

*VECM 02.sas: Original cq data*

Obs	SYMBOL	DATE	TIME	BID	OFR	BIDSIZ	OFRSIZ	MODE	EX	MMID
21	MTZ	20051003	9:30:47	0.01	9999.00	1	1	12	T	CDRG
22	MTZ	20051003	9:30:47	0.00	0.00	0	0	12	T	CDRG
23	MTZ	20051003	9:30:55	10.78	10.90	1	1	10	N	
24	MTZ	20051003	9:30:56	10.31	11.41	1	1	12	X	
25	MTZ	20051003	9:30:56	10.38	11.30	1	1	12	M	
26	MTZ	20051003	9:30:56	0.00	0.00	0	0	12	T	TRIM
27	MTZ	20051003	9:30:56	10.67	11.03	17	5	12	T	TRIM
28	MTZ	20051003	9:30:56	10.67	11.03	17	5	12	T	CAES
29	MTZ	20051003	9:30:59	10.75	10.90	1	1	12	N	
30	MTZ	20051003	9:31:00	10.28	11.41	1	1	12	X	
31	MTZ	20051003	9:31:01	10.77	11.30	15	1	12	M	
32	MTZ	20051003	9:31:02	10.75	10.90	2	1	12	N	
33	MTZ	20051003	9:31:25	9.97	9999.00	1	1	12	T	CDRG
34	MTZ	20051003	9:31:25	9.97	11.72	1	1	12	T	CDRG
35	MTZ	20051003	9:31:31	10.75	10.90	2	2	12	N	
36	MTZ	20051003	9:31:57	10.77	10.90	1	2	12	N	
37	MTZ	20051003	9:31:57	10.30	11.41	1	1	12	X	
38	MTZ	20051003	9:31:58	10.31	11.40	1	1	12	X	
39	MTZ	20051003	9:31:58	10.78	10.89	1	1	12	N	
40	MTZ	20051003	9:32:00	10.78	10.85	1	2	12	N	
41	MTZ	20051003	9:32:01	10.78	11.85	1	30	12	P	
42	MTZ	20051003	9:32:01	10.31	11.36	1	1	12	X	
43	MTZ	20051003	9:32:14	10.35	11.36	1	1	12	X	
44	MTZ	20051003	9:32:14	10.82	10.85	1	2	12	N	
45	MTZ	20051003	9:32:37	10.82	10.85	1	3	12	N	
46	MTZ	20051003	9:32:41	10.82	10.85	2	3	12	N	
47	MTZ	20051003	9:33:19	10.82	10.85	3	3	12	N	
48	MTZ	20051003	9:33:52	10.83	10.85	1	3	12	N	
49	MTZ	20051003	9:33:53	10.36	11.36	1	1	12	X	
50	MTZ	20051003	9:33:54	10.83	10.85	1	1	12	N	

*VECM 02.sas: Parallel quotes, every five minutes.*

Stock Symbol=MTZ Quote date=20051003

time	Nbid	Nofr	Pbid	Pofr	Xbid	Xofr	Mbid	Mofr	Tbid	Tofr
9:34:59	10.78	10.90	9.95	.	.	.	.	.	8.53	.
9:39:59	10.84	10.90	10.84	10.90	10.37	11.41	10.77	11.30	10.67	11.03
9:44:59	10.87	10.98	10.87	10.97	10.40	11.49	10.77	11.30	10.67	11.03
9:49:59	10.94	10.98	10.87	11.60	10.47	11.49	10.77	11.35	10.67	11.03
9:54:59	11.00	11.02	10.91	11.60	10.53	11.53	10.77	11.35	10.67	11.03
9:59:59	10.98	11.00	10.91	11.01	10.51	11.51	10.77	11.35	10.67	11.03
10:04:59	11.00	11.03	10.91	11.03	10.53	11.54	10.77	11.35	10.67	11.03
10:09:59	11.01	11.02	10.91	11.21	10.54	11.53	10.77	11.35	10.67	11.03
10:14:59	10.97	10.98	10.92	11.16	10.50	11.49	10.77	11.00	10.67	11.03
10:19:59	10.98	10.99	10.94	11.16	10.51	11.50	10.77	11.00	10.67	11.03
10:24:59	10.93	10.97	10.93	10.98	10.46	11.48	10.77	11.00	10.67	11.03
10:29:59	10.97	10.98	10.96	11.02	10.50	11.49	10.77	11.00	10.67	11.03
10:34:59	10.98	11.00	10.94	11.12	10.51	11.51	10.77	11.00	10.67	11.03
10:39:59	10.98	11.00	10.94	11.00	10.51	11.51	10.77	11.00	10.67	11.03
10:44:59	11.00	11.01	10.94	11.04	10.53	11.52	10.77	11.35	10.67	11.03
10:49:59	10.97	11.01	10.95	11.01	10.50	11.52	10.77	11.35	10.67	11.03
10:54:59	11.00	11.01	10.99	11.05	10.53	11.52	10.77	11.35	10.67	11.03
10:59:59	11.02	11.03	10.99	11.06	10.55	11.54	10.77	11.35	10.67	11.03
11:04:59	11.01	11.02	10.94	11.04	10.54	11.53	10.77	11.35	10.67	11.03
11:09:59	10.96	11.00	10.96	11.02	10.49	11.51	10.77	11.35	10.67	11.03
11:14:59	10.99	11.00	10.98	11.12	10.52	11.51	10.77	11.35	10.67	11.03
11:19:59	10.99	11.00	10.98	11.00	10.52	11.51	10.77	11.35	10.67	11.03
11:24:59	11.00	11.01	10.98	11.02	10.53	11.52	10.77	11.35	10.67	11.03
11:29:59	11.01	11.02	11.01	11.06	10.54	11.53	10.77	11.35	10.67	11.03
11:34:59	11.02	11.03	11.01	11.06	10.55	11.54	10.77	11.35	10.67	11.03
11:39:59	11.02	11.03	11.01	11.06	10.55	11.54	10.77	11.35	10.67	11.24
11:44:59	11.02	11.03	11.00	11.06	10.55	11.54	10.77	11.35	10.67	11.24
11:49:59	11.02	11.03	11.02	11.03	10.55	11.54	10.77	11.35	10.67	11.24
11:54:59	11.02	11.03	11.02	11.06	10.55	11.54	10.77	11.35	11.01	11.24
11:59:59	11.02	11.04	11.00	11.06	10.55	11.55	10.77	11.44	11.01	11.24

*VECM 02.sas: Parallel quotes, every five minutes.*

*The MEANS Procedure*

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
DATE	Quote date	1750	16725.27	8.4446435	16712.00	16740.00
time	Quote time	1750	46846.31	7213.93	34499.00	59399.00
Nbid		1729	10.2819375	0.4318737	9.2100000	11.3800000
Nofr		1729	10.3021689	0.4319354	9.2400000	11.3900000
Pbid		1729	10.1334413	0.5334112	7.7200000	11.3700000
Pofr		1704	10.4050646	0.4639030	9.2700000	11.9000000
Xbid		1717	9.8116191	0.4313449	8.7500000	10.9000000
Xofr		1715	10.8110845	0.4317151	9.7500000	11.8900000
Mbid		1711	9.7675511	1.0849452	4.6500000	11.3300000
Mofr		1711	10.8369082	1.1711018	9.4700000	17.4500000
Tbid		1729	10.0066744	0.5243886	6.4500000	11.1600000
Tofr		1708	10.5502225	0.4468598	9.3000000	13.2000000

## *NYSE versus P; Quotes sampled every five minutes; VECM order=3*

### *The MODEL Procedure*

Model Summary	
Model Variables	4
Parameters	63
Equations	4
Number of Statements	11
Program Lag Length	4

Note: The parameter zmean2 is shared by all 4 of the equations to be estimated.

