
Tsukiji Tuna
Quantities

Tokyo Fish Market ("Tsukiji" to Toyosu)

Background:

- Established in 1935
  - Relocated following the Great Kanto Earthquake in 1923
    - Relocated again in 2018 for the Olympics

- The largest wholesale fish and seafood market in the world

- Hub for Culinary wonders, Marine Industry & Tourism

Tsukiji Tuna Dataset

January 2003 - December 2016

Quantity

Cumulative Monthly Quantity in Metric Tonnes (1000 kgs)

1

Species

Bluefin Tuna, Bigeye Tuna, Southern Bluefin Tuna

2

State

Fresh, Frozen

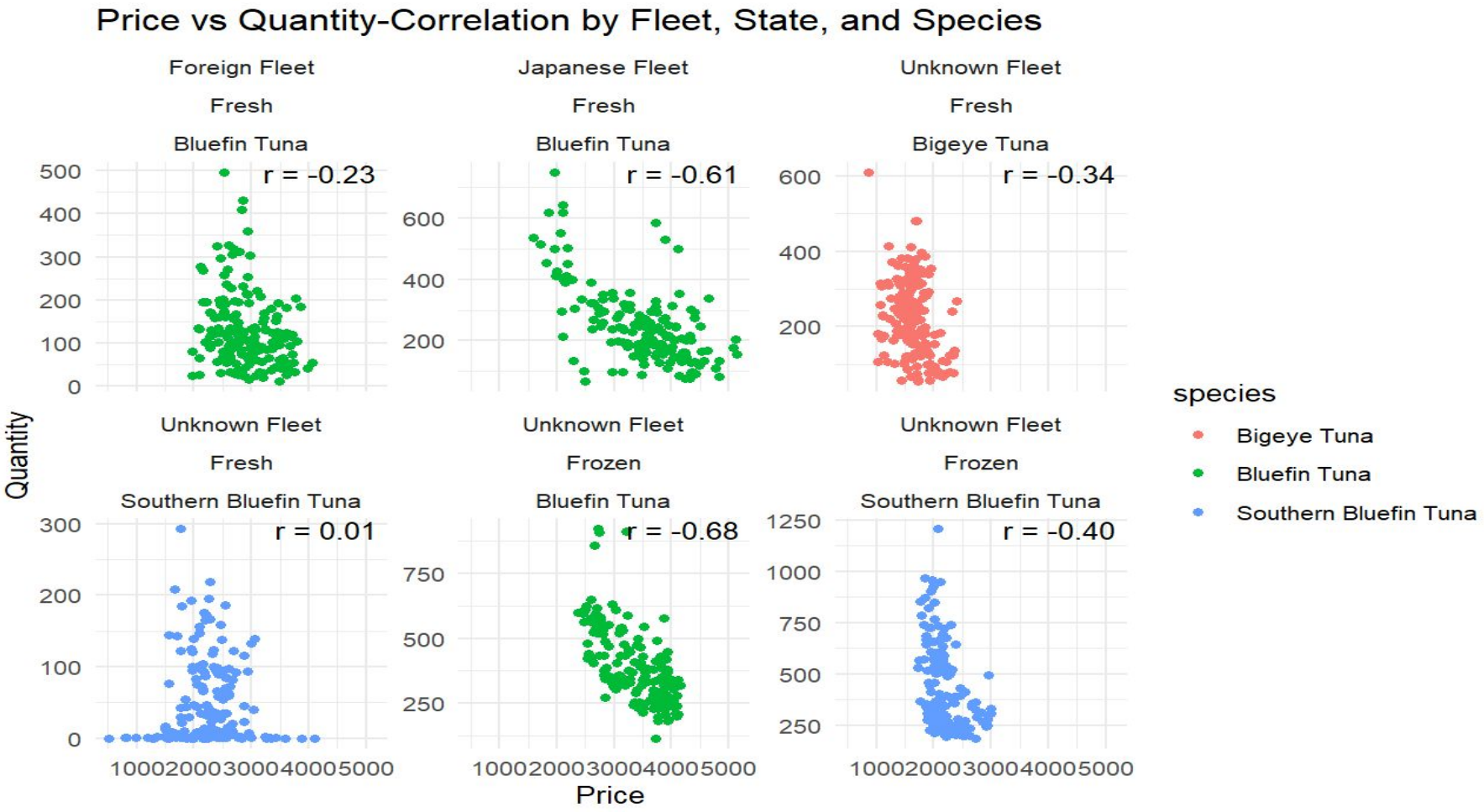
3

Fleet

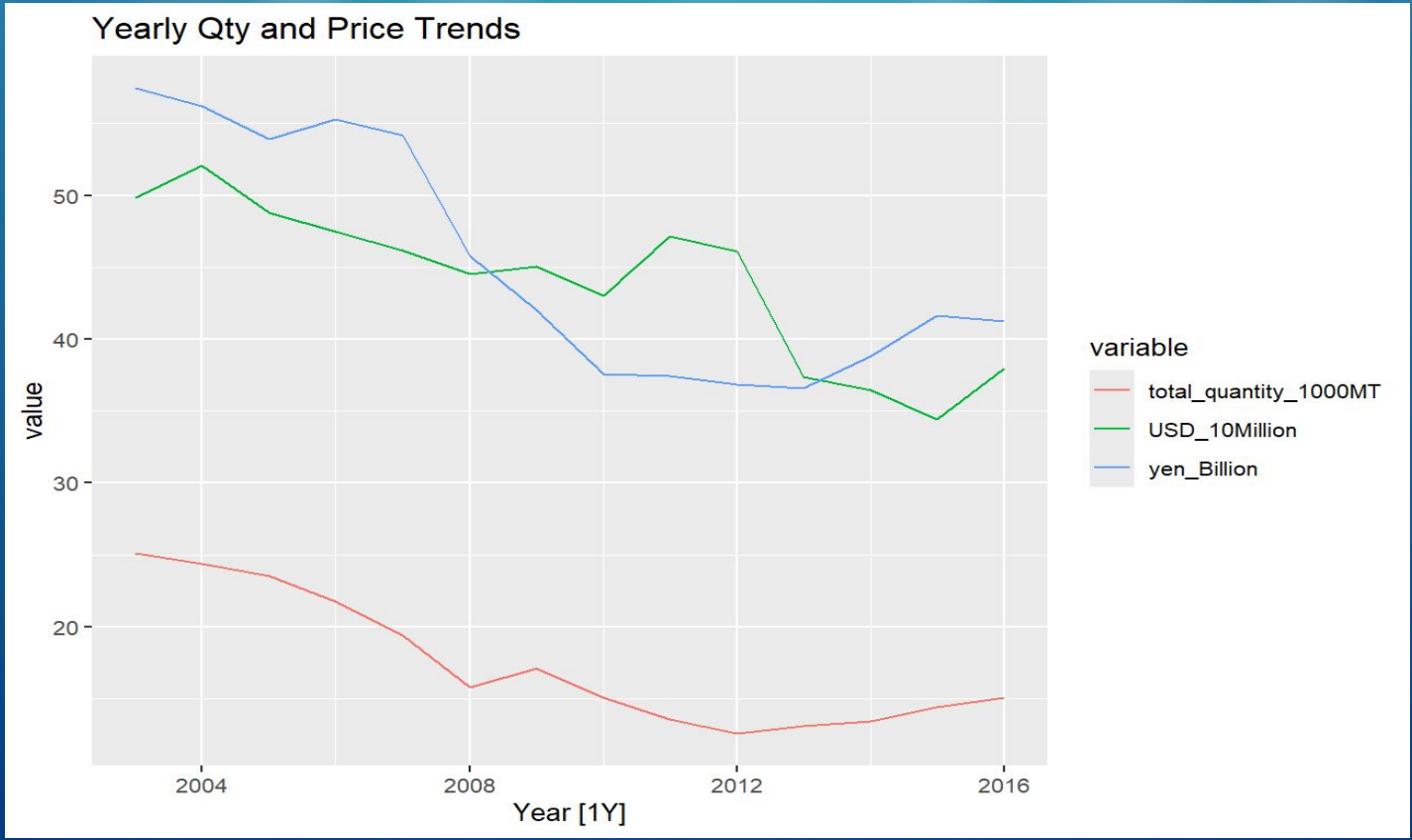
Japanese Fleet, Foreign Fleet, Unknown Fleet

