

Predicting Demand

Time-Series Analysis // Walmart 

Forest // May 2020

O . S . E . M . N .

O. S. E. M. N.
b
t
a
i
n

O . S . E . M . N .

b
t
a
i
n

c
r
u
b

O . S . E . M . N .

b t a i n
c r u b
x p l o r e

O . S . E . M . N .

b t a i n c r u b x p l o r e o d e l

O . S . E . M . N .
b t a i n c r u b x p l o r e o d e l (i) t e r p r e t

O.

Provided by **Walmart**★
(via Kaggle)

O.

Provided by **Walmart** 
(via [Kaggle](#))

`calendar.csv` Contains information about the dates on which the products are sold.

O.

Provided by **Walmart** 
(via [Kaggle](#))

`calendar.csv` Contains information about the dates on which the products are sold.

`sales_train_validation.csv` Contains the historical daily unit sales per product and store.

O.

Provided by Walmart[®]

(via [Kaggle](#))

`calendar.csv` Contains information about the dates on which the products are sold.

`sales_train_validation.csv` Contains the historical daily unit sales per product and store.

`sell_prices.csv` Contains information about the price of the products sold per store per date.

S.

Already in good condition -

S.

Already in good condition -

- Filled in a few missing values

S.

Already in good condition -

- Filled in a few missing values
- Ensured 'datetime' object

E.

Jan. 1, 2016 - Jun. 6, 2019

30,490 Unique Product/Store Combinations

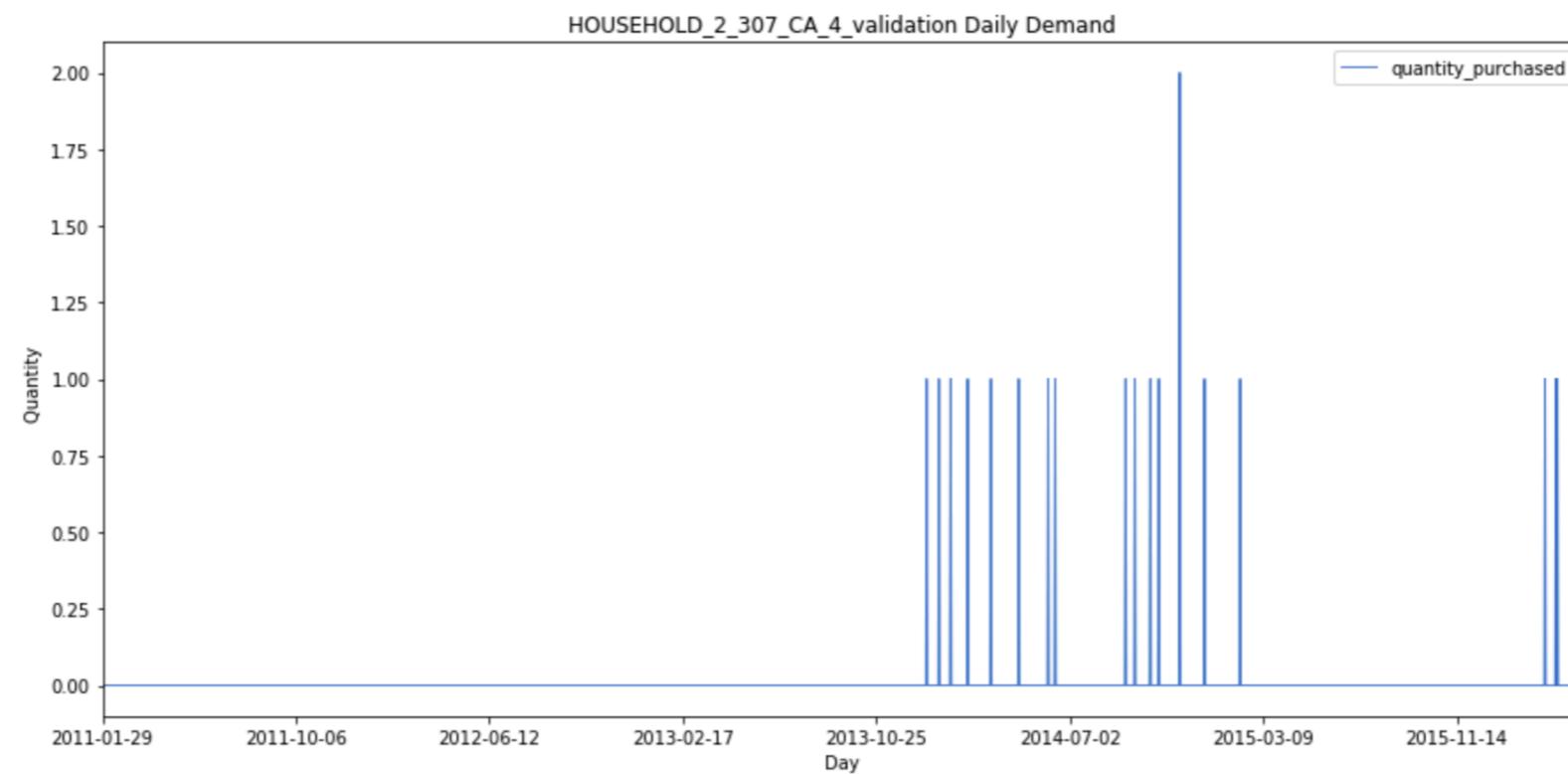
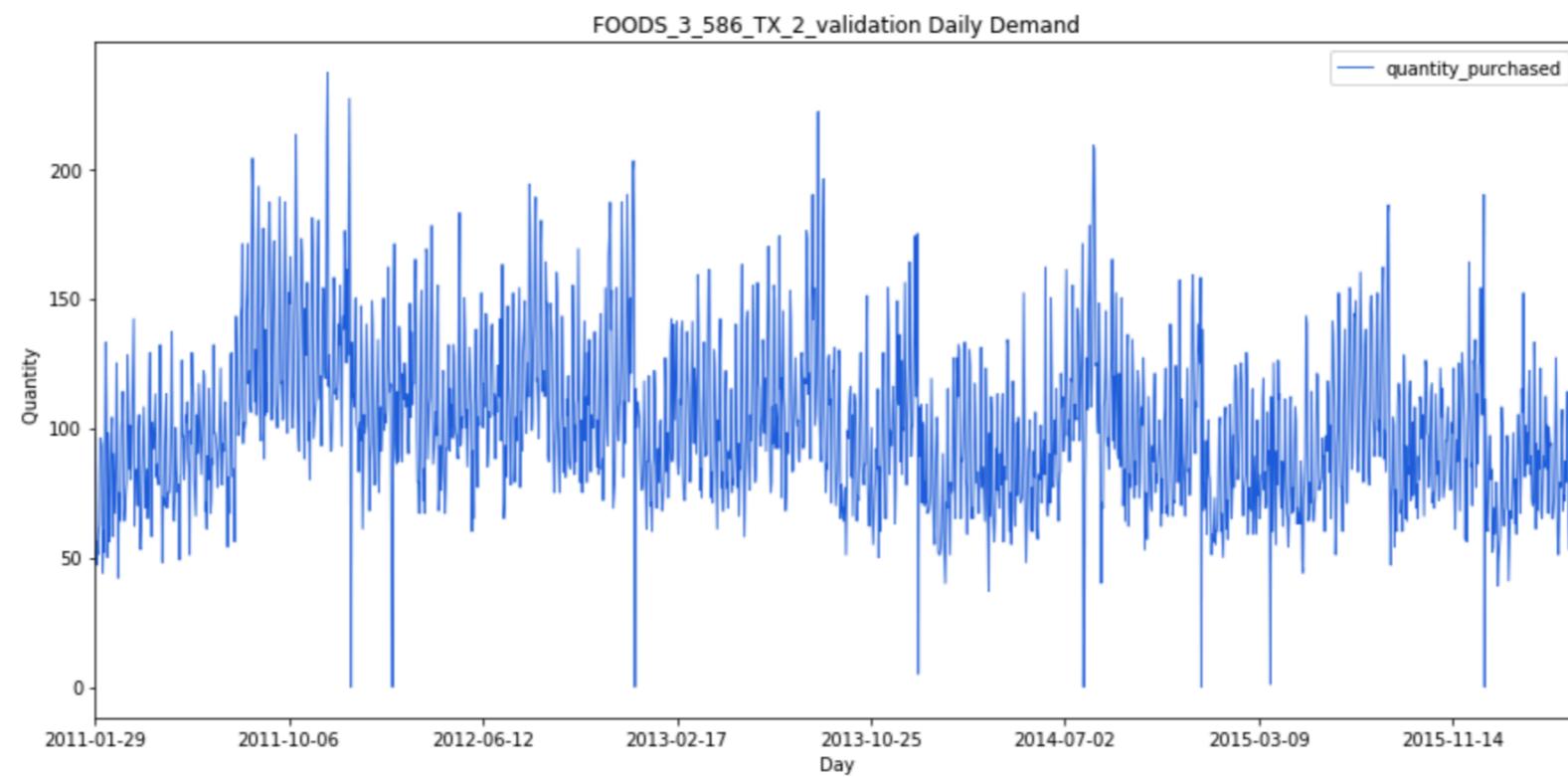
1,913 Days of Historical Data

E.

