

## The SAS System

## The VARMAX Procedure

Number of Observations	130
Number of Pairwise Missing	0
Observation(s) eliminated by differencing	1

Simple Summary Statistics							
Variable	Type	N	Mean	Standard Deviation	Min	Max	Difference
Quarterly_GDP_of_NC	Dependent	130	0.00000	8222.52836	-53855.20000	53855.20000	1
Labor_Force	Dependent	130	168.08462	23920.37968	-155005.0000	139892.00000	1
Employment	Dependent	130	1698.80000	67983.93750	-554817.0000	496790.00000	1
Unemployment	Dependent	130	1976.88462	50917.87049	-380172.0000	356898.00000	1
CPI_U	Dependent	130	0.01035	0.55740	-1.32400	1.60600	1
Monthly_Retail_and_Food_Services	Dependent	130	24.21538	7223.30628	-31304.00000	25590.00000	1

Granger-Causality Wald Test			
Test	DF	Chi-Square	Pr > ChiSq
1	10	409.68	<.0001

Test 1: Group 1 Variables:	Quarterly_GDP_of_NC
Group 2 Variables:	Labor_Force Employment Unemployment CPI_U Monthly_Retail_and_Food_Services

## The SAS System

## The VARMAX Procedure

Type of Model	VAR(2)
Estimation Method	Least Squares Estimation

Constant Estimates	
Variable	Constant
Quarterly_GDP_of_NC	-29.75691
Labor_Force	1159.80076
Employment	1472.61152
Unemployment	318.16281
CPI_U	0.00099
Monthly_Retail_and_Food_Services	41.19173

AR Coefficient Estimates							
Lag	Variable	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
1	Quarterly_GDP_of_NC	-0.92691	0.18169	0.19975	-0.30827	251.31803	0.14680
	Labor_Force	-0.52708	1.13855	-0.04277	-0.63498	-1704.31389	-0.14037
	Employment	-0.92173	2.40917	1.48123	-3.83151	-2456.54387	-0.22858
	Unemployment	-0.38145	1.65626	1.10798	-2.68650	-342.13135	-0.12690
	CPI_U	0.00000	0.00001	-0.00000	-0.00000	-0.33261	0.00002
	Monthly_Retail_and_Food_Services	-0.57295	-0.04495	0.06777	0.01873	503.50058	-0.59109
2	Quarterly_GDP_of_NC	-0.69291	-0.20417	0.04657	0.03150	167.88797	0.12100
	Labor_Force	-0.17875	-0.02166	-0.12075	-0.40799	2215.35598	0.25924
	Employment	-0.24217	-1.19692	-0.29484	0.34704	3804.68228	0.45162
	Unemployment	-0.01460	-1.64608	0.17227	0.62695	1722.62274	0.16203
	CPI_U	0.00002	-0.00001	-0.00000	0.00000	-0.24736	0.00001
	Monthly_Retail_and_Food_Services	0.06695	0.21276	-0.05090	-0.04538	-169.83904	0.05697

Schematic Representation of Parameter Estimates			
Variable/Lag	C	AR1	AR2
Quarterly_GDP_of_NC	.	-.+.+	-.+.+
Labor_Force	.	+. ....	....
Employment	.	+. -. .	....
Unemployment	.	+. +-. .	-. ....
CPI_U	.	....-. .	....-. .
Monthly_Retail_and_Food_Services	.	-.+. -. .	....
+ is > 2*std error, - is < -2*std error, . is between, * is N/A			

Model Parameter Estimates						
Equation	Parameter	Estimate	Standard Error	t Value	Pr >  t	Variable
Quarterly_GDP_of_NC	CONST1	-29.75691	233.71269	-0.13	0.8989	1
	AR1_1_1	-0.92691	0.06563	-14.12	0.0001	Quarterly_GDP_of_NC(t-1)
	AR1_1_2	0.18169	0.10524	1.73	0.0869	Labor_Force(t-1)
	AR1_1_3	0.19975	0.10171	1.96	0.0519	Employment(t-1)
	AR1_1_4	-0.30827	0.09642	-3.20	0.0018	Unemployment(t-1)
	AR1_1_5	251.31803	484.71550	0.52	0.6051	CPI_U(t-1)
Labor_Force	AR1_1_6	0.14680	0.05811	2.53	0.0129	Monthly_Retail_and_Food_Services(t-1)
	AR2_1_1	-0.69291	0.06707	-10.33	0.0001	Quarterly_GDP_of_NC(t-2) (t-1)
	AR2_1_2	-0.20417	0.10281	-1.99	0.0494	Labor_Force(t-2) (t-1)
	AR2_1_3	0.04657	0.10030	0.46	0.6433	Employment(t-2) (t-1)
	AR2_1_4	0.03150	0.13511	0.23	0.8161	Unemployment(t-2) (t-1)
	AR2_1_5	167.88797	475.70930	0.35	0.7248	CPI_U(t-2) (t-1)
Labor_Force	AR2_1_6	0.12100	0.05842	2.07	0.0406	Monthly_Retail_and_Food_Services(t-2)
	CONST2	1159.80076	1235.91401	0.94	0.3500	1
	AR1_2_1	-0.52708	0.34704	-1.52	0.1316	Quarterly_GDP_of_NC(t-1)
	AR1_2_2	1.13855	0.55651	2.05	0.0431	Labor_Force(t-1)

	AR1_2_3	-0.04277	0.53786	-0.08	0.9368	Employment(t-1)
	AR1_2_4	-0.63498	0.50989	-1.25	0.2155	Unemployment(t-1)
	AR1_2_5	-1704.31389	2563.26128	-0.66	0.5074	CPI_U(t-1)
	AR1_2_6	-0.14037	0.30730	-0.46	0.6487	Monthly_Retail_and_Food_Services(t-1)
	AR2_2_1	-0.17875	0.35469	-0.50	0.6152	Quarterly_GDP_of_NC(t-2) (t-1)
	AR2_2_2	-0.02166	0.54366	-0.04	0.9683	Labor_Force(t-2) (t-1)
	AR2_2_3	-0.12075	0.53039	-0.23	0.8203	Employment(t-2) (t-1)
	AR2_2_4	-0.40799	0.71448	-0.57	0.5691	Unemployment(t-2) (t-1)
	AR2_2_5	2215.35598	2515.63488	0.88	0.3804	CPI_U(t-2) (t-1)
	AR2_2_6	0.25924	0.30895	0.84	0.4031	Monthly_Retail_and_Food_Services(t-2)
Employment	CONST3	1472.61152	1820.90802	0.81	0.4203	1
	AR1_3_1	-0.92173	0.51131	-1.80	0.0741	Quarterly_GDP_of_NC(t-1)
	AR1_3_2	2.40917	0.81993	2.94	0.0040	Labor_Force(t-1)
	AR1_3_3	1.48123	0.79245	1.87	0.0641	Employment(t-1)
	AR1_3_4	-3.83151	0.75123	-5.10	0.0001	Unemployment(t-1)
	AR1_3_5	-2456.54387	3776.52732	-0.65	0.5167	CPI_U(t-1)
	AR1_3_6	-0.22858	0.45275	-0.50	0.6146	Monthly_Retail_and_Food_Services(t-1)
	AR2_3_1	-0.24217	0.52258	-0.46	0.6439	Quarterly_GDP_of_NC(t-2) (t-1)
	AR2_3_2	-1.19692	0.80099	-1.49	0.1378	Labor_Force(t-2) (t-1)
	AR2_3_3	-0.29484	0.78144	-0.38	0.7066	Employment(t-2) (t-1)
	AR2_3_4	0.34704	1.05267	0.33	0.7422	Unemployment(t-2) (t-1)
	AR2_3_5	3804.68228	3706.35796	1.03	0.3068	CPI_U(t-2) (t-1)
	AR2_3_6	0.45162	0.45519	0.99	0.3232	Monthly_Retail_and_Food_Services(t-2)
Unemployment	CONST4	318.16281	814.27508	0.39	0.6967	1
	AR1_4_1	-0.38145	0.22865	-1.67	0.0980	Quarterly_GDP_of_NC(t-1)
	AR1_4_2	1.65626	0.36666	4.52	0.0001	Labor_Force(t-1)
	AR1_4_3	1.10798	0.35437	3.13	0.0022	Employment(t-1)
	AR1_4_4	-2.68650	0.33594	-8.00	0.0001	Unemployment(t-1)
	AR1_4_5	-342.13135	1688.79046	-0.20	0.8398	CPI_U(t-1)
	AR1_4_6	-0.12690	0.20246	-0.63	0.5320	Monthly_Retail_and_Food_Services(t-1)
	AR2_4_1	-0.01460	0.23369	-0.06	0.9503	Quarterly_GDP_of_NC(t-2) (t-1)
	AR2_4_2	-1.64608	0.35819	-4.60	0.0001	Labor_Force(t-2) (t-1)
	AR2_4_3	0.17227	0.34944	0.49	0.6230	Employment(t-2) (t-1)
	AR2_4_4	0.62695	0.47073	1.33	0.1855	Unemployment(t-2) (t-1)
	AR2_4_5	1722.62274	1657.41207	1.04	0.3008	CPI_U(t-2) (t-1)
	AR2_4_6	0.16203	0.20355	0.80	0.4277	Monthly_Retail_and_Food_Services(t-2)
CPI_U	CONST5	0.00099	0.04524	0.02	0.9825	1
	AR1_5_1	0.00000	0.00001	0.08	0.9361	Quarterly_GDP_of_NC(t-1)
	AR1_5_2	0.00001	0.00002	0.67	0.5054	Labor_Force(t-1)
	AR1_5_3	-0.00000	0.00002	-0.12	0.9017	Employment(t-1)
	AR1_5_4	-0.00000	0.00002	-0.09	0.9273	Unemployment(t-1)
	AR1_5_5	-0.33261	0.09383	-3.54	0.0006	CPI_U(t-1)
	AR1_5_6	0.00002	0.00001	1.54	0.1260	Monthly_Retail_and_Food_Services(t-1)
	AR2_5_1	0.00002	0.00001	1.17	0.2434	Quarterly_GDP_of_NC(t-2) (t-1)
	AR2_5_2	-0.00001	0.00002	-0.32	0.7469	Labor_Force(t-2) (t-1)
	AR2_5_3	-0.00000	0.00002	-0.06	0.9488	Employment(t-2) (t-1)
	AR2_5_4	0.00000	0.00003	0.15	0.8825	Unemployment(t-2) (t-1)
	AR2_5_5	-0.24736	0.09209	-2.69	0.0083	CPI_U(t-2) (t-1)
	AR2_5_6	0.00001	0.00001	0.65	0.5161	Monthly_Retail_and_Food_Services(t-2)
Monthly_Retail_and_Food_Services	CONST6	41.19173	394.03105	0.10	0.9169	1
	AR1_6_1	-0.57295	0.11064	-5.18	0.0001	Quarterly_GDP_of_NC(t-1)
	AR1_6_2	-0.04495	0.17743	-0.25	0.8005	Labor_Force(t-1)
	AR1_6_3	0.06777	0.17148	0.40	0.6934	Employment(t-1)
	AR1_6_4	0.01873	0.16256	0.12	0.9085	Unemployment(t-1)
	AR1_6_5	503.50058	817.21263	0.62	0.5390	CPI_U(t-1)
	AR1_6_6	-0.59109	0.09797	-6.03	0.0001	Monthly_Retail_and_Food_Services(t-1)
	AR2_6_1	0.06695	0.11308	0.59	0.5550	Quarterly_GDP_of_NC(t-2) (t-1)