4

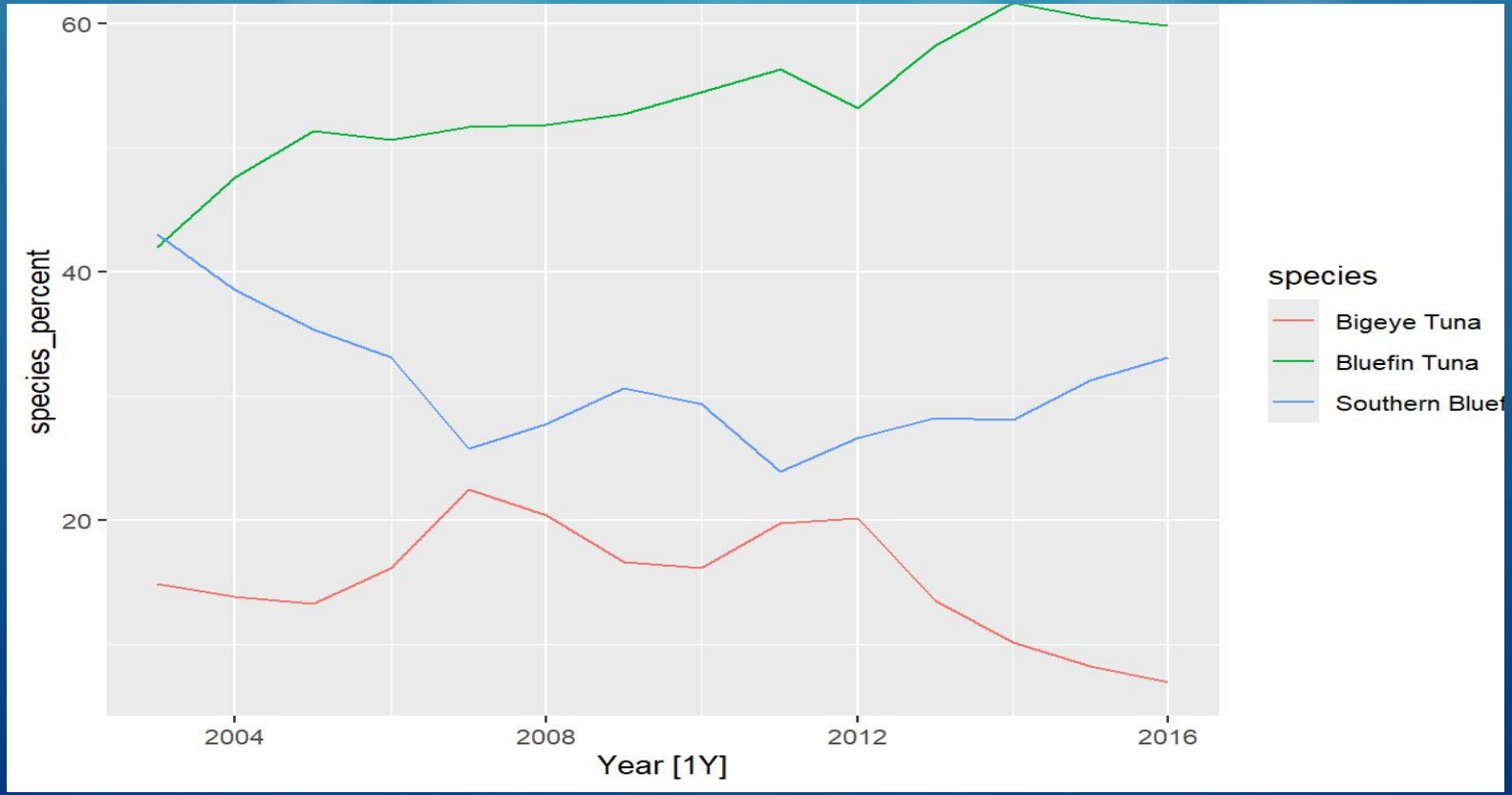
Tsujiki Tuna - Price v Quantity



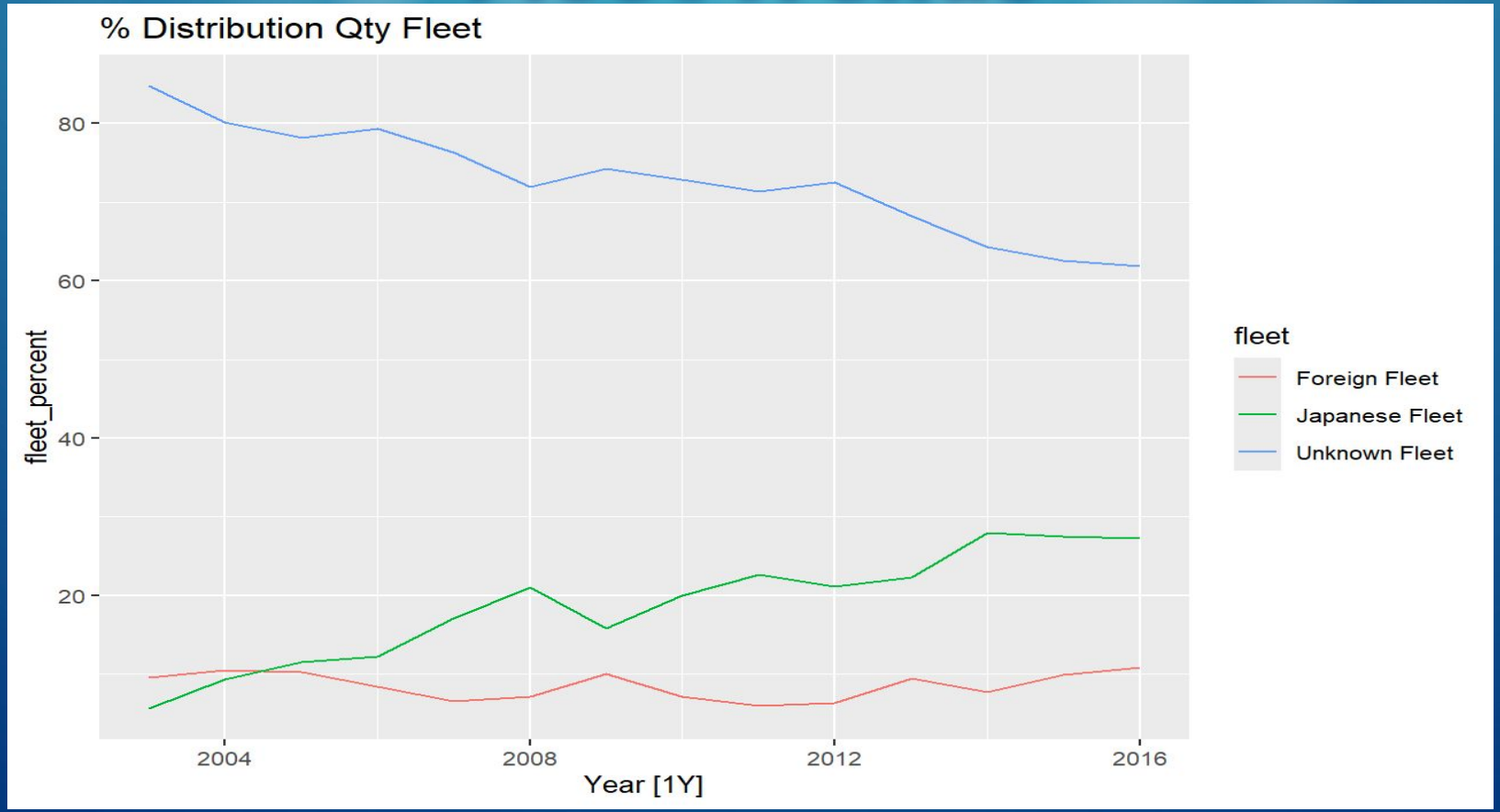
Tsujiki Tuna -Price Trends



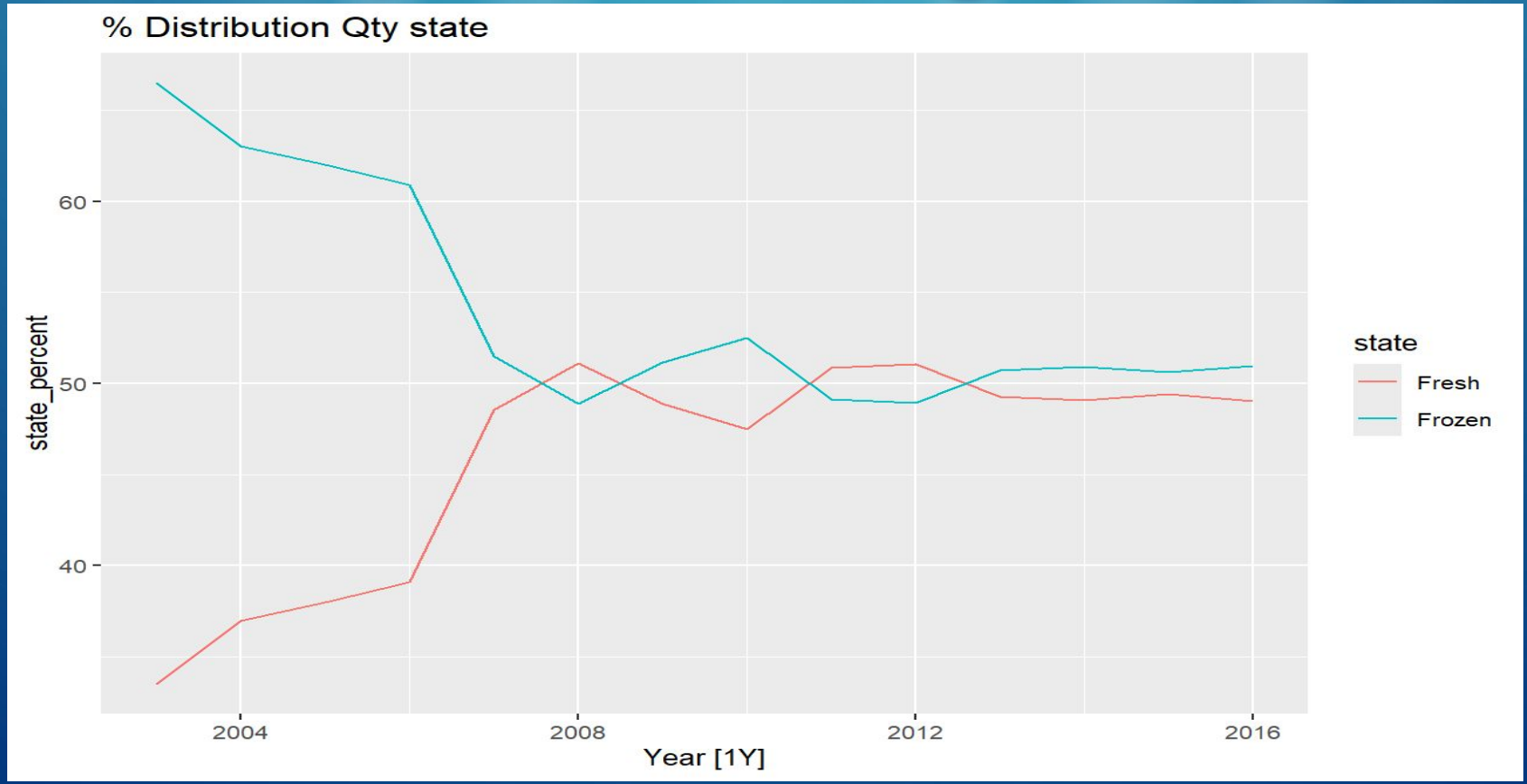
Species Trends



Fleet Trends

