	-0.93	0.354	-.4198822	.1503225
L2.	.1867694	.1459421	1.28	0.201	-.0992719	.4728107
REA1						
L1.	.0360503	.0356809	1.01	0.312	-.033883	.1059836
L2.	-.0190595	.0360573	-0.53	0.597	-.0897306	.0516116
_cons	.0226652	.0140451	1.61	0.107	-.0048628	.0501932
REA1						
IndiumPrice						
L1.	.4530836	.3035842	1.49	0.136	-.1419304	1.048098
L2.	-.3320257	.3099904	-1.07	0.284	-.9395958	.2755443
IndiumProduction						
L1.	-.6174783	.5872144	-1.05	0.293	-1.768397	.5334408
L2.	-.8471059	.5891482	-1.44	0.150	-2.001815	.3076034
REA1						
L1.	.7469936	.1440389	5.19	0.000	.4646825	1.029305
L2.	-.2163047	.1455585	-1.49	0.137	-.5015941	.0689848
_cons	.0603782	.0566983	1.06	0.287	-.0507484	.1715049

2 . varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.4132601 + .482703i	.635442
.4132601 - .482703i	.635442
-.534862	.534862
.4829338	.482934
.114475 + .3727593i	.389941
.114475 - .3727593i	.389941

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

3 . predict error44, resid
(10 missing values generated)

4 . summarize error44

Variable	Obs	Mean	Std. Dev.	Min	Max
error44	45	1.24e-10	.1611165	-.265579	.4872707

5 . tsline error44, yline(1.24e-10)

6 . varlmar

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	6.2785	9	0.71175
2	15.2943	9	0.08316

H0: no autocorrelation at lag order

7 . vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
IndiumPrice	IndiumProduction	.12041	2	0.942
IndiumPrice	REAL	2.1927	2	0.334
IndiumPrice	ALL	2.3191	4	0.677
IndiumProduction	IndiumPrice	3.7654	2	0.152
IndiumProduction	REAL	1.0428	2	0.594
IndiumProduction	ALL	4.5874	4	0.332
REAL	IndiumPrice	2.6866	2	0.261
REAL	IndiumProduction	2.8563	2	0.240
REAL	ALL	7.4342	4	0.115

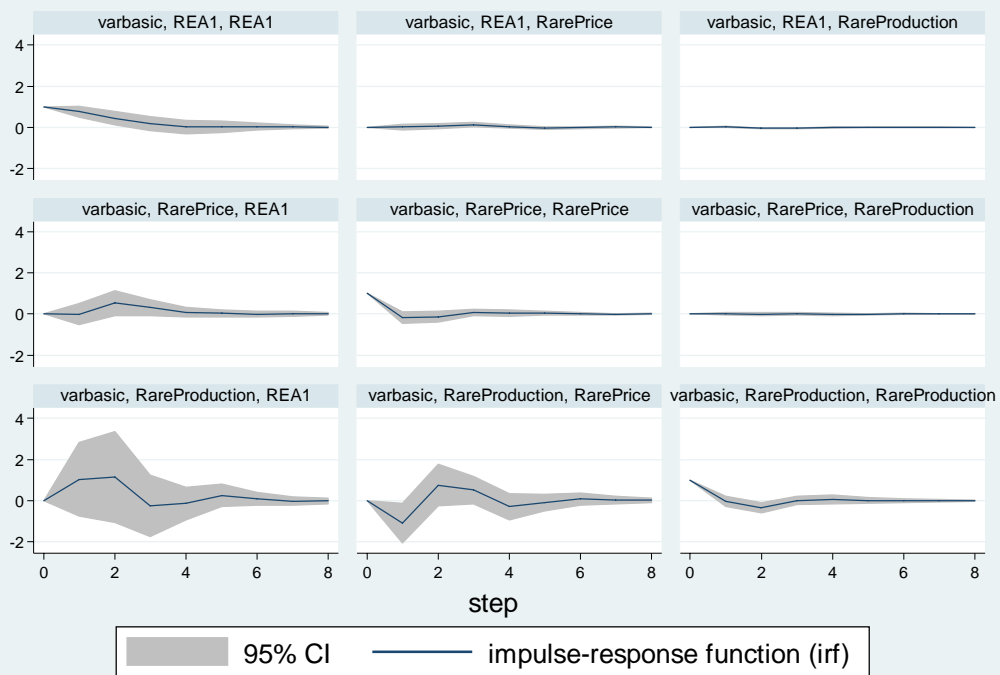
8 . irf table fevd, impulse(IndiumPrice IndiumProduction REAL) response(IndiumPrice IndiumProduction REAL)
> i