	<a href="#">AR2_6_2</a>	0.21276	0.17333	1.23	0.2221	Labor_Force(t-2) (t-1)
	<a href="#">AR2_6_3</a>	-0.05090	0.16910	-0.30	0.7639	Employment(t-2) (t-1)
	<a href="#">AR2_6_4</a>	-0.04538	0.22779	-0.20	0.8425	Unemployment(t-2) (t-1)
	<a href="#">AR2_6_5</a>	-169.83904	802.02850	-0.21	0.8327	CPI_U(t-2) (t-1)
	<a href="#">AR2_6_6</a>	0.05697	0.09850	0.58	0.5642	Monthly_Retail_and_Food_Services(t-2)

Covariances of Innovations						
Variable	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
Quarterly_GDP_of_NC	6827633.3266	5470748.8656	11532225.962	7304801.5098	-78.56628	-856302.0726
Labor_Force	5470748.8656	190933496.99	264040034.60	78315075.853	-114.41441	7066876.0764
Employment	11532225.962	264040034.60	414459055.80	155693381.14	-442.06305	5393566.4837
Unemployment	7304801.5098	78315075.853	155693381.14	82879649.288	-456.42339	-1870343.118
CPI_U	-78.56628	-114.41441	-442.06305	-456.42339	0.25585	622.06703
Monthly_Retail_and_Food_Services	-856302.0726	7066876.0764	5393566.4837	-1870343.118	622.06703	19407362.290

Log-likelihood	-5664.19
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Information Criteria	
AICC	12233.53
HQC	11641.11
AIC	11526.39
SBC	11808.74
FPEC	2.3E36

Cross Covariances of Residuals							
Lag	Variable	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
0	Quarterly_GDP_of_NC	6134201.8168	4915125.9339	10360984.263	6562907.6065	-70.58689	-769333.8933
	Labor_Force	4915125.9339	171541813.70	237223468.59	70361200.962	-102.79419	6349146.4749
	Employment	10360984.263	237223468.59	372365557.95	139880772.12	-397.16603	4845782.387
	Unemployment	6562907.6065	70361200.962	139880772.12	74462184.907	-410.06789	-1680386.395
	CPI_U	-70.58689	-102.79419	-397.16603	-410.06789	0.22987	558.88835
	Monthly_Retail_and_Food_Services	-769333.8933	6349146.4749	4845782.3877	-1680386.395	558.88835	17436302.057
1	Quarterly_GDP_of_NC	-244919.2333	-1625205.691	-3173273.606	-1132951.926	-6.52739	1764945.1350
	Labor_Force	290950.87313	-1431091.313	-2940535.987	-1761778.528	116.33551	2085110.7018
	Employment	345530.91151	-5811230.557	-3845156.979	691895.20869	169.66182	1649377.0335
	Unemployment	-275942.7890	-6073952.020	-3584462.300	860790.21065	72.74284	-876194.9355
	CPI_U	10.02178	-44.12423	-84.69028	-30.90703	-0.00792	-20.77889
	Monthly_Retail_and_Food_Services	200926.41092	784261.11167	401754.14041	38667.41188	1.79905	338243.38372
2	Quarterly_GDP_of_NC	-267592.1858	-5634118.161	-7104219.466	-1269251.800	12.27616	-448712.5010
	Labor_Force	-572286.9108	1605525.6464	-1864049.795	-2606960.039	15.62947	371380.48992
	Employment	-743050.7539	-781291.8519	-12818413.98	-12486110.44	83.53182	2276013.7803
	Unemployment	418505.76546	-221375.1295	-5169074.339	-5743294.082	40.47637	1550003.1254
	CPI_U	29.74798	-29.60593	-106.18267	-9.95188	-0.01527	101.88915
	Monthly_Retail_and_Food_Services	-1276609.536	2683872.3543	3996165.3567	1284630.3022	-22.75962	-1537112.296
3	Quarterly_GDP_of_NC	-2947128.248	-236864.6028	558098.22620	-42417.32715	34.63446	601183.57230
	Labor_Force	-1629193.719	-5651877.193	-9726910.596	-5287007.566	40.52644	599942.91058
	Employment	-3451944.775	-1803678.688	-11509192.71	-12262427.89	277.52415	4269378.9131
	Unemployment	-2749655.158	135186.19085	-8292167.033	-11149043.52	296.22539	3571640.1288
	CPI_U	46.07326	120.02127	89.98933	137.34965	-0.03449	-196.62617
	Monthly_Retail_and_Food_Services	114167.15546	-1798402.026	2765060.9946	4472195.1335	-53.92325	-6473341.300

Cross Covariances of Residuals by Variable							
Variable	Lag	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
Quarterly_GDP_of_NC	0	6134201.8168	4915125.9339	10360984.263	6562907.6065	-70.58689	-769333.8933
	1	-244919.2333	-1625205.691	-3173273.606	-1132951.926	-6.52739	1764945.1350
	2	-267592.1858	-5634118.161	-7104219.466	-1269251.800	12.27616	-448712.5010
	3	-2947128.248	-236864.6028	558098.22620	-42417.32715	34.63446	601183.57230
Labor_Force	0	4915125.9339	171541813.70	237223468.59	70361200.962	-102.79419	6349146.4749
	1	290950.87313	-1431091.313	-2940535.987	-1761778.528	116.33551	2085110.7018

