



Global Mart Sales Forecasting

-A Time Series Analysis

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About Global Mart

- “Global Mart” is an online super store giant having worldwide operations. It takes orders and delivers across the globe.
 - It deals with all the major product categories - Consumer, Corporate & Home Office.
 - The store caters to 7 different market segments – Africa, APAC, Canada, EU, EMEA, LATAM, US.
 - Overall, there are 21 different segments based on the market and product category.
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Business Problem

- As a Sales Manager, our aim is to forecast the sales and demand for the next 6 months, that would help in managing the revenue and inventory accordingly.
 - Not all of the 21 market buckets are important from the store's point of view. So we need to find out the 2 most profitable and consistent segments from these 21, and forecast the sales and demand for these segments.
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Data Attributes

Order ID	Unique ID of the transaction
Order Date	Date on which the order was placed
Ship Date	Date on which the shipment was made
Ship Mode	The mode of shipment (category)
Customer ID	The unique ID of the customer
Customer Name	Name of the customer
Segment	The market segment to which the product belongs
City	City of the delivery address
State	State of the delivery address
Country	Country of the delivery address
Postal Code	Postal code of the delivery address
Market	Market segment to which the customer belongs
Region	Geographical region of the customer
Product ID	Unique ID of the product
Category	Category of the product
Sub-Category	Sub-category of the product
Product Name	Name of the product
Sales	Total sales value of the transaction
Quantity	Quantity of the product ordered
Discount	Discount percentage offered on the product
Profit	Profit made on the transaction
Shipping Cost	Shipping cost incurred on the transaction
Order Priority	Priority assigned to the order

Data Understanding

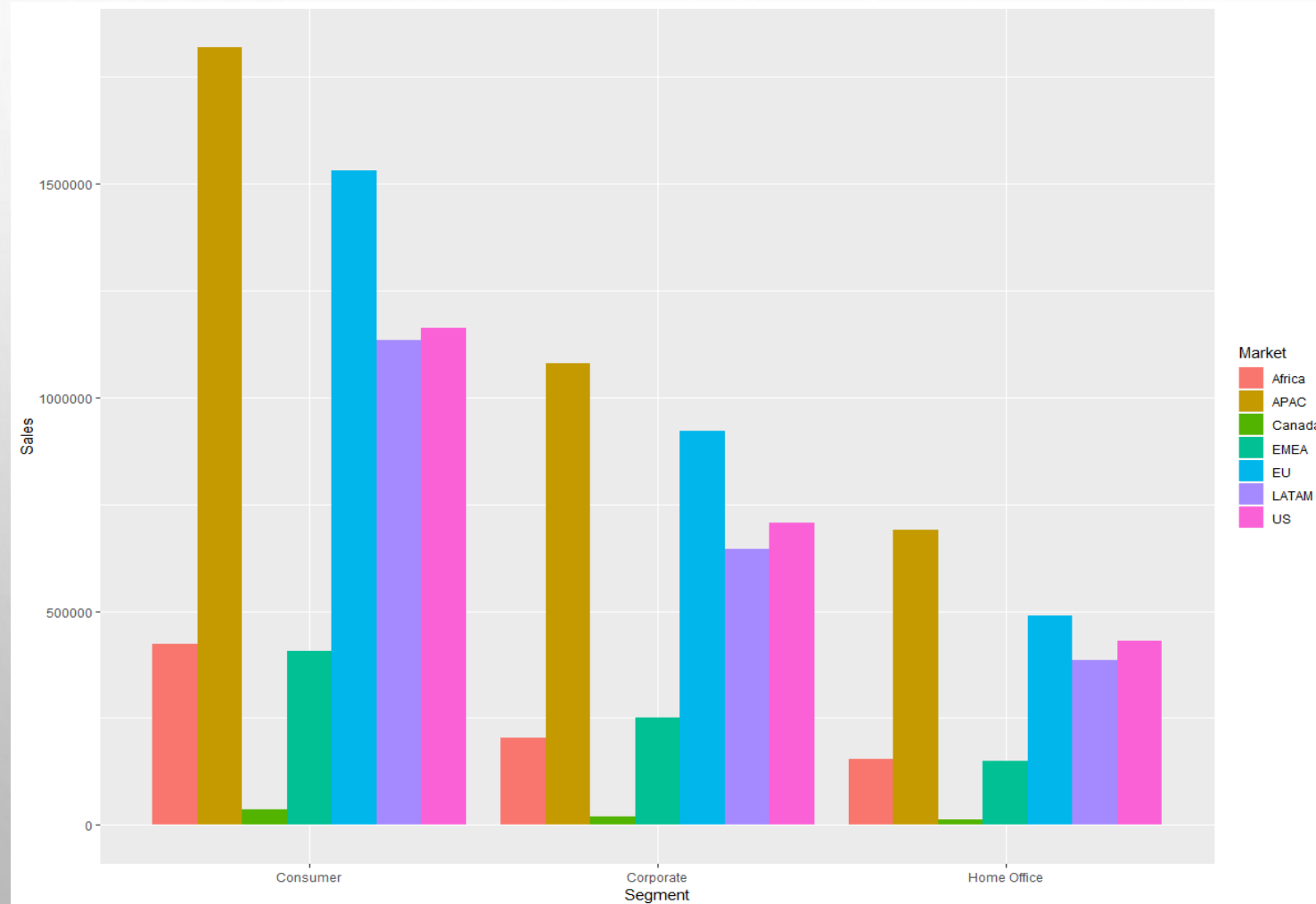
- The data has the transaction level data for 4 years, where each row represents a particular order made on the online store. There are 24 attributes related to each such transaction.
- The “Market” attribute has 7-factor levels representing the geographical market sector that the customer belongs to.
- The “Segment” attribute tells which of the 3 segments that customer belongs to.
- The main attributes that we need to focus on apart from the Market and Segment are the Profit, Sales and Quantity attributes.

Analysis and forecasting Process

We followed the below process for our sales forecasting project:

