

Business Insights and Recommendations using Statistical Significance Testing

Data Science Consultation for Northwind Traders



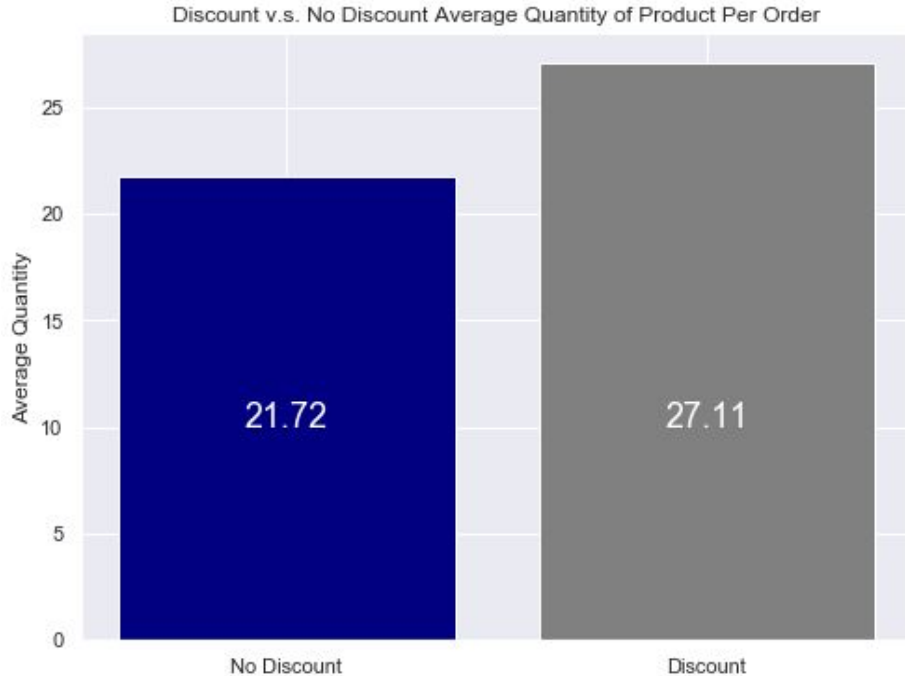
Overview of Business Insights: 5 Wishes

I wish Northwind Traders could...

1. Increase sales quantities
2. Motivate the sales team
3. Develop the European market
4. Better distribute the sales team's workload
5. Improve the supply chain



1.1 Discounts and Quantity



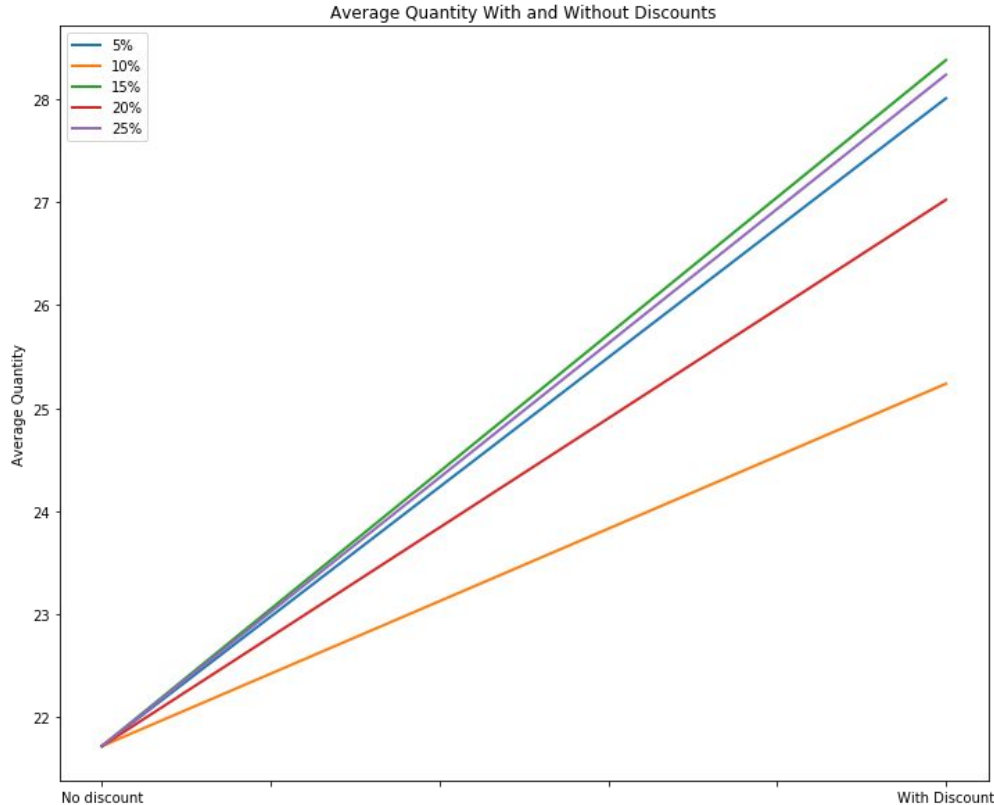
Question:

Do applying discounts impact the quantity of the sale?

Results:

Providing a discount does increase the amount of quantity in the order.

1.2 Discounts and Quantity



Question:

Do different discount levels impact quantity?

Results:

The impact of discounts on quantity vary by discount level, with a %5 discount being the most impactful on quantity.

1.1/1.2 Discounts and Quantity - Business Recs

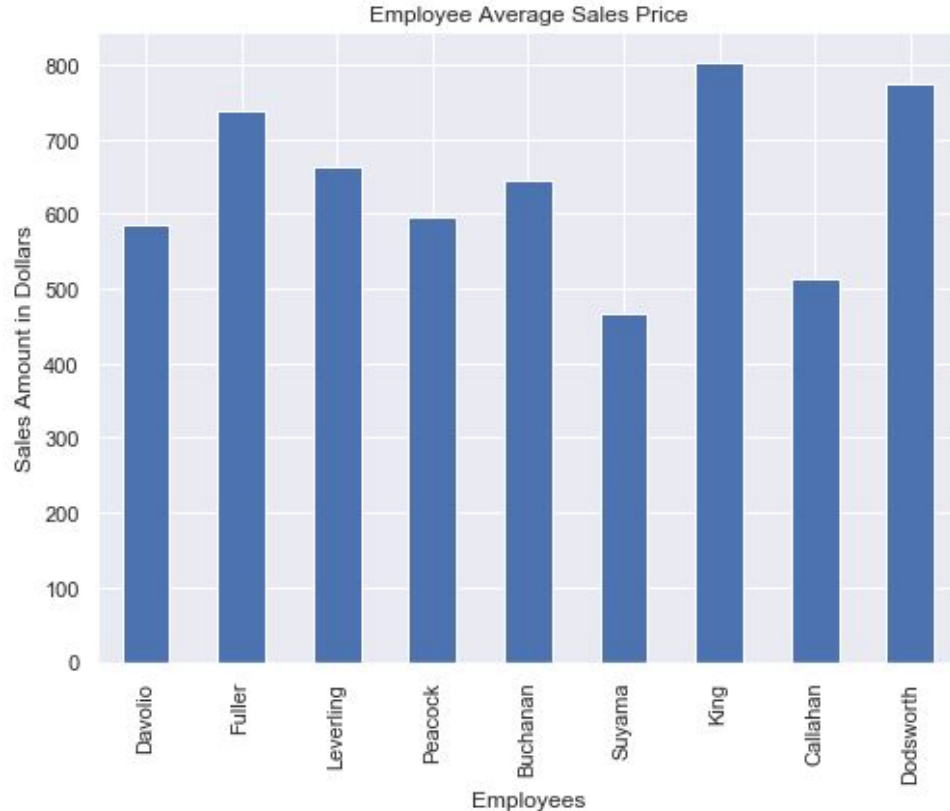
Wish #1: Increase sales quantities.

Recommendations:

- Find more opportunities to provide customers with 5% and 15% discounts (ad campaigns, email blasts, customer reward programs)



2. Employee Sales



Question:

Are there any employees who are averaging higher sales prices per sale?

Results:

There are no significant differences between employees average sales price.

2. Employee Sales - Business Recs

Wish #2: Motivate our sales team.

Recommendations:

- Use average sale by employee (~\$628) as a marker for success, rewarding employees who increase their average over time (commissions, extra PTO, special events)



3. The European Market



Question:

Are any of the European regions averaging higher sales prices?

Results:

There are no significant differences in average sales price between regions.

3. European Market - Business Recs

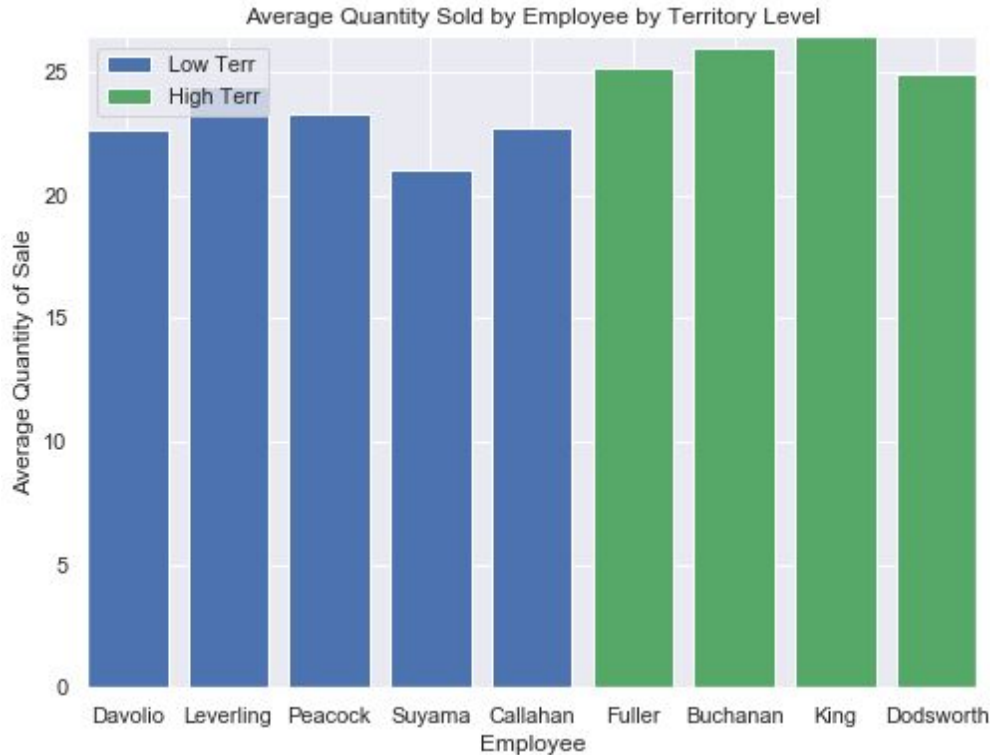
Wish #3: Develop the European market

Recommendations:



- Focus ad campaigns in eastern, northern and southern European regions.
- Focus on further development western Europe.