Note: The parameter zmean3 is shared by all 4 of the equations to be estimated.

Note: The parameter zmean4 is shared by all 4 of the equations to be estimated.

The 4 Equations to Estimate	
Nbid =	F(zmean2, zmean3, zmean4, c_Nbid_Nbid_1, c_Nbid_Nbid_2, c_Nbid_Nbid_3, c_Nbid_Nofr_1, c_Nbid_Nofr_2, c_Nbid_Nofr_3, g_Nbid_2, c_Nbid_Pbid_1, c_Nbid_Pbid_2, c_Nbid_Pbid_3, g_Nbid_3, c_Nbid_Pofr_1, c_Nbid_Pofr_2, c_Nbid_Pofr_3, g_Nbid_4)
Nofr =	F(zmean2, zmean3, zmean4, c_Nofr_Nbid_1, c_Nofr_Nbid_2, c_Nofr_Nbid_3, c_Nofr_Nofr_1, c_Nofr_Nofr_2, c_Nofr_Nofr_3, g_Nofr_2, c_Nofr_Pbid_1, c_Nofr_Pbid_2, c_Nofr_Pbid_3, g_Nofr_3, c_Nofr_Pofr_1, c_Nofr_Pofr_2, c_Nofr_Pofr_3, g_Nofr_4)
Pbid =	F(zmean2, zmean3, zmean4, c_Pbid_Nbid_1, c_Pbid_Nbid_2, c_Pbid_Nbid_3, c_Pbid_Nofr_1, c_Pbid_Nofr_2, c_Pbid_Nofr_3, g_Pbid_2, c_Pbid_Pbid_1, c_Pbid_Pbid_2, c_Pbid_Pbid_3, g_Pbid_3, c_Pbid_Pofr_1, c_Pbid_Pofr_2, c_Pbid_Pofr_3, g_Pbid_4)
Pofr =	F(zmean2, zmean3, zmean4, c_Pofr_Nbid_1, c_Pofr_Nbid_2, c_Pofr_Nbid_3, c_Pofr_Nofr_1, c_Pofr_Nofr_2, c_Pofr_Nofr_3, g_Pofr_2, c_Pofr_Pbid_1, c_Pofr_Pbid_2, c_Pofr_Pbid_3, g_Pofr_3, c_Pofr_Pofr_1, c_Pofr_Pofr_2, c_Pofr_Pofr_3, g_Pofr_4)

The estimation lag length (Lagexec)	4
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NOTE: At OLS Iteration 9 CONVERGE=0.001 Criteria Met.
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*NYSE versus P; Quotes sampled every five minutes; VECM order=3*

*The MODEL Procedure*

*OLS Estimation Summary*

Data Set Options	
DATA=	CQALL

Minimization Summary	
Parameters Estimated	63
Method	Gauss
Iterations	9
Subiterations	11
Average Subiterations	1.222222

Final Convergence Criteria	
R	0.000154
PPC(g_Nofr_3)	0.065272
RPC(g_Nofr_3)	2.548444
Object	0.000011
Trace(S)	0.089889
Objective Value	0.089015

Observations Processed	
Read	1750
Solved	1746
First	5
Last	1750
Used	1620
Missing	126
Lagged	4

*NYSE versus P; Quotes sampled every five minutes; VECM order=3*

*The MODEL Procedure*

Nonlinear OLS Summary of Residual Errors							
Equation	DF Model	DF Error	SSE	MSE	Root MSE	R- Square	Adj R- Sq
Nbid	15.75	1604	0.9461	0.000590	0.0243	0.9969	0.9968
Nofr	15.75	1604	0.9434	0.000588	0.0243	0.9969	0.9968
Pbid	15.75	1604	86.7781	0.0541	0.2326	0.7978	0.7959
Pofr	15.75	1604	55.5368	0.0346	0.1861	0.8339	0.8324

*NYSE versus P; Quotes sampled every five minutes; VECM order=3*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
zmean2	- 0.01868	0.00171	- 10.94	<.0001
zmean3	0.133998	0.0131	10.20	<.0001
zmean4	- 0.11917	0.0111	- 10.73	<.0001
c_Nbid_Nbid_1	- 0.17872	0.0719	- 2.49	0.0130
c_Nbid_Nbid_2	- 0.04214	0.0624	- 0.67	0.4999
c_Nbid_Nbid_3	- 0.05069	0.0487	- 1.04	0.2979
c_Nbid_NoFr_1	0.169286	0.0725	2.34	0.0197
c_Nbid_NoFr_2	0.010734	0.0623	0.17	0.8632
c_Nbid_NoFr_3	0.119701	0.0502	2.39	0.0171
g_Nbid_2	- 0.29602	0.0738	- 4.01	<.0001
c_Nbid_Pbid_1	- 0.00178	0.00330	- 0.54	0.5895
c_Nbid_Pbid_2	- 0.00078	0.00294	- 0.27	0.7901
c_Nbid_Pbid_3	- 0.00063	0.00243	- 0.26	0.7946
g_Nbid_3	- 0.00519	0.00335	- 1.55	0.1212
c_Nbid_PoFr_1	- 0.00649	0.00417	- 1.56	0.1195
c_Nbid_PoFr_2	- 0.00194	0.00374	- 0.52	0.6041
c_Nbid_PoFr_3	- 0.0009	0.00317	- 0.28	0.7762
g_Nbid_4	- 0.00841	0.00418	- 2.01	0.0443
c_NoFr_Nbid_1	0.065534	0.0717	0.91	0.3610
c_NoFr_Nbid_2	0.069331	0.0623	1.11	0.2661
c_NoFr_Nbid_3	0.0202	0.0486	0.42	0.6777
c_NoFr_NoFr_1	- 0.09153	0.0724	- 1.26	0.2061
c_NoFr_NoFr_2	- 0.09835	0.0622	- 1.58	0.1138
c_NoFr_NoFr_3	0.055744	0.0501	1.11	0.2657
g_NoFr_2	0.203428	0.0736	2.76	0.0058
c_NoFr_Pbid_1	0.000977	0.00329	0.30	0.7668
c_NoFr_Pbid_2	0.00255	0.00294	0.87	0.3856
c_NoFr_Pbid_3	0.002067	0.00243	0.85	0.3951
g_NoFr_3	- 0.00035	0.00334	- 0.11	0.9159
c_NoFr_PoFr_1	- 0.00523	0.00416	- 1.26	0.2090
c_NoFr_PoFr_2	- 0.00251	0.00374	- 0.67	0.5020

