Rotman School of Management
UNIVERSITY OF TORONTO

Rotman

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Course Code: RSM8423

Course Title: Optimizing Supply Chain Management and Logistics

Instructor Name: Andre Cire

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☐ **1007045118**

Executive Summary

UberFashion has hired a data consultant to determine better inventory policies in terms of reordering and ordering amount for their FashRing and LuxJacky products. They have provided data on their daily inventory level and production order amounts from 2016 to 2020 to help us create the new policies. Using the assumptions that were provided from the case and additional assumptions made, the optimal order quantity, reordering point, and safety stock levels for each of the products for the next two years were generated. The new policy will lead to a total cumulative cost for the next two years of $1,429,013.57 for FashRing and $2,789,456.69 for LuxJacky. The new policy cuts operating costs by 18.01% for FashRing and 33.49% for LuxJacky. The new solution can be easily implemented as it requires lower order quantities and lower reordering points in general for UberFashion. Finally, it was found that the no-customer-lost policy will lead to the highest total cumulative cost compared to other service levels, however the potential loss of customer satisfaction from not having product availability may justify the policy.

Introduction

UberFashion is a modern online Canadian company that specializes in the design and sales of fashion clothing and accessories. Their catalogue consists of items such as t-shirts, jackets, and earrings. The value proposition that UberFashion provides is the ability to bypass retailers and sell high-quality apparel items directly to consumers at affordable prices. Due to this, UberFashion has experienced healthy growth over the last ten years with a stable customer base that routinely purchases new products and designs. Even the advent of COVID-19 has not led to significant declines in forecasted revenue.

However, due to UberFashion's no-customer-lost strategy, which strived to have 100% item availability on their website, the operational costs of the company are inflated. This policy has led to high production rates and many items in inventory for multiple years.

To evaluate the strategy, I was hired as a data consultant to help UberFashion better understand the costs associated with this policy qualitatively and quantitatively by analyzing two products: FashRing and LuxJacky.

Current Situation

In more detail, UberFashion has provided several managerial questions for us to answer.

1. Can you design better inventory policies, i.e., strategies on how much inventory to keep and when to start a production campaign?
2. What are the different costs associated with your proposed inventory policies (e.g., holding, ordering, and production costs) if applied for the next two years?
3. How does your policy compare with the one implemented in practice for the same costs in (2)?
    a. Counterfactual Analysis

4. Draw a curve depicting the total costs vs. likelihood of stockout for each product, based on your chosen inventory policy.
5. Are there possible qualitative problems (i.e., customer perception) if product availability changes significantly in this context?

Data

The data provided is daily time series inventory and production order data for both FashRing and LuxJacky from 2016-2020. Inventory in the data represents the inventory level of the product at 11:59 PM on a specific day and Production Order is the input amount from a production campaign that was completed on the day as well.

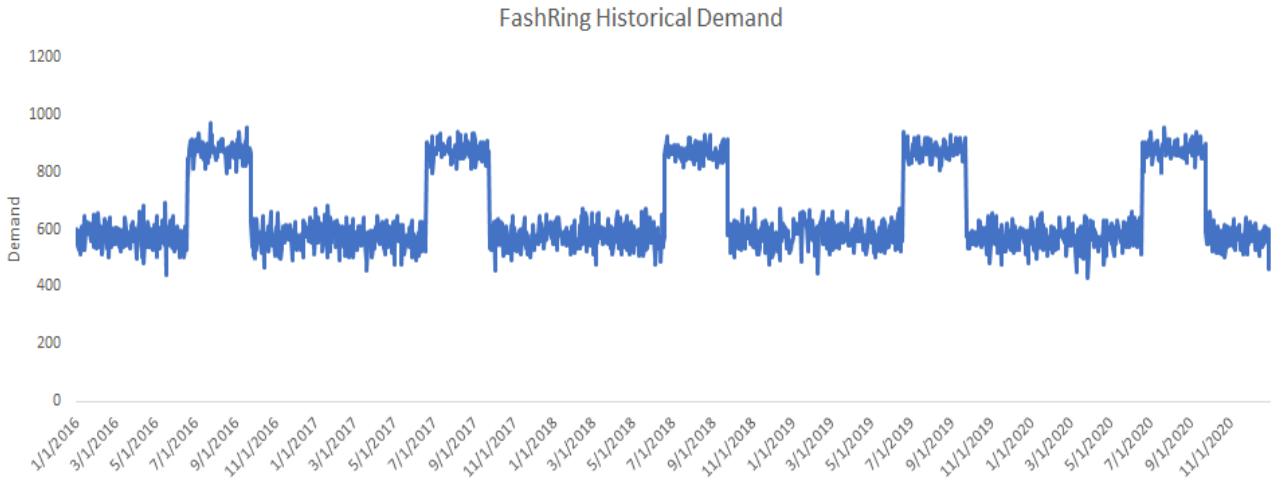
Assumptions

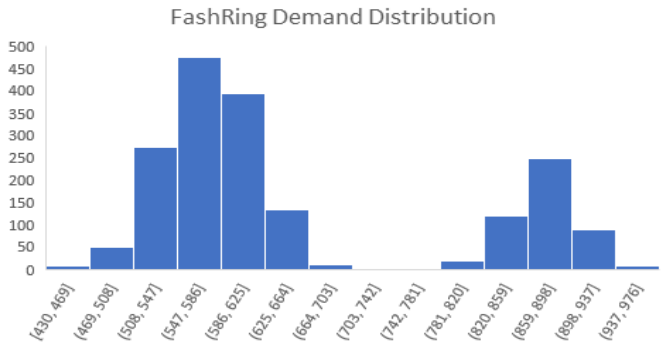
To further help generate our model various assumptions were provided and created to generate a useful model. The assumptions for each product are listed below:

FashRing

1. Cost of raw materials for a unit of Fash Ring: $2.50
2. Lead Time: 2 days
3. Machine Setup Cost: $1000 per production campaign
4. Holding Costs: 2.5% of production cost
5. Net profit per unit of FashRing: $35

On top of the assumptions listed above, to evaluate the effect of a new policy demand must be forecasted as well. To accomplish this the historical demand and demand distribution of FashRing is shown below.



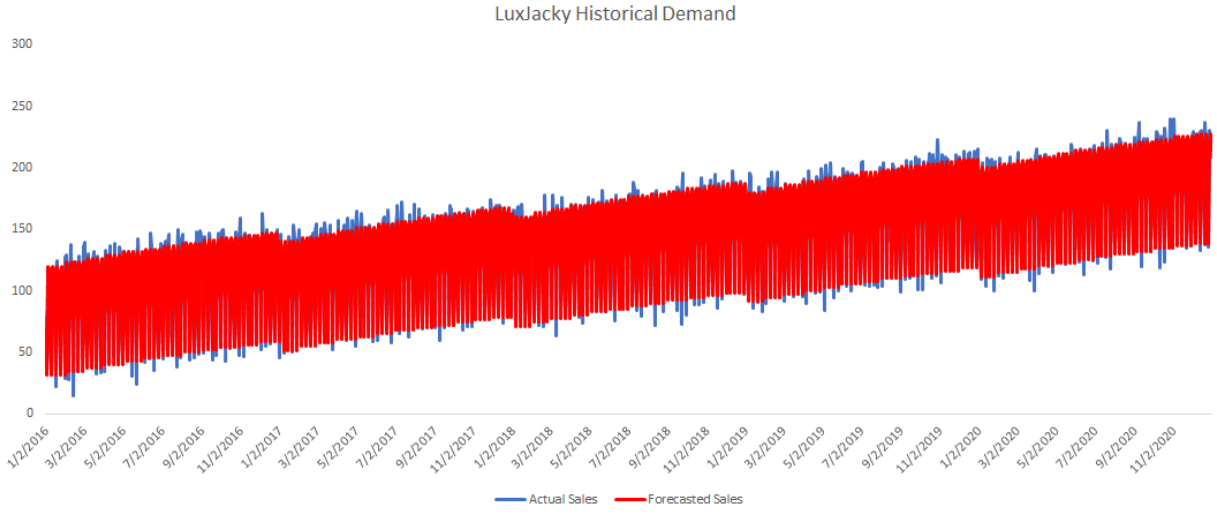


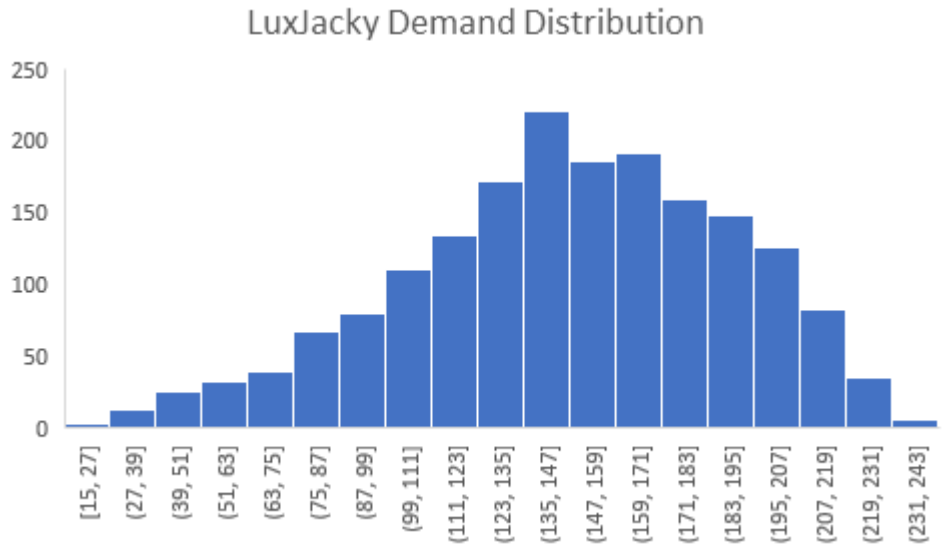
As you can see from the first graph, demand is consistent with no trend. However, there is obvious seasonality during the 6/20-9/24 interval every year. This is further enforced with the histogram that demonstrates that there are two seasons that are normally distributed. Therefore, when determining the economic order quantity and reorder point, two different versions must be created.