4. The Distribution of Sales Territories



Question:

Do employees with a high number of sales regions sell higher quantities?

Results:

There are significant differences in employee sales quantities depending on territory amounts.

4. The Distribution of Sales Territories - Business Recs

Wish #4: Better distribute our sales team's workload

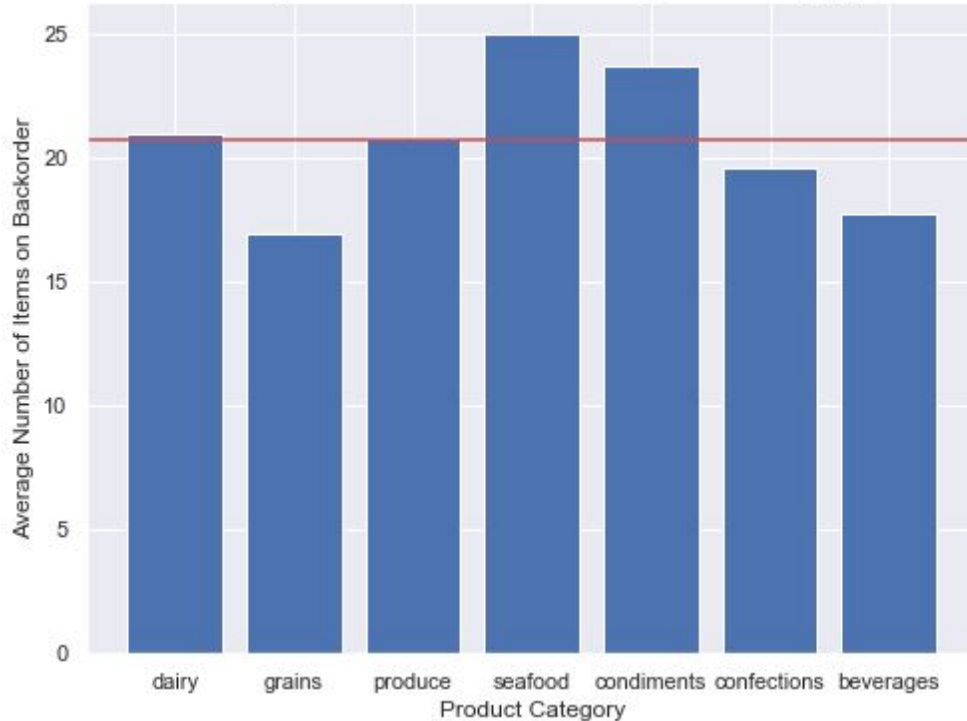
Recommendations:

- Develop young and promising employees by adding sales regions to their responsibilities.



5.1 Improve the Supply Chain

Average Number of Items on Backorder by Product Category



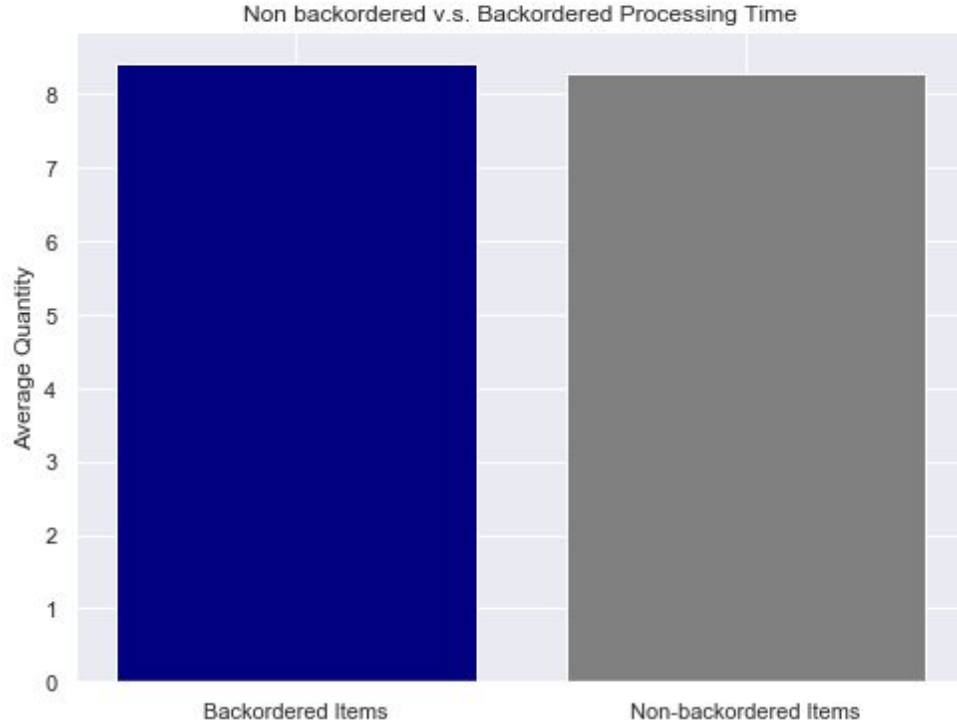
Question:

Do certain product categories have a higher number of products going on backorder?

Results:

Backordering varies by product, but no one category is backordered more than average.

5.2 Improve the Supply Chain



Question:

Do items on backorder take longer to get to customers?

Results:

Items that go on backorder do not significantly impact the average processing time of the order.

5.1/5.2 Improve the Supply Chain - Business Recommendations

Wish #5: Improve our supply chain

Recommendations:

- Further investigate how often items are backordered for future growth



Future Work

- Questions focusing heavily on supply chain
- Predictive modeling for new markets
- Need for deeper analysis of employee sales



Thank You

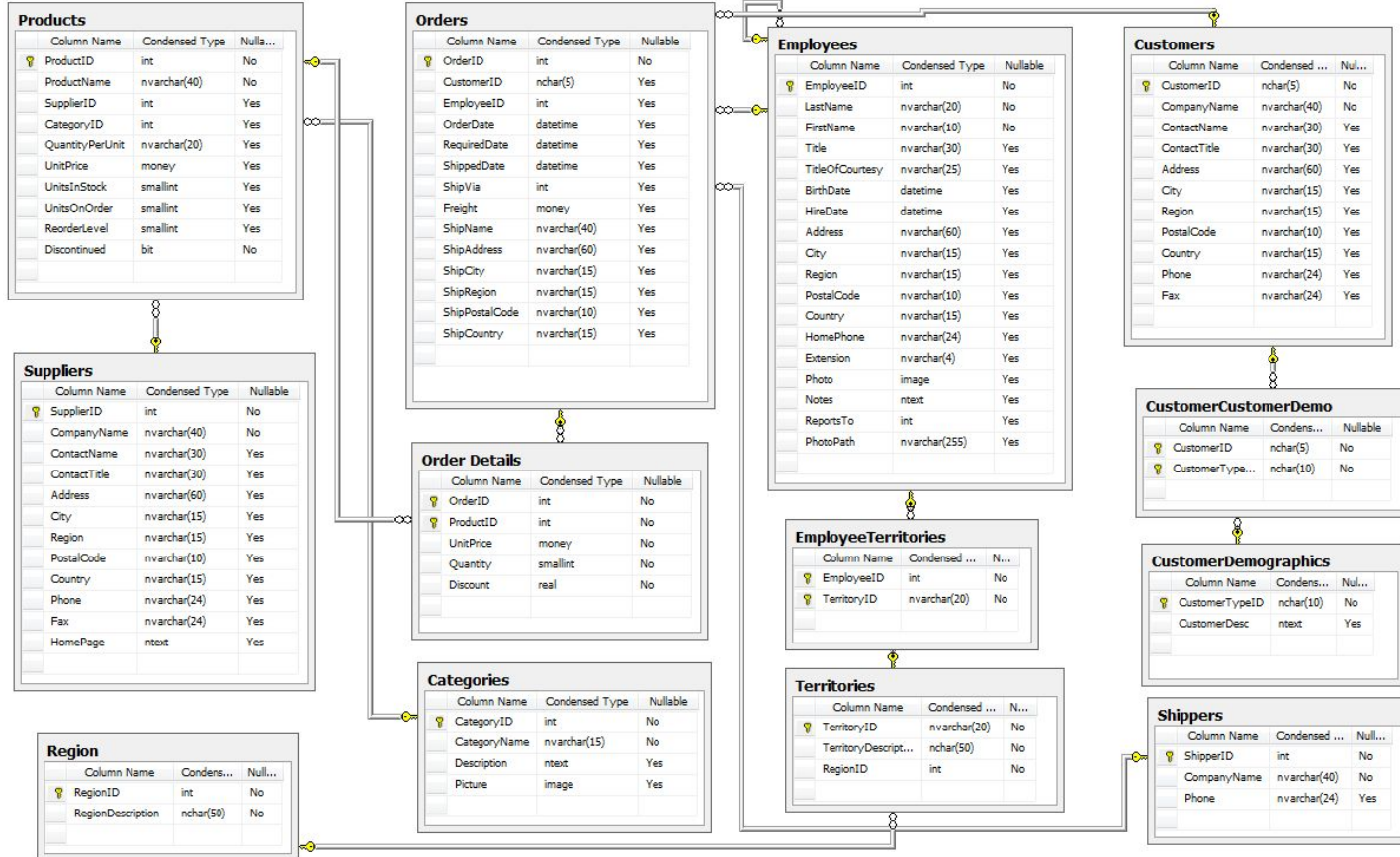
www.lucaskellydataportfolio.weebly.com

[www.github.com/lucaskelly49](https://github.com/lucaskelly49)