Results from varbasic

step	(1) fevd	(2) fevd	(3) fevd	(4) fevd	(5) fevd	(6) fevd	(7) fevd	(8) fevd
0	0	0	0	0	0	0	0	0
1	1	.050863	.137219	0	.949137	.00381	0	0
2	.964912	.063184	.098485	.000573	.919466	.009598	.034515	.01735
3	.958612	.098733	.099624	.000647	.882673	.054475	.040741	.018594
4	.955724	.097995	.122367	.002955	.88098	.071187	.041321	.021025
5	.950807	.098462	.138138	.003023	.880351	.075837	.04617	.021187
6	.949468	.099376	.139947	.003096	.878984	.075597	.047437	.02164
7	.949218	.099315	.139868	.003398	.878584	.075577	.047384	.022101
8	.948997	.099365	.140351	.003459	.878515	.075696	.047544	.02212

step	(9) fevd
0	0
1	.858971
2	.891918
3	.845901
4	.806447
5	.786025
6	.784456
7	.784554
8	.783953

(1) irfname = varbasic, impulse = IndiumPrice, and response = IndiumPrice
(2) irfname = varbasic, impulse = IndiumPrice, and response = IndiumProduction
(3) irfname = varbasic, impulse = IndiumPrice, and response = REAL
(4) irfname = varbasic, impulse = IndiumProduction, and response = IndiumPrice
(5) irfname = varbasic, impulse = IndiumProduction, and response = IndiumProduction
(6) irfname = varbasic, impulse = IndiumProduction, and response = REAL
(7) irfname = varbasic, impulse = REAL, and response = IndiumPrice
(8) irfname = varbasic, impulse = REAL, and response = IndiumProduction
(9) irfname = varbasic, impulse = REAL, and response = REAL



Graphs by irfname, impulse variable, and response variable

(R)

Statistics/Data Analysis

User: Keisi Kapaj
Project: Thesis - Part 3

1 . varbasic RarePrice RareProduction REA1, lags(1/2) step(8) irf

Vector autoregression

Sample: 1970 - 2019	Number of obs	=	50
Log likelihood = 77.07347	AIC	=	-2.242939
FPE = .0000214	HQIC	=	-1.937133
Det(Sigma_ml) = 9.20e-06	SBIC	=	-1.439889

Equation	Parms	RMSE	R-sq	chi2	P>chi2
RarePrice	7	.203998	0.2054	12.92648	0.0442
RareProduction	7	.049966	0.3342	25.10288	0.0003
REA1	7	.376431	0.4930	48.61953	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
RarePrice						
RarePrice						
L1.	-.1851074	.1399667	-1.32	0.186	-.459437	.0892222
L2.	-.151043	.1327264	-1.14	0.255	-.4111819	.1090958
RareProduction						
L1.	-1.099868	.492721	-2.23	0.026	-2.065583	-.1341522
L2.	.4913093	.5278916	0.93	0.352	-.5433391	1.525958
REAL						
L1.	.0193838	.0732901	0.26	0.791	-.1242622	.1630298
L2.	.0834829	.0747177	1.12	0.264	-.0629611	.2299269
_cons	.0456845	.0319127	1.43	0.152	-.0168634	.1082323
RareProduction						
RarePrice						
L1.	.0143246	.0342827	0.42	0.676	-.0528683	.0815175
L2.	-.0037957	.0325093	-0.12	0.907	-.0675128	.0599214
RareProduction						
L1.	-.0364317	.1206846	-0.30	0.763	-.2729692	.2001057
L2.	-.37659	.1292991	-2.91	0.004	-.6300115	-.1231684
REAL						
L1.	.0303275	.0179513	1.69	0.091	-.0048564	.0655114
L2.	-.0732706	.018301	-4.00	0.000	-.1091399	-.0374014
_cons	.0295097	.0078165	3.78	0.000	.0141896	.0448298
REAL						
RarePrice						
L1.	-.0059702	.2582768	-0.02	0.982	-.5121833	.5002429
L2.	.5199486	.2449164	2.12	0.034	.0399212	.999976
RareProduction						
L1.	1.030903	.909205	1.13	0.257	-.7511057	2.812913
L2.	.391413	.9741043	0.40	0.688	-1.517796	2.300622
REAL						
L1.	.7656831	.1352403	5.66	0.000	.500617	1.030749
L2.	-.1720763	.1378746	-1.25	0.212	-.4423055	.0981528
_cons	-.0424623	.0588877	-0.72	0.471	-.1578802	.0729555