*NYSE versus P; Quotes sampled every five minutes; VECM order=3*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_NoFr_PoFr_3	- 0.00174	0.00316	- 0.55	0.5827
g_NoFr_4	- 0.00926	0.00417	- 2.22	0.0265
c_Pbid_Nbid_1	0.242865	0.6884	0.35	0.7243
c_Pbid_Nbid_2	1.018821	0.5983	1.70	0.0888
c_Pbid_Nbid_3	1.086959	0.4663	2.33	0.0199
c_Pbid_NoFr_1	- 0.20889	0.6945	- 0.30	0.7636
c_Pbid_NoFr_2	- 0.96803	0.5968	- 1.62	0.1050
c_Pbid_NoFr_3	- 1.18369	0.4805	- 2.46	0.0139
g_Pbid_2	0.17804	0.7066	0.25	0.8011
c_Pbid_Pbid_1	- 0.1535	0.0316	- 4.85	<.0001
c_Pbid_Pbid_2	- 0.04365	0.0282	- 1.55	0.1218
c_Pbid_Pbid_3	- 0.01471	0.0233	- 0.63	0.5281
g_Pbid_3	0.458464	0.0321	14.28	<.0001
c_Pbid_PoFr_1	0.020971	0.0399	0.53	0.5995
c_Pbid_PoFr_2	- 0.02479	0.0359	- 0.69	0.4894
c_Pbid_PoFr_3	- 0.02711	0.0303	- 0.89	0.3714
g_Pbid_4	0.079155	0.0401	1.98	0.0484
c_PoFr_Nbid_1	- 0.09041	0.5507	- 0.16	0.8696
c_PoFr_Nbid_2	- 0.1938	0.4786	- 0.40	0.6856
c_PoFr_Nbid_3	- 0.18893	0.3730	- 0.51	0.6126
c_PoFr_NoFr_1	- 0.11168	0.5556	- 0.20	0.8407
c_PoFr_NoFr_2	0.173608	0.4774	0.36	0.7162
c_PoFr_NoFr_3	0.192556	0.3844	0.50	0.6164
g_PoFr_2	- 0.0438	0.5652	- 0.08	0.9383
c_PoFr_Pbid_1	0.01893	0.0253	0.75	0.4544
c_PoFr_Pbid_2	0.005999	0.0226	0.27	0.7903
c_PoFr_Pbid_3	- 0.00447	0.0186	- 0.24	0.8104
g_PoFr_3	0.038759	0.0257	1.51	0.1314
c_PoFr_PoFr_1	- 0.13687	0.0319	- 4.29	<.0001
c_PoFr_PoFr_2	- 0.06492	0.0287	- 2.26	0.0238



*NYSE versus P; Quotes sampled every five minutes; VECM order=3*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_Pofr_Pofr_3	- 0.07068	0.0243	- 2.91	0.0036
g_Pofr_4	0.419555	0.0321	13.09	<.0001

Number of Observations		Statistics for System	
Used	1620	Objective	0.0890
Missing	126	Objective*N	144.2045

Note: An identity matrix is used for the covariance of residuals for this estimation.

Covariance of Residuals				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0005898	0.0005224	0.0011973	0.0008566
Nofr	0.0005224	0.0005881	0.0012509	0.0009186
Pbid	0.0011973	0.0012509	0.0540926	- .0009400
Pofr	0.0008566	0.0009186	- .0009400	0.0346186

*NYSE versus P; Quotes sampled every five minutes; VECM order=3  
VECM2. Long-run (cumulative) impact coefficients (dataset=LRCoeff)*

Variable	Nbid	Nofr	Pbid	Pofr
Nbid	0.39946	0.58284	.003260392	0.020259
Nofr	0.39947	0.58283	.003258424	0.020262
Pbid	0.39915	0.58319	.003246879	0.020254
Pofr	0.39972	0.58254	.003263442	0.020279

## Variance Decomposition

Coefficient matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.3994622	0.5828431	0.0032604	0.0202594
Nofr	0.3994709	0.5828327	0.0032584	0.0202622
Pbid	0.3991538	0.5831911	0.0032469	0.0202537
Pofr	0.3997164	0.5825413	0.0032634	0.0202789

Covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0005898	0.0005224	0.0011973	0.0008566
Nofr	0.0005224	0.0005881	0.0012509	0.0009186
Pbid	0.0011973	0.0012509	0.0540926	- 0.00094
Pofr	0.0008566	0.0009186	- 0.00094	0.0346186

Correlation matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	1.000	0.887	0.212	0.190
Nofr	0.887	1.000	0.222	0.204
Pbid	0.212	0.222	1.000	- 0.022
Pofr	0.190	0.204	- 0.022	1.000

Purmutation used in decomposition / ordering of variables:			
Nbid	Nofr	Pbid	Pofr

Permuted coefficients				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.3994622	0.5828431	0.0032604	0.0202594
Nofr	0.3994709	0.5828327	0.0032584	0.0202622
Pbid	0.3991538	0.5831911	0.0032469	0.0202537
Pofr	0.3997164	0.5825413	0.0032634	0.0202789

Permuted covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0005898	0.0005224	0.0011973	0.0008566
Nofr	0.0005224	0.0005881	0.0012509	0.0009186
Pbid	0.0011973	0.0012509	0.0540926	- 0.00094
Pofr	0.0008566	0.0009186	- 0.00094	0.0346186

## Variance Decomposition

Cholesky factor of permuted covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0242851	0	0	0
Nofr	0.0215128	0.0111932	0	0
Pbid	0.0493024	0.0169978	0.2266561	0
Pofr	0.0352725	0.014276	- 0.01289	0.1816713

Variance contributions (ordered)				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0005343	0.0000472	2.2833E- 7	0.0000135
Nofr	0.0005343	0.0000472	2.2787E- 7	0.0000136
Pbid	0.0005343	0.0000472	2.2548E- 7	0.0000135
Pofr	0.0005343	0.0000471	2.2875E- 7	0.0000136

Total variance	
Nbid	0.0005953
Nofr	0.0005953
Pbid	0.0005952
Pofr	0.0005953

Proportional contributions				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.898	0.079	0.000	0.023
Nofr	0.898	0.079	0.000	0.023
Pbid	0.898	0.079	0.000	0.023
Pofr	0.898	0.079	0.000	0.023

## Variance Decomposition

Coefficient matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.3994622	0.5828431	0.0032604	0.0202594
Nofr	0.3994709	0.5828327	0.0032584	0.0202622
Pbid	0.3991538	0.5831911	0.0032469	0.0202537
Pofr	0.3997164	0.5825413	0.0032634	0.0202789

Covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0005898	0.0005224	0.0011973	0.0008566
Nofr	0.0005224	0.0005881	0.0012509	0.0009186
Pbid	0.0011973	0.0012509	0.0540926	- 0.00094
Pofr	0.0008566	0.0009186	- 0.00094	0.0346186

Correlation matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	1.000	0.887	0.212	0.190
Nofr	0.887	1.000	0.222	0.204
Pbid	0.212	0.222	1.000	- 0.022
Pofr	0.190	0.204	- 0.022	1.000

Purmutation used in decomposition / ordering of variables:			
Nofr	Nbid	Pbid	Pofr

Permuted coefficients				
	Nofr	Nbid	Pbid	Pofr
Nbid	0.5828431	0.3994622	0.0032604	0.0202594
Nofr	0.5828327	0.3994709	0.0032584	0.0202622
Pbid	0.5831911	0.3991538	0.0032469	0.0202537
Pofr	0.5825413	0.3997164	0.0032634	0.0202789

Permuted covariance matrix				
	Nofr	Nbid	Pbid	Pofr
Nofr	0.0005881	0.0005224	0.0012509	0.0009186
Nbid	0.0005224	0.0005898	0.0011973	0.0008566
Pbid	0.0012509	0.0011973	0.0540926	- 0.00094
Pofr	0.0009186	0.0008566	- 0.00094	0.0346186

## Variance Decomposition

Cholesky factor of permuted covariance matrix				
	Nofr	Nbid	Pbid	Pofr
Nbid	0.0242506	0	0	0
Nofr	0.0215434	0.0112091	0	0
Pbid	0.0515821	0.0076775	0.2266561	0
Pofr	0.0378798	0.0036162	- 0.01289	0.1816713

Variance contributions (ordered)				
	Nofr	Nbid	Pbid	Pofr
Nbid	0.0005605	0.0000209	2.2833E- 7	0.0000135
Nofr	0.0005605	0.0000209	2.2787E- 7	0.0000136
Pbid	0.0005606	0.0000209	2.2548E- 7	0.0000135
Pofr	0.0005605	0.000021	2.2875E- 7	0.0000136