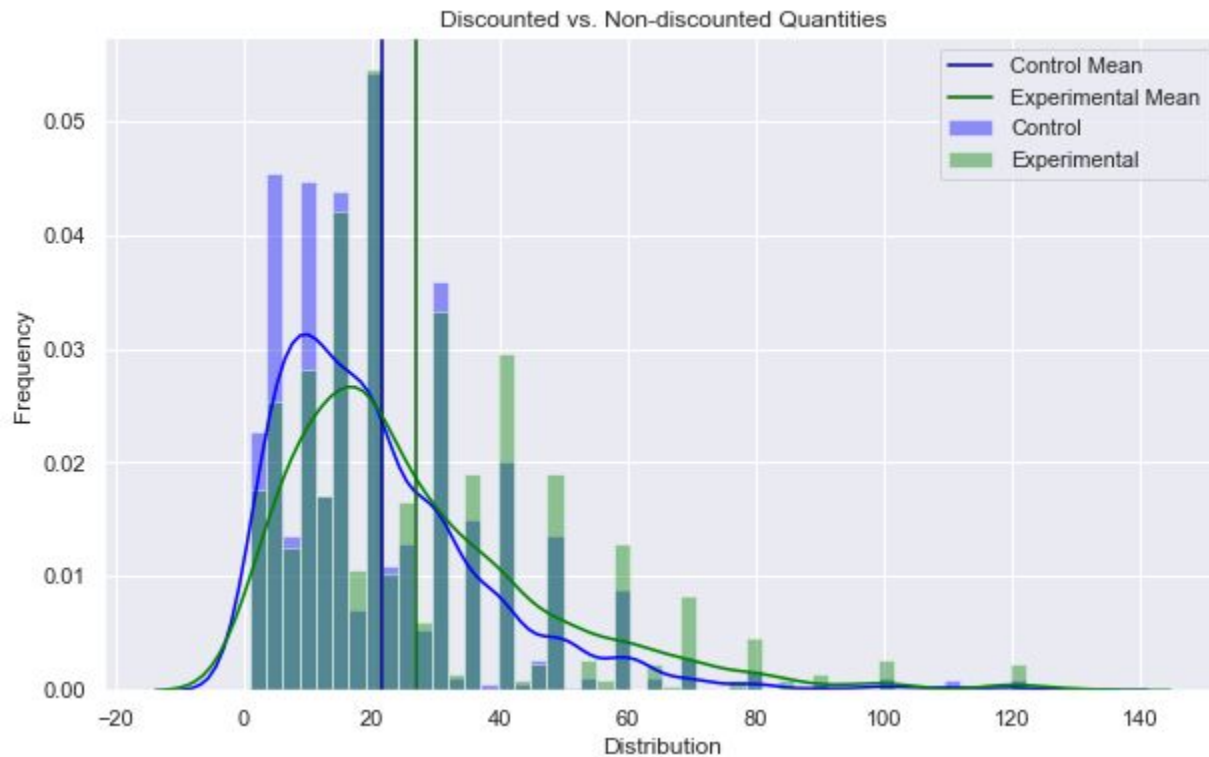
<https://www.linkedin.com/in/lucaskelly49/>



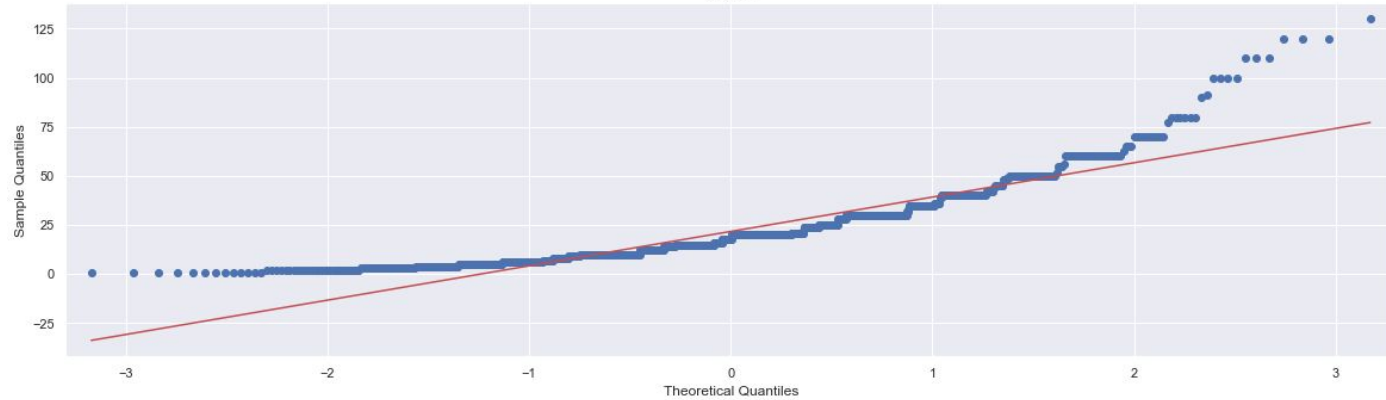
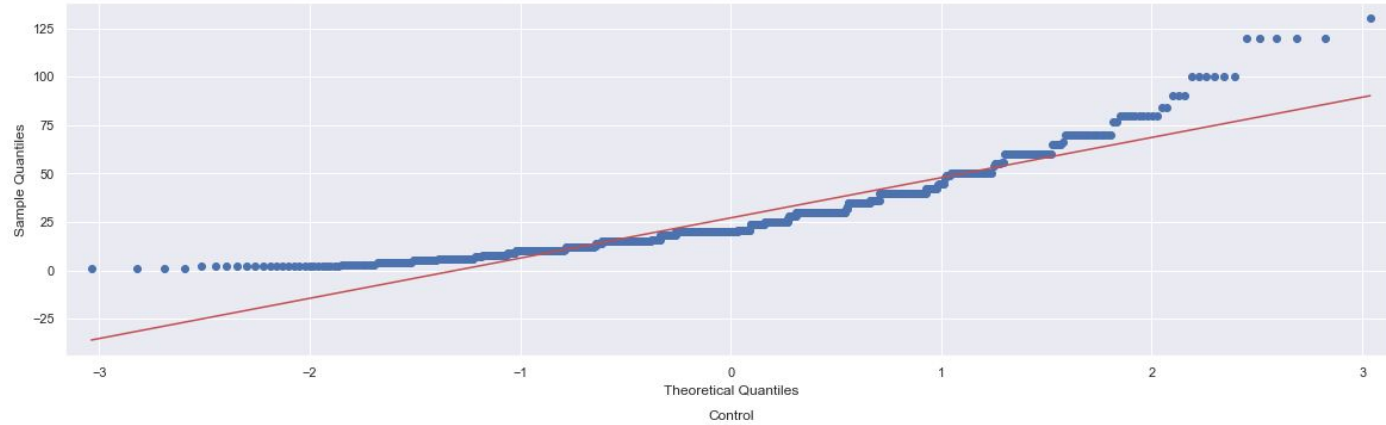
Index ERD



Index Q1. Dist



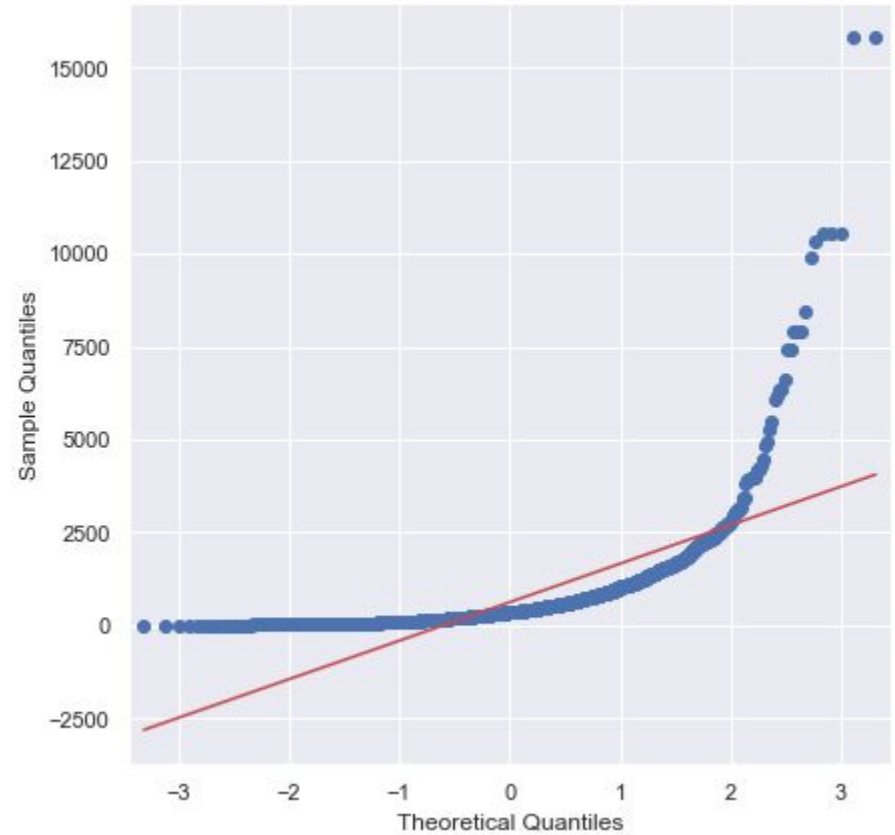
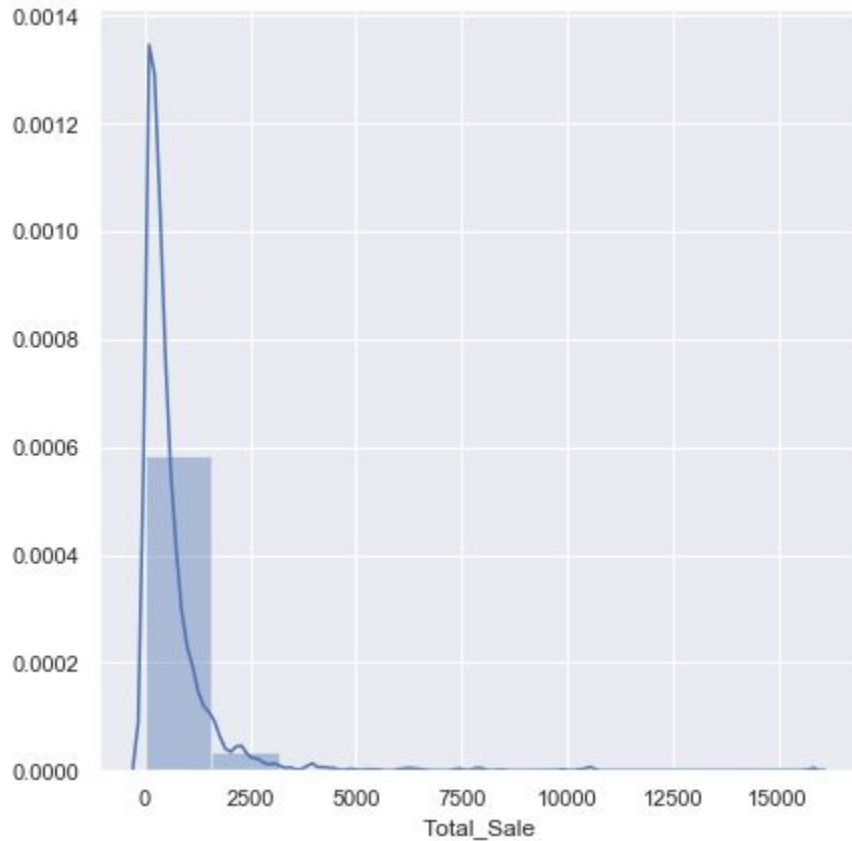
Index Q1 - Normality check, control/experimental