LuxJacky

1. Cost of raw materials for a unit of Fash Ring: $10
2. Lead Time: 7 days
3. Machine Setup Cost: $4000 per production campaign
4. Holding Costs: 5% of production cost
5. Net profit per unit of FashRing: $60

For LuxJacky, UberFashion has already created a robust equation to forecast sales based on the day, month, and year (Appendix A). The graph below demonstrates the formula versus actual sales and the demand distribution.

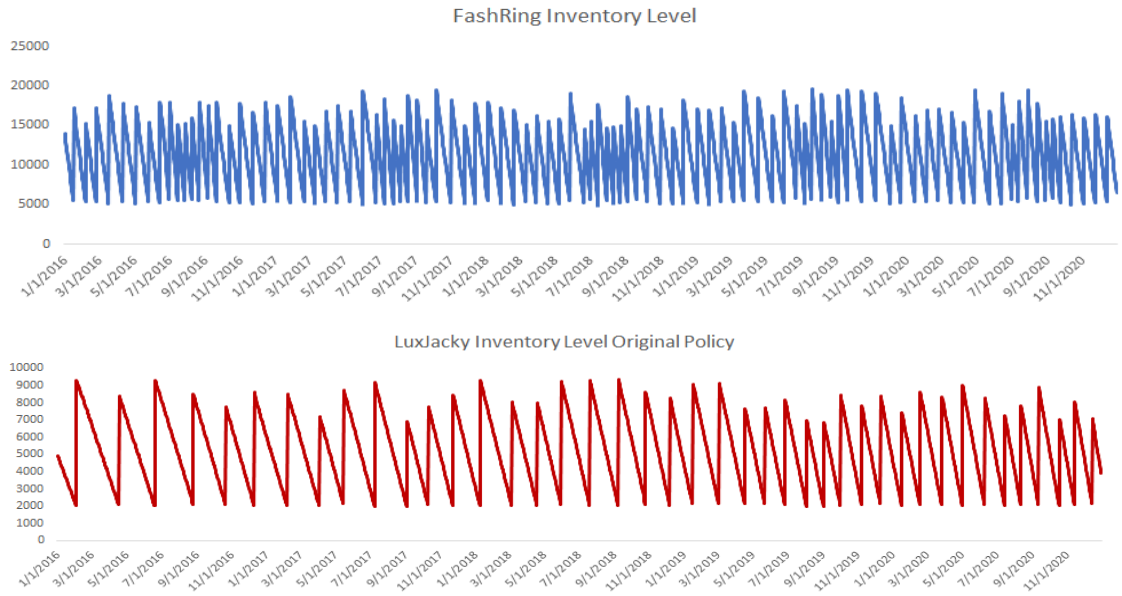




As you can see, the formula is very accurate in predicting actual sales and therefore can be utilized to forecast future daily demand. Additionally, in terms of distribution you can see that LuxJacky demand is left-skewed in terms of distribution. This can be because there is an increasing trend in sales, which will lead to higher demand values over time. To simplify the process, it is assumed that the demand distribution for LuxJacky is normal as well when determining safety stock.

Model

To evaluate the no-customer-lost strategy the economic order quantity model must be used to determine the service level, optimal order quantity (EOQ), and reordering point (ROP) for each product. These two variables will minimize the operating costs associated with each product. The formula for both variables and the EOQ model is shown in Appendix A below.



Looking at the historical inventory level of FashRing and LuxJacky, we can notice that typically reordering occurs when inventory level reaches or falls below 5000 or 2000 units respectively historically. By utilizing the holding, setup cost, lead time, and average demand rate provided, we can evaluate if there is an EOQ and ROP, which will lead to lower operating costs compared to the current policy.

Managerial Question 1

The first question asked by UberFashion is whether better inventory policies can be designed to start a production campaign. From the results of the model for both FashRing and LuxJacky it is possible to implement better policies.

FashRing

In terms of FashRing, as mentioned in the assumptions, there are two optimal order quantities and therefore two reordering points. This is because there is a low season of demand and a high season of demand that are both normally distributed. Due to this by taking the average of the low and high season we were able to generate the two optimal order quantities and reordering points. As demand does not seem to be trending upward or downward, these points are still useful for forecasts. The results are shown in the table below.

	High	**Low**
Average Demand Rate	575.70	874.67
Standard Deviation	40.12	29.10
EOQ	4292.15	5290.49
Safety Stock	131.99	95.73
ROP	1283.40	1845.06

To mimic the no-customer-lost policy the service level was set to 99% to make sure all customer demand is accounted for. As both the low and high season are normally distributed, a Z score of 2.33 was used to find the safety stock values, ultimately leading to the reordering points. These values ultimately led to much lower operating cost, which will be discussed later. From our results, the current strategy of reordering at an inventory level of 5000 and always ordering on average 12401.84 units is way too conservative and simple of a strategy. By recognizing that there are two different seasons for FashRing, UberFashion can more effectively manage their supply chain and minimize costs, while still maintaining their no-customer-lost policy. The production order historical time series is shown in Appendix B to illustrate the variance in order quantity.

LuxJacky

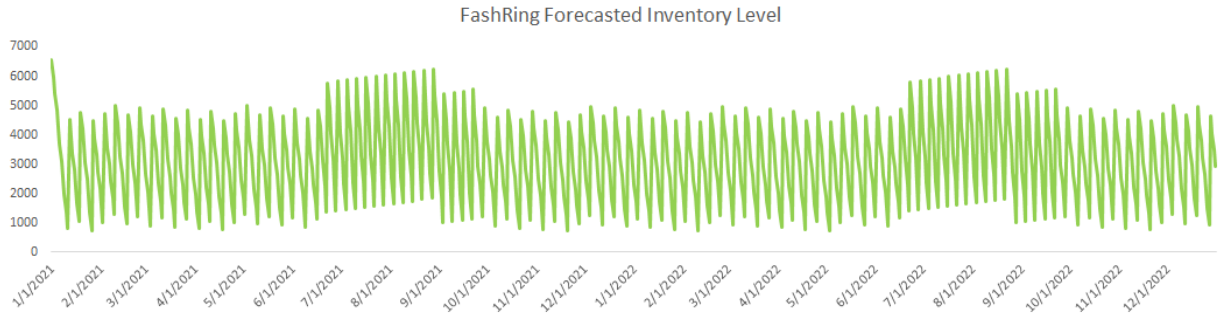
In terms of LuxJacky, because there is observed weekly seasonality, monthly seasonality, and yearly trend, the average daily demand level for each week and month over the years is used. This leads to as low as 24 different EOQs for monthly aggregations and 154 EOQs for weekly aggregations for the forecasts. The EOQ, ROP, average, and standard deviation are shown in Appendix C. The EOQ and ROP variables for the forecast are only possible due to the sales forecast formula UberFashion created, allowing us to figure out what the average weekly and monthly demand will be for future years. To mimic the no-customer-lost policy, the service level was once again set at 99% with a Z score of 2.33.

Once again from our results we found that the new policy in terms of when to reorder leads to lower operating costs, which will again be discussed in more detail during our counterfactual analysis. From the data, UberFashion seems to have the same reordering point of 2000 units regardless of the date. This is inefficient as there is a clear growing trend in demand and keeping the same reordering point when demand is changing is suboptimal. Additionally, a reorder point of 2000 is way too conservative as from our results the reorder point can go as low as 831 units if need be. The reorder point does not need to be 2000 until after the next two years leading to higher holding costs overall.

Managerial Question 2

FashRing

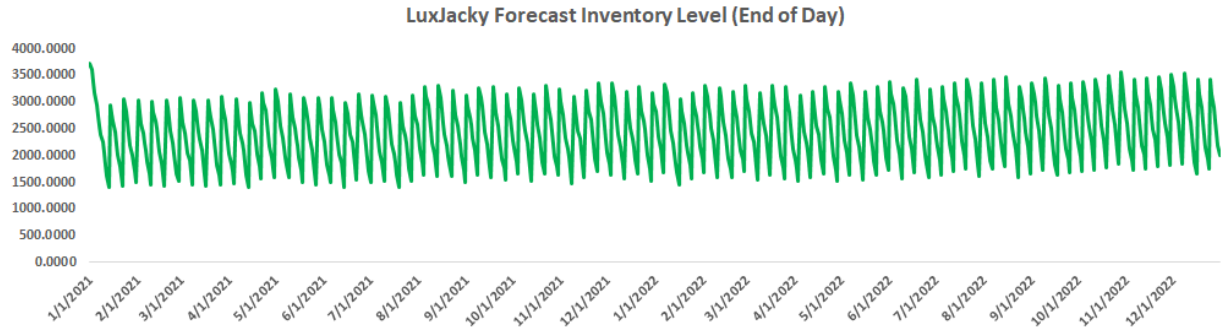
The different costs associated with the proposed inventory policies are holding, setup, and production costs mentioned earlier in the assumptions. After determining the EOQ and ROP for each season, the policy was implemented for the next two years. The inventory level, production order, holding costs, production cost, and total cost time series are shown in Appendix D.



From the graphs above, you can see the reorder points being different depending on the type of season UberFashion is in. The holding costs in general are lower as the ROP is lower than the 5000 ROP in the original policy. Additionally, the new policy also allows for lower orders overall leading to lower production costs and lower chances of suppliers not being able to accommodate the new orders. After calculating the costs, it was found that the cumulative total cost for the strategy for the next two years was $1,429,013.57. This cost averages to $714,506.79 per year, which is lower than the $1,088,237.70 per year total cumulative cost from 2016-2020.

LuxJacky

The holding, production, and setup costs are once again the same as the ones from the assumption. The different costs over the next two years are shown in the Appendix E below. After creating EOQs and ROPs for both weekly and monthly, the monthly was found to lead to lower cumulative costs.The inventory level for LuxJacky after implementing the new policy based on monthly EOQs over the next two years is shown in the graph below.



From the graph above, you can see that the reorder points are increasing overtime, which is consistent with the sales formula that UberFashion created (Appendix A). Holding costs are slowly increasing overtime but are not as high as they were in the original strategy where the ROP was 2000. Additionally, production costs are lower as EOQ values are much lower than the amounts previously purchased. After calculating all the costs, it was found that the cumulative total cost for the strategy was $2,789,456.69. The cost averages to $1,394,728.34, per year which is lower than the original $1,916,918.38 per year cost from 2016-2020.