2 . varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.1482841 + .6060266i	.623904
.1482841 - .6060266i	.623904
-.2557742 + .4883768i	.551301
-.2557742 - .4883768i	.551301
.4098917	.409892
.3492326	.349233

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

3 . predict error33, resid
(5 missing values generated)

4 . summarize error33

Variable	Obs	Mean	Std. Dev.	Min	Max
error33	50	2.14e-10	.1911003	-.39514	.5868568

5 . tsline error33, yline(2.14e-10)

6 . varlmar

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	8.8846	9	0.44800
2	13.9454	9	0.12428

H0: no autocorrelation at lag order

7 . vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
RarePrice	RareProduction	6.1054	2	0.047
RarePrice	REAL	2.9679	2	0.227
RarePrice	ALL	10.471	4	0.033
RareProduction	RarePrice	.21198	2	0.899
RareProduction	REAL	17.514	2	0.000
RareProduction	ALL	17.94	4	0.001
REAL	RarePrice	4.6696	2	0.097
REAL	RareProduction	1.3997	2	0.497
REAL	ALL	6.4613	4	0.167

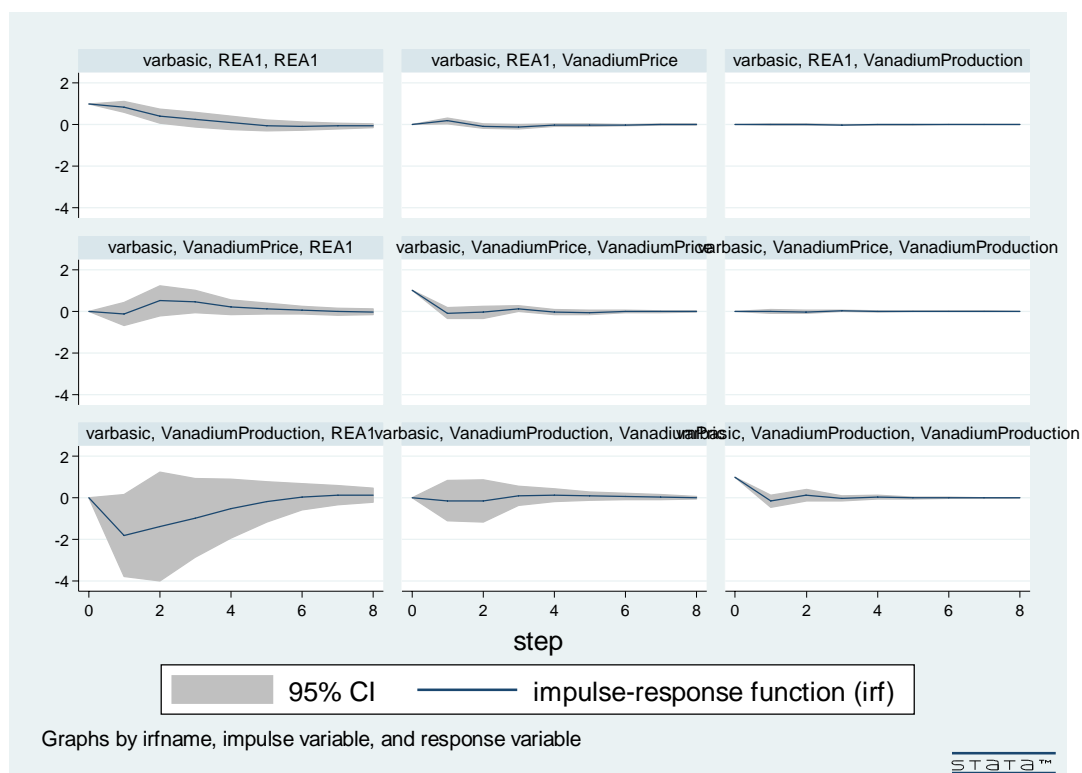
8 . irf table fevd, impulse(RarePrice RareProduction REAL) response(RarePrice RareProduction REAL) noc