Focus On:
Top 10 Products
Bottom 10 Products

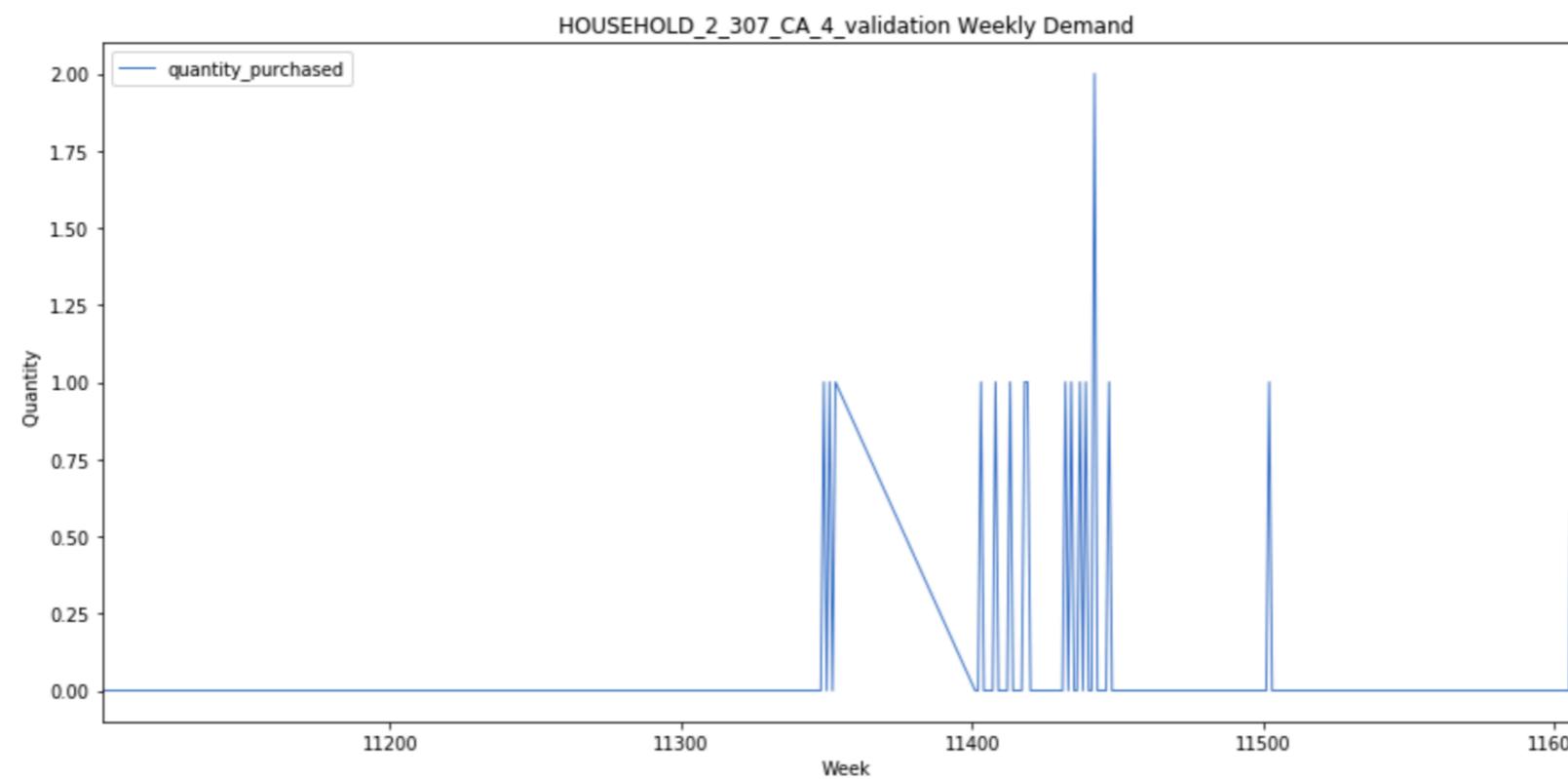
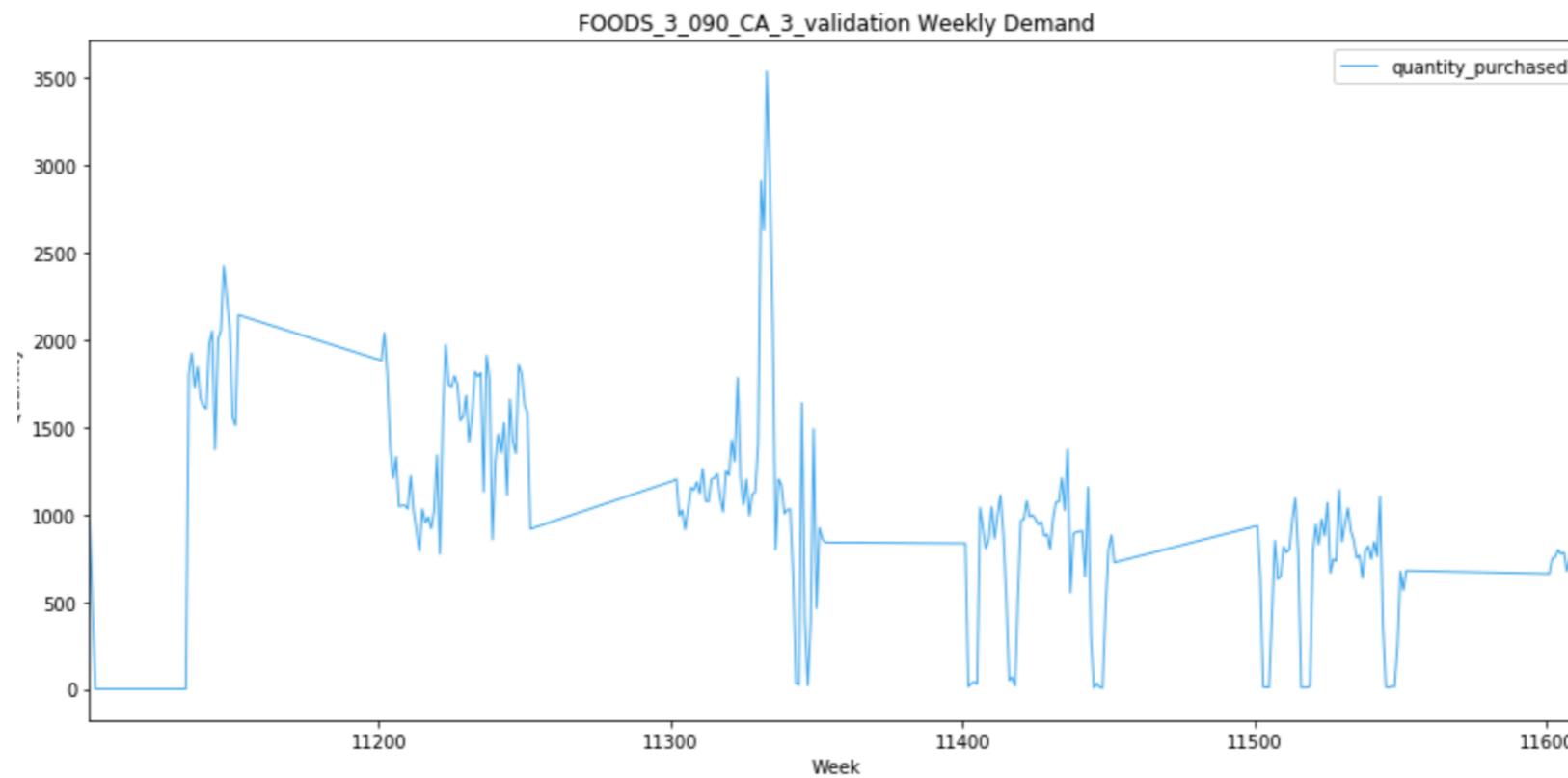
E.