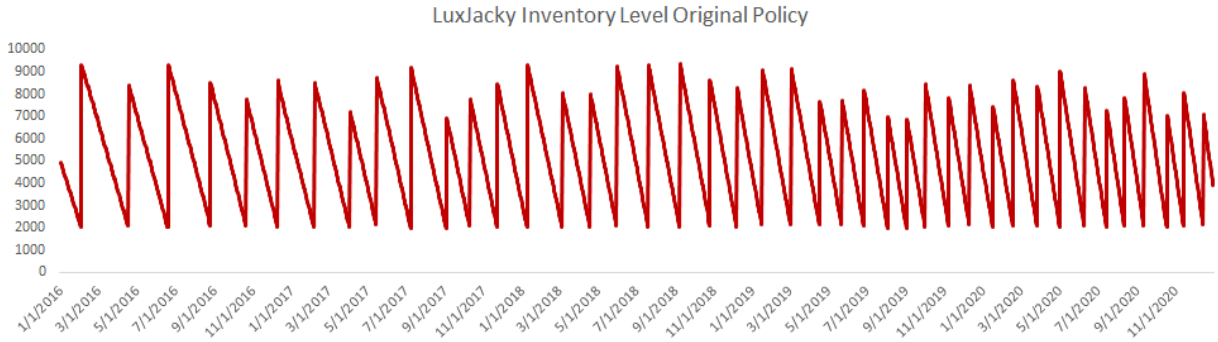
Managerial Question 3

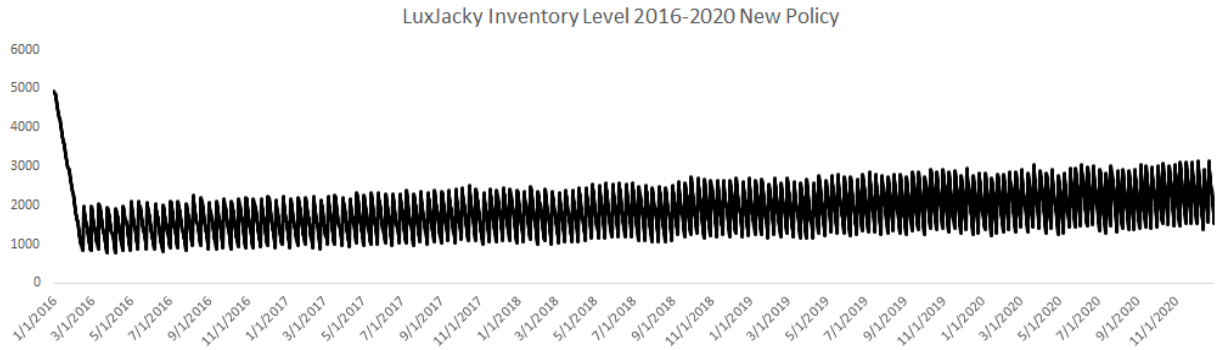
FashRing

To truly measure how effective the new policy is compared to the one implemented in practice, we can conduct counterfactual analysis to simulate what would have happened if the new policy were to be implemented in the previous years. The time series of total costs, holding costs, inventory level, and production order are shown in Appendix F below. As sales and inventory level before 1/1/2016 is unknown it was decided to leave that row untouched in the excel model. From the results, it was found that the new policy led to an 18.01% decrease in total cost from $4,352,950,81 to $3,569,014.03. Once again recognizing that there are two different seasons and a different optimal ordering amount for each season is paramount in leading more efficient inventory management.

LuxJacky

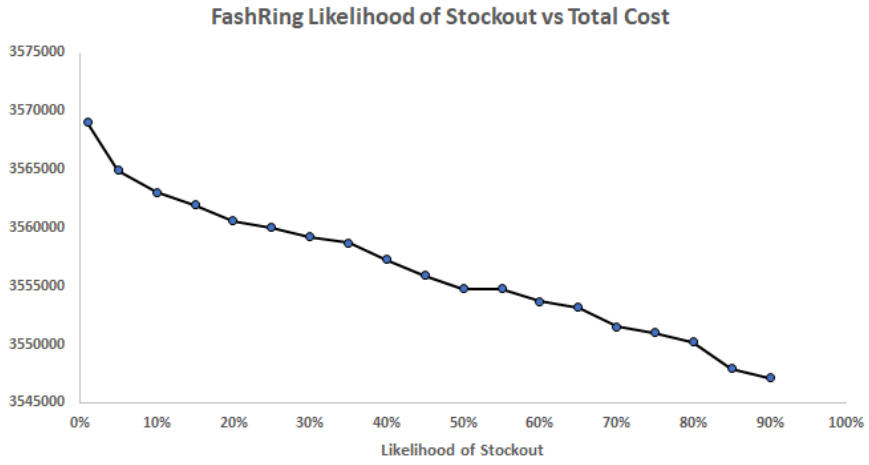
Repeating the same steps from FashRing, a counterfactual analysis was done to simulate what would happen if the new policy were to be implemented in the previous years. The time series of total costs, holding costs, and production order are shown in Appendix G below. Once again as sales before 1/1/2016 is unknown, the inventory level was used as a starting point for the excel model. From the results it was found that the new policy reduced costs by 33.49% from $7,667,673.50 to $5,099,526.12. The reason cost decreased can be best demonstrated by the two graphs below.





As you can see from the graphs above, in the original policy, UberFashion decided to only reorder when inventory level dropped to 2000 units and then order around 6330.58 units more on average. The policy is relatively simple to understand, however it leads to extraordinarily large holding costs as sales are not large enough to justify ordering that much inventory each time. Compared to the new policy, where the reorder point is increasing, but also the ordering amount is not increasing inventory level to way too large inventory values.

Managerial Question 4
FashRing

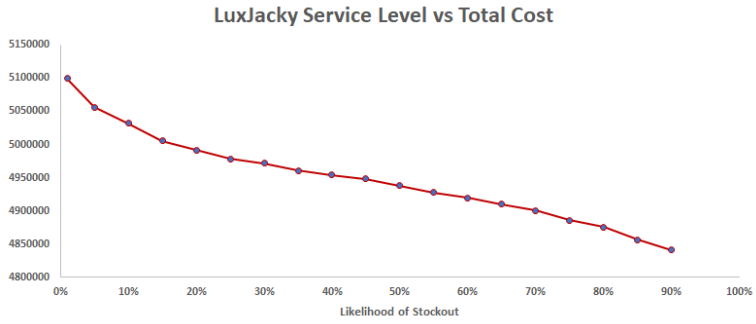


The graph above demonstrates the total cost from 2016-2020 compared to the different service levels for FashRing using the new policy. From our analysis, it was found that as the service

level decreases or the likelihood of stockout increases, the total cumulative cost falls. This makes sense as the amount of safety stock needed is lowered leading to lower holding cost. If UberFashion wants to have a likelihood of stockout near 0%, then the total cost would be $3,569,014.03 mentioned earlier for 2016-2020.

Additionally, if UberFashion chooses to lower the service level then that would mean losing $35 per unit in net profit. Beyond the net profit, having a stockout occur will also lead to lower customer satisfaction as not having the product available will lead to customers spending their income on another app or store.

LuxJacky



The graph above demonstrates the total cost from 2016-2020 compared to the different service levels for LuxJacky using the new policy. The same trend that was seen for FashRing was demonstrated in LuxJacky, where the lower the service level the lower the costs. However, in the case of LuxJacky the curve is much smoother. If UberFashion wants to have a no-customer-lost policy, then the total cost from 2016-2020 would be $5,099,526.12 using the new policy.

In terms of opportunity cost, the net profit lost if a stockout occurs is $60 per unit. The same opportunity costs present in FashRing also apply to this product in terms of customer satisfaction if stockout occurs.

Managerial Question 5

For both FashRing and LuxJacky, as mentioned earlier, changes in product availability will lead to changes in consumer perception. To begin with, if consumers are constantly going to the app and finding out the product they want is not available, they will go to another app. The lack of product availability can lead to the loss of customers. However, if UberFashion wants to artificially create scarcity to incentivize consumers to buy immediately this may be a beneficial strategy. Zara tends to accomplish this by having new design constantly, which pressures consumers to purchase an item now when they typically would not. This strategy could make LuxJacky or FashRing look like luxury items, however without strong branding this could fail. This strategy would be more appropriate for LuxJacky as it often updates its designs to depict social or community issues supported by the company.

Another problem that occurs if product availability changes significantly is that inventory levels need to be much more finely tuned and controlled than before. As observed for both FashRing and LuxJacky, the previous policies would just have a static ROP and random production orders. In the new policy, the policy must constantly be updated to make sure assumptions are still true. This is especially true in the case for LuxJacky where demand is forecasted based on a formula. Any sudden increases in demand will lead to a high chance of stockout as the inventory levels are not as high as they would be according to the original policy.

Conclusions

After conducting our analysis and answering the managerial questions, we can conclude that the current implemented policies are inefficient if the no-customer-lost policy must be held. UberFashion does not take advantage of the seasonality of both products and have suboptimal and overly conservative optimal order quantities and reorder points. By taking advantage of the policies recommended, UberFashion can simplify their ordering process given the forecasted demand holds. The no-customer-lost policy does lead to higher costs, but it can be reduced by implementing the new policy and the qualitative benefits it provides in terms of customer satisfaction may be worth it overall.

Limitations of Model

The model works under the assumption that all the costs are going to be static and will not increase over time. This can be explained away due to long-term contracts, however as we do not know how long their special contracts are with suppliers and delivery companies, it can be misleading. Additionally, the forecasted demand for FashRing and LuxJacky were based on assuming normality for FashRing and using a formula with LuxJacky. If these assumptions do not hold then the optimal order quantities and reorder points are wrong. The sales formula given for LuxJacky also assumes infinite growth and can lead to inflated forecasts as well leading to potentially higher holding costs due to unsold inventory. Additionally, having data on how much losing a customer costs UberFashion can be helpful in assessing the true cost of not having high product availability. Finally, the model assumes that UberFashion can freely adjust their order quantity with their established suppliers without any changes in lead time. Having historical performance on how often lead times are not met can be useful in improving the model.