Results from varbasic

step	(1) fevd	(2) fevd	(3) fevd	(4) fevd	(5) fevd	(6) fevd	(7) fevd	(8) fevd
0	0	0	0	0	0	0	0	0
1	1	.016332	.001477	0	.983668	5.4e-06	0	0
2	.933597	.020313	.000968	.065236	.930449	.01119	.001167	.049238
3	.897754	.016147	.043592	.090148	.83459	.021275	.012098	.149262
4	.846058	.014992	.058508	.096932	.750021	.021173	.05701	.234987
5	.839427	.023184	.059636	.100051	.74354	.021328	.060522	.233276
6	.837002	.028599	.059657	.100048	.738	.021857	.062951	.233401
7	.836652	.028935	.059602	.100251	.737742	.021904	.063097	.233323
8	.836344	.029349	.059614	.100202	.737171	.021906	.063454	.23348

step	(9) fevd
0	0
1	.998518
2	.987842
3	.935133
4	.920318
5	.919036
6	.918486
7	.918494
8	.918479

(1) irfname = varbasic, impulse = RarePrice, and response = RarePrice
(2) irfname = varbasic, impulse = RarePrice, and response = RareProduction
(3) irfname = varbasic, impulse = RarePrice, and response = REAL
(4) irfname = varbasic, impulse = RareProduction, and response = RarePrice
(5) irfname = varbasic, impulse = RareProduction, and response = RareProduction
(6) irfname = varbasic, impulse = RareProduction, and response = REAL
(7) irfname = varbasic, impulse = REAL, and response = RarePrice
(8) irfname = varbasic, impulse = REAL, and response = RareProduction
(9) irfname = varbasic, impulse = REAL, and response = REAL



(R)

Statistics/Data Analysis

User: Keisi Kapaj
Project: Thesis - Part 3

1 . varbasic VanadiumPrice VanadiumProduction REA1, lags(1/2) step(8) irf

Vector autoregression

Sample: 1970 - 2019	Number of obs	=	50
Log likelihood = 84.04813	AIC	=	-2.521925
FPE = .0000162	HQIC	=	-2.216119
Det(Sigma_ml) = 6.96e-06	SBIC	=	-1.718875

Equation	Parms	RMSE	R-sq	chi2	P>chi2
VanadiumPrice	7	.180665	0.1897	11.70639	0.0688
VanadiumProduc~n	7	.053999	0.0538	2.841185	0.8285
REA1	7	.368186	0.5150	53.08636	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
VanadiumPrice						
VanadiumPrice						
L1.	-.0870717	.1370181	-0.64	0.525	-.3556223	.1814789
L2.	-.0395604	.1422833	-0.28	0.781	-.3184305	.2393097
VanadiumProduction						
L1.	-.1397534	.4960095	-0.28	0.778	-1.111914	.8324073
L2.	.1537236	.5019498	0.31	0.759	-.83008	1.137527
REA1						
L1.	.1818439	.0666095	2.73	0.006	.0512917	.312396
L2.	-.2069445	.0668446	-3.10	0.002	-.3379576	-.0759314
_cons	.0205741	.0270157	0.76	0.446	-.0323757	.0735239
VanadiumProduction						
VanadiumPrice						
L1.	-.0109584	.0409533	-0.27	0.789	-.0912255	.0693086
L2.	-.0274083	.042527	-0.64	0.519	-.1107598	.0559432
VanadiumProduction						
L1.	-.1524282	.1482522	-1.03	0.304	-.4429972	.1381409
L2.	.1303844	.1500277	0.87	0.385	-.1636645	.4244334
REA1						
L1.	.0144648	.0199089	0.73	0.468	-.0245559	.0534855
L2.	-.0147656	.0199792	-0.74	0.460	-.0539241	.0243928
_cons	.0193673	.0080747	2.40	0.016	.0035411	.0351934
REA1						
VanadiumPrice						
L1.	-.1267078	.2792353	-0.45	0.650	-.673999	.4205834
L2.	.5795115	.2899654	2.00	0.046	.0111897	1.147833
VanadiumProduction						
L1.	-1.808436	1.01084	-1.79	0.074	-3.789646	.1727734
L2.	-.1401569	1.022946	-0.14	0.891	-2.145094	1.86478
REA1						
L1.	.8502516	.1357464	6.26	0.000	.5841936	1.11631
L2.	-.2675444	.1362256	-1.96	0.050	-.5345417	-.000547
_cons	.0283389	.0550565	0.51	0.607	-.0795698	.1362476