	2	-572286.9108	1605525.6464	-1864049.795	-2606960.039	15.62947	371380.48992
	3	-1629193.719	-5651877.193	-9726910.596	-5287007.566	40.52644	599942.91058
Employment	0	10360984.263	237223468.59	372365557.95	139880772.12	-397.16603	4845782.3877
	1	345530.91151	-5811230.557	-3845156.979	691895.20869	169.66182	1649377.0335
	2	-743050.7539	-781291.8519	-12818413.98	-12486110.44	83.53182	2276013.7803
	3	-3451944.775	-1803678.688	-11509192.71	-12262427.89	277.52415	4269378.9131
Unemployment	0	6562907.6065	70361200.962	139880772.12	74462184.907	-410.06789	-1680386.395
	1	-275942.7890	-6073952.020	-3584462.300	860790.21065	72.74284	-876194.9355
	2	418505.76546	-221375.1295	-5169074.339	-5743294.082	40.47637	1550003.1254
	3	-2749655.158	135186.19085	-8292167.033	-11149043.52	296.22539	3571640.1288
CPI_U	0	-70.58689	-102.79419	-397.16603	-410.06789	0.22987	558.88835
	1	10.02178	-44.12423	-84.69028	-30.90703	-0.00792	-20.77889
	2	29.74798	-29.60593	-106.18267	-9.95188	-0.01527	101.88915
	3	46.07326	120.02127	89.98933	137.34965	-0.03449	-196.62617
Monthly_Retail_and_Food_Services	0	-769333.8933	6349146.4749	4845782.3877	-1680386.395	558.88835	17436302.057
	1	200926.41092	784261.11167	401754.14041	38667.41188	1.79905	338243.38372
	2	-1276609.536	2683872.3543	3996165.3567	1284630.3022	-22.75962	-1537112.296
	3	114167.15546	-1798402.026	2765060.9946	4472195.1335	-53.92325	-6473341.300

Cross Correlations of Residuals							
Lag	Variable	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
0	Quarterly_GDP_of_NC	1.00000	0.15152	0.21679	0.30708	-0.05944	-0.07439
	Labor_Force	0.15152	1.00000	0.93862	0.62256	-0.01637	0.11609
	Employment	0.21679	0.93862	1.00000	0.84005	-0.04293	0.06014
	Unemployment	0.30708	0.62256	0.84005	1.00000	-0.09912	-0.04664
	CPI_U	-0.05944	-0.01637	-0.04293	-0.09912	1.00000	0.27916
	Monthly_Retail_and_Food_Services	-0.07439	0.11609	0.06014	-0.04664	0.27916	1.00000
1	Quarterly_GDP_of_NC	-0.03993	-0.05010	-0.06640	-0.05301	-0.00550	0.17066
	Labor_Force	0.00897	-0.00834	-0.01163	-0.01559	0.01853	0.03813
	Employment	0.00723	-0.02299	-0.01033	0.00416	0.01834	0.02047
	Unemployment	-0.01291	-0.05374	-0.02153	0.01156	0.01758	-0.02432
	CPI_U	0.00844	-0.00703	-0.00915	-0.00747	-0.03447	-0.01038
	Monthly_Retail_and_Food_Services	0.01943	0.01434	0.00499	0.00107	0.00090	0.01940
2	Quarterly_GDP_of_NC	-0.04362	-0.17368	-0.14865	-0.05939	0.01034	-0.04339
	Labor_Force	-0.01764	0.00936	-0.00738	-0.02307	0.00249	0.00679
	Employment	-0.01555	-0.00309	-0.03442	-0.07499	0.00903	0.02825
	Unemployment	0.01958	-0.00196	-0.03104	-0.07713	0.00978	0.04302
	CPI_U	0.02505	-0.00471	-0.01148	-0.00241	-0.06642	0.05089
	Monthly_Retail_and_Food_Services	-0.12344	0.04907	0.04959	0.03565	-0.01137	-0.08816
3	Quarterly_GDP_of_NC	-0.48044	-0.00730	0.01168	-0.00198	0.02917	0.05813
	Labor_Force	-0.05022	-0.03295	-0.03849	-0.04678	0.00645	0.01097
	Employment	-0.07223	-0.00714	-0.03091	-0.07364	0.03000	0.05298
	Unemployment	-0.12866	0.00120	-0.04980	-0.14973	0.07160	0.09912
	CPI_U	0.03880	0.01911	0.00973	0.03320	-0.15006	-0.09821
	Monthly_Retail_and_Food_Services	0.01104	-0.03288	0.03432	0.12412	-0.02693	-0.37126

Cross Correlations of Residuals by Variable							
Variable	Lag	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
Quarterly_GDP_of_NC	0	1.00000	0.15152	0.21679	0.30708	-0.05944	-0.07439
	1	-0.03993	-0.05010	-0.06640	-0.05301	-0.00550	0.17066
	2	-0.04362	-0.17368	-0.14865	-0.05939	0.01034	-0.04339
	3	-0.48044	-0.00730	0.01168	-0.00198	0.02917	0.05813
Labor_Force	0	0.15152	1.00000	0.93862	0.62256	-0.01637	0.11609
	1	0.00897	-0.00834	-0.01163	-0.01559	0.01853	0.03813
	2	-0.01764	0.00936	-0.00738	-0.02307	0.00249	0.00679
	3	-0.05022	-0.03295	-0.03849	-0.04678	0.00645	0.01097
Employment	0	0.21679	0.93862	1.00000	0.84005	-0.04293	0.06014
	1	0.00723	-0.02299	-0.01033	0.00416	0.01834	0.02047

	2	-0.01555	-0.00309	-0.03442	-0.07499	0.00903	0.02825
	3	-0.07223	-0.00714	-0.03091	-0.07364	0.03000	0.05298
Unemployment	0	0.30708	0.62256	0.84005	1.00000	-0.09912	-0.04664
	1	-0.01291	-0.05374	-0.02153	0.01156	0.01758	-0.02432
	2	0.01958	-0.00196	-0.03104	-0.07713	0.00978	0.04302
	3	-0.12866	0.00120	-0.04980	-0.14973	0.07160	0.09912
CPI_U	0	-0.05944	-0.01637	-0.04293	-0.09912	1.00000	0.27916
	1	0.00844	-0.00703	-0.00915	-0.00747	-0.03447	-0.01038
	2	0.02505	-0.00471	-0.01148	-0.00241	-0.06642	0.05089
	3	0.03880	0.01911	0.00973	0.03320	-0.15006	-0.09821
Monthly_Retail_and_Food_Services	0	-0.07439	0.11609	0.06014	-0.04664	0.27916	1.00000
	1	0.01943	0.01434	0.00499	0.00107	0.00090	0.01940
	2	-0.12344	0.04907	0.04959	0.03565	-0.01137	-0.08816
	3	0.01104	-0.03288	0.03432	0.12412	-0.02693	-0.37126

Schematic Representation of Cross Correlations of Residuals				
Variable/Lag	0	1	2	3
Quarterly_GDP_of_NC	+ . + + .	. . . . .	. . . . .	- . . . .
Labor_Force	. + + + .	. . . . .	. . . . .	. . . . .
Employment	+ + + + .	. . . . .	. . . . .	. . . . .
Unemployment	+ + + + .	. . . . .	. . . . .	. . . . .
CPI_U	. . . . + +	. . . . .	. . . . .	. . . . .
Monthly_Retail_and_Food_Services	. . . . + +	. . . . .	. . . . .	. . . . -
+ is > 2*std error, - is < -2*std error, . is between				

Portmanteau Test for Cross Correlations of Residuals			
Up To Lag	DF	Chi-Square	Pr > ChiSq
3	36	123.94	<.0001

Univariate Model ANOVA Diagnostics				
Variable	R-Square	Standard Deviation	F Value	Pr > F
Quarterly_GDP_of_NC	0.9095	2612.97404	96.26	<.0001
Labor_Force	0.7025	13817.86876	22.62	<.0001
Employment	0.9201	20358.26750	110.29	<.0001
Unemployment	0.9715	9103.82608	326.70	<.0001
CPI_U	0.2642	0.50582	3.44	0.0002
Monthly_Retail_and_Food_Services	0.6566	4405.37879	18.32	<.0001

Univariate Model White Noise Diagnostics					
Variable	Durbin Watson	Normality		ARCH	
		Chi-Square	Pr > ChiSq	F Value	Pr > F
Quarterly_GDP_of_NC	2.07841	19.95	<.0001	1.37	0.2448
Labor_Force	2.01358	9999.99	<.0001	0.00	0.9902
Employment	2.01802	9999.99	<.0001	0.06	0.8119
Unemployment	1.96393	534.77	<.0001	4.93	0.0282
CPI_U	2.06619	4.14	0.1259	0.01	0.9316
Monthly_Retail_and_Food_Services	1.96075	1.50	0.4725	0.12	0.7282