Daily Demand



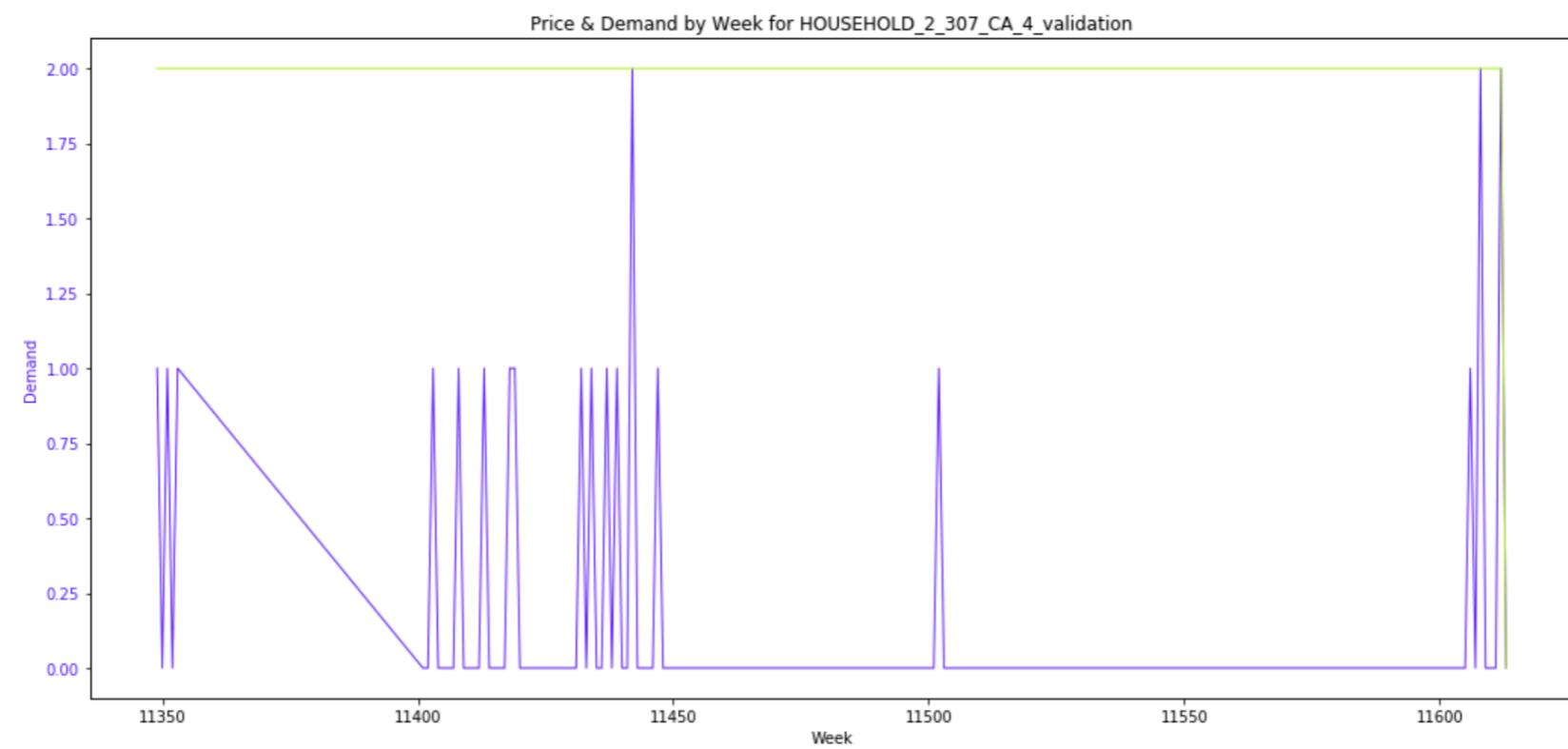
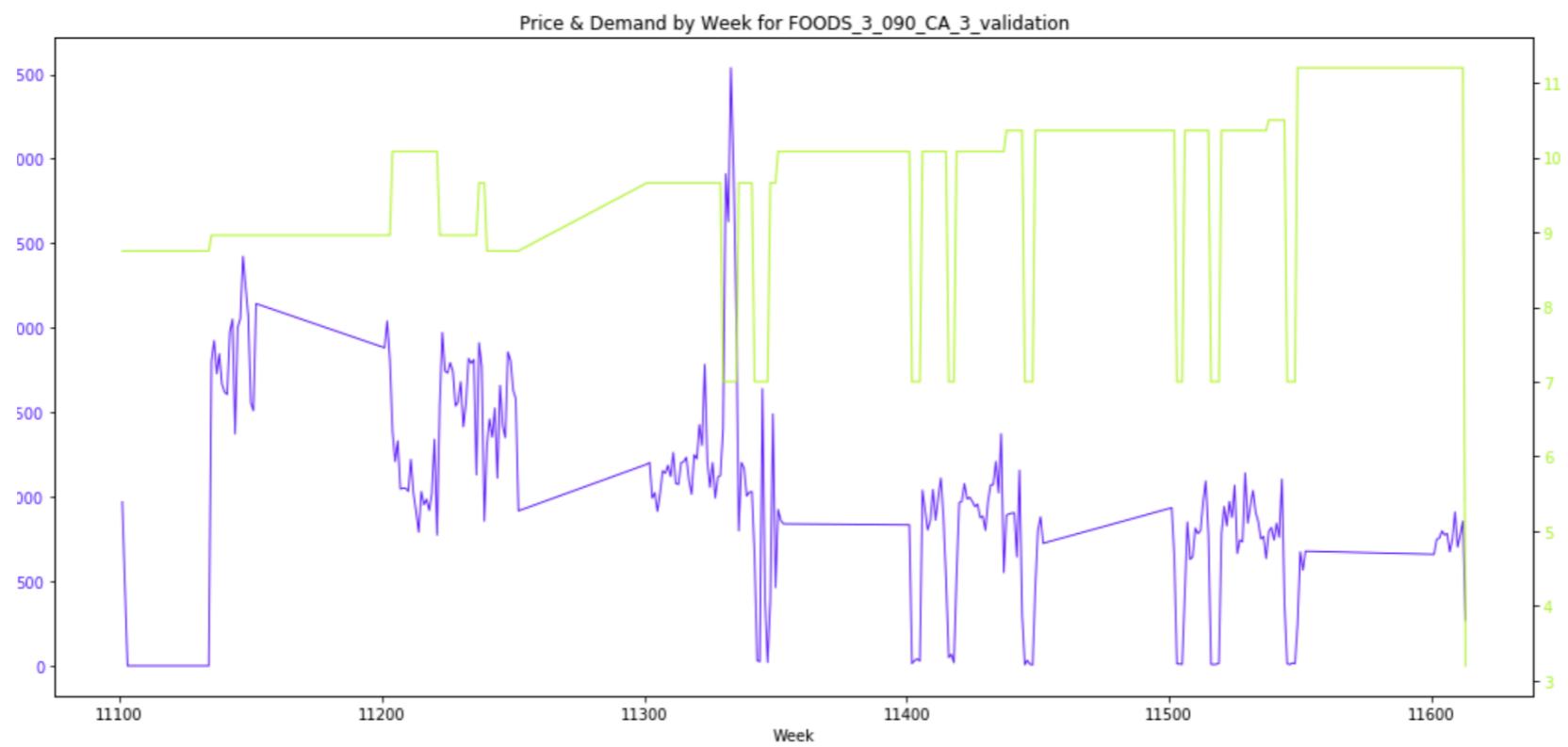
E.