2 . varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.5912314 + .3261711i	.675235
.5912314 - .3261711i	.675235
-.197975 + .5003265i	.538071
-.197975 - .5003265i	.538071
-.4236271	.423627
.247866	.247866

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

3 . predict error11, resid
(5 missing values generated)

4 . summarize error11

Variable	Obs	Mean	Std. Dev.	Min	Max
error11	50	-4.42e-10	.169243	-.3790916	.3782963

5 . tsline error11, yline(-4.42e-10)

6 . varlmar

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	17.8585	9	0.03685
2	12.5871	9	0.18220

H0: no autocorrelation at lag order

7 . vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
VanadiumPrice	VanadiumProduct~n	.20486	2	0.903
VanadiumPrice	REAL	10.391	2	0.006
VanadiumPrice	ALL	10.609	4	0.031
VanadiumProduct~n	VanadiumPrice	.46706	2	0.792
VanadiumProduct~n	REAL	.64515	2	0.724
VanadiumProduct~n	ALL	1.2385	4	0.872
REAL	VanadiumPrice	4.3318	2	0.115
REAL	VanadiumProduct~n	3.2209	2	0.200
REAL	ALL	9.0186	4	0.061

8 . irf table fevd, impulse(VanadiumPrice VanadiumProduction REAL) response(VanadiumPrice VanadiumProduction) nci
> 1) nci

Results from varbasic

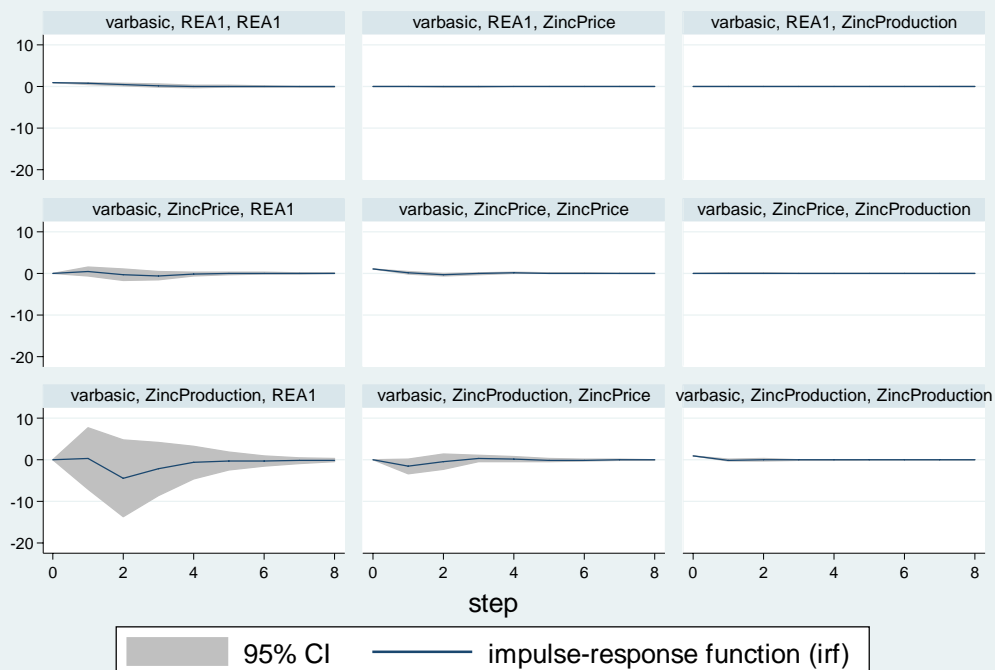
step	(1) fevd	(2) fevd	(3) fevd	(4) fevd	(5) fevd	(6) fevd	(7) fevd	(8) fevd
0	0	0	0	0	0	0	0	0
1	1	.114571	.005648	0	.885429	.036698	0	0
2	.883537	.117424	.007848	.000882	.873544	.025893	.11558	.009032
3	.865914	.117786	.029579	.00473	.871443	.029679	.129356	.010771
4	.839299	.118401	.0477	.004621	.868185	.031918	.15608	.013414
5	.836729	.11839	.050115	.005145	.868176	.033156	.158126	.013433
6	.834693	.118618	.05115	.005227	.867944	.033671	.16008	.013439
7	.833305	.118621	.051249	.005294	.867924	.033602	.161401	.013456
8	.833247	.118618	.051196	.005378	.867905	.033546	.161375	.013477