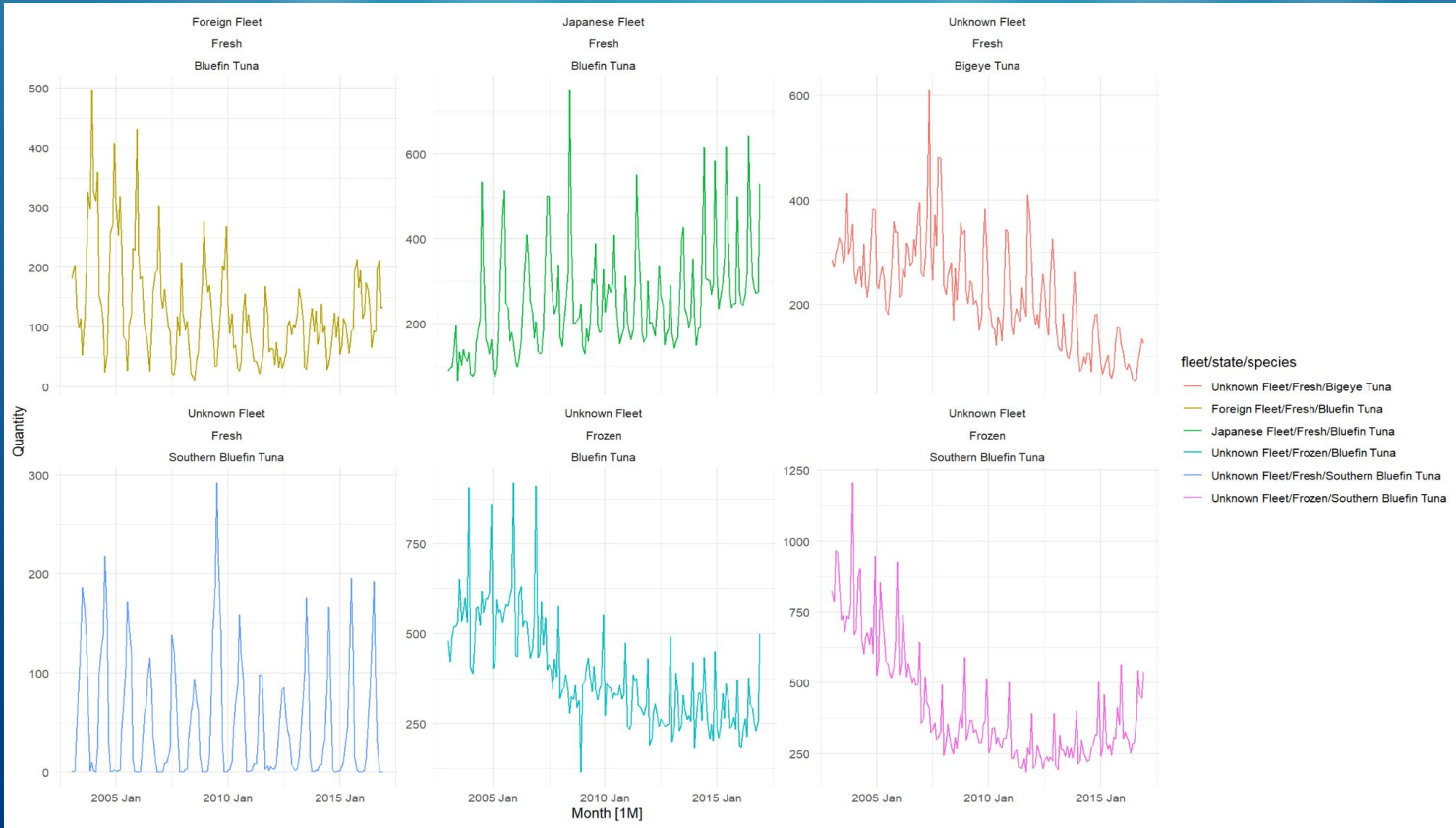


State (of fish storage) Trends

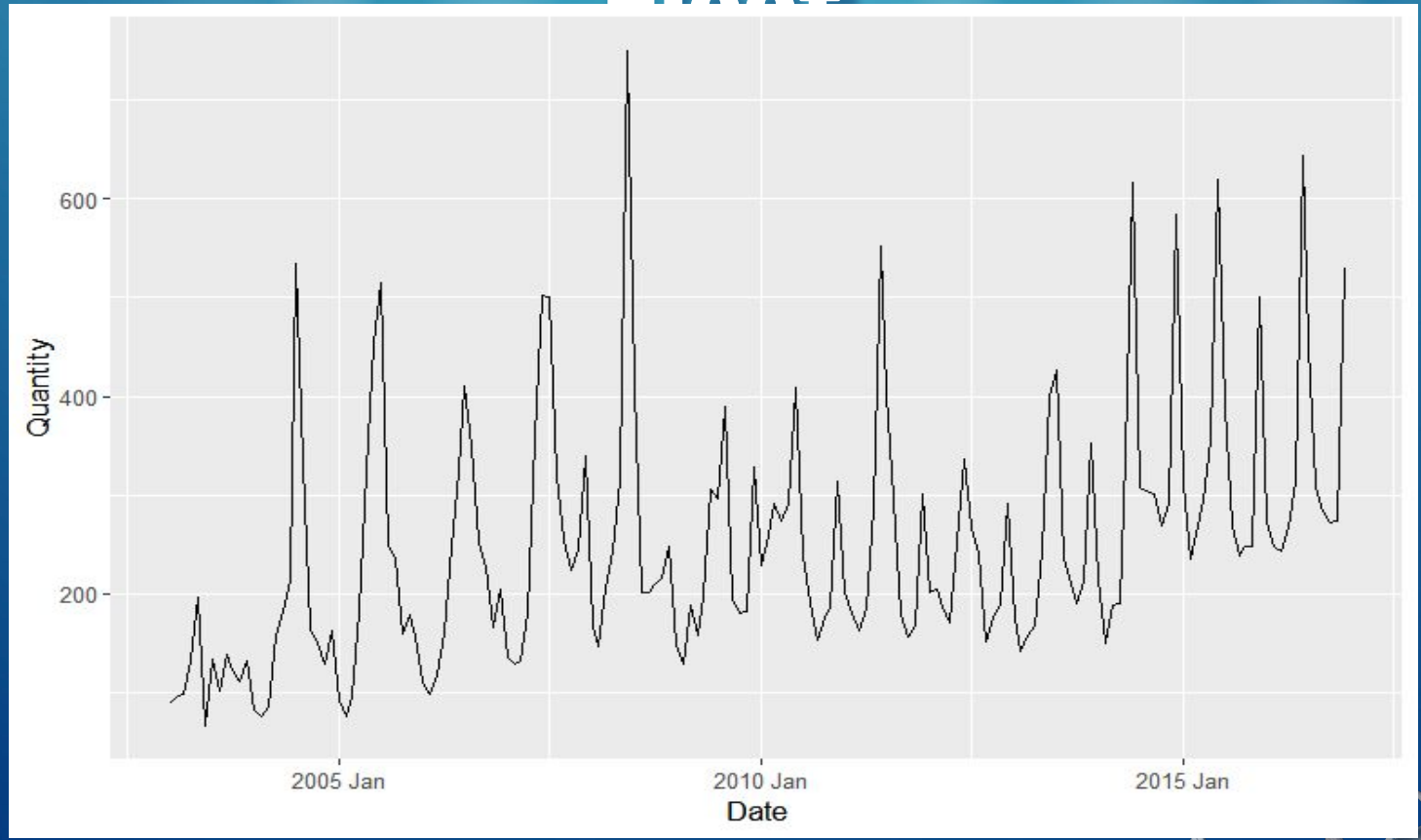


Tsukiji Tuna Dataset

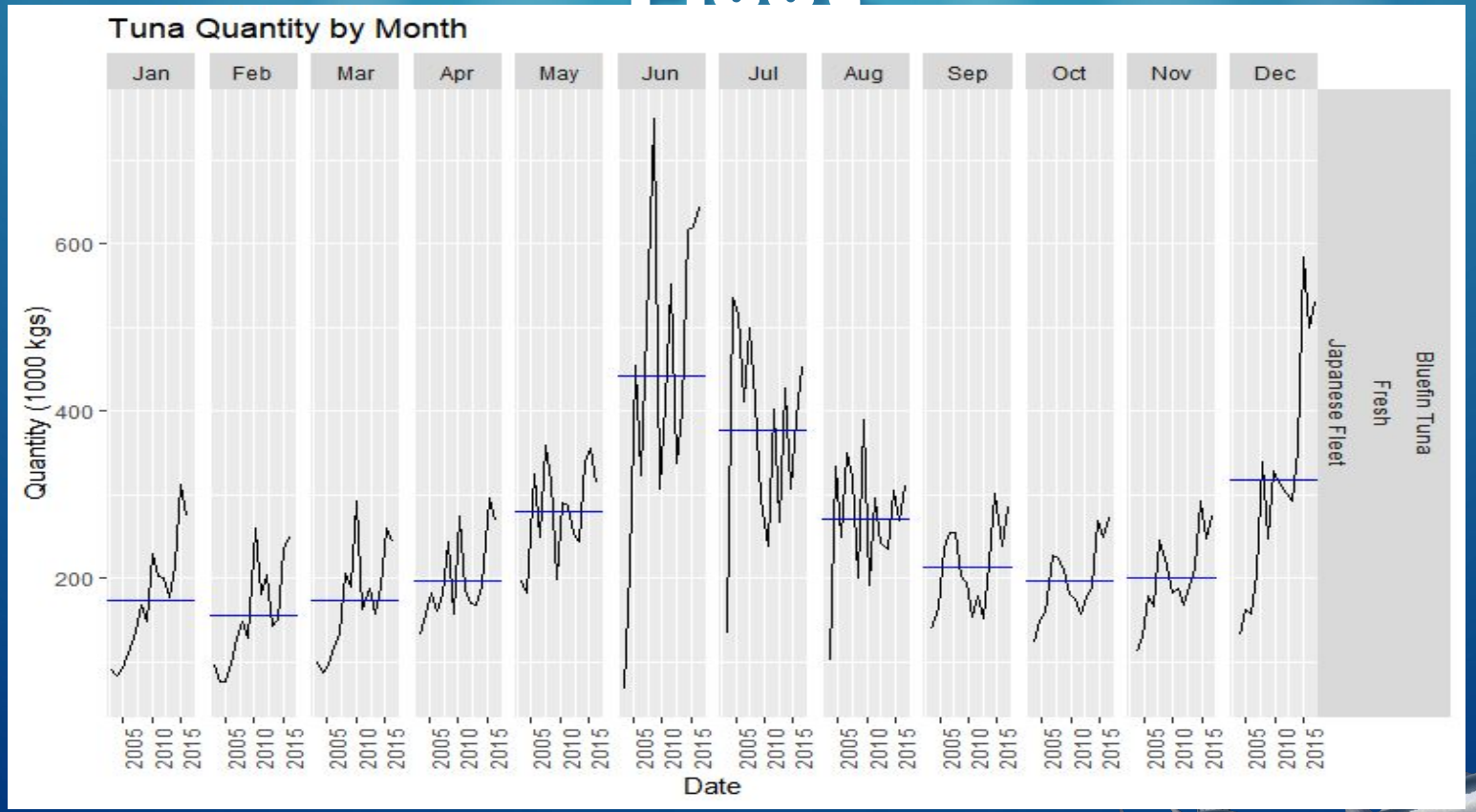
January 2003 - December 2016