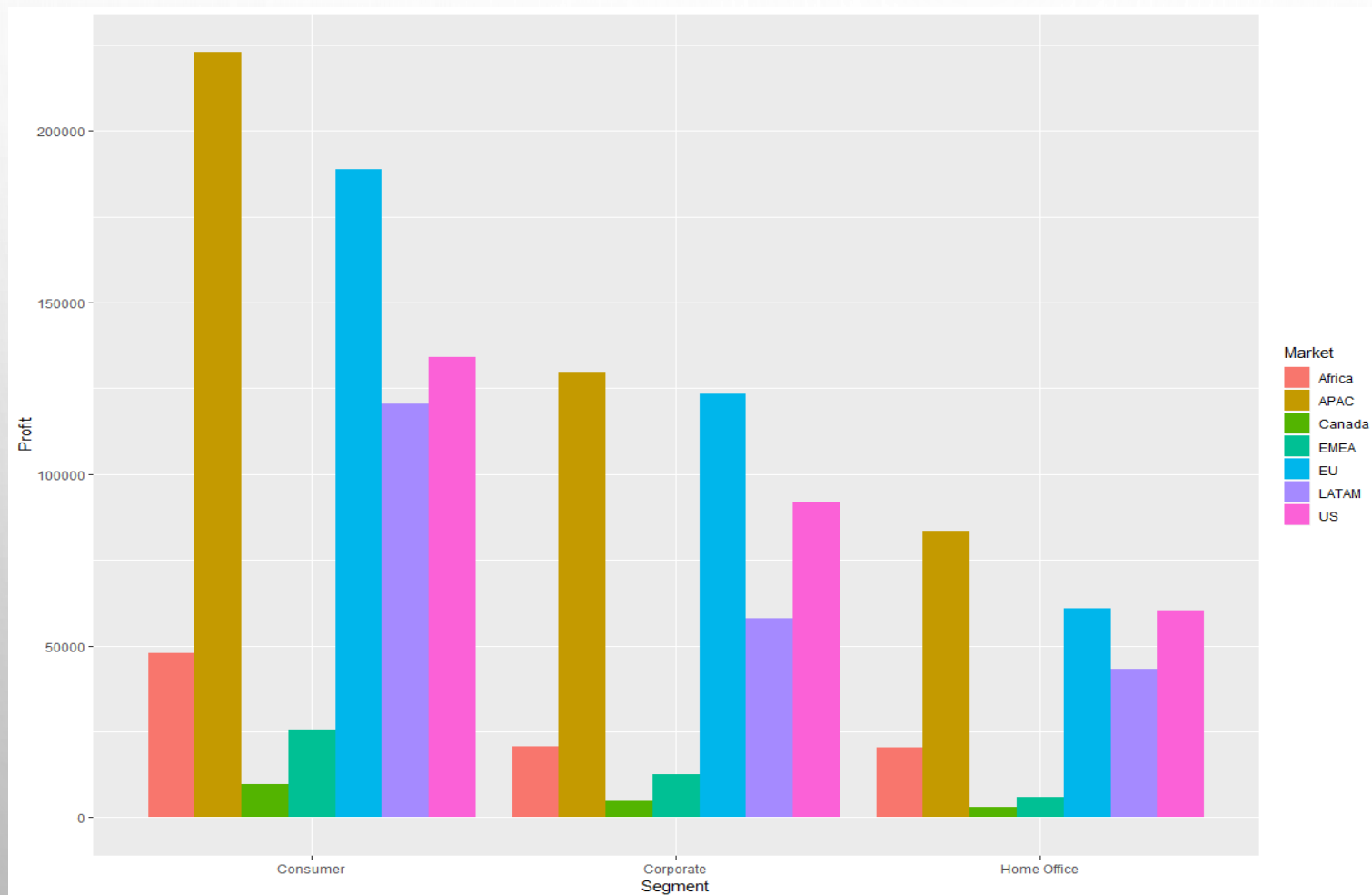
- Data Preparation
- EDA
- Model Building : Classical Decomposition & ARIMA method
- Model Evaluation : mape

Total Sales for 4 years for Market-Segment



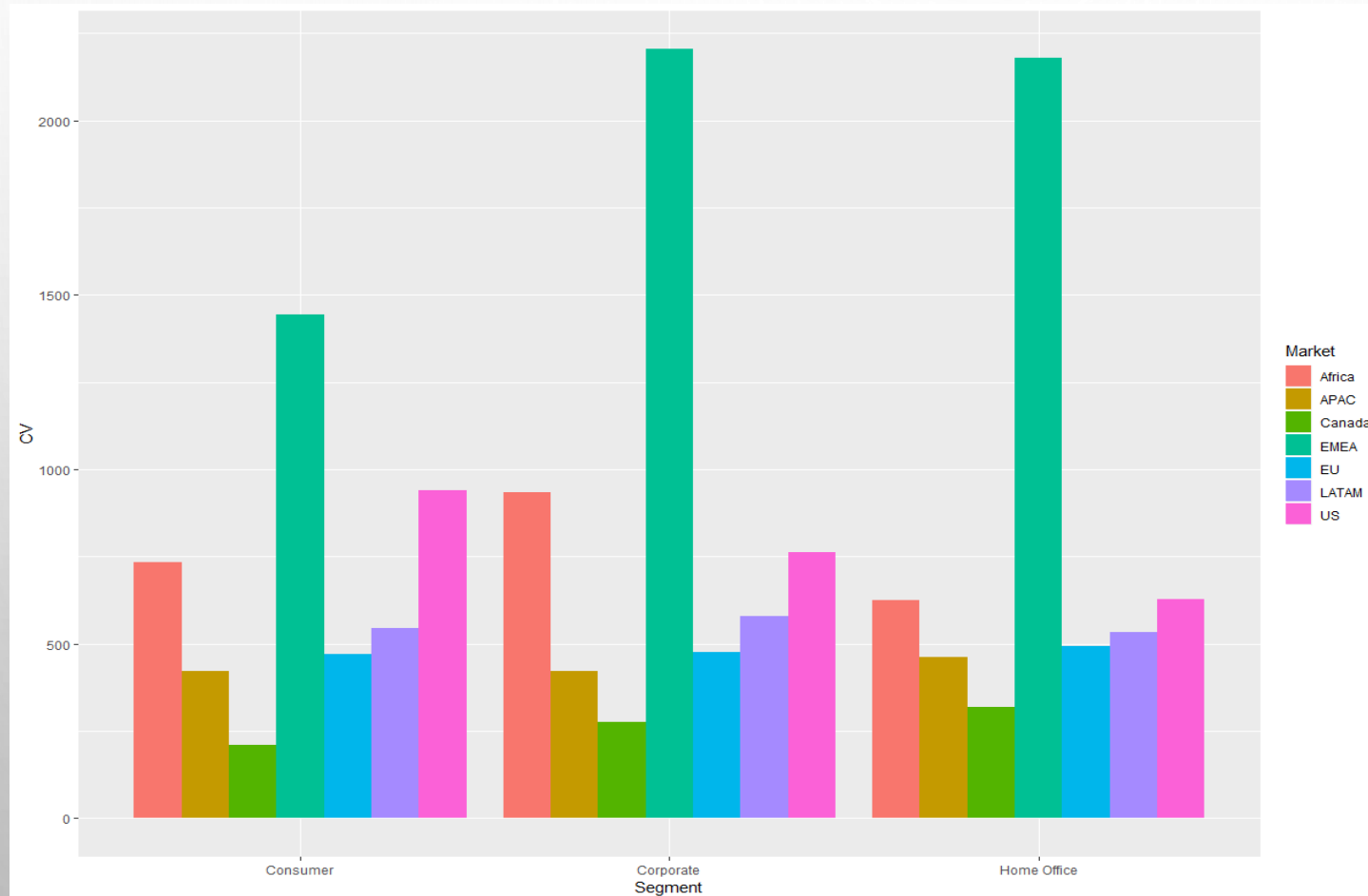
We can see that sales for APAC and EU Consumer segments is the highest