step	(9) fevd
0	0
1	.957654
2	.96626
3	.940742
4	.920382
5	.916729
6	.91518
7	.915149
8	.915258

```

(1) irfname = varbasic, impulse = VanadiumPrice, and response = VanadiumPrice
(2) irfname = varbasic, impulse = VanadiumPrice, and response = VanadiumProduction
(3) irfname = varbasic, impulse = VanadiumPrice, and response = REAL
(4) irfname = varbasic, impulse = VanadiumProduction, and response = VanadiumPrice
(5) irfname = varbasic, impulse = VanadiumProduction, and response = VanadiumProduction
(6) irfname = varbasic, impulse = VanadiumProduction, and response = REAL
(7) irfname = varbasic, impulse = REAL, and response = VanadiumPrice
(8) irfname = varbasic, impulse = REAL, and response = VanadiumProduction
(9) irfname = varbasic, impulse = REAL, and response = REAL

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Graphs by irfname, impulse variable, and response variable

(R)

Statistics/Data Analysis

User: Keisi Kapaj
Project: Thesis - Part 3

1 . varbasic ZincPrice ZincProduction REAL, lags(1/2) step(8) irf

Vector autoregression

Sample: 1970 - 2019	Number of obs	=	50
Log likelihood = 178.3668	AIC	=	-6.29467
FPE = 3.73e-07	HQIC	=	-5.988864
Det(Sigma_ml) = 1.60e-07	SBIC	=	-5.491621

Equation	Parms	RMSE	R-sq	chi2	P>chi2
ZincPrice	7	.095864	0.1594	9.482004	0.1482
ZincProduction	7	.014927	0.0748	4.039964	0.6713
REAL	7	.386845	0.4646	43.38163	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
ZincPrice						
ZincPrice						
L1.	.0972489	.1440814	0.67	0.500	-.1851454	.3796433
L2.	-.2981991	.1382792	-2.16	0.031	-.5692214	-.0271769
ZincProduction						
L1.	-1.562741	.931103	-1.68	0.093	-3.387669	.2621877
L2.	-.3825191	.9554966	-0.40	0.689	-2.255258	1.49022
REAL						
L1.	.0395836	.0373292	1.06	0.289	-.0335803	.1127474
L2.	-.0053895	.0354144	-0.15	0.879	-.0748004	.0640214
_cons	.0381301	.0178394	2.14	0.033	.0031656	.0730947
ZincProduction						
ZincPrice						
L1.	.0209841	.0224349	0.94	0.350	-.0229875	.0649557
L2.	.000239	.0215315	0.01	0.991	-.0419619	.0424399
ZincProduction						
L1.	-.0535437	.1449821	-0.37	0.712	-.3377033	.2306159
L2.	.0025925	.1487804	0.02	0.986	-.2890117	.2941967
REAL						
L1.	.0068224	.0058125	1.17	0.241	-.00457	.0182147
L2.	-.0011793	.0055144	-0.21	0.831	-.0119873	.0096287
_cons	.0074774	.0027778	2.69	0.007	.002033	.0129217
REAL						
ZincPrice						
L1.	.4170945	.5814159	0.72	0.473	-.7224597	1.556649
L2.	-.7512431	.5580022	-1.35	0.178	-1.844907	.3424212
ZincProduction						
L1.	.297657	3.757308	0.08	0.937	-7.066531	7.661845
L2.	-4.039985	3.855744	-1.05	0.295	-11.5971	3.517134
REAL						
L1.	.7436412	.1506355	4.94	0.000	.448401	1.038881
