Northwind Traders | Discounts and the effect on Product Sales

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Background

- This project provides a .csv database for a fictitious company named "**Northwind Traders**" containing all the sales transactions that occur between the company i.e. Northwind traders and its customers as well as the purchase transactions between Northwind and its suppliers.

- We will look to generate analytical insights that could be of value to the company via the use of our statistical analysis and hypothesis testing based on the general structure of experimental design:
  - Make an observation
  - Examine the research
  - Form a Hypothesis
  - Conduct an experiment and/or gather your of Data
  - Analyze the Results
  - Draw Conclusions

Areas of Interest for this analysis

- Identify quantifiable benefit(s) – if any- to provide discounts to customers
  - Increase in sales of Products based on Discount level
  - Best sellers in Products and or Categories
  - Profit of Product or Categories per Country
- Strategy to maintain inventory levels
  - Sales in products changing over a period of time

Analyzing Product Discounts

Obtaining all the Products sold from the data, we split in 2 sets: Those with no discount (Undiscounted) and those with any type of Discount (Discounted) regardless of the customer, Region or any other condition.
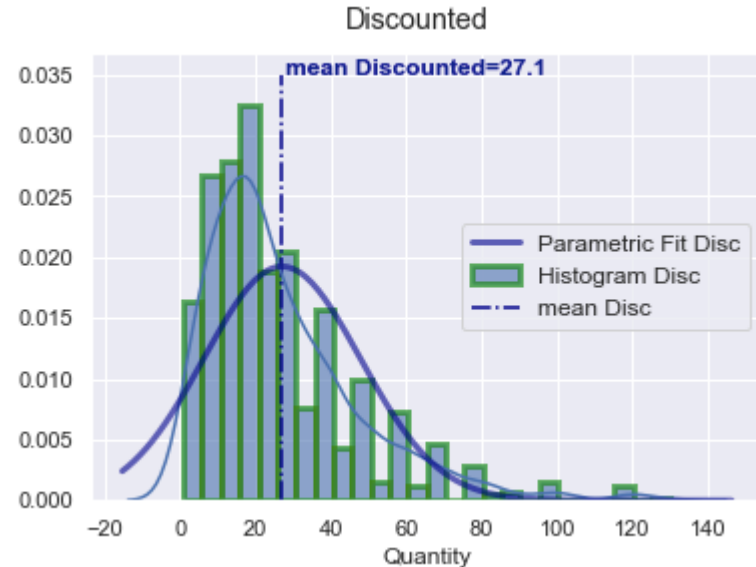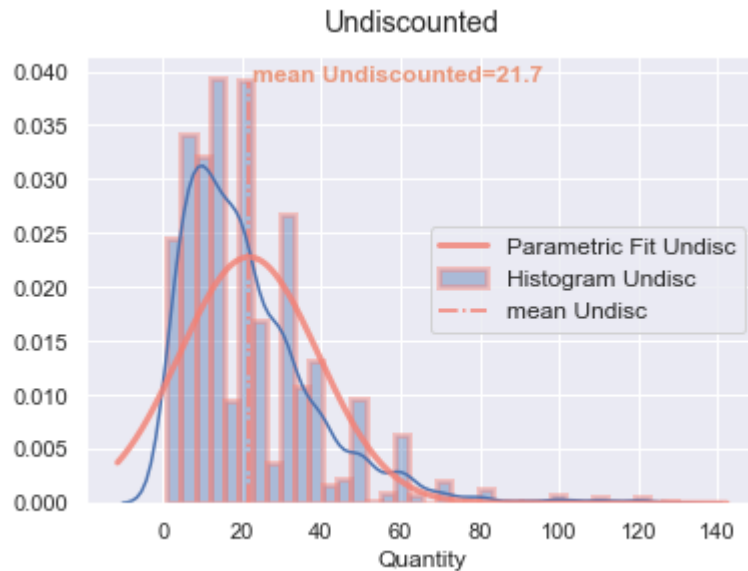

Methodology:
1) State our premise: we are looking for a difference in the number of products sold (mean) for both sets of data
2) Confirm that both sets follow similar behavior (making sure we compare apples to apples): Undiscounted and Discounted products both follow a similar distribution: close to a normal distribution (shown as Parametric Fit)
3) When quantifying the differences between the 2 sets, we found significance of the effect of Discounts.