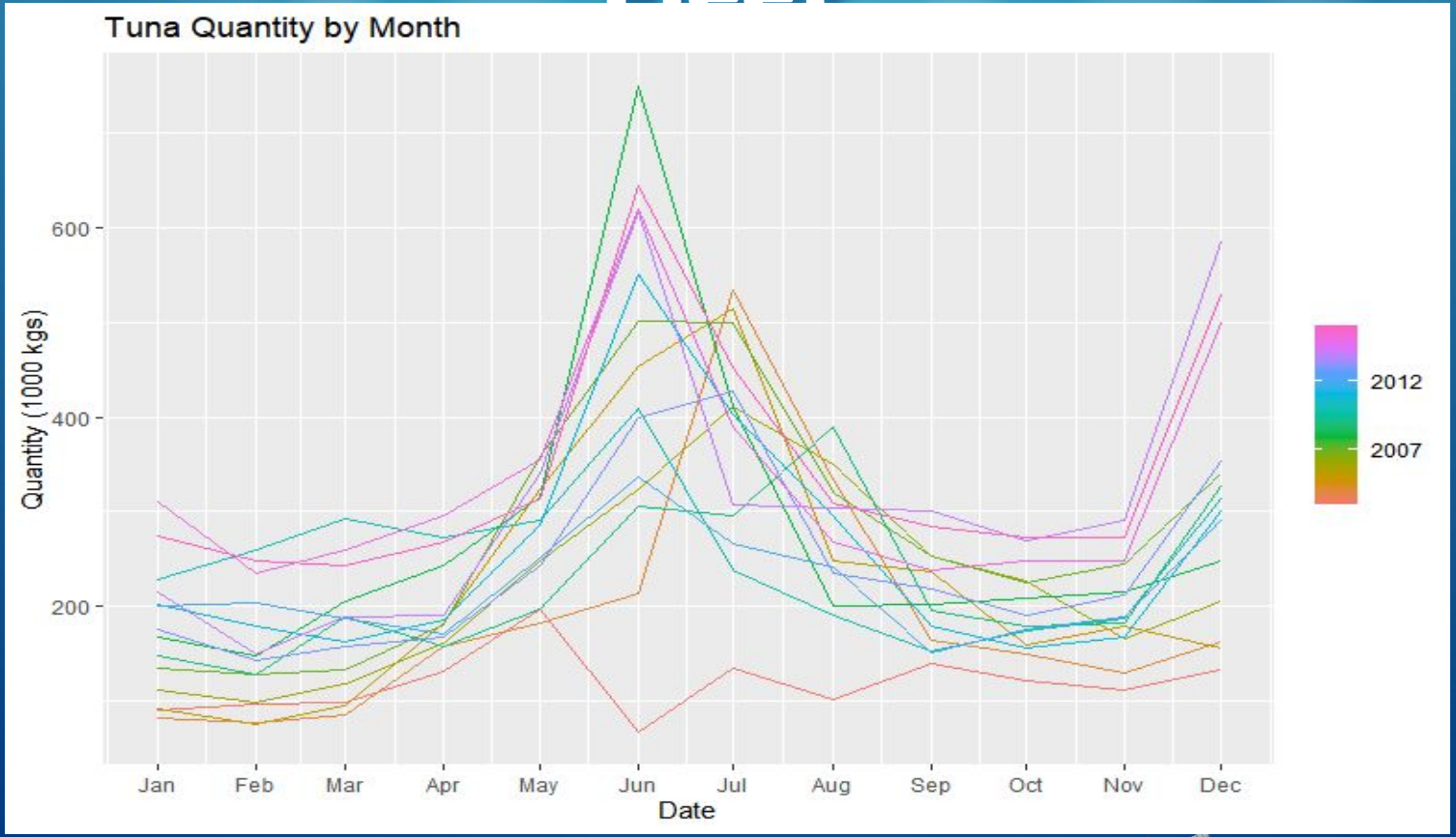
Bluefin Tuna, Fresh, Japanese Fleet



Bluefin Tuna, Fresh, Japanese Fleet



Bluefin Tuna, Fresh, Japanese Fleet



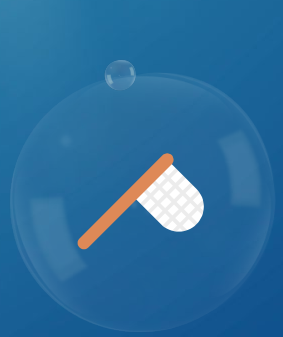
Forecasting Process

(Our Path Taken)