Weekly Demand



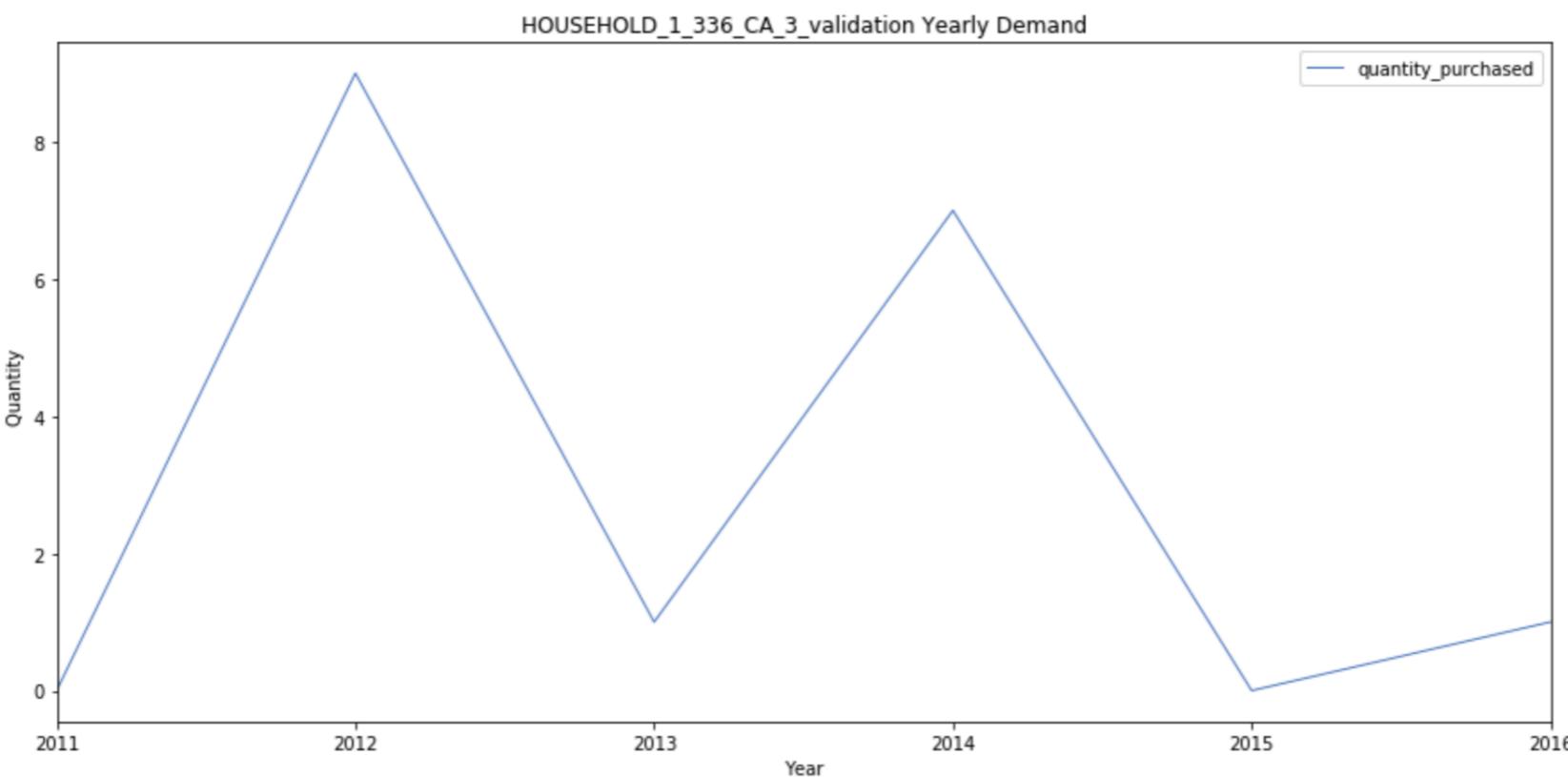
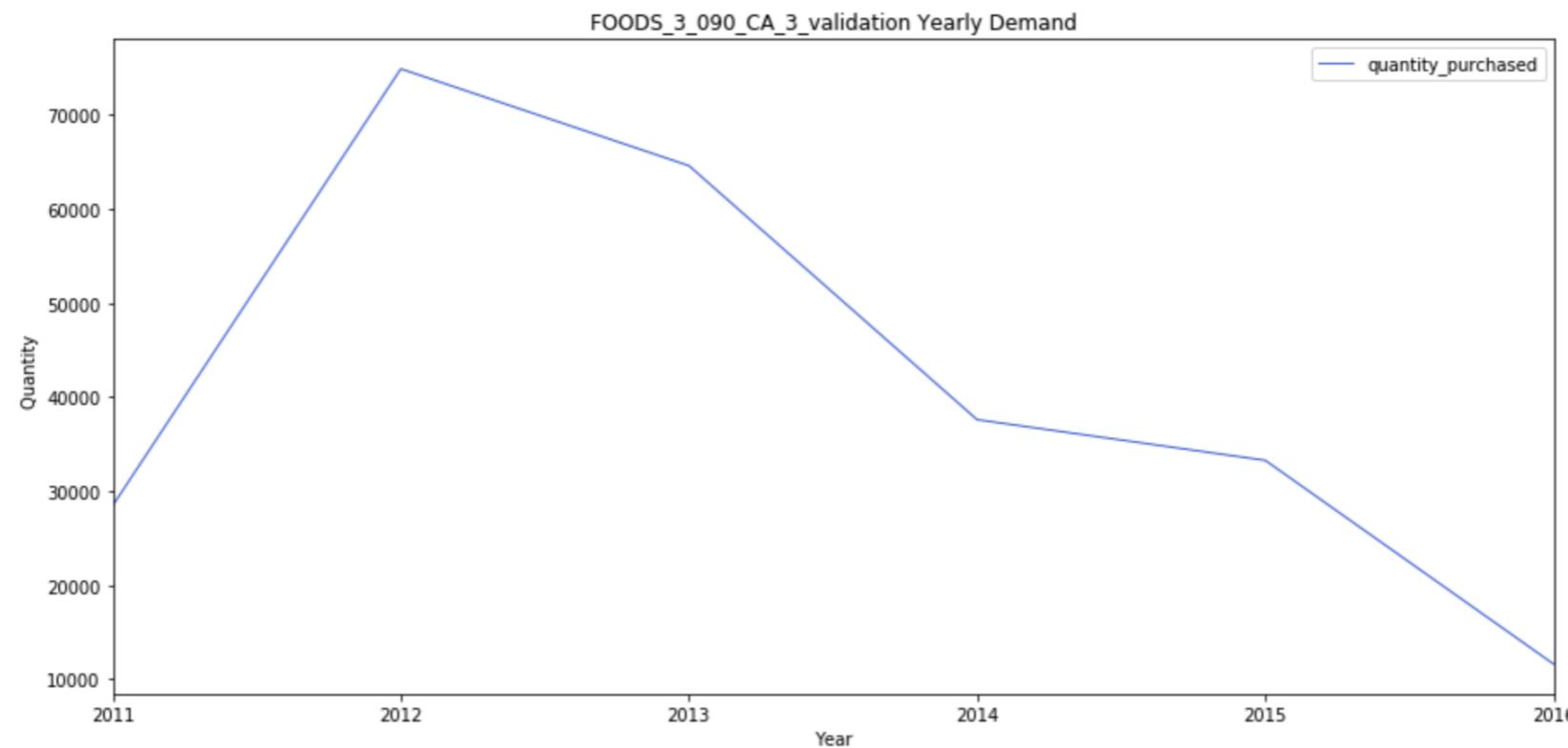
E.