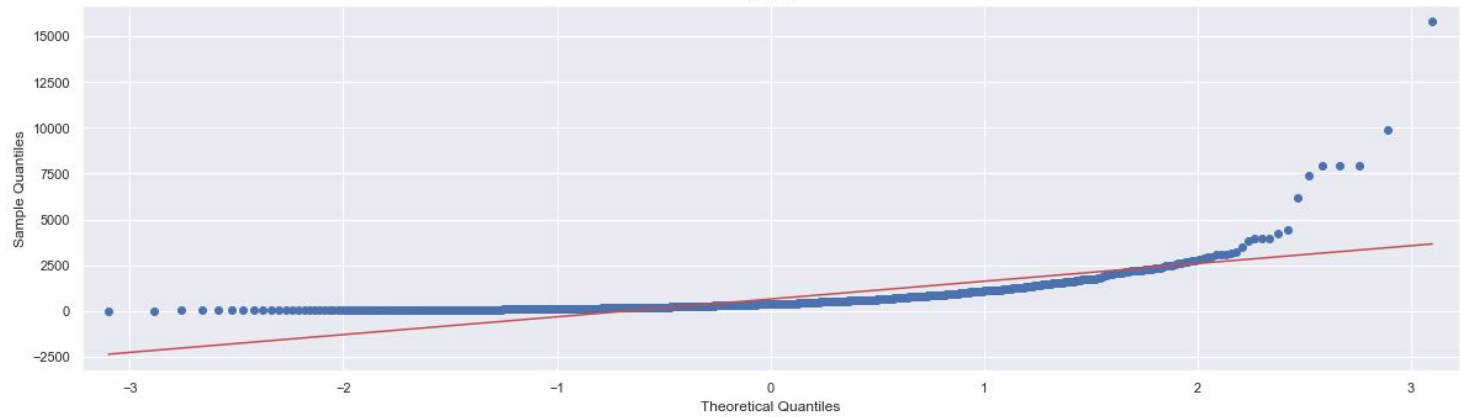
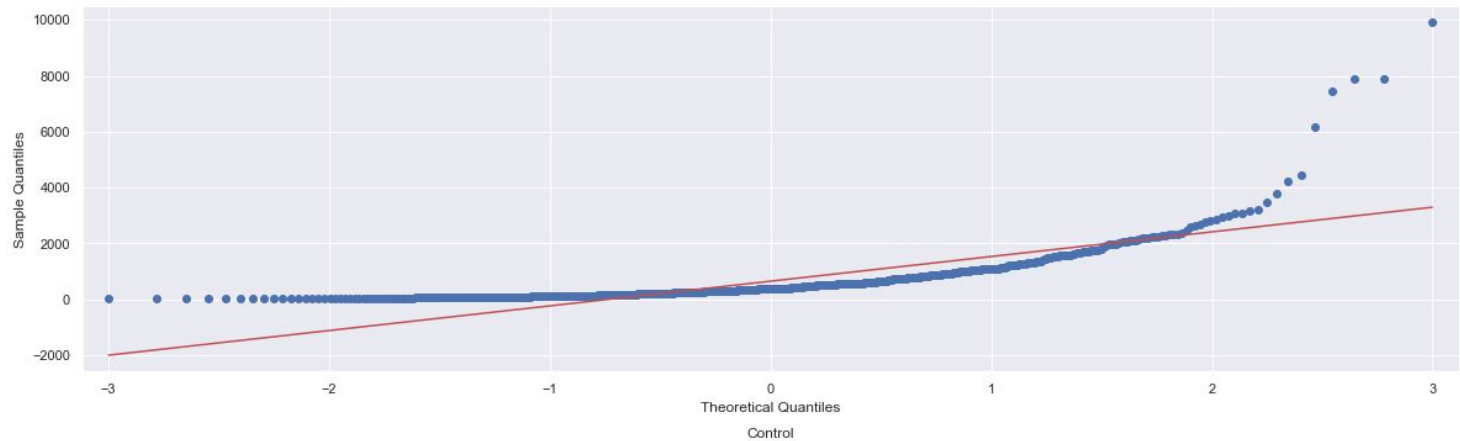
Index Q2 - ANOVA Test Results

	PR(>F)
C(five)	0.000015
C(ten)	0.016761
C(fifteen)	0.000020
C(twenty)	0.000558
C(twentyfive)	0.000035
Residual	NaN

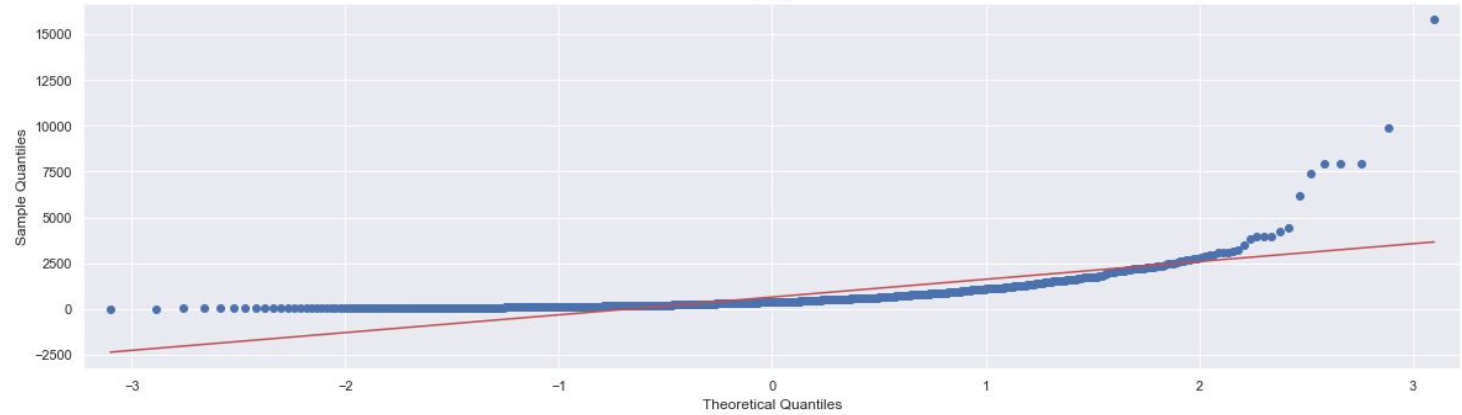
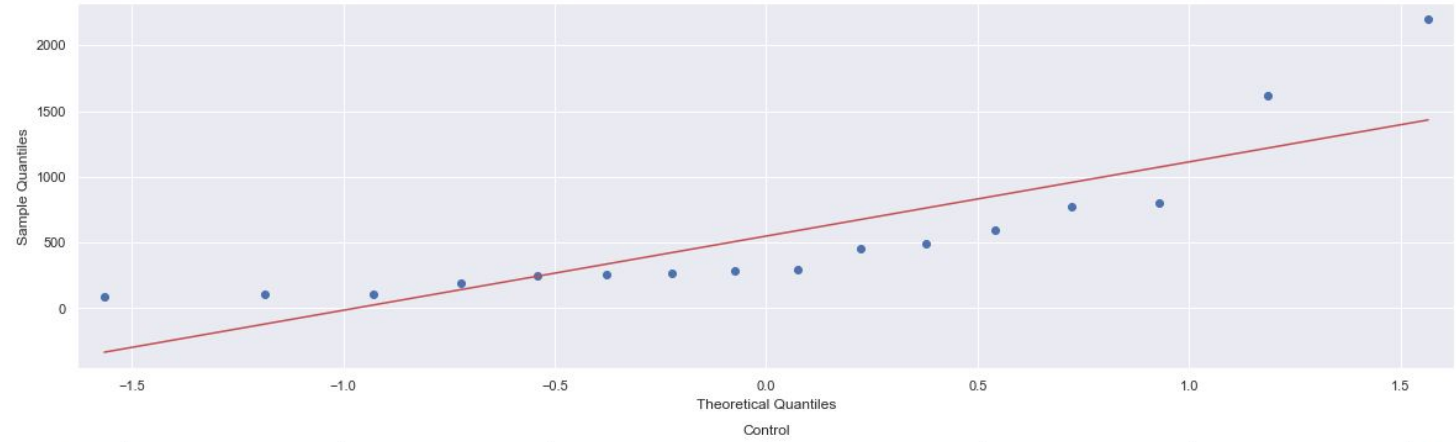
Index Q2 - Normality Check