Explore for Models

Assess Models

Choose Model



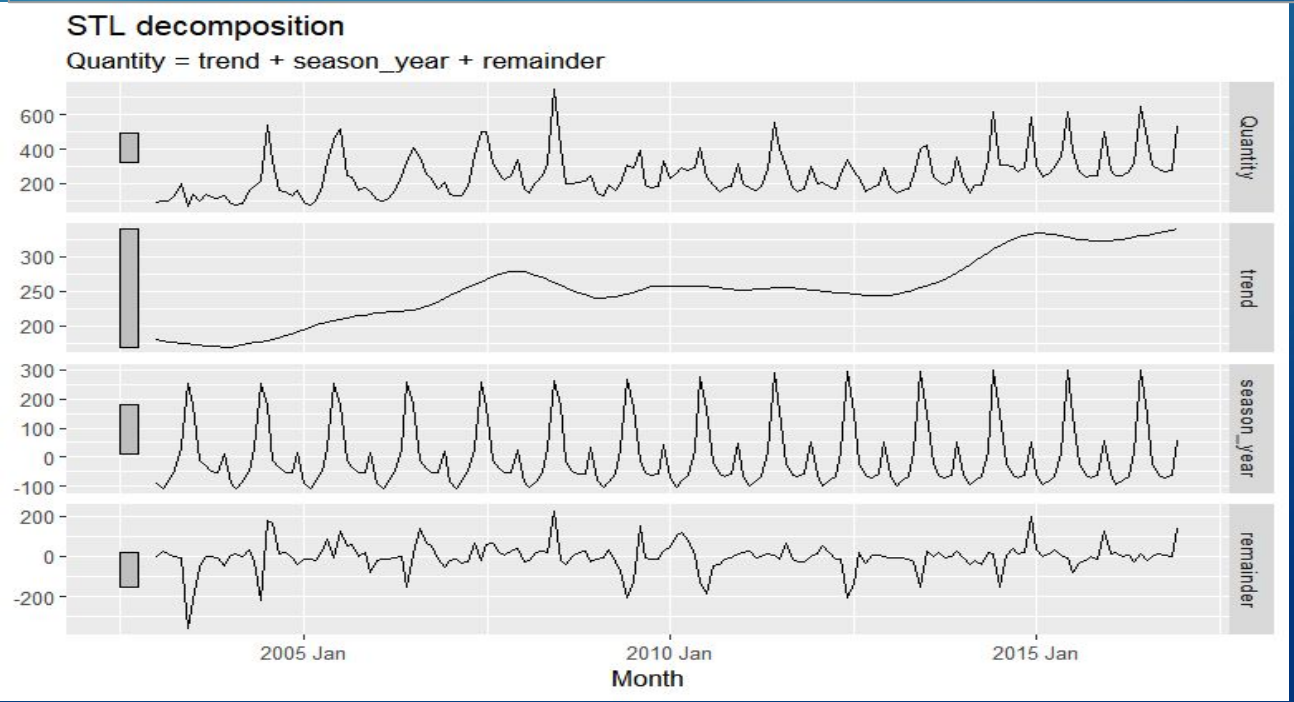
Predict

1 Explore for Models

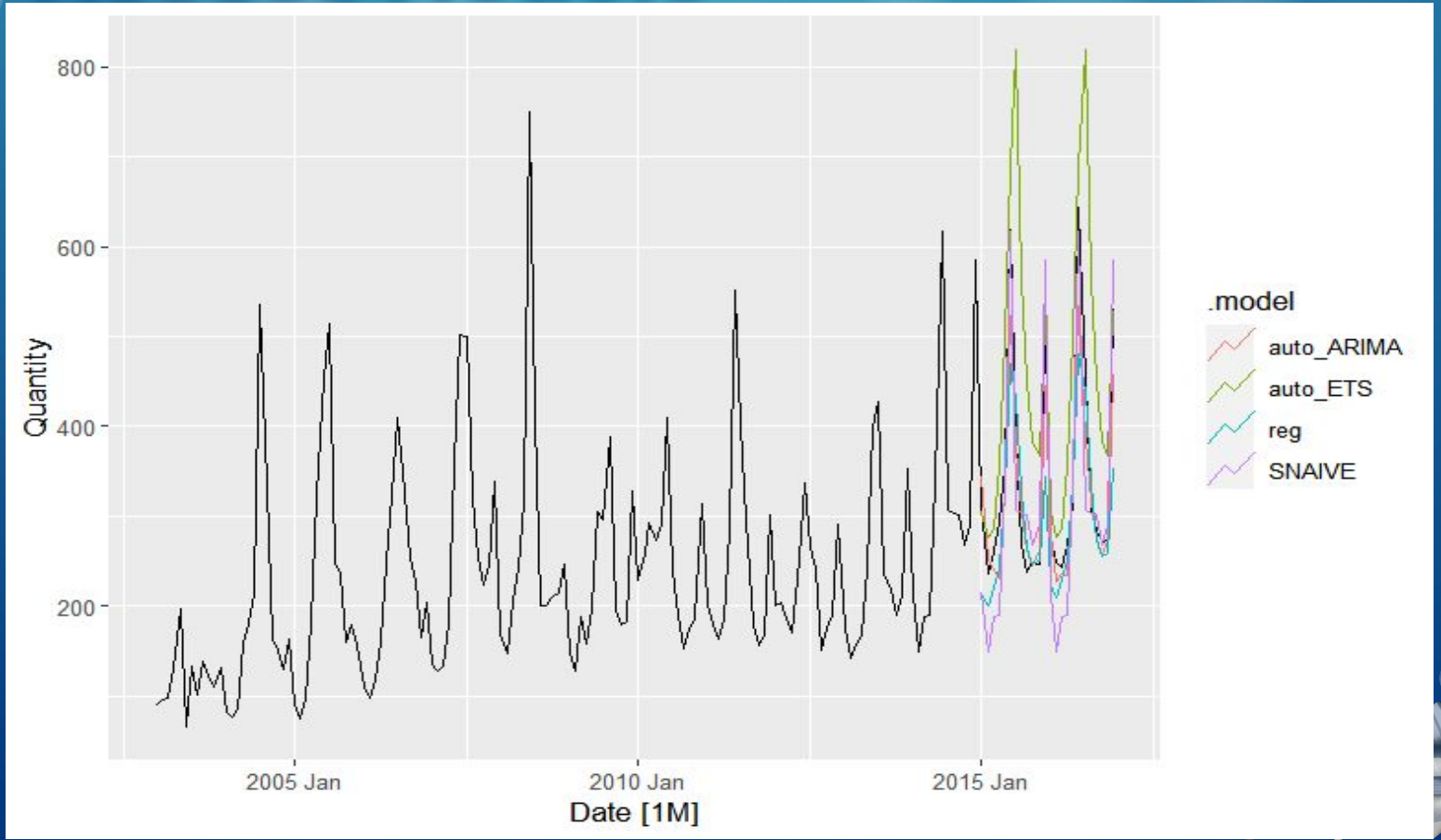
```
tuna %>%
  model(STL(Quantity ~ trend(window=24)+season(window=12),
            robust = TRUE)) %>%
  components() %>%
  autoplot()
```

Viewing the STL decomposition can help understand the trend and seasonal components of the data to assist with model selection. Because it appears that the trend is somewhat **linear** and there is apparent **seasonality**, we will move forward with the following models:

- auto ETS model
- the auto ARIMA model
- a time series linear regression model
- seasonal naive model.