Total variance	
Nbid	0.0005953
Nofr	0.0005953
Pbid	0.0005952
Pofr	0.0005953

Proportional contributions				
	Nofr	Nbid	Pbid	Pofr
Nbid	0.942	0.035	0.000	0.023
Nofr	0.942	0.035	0.000	0.023
Pbid	0.942	0.035	0.000	0.023
Pofr	0.942	0.035	0.000	0.023

## Variance Decomposition

Coefficient matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.3994622	0.5828431	0.0032604	0.0202594
Nofr	0.3994709	0.5828327	0.0032584	0.0202622
Pbid	0.3991538	0.5831911	0.0032469	0.0202537
Pofr	0.3997164	0.5825413	0.0032634	0.0202789

Covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0005898	0.0005224	0.0011973	0.0008566
Nofr	0.0005224	0.0005881	0.0012509	0.0009186
Pbid	0.0011973	0.0012509	0.0540926	- 0.00094
Pofr	0.0008566	0.0009186	- 0.00094	0.0346186

Correlation matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	1.000	0.887	0.212	0.190
Nofr	0.887	1.000	0.222	0.204
Pbid	0.212	0.222	1.000	- 0.022
Pofr	0.190	0.204	- 0.022	1.000

Purmutation used in decomposition / ordering of variables:			
Pbid	Pofr	Nbid	Nofr

Permuted coefficients				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.0032604	0.0202594	0.3994622	0.5828431
Nofr	0.0032584	0.0202622	0.3994709	0.5828327
Pbid	0.0032469	0.0202537	0.3991538	0.5831911
Pofr	0.0032634	0.0202789	0.3997164	0.5825413

Permuted covariance matrix				
	Pbid	Pofr	Nbid	Nofr
Pbid	0.0540926	- 0.00094	0.0011973	0.0012509
Pofr	- 0.00094	0.0346186	0.0008566	0.0009186
Nbid	0.0011973	0.0008566	0.0005898	0.0005224
Nofr	0.0012509	0.0009186	0.0005224	0.0005881

## *Variance Decomposition*

Cholesky factor of permuted covariance matrix				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.2325783	0	0	0
Nofr	- 0.004042	0.1860168	0	0
Pbid	0.005148	0.0047168	0.0232597	0
Pofr	0.0053784	0.0050552	0.0202457	0.011123

Variance contributions (ordered)				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.0000344	0.0000739	0.0004448	0.000042
Nofr	0.0000344	0.000074	0.0004448	0.000042
Pbid	0.0000344	0.0000739	0.0004448	0.0000421
Pofr	0.0000344	0.000074	0.0004448	0.000042

Total variance	
Nbid	0.0005953
Nofr	0.0005953
Pbid	0.0005952
Pofr	0.0005953

Proportional contributions				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.058	0.124	0.747	0.071
Nofr	0.058	0.124	0.747	0.071
Pbid	0.058	0.124	0.747	0.071
Pofr	0.058	0.124	0.747	0.071



## *VECM 02.sas: Parallel quotes, every five seconds.*

Stock Symbol=MTZ Quote date=20051003

time	Nbid	Nofr	Pbid	Pofr	Xbid	Xofr	Mbid	Mofr	Tbid	Tofr
9:30:59	10.78	10.90	9.95	.	10.31	11.41	10.38	11.3	8.53	11.03
9:31:04	10.75	10.90	9.95	.	10.28	11.41	10.38	11.3	10.67	11.03
9:31:09	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:14	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:19	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:24	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:29	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:34	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:39	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:44	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:49	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:54	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:31:59	10.75	10.90	9.95	.	10.28	11.41	10.77	11.3	10.67	11.03
9:32:04	10.78	10.85	9.95	11.85	10.31	11.40	10.77	11.3	10.67	11.03
9:32:09	10.78	10.85	10.78	11.85	10.31	11.36	10.77	11.3	10.67	11.03
9:32:14	10.78	10.85	10.78	11.85	10.31	11.36	10.77	11.3	10.67	11.03
9:32:19	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:24	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:29	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:34	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:39	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:44	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:49	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:54	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:32:59	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:33:04	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:33:09	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:33:14	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:33:19	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03
9:33:24	10.82	10.85	10.78	11.85	10.35	11.36	10.77	11.3	10.67	11.03

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MEANS Procedure*

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
DATE	Quote date	103144	16725.27	8.4434058	16712.00	16740.00
time	Quote time	103144	46528.87	7091.47	34214.00	59374.00
Nbid		103123	10.2820975	0.4308914	9.2000000	11.3800000
Nofr		103123	10.3017877	0.4315472	9.2400000	11.3900000
Pbid		103123	10.1371331	0.5313401	7.7200000	11.3800000
Pofr		102679	10.4098603	0.4690017	9.2700000	12.3900000
Xbid		103113	9.8121267	0.4309944	8.7300000	10.9100000
Xofr		103110	10.8113667	0.4317049	9.7500000	11.9000000
Mbid		103108	9.7414373	1.1394400	4.6500000	11.3300000
Mofr		103108	10.8664390	1.2294291	9.4600000	17.4500000
Tbid		103123	10.0300018	0.4719513	6.4500000	11.3600000
Tofr		103104	10.5517663	0.4461343	9.3000000	13.2000000

## NYSE versus P; Quotes sampled every five seconds; VECM order=12

### The MODEL Procedure

Model Summary	
Model Variables	4
Parameters	207
Equations	4
Number of Statements	11
Program Lag Length	13

Note: The parameter zmean2 is shared by all 4 of the equations to be estimated.

Note: The parameter zmean3 is shared by all 4 of the equations to be estimated.

Note: The parameter zmean4 is shared by all 4 of the equations to be estimated.