Univariate Model AR Diagnostics								
Variable	AR1		AR2		AR3		AR4	
	F Value	Pr > F	F Value	Pr > F	F Value	Pr > F	F Value	Pr > F
Quarterly_GDP_of_NC	0.20	0.6556	0.22	0.8002	12.79	<.0001	9.92	<.0001
Labor_Force	0.01	0.9257	0.01	0.9877	0.05	0.9840	0.12	0.9749
Employment	0.01	0.9082	0.08	0.9224	0.09	0.9672	0.36	0.8383
Unemployment	0.02	0.8967	0.38	0.6815	1.16	0.3289	2.52	0.0446
CPI_U	0.15	0.7001	0.35	0.7062	1.25	0.2945	1.48	0.2133
Monthly_Retail_and_Food_Services	0.05	0.8286	0.51	0.6022	6.82	0.0003	5.18	0.0007

Simple Impulse Response							
Lag	Variable Response\Impulse	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
1	Quarterly_GDP_of_NC	-0.92691	0.18169	0.19975	-0.30827	251.31803	0.14680
	STD	0.06563	0.10524	0.10171	0.09642	484.71550	0.05811
	Labor_Force	-0.52708	1.13855	-0.04277	-0.63498	-1704.31389	-0.14037
	STD	0.34704	0.55651	0.53786	0.50989	2563.26128	0.30730
	Employment	-0.92173	2.40917	1.48123	-3.83151	-2456.54387	-0.22858
	STD	0.51131	0.81993	0.79245	0.75123	3776.52732	0.45275
	Unemployment	-0.38145	1.65626	1.10798	-2.68650	-342.13135	-0.12690
	STD	0.22865	0.36666	0.35437	0.33594	1688.79046	0.20246
	CPI_U	0.00000	0.00001	-0.00000	-0.00000	-0.33261	0.00002
	STD	0.00001	0.00002	0.00002	0.00002	0.09383	0.00001
	Monthly_Retail_and_Food_Services	-0.57295	-0.04495	0.06777	0.01873	503.50058	-0.59109
	STD	0.11064	0.17743	0.17148	0.16256	817.21263	0.09797
	Quarterly_GDP_of_NC	-0.07989	-0.19823	-0.18269	0.26700	-769.63379	-0.12952
	STD	0.15390	0.22501	0.21877	0.21026	1081.84580	0.12263
	Labor_Force	0.07002	0.00726	-1.04699	0.90156	960.95320	0.16583
2	STD	0.31763	0.72215	0.69826	0.67339	3204.35072	0.35174
	Employment	-0.43294	-1.42203	-2.64270	3.71933	-2158.77177	0.21830
	STD	1.01571	1.94511	1.87595	1.78247	8658.53101	1.02584
	Unemployment	-0.45815	-1.60882	-1.31794	2.66309	-2948.79383	0.03028
	STD	0.77984	1.30279	1.25898	1.19600	5961.25003	0.70804
	CPI_U	-0.00000	-0.00000	-0.00001	0.00001	-0.14437	-0.00001
	STD	0.00001	0.00002	0.00002	0.00002	0.09781	0.00001
	Monthly_Retail_and_Food_Services	0.89128	0.28519	-0.08358	-0.16211	-875.19426	0.31942
	STD	0.14354	0.17999	0.17787	0.17763	952.02669	0.09146
	Quarterly_GDP_of_NC	0.89808	0.24049	-0.17406	-0.10088	1254.74078	0.07261
	STD	0.21756	0.25193	0.24737	0.24256	1382.45051	0.14164
	Labor_Force	0.60437	0.15794	-0.77888	0.67048	3655.28522	0.14144
	STD	0.58889	0.93293	0.92010	0.87195	3730.71620	0.33861
	Employment	1.89322	2.69380	-1.21502	-1.72147	13226.39698	0.63172
	STD	1.92988	2.65438	2.61833	2.52233	12434.54892	1.21562
3	Unemployment	1.17669	2.39240	-0.01534	-2.91940	9248.35514	0.49142
	STD	1.34729	1.68712	1.66264	1.62852	8587.67600	0.87069
	CPI_U	0.00000	0.00001	0.00000	-0.00001	0.15796	0.00000
	STD	0.00001	0.00001	0.00001	0.00001	0.07590	0.00001
	Monthly_Retail_and_Food_Services	-0.66504	-0.13248	-0.12235	0.37170	520.83576	-0.15080
	STD	0.16448	0.14402	0.13688	0.14220	944.05884	0.11291

Simple Impulse Response by Variable							
Variable Response\Impulse	Lag	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
Quarterly_GDP_of_NC	1	-0.92691	0.18169	0.19975	-0.30827	251.31803	0.14680
	STD	0.06563	0.10524	0.10171	0.09642	484.71550	0.05811
	2	-0.07989	-0.19823	-0.18269	0.26700	-769.63379	-0.12952
	STD	0.15390	0.22501	0.21877	0.21026	1081.84580	0.12263
	3	0.89808	0.24049	-0.17406	-0.10088	1254.74078	0.07261
	STD	0.21756	0.25193	0.24737	0.24256	1382.45051	0.14164
Labor_Force	1	-0.52708	1.13855	-0.04277	-0.63498	-1704.31389	-0.14037
	STD	0.34704	0.55651	0.53786	0.50989	2563.26128	0.30730
	2	0.07002	0.00726	-1.04699	0.90156	960.95320	0.16583
	STD	0.31763	0.72215	0.69826	0.67339	3204.35072	0.35174
	3	0.60437	0.15794	-0.77888	0.67048	3655.28522	0.14144
	STD	0.58889	0.93293	0.92010	0.87195	3730.71620	0.33861
Employment	1	-0.92173	2.40917	1.48123	-3.83151	-2456.54387	-0.22858
	STD	0.51131	0.81993	0.79245	0.75123	3776.52732	0.45275
	2	-0.43294	-1.42203	-2.64270	3.71933	-2158.77177	0.21830

	<b>STD</b>	1.01571	1.94511	1.87595	1.78247	8658.53101	1.02584
	<b>3</b>	1.89322	2.69380	-1.21502	-1.72147	13226.39698	0.63172
	<b>STD</b>	1.92988	2.65438	2.61833	2.52233	12434.54892	1.21562
<b>Unemployment</b>	<b>1</b>	-0.38145	1.65626	1.10798	-2.68650	-342.13135	-0.12690
	<b>STD</b>	0.22865	0.36666	0.35437	0.33594	1688.79046	0.20246
	<b>2</b>	-0.45815	-1.60882	-1.31794	2.66309	-2948.79383	0.03028
	<b>STD</b>	0.77984	1.30279	1.25898	1.19600	5961.25003	0.70804
	<b>3</b>	1.17669	2.39240	-0.01534	-2.91940	9248.35514	0.49142
	<b>STD</b>	1.34729	1.68712	1.66264	1.62852	8587.67600	0.87069
<b>CPI_U</b>	<b>1</b>	0.00000	0.00001	-0.00000	-0.00000	-0.33261	0.00002
	<b>STD</b>	0.00001	0.00002	0.00002	0.00002	0.09383	0.00001
	<b>2</b>	-0.00000	-0.00000	-0.00001	0.00001	-0.14437	-0.00001
	<b>STD</b>	0.00001	0.00002	0.00002	0.00002	0.09781	0.00001
	<b>3</b>	0.00000	0.00001	0.00000	-0.00001	0.15796	0.00000
	<b>STD</b>	0.00001	0.00001	0.00001	0.00001	0.07590	0.00001
<b>Monthly_Retail_and_Food_Services</b>	<b>1</b>	-0.57295	-0.04495	0.06777	0.01873	503.50058	-0.59109
	<b>STD</b>	0.11064	0.17743	0.17148	0.16256	817.21263	0.09797
	<b>2</b>	0.89128	0.28519	-0.08358	-0.16211	-875.19426	0.31942
	<b>STD</b>	0.14354	0.17999	0.17787	0.17763	952.02669	0.09146
	<b>3</b>	-0.66504	-0.13248	-0.12235	0.37170	520.83576	-0.15080
	<b>STD</b>	0.16448	0.14402	0.13688	0.14220	944.05884	0.11291

