

Product Demand Forecasting

WAREHOUSE INVENTORY MANAGEMENT

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Business Case

- Warehouse manufacturer wants to implement inventory management strategy to save costs



Carrying Cost

- Holding inventory for 12 months could increase the cost of an item by as much as 60%



Stockout

- Decrease in customer satisfaction and loss of sales



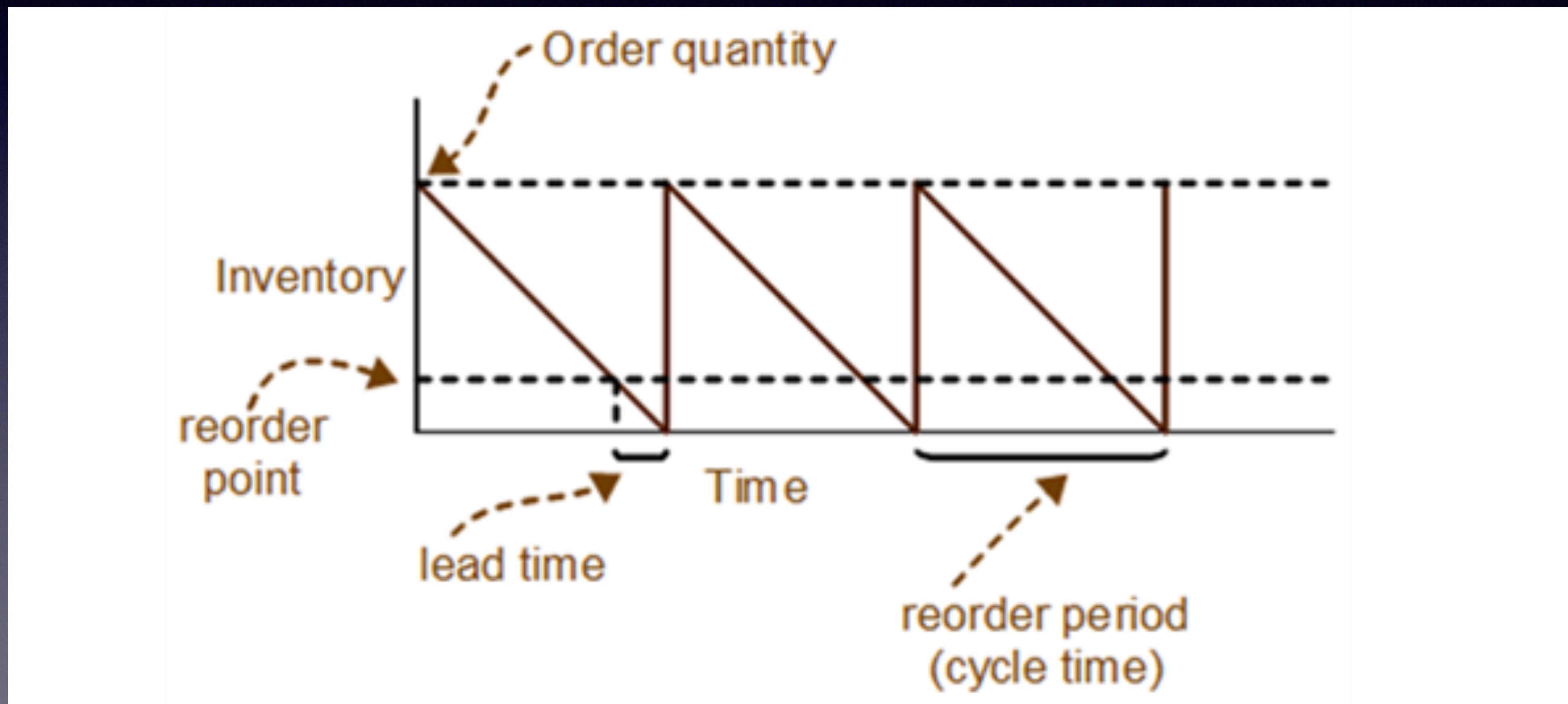
Trade-off

- Finding a balance reduces costs and increases profits



Reorder Point

$ROP = (\text{Avg Daily Unit Sales} \times \text{Delivery Lead Time}) + \text{Safety Stock}$