The 4 Equations to Estimate	
Nbid =	F(zmean2, zmean3, zmean4, c_Nbid_Nbid_1, c_Nbid_Nbid_2, c_Nbid_Nbid_3, c_Nbid_Nbid_4, c_Nbid_Nbid_5, c_Nbid_Nbid_6, c_Nbid_Nbid_7, c_Nbid_Nbid_8, c_Nbid_Nbid_9, c_Nbid_Nbid_10, c_Nbid_Nbid_11, c_Nbid_Nbid_12, c_Nbid_Nofr_1, c_Nbid_Nofr_2, c_Nbid_Nofr_3, c_Nbid_Nofr_4, c_Nbid_Nofr_5, c_Nbid_Nofr_6, c_Nbid_Nofr_7, c_Nbid_Nofr_8, c_Nbid_Nofr_9, c_Nbid_Nofr_10, c_Nbid_Nofr_11, c_Nbid_Nofr_12, g_Nbid_2, c_Nbid_Pbid_1, c_Nbid_Pbid_2, c_Nbid_Pbid_3, c_Nbid_Pbid_4, c_Nbid_Pbid_5, c_Nbid_Pbid_6, c_Nbid_Pbid_7, c_Nbid_Pbid_8, c_Nbid_Pbid_9, c_Nbid_Pbid_10, c_Nbid_Pbid_11, c_Nbid_Pbid_12, g_Nbid_3, c_Nbid_Pofr_1, c_Nbid_Pofr_2, c_Nbid_Pofr_3, c_Nbid_Pofr_4, c_Nbid_Pofr_5, c_Nbid_Pofr_6, c_Nbid_Pofr_7, c_Nbid_Pofr_8, c_Nbid_Pofr_9, c_Nbid_Pofr_10, c_Nbid_Pofr_11, c_Nbid_Pofr_12, g_Nbid_4)
Nofr =	F(zmean2, zmean3, zmean4, c_Nofr_Nbid_1, c_Nofr_Nbid_2, c_Nofr_Nbid_3, c_Nofr_Nbid_4, c_Nofr_Nbid_5, c_Nofr_Nbid_6, c_Nofr_Nbid_7, c_Nofr_Nbid_8, c_Nofr_Nbid_9, c_Nofr_Nbid_10, c_Nofr_Nbid_11, c_Nofr_Nbid_12, c_Nofr_Nofr_1, c_Nofr_Nofr_2, c_Nofr_Nofr_3, c_Nofr_Nofr_4, c_Nofr_Nofr_5, c_Nofr_Nofr_6, c_Nofr_Nofr_7, c_Nofr_Nofr_8, c_Nofr_Nofr_9, c_Nofr_Nofr_10, c_Nofr_Nofr_11, c_Nofr_Nofr_12, g_Nofr_2, c_Nofr_Pbid_1, c_Nofr_Pbid_2, c_Nofr_Pbid_3, c_Nofr_Pbid_4, c_Nofr_Pbid_5, c_Nofr_Pbid_6, c_Nofr_Pbid_7, c_Nofr_Pbid_8, c_Nofr_Pbid_9, c_Nofr_Pbid_10, c_Nofr_Pbid_11, c_Nofr_Pbid_12, g_Nofr_3, c_Nofr_Pofr_1, c_Nofr_Pofr_2, c_Nofr_Pofr_3, c_Nofr_Pofr_4, c_Nofr_Pofr_5, c_Nofr_Pofr_6, c_Nofr_Pofr_7, c_Nofr_Pofr_8, c_Nofr_Pofr_9, c_Nofr_Pofr_10, c_Nofr_Pofr_11, c_Nofr_Pofr_12, g_Nofr_4)
Pbid =	F(zmean2, zmean3, zmean4, c_Pbid_Nbid_1, c_Pbid_Nbid_2, c_Pbid_Nbid_3, c_Pbid_Nbid_4, c_Pbid_Nbid_5, c_Pbid_Nbid_6, c_Pbid_Nbid_7, c_Pbid_Nbid_8, c_Pbid_Nbid_9, c_Pbid_Nbid_10, c_Pbid_Nbid_11, c_Pbid_Nbid_12, c_Pbid_Nofr_1, c_Pbid_Nofr_2, c_Pbid_Nofr_3, c_Pbid_Nofr_4, c_Pbid_Nofr_5, c_Pbid_Nofr_6, c_Pbid_Nofr_7, c_Pbid_Nofr_8, c_Pbid_Nofr_9, c_Pbid_Nofr_10, c_Pbid_Nofr_11, c_Pbid_Nofr_12, g_Pbid_2, c_Pbid_Pbid_1, c_Pbid_Pbid_2, c_Pbid_Pbid_3, c_Pbid_Pbid_4, c_Pbid_Pbid_5, c_Pbid_Pbid_6, c_Pbid_Pbid_7, c_Pbid_Pbid_8, c_Pbid_Pbid_9, c_Pbid_Pbid_10, c_Pbid_Pbid_11, c_Pbid_Pbid_12, g_Pbid_3, c_Pbid_Pofr_1, c_Pbid_Pofr_2, c_Pbid_Pofr_3, c_Pbid_Pofr_4, c_Pbid_Pofr_5, c_Pbid_Pofr_6, c_Pbid_Pofr_7, c_Pbid_Pofr_8, c_Pbid_Pofr_9, c_Pbid_Pofr_10, c_Pbid_Pofr_11, c_Pbid_Pofr_12, g_Pbid_4)
Pofr =	F(zmean2, zmean3, zmean4, c_Pofr_Nbid_1, c_Pofr_Nbid_2, c_Pofr_Nbid_3, c_Pofr_Nbid_4, c_Pofr_Nbid_5, c_Pofr_Nbid_6, c_Pofr_Nbid_7, c_Pofr_Nbid_8, c_Pofr_Nbid_9, c_Pofr_Nbid_10, c_Pofr_Nbid_11, c_Pofr_Nbid_12, c_Pofr_Nofr_1, c_Pofr_Nofr_2, c_Pofr_Nofr_3, c_Pofr_Nofr_4, c_Pofr_Nofr_5, c_Pofr_Nofr_6, c_Pofr_Nofr_7, c_Pofr_Nofr_8, c_Pofr_Nofr_9, c_Pofr_Nofr_10, c_Pofr_Nofr_11, c_Pofr_Nofr_12, g_Pofr_2, c_Pofr_Pbid_1, c_Pofr_Pbid_2, c_Pofr_Pbid_3, c_Pofr_Pbid_4, c_Pofr_Pbid_5, c_Pofr_Pbid_6, c_Pofr_Pbid_7, c_Pofr_Pbid_8, c_Pofr_Pbid_9, c_Pofr_Pbid_10, c_Pofr_Pbid_11, c_Pofr_Pbid_12, g_Pofr_3, c_Pofr_Pofr_1, c_Pofr_Pofr_2, c_Pofr_Pofr_3, c_Pofr_Pofr_4, c_Pofr_Pofr_5, c_Pofr_Pofr_6, c_Pofr_Pofr_7, c_Pofr_Pofr_8, c_Pofr_Pofr_9, c_Pofr_Pofr_10, c_Pofr_Pofr_11, c_Pofr_Pofr_12, g_Pofr_4)

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

The estimation lag length (Lagexec)	13
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NOTE: At OLS Iteration 4 CONVERGE=0.001 Criteria Met.
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*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*  
*OLS Estimation Summary*

Data Set Options	
DATA=	CQALL

Minimization Summary	
Parameters Estimated	207
Method	Gauss
Iterations	4
Subiterations	2
Average Subiterations	0.5

Final Convergence Criteria	
R	0.000503
PPC(c_Pofr_NoFr_10)	0.583617
RPC(c_NoFr_NoFr_12)	3.904985
Object	0.000023
Trace(S)	0.005946
Objective Value	0.005943

Observations Processed	
Read	103144
Solved	103131
First	14
Last	103144
Used	102406
Missing	725
Lagged	13

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Summary of Residual Errors							
Equation	DF Model	DF Error	SSE	MSE	Root MSE	R- Square	Adj R- Sq
Nbid	51.75	102E3	2.4359	0.000024	0.00488	0.9999	0.9999
Nofr	51.75	102E3	1.9294	0.000019	0.00434	0.9999	0.9999
Pbid	51.75	102E3	353.7	0.00346	0.0588	0.9877	0.9877
Pofr	51.75	102E3	250.5	0.00245	0.0495	0.9888	0.9888

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
zmean2	- 0.01929	0.000403	- 47.88	<.0001
zmean3	0.138849	0.0104	13.36	<.0001
zmean4	- 0.12443	0.00766	- 16.24	<.0001
c_Nbid_Nbid_1	- 0.09734	0.00338	- 28.82	<.0001
c_Nbid_Nbid_2	- 0.06442	0.00340	- 18.94	<.0001
c_Nbid_Nbid_3	- 0.05933	0.00340	- 17.43	<.0001
c_Nbid_Nbid_4	- 0.04564	0.00341	- 13.38	<.0001
c_Nbid_Nbid_5	- 0.0381	0.00341	- 11.18	<.0001
c_Nbid_Nbid_6	- 0.02957	0.00340	- 8.69	<.0001
c_Nbid_Nbid_7	- 0.02829	0.00340	- 8.33	<.0001
c_Nbid_Nbid_8	- 0.0181	0.00338	- 5.35	<.0001
c_Nbid_Nbid_9	- 0.01373	0.00337	- 4.08	<.0001
c_Nbid_Nbid_10	- 0.01591	0.00335	- 4.75	<.0001
c_Nbid_Nbid_11	- 0.03436	0.00332	- 10.34	<.0001
c_Nbid_Nbid_12	- 0.01529	0.00326	- 4.69	<.0001
c_Nbid_NoFr_1	0.088235	0.00376	23.47	<.0001
c_Nbid_NoFr_2	0.037175	0.00381	9.76	<.0001
c_Nbid_NoFr_3	0.030306	0.00381	7.94	<.0001
c_Nbid_NoFr_4	0.019964	0.00382	5.23	<.0001
c_Nbid_NoFr_5	0.018781	0.00381	4.93	<.0001
c_Nbid_NoFr_6	0.016339	0.00380	4.29	<.0001
c_Nbid_NoFr_7	0.01777	0.00380	4.68	<.0001
c_Nbid_NoFr_8	0.008414	0.00378	2.22	0.0261
c_Nbid_NoFr_9	0.011962	0.00377	3.17	0.0015
c_Nbid_NoFr_10	0.01596	0.00375	4.26	<.0001
c_Nbid_NoFr_11	0.018265	0.00373	4.90	<.0001
c_Nbid_NoFr_12	0.000941	0.00366	0.26	0.7968
g_Nbid_2	- 0.02814	0.00124	- 22.67	<.0001
c_Nbid_Pbid_1	0.00076	0.000261	2.91	0.0036
c_Nbid_Pbid_2	0.000531	0.000259	2.05	0.0408
c_Nbid_Pbid_3	0.000565	0.000260	2.17	0.0296