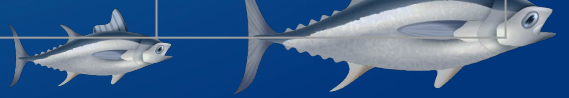


2 Assess Models



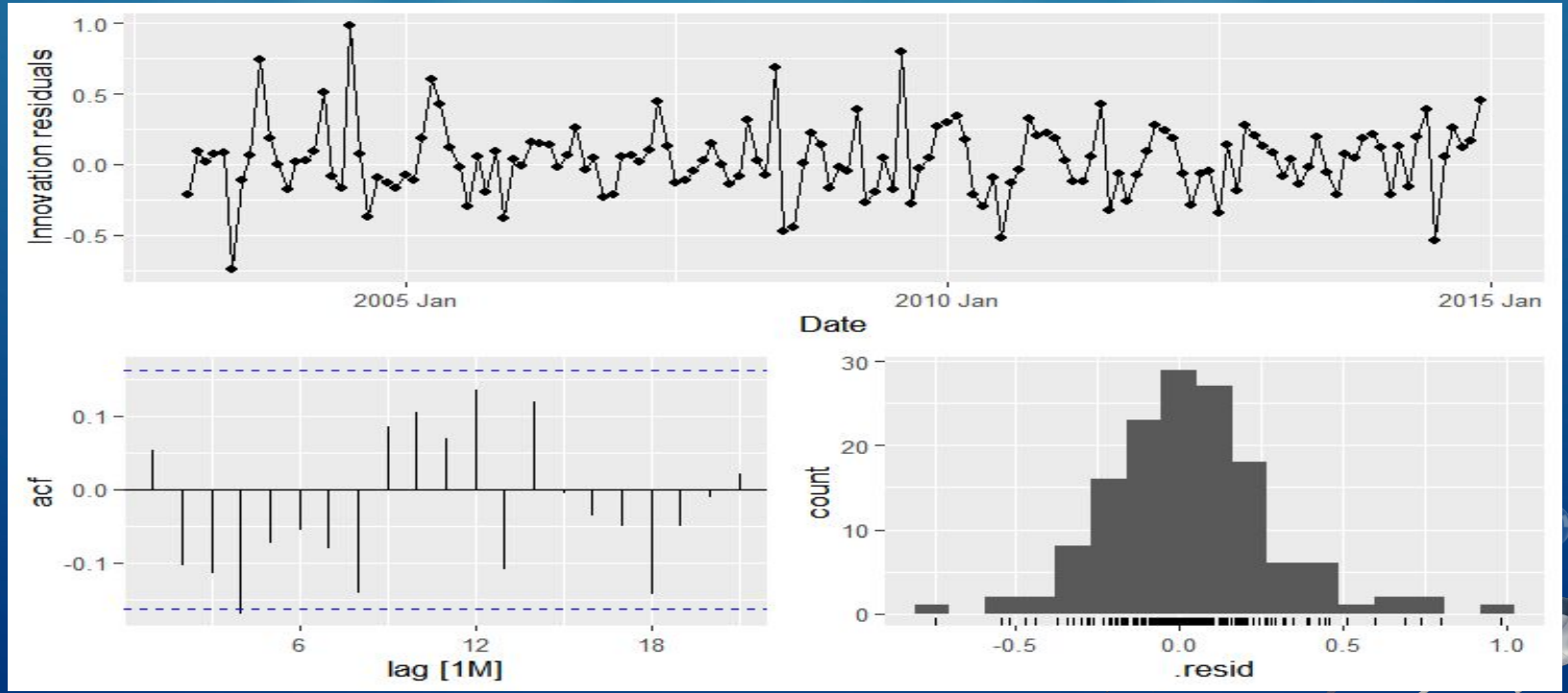
2 Assess Models

Model	RMSE	MAE	MPE	MAPE
ETS(M,N,M)	168	124	-39.6	39.8
SNAIVE	65.6	54	8.12	17.6
REG	74.3	52.2	8.56	13.6
ARIMA(1,0,0)(0,1,1)[12] w/ drift>	43.5	32.3	3.64	8.58



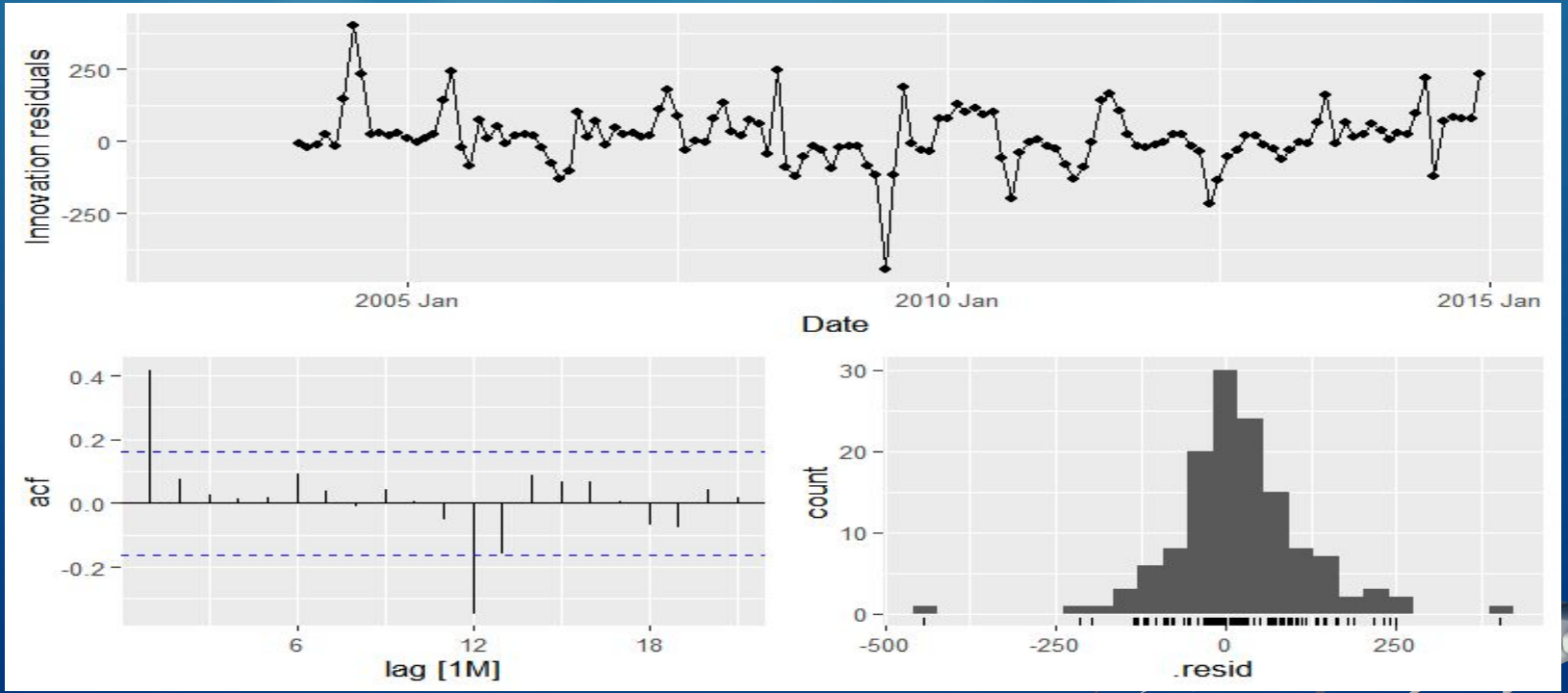
2 Assess Models - ETS(M,N,M)