Total Profit for 4 years for Market-Segment



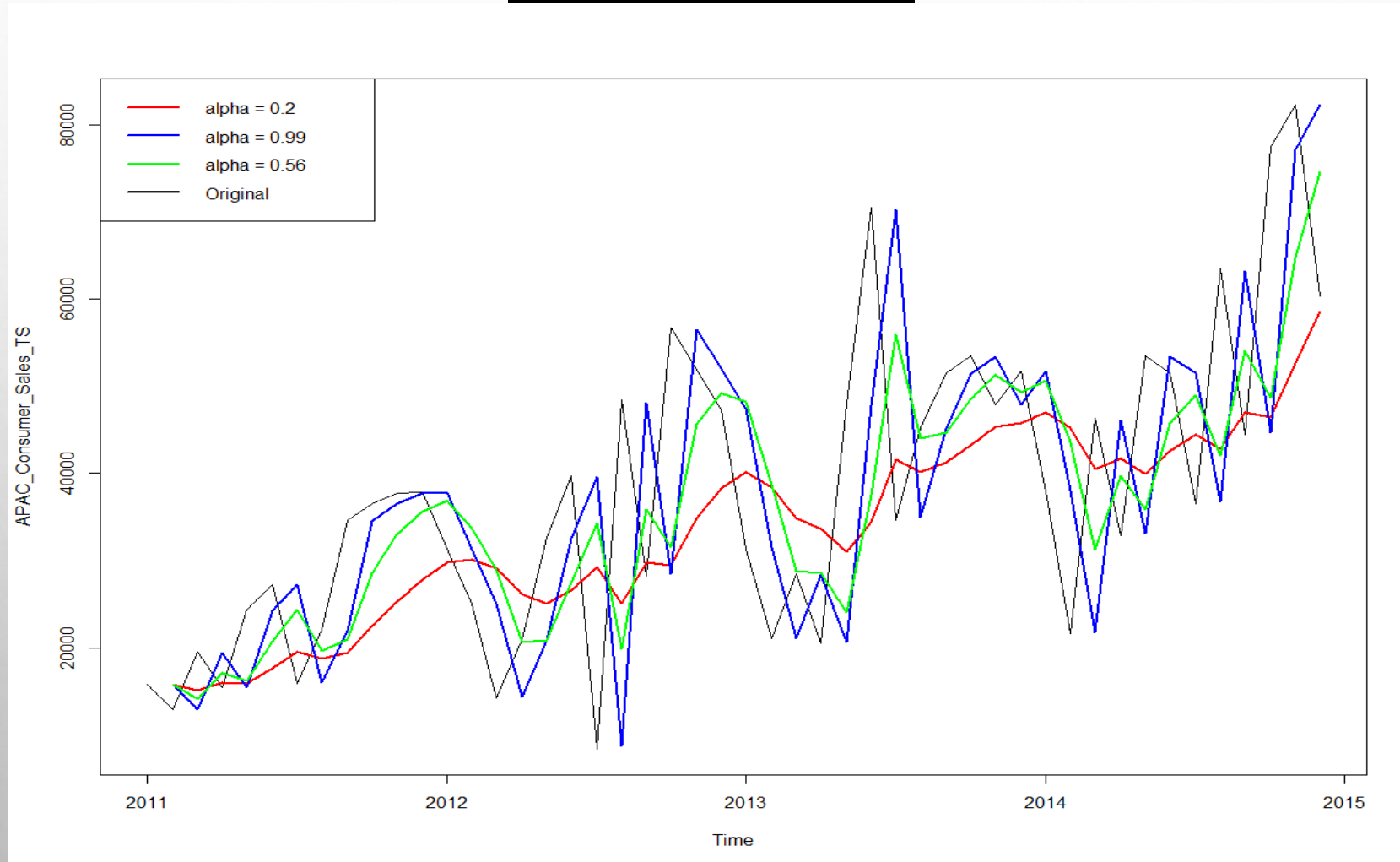
We can see that profit for APAC and EU Consumer segments is the highest

CV for 4 years for Market-Segment

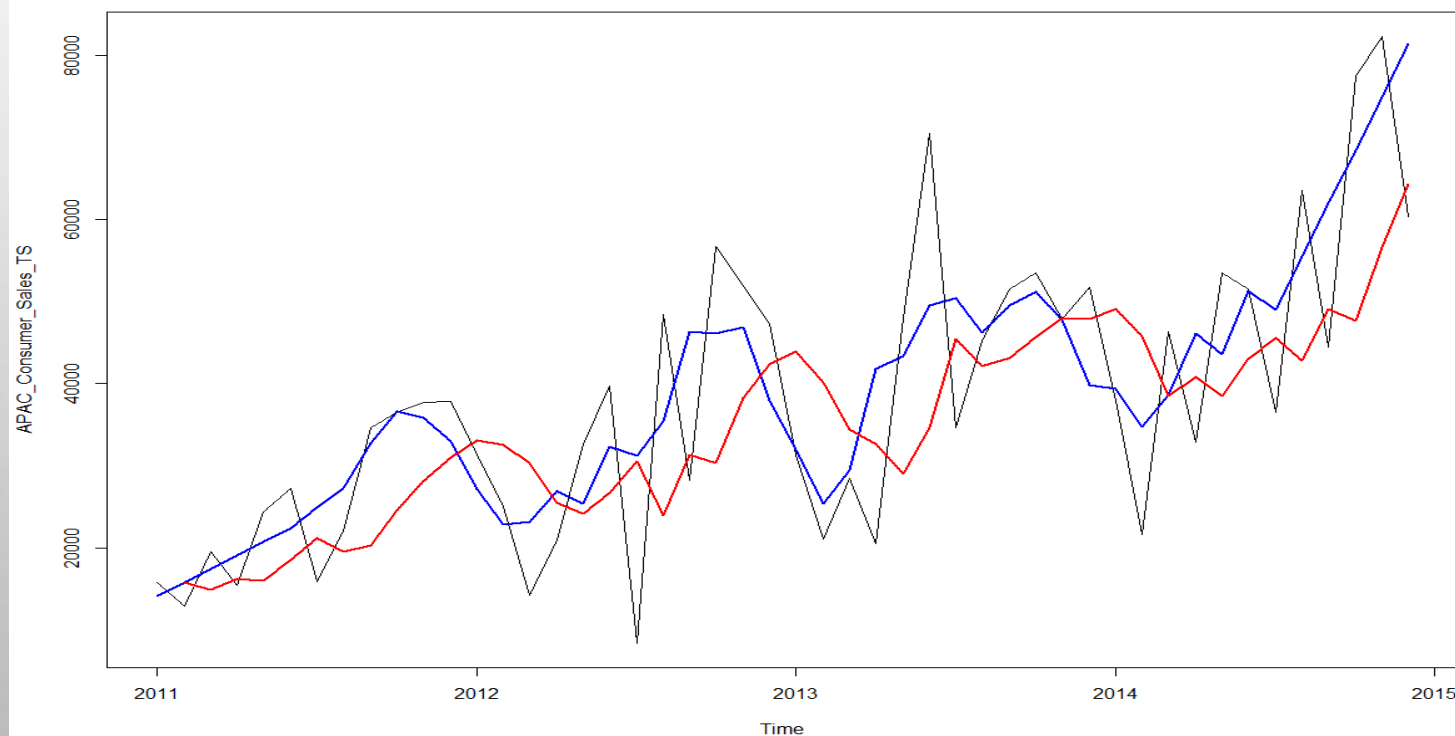


Based on the lowest CV and highest profits, we can say that APAC Consumer and EU Consumer segments are the most profitable and consistent segments.