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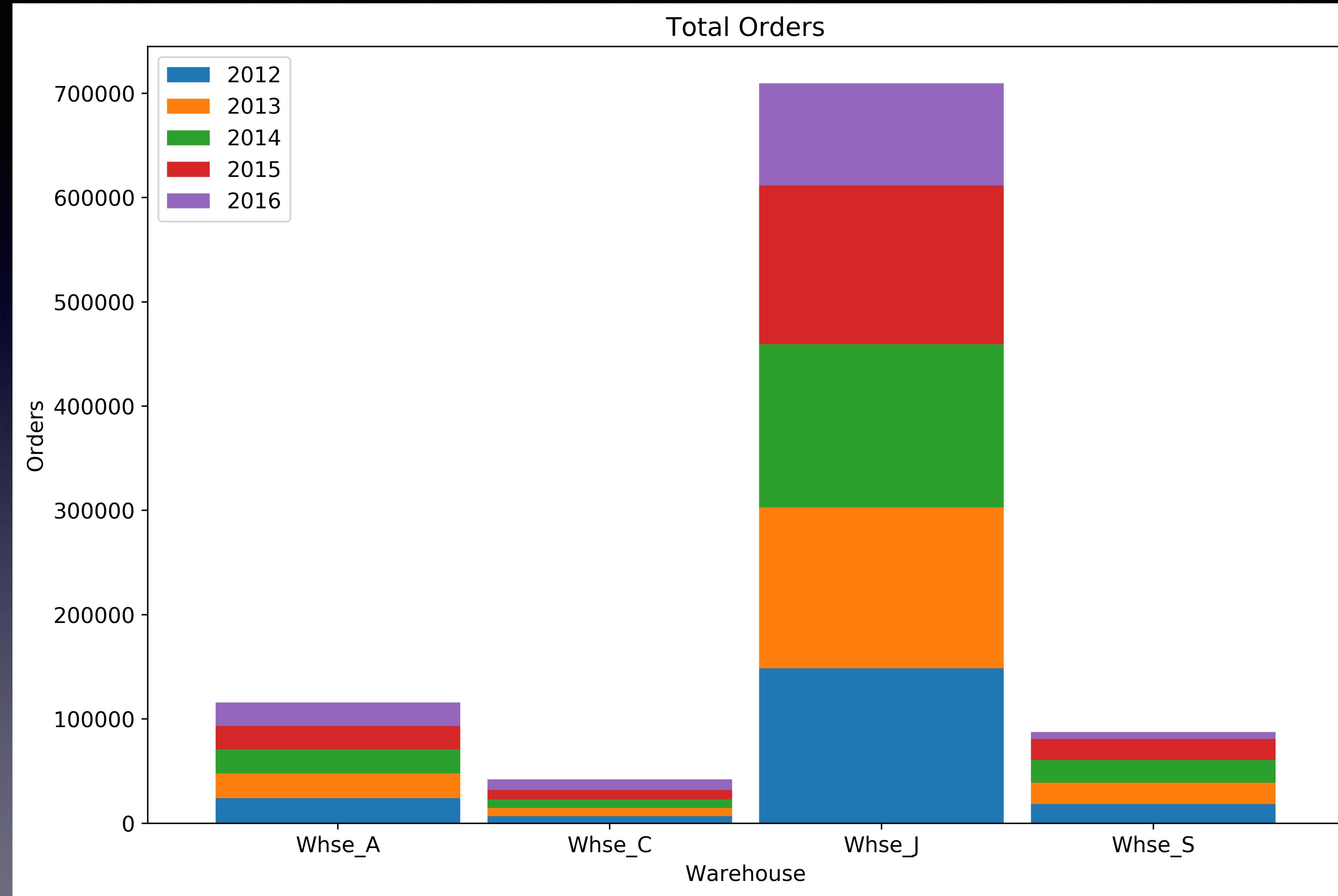
Reorder Point