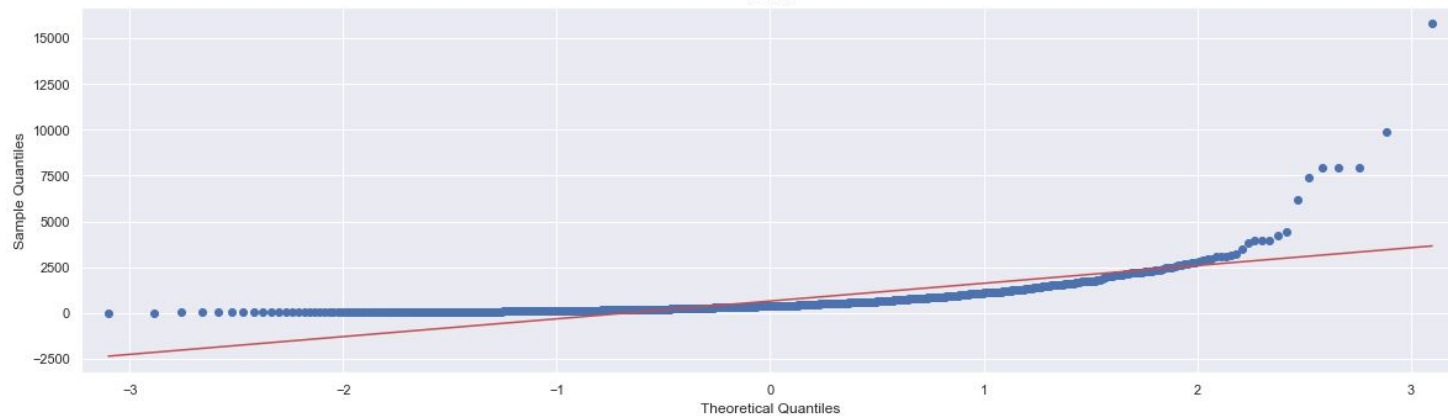
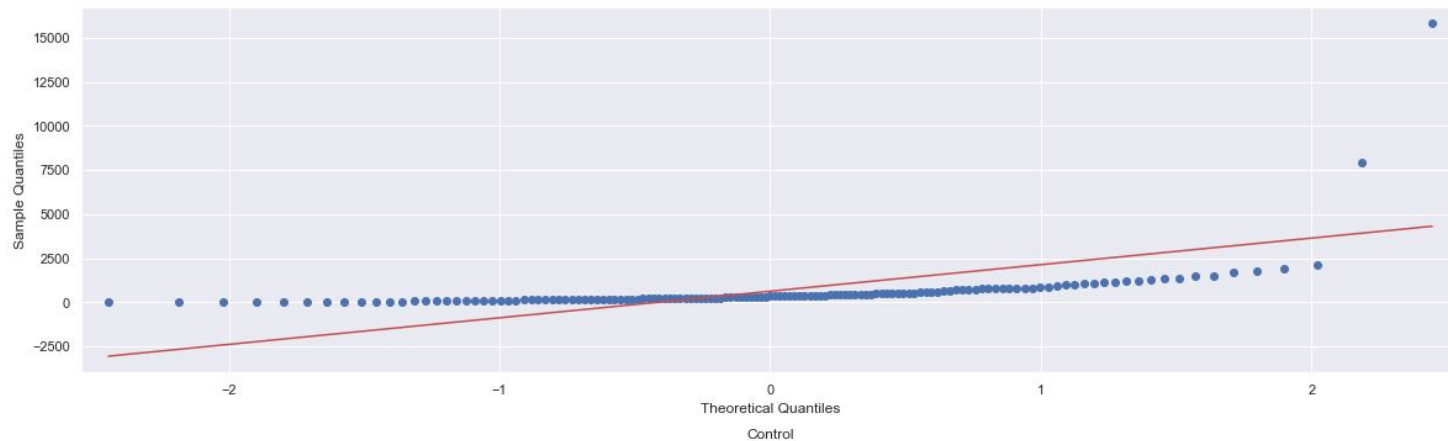
Index Q3 - Western Europe vs Europe Normality Check



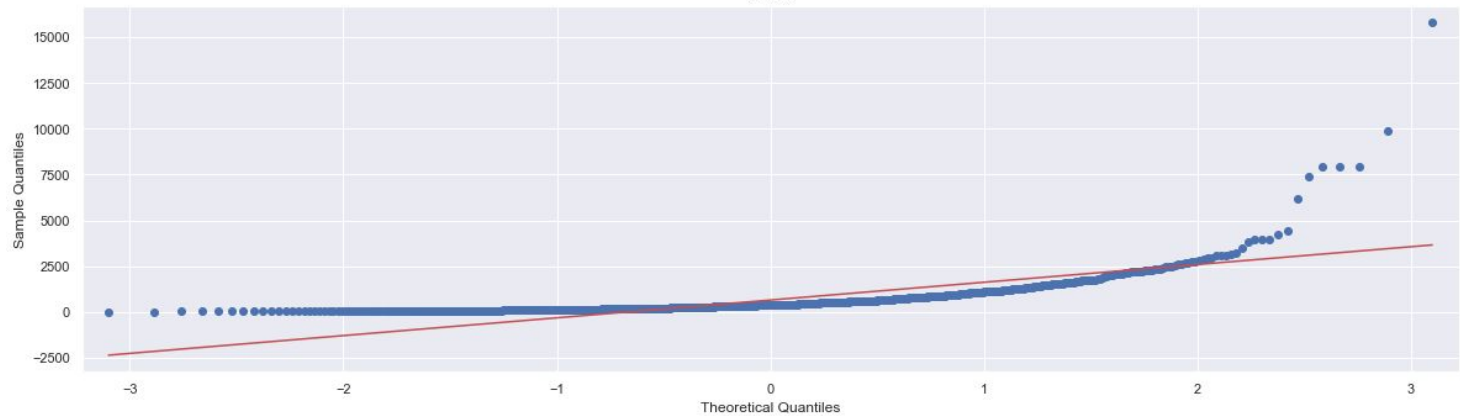
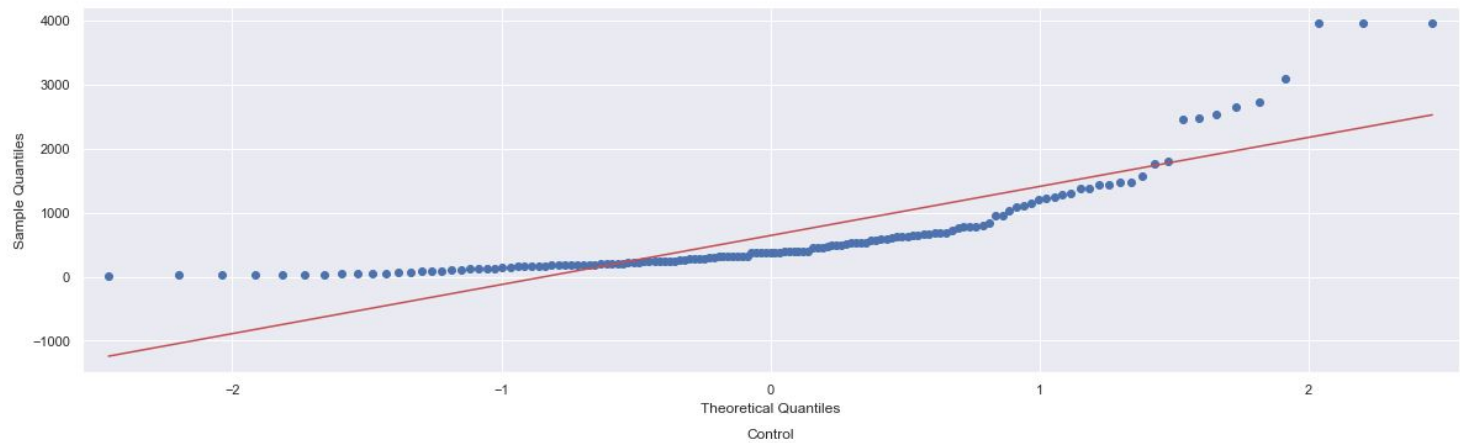
Index Q3 - Eastern Europe vs Europe Normality Check