APAC CONSUMER SALES FORECAST: HOLT WINTERS SMOOTHING

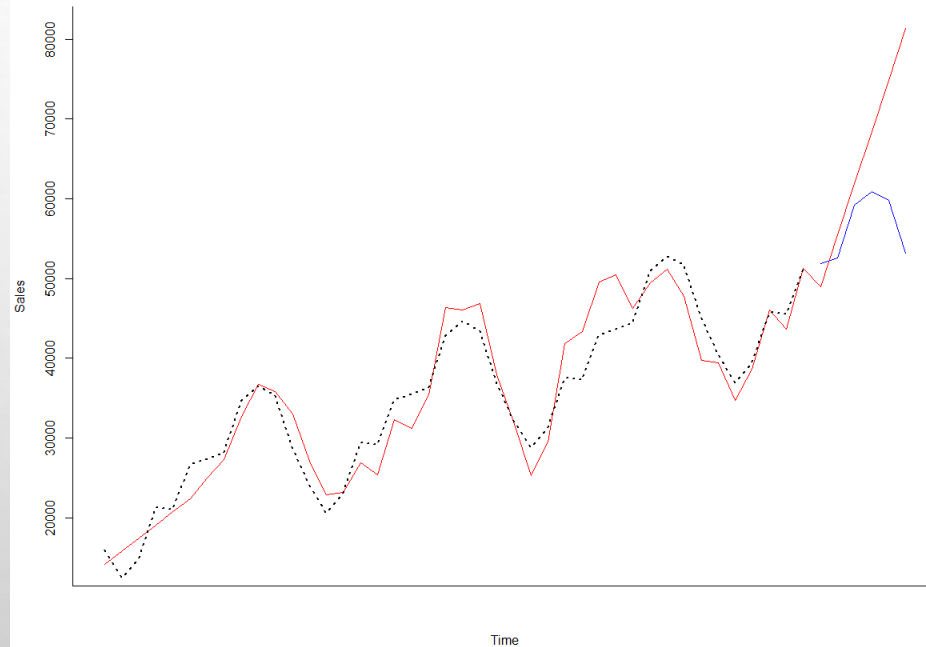


APAC CONSUMER SALES: HOLT WINTERS VS MOVING AVERAGE

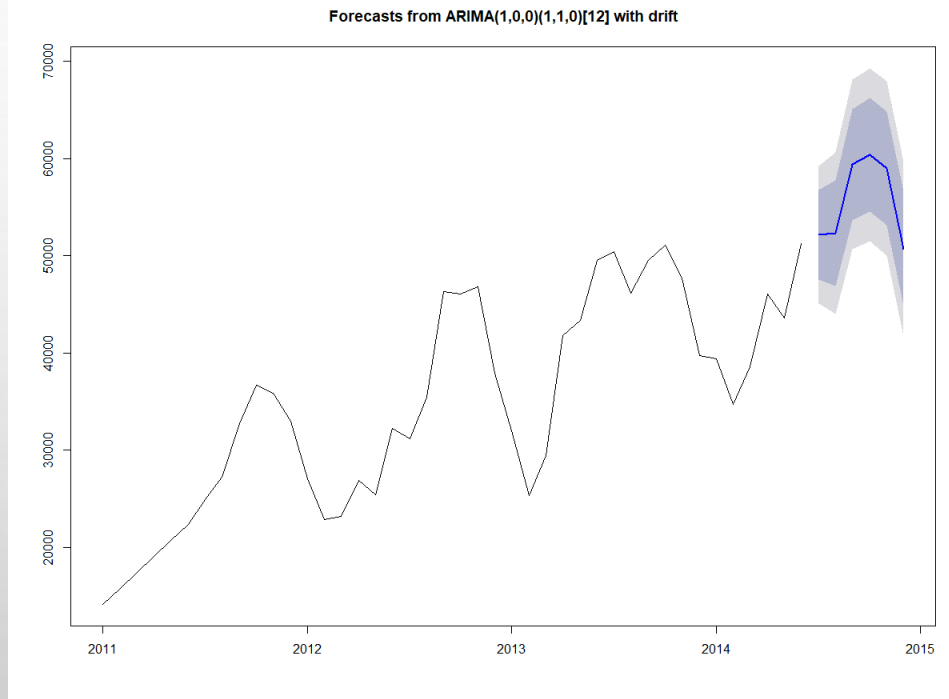


Red- Holt Winters
Blue- Moving Average

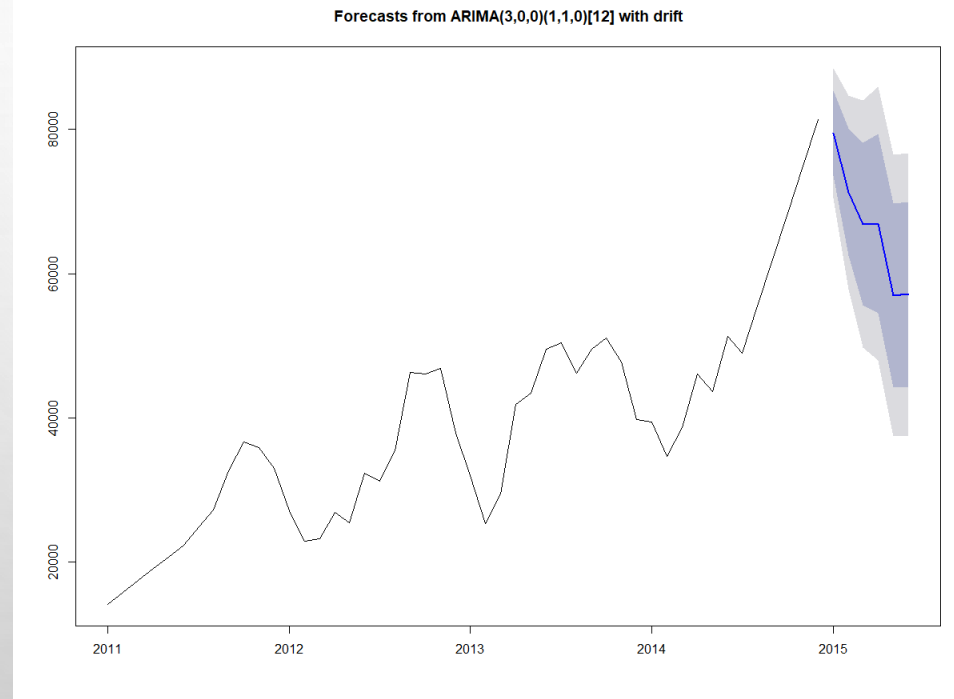
APAC CONSUMER SALES: REGRESSION MODEL BASED ON TREND AND SEASONALITY



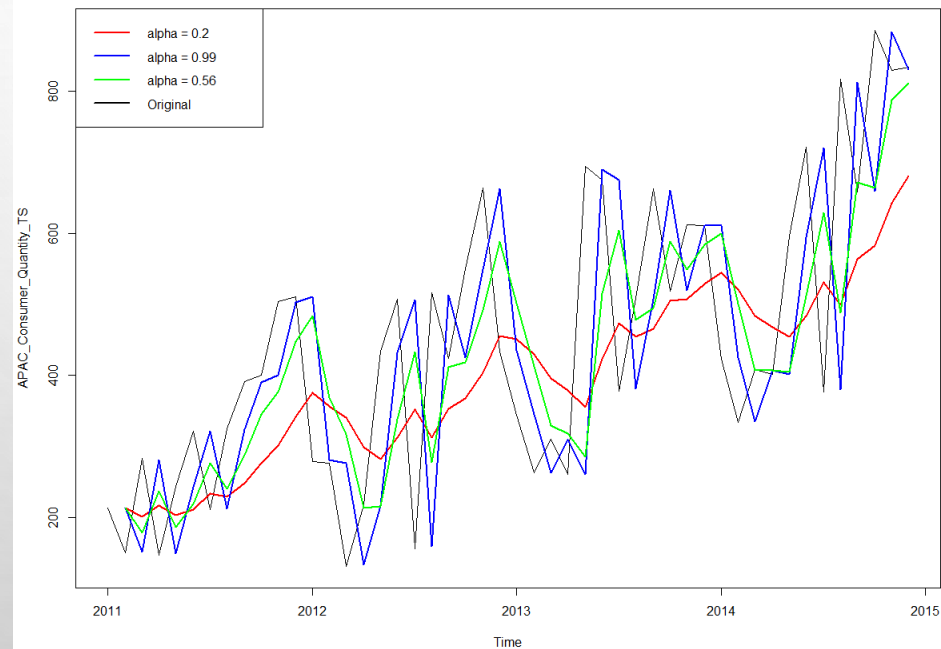
APAC CONSUMER SALES: AUTO ARIMA METHOD