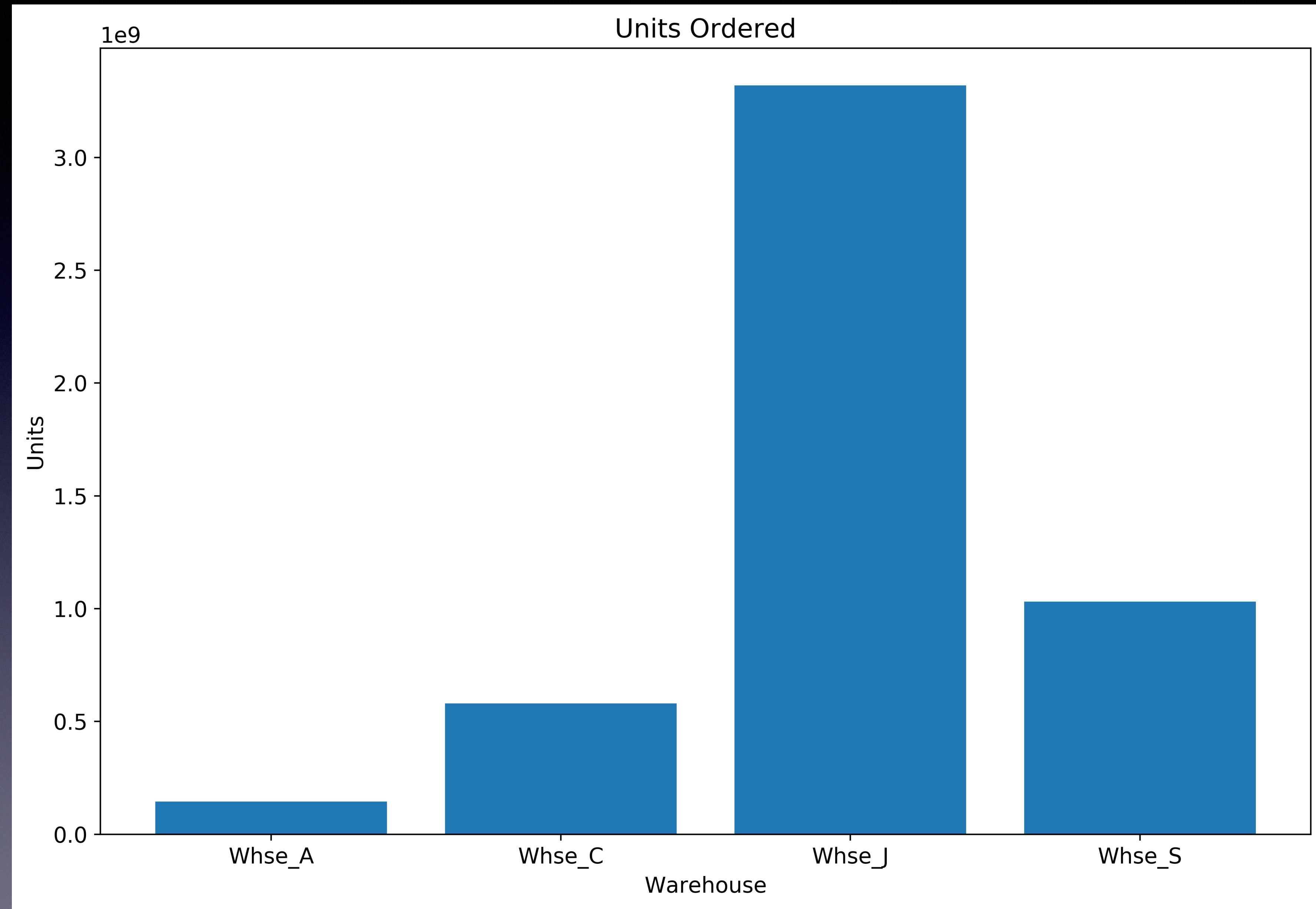
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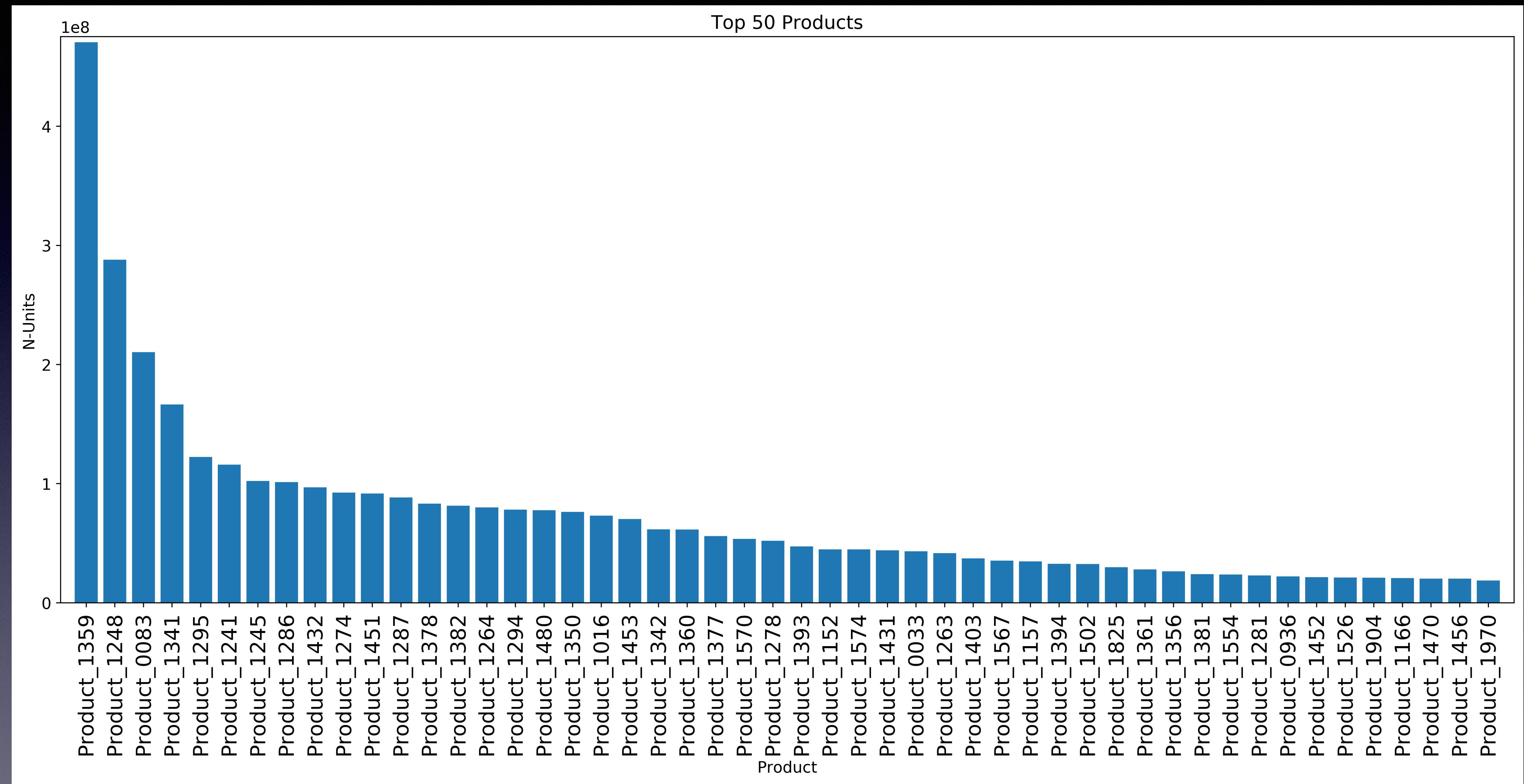
Methods

