

Scatter plot of Log(Case Increase) vs Date for New York

## Response CaseIncreaseLog

### Singularity Details

Term	Details
GathRecomAny	= 0
Quarantine	= 0
OtherBusinessClose	= RestaurantRestrict
NEBusinessClose	= StayAtHome=StayAtHomeMandate

### Effect Summary

Source	LogWorth	PValue
GathRestrict10	4.054	0.00009
PublicMask	1.373	0.04236
SchoolClose	1.275	0.05304
EmergDec	0.879	0.13208
GathRestrictAny	0.141	0.72290
StayAtHomeMandate	.	.
StayAtHome	.	.
RestaurantRestrict	.	.
Quarantine	.	.
OtherBusinessClose	.	.
NEBusinessClose	.	.
GathRecomAny	.	.

### Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	3	79.54242	26.5141	62.6321
Pure Error	91	38.52314	0.4233	Prob > F
Total Error	94	118.06555		<.0001*
			Max RSq	0.8859

### Summary of Fit

RSquare	0.650303
RSquare Adj	0.624262
Root Mean Square Error	1.120721
Mean of Response	7.429882
Observations (or Sum Wgts)	102

### Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	219.55696	31.3653	24.9720
Error	94	118.06555	1.2560	Prob > F
C. Total	101	337.62251		<.0001*

## Response CaseIncreaseLog

### Parameter Estimates

Term		Estimate	Std Error	t Ratio	Prob> t	VIF
Intercept		4.3480472	0.376084	11.56	<.0001*	.
EmergDec		0.7157663	0.471158	1.52	0.1321	1.8713781
GathRecomAny	Zeroed	0	0	.	.	0
GathRestrict10		1.4444306	0.352435	4.10	<.0001*	1.6491749
GathRestrictAny		-0.241065	0.677807	-0.36	0.7229	6.7130934
NEBusinessClose	Biased	0.9344882	0.597226	1.56	0.1210	6.4367979
OtherBusinessClose	Biased	0.8955439	0.970573	0.92	0.3585	15.235294
PublicMask		-0.555612	0.269974	-2.06	0.0424*	1.4797565
Quarantine	Zeroed	0	0	.	.	0
RestaurantRestrict	Zeroed	0	0	.	.	0
SchoolClose		1.9016536	0.970573	1.96	0.0530	15.882353
StayAtHome	Zeroed	0	0	.	.	0
StayAtHomeMandate	Zeroed	0	0	.	.	0

### Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
EmergDec	1	1	2.898709	2.3079	0.1321
GathRecomAny	1	0	0.000000	.	LostDFs
GathRestrict10	1	1	21.097490	16.7971	<.0001*
GathRestrictAny	1	1	0.158874	0.1265	0.7229
NEBusinessClose	1	0	0.000000	.	LostDFs
OtherBusinessClose	1	0	0.000000	.	LostDFs
PublicMask	1	1	5.319783	4.2354	0.0424*
Quarantine	1	0	0.000000	.	LostDFs
RestaurantRestrict	1	0	0.000000	.	LostDFs
SchoolClose	1	1	4.821715	3.8389	0.0530
StayAtHome	1	0	0.000000	.	LostDFs
StayAtHomeMandate	1	0	0.000000	.	LostDFs

## Response CaseIncreaseLog

### Correlation of Estimates

Corr

	Intercept	EmergDec	GathRecomAny	GathRestrict10	GathRestrictAny	NEBusinessClose	OtherBusinessClose	PublicMask	Quarantine	RestaurantRestrict	SchoolClose	StayAtHome	StayAtHomeMandate
Intercept	1.0000	-0.6152	0.0000	-0.4980	-0.1272	0.0016	0.0000	0.0000	0.1025	0.0000	0.0000	0.0000	0.0000
EmergDec	-0.6152	1.0000	0.0000	0.0970	-0.3538	0.0608	0.0000	0.0000	-0.2388	0.0000	0.0000	-0.0000	0.0000
GathRecomAny	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GathRestrict10	-0.4980	0.0970	0.0000	1.0000	0.2089	0.0527	-0.0000	-0.4064	0.0000	0.0000	0.0000	0.0000	0.0000
GathRestrictAny	-0.1272	-0.3538	0.0000	0.2089	1.0000	-0.0431	-0.0000	0.4773	0.1091	0.0000	0.0000	0.0000	0.0000
NEBusinessClose	0.0016	0.0608	0.0000	0.0527	-0.0431	1.0000	0.0000	-0.2545	0.0000	0.0000	-0.5417	0.0000	0.0000
OtherBusinessClose	0.0000	0.0000	0.0000	-0.0000	-0.4773	0.0000	1.0000	0.0000	0.0000	0.0000	-0.6667	0.0000	0.0000
PublicMask	0.1025	-0.2388	0.0000	-0.4064	0.1091	-0.2545	0.0000	1.0000	0.0000	0.0000	-0.0000	0.0000	0.0000
Quarantine	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
RestaurantRestrict	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
SchoolClose	0.0000	-0.0000	0.0000	0.0000	0.0000	-0.5417	-0.6667	-0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
StayAtHome	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
StayAtHomeMandate	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000