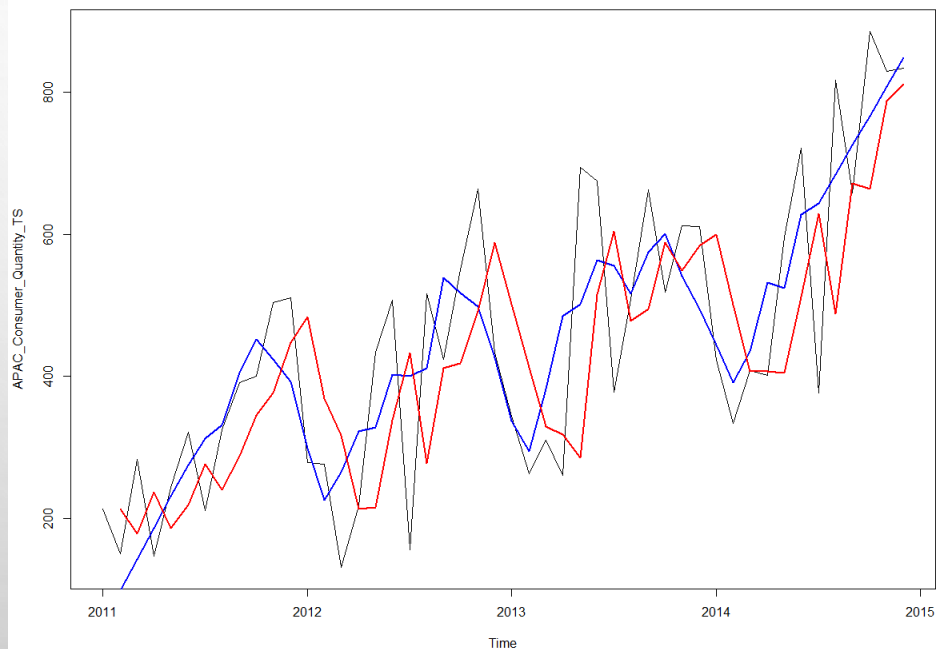
APAC CONSUMER SALES: FORECAST FOR MONTHS FROM JAN 2015 TO JUNE 2015



APAC CONSUMER QUANTITY: HOLT WINTER SMOOTHING

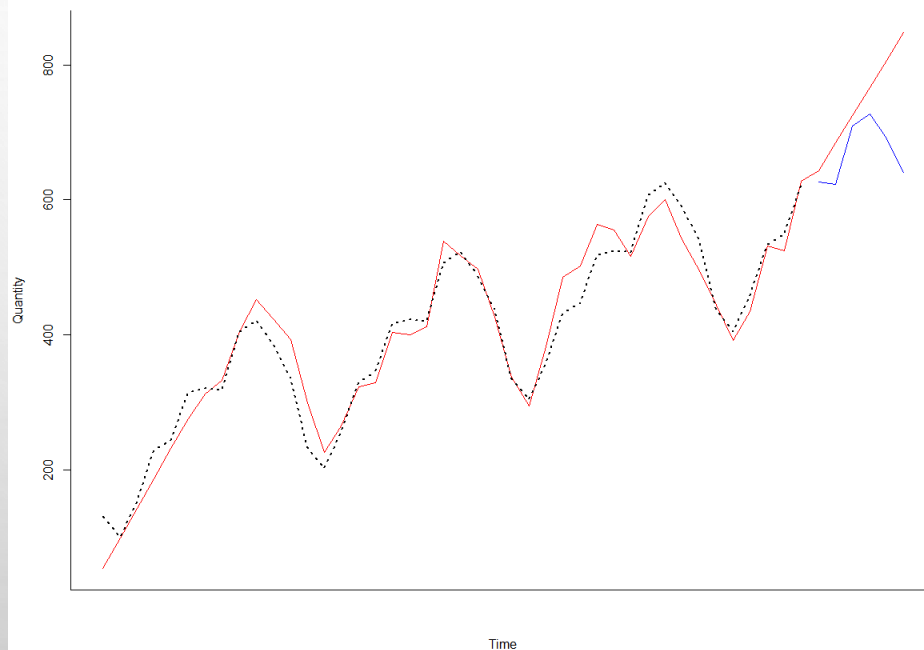


APAC CONSUMER QUANTITY: HOLT WINTERS VS MOVING AVERAGE



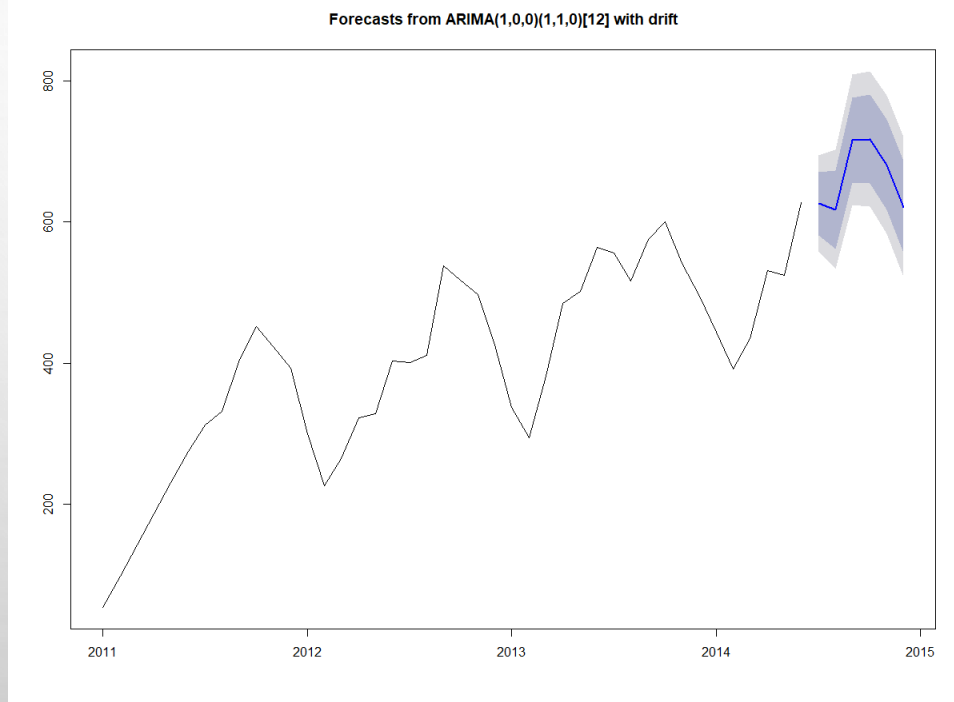
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APAC CONSUMER QUANTITY: REGRESSION MODEL BASED ON TREND AND SEASONALITY