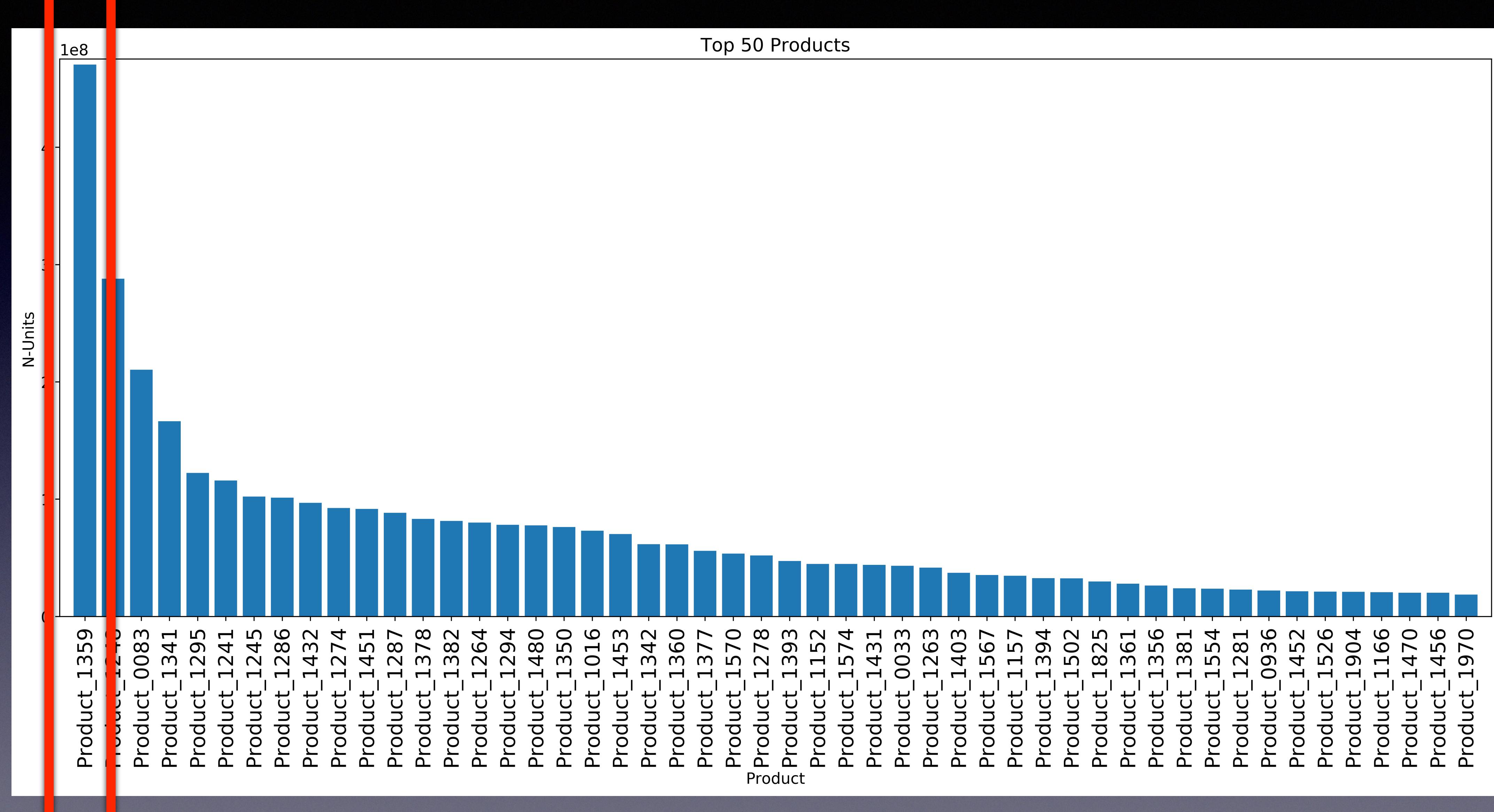
- FB Prophet Time Series Algorithm
- Additive Linear Model
 - Trend
 - Seasonality
 - Holiday