Appendix A

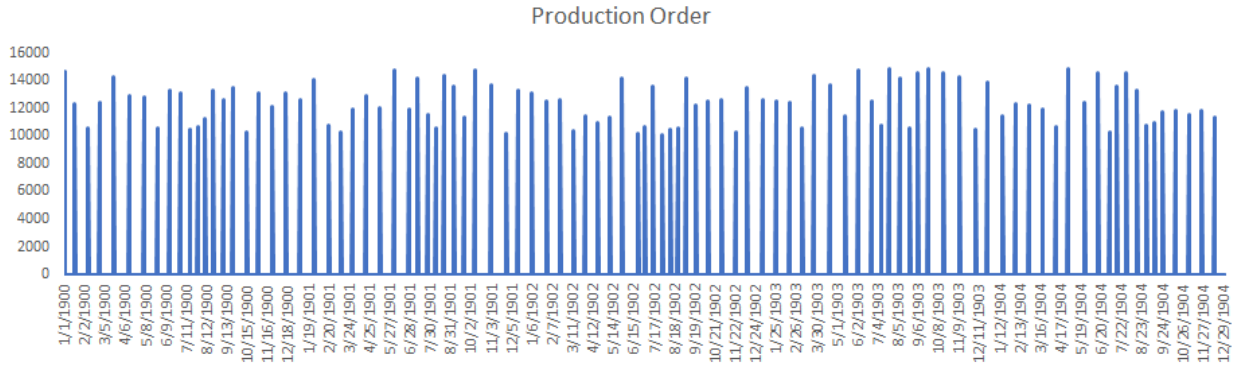
Formulas

$$Q_{opt} = \sqrt{\frac{2 \times \mathrm{E}[D] \times S}{H}}$$

$$\mathbf{ROP = \mu_{dLT} + Z\sigma_{dLT}}$$

$$sales = 100 - 2.17w^{2.25} + 12.77w + e^{-\frac{w}{0.032}} + 5m^{0.75} + 10s + 20(y - 2016)$$

Appendix B
Fashring



Appendix C
LuxJacky

Monthly Forecast EOQ and ROP

Year	Month	YearMonth	Average Demand	Standard Deviation	EOQ	ROP
2021	1	20211	190.712287	31.84098	1746.824717	1530.965289
2021	2	20212	196.1121495	30.86127	1771.382057	1562.734277
2021	3	20213	201.2521305	30.08479	1794.445343	1593.93495

2021	4	20214	200.901206	30.09091	1792.880168	1591.516122
2021	5	20215	204.0715072	32.01378	1806.970978	1625.543361
2021	6	20216	208.1774521	30.22223	1825.058693	1643.258123
2021	7	20217	206.3307539	31.50656	1816.945806	1638.236195
2021	8	20218	213.9168502	30.24006	1850.045838	1683.543617
2021	9	20219	213.9939295	29.90845	1850.379116	1682.042191
2021	10	202110	213.8293532	31.84098	1849.667444	1692.784752
2021	11	202111	219.6509916	30.5134	1874.677537	1725.365008
2021	12	202112	219.4871178	29.71115	1873.978091	1719.280137
2022	1	20221	212.3529995	32.01378	1843.271004	1683.513807
2022	2	20222	216.1121495	30.86127	1859.514558	1702.734277
2022	3	20223	220.2040546	29.73567	1877.036194	1724.449589
2022	4	20224	219.0248322	32.04275	1872.003556	1730.394982
2022	5	20225	226.8512156	30.24006	1905.156017	1774.084174
2022	6	20226	227.1814606	29.90845	1906.542255	1774.354908
2022	7	20227	227.2298723	31.84098	1906.745383	1786.588386
2022	8	20228	233.6387375	30.08479	1933.447646	1820.641199
2022	9	20229	232.7398325	30.09091	1929.724675	1814.386507

2022	10	202210	235.4700658	32.01378	1941.010318	1845.333271
2022	11	202211	239.2096857	30.22223	1956.362689	1860.483759
2022	12	202212	237.0502665	31.50656	1947.512327	1853.272783

Weekly LuxJacky EOQ and ROP

Year	Week 1	YearWeek	Average Demand	Standard Deviation	EOQ	ROP
2021	1	20211	150.3958534	26.81312032	1551.23617	1217.8
2021	2	20212	192.7031853	32.7333249	1755.918838	1550.39
2021	3	20213	192.7031853	32.7333249	1755.918838	1550.39
2021	4	20214	192.7031853	32.7333249	1755.918838	1550.39
2021	5	20215	192.7031853	32.7333249	1755.918838	1550.39
2021	6	20216	195.6251546	32.35911877	1769.1813	1568.54
2021	7	20217	196.1121495	32.7333249	1771.382057	1574.26
2021	8	20218	196.1121495	32.7333249	1771.382057	1574.26
2021	9	20219	196.1121495	32.7333249	1771.382057	1574.26
2021	10	202110	198.6737819	32.40272997	1782.913489	1590.15
2021	11	202111	199.1007206	32.7333249	1784.828151	1595.18

2021	12	202112	199.1007206	32.7333249	1784.828151	1595.18
2021	13	202113	199.1007206	32.7333249	1784.828151	1595.18
2021	14	202114	200.2769779	31.49062409	1790.092636	1595.76
2021	15	202115	201.845321	32.7333249	1797.08796	1614.39
2021	16	202116	201.845321	32.7333249	1797.08796	1614.39
2021	17	202117	201.845321	32.7333249	1797.08796	1614.39
2021	18	202118	202.2133741	31.93435787	1798.725656	1612.05
2021	19	202119	204.421693	32.7333249	1808.52069	1632.42
2021	20	202120	204.421693	32.7333249	1808.52069	1632.42
2021	21	202121	204.421693	32.7333249	1808.52069	1632.42
2021	22	202122	204.421693	32.7333249	1808.52069	1632.42
2021	23	202123	206.1715397	32.12061398	1816.244652	1640.9
2021	24	202124	206.8714785	32.7333249	1819.325055	1649.57
2021	25	202125	206.8714785	32.7333249	1819.325055	1649.57
2021	26	202126	206.8714785	32.7333249	1819.325055	1649.57
2021	27	202127	207.878318	31.66842847	1823.746991	1650.07
2021	28	202128	209.2207707	32.7333249	1829.626282	1666.02
2021	29	202129	209.2207707	32.7333249	1829.626282	1666.02

2021	30	202130	209.2207707	32.7333249	1829.626282	1666.02
2021	31	202131	209.2207707	32.7333249	1829.626282	1666.02
2021	32	202132	211.4873276	32.7333249	1839.510055	1681.88
2021	33	202133	211.4873276	32.7333249	1839.510055	1681.88
2021	34	202134	211.4873276	32.7333249	1839.510055	1681.88
2021	35	202135	211.4873276	32.7333249	1839.510055	1681.88
2021	36	202136	212.742539	31.90145581	1844.960873	1685.55
2021	37	202137	213.6839474	32.7333249	1849.038442	1697.26
2021	38	202138	213.6839474	32.7333249	1849.038442	1697.26
2021	39	202139	213.6839474	32.7333249	1849.038442	1697.26
2021	40	202140	214.2943201	31.81670879	1851.67738	1695.89
2021	41	202141	215.8202516	32.7333249	1858.258331	1712.21
2021	42	202142	215.8202516	32.7333249	1858.258331	1712.21
2021	43	202143	215.8202516	32.7333249	1858.258331	1712.21
2021	44	202144	215.8202516	32.7333249	1858.258331	1712.21
2021	45	202145	217.6060749	32.49906365	1865.930652	1723.27
2021	46	202146	217.9037121	32.7333249	1867.206307	1726.8
2021	47	202147	217.9037121	32.7333249	1867.206307	1726.8

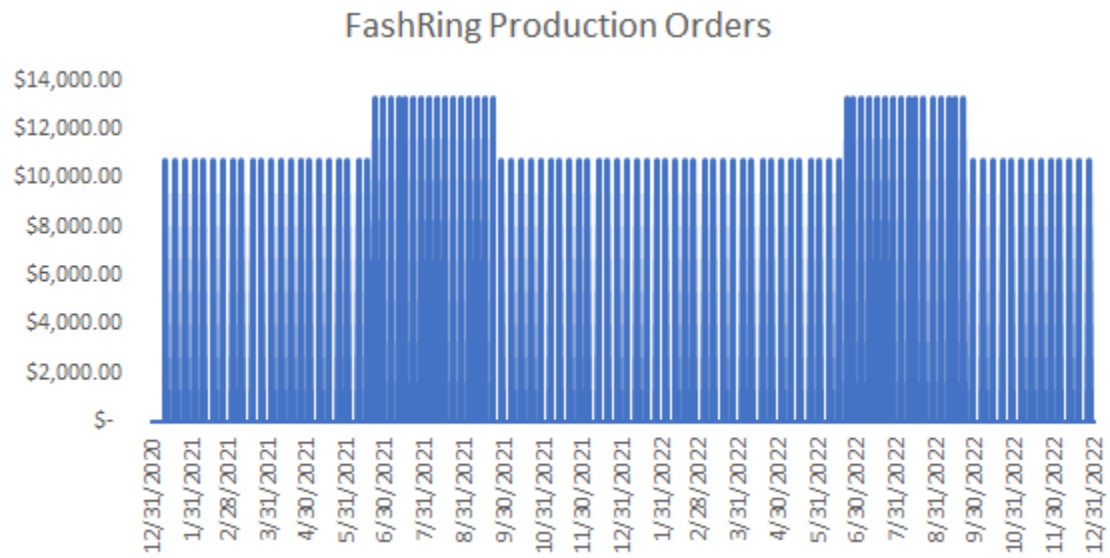
2021	48	202148	217.9037121	32.7333249	1867.206307	1726.8
2021	49	202149	219.0674671	31.96134131	1872.185747	1730.19
2021	50	202150	219.9402833	32.7333249	1875.911654	1741.05
2021	51	202151	219.9402833	32.7333249	1875.911654	1741.05
2021	52	202152	219.9402833	32.7333249	1875.911654	1741.05
2021	53	202153	230.1514618	20.24628534	1918.964145	1735.67
2022	1	20221	151.4361142	0	1556.591734	1060.05
2022	2	20222	212.7031853	32.7333249	1844.790223	1690.39
2022	3	20223	212.7031853	32.7333249	1844.790223	1690.39
2022	4	20224	212.7031853	32.7333249	1844.790223	1690.39
2022	5	20225	212.7031853	32.7333249	1844.790223	1690.39
2022	6	20226	215.1381597	31.88971655	1855.319529	1702.25
2022	7	20227	216.1121495	32.7333249	1859.514558	1714.26
2022	8	20228	216.1121495	32.7333249	1859.514558	1714.26
2022	9	20229	216.1121495	32.7333249	1859.514558	1714.26
2022	10	202210	218.2468431	31.99027754	1868.675866	1724.63
2022	11	202211	219.1007206	32.7333249	1872.327837	1735.18
2022	12	202212	219.1007206	32.7333249	1872.327837	1735.18