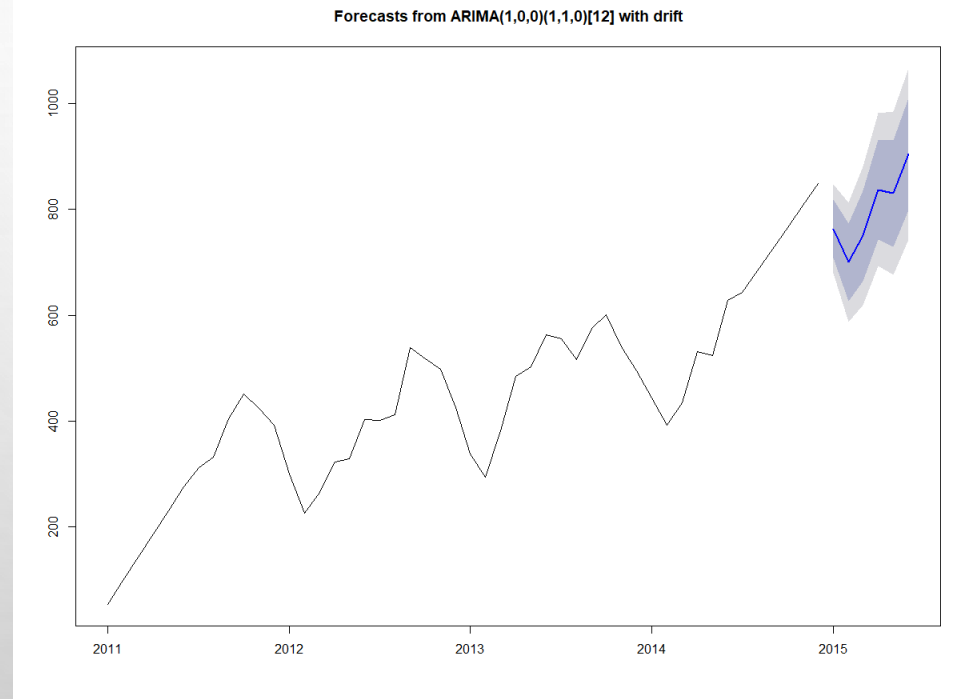
MAPE: 9.58

APAC CONSUMER QUANTITY: AUTO ARIMA METHOD

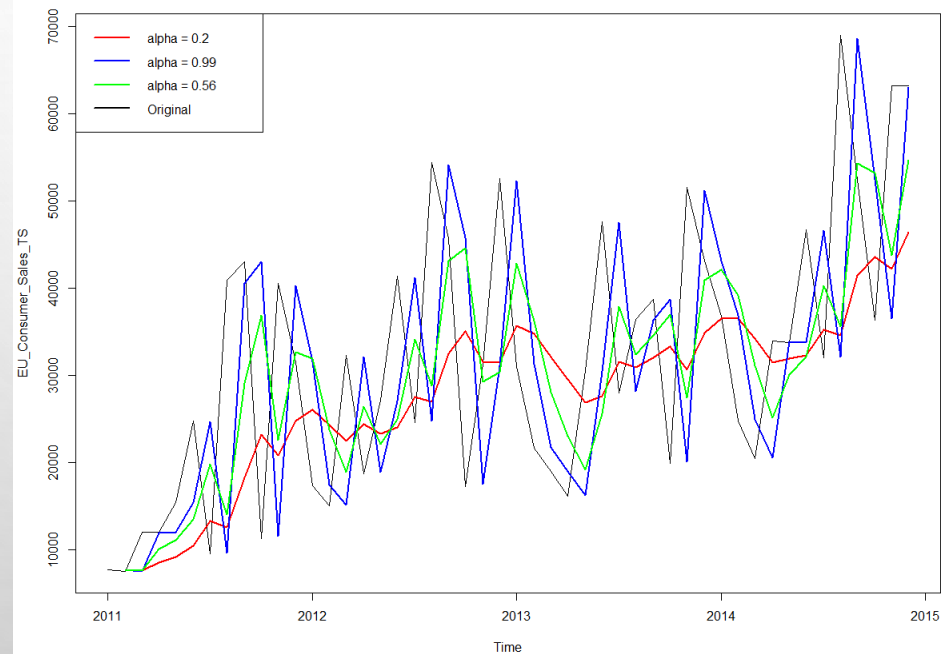


MAPE: 4.80

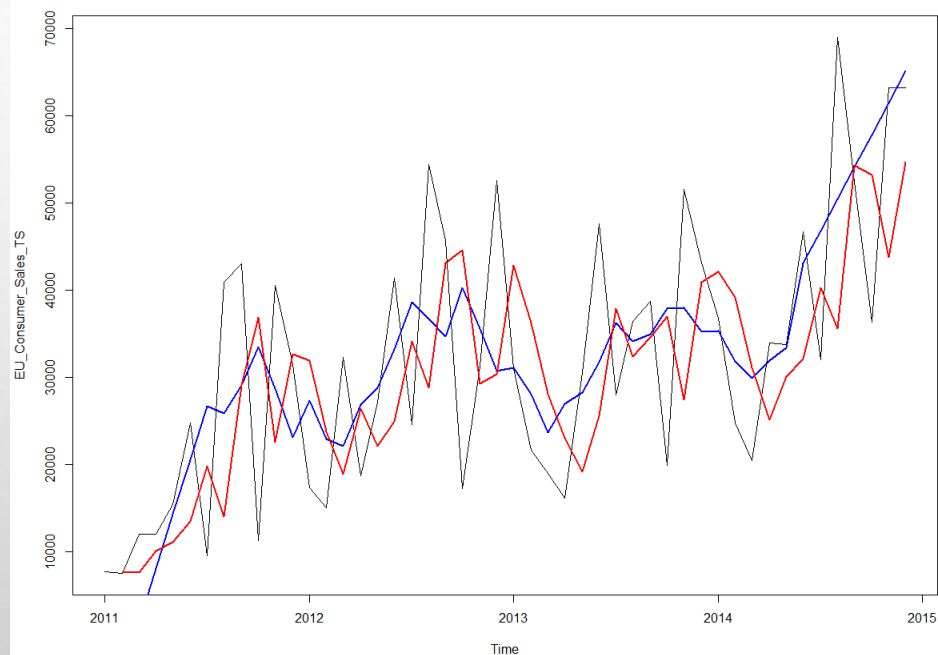
APAC CONSUMER QUANTITY: FORECAST FOR MONTHS FROM JAN 2015 TO JUNE 2015



EU CONSUMER SALES: HOLT WINTER SMOOTHING