Decomposition of Prediction Error Covariances							
Lead	Variable	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
1	Quarterly_GDP_of_NC	6827633.3266	0.00000	0.00000	0.00000	0.00000	0.00000
	Labor_Force	4383523.7949	186549973.20	0.00000	0.00000	0.00000	0.00000
	Employment	19478526.348	348018624.40	46961905.054	0.00000	0.00000	0.00000
	Unemployment	7815317.9214	28146558.700	41945413.629	4972359.0375	0.00000	0.00000
	CPI_U	0.00090	0.00001	0.00122	0.00321	0.25050	0.00000
	Monthly_Retail_and_Food_Services	107394.93531	322214.11243	299372.63645	35828.52998	1363978.2557	17278573.820
2	Quarterly_GDP_of_NC	11143444.318	21668653.084	513681.80837	532082.20279	88346.01835	372352.49711
	Labor_Force	5123362.0968	314484413.09	18226829.108	1671121.5687	1034184.2183	340458.38935
	Employment	21409605.271	1955223513.7	255863752.96	69910381.763	2239387.4634	902784.27735
	Unemployment	7824820.7364	867285480.97	136520212.56	40340879.160	102044.78414	278254.14072
	CPI_U	0.00130	0.02031	0.00187	0.00335	0.27188	0.00519
	Monthly_Retail_and_Food_Services	1233526.7229	492157.00425	1094226.4588	51477.38223	1556112.8348	23315539.592
3	Quarterly_GDP_of_NC	11525457.511	44418840.595	844272.35908	972351.82308	376148.28823	662224.71336
	Labor_Force	9065672.6363	526450458.40	20358955.495	5374769.8479	1489304.1767	815594.40991
	Employment	50363637.073	4342375412.8	291077237.50	140046418.43	2920855.5618	1726216.9948
	Unemployment	15995979.258	1917274791.1	205446722.36	77548956.872	2177109.9432	294096.30695
	CPI_U	0.00130	0.03337	0.00333	0.00436	0.27886	0.00680
	Monthly_Retail_and_Food_Services	5336434.3559	3249411.3080	4216163.6849	190095.68499	1560336.0786	25078453.546
4	Quarterly_GDP_of_NC	14547584.877	44631426.693	4567838.7445	1068352.3355	884232.38130	753323.50489
	Labor_Force	9101942.0303	603003064.09	21799170.407	6965057.1578	5467978.3685	1161269.2187
	Employment	50400793.055	4370487721.2	702460151.95	162213469.00	57055091.524	8621553.5294
	Unemployment	16337848.095	2211247708.6	589772086.90	128347443.51	29245551.848	4466796.4422
	CPI_U	0.00146	0.03774	0.00994	0.00583	0.28598	0.00716
	Monthly_Retail_and_Food_Services	7533372.5343	8122039.4443	6883560.0435	875435.53187	1567486.2924	25471383.835
5	Quarterly_GDP_of_NC	15389258.980	51048239.156	20663630.955	3547867.4524	957413.80658	757830.78710
	Labor_Force	14895084.231	603031986.94	91142018.162	13666675.693	7188989.5273	1606994.7148
	Employment	77660968.113	7517206582.6	2806659030.8	590666515.82	97956266.769	18693187.286
	Unemployment	20708367.055	5676962924.7	1970996438.8	457029923.94	55616547.411	10188605.887
	CPI_U	0.00146	0.08829	0.02966	0.01043	0.28648	0.00731
	Monthly_Retail_and_Food_Services	7544148.7484	19213165.348	13887608.803	2121165.4081	1667332.9428	25760925.660
6	Quarterly_GDP_of_NC	15436825.477	203051520.34	42275393.797	12445591.175	957546.17175	805959.72575
	Labor_Force	16399114.791	1695228042.6	140150701.85	57286478.436	7822118.2405	1890999.9006
	Employment	101522925.63	32612046067	5978482656.4	1902660546.0	120140188.98	21410650.667
	Unemployment	33088720.836	20602252221	4483595966.4	1312489249.5	91647322.784	15979965.997



<b>CPI_U</b>	0.00235	0.28304	0.06594	0.02156	0.28654	0.00747
<b>Monthly_Retail_and_Food_Services</b>	8507807.3992	93240994.948	33344770.072	7328210.0247	2105162.5724	26268723.679

Decomposition of Prediction Error Covariances by Variable							
Variable	Lead	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
<b>Quarterly_GDP_of_NC</b>	<b>1</b>	6827633.3266	0.00000	0.00000	0.00000	0.00000	0.00000
	<b>2</b>	11143444.318	21668653.084	513681.80837	532082.20279	88346.01835	372352.49711
	<b>3</b>	11525457.511	44418840.595	844272.35908	972351.82308	376148.28823	662224.71336
	<b>4</b>	14547584.877	44631426.693	4567838.7445	1068352.3355	884232.38130	753323.50489
	<b>5</b>	15389258.980	51048239.156	20663630.955	3547867.4524	957413.80658	757830.78710
	<b>6</b>	15436825.477	203051520.34	42275393.797	12445591.175	957546.17175	805959.72575
<b>Labor_Force</b>	<b>1</b>	4383523.7949	186549973.20	0.00000	0.00000	0.00000	0.00000
	<b>2</b>	5123362.0968	314484413.09	18226829.108	1671121.5687	1034184.2183	340458.38935
	<b>3</b>	9065672.6363	526450458.40	20358955.495	5374769.8479	1489304.1767	815594.40991
	<b>4</b>	9101942.0303	603003064.09	21799170.407	6965057.1578	5467978.3685	1161269.2187
	<b>5</b>	14895084.231	603031986.94	91142018.162	13666675.693	7188989.5273	1606994.7148
	<b>6</b>	16399114.791	1695228042.6	140150701.85	57286478.436	7822118.2405	1890999.9006
<b>Employment</b>	<b>1</b>	19478526.348	348018624.40	46961905.054	0.00000	0.00000	0.00000
	<b>2</b>	21409605.271	1955223513.7	255863752.96	69910381.763	2239387.4634	902784.27735
	<b>3</b>	50363637.073	4342375412.8	291077237.50	140046418.43	2920855.5618	1726216.9948
	<b>4</b>	50400793.055	4370487721.2	702460151.95	162213469.00	57055091.524	8621553.5294
	<b>5</b>	77660968.113	7517206582.6	2806659030.8	590666515.82	97956266.769	18693187.286
	<b>6</b>	101522925.63	32612046067	5978482656.4	1902660546.0	120140188.98	21410650.667
<b>Unemployment</b>	<b>1</b>	7815317.9214	28146558.700	41945413.629	4972359.0375	0.00000	0.00000
	<b>2</b>	7824820.7364	867285480.97	136520212.56	40340879.160	102044.78414	278254.14072
	<b>3</b>	15995979.258	1917274791.1	205446722.36	77548956.872	2177109.9432	294096.30695
	<b>4</b>	16337848.095	2211247708.6	589772086.90	128347443.51	29245551.848	4466796.4422
	<b>5</b>	20708367.055	5676962924.7	1970996438.8	457029923.94	55616547.411	10188605.887
	<b>6</b>	33088720.836	20602252221	4483595966.4	1312489249.5	91647322.784	15979965.997
<b>CPI_U</b>	<b>1</b>	0.00090	0.00001	0.00122	0.00321	0.25050	0.00000
	<b>2</b>	0.00130	0.02031	0.00187	0.00335	0.27188	0.00519
	<b>3</b>	0.00130	0.03337	0.00333	0.00436	0.27886	0.00680
	<b>4</b>	0.00146	0.03774	0.00994	0.00583	0.28598	0.00716
	<b>5</b>	0.00146	0.08829	0.02966	0.01043	0.28648	0.00731
	<b>6</b>	0.00235	0.28304	0.06594	0.02156	0.28654	0.00747
<b>Monthly_Retail_and_Food_Services</b>	<b>1</b>	107394.93531	322214.11243	299372.63645	35828.52998	1363978.2557	17278573.820
	<b>2</b>	1233526.7229	492157.00425	1094226.4588	51477.38223	1556112.8348	23315539.592
	<b>3</b>	5336434.3559	3249411.3080	4216163.6849	190095.68499	1560336.0786	25078453.546
	<b>4</b>	7533372.5343	8122039.4443	6883560.0435	875435.53187	1567486.2924	25471383.835
	<b>5</b>	7544148.7484	19213165.348	13887608.803	2121165.4081	1667332.9428	25760925.660
	<b>6</b>	8507807.3992	93240994.948	33344770.072	7328210.0247	2105162.5724	26268723.679

Proportions of Prediction Error Covariances							
Lead	Variable	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
<b>1</b>	<b>Quarterly_GDP_of_NC</b>	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	<b>Labor_Force</b>	0.02296	0.97704	0.00000	0.00000	0.00000	0.00000
	<b>Employment</b>	0.04700	0.83969	0.11331	0.00000	0.00000	0.00000
	<b>Unemployment</b>	0.09430	0.33961	0.50610	0.05999	0.00000	0.00000
	<b>CPI_U</b>	0.00353	0.00006	0.00476	0.01257	0.97909	0.00000
	<b>Monthly_Retail_and_Food_Services</b>	0.00553	0.01660	0.01543	0.00185	0.07028	0.89031
<b>2</b>	<b>Quarterly_GDP_of_NC</b>	0.32471	0.63140	0.01497	0.01550	0.00257	0.01085
	<b>Labor_Force</b>	0.01503	0.92257	0.05347	0.00490	0.00303	0.00100
	<b>Employment</b>	0.00929	0.84805	0.11098	0.03032	0.00097	0.00039
	<b>Unemployment</b>	0.00744	0.82414	0.12973	0.03833	0.00010	0.00026
	<b>CPI_U</b>	0.00428	0.06683	0.00617	0.01103	0.89459	0.01709
	<b>Monthly_Retail_and_Food_Services</b>	0.04446	0.01774	0.03944	0.00186	0.05609	0.84041
<b>3</b>	<b>Quarterly_GDP_of_NC</b>	0.19601	0.75543	0.01436	0.01654	0.00640	0.01126
	<b>Labor_Force</b>	0.01609	0.93416	0.03613	0.00954	0.00264	0.00145