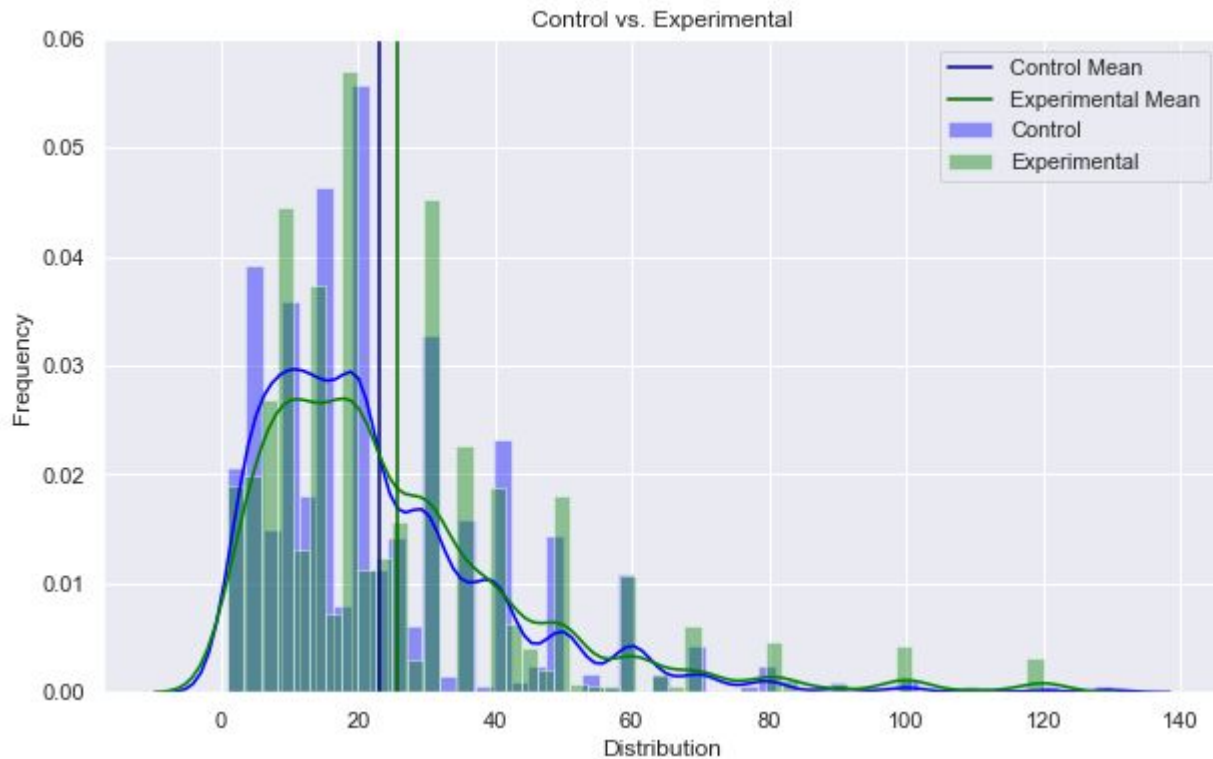
Index Q3 - Southern Europe vs Europe Normality Check



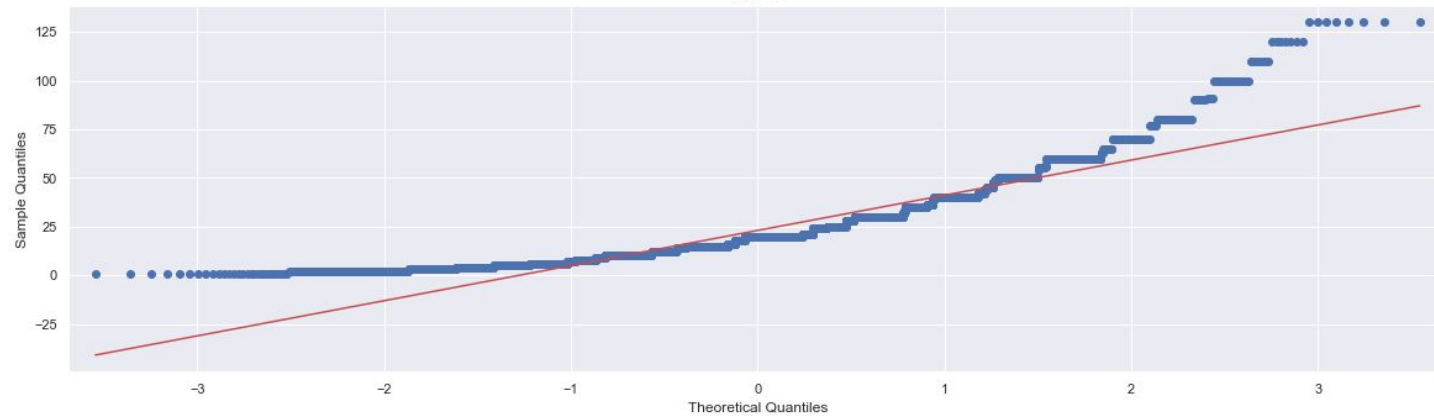
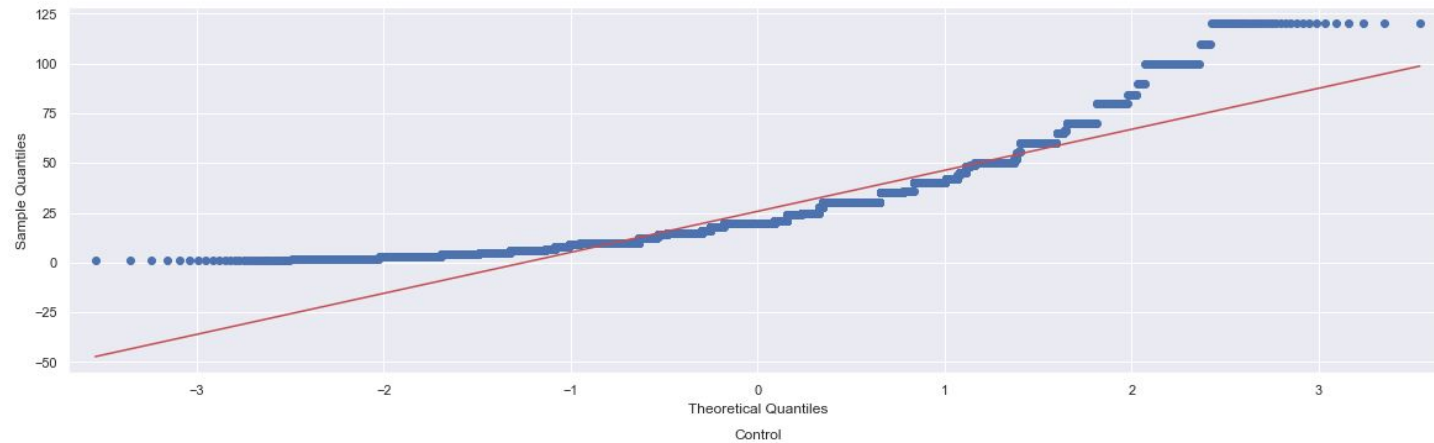
Index Q3 - Northern Europe vs Europe Normality Check



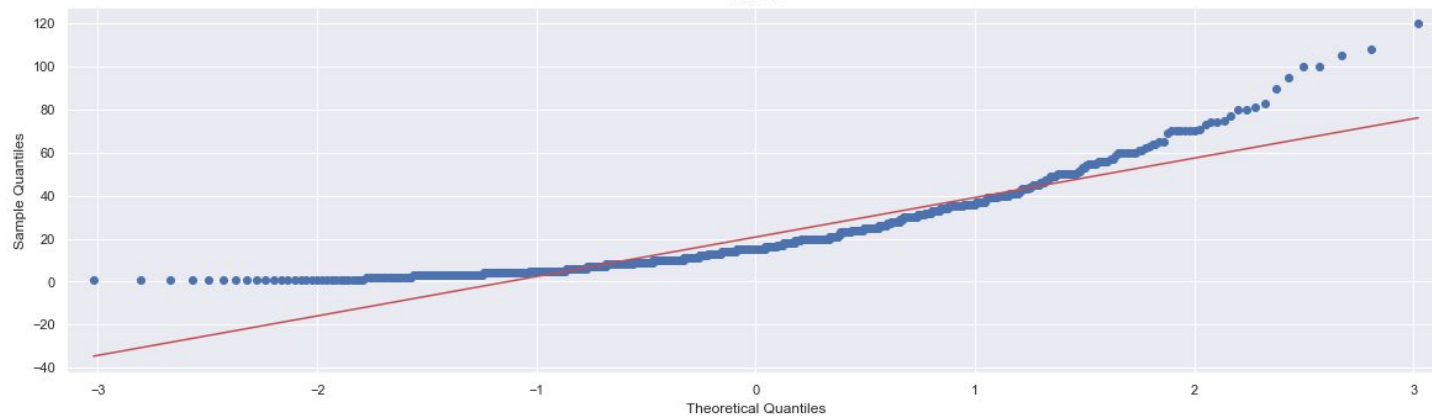
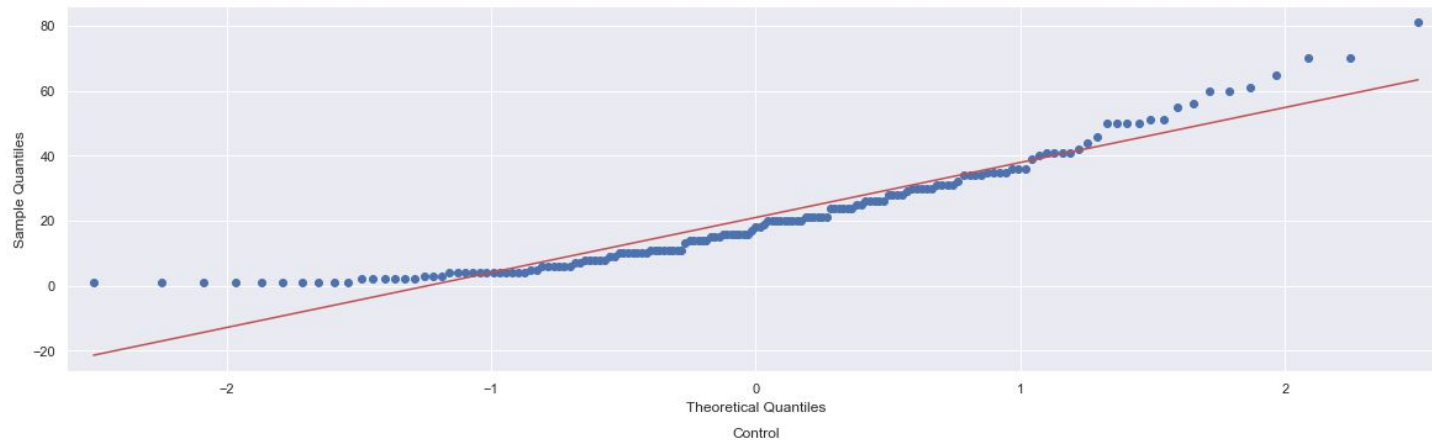
Index Q4 - Low Territory/High Territory Distribution