Model	RMSE	MAE	MPE	MAPE
ETS(M,N,M)	168	124	-39.6	39.8



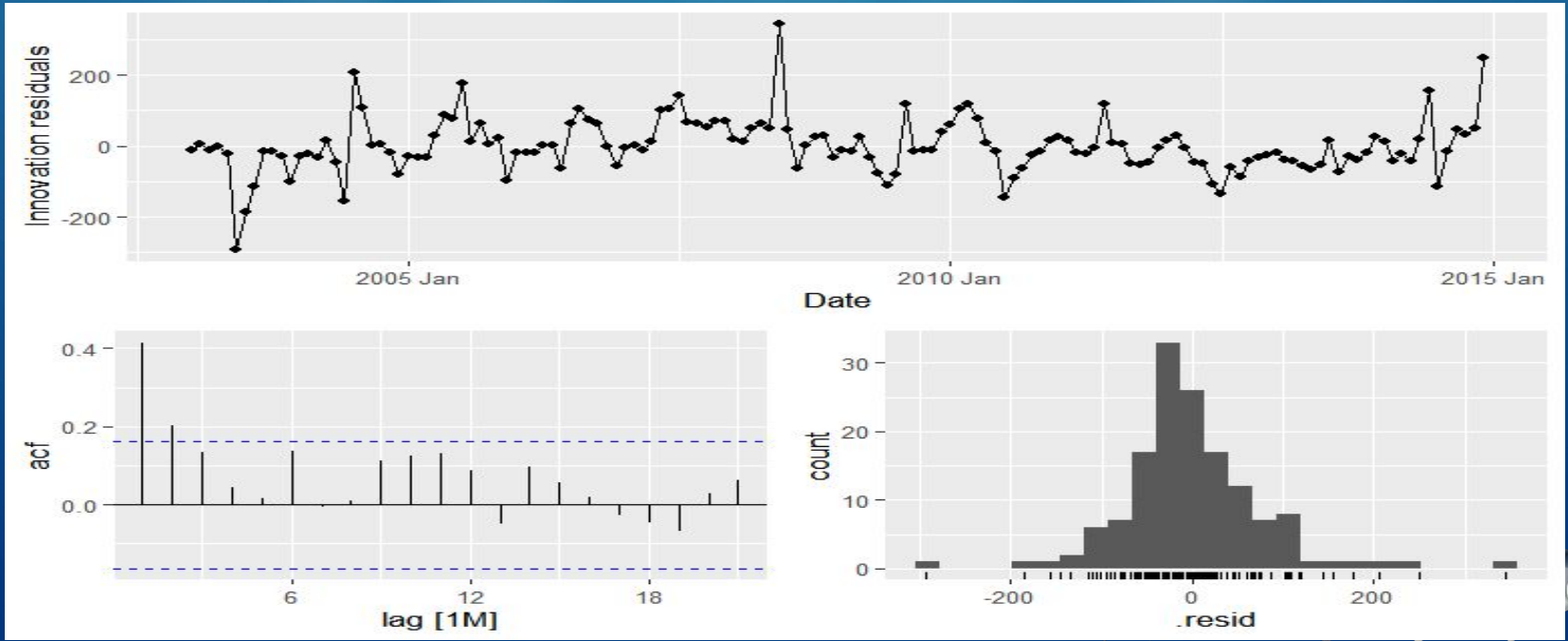
2 Assess Models - Seasonal Naive

Model	RMSE	MAE	MPE	MAPE
SNAIVE	65.6	54	8.12	17.6



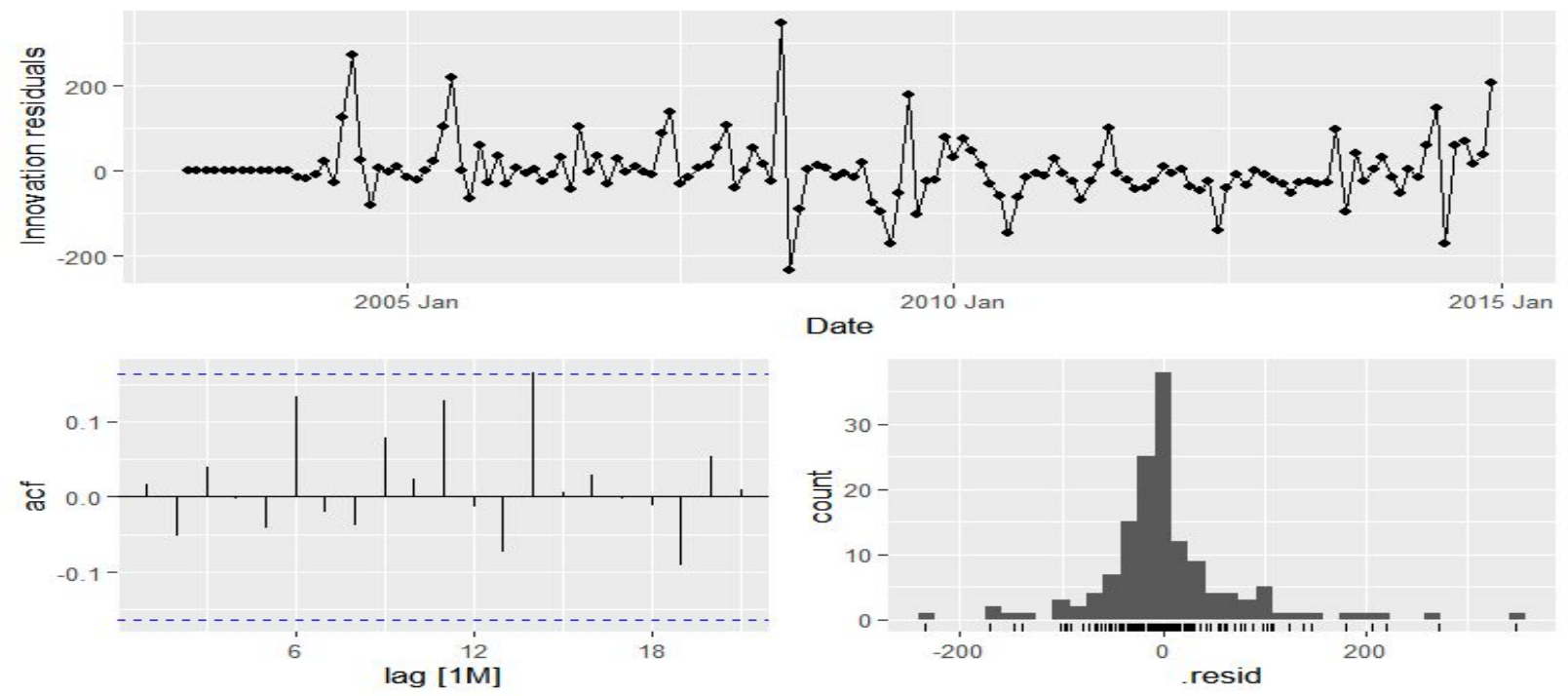
2 Assess Models -Time Series Linear Regression

Model	RMSE	MAE	MPE	MAPE
REG	74.3	52.2	8.56	13.6



2 Assess Models - ARIMA

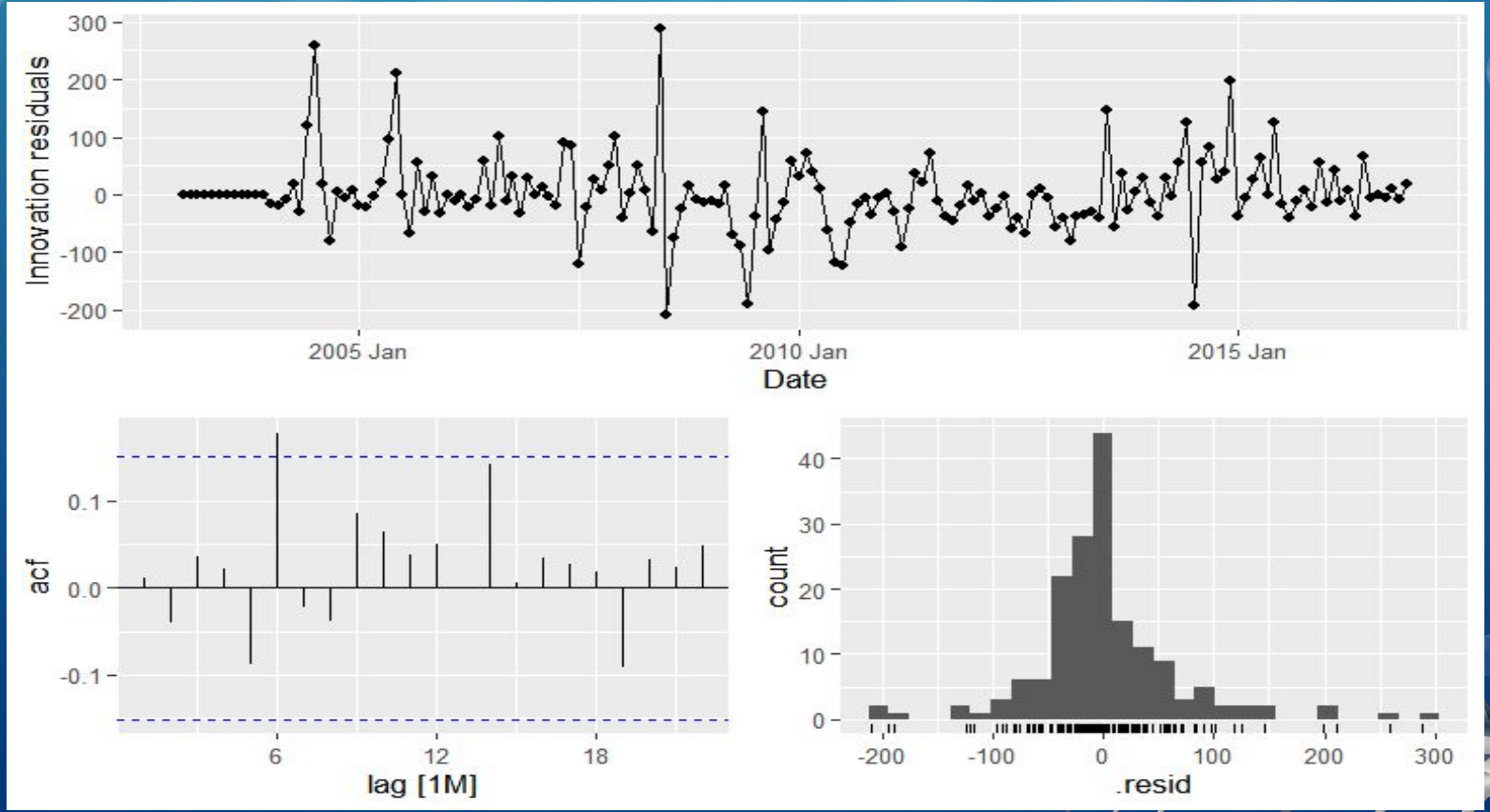
Model	RMSE	MAE	MPE	MAPE
ARIMA	43.5	32.3	3.64	8.58