	Employment	0.01043	0.89932	0.06028	0.02900	0.00060	0.00036
	Unemployment	0.00721	0.86413	0.09260	0.03495	0.00098	0.00013
	CPI_U	0.00398	0.10174	0.01014	0.01329	0.85013	0.02073
	Monthly_Retail_and_Food_Services	0.13465	0.08199	0.10639	0.00480	0.03937	0.63280
4	Quarterly_GDP_of_NC	0.21892	0.67163	0.06874	0.01608	0.01331	0.01134
	Labor_Force	0.01406	0.93128	0.03367	0.01076	0.00844	0.00179
	Employment	0.00942	0.81672	0.13127	0.03031	0.01066	0.00161
	Unemployment	0.00548	0.74217	0.19795	0.04308	0.00982	0.00150
	CPI_U	0.00419	0.10842	0.02856	0.01674	0.82152	0.02057
	Monthly_Retail_and_Food_Services	0.14931	0.16098	0.13643	0.01735	0.03107	0.50485
5	Quarterly_GDP_of_NC	0.16661	0.55268	0.22372	0.03841	0.01037	0.00820
	Labor_Force	0.02036	0.82434	0.12459	0.01868	0.00983	0.00220
	Employment	0.00699	0.67669	0.25265	0.05317	0.00882	0.00168
	Unemployment	0.00253	0.69303	0.24061	0.05579	0.00679	0.00124
	CPI_U	0.00346	0.20841	0.07001	0.02463	0.67624	0.01726
	Monthly_Retail_and_Food_Services	0.10748	0.27371	0.19785	0.03022	0.02375	0.36699
6	Quarterly_GDP_of_NC	0.05614	0.73844	0.15374	0.04526	0.00348	0.00293
	Labor_Force	0.00855	0.88349	0.07304	0.02986	0.00408	0.00099
	Employment	0.00249	0.80057	0.14676	0.04671	0.00295	0.00053
	Unemployment	0.00125	0.77630	0.16894	0.04946	0.00345	0.00060
	CPI_U	0.00353	0.42441	0.09888	0.03232	0.42967	0.01119
	Monthly_Retail_and_Food_Services	0.04981	0.54592	0.19523	0.04291	0.01233	0.15380

Proportions of Prediction Error Covariances by Variable							
Variable	Lead	Quarterly_GDP_of_NC	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
Quarterly_GDP_of_NC	1	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	2	0.32471	0.63140	0.01497	0.01550	0.00257	0.01085
	3	0.19601	0.75543	0.01436	0.01654	0.00640	0.01126
	4	0.21892	0.67163	0.06874	0.01608	0.01331	0.01134
	5	0.16661	0.55268	0.22372	0.03841	0.01037	0.00820
	6	0.05614	0.73844	0.15374	0.04526	0.00348	0.00293
Labor_Force	1	0.02296	0.97704	0.00000	0.00000	0.00000	0.00000
	2	0.01503	0.92257	0.05347	0.00490	0.00303	0.00100
	3	0.01609	0.93416	0.03613	0.00954	0.00264	0.00145
	4	0.01406	0.93128	0.03367	0.01076	0.00844	0.00179
	5	0.02036	0.82434	0.12459	0.01868	0.00983	0.00220
	6	0.00855	0.88349	0.07304	0.02986	0.00408	0.00099
Employment	1	0.04700	0.83969	0.11331	0.00000	0.00000	0.00000
	2	0.00929	0.84805	0.11098	0.03032	0.00097	0.00039
	3	0.01043	0.89932	0.06028	0.02900	0.00060	0.00036
	4	0.00942	0.81672	0.13127	0.03031	0.01066	0.00161
	5	0.00699	0.67669	0.25265	0.05317	0.00882	0.00168
	6	0.00249	0.80057	0.14676	0.04671	0.00295	0.00053
Unemployment	1	0.09430	0.33961	0.50610	0.05999	0.00000	0.00000
	2	0.00744	0.82414	0.12973	0.03833	0.00010	0.00026
	3	0.00721	0.86413	0.09260	0.03495	0.00098	0.00013
	4	0.00548	0.74217	0.19795	0.04308	0.00982	0.00150
	5	0.00253	0.69303	0.24061	0.05579	0.00679	0.00124
	6	0.00125	0.77630	0.16894	0.04946	0.00345	0.00060
CPI_U	1	0.00353	0.00006	0.00476	0.01257	0.97909	0.00000
	2	0.00428	0.06683	0.00617	0.01103	0.89459	0.01709
	3	0.00398	0.10174	0.01014	0.01329	0.85013	0.02073
	4	0.00419	0.10842	0.02856	0.01674	0.82152	0.02057
	5	0.00346	0.20841	0.07001	0.02463	0.67624	0.01726
	6	0.00353	0.42441	0.09888	0.03232	0.42967	0.01119
Monthly_Retail_and_Food_Services	1	0.00553	0.01660	0.01543	0.00185	0.07028	0.89031
	2	0.04446	0.01774	0.03944	0.00186	0.05609	0.84041
	3	0.13465	0.08199	0.10639	0.00480	0.03937	0.63280

	<b>4</b>	0.14931	0.16098	0.13643	0.01735	0.03107	0.50485
	<b>5</b>	0.10748	0.27371	0.19785	0.03022	0.02375	0.36699
	<b>6</b>	0.04981	0.54592	0.19523	0.04291	0.01233	0.15380

Forecasts						
Variable	Obs	Time	Forecast	Standard Error	95% Confidence Limits	
Quarterly_GDP_of_NC	132	JUL2020	-42878.61326	2612.97404	-47999.94827	-37757.27826
	133	AUG2020	110774.41863	5503.59262	99987.57531	121561.26195
	134	SEP2020	-73490.69793	5513.28800	-84296.54383	-62684.85202
	135	OCT2020	180475.97092	6185.91898	168351.79252	192600.14933
	136	NOV2020	-327058.1255	7342.69706	-341449.5473	-312666.7037
Labor_Force	132	JUL2020	-3972.03987	13817.86876	-31054.56498	23110.48524
	133	AUG2020	392066.35300	28934.16167	335356.43820	448776.26780
	134	SEP2020	146059.40082	31296.57201	84719.24683	207399.55481
	135	OCT2020	326455.93649	32208.09879	263329.22286	389582.65013
	136	NOV2020	-533218.2149	32636.53648	-597184.6510	-469251.7788
Employment	132	JUL2020	-555037.1053	20358.26750	-594938.5764	-515135.6342
	133	AUG2020	1398007.5547	63288.42039	1273964.5301	1522050.5793
	134	SEP2020	-698833.6834	64163.05823	-824590.9667	-573076.4001
	135	OCT2020	2383288.9112	69928.04508	2246232.4613	2520345.3610
	136	NOV2020	-3993731.349	86029.39815	-4162345.871	-3825116.827
Unemployment	132	JUL2020	-523178.1787	9103.82608	-541021.3500	-505335.0075
	133	AUG2020	999655.13968	35910.50294	929271.84725	1070038.4321
	134	SEP2020	-885635.3158	36435.72007	-957048.0149	-814222.6167
	135	OCT2020	2125811.9375	44028.09877	2039518.4496	2212105.4254
	136	NOV2020	-3434869.822	64982.28988	-3562232.770	-3307506.875
CPI_U	132	JUL2020	-1.46840	0.50582	-2.45978	-0.47701
	133	AUG2020	4.07767	0.64154	2.82026	5.33507
	134	SEP2020	-2.90094	0.69805	-4.26908	-1.53279
	135	OCT2020	8.60074	0.79880	7.03512	10.16637
	136	NOV2020	-12.41312	0.87778	-14.13353	-10.69271
Monthly_Retail_and_Food_Services	132	JUL2020	53288.89923	4405.37879	44654.51546	61923.28300
	133	AUG2020	-57272.21905	5083.36971	-67235.44060	-47308.99749
	134	SEP2020	134602.08403	6711.10254	121448.56475	147755.60331
	135	OCT2020	-124264.5557	7243.14254	-138460.8542	-110068.2572
	136	NOV2020	285947.26618	9151.82559	268010.01763	303884.51473