First Regression

## Response CaseIncreaseLog

### Effect Summary

Source	LogWorth					PValue
RestaurantRestrict	4.262					0.00005
GathRestrict10	3.254					0.00056
NEBusinessClose	1.923					0.01193

### Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	65.39054	65.3905	98.6498
Pure Error	97	64.29698	0.6629	Prob > F
Total Error	98	129.68752		<.0001*
			Max RSq	0.8096

### Summary of Fit

RSquare	0.61588
RSquare Adj	0.604121
Root Mean Square Error	1.150366
Mean of Response	7.429882
Observations (or Sum Wgts)	102

### Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	207.93499	69.3117	52.3762
Error	98	129.68752	1.3233	Prob > F
C. Total	101	337.62251		<.0001*

### Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	4.7029581	0.268655	17.51	<.0001*
GathRestrict10	1.1265722	0.31568	3.57	0.0006*
NEBusinessClose	1.2579211	0.490993	2.56	0.0119*
RestaurantRestrict	2.2831031	0.541048	4.22	<.0001*

### Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
GathRestrict10	1	1	16.853765	12.7358	0.0006*
NEBusinessClose	1	1	8.686176	6.5638	0.0119*
RestaurantRestrict	1	1	23.564162	17.8066	<.0001*

## Response CaseIncreaseLog

### Correlation of Estimates

Corr

	Intercept	GathRestrict10	NEBusinessClose	RestaurantRestrict
Intercept	1.0000	-0.5875	0.0389	-0.4965
GathRestrict10	-0.5875	1.0000	-0.0662	0.2917
NEBusinessClose	0.0389	-0.0662	1.0000	-0.8496
RestaurantRestrict	-0.4965	0.2917	-0.8496	1.0000

Final Regression model

## Model: ARI(8, 1)

### Model Summary

DF	92	Stable	Yes
Sum of Squared Errors	9.46144381	Invertible	Yes
Variance Estimate	0.10284178		
Standard Deviation	0.32068954		
Akaike's 'A' Information Criterion	69.341384		
Schwarz's Bayesian Criterion	92.8774687		
RSquare	0.95737602		
RSquare Adj	0.95366959		
MAPE	4.06244874		
MAE	0.23550786		
-2LogLikelihood	51.341384		

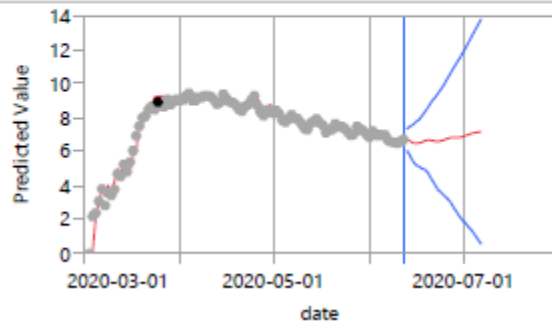
### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Mu
						Estimate	
AR1	1	-0.1146207	0.1053086	-1.09	0.2793	0.02099592	0.12538496
AR2	2	0.1598067	0.1003733	1.59	0.1148		
AR3	3	0.0746352	0.0990018	0.75	0.4528		
AR4	4	-0.2828197	0.0929797	-3.04	0.0031*		
AR5	5	0.2729292	0.1005057	2.72	0.0079*		
AR6	6	0.0878561	0.1064565	0.83	0.4113		
AR7	7	0.3590548	0.1057746	3.39	0.0010*		
AR8	8	0.2757067	0.1116545	2.47	0.0154*		
Intercept	0	0.1253850	0.1458561	0.86	0.3922		