Weekly Demand + Price Behavior



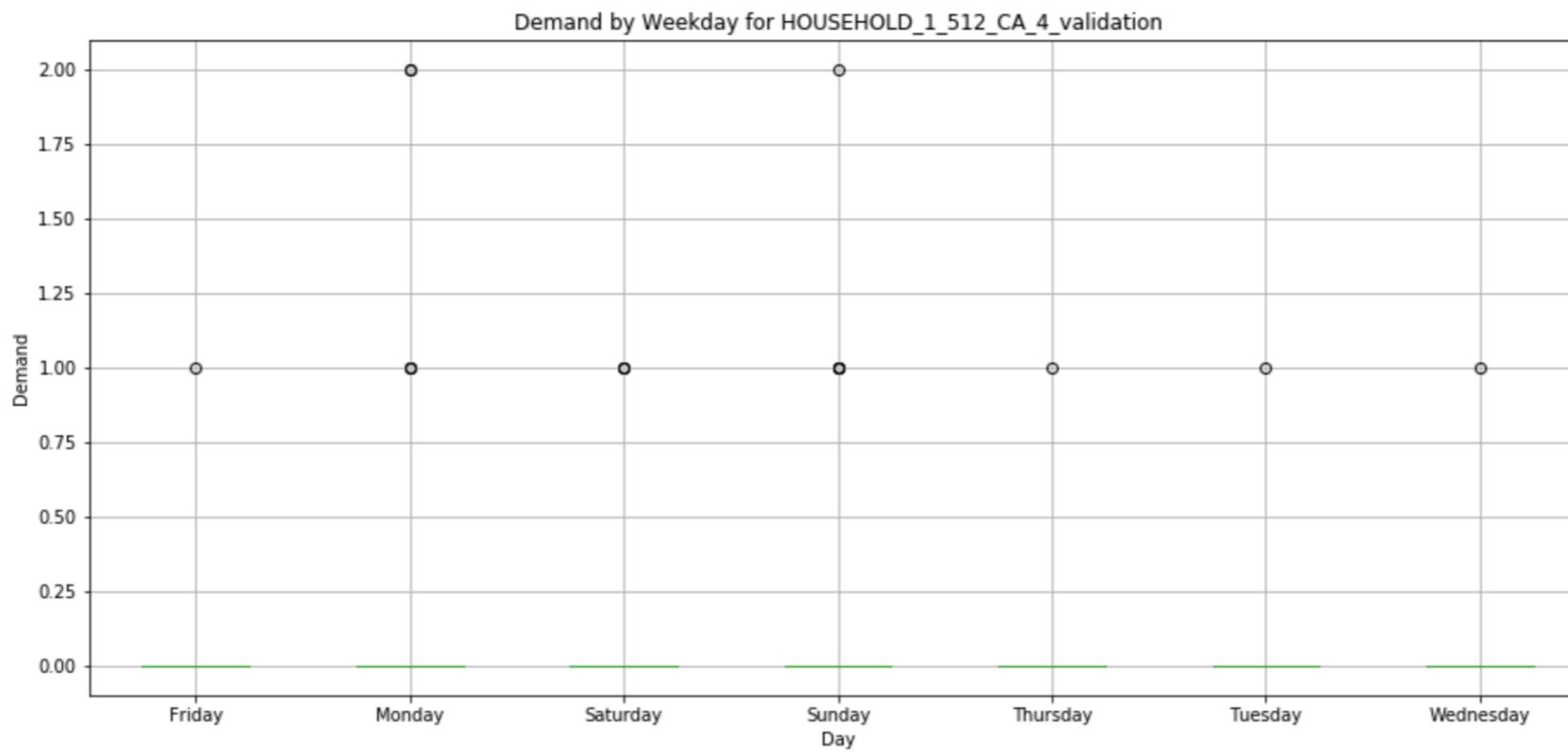
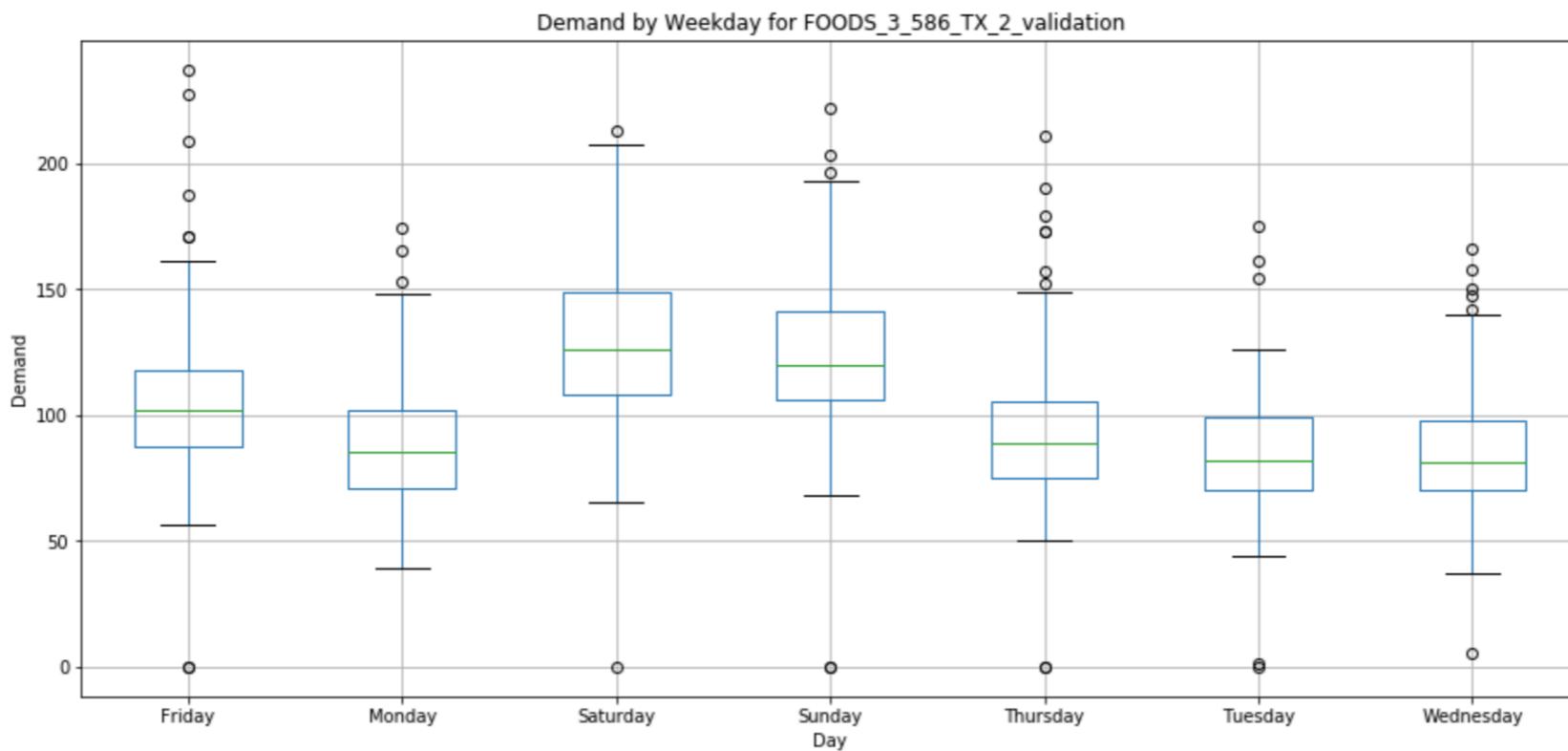
E.