Product Discounts - recommendations

- The Quantification of the effect performed indicates that having a Discount in a Product has a positive effect (more sales) over that product.

- In addition, the Probability of selling more items Discounted than Undiscounted is approx. 55% meaning that if we select any random Product from the data, we have a 55% chance that it will sell more when Discounted.

Analyzing Product Discounts – per amount of discount

Obtaining all the Products sold with Discount from the data, we split in 5 sets: Those with any type of Discount (Discounted) in increments of 5% (from 5% to the max of 25%) regardless of the customer, Region or any other condition.
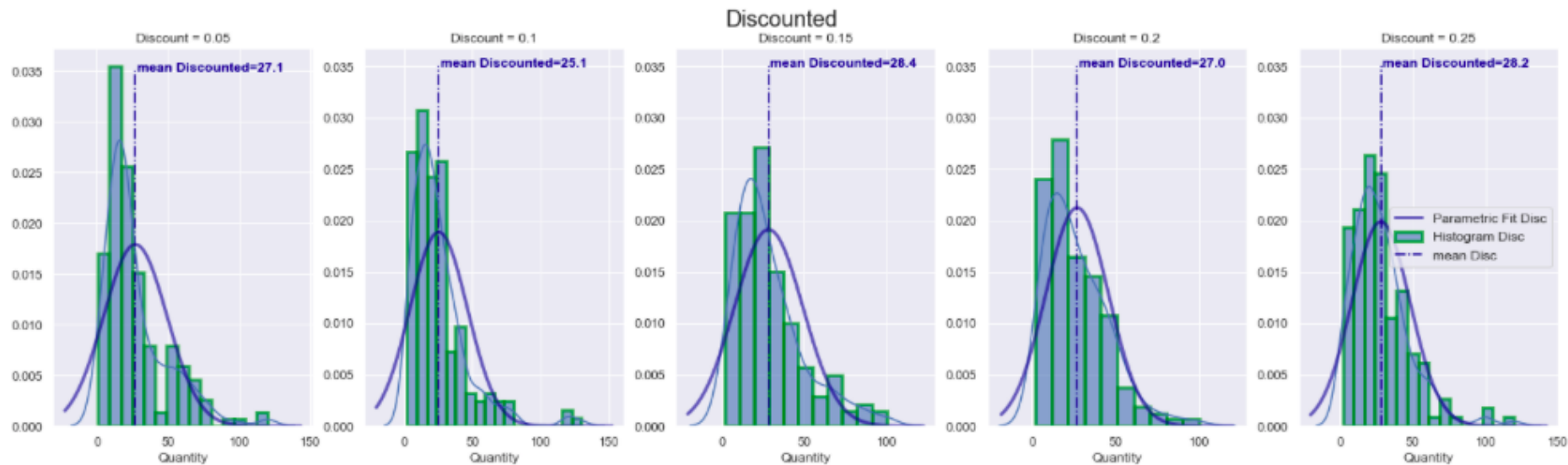
Observations:

1) The average of Products sold varies depending on the amount of discount but not proportionally
2) Confirmation of similar behavior of Discounted vs Undiscounted products (making sure we compare apples to apples): both follow a similar distribution
3) Not all Discounts are same: The 10 % Discount is the least significant of the set. Both 15% and 25% have the highest difference than when a product is Undiscounted

Product Discounts per level - recommendations

- The increase in Discount does not affect proportionally the amount of sales: Noting that 15% and 25% are the ones with more significance, Northwind Traders may consider to select these values when applying discounts more frequently as they seem to be more attractive to customers.

Product sales per Country - observations

- Understanding if there is a significance of selling a product differently per Country could provide value to Northwind Traders

- Using a random sample of common products for the best selling Countries we can see that large markets like Germany and the USA although share the consumption of a product, the amount of quantities differ.

Before submitting final recommendations

- Further analysis in Categories

- Focus Discounts on items with highest revenue

- Review different Countries

Thanks