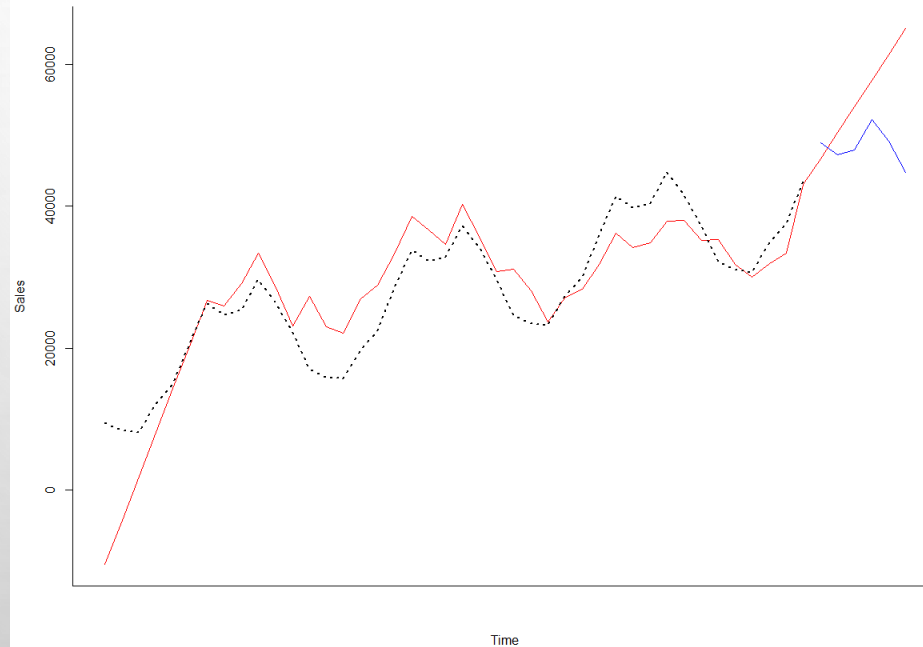


EU CONSUMER SALES: HOLT WINTERS VS MOVING AVERAGE

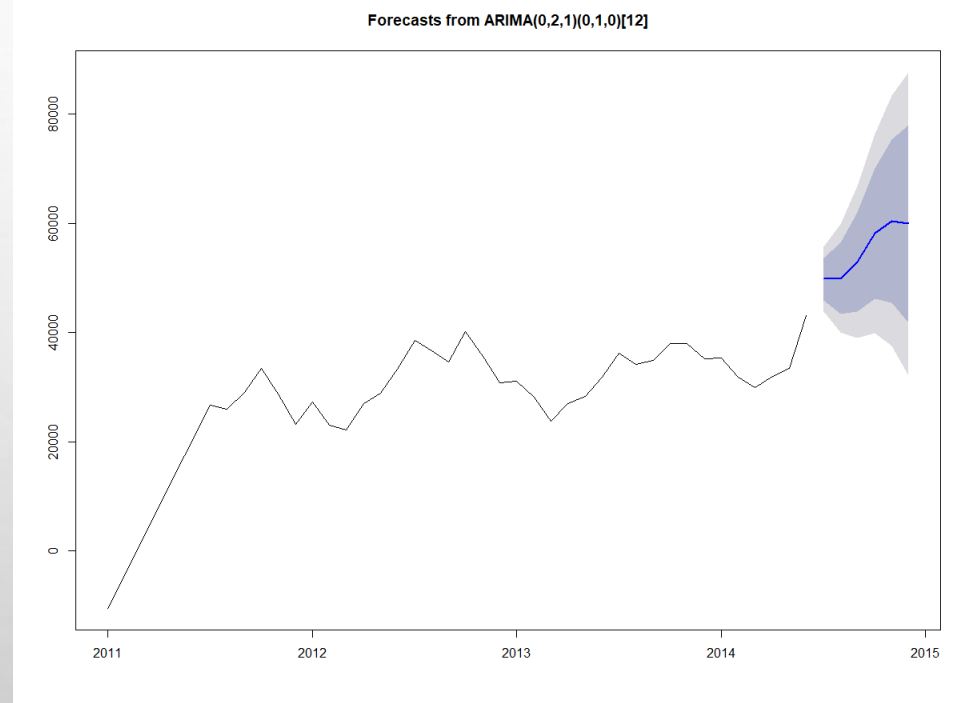


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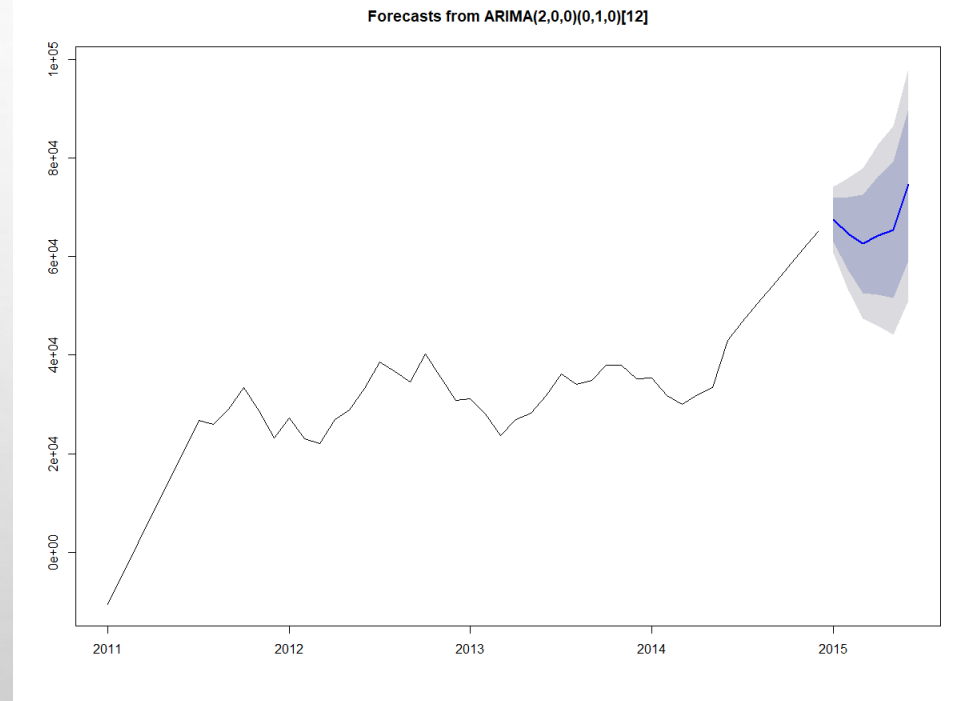
EU CONSUMER SALES: REGRESSION MODEL BASED ON TREND AND SEASONALITY