Yearly Demand



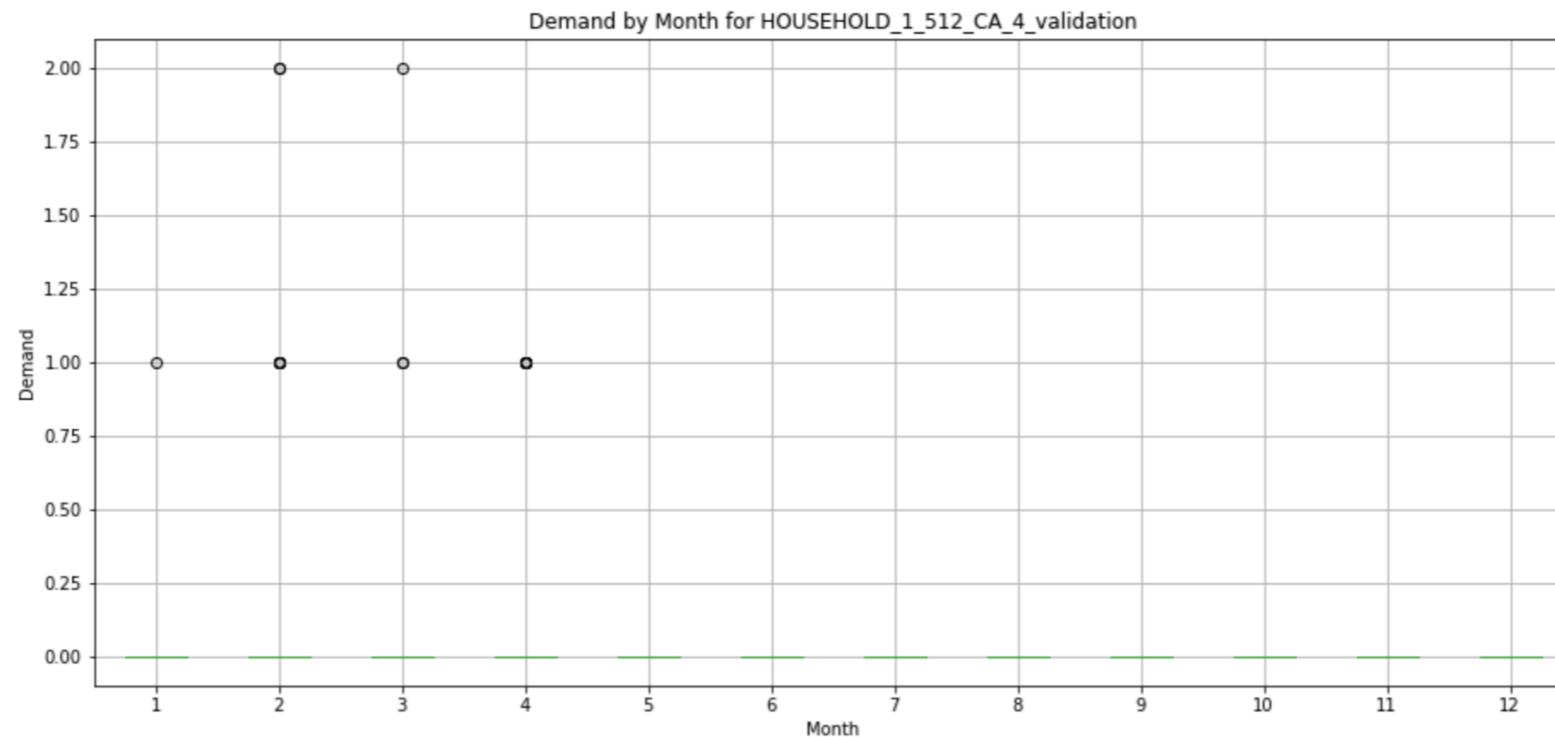
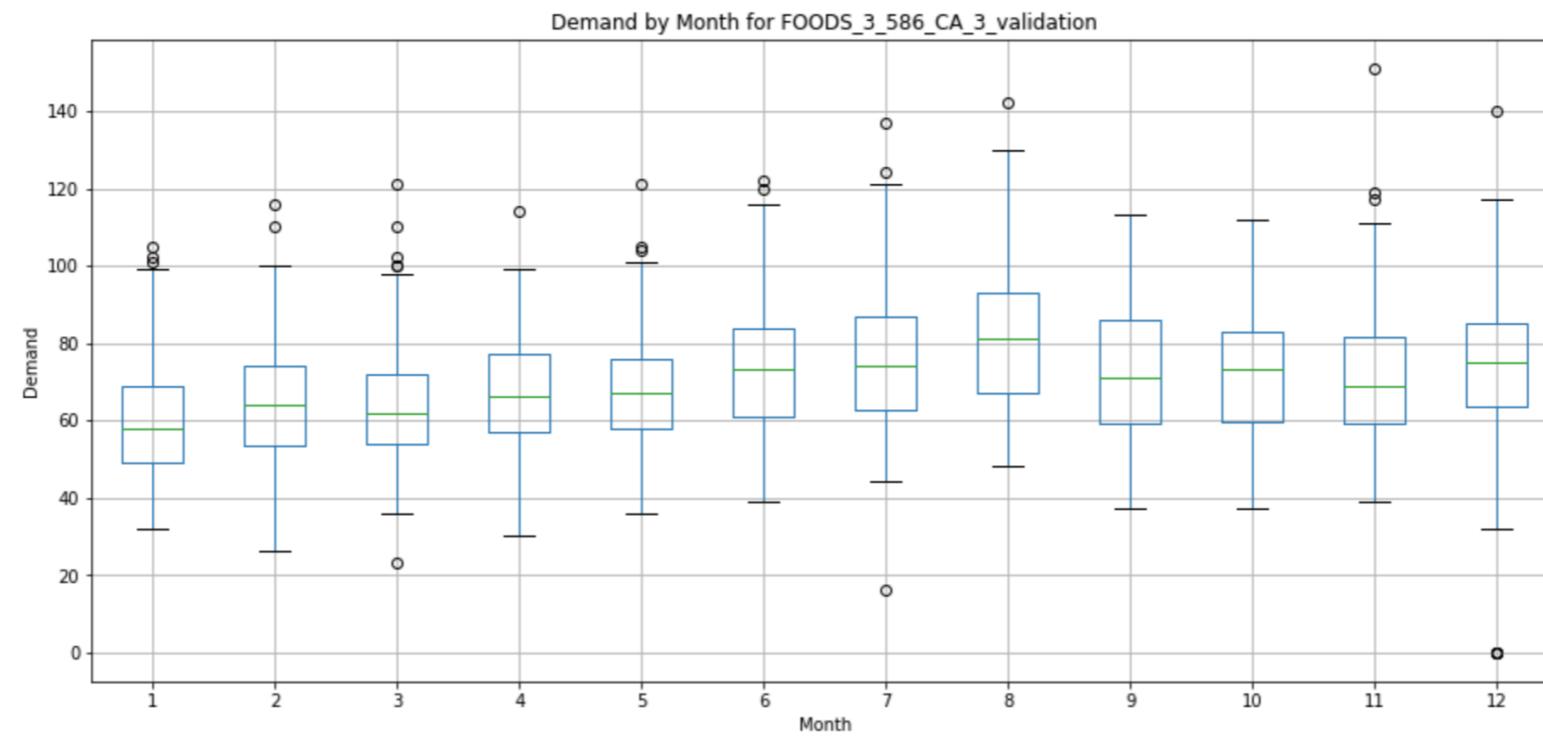
E.

Demand by Day of Week



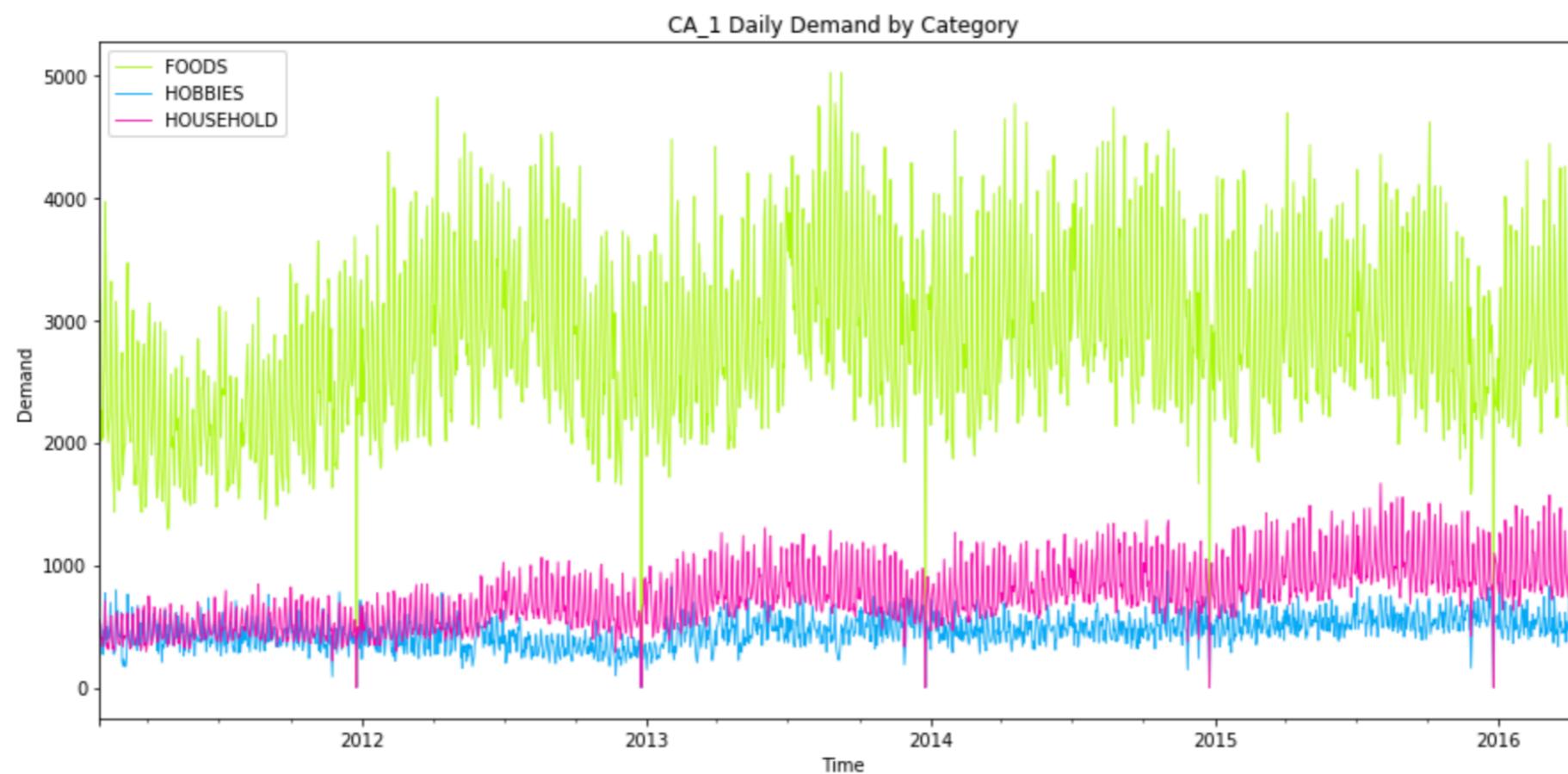
E.