2022	13	202213	219.1007206	32.7333249	1872.327837	1735.18
2022	14	202214	219.8848921	31.55713779	1875.675418	1733.43
2022	15	202215	221.845321	32.7333249	1884.018348	1754.39
2022	16	202216	221.845321	32.7333249	1884.018348	1754.39
2022	17	202217	221.845321	32.7333249	1884.018348	1754.39
2022	18	202218	221.845321	32.7333249	1884.018348	1754.39
2022	19	202219	224.421693	32.7333249	1894.926671	1772.42
2022	20	202220	224.421693	32.7333249	1894.926671	1772.42
2022	21	202221	224.421693	32.7333249	1894.926671	1772.42
2022	22	202222	224.421693	32.7333249	1894.926671	1772.42
2022	23	202223	225.8215704	31.80696826	1900.827485	1776.52
2022	24	202224	226.8714785	32.7333249	1905.241102	1789.57
2022	25	202225	226.8714785	32.7333249	1905.241102	1789.57
2022	26	202226	226.8714785	32.7333249	1905.241102	1789.57
2022	27	202227	227.5427048	31.7257486	1908.057462	1788.07
2022	28	202228	229.2207707	32.7333249	1915.080241	1806.02
2022	29	202229	229.2207707	32.7333249	1915.080241	1806.02
2022	30	202230	229.2207707	32.7333249	1915.080241	1806.02

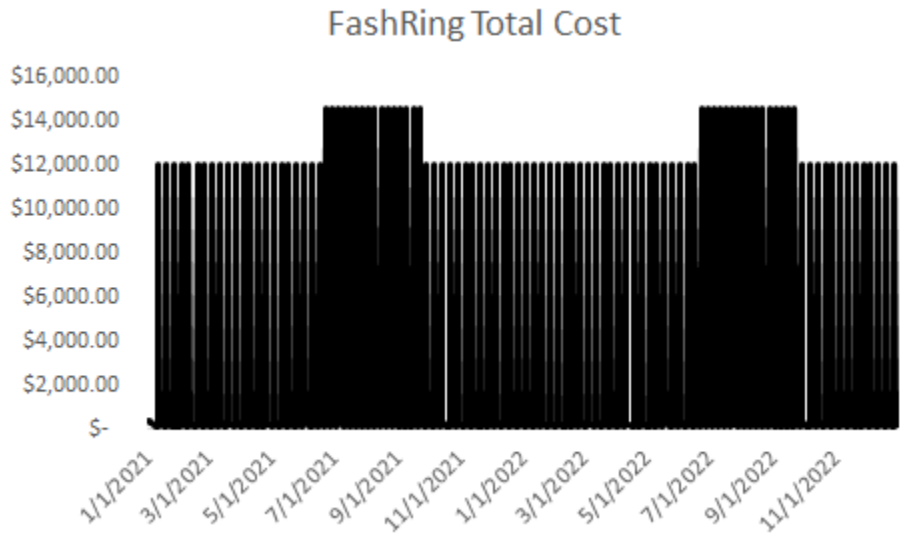
2022	31	202231	229.2207707	32.7333249	1915.080241	1806.02
2022	32	202232	231.1635338	32.47930847	1923.178759	1818.05
2022	33	202233	231.4873276	32.7333249	1924.525199	1821.88
2022	34	202234	231.4873276	32.7333249	1924.525199	1821.88
2022	35	202235	231.4873276	32.7333249	1924.525199	1821.88
2022	36	202236	232.4287361	31.73720844	1928.434541	1822.34
2022	37	202237	233.6839474	32.7333249	1933.634702	1837.26
2022	38	202238	233.6839474	32.7333249	1933.634702	1837.26
2022	39	202239	233.6839474	32.7333249	1933.634702	1837.26
2022	40	202240	233.9891337	32.07014443	1934.896933	1835.31
2022	41	202241	235.8202516	32.7333249	1942.453095	1852.21
2022	42	202242	235.8202516	32.7333249	1942.453095	1852.21
2022	43	202243	235.8202516	32.7333249	1942.453095	1852.21
2022	44	202244	235.8202516	32.7333249	1942.453095	1852.21
2022	45	202245	237.3084377	32.21015512	1948.572555	1859.41
2022	46	202246	237.9037121	32.7333249	1951.014965	1866.8
2022	47	202247	237.9037121	32.7333249	1951.014965	1866.8
2022	48	202248	237.9037121	32.7333249	1951.014965	1866.8

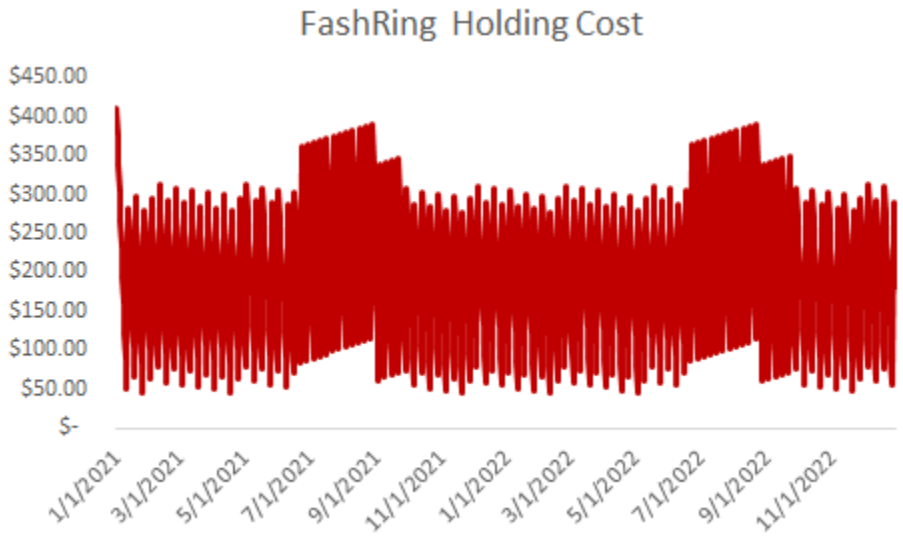
2022	49	202249	238.7765283	31.80937655	1954.59061	1867.22
2022	50	202250	239.9402833	32.7333249	1959.347987	1881.05
2022	51	202251	239.9402833	32.7333249	1959.347987	1881.05
2022	52	202252	239.9402833	32.7333249	1959.347987	1881.05
2022	53	202253	239.9402833	32.7333249	1959.347987	1881.05