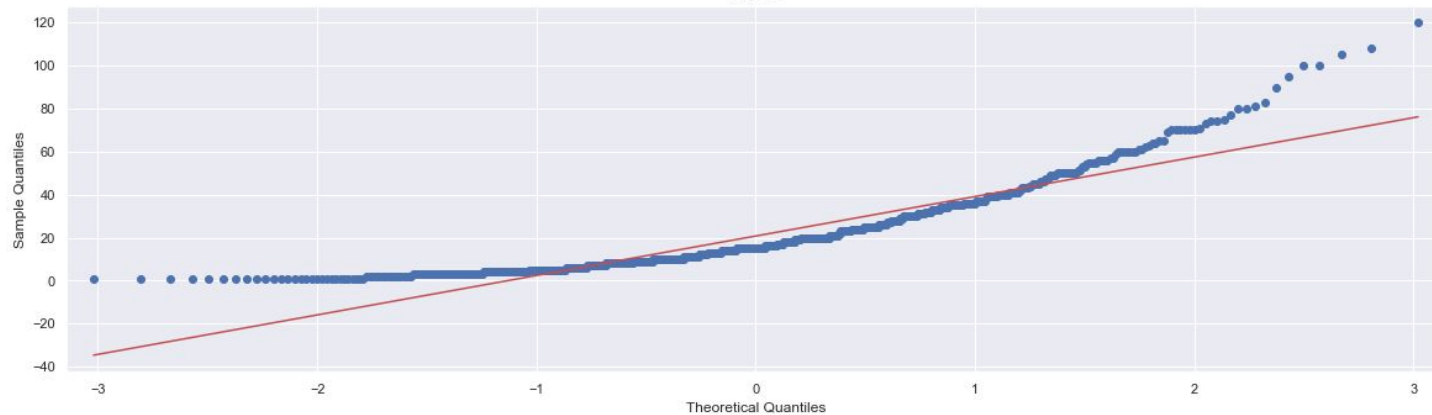
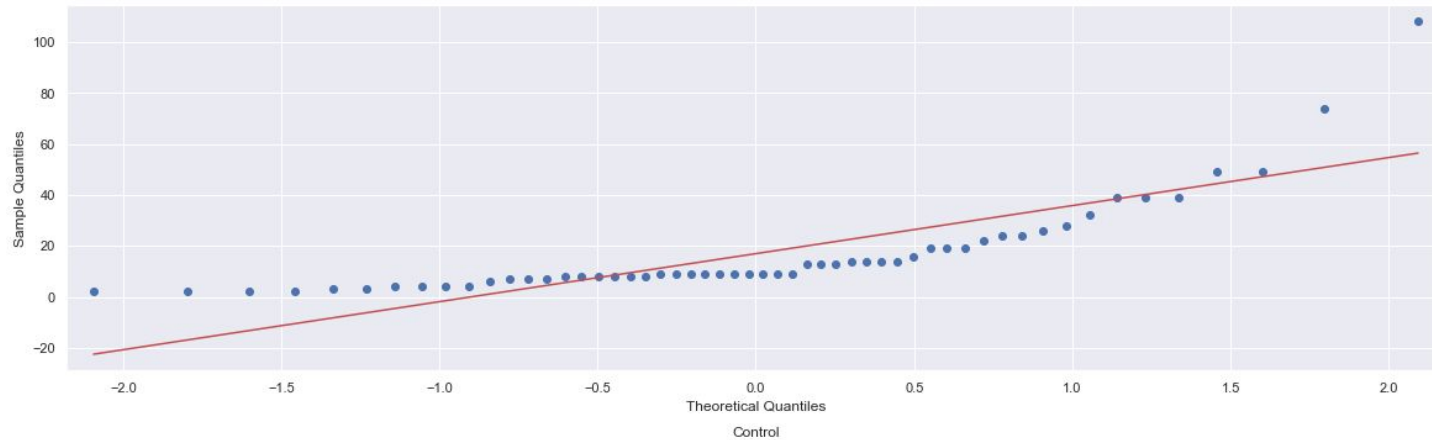
Index Q4 - Low Territory/High Territory Normality Check



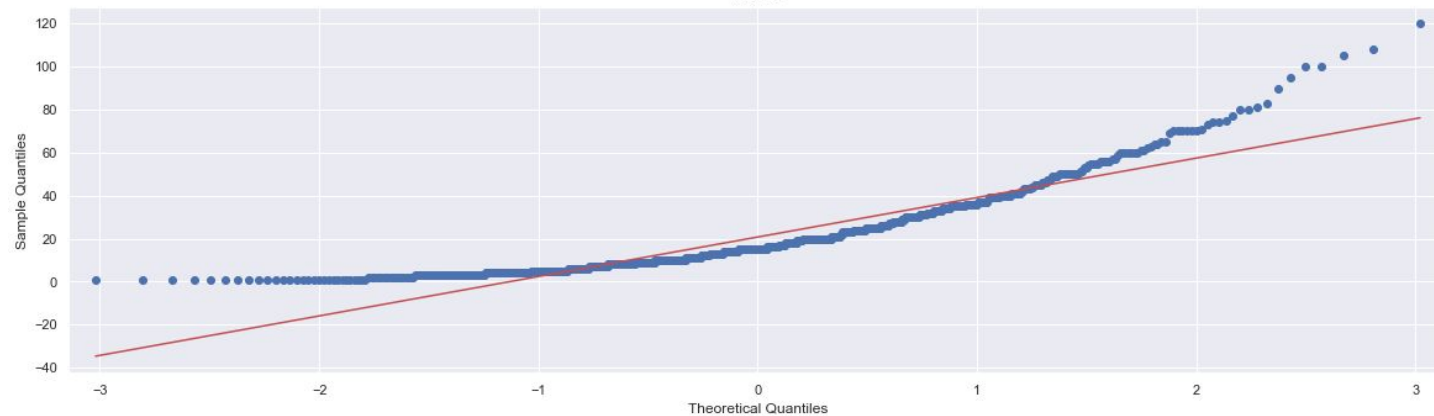
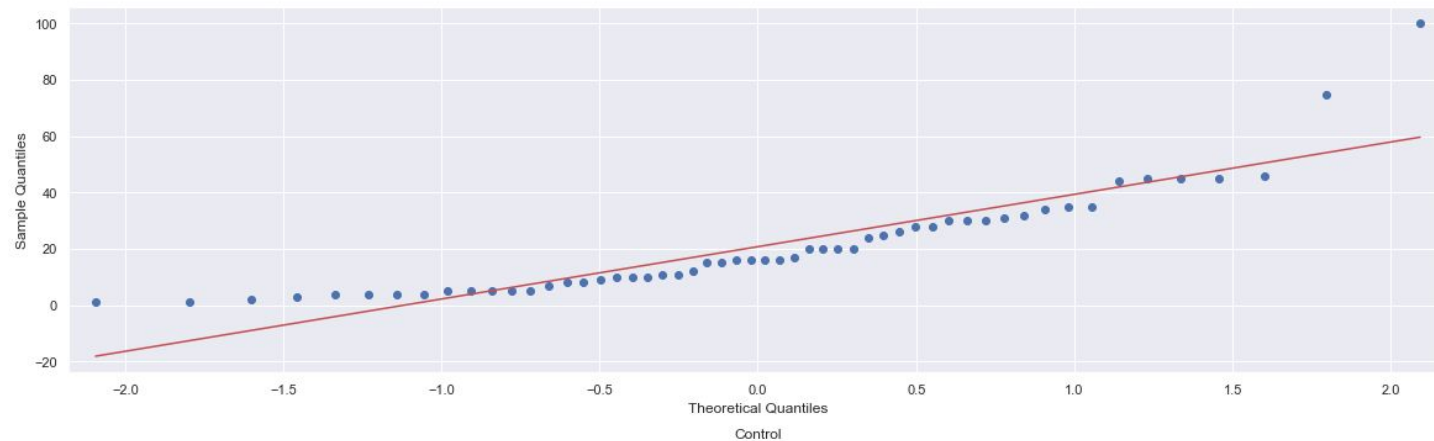
Index Q5 - Dairy Backorder vs. Average Normality Check



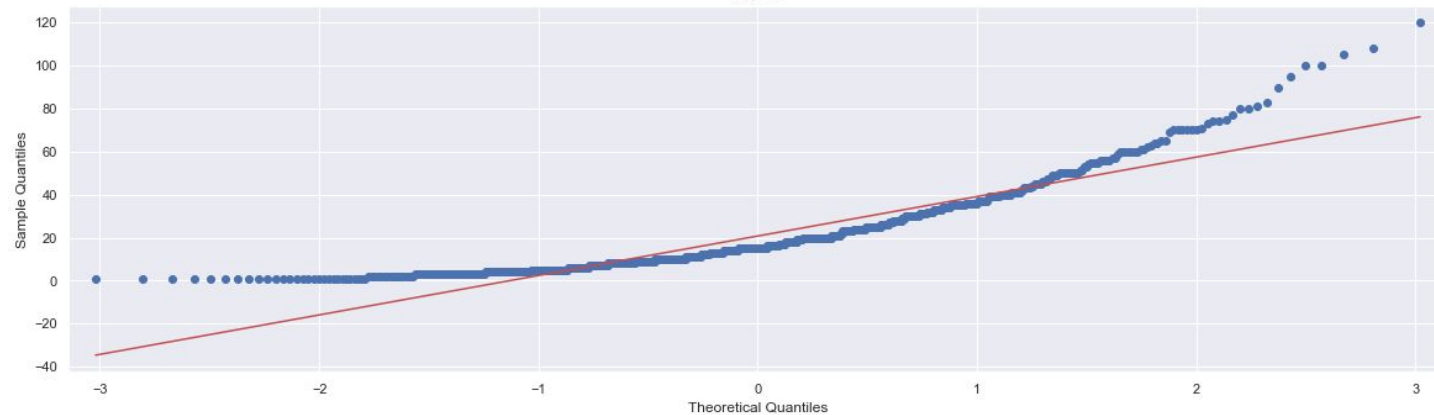
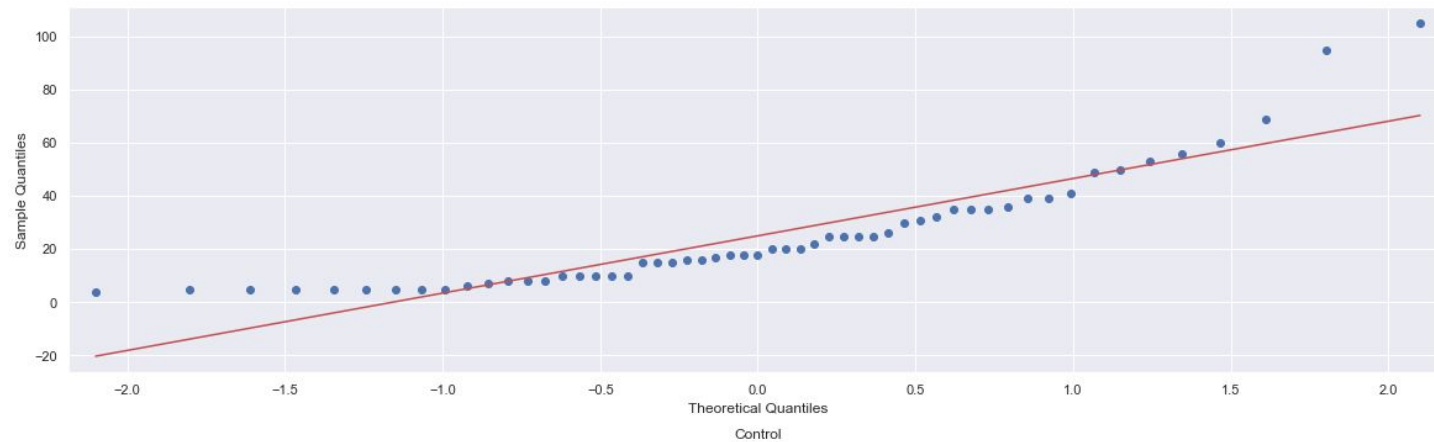
Index Q5 - Grains Backorder vs. Average Normality Check