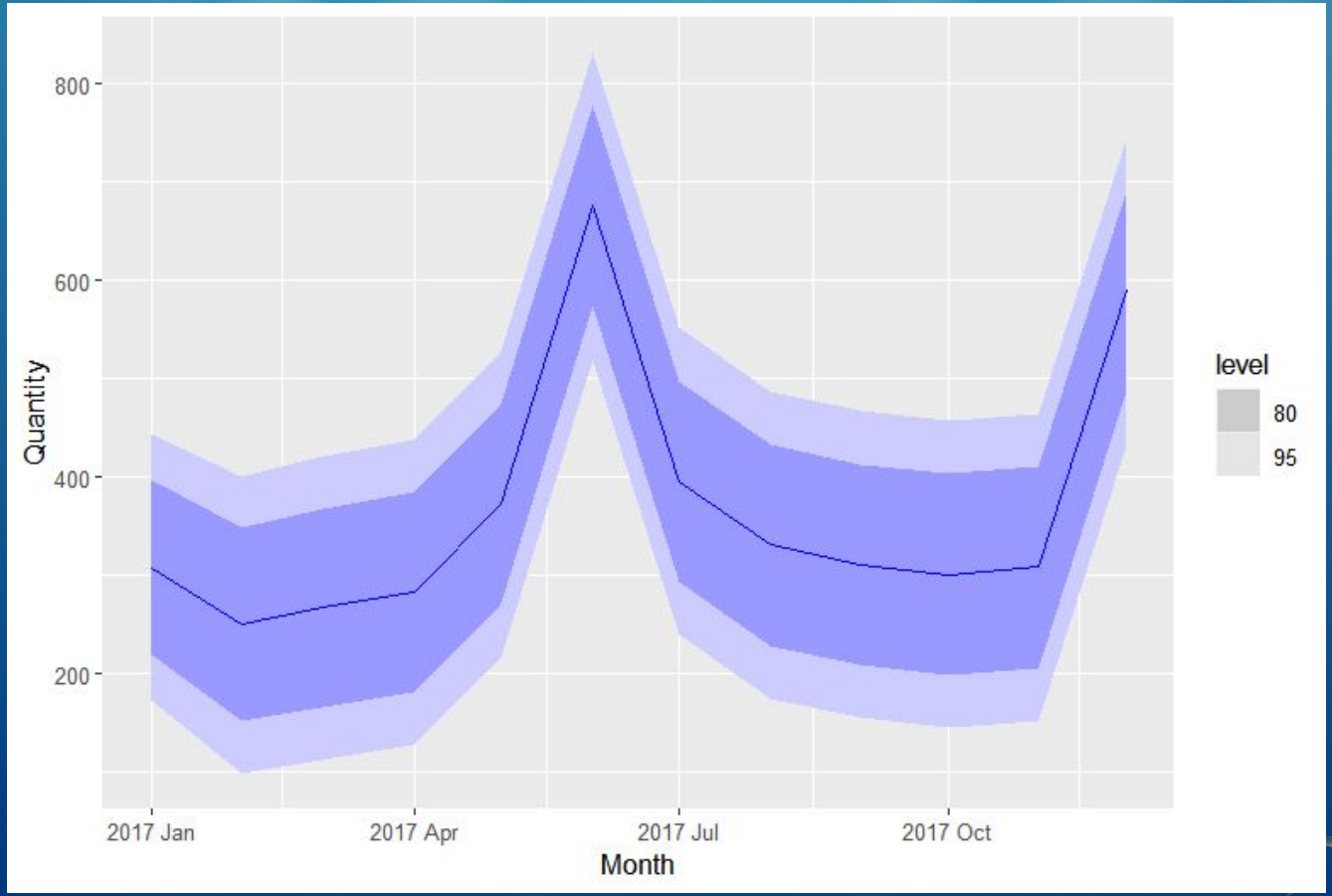
2 Assess Models - Cross Validation

Model	RMSE	MAE	MPE	MAPE
Auto_ARIMA	88	55.6	-12.9	19
TSLR	93.9	67.6	-20.9	27.7

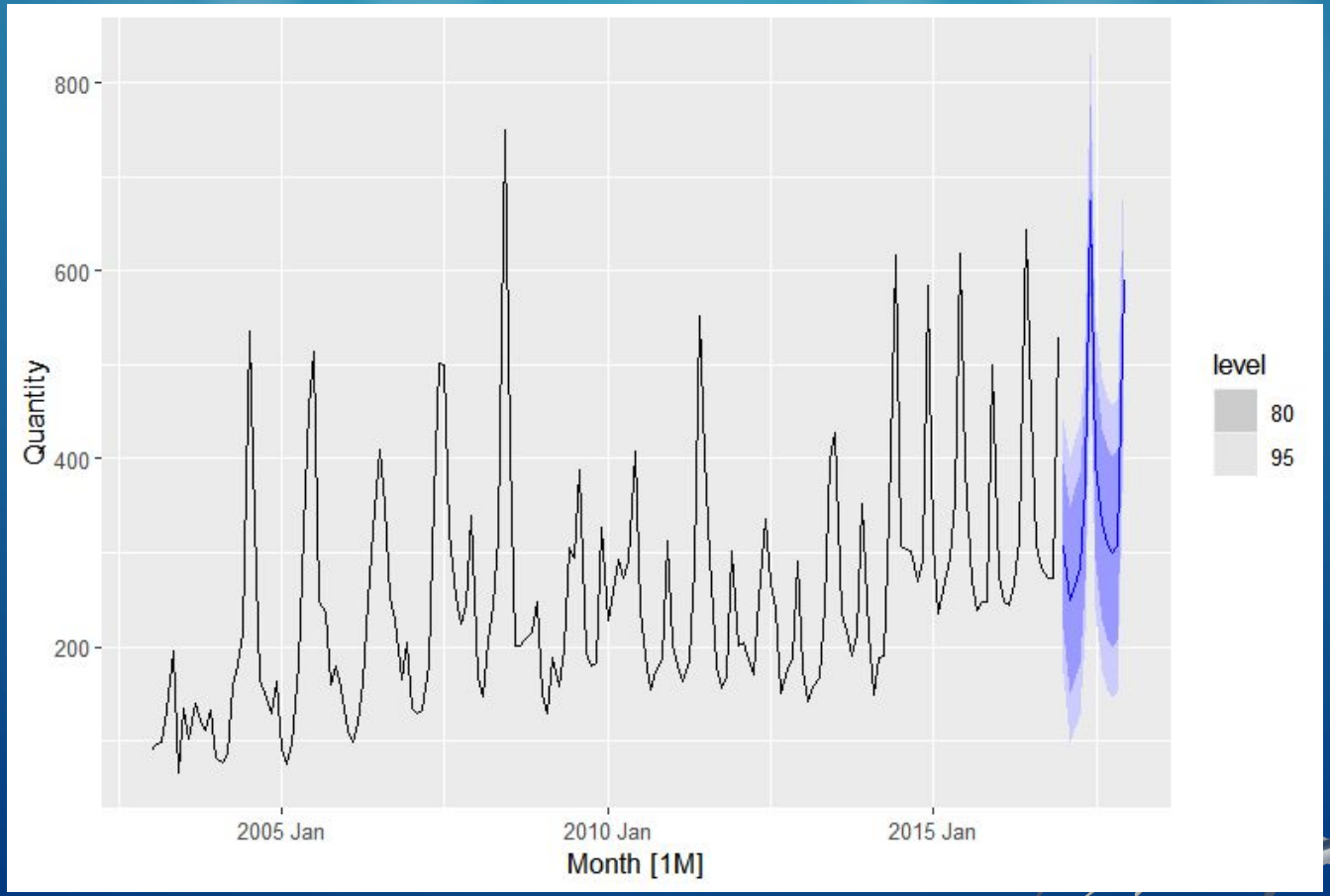
3 Choose Final Model - ARIMA



4 Predict


800
600
400
200
Quantity
2017 Jan
2017 Apr
2017 Jul
2017 Oct
Month
level
80
95

4 Predict


800
600
400
200
Quantity
2005 Jan
2010 Jan
2015 Jan
Month [1M]
level
80
95

4 Predict

Date	.mean	95%_lower	95%_upper
2017 Jan	307.7826	173.0202	442.5451
2017 Feb	250.0182	99.19982	400.8367
2017 Mar	266.6017	111.9929	421.2105
2017 Apr	283.249	127.6978	438.8003
2017 May	372.0632	216.275	527.8515
2017 Jun	675.2784	519.4304	831.1265
2017 Jul	395.5412	239.678	551.4043
2017 Aug	330.3864	174.5195	486.2534
2017 Sep	310.6118	154.7439	466.4797
2017 Oct	300.8849	145.0168	456.7531
2017 Nov	307.8657	151.9975	463.7339
2017 Dec	589.3663	433.4981	745.2346

Questions and or comments?