Appendix D

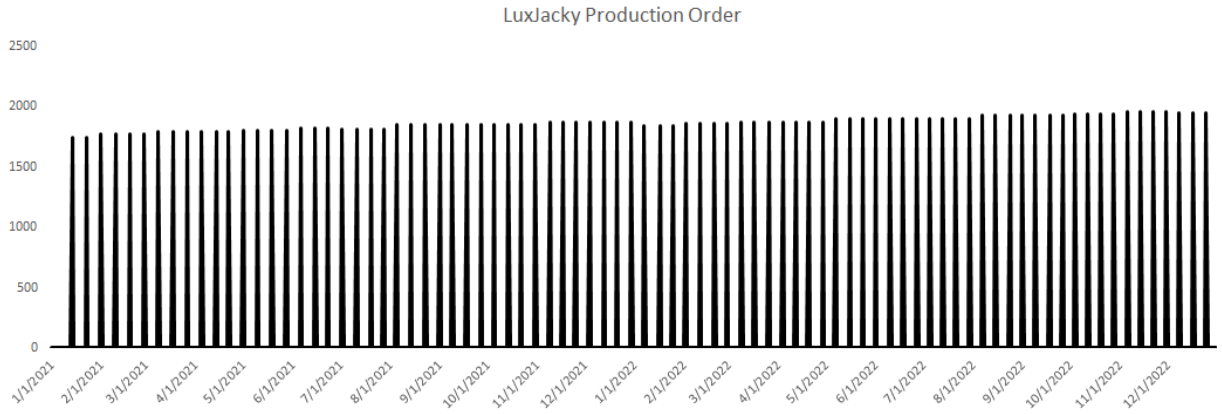


FashRing Costs

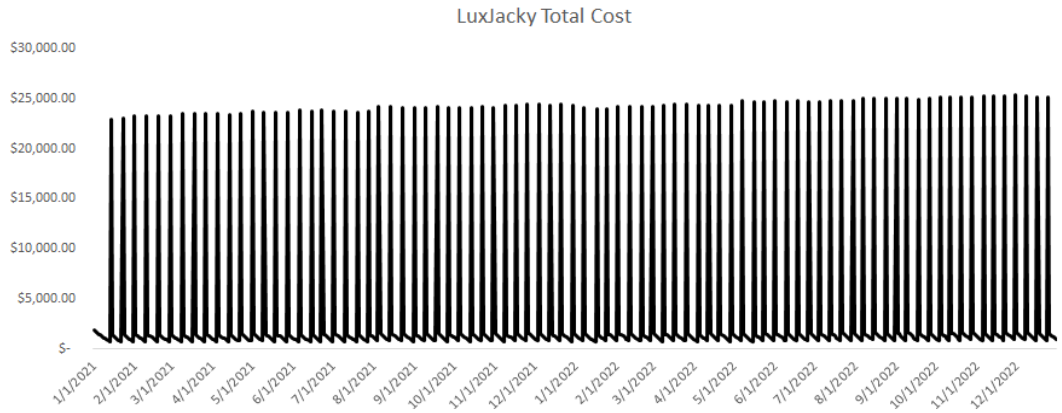


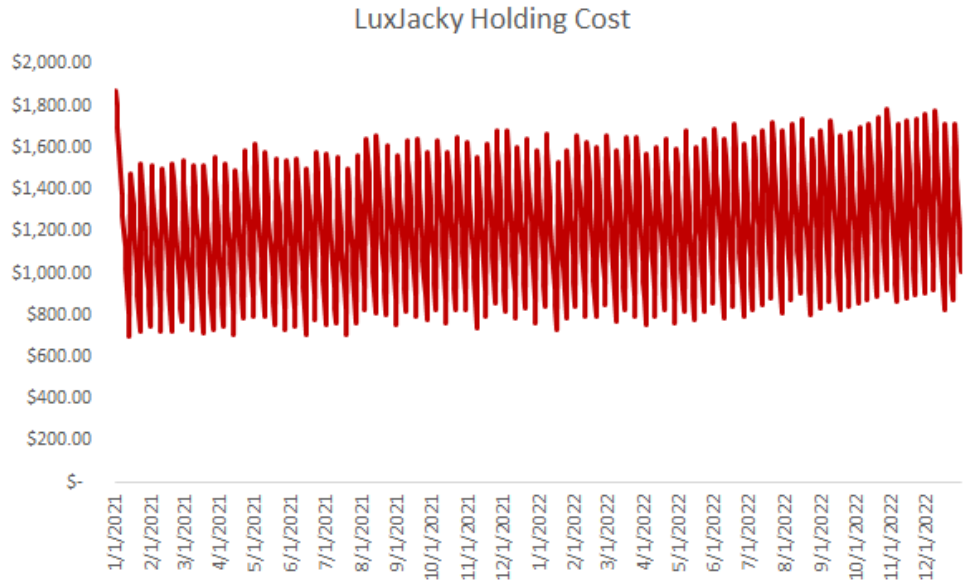


Appendix E



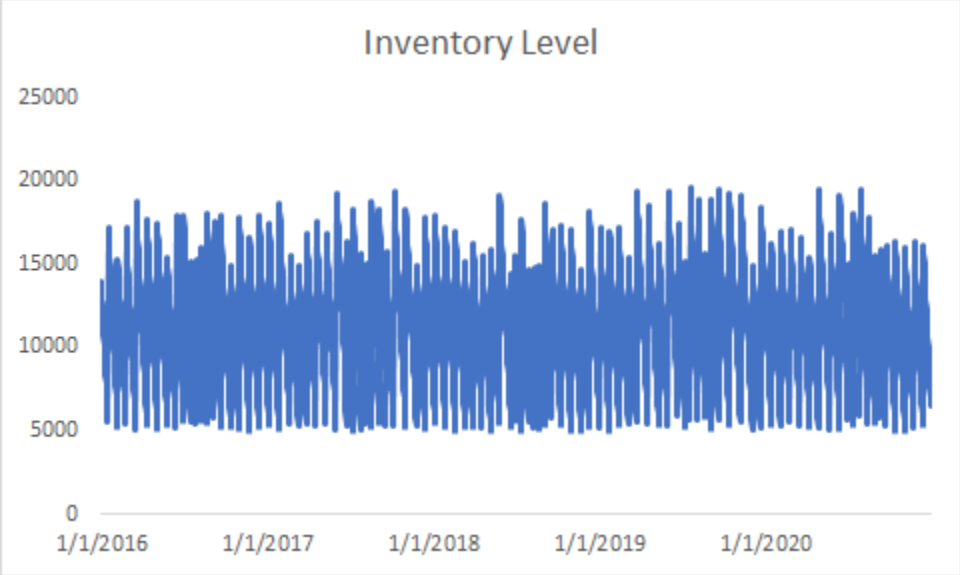
LuxJacky Costs

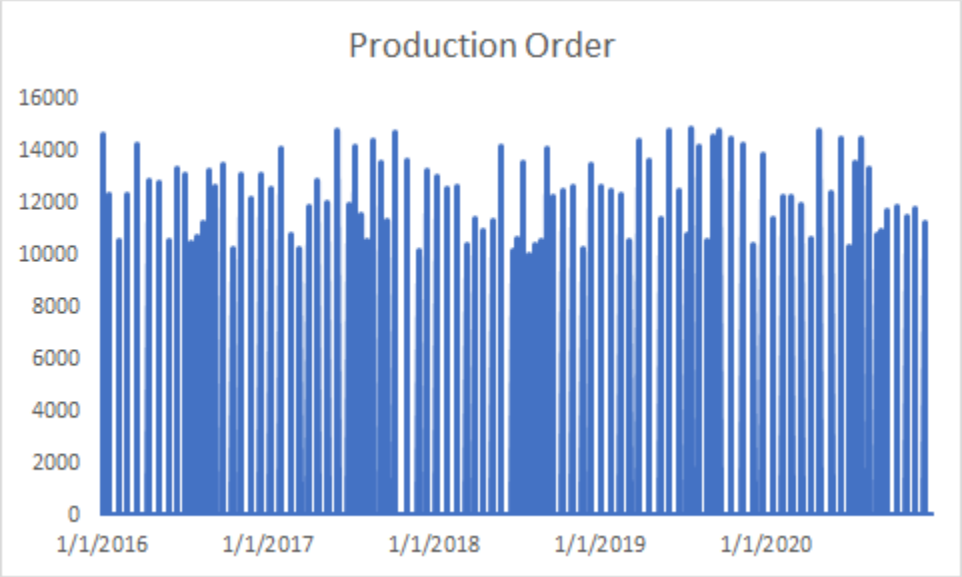


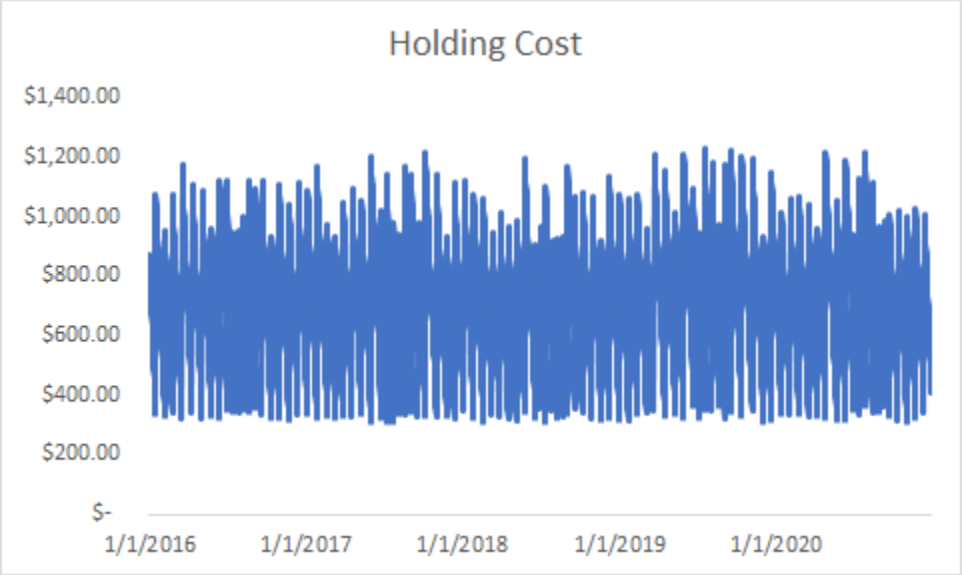


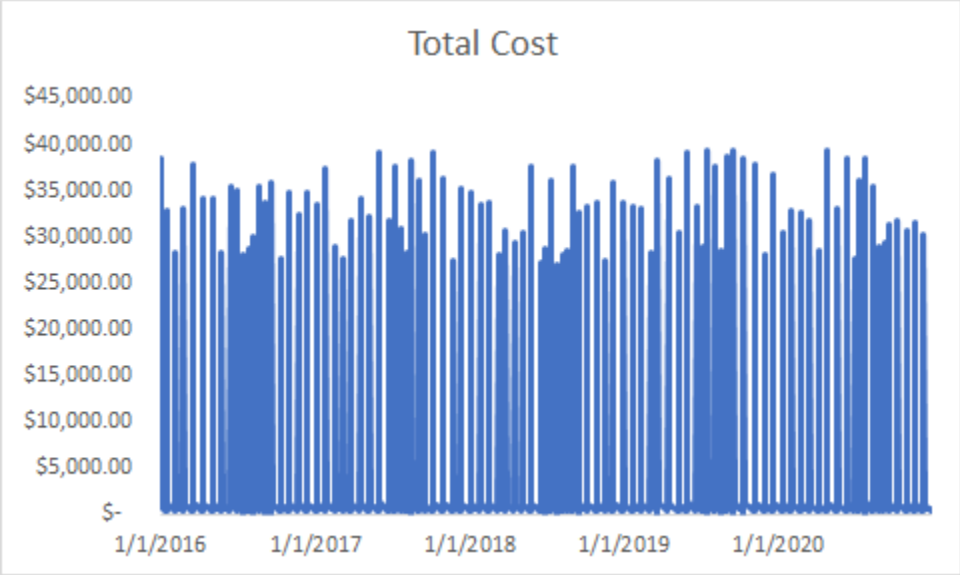
Appendix F

Original Policy FashRing

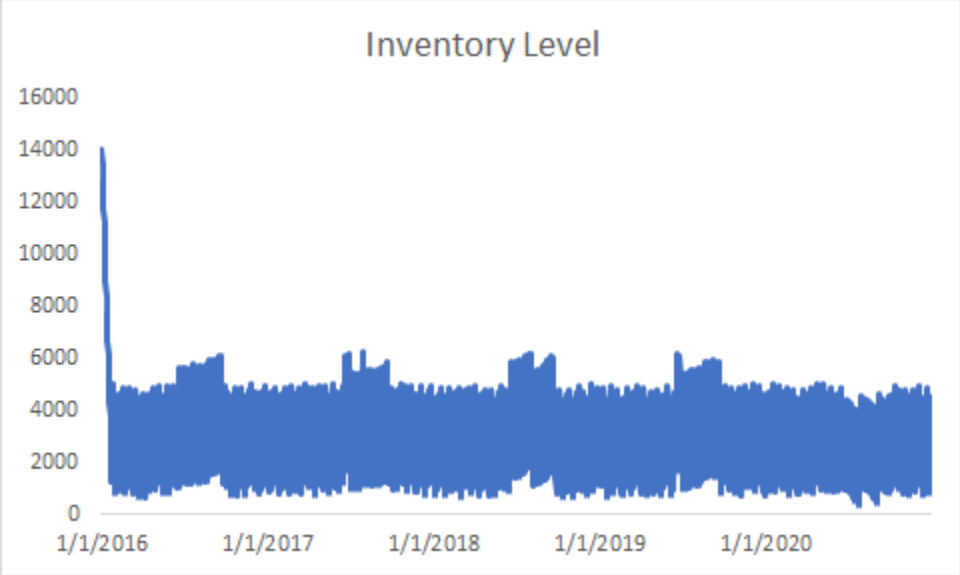


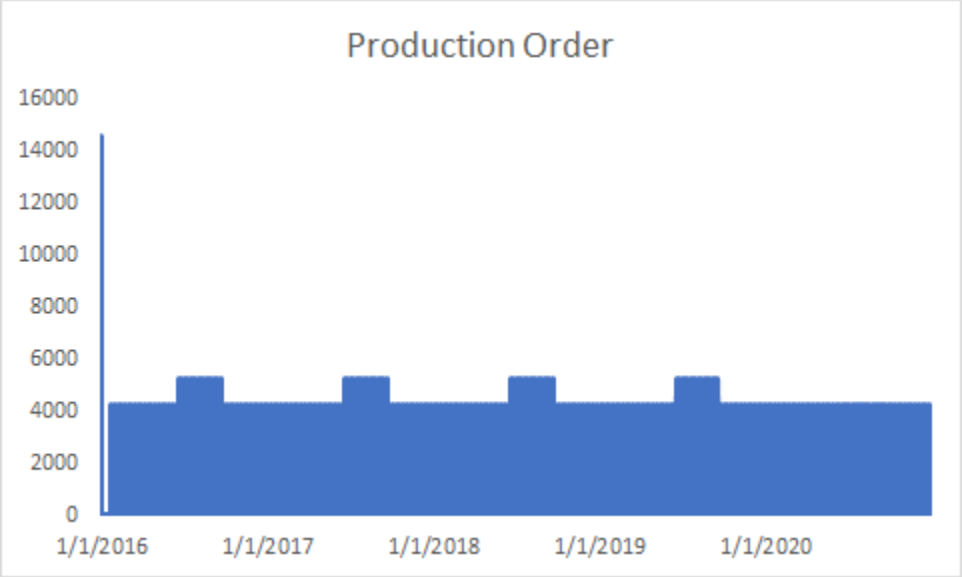

Production Order
16000
14000
12000
10000
8000
6000
4000
2000
0
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020