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_Nbid_Pbid_4	0.000754	0.000260	2.90	0.0037
c_Nbid_Pbid_5	- 0.0001	0.000260	- 0.38	0.7039
c_Nbid_Pbid_6	- 0.00001	0.000259	- 0.04	0.9649
c_Nbid_Pbid_7	0.000096	0.000259	0.37	0.7104
c_Nbid_Pbid_8	0.00059	0.000259	2.28	0.0225
c_Nbid_Pbid_9	0.000225	0.000259	0.87	0.3850
c_Nbid_Pbid_10	- 0.00018	0.000258	- 0.70	0.4836
c_Nbid_Pbid_11	0.000219	0.000258	0.85	0.3959
c_Nbid_Pbid_12	0.000104	0.000256	0.41	0.6836
g_Nbid_3	- 0.00048	0.000056	- 8.45	<.0001
c_Nbid_Pofr_1	0.001801	0.000310	5.81	<.0001
c_Nbid_Pofr_2	0.001542	0.000310	4.97	<.0001
c_Nbid_Pofr_3	0.000041	0.000310	0.13	0.8948
c_Nbid_Pofr_4	0.000381	0.000310	1.23	0.2195
c_Nbid_Pofr_5	0.000105	0.000310	0.34	0.7356
c_Nbid_Pofr_6	0.000543	0.000310	1.75	0.0793
c_Nbid_Pofr_7	0.000769	0.000310	2.48	0.0130
c_Nbid_Pofr_8	0.000552	0.000309	1.79	0.0738
c_Nbid_Pofr_9	0.000349	0.000309	1.13	0.2582
c_Nbid_Pofr_10	0.000657	0.000308	2.13	0.0328
c_Nbid_Pofr_11	0.00022	0.000307	0.72	0.4744
c_Nbid_Pofr_12	0.000542	0.000306	1.77	0.0763
g_Nbid_4	- 0.00011	0.000071	- 1.54	0.1241
c_Nofer_Nbid_1	0.062028	0.00301	20.64	<.0001
c_Nofer_Nbid_2	0.021756	0.00303	7.19	<.0001
c_Nofer_Nbid_3	0.043628	0.00303	14.40	<.0001
c_Nofer_Nbid_4	0.010257	0.00303	3.38	0.0007
c_Nofer_Nbid_5	0.029678	0.00303	9.79	<.0001
c_Nofer_Nbid_6	0.009904	0.00303	3.27	0.0011
c_Nofer_Nbid_7	0.013252	0.00302	4.39	<.0001
c_Nofer_Nbid_8	0.008279	0.00301	2.75	0.0060



*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_NoFr_Nbid_9	0.005946	0.00300	1.98	0.0474
c_NoFr_Nbid_10	0.002119	0.00298	0.71	0.4765
c_NoFr_Nbid_11	- 0.00529	0.00296	- 1.79	0.0735
c_NoFr_Nbid_12	0.003339	0.00290	1.15	0.2502
c_NoFr_NoFr_1	- 0.12869	0.00335	- 38.47	<.0001
c_NoFr_NoFr_2	- 0.05465	0.00339	- 16.12	<.0001
c_NoFr_NoFr_3	- 0.04623	0.00339	- 13.62	<.0001
c_NoFr_NoFr_4	- 0.0216	0.00340	- 6.36	<.0001
c_NoFr_NoFr_5	- 0.02935	0.00339	- 8.65	<.0001
c_NoFr_NoFr_6	- 0.02686	0.00339	- 7.93	<.0001
c_NoFr_NoFr_7	- 0.02058	0.00338	- 6.09	<.0001
c_NoFr_NoFr_8	- 0.01089	0.00337	- 3.24	0.0012
c_NoFr_NoFr_9	- 0.00385	0.00336	- 1.15	0.2512
c_NoFr_NoFr_10	- 0.00424	0.00334	- 1.27	0.2041
c_NoFr_NoFr_11	0.006783	0.00332	2.04	0.0409
c_NoFr_NoFr_12	0.001084	0.00325	0.33	0.7391
g_NoFr_2	0.025104	0.00110	22.72	<.0001
c_NoFr_Pbid_1	0.001021	0.000232	4.40	<.0001
c_NoFr_Pbid_2	0.001259	0.000231	5.45	<.0001
c_NoFr_Pbid_3	0.00117	0.000231	5.06	<.0001
c_NoFr_Pbid_4	- 0.00034	0.000231	- 1.46	0.1432
c_NoFr_Pbid_5	0.000038	0.000231	0.16	0.8694
c_NoFr_Pbid_6	0.000669	0.000231	2.90	0.0038
c_NoFr_Pbid_7	0.000356	0.000231	1.54	0.1235
c_NoFr_Pbid_8	0.000682	0.000230	2.96	0.0031
c_NoFr_Pbid_9	0.000414	0.000230	1.80	0.0718
c_NoFr_Pbid_10	0.000182	0.000230	0.79	0.4286
c_NoFr_Pbid_11	0.000485	0.000229	2.12	0.0344
c_NoFr_Pbid_12	0.000205	0.000228	0.90	0.3688
g_NoFr_3	0.000019	0.000050	0.37	0.7117
c_NoFr_Pofr_1	0.000329	0.000276	1.19	0.2334