Demand by Month



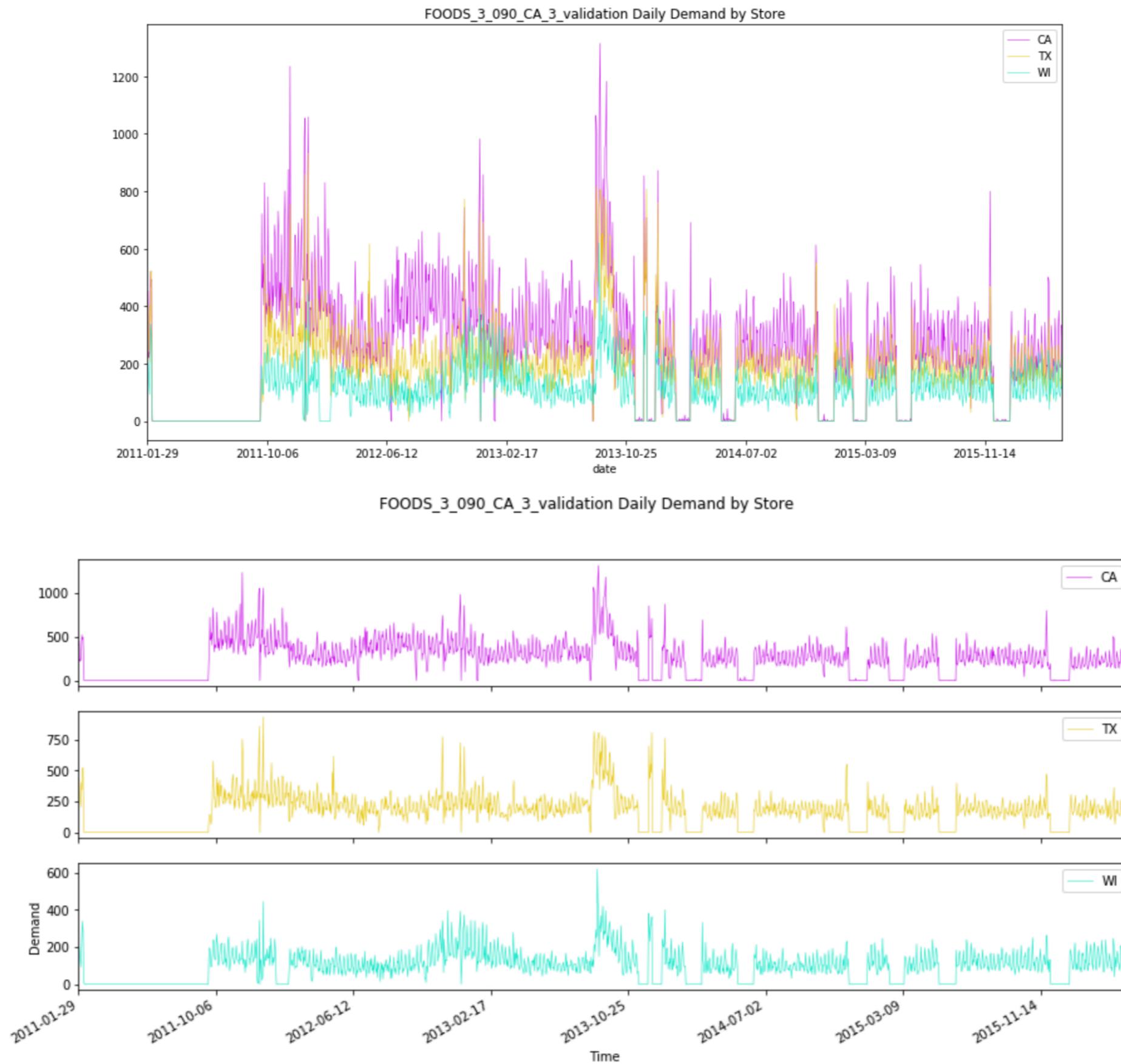
E.

Demand by Category



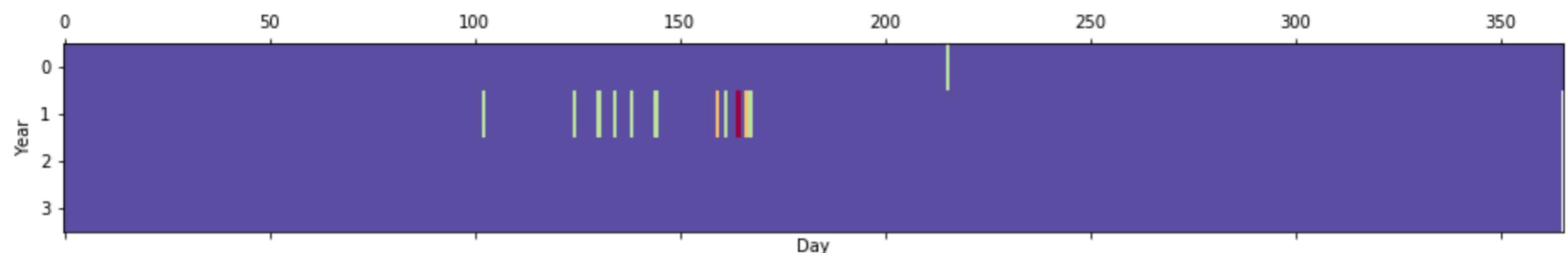
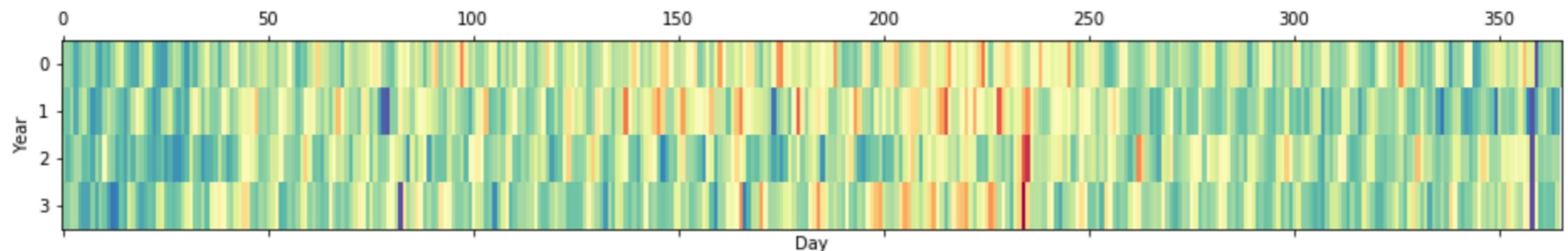
E.