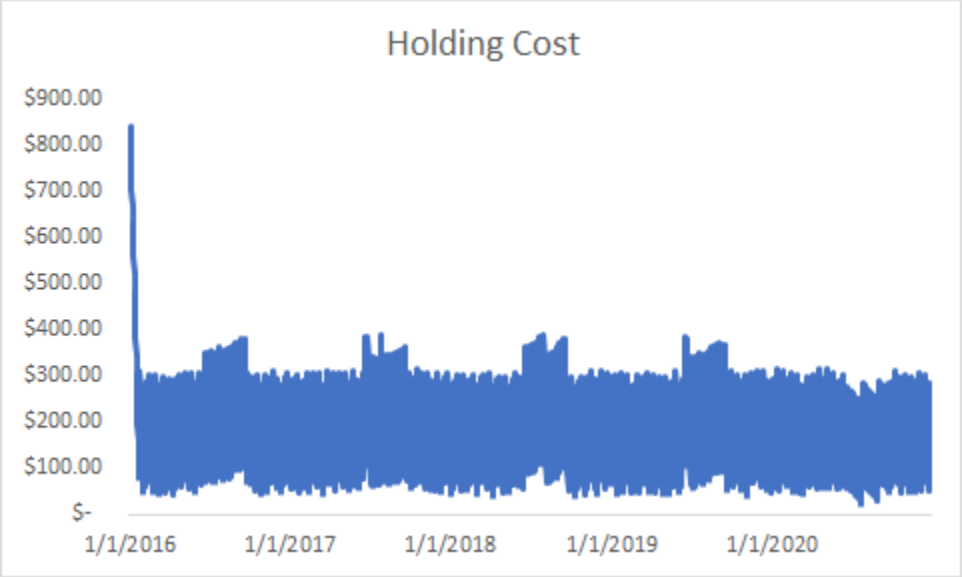

Holding Cost
$1,400.00
$1,200.00
$1,000.00
$800.00
$600.00
$400.00
$200.00
$-
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020

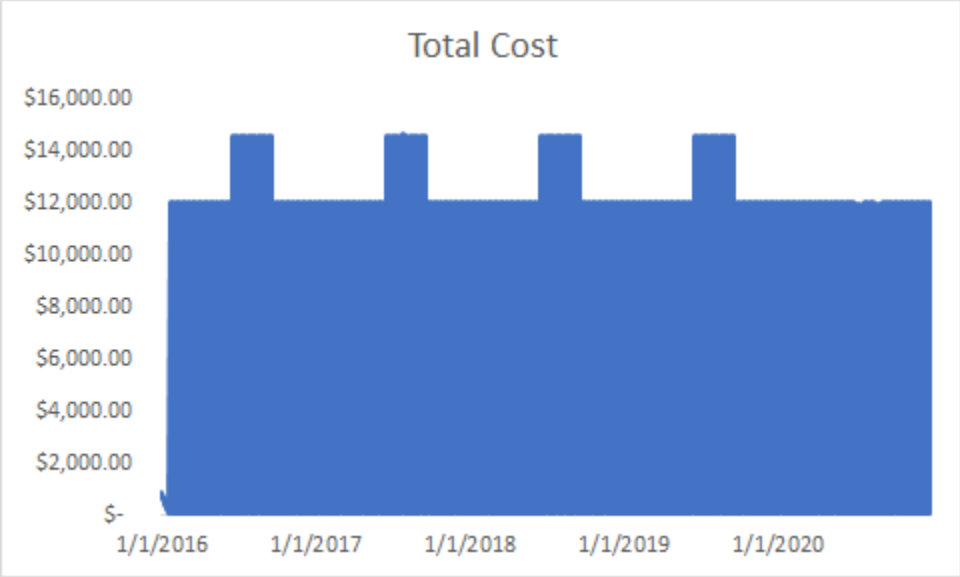


New Policy FashRing



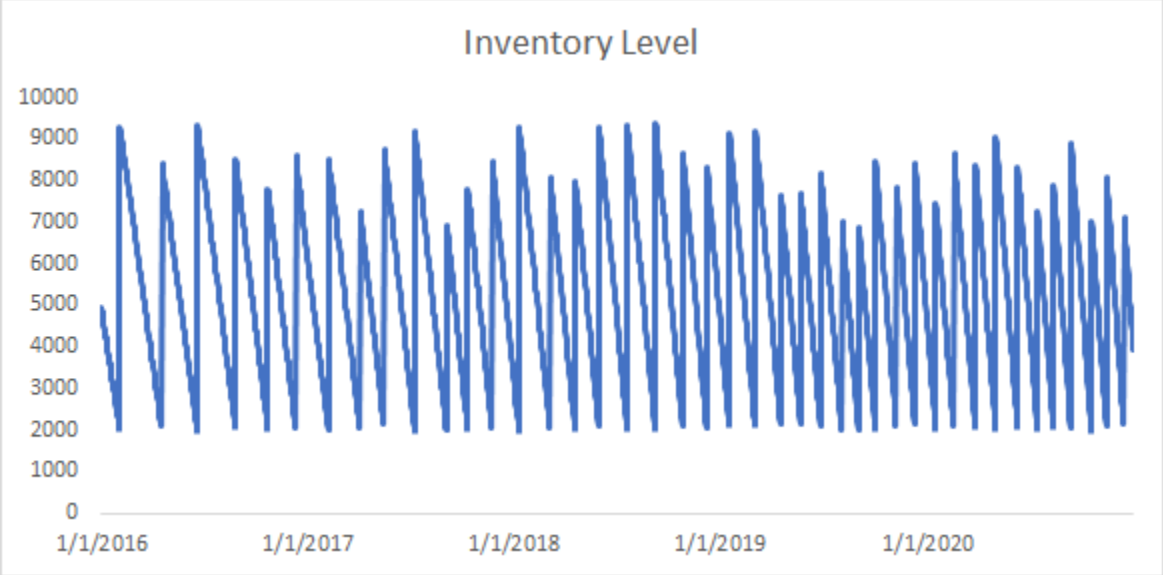

Production Order
16000
14000
12000
10000
8000
6000
4000
2000
0
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020

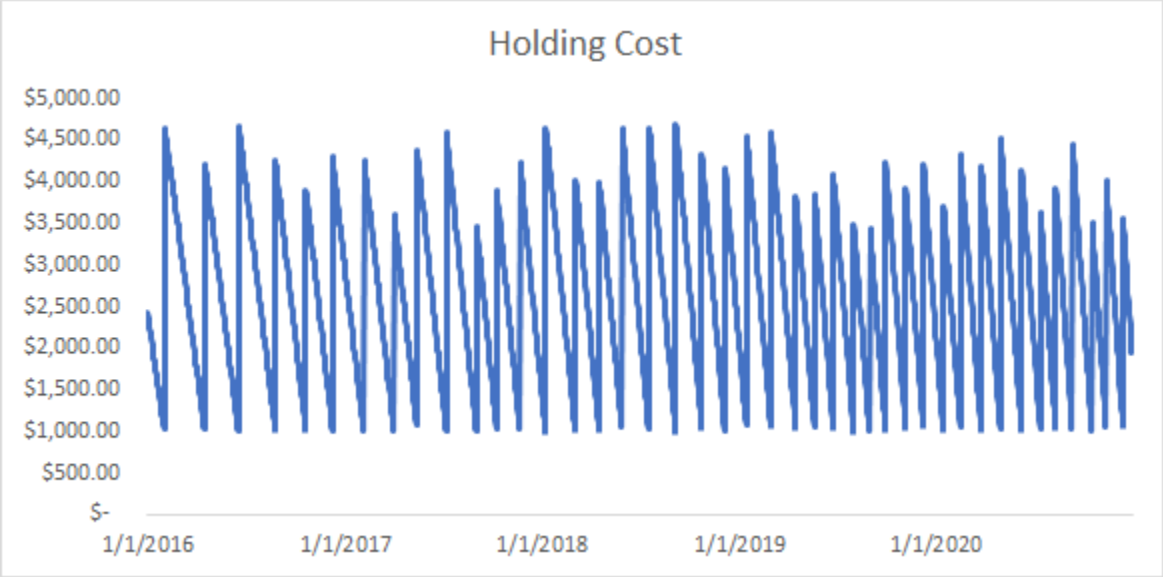

Holding Cost
$900.00
$800.00
$700.00
$600.00
$500.00
$400.00
$300.00
$200.00
$100.00
$-
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020