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**The SAS System****The VARMAX Procedure**

Number of Observations	130
Number of Pairwise Missing	0
Observation(s) eliminated by differencing	1

Simple Summary Statistics							
Variable	Type	N	Mean	Standard Deviation	Min	Max	Difference
Labor_Force	Dependent	130	168.08462	23920.37968	-155005.0000	139892.00000	1
Employment	Dependent	130	1698.80000	67983.93750	-554817.0000	496790.00000	1
Unemployment	Dependent	130	1976.88462	50917.87049	-380172.0000	356898.00000	1
CPI_U	Dependent	130	0.01035	0.55740	-1.32400	1.60600	1
Monthly_Retail_and_Food_Services	Dependent	130	24.21538	7223.30628	-31304.00000	25590.00000	1
Quarterly_GDP_of_NC	Independent	130	0.00000	8222.52836	-53855.20000	53855.20000	1

## The SAS System

## The VARMAX Procedure

Type of Model	VARX(2,1)
Estimation Method	Least Squares Estimation

Constant Estimates	
Variable	Constant
Labor_Force	1171.87514
Employment	1493.85495
Unemployment	327.27985
CPI_U	0.00042
Monthly_Retail_and_Food_Services	38.08356

Coefficient Estimates of Independent Variables		
Lag	Variable	Quarterly_GDP_of_NC
0	Labor_Force	0.53976
	Employment	1.04427
	Unemployment	0.56505
	CPI_U	-0.00002
	Monthly_Retail_and_Food_Services	-0.11155
1	Labor_Force	-0.11530
	Employment	-0.17204
	Unemployment	-0.02858
	CPI_U	-0.00002
	Monthly_Retail_and_Food_Services	-0.67166

AR Coefficient Estimates						
Lag	Variable	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
1	Labor_Force	1.04431	-0.14853	-0.47542	-1761.17552	-0.30828
	Employment	2.22887	1.27770	-3.52644	-2524.72249	-0.60051
	Unemployment	1.56099	0.99908	-2.52550	-332.03720	-0.38103
	CPI_U	0.00002	0.00000	-0.00001	-0.32694	0.00002
	Monthly_Retail_and_Food_Services	-0.02488	0.08994	-0.01530	527.35972	-0.57002
2	Labor_Force	0.10258	-0.11914	-0.44831	2276.33237	0.15239
	Employment	-0.94911	-0.27751	0.25666	4003.13986	0.22283
	Unemployment	-1.50362	0.19760	0.56415	1920.41002	0.01346
	CPI_U	-0.00001	0.00000	0.00000	-0.24167	0.00001
	Monthly_Retail_and_Food_Services	0.18924	-0.04712	-0.04063	-159.14633	0.07267

Schematic Representation of Parameter Estimates					
Variable/Lag	C	XL0	XL1	AR1	AR2
Labor_Force	.	.	.	.....	.....
Employment	.	+	.	+.-..	.....
Unemployment	.	+	.	++-..	-....
CPI_U	.	.	.	...-.	...-.
Monthly_Retail_and_Food_Services	.	.	-	....-	.....
+ is > 2*std error, - is < -2*std error, . is between, * is N/A					

Model Parameter Estimates						
Equation	Parameter	Estimate	Standard Error	t Value	Pr >  t	Variable
Labor_Force	CONST1	1171.87514	1224.80773	0.96	0.3407	1
	XL0_1_1	0.53976	0.35195	1.53	0.1279	Quarterly_GDP_of_NC(t)
	XL1_1_1	-0.11530	0.37336	-0.31	0.7580	Quarterly_GDP_of_NC(t-1)
	AR1_1_1	1.04431	0.55464	1.88	0.0622	Labor_Force(t-1)
	AR1_1_2	-0.14853	0.53731	-0.28	0.7827	Employment(t-1)
	AR1_1_3	-0.47542	0.51495	-0.92	0.3578	Unemployment(t-1)
	AR1_1_4	-1761.17552	2536.30153	-0.69	0.4888	CPI_U(t-1)

	AR1_1_5	-0.30828	0.30601	-1.01	0.3158	Monthly_Retail_and_Food_Services(t-1)
	AR2_1_1	0.10258	0.54556	0.19	0.8512	Labor_Force(t-2) (t-1)
	AR2_1_2	-0.11914	0.52369	-0.23	0.8204	Employment(t-2) (t-1)
	AR2_1_3	-0.44831	0.70797	-0.63	0.5278	Unemployment(t-2) (t-1)
	AR2_1_4	2276.33237	2481.48452	0.92	0.3609	CPI_U(t-2) (t-1)
	AR2_1_5	0.15239	0.31157	0.49	0.6257	Monthly_Retail_and_Food_Services(t-2)
Employment	CONST2	1493.85495	1790.81232	0.83	0.4059	1
	XL0_2_1	1.04427	0.51459	2.03	0.0447	Quarterly_GDP_of_NC(t)
	XL1_2_1	-0.17204	0.54590	-0.32	0.7532	Quarterly_GDP_of_NC(t-1)
	AR1_2_1	2.22887	0.81095	2.75	0.0070	Labor_Force(t-1)
	AR1_2_2	1.27770	0.78560	1.63	0.1066	Employment(t-1)
	AR1_2_3	-3.52644	0.75292	-4.68	0.0001	Unemployment(t-1)
	AR1_2_4	-2524.72249	3708.36984	-0.68	0.4974	CPI_U(t-1)
	AR1_2_5	-0.60051	0.44742	-1.34	0.1822	Monthly_Retail_and_Food_Services(t-1)
	AR2_2_1	-0.94911	0.79767	-1.19	0.2366	Labor_Force(t-2) (t-1)
	AR2_2_2	-0.27751	0.76570	-0.36	0.7177	Employment(t-2) (t-1)
	AR2_2_3	0.25666	1.03513	0.25	0.8046	Unemployment(t-2) (t-1)
	AR2_2_4	4003.13986	3628.22096	1.10	0.2722	CPI_U(t-2) (t-1)
	AR2_2_5	0.22283	0.45555	0.49	0.6257	Monthly_Retail_and_Food_Services(t-2)
Unemployment	CONST3	327.27985	793.36821	0.41	0.6807	1
	XL0_3_1	0.56505	0.22798	2.48	0.0146	Quarterly_GDP_of_NC(t)
	XL1_3_1	-0.02858	0.24185	-0.12	0.9061	Quarterly_GDP_of_NC(t-1)
	AR1_3_1	1.56099	0.35927	4.34	0.0001	Labor_Force(t-1)
	AR1_3_2	0.99908	0.34804	2.87	0.0049	Employment(t-1)
	AR1_3_3	-2.52550	0.33356	-7.57	0.0001	Unemployment(t-1)
	AR1_3_4	-332.03720	1642.88725	-0.20	0.8402	CPI_U(t-1)
	AR1_3_5	-0.38103	0.19822	-1.92	0.0570	Monthly_Retail_and_Food_Services(t-1)
	AR2_3_1	-1.50362	0.35339	-4.25	0.0001	Labor_Force(t-2) (t-1)
	AR2_3_2	0.19760	0.33922	0.58	0.5614	Employment(t-2) (t-1)
	AR2_3_3	0.56415	0.45858	1.23	0.2211	Unemployment(t-2) (t-1)
	AR2_3_4	1920.41002	1607.37958	1.19	0.2346	CPI_U(t-2) (t-1)
	AR2_3_5	0.01346	0.20182	0.07	0.9470	Monthly_Retail_and_Food_Services(t-2)
CPI_U	CONST4	0.00042	0.04519	0.01	0.9925	1
	XL0_4_1	-0.00002	0.00001	-1.27	0.2052	Quarterly_GDP_of_NC(t)
	XL1_4_1	-0.00002	0.00001	-1.16	0.2473	Quarterly_GDP_of_NC(t-1)
	AR1_4_1	0.00002	0.00002	0.82	0.4165	Labor_Force(t-1)
	AR1_4_2	0.00000	0.00002	0.05	0.9636	Employment(t-1)
	AR1_4_3	-0.00001	0.00002	-0.37	0.7157	Unemployment(t-1)
	AR1_4_4	-0.32694	0.09359	-3.49	0.0007	CPI_U(t-1)
	AR1_4_5	0.00002	0.00001	1.60	0.1125	Monthly_Retail_and_Food_Services(t-1)
	AR2_4_1	-0.00001	0.00002	-0.47	0.6362	Labor_Force(t-2) (t-1)
	AR2_4_2	0.00000	0.00002	0.00	0.9985	Employment(t-2) (t-1)
	AR2_4_3	0.00000	0.00003	0.15	0.8802	Unemployment(t-2) (t-1)
	AR2_4_4	-0.24167	0.09156	-2.64	0.0095	CPI_U(t-2) (t-1)
	AR2_4_5	0.00001	0.00001	0.75	0.4576	Monthly_Retail_and_Food_Services(t-2)
Monthly_Retail_and_Food_Services	CONST5	38.08356	392.96426	0.10	0.9230	1
	XL0_5_1	-0.11155	0.11292	-0.99	0.3253	Quarterly_GDP_of_NC(t)
	XL1_5_1	-0.67166	0.11979	-5.61	0.0001	Quarterly_GDP_of_NC(t-1)
	AR1_5_1	-0.02488	0.17795	-0.14	0.8890	Labor_Force(t-1)
	AR1_5_2	0.08994	0.17239	0.52	0.6029	Employment(t-1)
	AR1_5_3	-0.01530	0.16522	-0.09	0.9264	Unemployment(t-1)
	AR1_5_4	527.35972	813.74067	0.65	0.5182	CPI_U(t-1)
	AR1_5_5	-0.57002	0.09818	-5.81	0.0001	Monthly_Retail_and_Food_Services(t-1)
	AR2_5_1	0.18924	0.17504	1.08	0.2819	Labor_Force(t-2) (t-1)
	AR2_5_2	-0.04712	0.16802	-0.28	0.7796	Employment(t-2) (t-1)
	AR2_5_3	-0.04063	0.22714	-0.18	0.8584	Unemployment(t-2) (t-1)
	AR2_5_4	-159.14633	796.15332	-0.20	0.8419	CPI_U(t-2) (t-1)