Demand by State



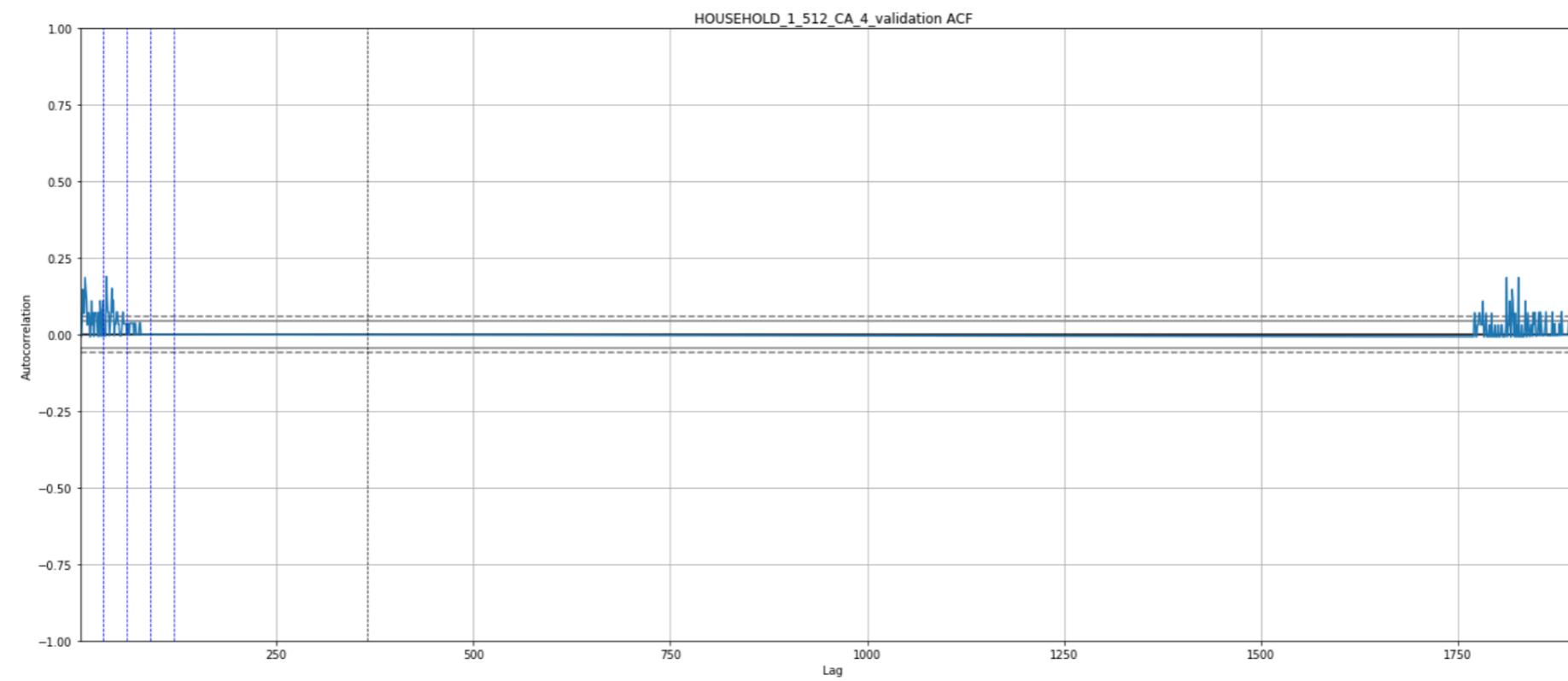
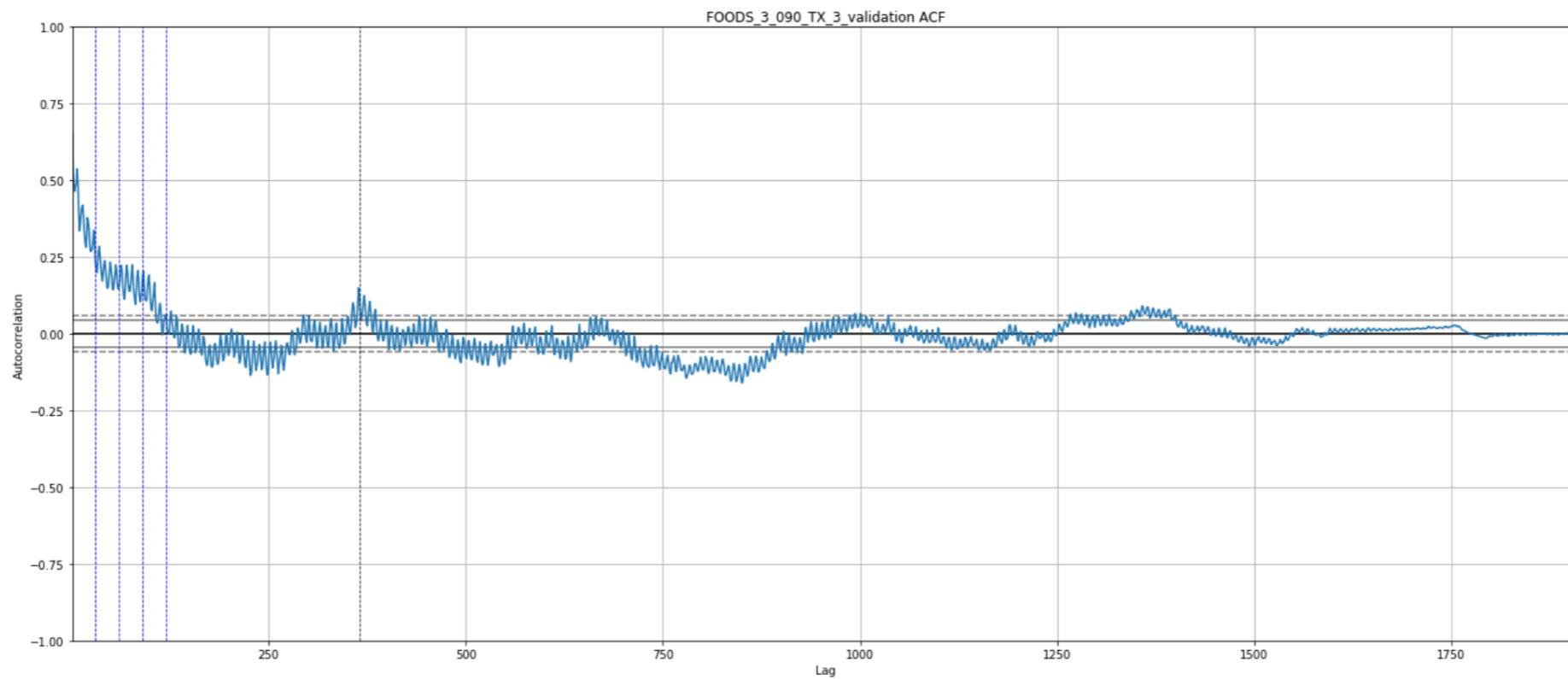
E.

Demand Heat Map



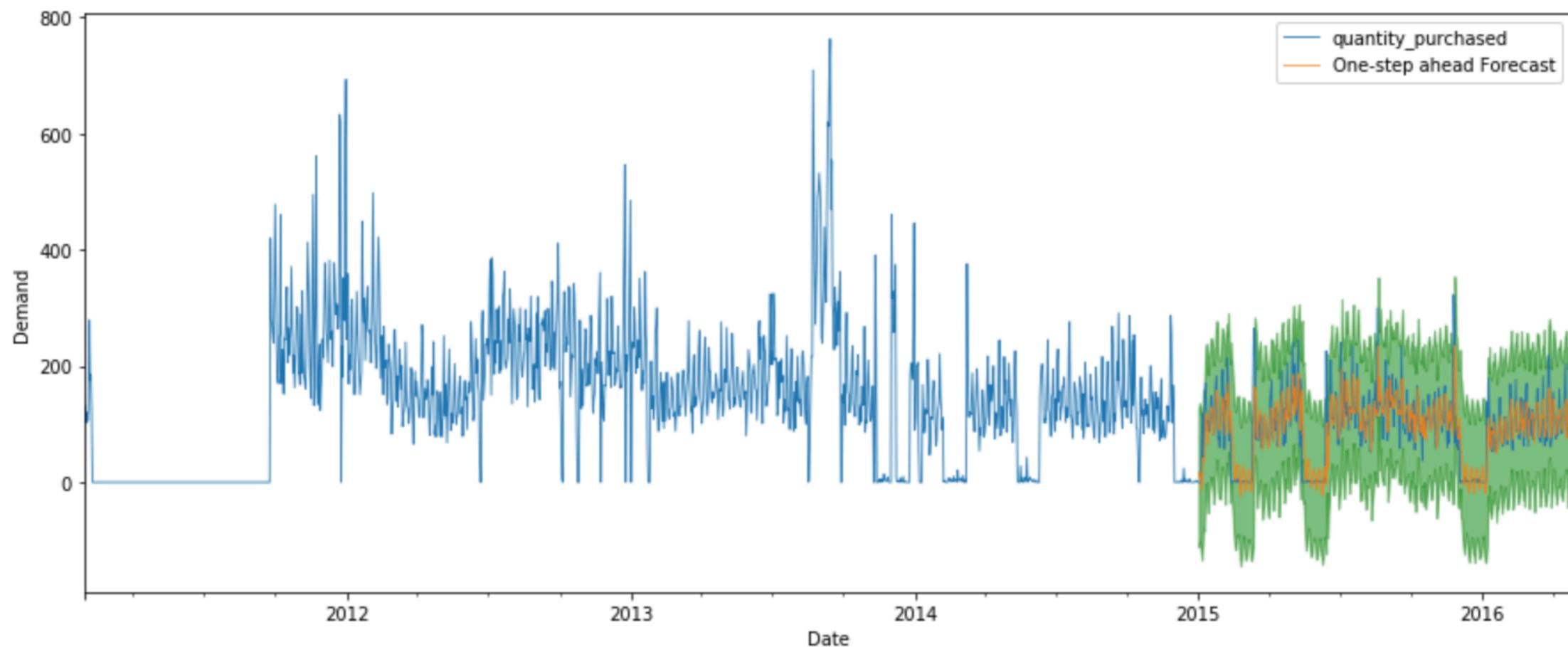
M.

ACF



M.

ARIMA Model



Mean RMSE for Top 10 Products: 22.250

Future Work:

- **Use current model for each of the 30, 490 products.**
- **Explore Long Short-Term Memory Networks. (LSTM)**
- **Explore Gated Recurrent Units. (GRU)**
- **Incorporate categorical features into prediction.**

Questions?

Thank You. 