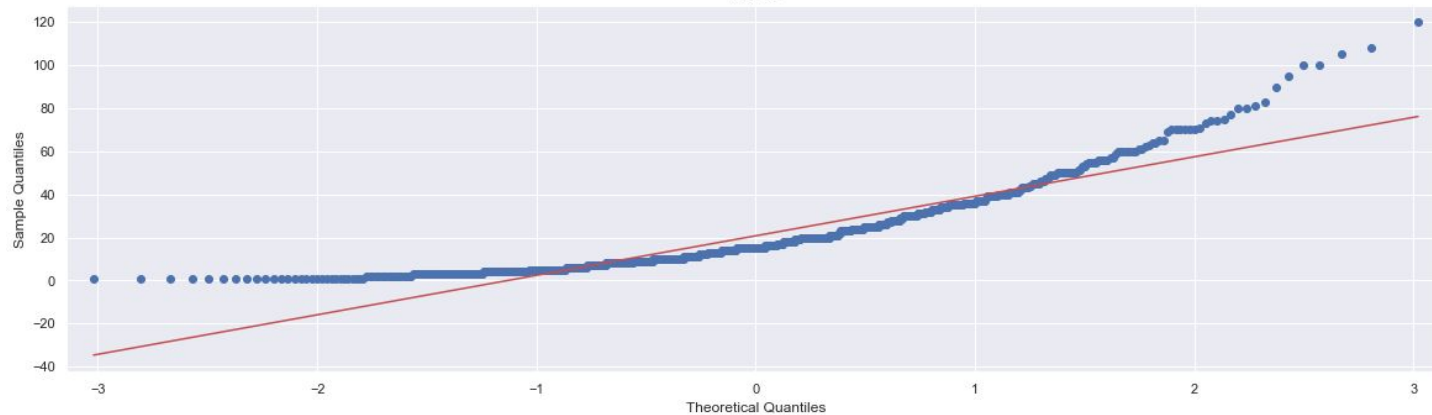
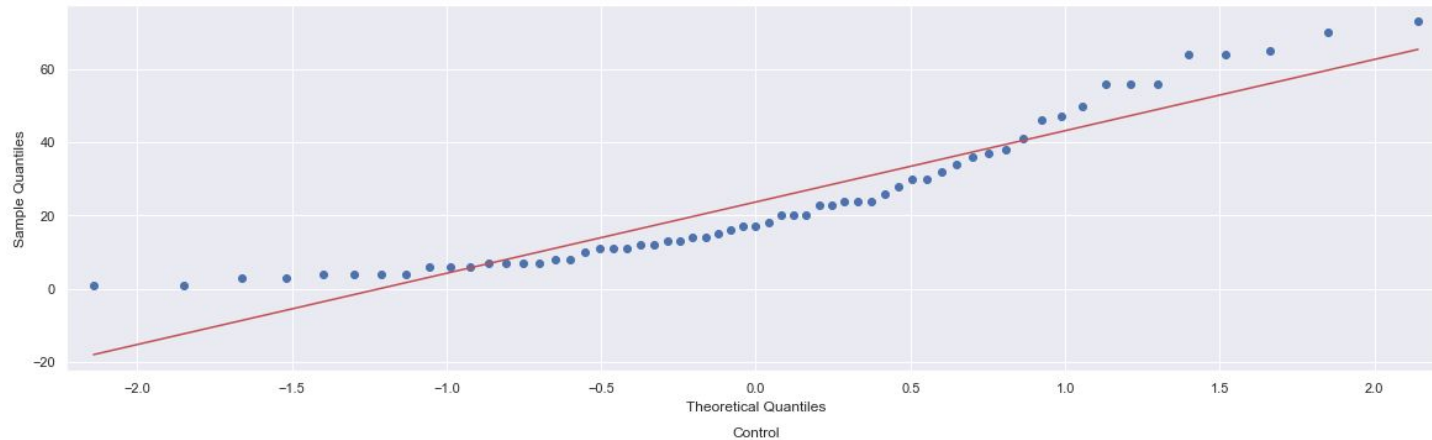
Index Q5 - Produce Backorder vs. Average Normality Check



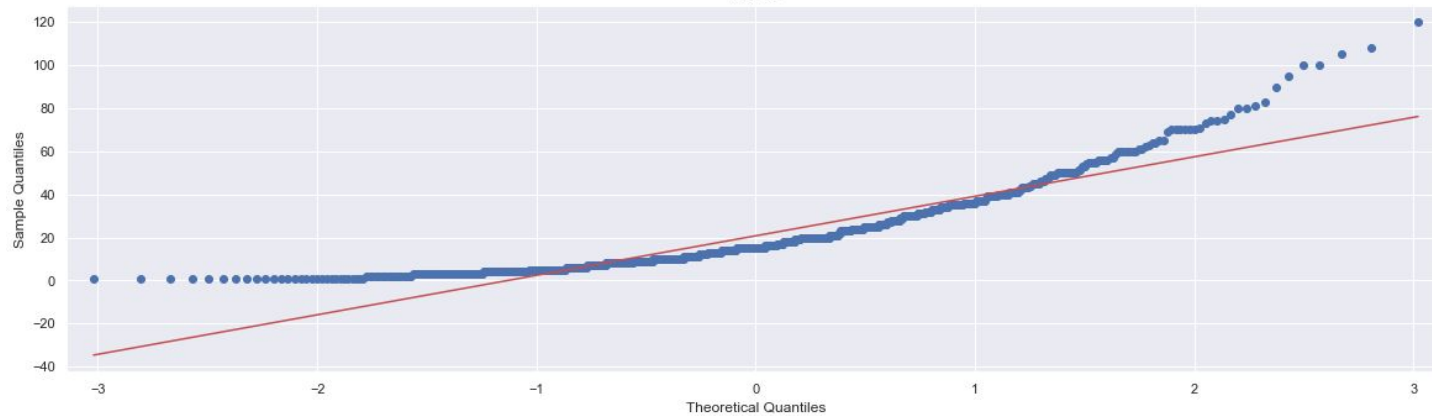
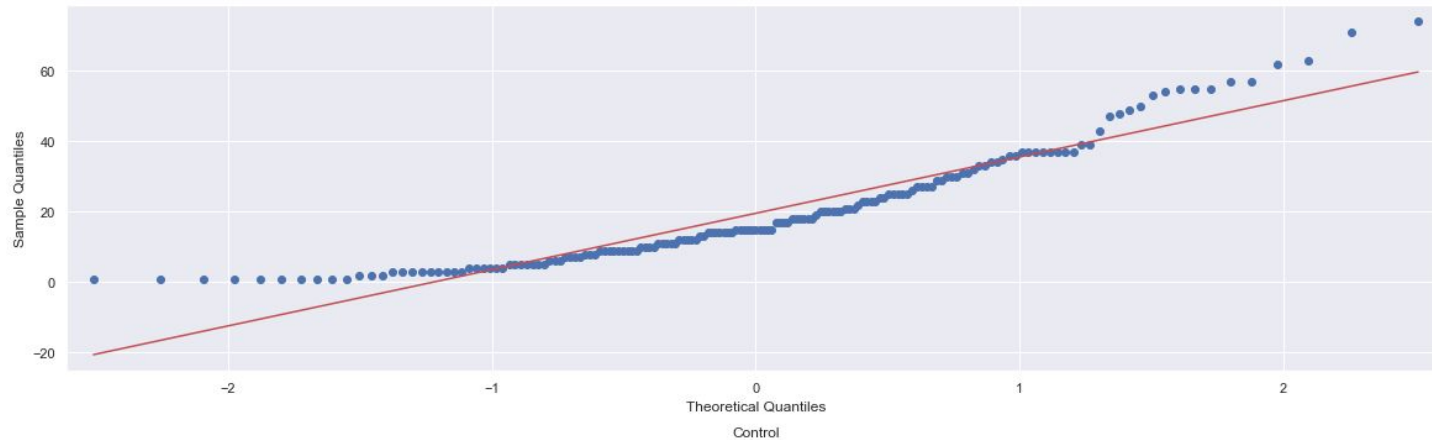
Index Q5 - Seafood Backorder vs. Average Normality Check



Index Q5 - Condiments Backorder vs. Average Normality Check



Index Q5 - Confections Backorder vs. Average Normality Check



Index Q5 - Beverages Backorder vs. Average Normality Check