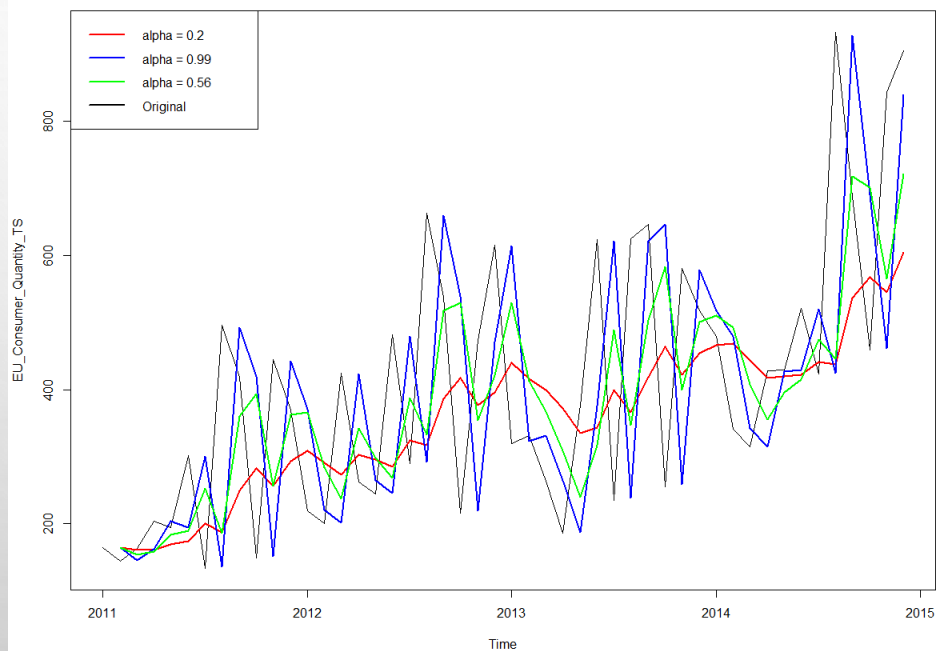
EU CONSUMER SALES: AUTO ARIMA METHOD



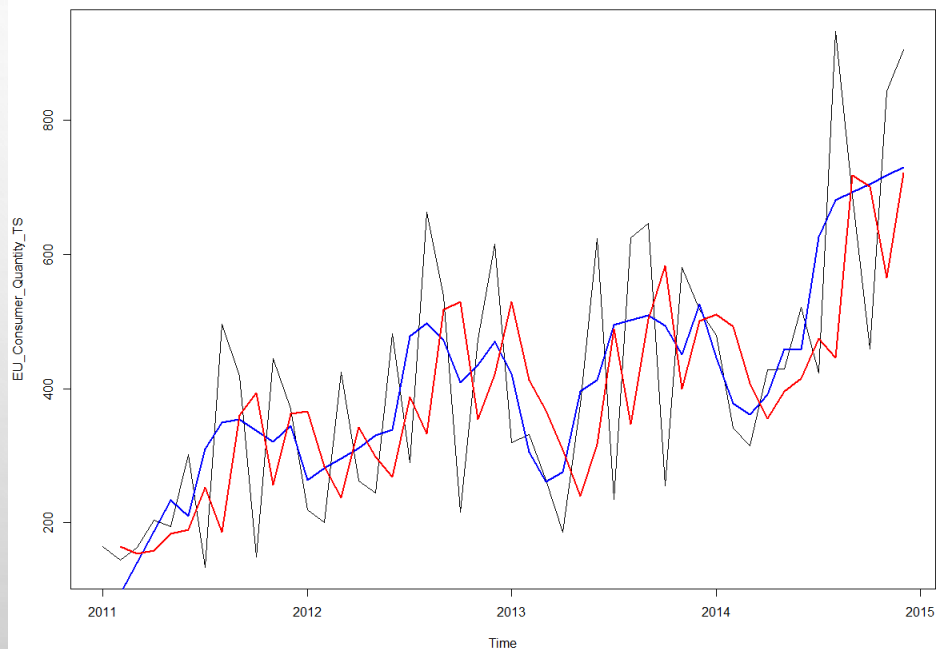
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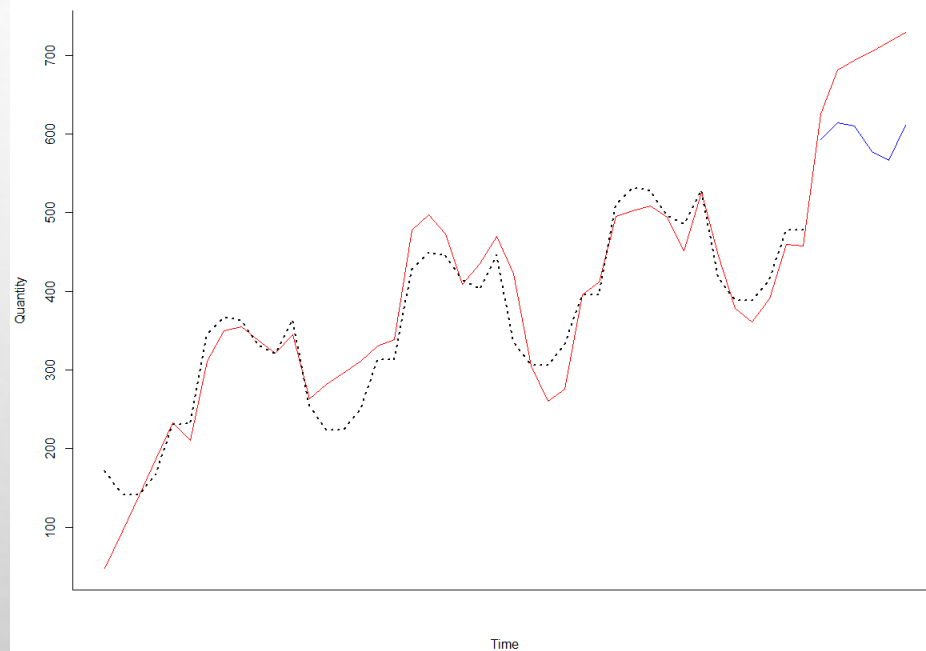


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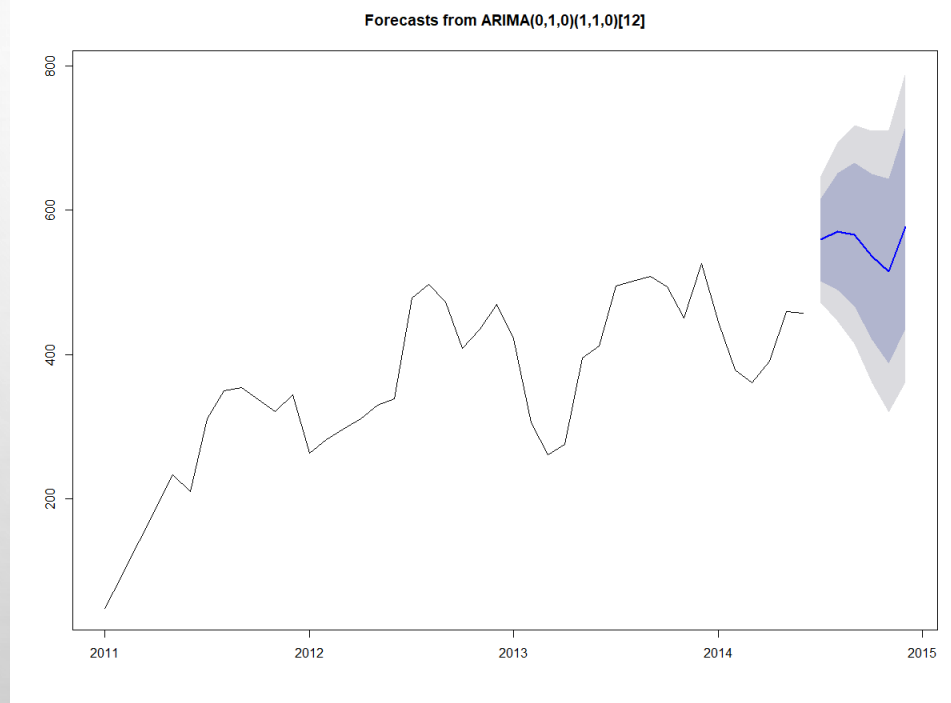


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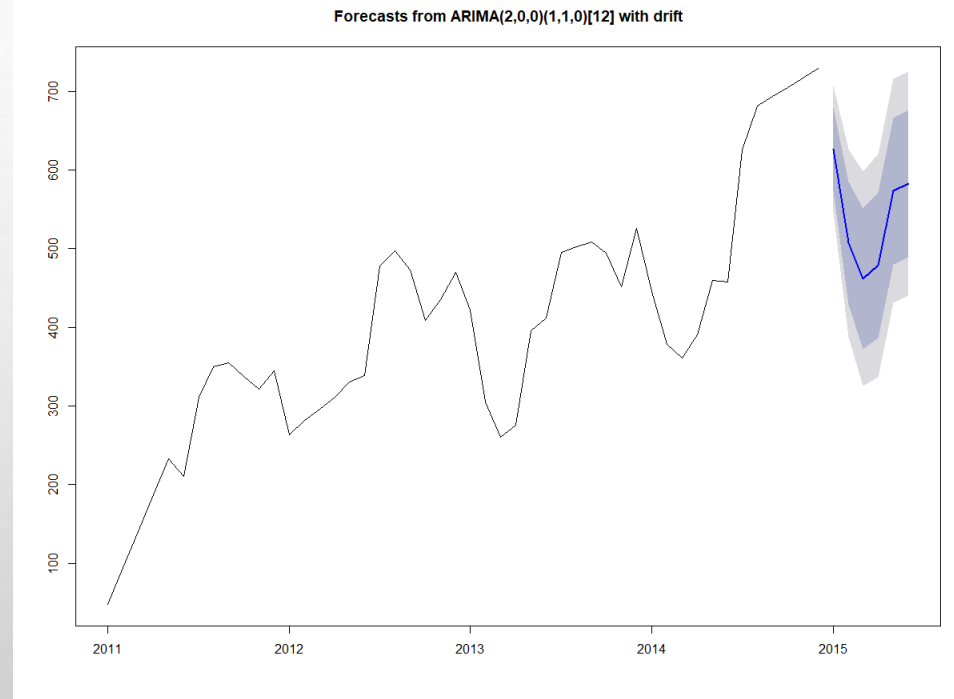
EU CONSUMER QUANTITY: AUTO ARIMA METHOD



EU CONSUMER QUANTITY USING AUTO ARIMA

METHOD: FORECAST FOR MONTHS FROM JAN 2015

TO JUNE 2015



EU CONSUMER QUANTITY USING REGRESSION

METHOD: FORECAST FOR MONTHS FROM JAN 2015

TO JUNE 2015