	AR2_5_5	0.07267	0.09996	0.73	0.4687	Monthly_Retail_and_Food_Services(t-2)
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Covariances of Innovations					
Variable	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
Labor_Force	187520015.69	257191423.41	74334641.675	-32.77744	7701580.1673
Employment	257191423.41	400877743.28	147972465.00	-263.29146	6713118.6830
Unemployment	74334641.675	147972465.00	78679461.735	-336.29612	-1053464.361
CPI_U	-32.77744	-263.29146	-336.29612	0.25531	611.22302
Monthly_Retail_and_Food_Services	7701580.1673	6713118.6830	-1053464.361	611.22302	19302693.179

Log-likelihood	-4605.15
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Information Criteria	
AICC	9646.039
HQC	9462.997
AIC	9370.294
SBC	9598.456
FPEC	3.319E29

Cross Covariances of Residuals						
Lag	Variable	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
0	Labor_Force	168475014.10	231070419.47	66785029.630	-29.44848	6919388.4316
	Employment	231070419.47	360163597.48	132944011.52	-236.55092	6031317.5668
	Unemployment	66785029.630	132944011.52	70688578.902	-302.14105	-946471.8868
	CPI_U	-29.44848	-236.55092	-302.14105	0.22938	549.14568
	Monthly_Retail_and_Food_Services	6919388.4316	6031317.5668	-946471.8868	549.14568	17342263.403
1	Labor_Force	-684365.0063	-1808611.547	-1487936.825	123.13149	1371046.7054
	Employment	-4223682.401	-1567247.311	1241117.5166	176.72502	346637.24749
	Unemployment	-4880143.812	-1885923.716	1412002.8937	67.19457	-1520024.604
	CPI_U	-42.30664	-72.02909	3.07222	-0.00743	11.18026
	Monthly_Retail_and_Food_Services	1947802.1221	3433555.4777	2606520.8665	31.94918	467821.43298
2	Labor_Force	3629465.5650	1164818.3937	-1910461.328	-7.47877	-419284.7779
	Employment	2161395.5744	-8284415.495	-11686433.07	37.66341	269934.37047
	Unemployment	174748.72110	-4341681.308	-5928950.234	23.45204	-30940.83353
	CPI_U	-160.04555	-273.10226	-48.77093	-0.01482	78.28972
	Monthly_Retail_and_Food_Services	2867374.7465	4734657.8211	1972005.2937	-41.72232	-1682845.404
3	Labor_Force	-5077339.211	-8984459.493	-4814613.465	2.06616	459194.25765
	Employment	-85508.01817	-8687819.867	-10529931.24	192.20625	4051859.3372
	Unemployment	1737216.4074	-5388335.427	-9569490.919	222.95318	3470758.2923
	CPI_U	152.14084	186.41170	197.34059	-0.03382	-184.75639
	Monthly_Retail_and_Food_Services	-1573672.468	3387544.7972	4870870.0890	-49.55452	-6448553.786

Cross Correlations of Residuals						
Lag	Variable	Labor_Force	Employment	Unemployment	CPI_U	Monthly_Retail_and_Food_Services
0	Labor_Force	1.00000	0.93805	0.61198	-0.00474	0.12801
	Employment	0.93805	1.00000	0.83319	-0.02603	0.07631
	Unemployment	0.61198	0.83319	1.00000	-0.07503	-0.02703
	CPI_U	-0.00474	-0.02603	-0.07503	1.00000	0.27533
	Monthly_Retail_and_Food_Services	0.12801	0.07631	-0.02703	0.27533	1.00000
1	Labor_Force	-0.00406	-0.00734	-0.01363	0.01981	0.02536
	Employment	-0.01715	-0.00435	0.00778	0.01944	0.00439
	Unemployment	-0.04472	-0.01182	0.01997	0.01669	-0.04341
	CPI_U	-0.00681	-0.00792	0.00076	-0.03237	0.00561
	Monthly_Retail_and_Food_Services	0.03603	0.04345	0.07444	0.01602	0.02698
2	Labor_Force	0.02154	0.00473	-0.01751	-0.00120	-0.00776
	Employment	0.00877	-0.02300	-0.07324	0.00414	0.00342
	Unemployment	0.00160	-0.02721	-0.08387	0.00582	-0.00088
	CPI_U	-0.02575	-0.03005	-0.01211	-0.06460	0.03925
	Monthly_Retail_and_Food_Services	0.05305	0.05991	0.05632	-0.02092	-0.09704

3	Labor_Force	-0.03014	-0.03647	-0.04412	0.00033	0.00850
	Employment	-0.00035	-0.02412	-0.06599	0.02115	0.05127
	Unemployment	0.01592	-0.03377	-0.13538	0.05537	0.09913
	CPI_U	0.02447	0.02051	0.04901	-0.14746	-0.09263
	Monthly_Retail_and_Food_Services	-0.02911	0.04286	0.13912	-0.02485	-0.37184

Schematic Representation of Cross Correlations of Residuals				
Variable/Lag	0	1	2	3
Labor_Force	+++..	.....	.....	.....
Employment	+++..	.....	.....	.....
Unemployment	+++..	.....	.....	.....
CPI_U	...++	.....	.....	.....
Monthly_Retail_and_Food_Services	...++	.....	.....	.....-
+ is > 2*std error, - is < -2*std error, . is between				

Portmanteau Test for Cross Correlations of Residuals			
Up To Lag	DF	Chi-Square	Pr > ChiSq
3	25	71.41	<.0001

Univariate Model ANOVA Diagnostics				
Variable	R-Square	Standard Deviation	F Value	Pr > F
Labor_Force	0.7078	13693.79479	23.21	<.0001
Employment	0.9227	20021.93156	114.35	<.0001
Unemployment	0.9729	8870.14440	344.65	<.0001
CPI_U	0.2658	0.50528	3.47	0.0002
Monthly_Retail_and_Food_Services	0.6584	4393.48303	18.47	<.0001

Univariate Model White Noise Diagnostics					
Variable	Durbin Watson	Normality		ARCH	
		Chi-Square	Pr > ChiSq	F Value	Pr > F
Labor_Force	2.00529	9999.99	<.0001	0.00	0.9647
Employment	2.00635	9999.99	<.0001	0.02	0.8909
Unemployment	1.94726	462.02	<.0001	2.30	0.1316
CPI_U	2.06159	3.24	0.1978	0.01	0.9270
Monthly_Retail_and_Food_Services	1.94569	1.32	0.5160	0.35	0.5572

Univariate Model AR Diagnostics								
Variable	AR1		AR2		AR3		AR4	
	F Value	Pr > F	F Value	Pr > F	F Value	Pr > F	F Value	Pr > F
Labor_Force	0.00	0.9638	0.03	0.9691	0.06	0.9802	0.15	0.9638
Employment	0.00	0.9612	0.03	0.9663	0.04	0.9891	0.38	0.8232
Unemployment	0.05	0.8225	0.47	0.6259	1.00	0.3969	2.68	0.0349
CPI_U	0.13	0.7175	0.32	0.7238	1.19	0.3149	1.41	0.2335
Monthly_Retail_and_Food_Services	0.09	0.7633	0.64	0.5295	6.90	0.0003	5.20	0.0007