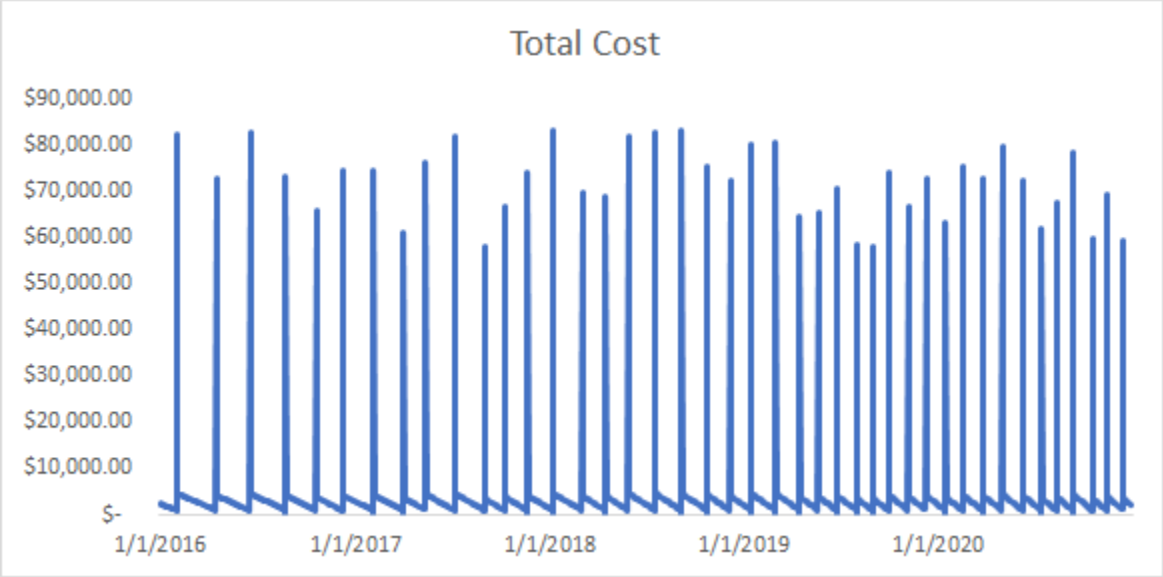


Appendix G

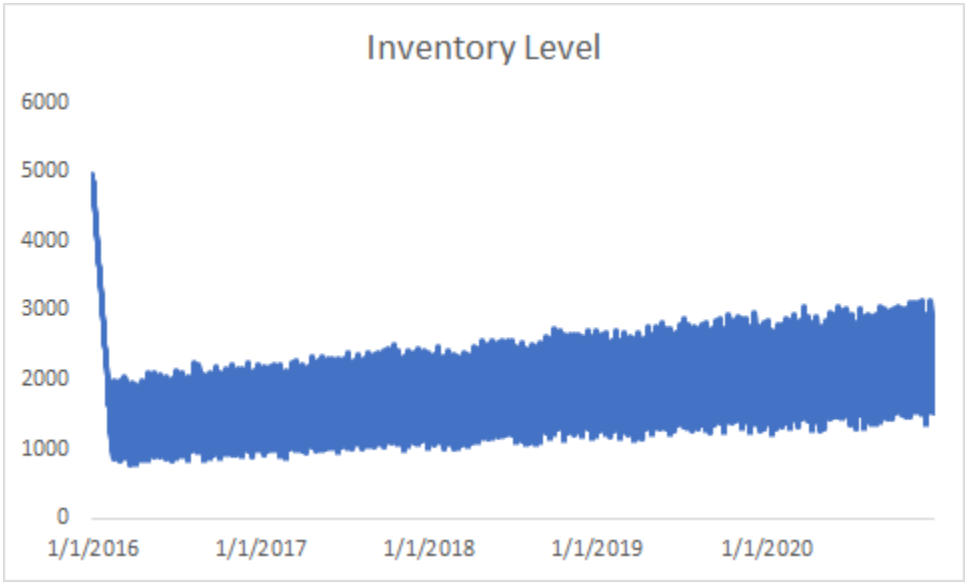
Original Policy LuxJacky

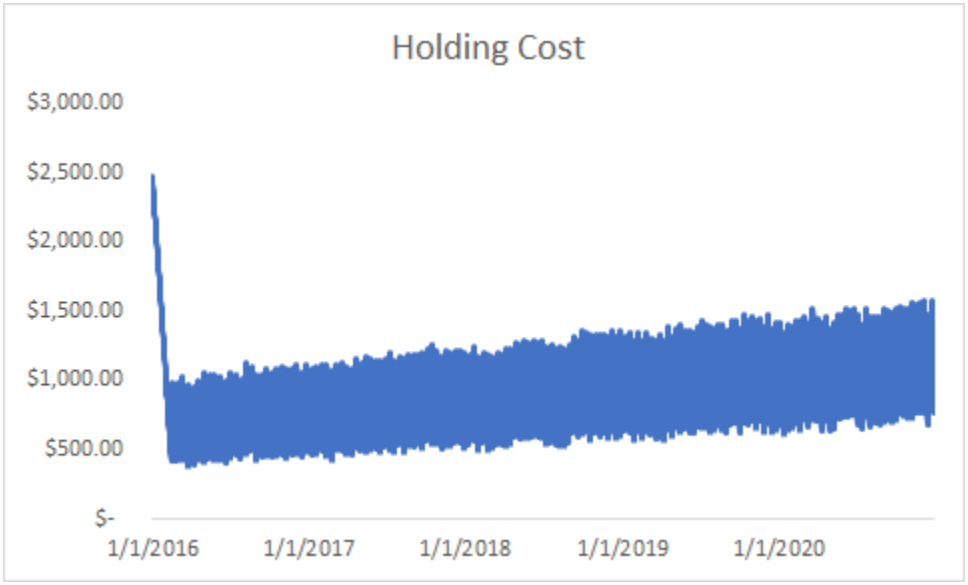


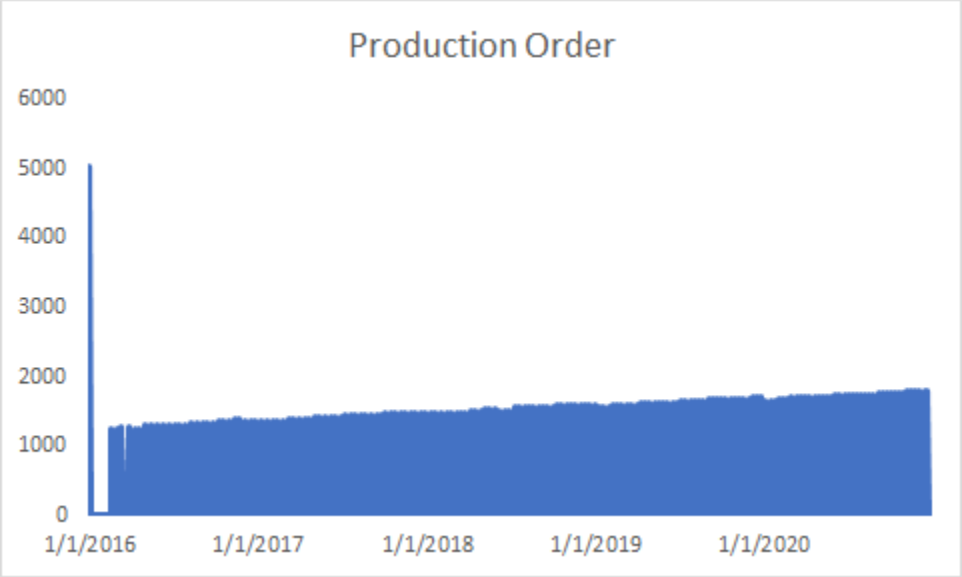


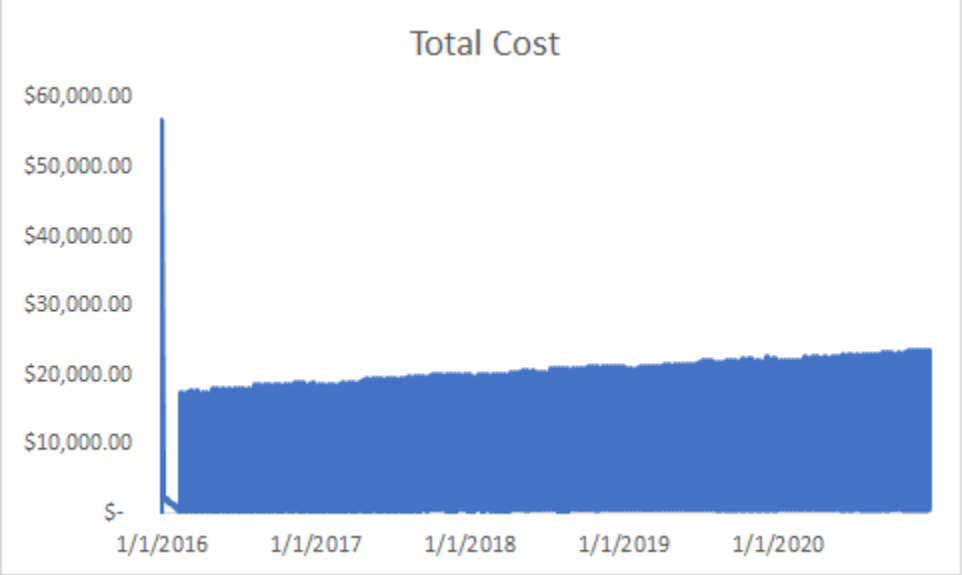


New Policy LuxJacky


Inventory Level
6000
5000
4000
3000
2000
1000
0
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020


Holding Cost
$3,000.00
$2,500.00
$2,000.00
$1,500.00
$1,000.00
$500.00
$-
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020


Production Order
6000
5000
4000
3000
2000
1000
0
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020


Total Cost
$60,000.00
$50,000.00
$40,000.00
$30,000.00
$20,000.00
$10,000.00
$-
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020