L2.	-.0920177	.1429087	-0.64	0.520	-.3721137	.1880782
_cons	.0369365	.0719877	0.51	0.608	-.1041569	.1780299

2 . varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.08931262 + .5428354i	.550134
.08931262 - .5428354i	.550134
.4634904	.46349
-.2280627	.228063
.1866468 + .02782901i	.18871
.1866468 - .02782901i	.18871

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

3 . predict error22, resid
(5 missing values generated)

4 . summarize error22

Variable	Obs	Mean	Std. Dev.	Min	Max
error22	50	-4.76e-10	.0898036	-.1800298	.3649224

5 . stline error22, yline(-4.76e-10)
command stline is unrecognized
r(199);

6 . tsline error22, yline(-4.76e-10)

7 . varlmar

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	7.2530	9	0.61079
2	11.0325	9	0.27349

H0: no autocorrelation at lag order

8 . vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
ZincPrice	ZincProduction	2.8815	2	0.237
ZincPrice	REAL	1.4225	2	0.491
ZincPrice	ALL	3.2255	4	0.521
ZincProduction	ZincPrice	.88025	2	0.644
ZincProduction	REAL	1.6793	2	0.432
ZincProduction	ALL	4.0292	4	0.402
REAL	ZincPrice	2.2084	2	0.331
REAL	ZincProduction	1.1274	2	0.569
REAL	ALL	3.4625	4	0.484

9 . irf table fevd, impulse(ZincPrice ZincProduction REAL) response(ZincPrice ZincProduction REAL) noc

Results from varbasic

step	(1) fevd	(2) fevd	(3) fevd	(4) fevd	(5) fevd	(6) fevd	(7) fevd	(8) fevd
0	0	0	0	0	0	0	0	0
1	1	.008957	.064699	0	.991043	.10716	0	0
2	.947178	.040667	.093061	.033314	.934912	.107048	.019508	.024421
3	.945834	.043147	.084037	.032647	.922907	.095743	.021519	.033946
4	.944712	.044545	.085348	.033748	.918338	.092943	.02154	.037117
5	.944377	.045198	.085496	.033961	.917354	.092492	.021662	.037448
6	.944371	.045237	.085521	.033979	.917277	.092404	.02165	.037486
7	.944289	.045306	.085548	.034025	.91719	.092379	.021687	.037504
8	.944298	.045306	.085549	.03402	.91718	.092375	.021683	.037514

step	(9) fevd
0	0
1	.828141
2	.799891
3	.82022
4	.821709
5	.822012
6	.822075
7	.822073
8	.822076

(1) irfname = varbasic, impulse = ZincPrice, and response = ZincPrice
 (2) irfname = varbasic, impulse = ZincPrice, and response = ZincProduction
 (3) irfname = varbasic, impulse = ZincPrice, and response = REAL
 (4) irfname = varbasic, impulse = ZincProduction, and response = ZincPrice
 (5) irfname = varbasic, impulse = ZincProduction, and response = ZincProduction
 (6) irfname = varbasic, impulse = ZincProduction, and response = REAL
 (7) irfname = varbasic, impulse = REAL, and response = ZincPrice
 (8) irfname = varbasic, impulse = REAL, and response = ZincProduction
 (9) irfname = varbasic, impulse = REAL, and response = REAL