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_NoFr_PoFr_2	0.000393	0.000276	1.42	0.1547
c_NoFr_PoFr_3	0.000412	0.000276	1.49	0.1357
c_NoFr_PoFr_4	0.000434	0.000276	1.57	0.1161
c_NoFr_PoFr_5	0.000352	0.000276	1.28	0.2020
c_NoFr_PoFr_6	0.000429	0.000276	1.56	0.1195
c_NoFr_PoFr_7	-0.00002	0.000275	-0.09	0.9315
c_NoFr_PoFr_8	0.001347	0.000275	4.90	<.0001
c_NoFr_PoFr_9	0.000599	0.000275	2.18	0.0291
c_NoFr_PoFr_10	-0.0001	0.000274	-0.38	0.7020
c_NoFr_PoFr_11	0.000357	0.000274	1.31	0.1915
c_NoFr_PoFr_12	0.000063	0.000272	0.23	0.8158
g_NoFr_4	-0.00035	0.000063	-5.58	<.0001
c_Pbid_Nbid_1	-0.29839	0.0407	-7.33	<.0001
c_Pbid_Nbid_2	-0.04513	0.0410	-1.10	0.2708
c_Pbid_Nbid_3	-0.15475	0.0410	-3.77	0.0002
c_Pbid_Nbid_4	-0.14769	0.0411	-3.59	0.0003
c_Pbid_Nbid_5	-0.04163	0.0411	-1.01	0.3106
c_Pbid_Nbid_6	-0.11546	0.0410	-2.82	0.0049
c_Pbid_Nbid_7	-0.08726	0.0409	-2.13	0.0330
c_Pbid_Nbid_8	-0.08146	0.0408	-2.00	0.0457
c_Pbid_Nbid_9	-0.18534	0.0406	-4.57	<.0001
c_Pbid_Nbid_10	-0.11792	0.0403	-2.93	0.0034
c_Pbid_Nbid_11	-0.05122	0.0400	-1.28	0.2007
c_Pbid_Nbid_12	0.020406	0.0393	0.52	0.6037
c_Pbid_NoFr_1	0.587607	0.0453	12.97	<.0001
c_Pbid_NoFr_2	0.174584	0.0459	3.80	0.0001
c_Pbid_NoFr_3	0.050007	0.0460	1.09	0.2767
c_Pbid_NoFr_4	0.151795	0.0460	3.30	0.0010
c_Pbid_NoFr_5	0.06473	0.0459	1.41	0.1587
c_Pbid_NoFr_6	0.032607	0.0458	0.71	0.4770
c_Pbid_NoFr_7	0.095748	0.0458	2.09	0.0364

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_Pbid_Nofr_8	0.075017	0.0456	1.65	0.0998
c_Pbid_Nofr_9	0.065946	0.0455	1.45	0.1468
c_Pbid_Nofr_10	0.037709	0.0452	0.84	0.4037
c_Pbid_Nofr_11	0.056682	0.0449	1.26	0.2070
c_Pbid_Nofr_12	0.078818	0.0440	1.79	0.0736
g_Pbid_2	0.012458	0.0150	0.83	0.4050
c_Pbid_Pbid_1	-0.05697	0.00315	-18.11	<.0001
c_Pbid_Pbid_2	-0.04051	0.00313	-12.96	<.0001
c_Pbid_Pbid_3	-0.01208	0.00313	-3.86	0.0001
c_Pbid_Pbid_4	-0.01271	0.00313	-4.06	<.0001
c_Pbid_Pbid_5	-0.01434	0.00313	-4.58	<.0001
c_Pbid_Pbid_6	-0.01194	0.00313	-3.82	0.0001
c_Pbid_Pbid_7	-0.01258	0.00313	-4.02	<.0001
c_Pbid_Pbid_8	-0.00578	0.00312	-1.86	0.0636
c_Pbid_Pbid_9	-0.00608	0.00312	-1.95	0.0512
c_Pbid_Pbid_10	-0.00105	0.00311	-0.34	0.7366
c_Pbid_Pbid_11	-0.00286	0.00311	-0.92	0.3571
c_Pbid_Pbid_12	-0.01779	0.00308	-5.77	<.0001
g_Pbid_3	0.018244	0.000681	26.80	<.0001
c_Pbid_Pofr_1	0.006832	0.00374	1.83	0.0675
c_Pbid_Pofr_2	-0.00124	0.00374	-0.33	0.7394
c_Pbid_Pofr_3	-0.00895	0.00374	-2.39	0.0168
c_Pbid_Pofr_4	0.001394	0.00374	0.37	0.7093
c_Pbid_Pofr_5	-0.00094	0.00374	-0.25	0.8018
c_Pbid_Pofr_6	0.011229	0.00373	3.01	0.0026
c_Pbid_Pofr_7	0.00149	0.00373	0.40	0.6896
c_Pbid_Pofr_8	0.004178	0.00372	1.12	0.2613
c_Pbid_Pofr_9	0.006463	0.00372	1.74	0.0821
c_Pbid_Pofr_10	0.002375	0.00371	0.64	0.5218
c_Pbid_Pofr_11	0.003529	0.00370	0.95	0.3408
c_Pbid_Pofr_12	0.008537	0.00368	2.32	0.0205

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
g_Pbid_4	0.003304	0.000856	3.86	0.0001
c_Pofr_Nbid_1	0.422327	0.0343	12.33	<.0001
c_Pofr_Nbid_2	0.003486	0.0345	0.10	0.9195
c_Pofr_Nbid_3	0.120397	0.0345	3.49	0.0005
c_Pofr_Nbid_4	0.041579	0.0346	1.20	0.2292
c_Pofr_Nbid_5	- 0.0164	0.0346	- 0.47	0.6350
c_Pofr_Nbid_6	- 0.01888	0.0345	- 0.55	0.5844
c_Pofr_Nbid_7	- 0.03121	0.0344	- 0.91	0.3648
c_Pofr_Nbid_8	- 0.03309	0.0343	- 0.96	0.3347
c_Pofr_Nbid_9	- 0.05097	0.0342	- 1.49	0.1357
c_Pofr_Nbid_10	0.005169	0.0339	0.15	0.8789
c_Pofr_Nbid_11	0.03417	0.0337	1.01	0.3104
c_Pofr_Nbid_12	- 0.01185	0.0331	- 0.36	0.7202
c_Pofr_Nofr_1	- 0.05725	0.0381	- 1.50	0.1332
c_Pofr_Nofr_2	0.049573	0.0386	1.28	0.1995
c_Pofr_Nofr_3	- 0.0684	0.0387	- 1.77	0.0770
c_Pofr_Nofr_4	- 0.00876	0.0387	- 0.23	0.8209
c_Pofr_Nofr_5	- 0.06234	0.0386	- 1.61	0.1068
c_Pofr_Nofr_6	0.063343	0.0386	1.64	0.1007
c_Pofr_Nofr_7	- 0.02772	0.0385	- 0.72	0.4716
c_Pofr_Nofr_8	0.056323	0.0384	1.47	0.1420
c_Pofr_Nofr_9	- 0.00625	0.0383	- 0.16	0.8701
c_Pofr_Nofr_10	- 0.00115	0.0380	- 0.03	0.9758
c_Pofr_Nofr_11	- 0.08682	0.0378	- 2.30	0.0216
c_Pofr_Nofr_12	- 0.00635	0.0371	- 0.17	0.8640
g_Pofr_2	- 0.01373	0.0126	- 1.09	0.2757
c_Pofr_Pbid_1	0.002869	0.00265	1.08	0.2784
c_Pofr_Pbid_2	- 0.00622	0.00263	- 2.36	0.0181
c_Pofr_Pbid_3	0.002528	0.00263	0.96	0.3370
c_Pofr_Pbid_4	0.014788	0.00263	5.62	<.0001
c_Pofr_Pbid_5	- 0.0001	0.00263	- 0.04	0.9707

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Nonlinear OLS Parameter Estimates				
Parameter	Estimate	Approx Std Err	t Value	Approx Pr >  t
c_Pofr_Pbid_6	0.007944	0.00263	3.02	0.0025
c_Pofr_Pbid_7	0.003121	0.00263	1.19	0.2353
c_Pofr_Pbid_8	0.006837	0.00262	2.61	0.0092
c_Pofr_Pbid_9	0.002703	0.00262	1.03	0.3028
c_Pofr_Pbid_10	- 0.00063	0.00262	- 0.24	0.8098
c_Pofr_Pbid_11	0.002811	0.00261	1.08	0.2821
c_Pofr_Pbid_12	0.003617	0.00260	1.39	0.1634
g_Pofr_3	0.003114	0.000573	5.43	<.0001
c_Pofr_Pofr_1	- 0.05714	0.00314	- 18.17	<.0001
c_Pofr_Pofr_2	- 0.01449	0.00315	- 4.60	<.0001
c_Pofr_Pofr_3	- 0.02727	0.00315	- 8.66	<.0001
c_Pofr_Pofr_4	- 0.01351	0.00315	- 4.29	<.0001
c_Pofr_Pofr_5	- 0.02145	0.00315	- 6.82	<.0001
c_Pofr_Pofr_6	- 0.00579	0.00314	- 1.84	0.0652
c_Pofr_Pofr_7	0.002573	0.00314	0.82	0.4125
c_Pofr_Pofr_8	- 0.0052	0.00313	- 1.66	0.0965
c_Pofr_Pofr_9	- 0.00465	0.00313	- 1.49	0.1373
c_Pofr_Pofr_10	0.004108	0.00312	1.32	0.1879
c_Pofr_Pofr_11	- 0.01433	0.00312	- 4.60	<.0001
c_Pofr_Pofr_12	- 0.00132	0.00310	- 0.42	0.6712
g_Pofr_4	0.021204	0.000720	29.43	<.0001

Number of Observations		Statistics for System	
Used	102406	Objective	0.005943
Missing	725	Objective*N	608.6035

Note: An identity matrix is used for the covariance of residuals for this estimation.