## Time Series CaseIncreaseLog

### Model: ARI(8, 1)

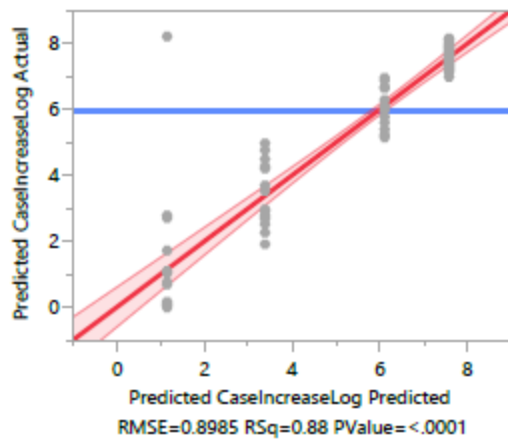
#### Forecast



Time series

## Response Predicted CaselIncreaseLog

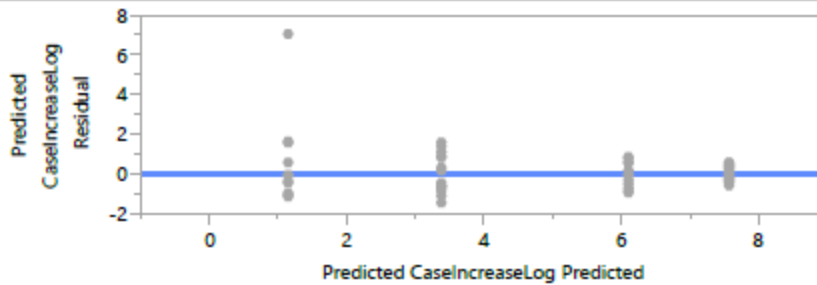
### Actual by Predicted Plot



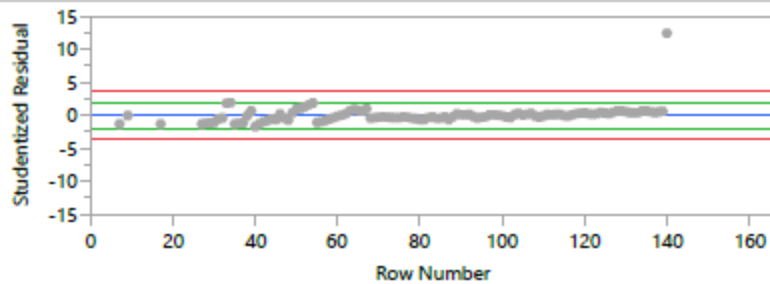
### Effect Summary

Source	LogWorth		PValue
NEBusinessClose	11.912		0.00000
EmergDec	9.723		0.00000
PublicMask	6.446		0.00000

### Residual by Predicted Plot



### Studentized Residuals



Externally studentized residuals with 95% simultaneous limits (Bonferroni) in red, individual limits in green.

## Response Predicted CaseIncreaseLog

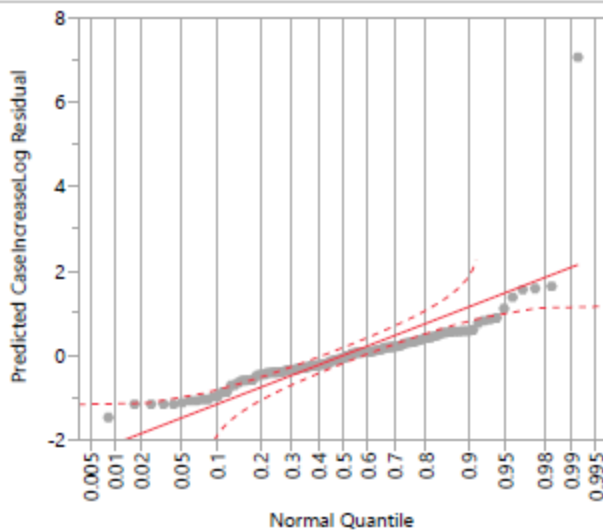
### Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	1.1511027	0.217908	5.28	<.0001*
EmergDec	2.2293882	0.318275	7.00	<.0001*
NEBusinessClose	2.722031	0.340455	8.00	<.0001*
PublicMask	1.464569	0.270751	5.41	<.0001*

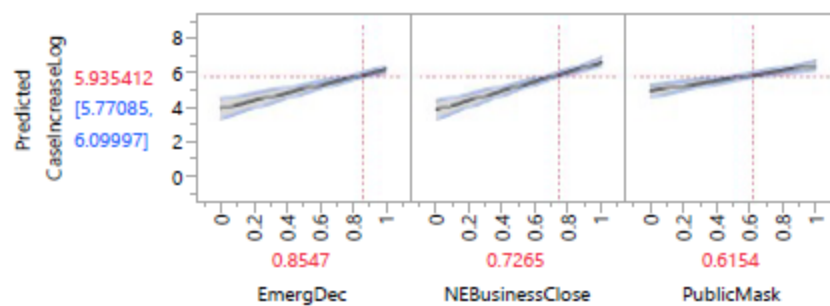
### Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
EmergDec	1	1	39.606056	49.0643	<.0001*
NEBusinessClose	1	1	51.601545	63.9244	<.0001*
PublicMask	1	1	23.619820	29.2604	<.0001*

### Residual Normal Quantile Plot



### Prediction Profiler



Final Arima model. We found that EmergDec, NEBusinessClose, and PublicMask policies impacted New York the most and used this model for prediction.