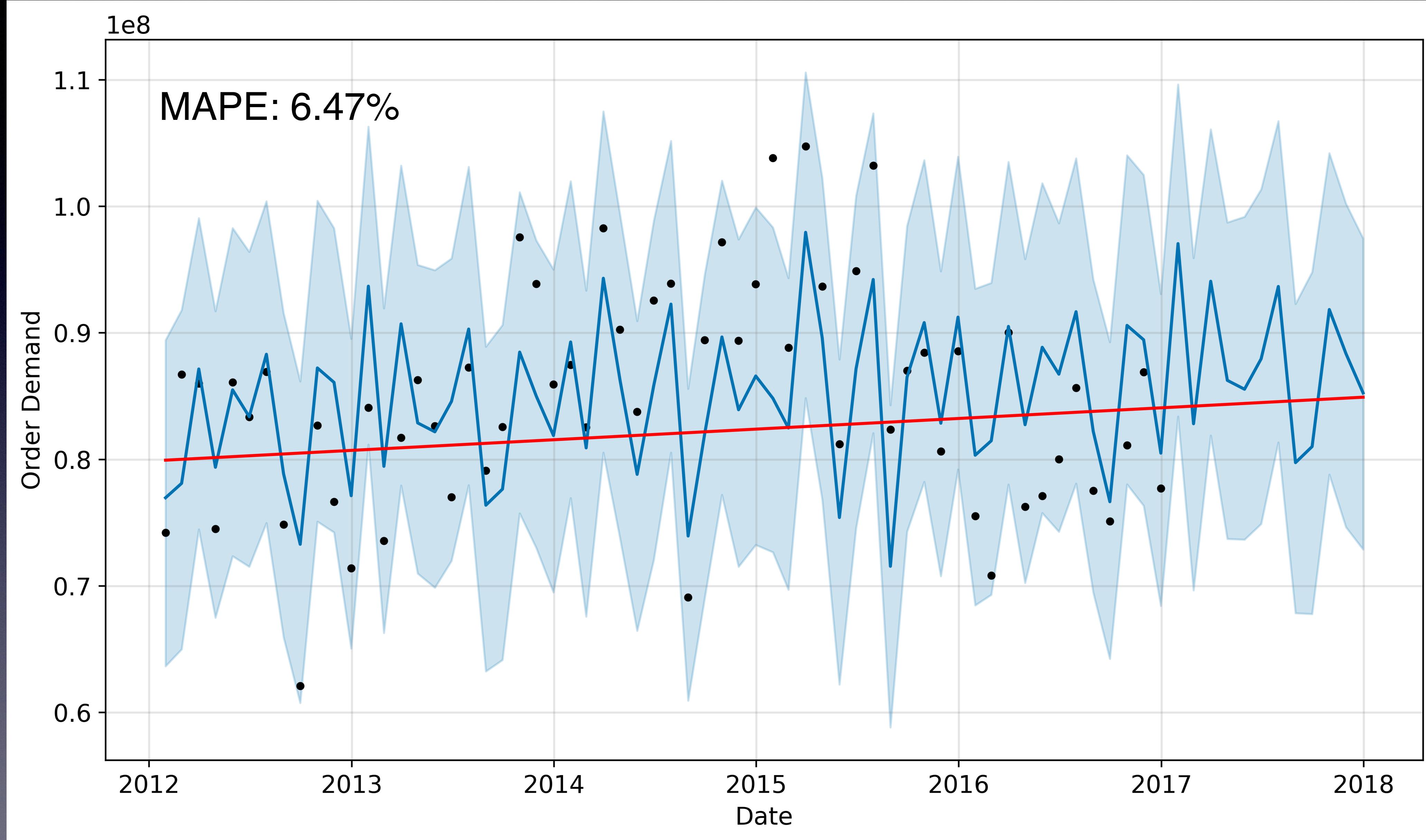


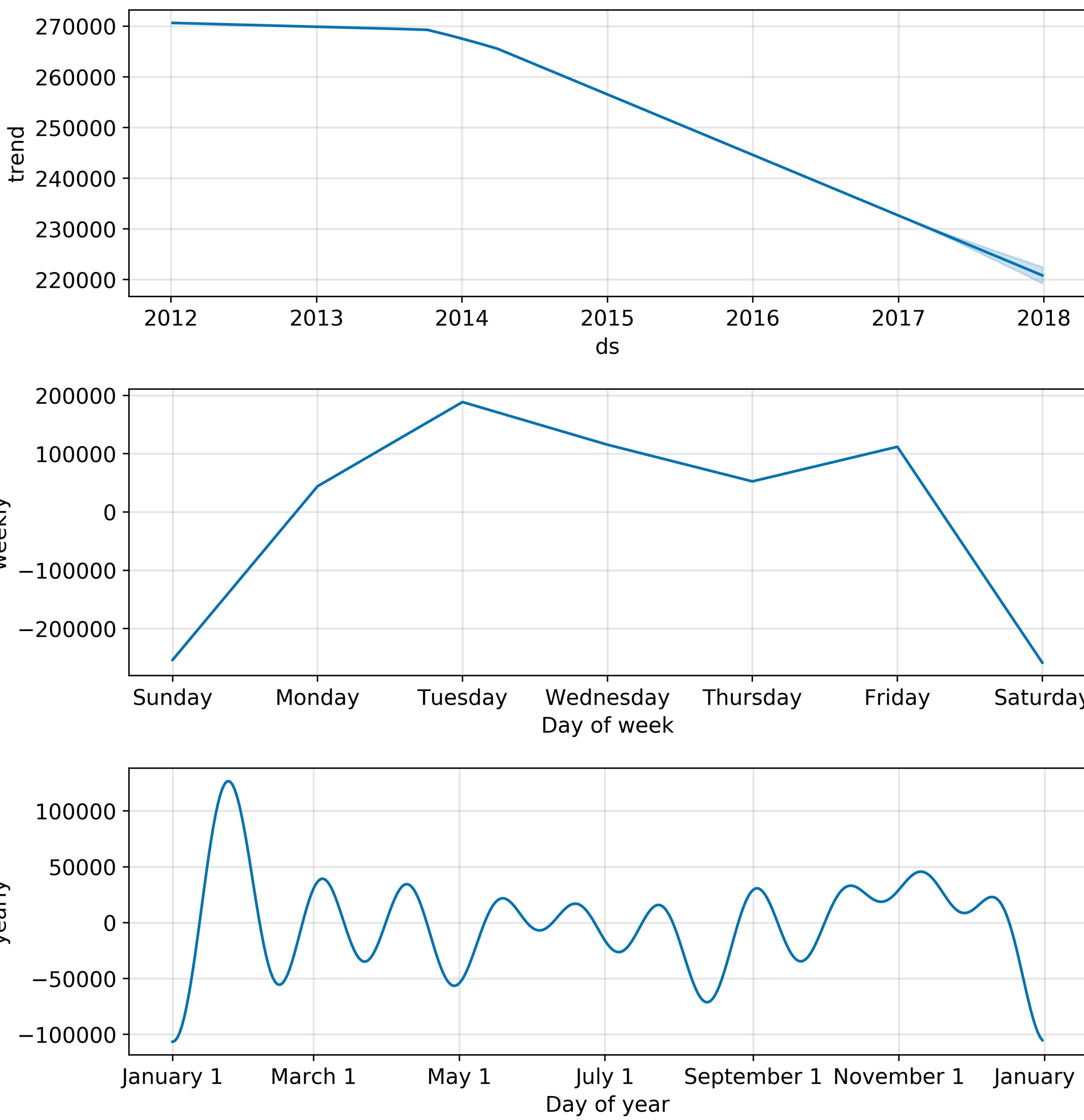


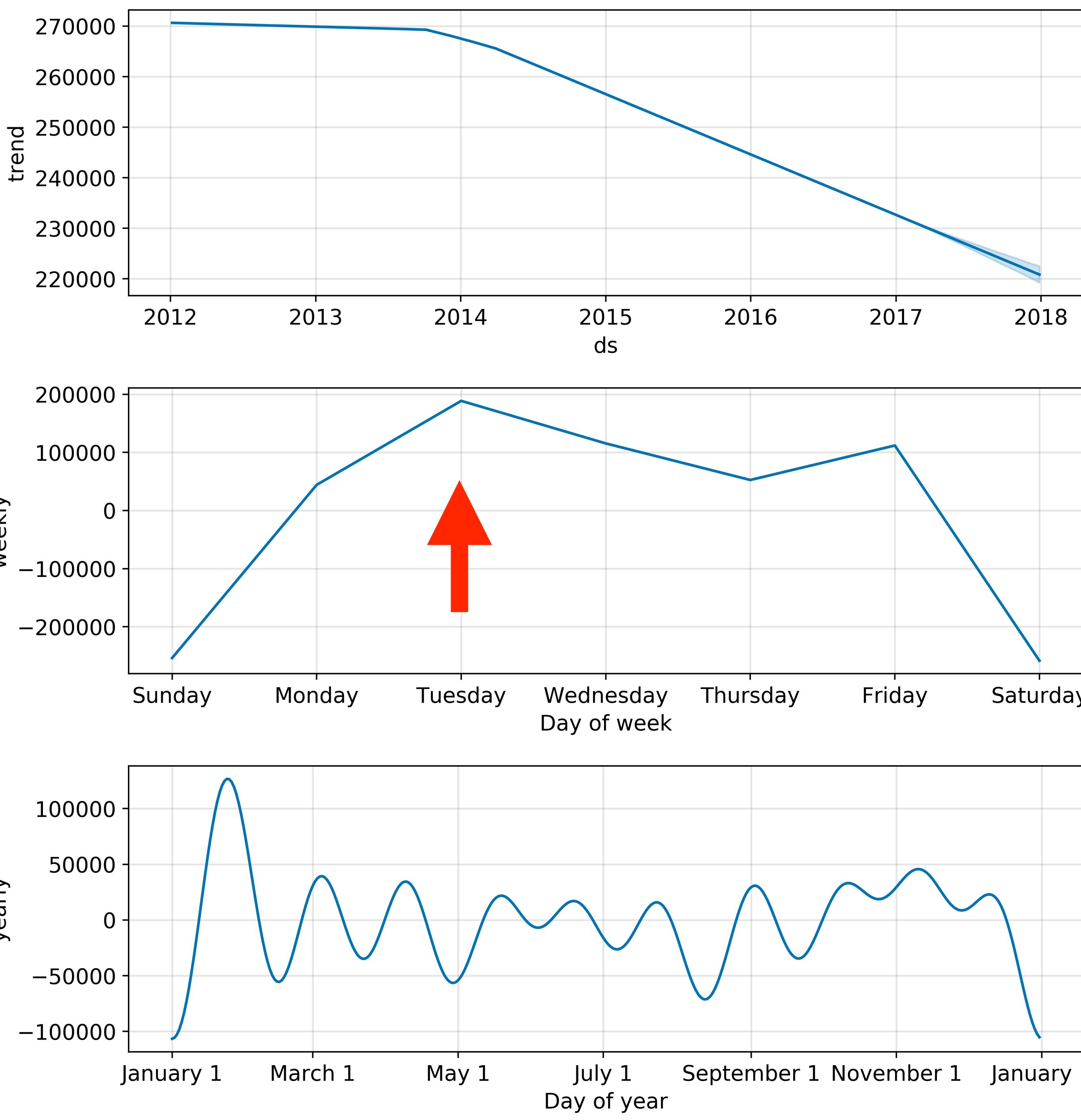


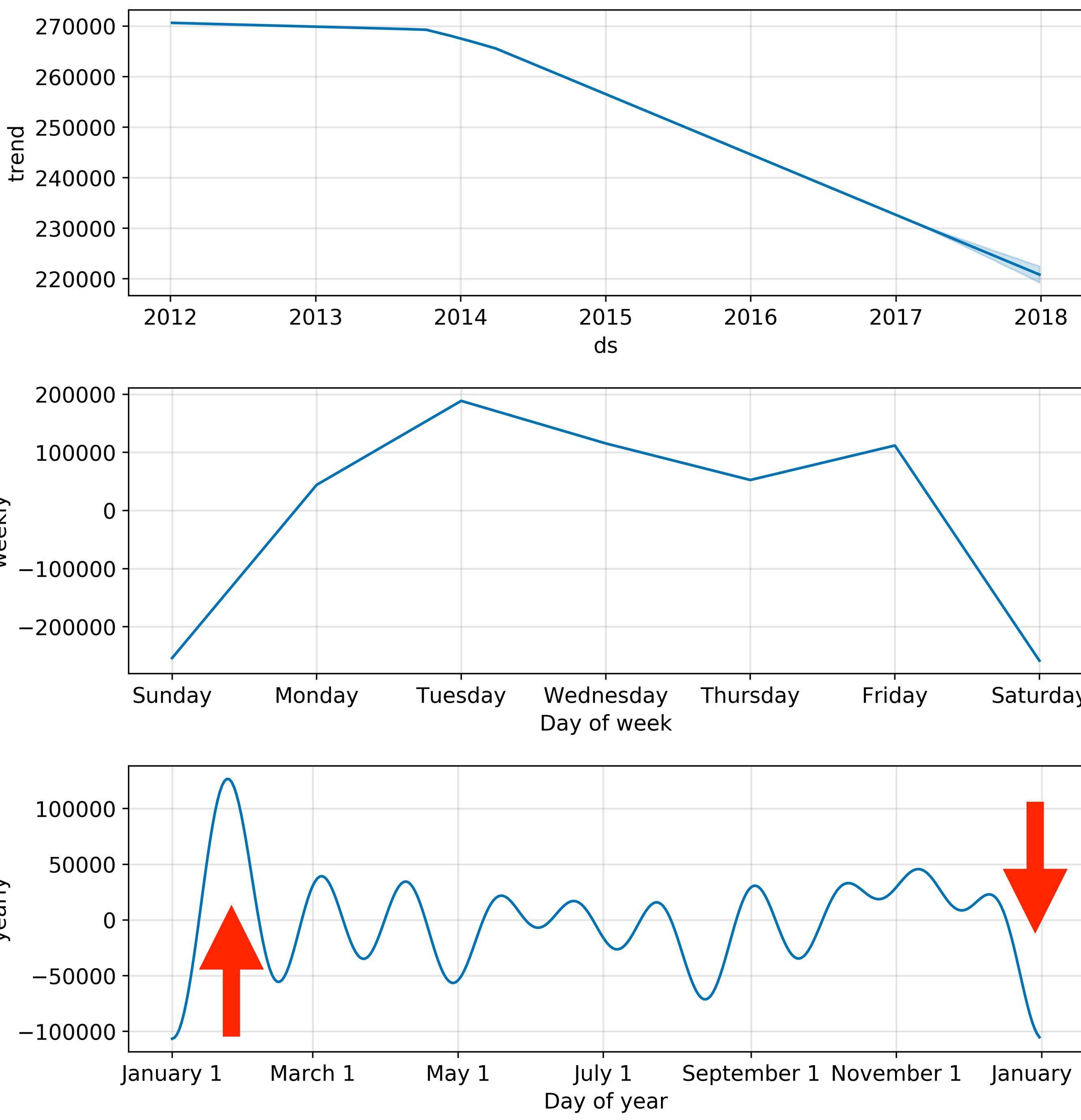








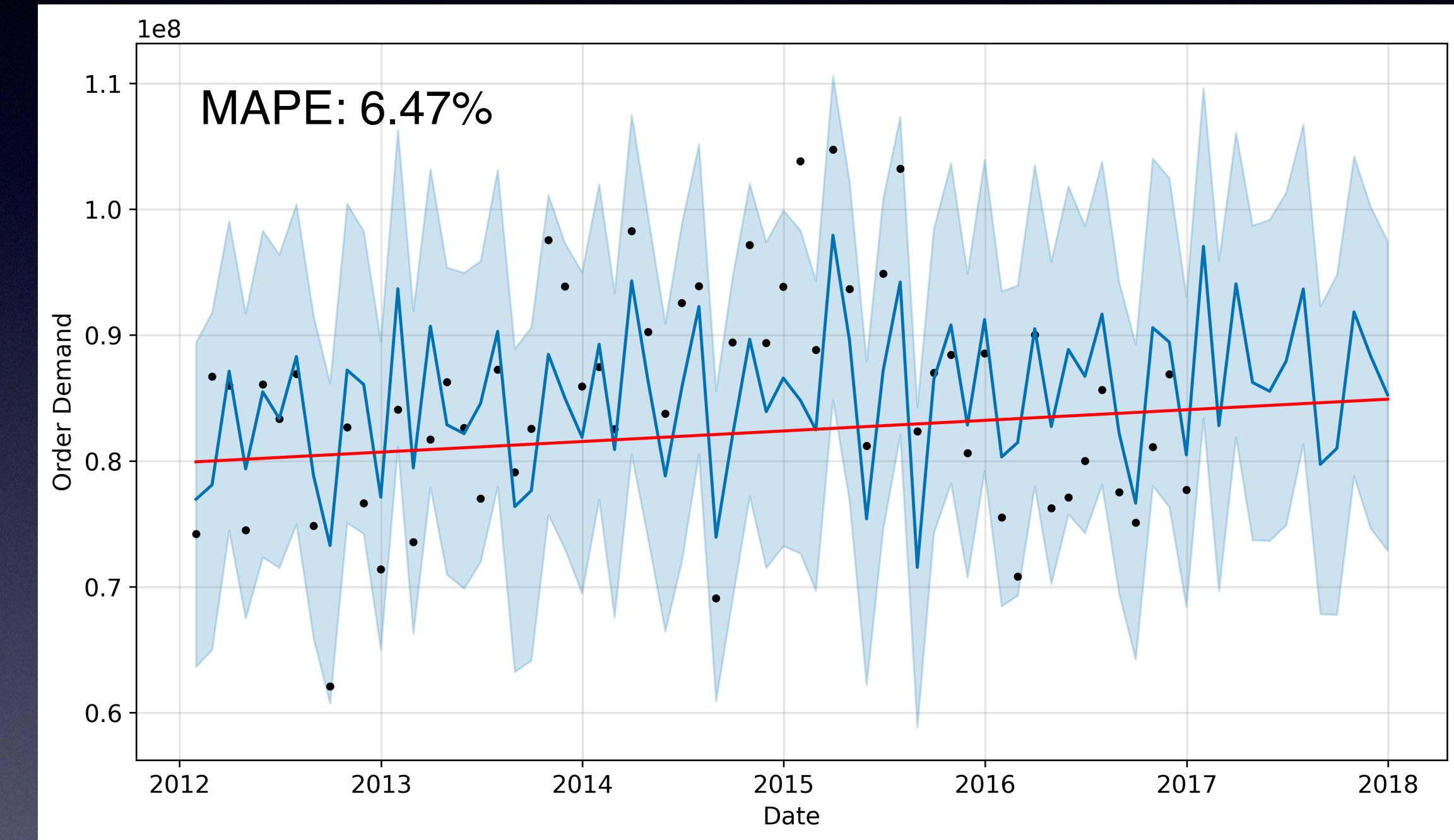




Recommendations

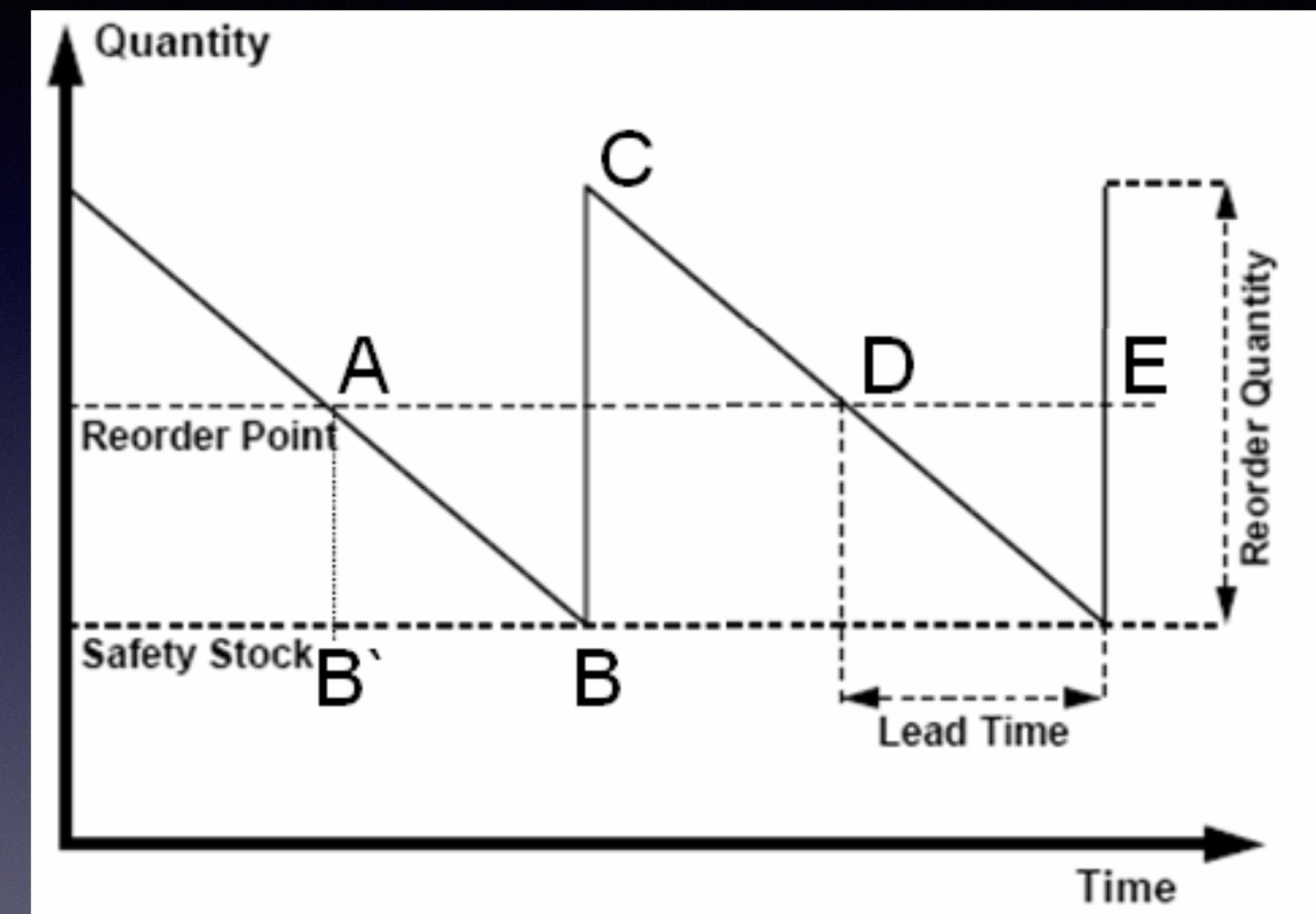


Monthly Model



Reorder Point

$$ROP = (\text{Avg Daily Sales} \times \text{Lead Time}) + \text{Safety Stock}$$