*NYSE versus P; Quotes sampled every five seconds; VECM order=12*

*The MODEL Procedure*

Covariance of Residuals				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0000238	0.0000061	0.0000066	0.0000092
Nofr	0.0000061	0.0000188	0.0000134	0.0000035
Pbid	0.0000066	0.0000134	0.0034559	- .0000239
Pofr	0.0000092	0.0000035	- .0000239	0.0024475

*NYSE versus P; Quotes sampled every five seconds; VECM order=12  
VECM2. Long-run (cumulative) impact coefficients (dataset=LRCoeff)*

Variable	Nbid	Nofr	Pbid	Pofr
Nbid	0.40603	0.45537	.008745434	.008310477
Nofr	0.40603	0.45537	.008745397	.008310501
Pbid	0.40603	0.45537	.008747153	.008309354
Pofr	0.40603	0.45538	.008744398	.008311155

## Variance Decomposition

Coefficient matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.4060292	0.4553746	0.0087454	0.0083105
Nofr	0.4060291	0.4553747	0.0087454	0.0083105
Pbid	0.4060312	0.4553718	0.0087472	0.0083094
Pofr	0.406028	0.4553763	0.0087444	0.0083112

Covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0000238	6.106E- 6	6.5825E- 6	9.1785E- 6
Nofr	6.106E- 6	0.0000188	0.0000134	3.5228E- 6
Pbid	6.5825E- 6	0.0000134	0.0034559	- 0.000024
Pofr	9.1785E- 6	3.5228E- 6	- 0.000024	0.0024475

Correlation matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	1.000	0.288	0.023	0.038
Nofr	0.288	1.000	0.053	0.016
Pbid	0.023	0.053	1.000	- 0.008
Pofr	0.038	0.016	- 0.008	1.000

Purmutation used in decomposition / ordering of variables:			
Nbid	Nofr	Pbid	Pofr

Permuted coefficients				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.4060292	0.4553746	0.0087454	0.0083105
Nofr	0.4060291	0.4553747	0.0087454	0.0083105
Pbid	0.4060312	0.4553718	0.0087472	0.0083094
Pofr	0.406028	0.4553763	0.0087444	0.0083112

Permuted covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0000238	6.106E- 6	6.5825E- 6	9.1785E- 6
Nofr	6.106E- 6	0.0000188	0.0000134	3.5228E- 6
Pbid	6.5825E- 6	0.0000134	0.0034559	- 0.000024
Pofr	9.1785E- 6	3.5228E- 6	- 0.000024	0.0024475



## Variance Decomposition

Cholesky factor of permuted covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0048784	0	0	0
Nofr	0.0012516	0.0041573	0	0
Pbid	0.0013493	0.0028243	0.0587033	0
Pofr	0.0018815	0.0002809	- 0.000464	0.0494338

Variance contributions (ordered)				
	Nbid	Nofr	Pbid	Pofr
Nbid	6.6469E- 6	3.687E- 6	2.5962E- 7	1.6877E- 7
Nofr	6.6469E- 6	3.687E- 6	2.5962E- 7	1.6877E- 7
Pbid	6.647E- 6	3.687E- 6	2.5973E- 7	1.6873E- 7
Pofr	6.6469E- 6	3.687E- 6	2.5956E- 7	1.688E- 7

Total variance	
Nbid	0.0000108
Nofr	0.0000108
Pbid	0.0000108
Pofr	0.0000108

Proportional contributions				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.618	0.343	0.024	0.016
Nofr	0.618	0.343	0.024	0.016
Pbid	0.618	0.343	0.024	0.016
Pofr	0.618	0.343	0.024	0.016

## Variance Decomposition

Coefficient matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.4060292	0.4553746	0.0087454	0.0083105
Nofr	0.4060291	0.4553747	0.0087454	0.0083105
Pbid	0.4060312	0.4553718	0.0087472	0.0083094
Pofr	0.406028	0.4553763	0.0087444	0.0083112

Covariance matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	0.0000238	6.106E- 6	6.5825E- 6	9.1785E- 6
Nofr	6.106E- 6	0.0000188	0.0000134	3.5228E- 6
Pbid	6.5825E- 6	0.0000134	0.0034559	- 0.000024
Pofr	9.1785E- 6	3.5228E- 6	- 0.000024	0.0024475

Correlation matrix				
	Nbid	Nofr	Pbid	Pofr
Nbid	1.000	0.288	0.023	0.038
Nofr	0.288	1.000	0.053	0.016
Pbid	0.023	0.053	1.000	- 0.008
Pofr	0.038	0.016	- 0.008	1.000

Purmutation used in decomposition / ordering of variables:			
Pbid	Pofr	Nbid	Nofr

Permuted coefficients				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.0087454	0.0083105	0.4060292	0.4553746
Nofr	0.0087454	0.0083105	0.4060291	0.4553747
Pbid	0.0087472	0.0083094	0.4060312	0.4553718
Pofr	0.0087444	0.0083112	0.406028	0.4553763

Permuted covariance matrix				
	Pbid	Pofr	Nbid	Nofr
Pbid	0.0034559	- 0.000024	6.5825E- 6	0.0000134
Pofr	- 0.000024	0.0024475	9.1785E- 6	3.5228E- 6
Nbid	6.5825E- 6	9.1785E- 6	0.0000238	6.106E- 6
Nofr	0.0000134	3.5228E- 6	6.106E- 6	0.0000188

## *Variance Decomposition*

Cholesky factor of permuted covariance matrix				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.0587867	0	0	0
Nofr	- 0.000406	0.0494709	0	0
Pbid	0.000112	0.0001865	0.0048735	0
Pofr	0.0002285	0.0000731	0.0012448	0.0041524

Variance contributions (ordered)				
	Pbid	Pofr	Nbid	Nofr
Nbid	4.3591E- 7	2.7052E- 7	6.4804E- 6	3.5755E- 6
Nofr	4.3591E- 7	2.7052E- 7	6.4804E- 6	3.5755E- 6
Pbid	4.3605E- 7	2.7046E- 7	6.4804E- 6	3.5755E- 6
Pofr	4.3583E- 7	2.7055E- 7	6.4804E- 6	3.5756E- 6

Total variance	
Nbid	0.0000108
Nofr	0.0000108
Pbid	0.0000108
Pofr	0.0000108

Proportional contributions				
	Pbid	Pofr	Nbid	Nofr
Nbid	0.041	0.025	0.602	0.332
Nofr	0.041	0.025	0.602	0.332
Pbid	0.041	0.025	0.602	0.332
Pofr	0.040	0.025	0.602	0.332