Module 03 – Production Modeling

Exploratory Data Analysis

*In this section, you should perform some data analysis on the data provided to you. Please format your findings in a visually pleasing way and please be sure to include these cuts:*

* *Make a table of average demand, production capacity, and costs for each quarter, are there differences between quarters?*
* *Since we have temporal data (i.e. year and quarter), see if you can make a yearly and/or quarterly chart showing these metrics over time.*





Model Formulation

*Write the formulation of the model into here prior to implementing it in your Excel model. Be explicit with the definition of the decision variables, objective function, and constraints*

Safety stock= demand \*.1

Ending inventory- beginning inventory+ units produced- units Demanded

Average Inventory=( beginning inventory- ending inventory)/2

Monthly production cost= unit production costs\* units produced

Monthly Carrying cost= Unit carrying costs\* average inventory

Min= 55P1+59P2+45P3+63P4 +1.17(B1+B2)/2 + 1.17(B2+B3)/2 +1.17(B3+B4)/2 +1.17(B4+B5)/2

Production level for Month 1: P1 ≤573

Production level for Month 2: P2 ≤560

Production level for Month 3: P3≤432

Production level for Month 4: P4≤522

Where:

B2=B1+P1 – 462

B3=B2+P2 – 309

B4=B3+P3 – 941

B5=B4+P4 – 728

Model Optimized for Cost Reduction

*Implement your formulation into Excel and be sure to make it neat. This section should include:*

* *A screenshot of your optimized final model (formatted nicely, of course)*
* *A text explanation of what your model is recommending*

Model with Stipulation

*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution. If we remove the production capacity constraint from the model & we removed the carrying cost, what do you think will happen? Try it out and see if it matches your expectation. Try to explain what is happening and talk a bit about fallbacks of models.*



* *The second dataset may represent a scenario where production is adjusted significantly to meet demand fluctuations, while the first dataset likely reflects a more controlled and steady production schedule to maintain inventory balance.*
* *No expenses associated with storing, handling, or maintaining inventory during the period, so monthly production costs and monthly carrying costs lower.*
* *When I removed carrying costs and ran solver, the optimal solution lowered a lot.*
* *In this chart there large fluctuations in units produced and units demanded*