Future Work



Inventory Selection

- Whse J: Top 100 products (out of 2157 total) account for 86.54% of total units of products sold



Cost Analysis

- Pricing Data
- Carrying Costs
- Negative Demand



Thank you!

References

- ROP Formula: [https://en.wikipedia.org/wiki/Reorder_point#:~:text=The%20reorder%20point%20\(ROP\)%20is,the%20item%20must%20be%20reordered](https://en.wikipedia.org/wiki/Reorder_point#:~:text=The%20reorder%20point%20(ROP)%20is,the%20item%20must%20be%20reordered).
- Image 1: <https://www.allthingssupplychain.com/9-tips-for-effective-warehouse-inventory-management/>
- Image 2: <https://www.intuitiveaccountant.com/vendor-news/reorderpoint-com-a-warehouse-wednesday-product-review/#.X59depNKgWo>
- Image 3: <https://research.fb.com/blog/2017/02/prophet-forecasting-at-scale/>
- Image 4: <https://www.manufacturing.net/home/article/13117104/what-is-the-real-cost-of-dead-inventory#&gid=1&pid=3>
- Image 5: <https://www.thebalancesmb.com/small-business-guide-to-inventory-control-4087712>
- Image 6: <https://mobisoftinfotech.com/resources/blog/warehouse-management-system-role-and-functions-in-logistics-chain/>