Markdown Optimization
White Paper

Quickborn Consulting LLC

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QUICKBORN
www.qbcs.com

Background

Retail has been impacted significantly by COVID-19 lock downs, especially those retailers that trade seasonal merchandise. With spring and summer seasons of 2020 almost gone and inventory mostly still in place, retailers need to find ways to sell their unsold goods and make room for next season's merchandise. Optimizing markdowns can help clear unsold goods, however, when and how much a retailer should be marking down is a decision that can have a big impact on ultimate revenue and margin. Optimizing markdowns is a proven and effective solution to maximizing revenue and profit during difficult times when every percent margin makes a massive difference in the future prospects of any retailers.

In this white paper we will explain to you how you can optimize your markdowns.

We will explain to you:

- What to optimize against: what your target objectives are and how you can measure them (sell as much as possible with maximum margin by a pre-determined date).

- What metrics you need to measure and consider when making markdown decisions:
    - Seasonality – when does the item you are marking down normally sell
    - Elasticity – How reactive are consumers to price change on your item

- What rules and constraints you need to consider for markdowns:
    - Do not touch periods
    - Price ladders
    - End date
    - Buy back price

- Based on your target, metrics and constraints, what you need to model to choose your best options.

- Finally: how do you measure progress and success of markdowns against your KPIs?

With the above skills in hand, you will be able to successfully take control of your markdowns and achieve your targeted goals measured by relevant KPIs to secure your business.

This white paper is based on a webinar that was held on Wednesday, May 6th 2020 at 10 am Eastern US Time which is 4 pm Central European Time. You can access the original recording on our website.

Context and definitions

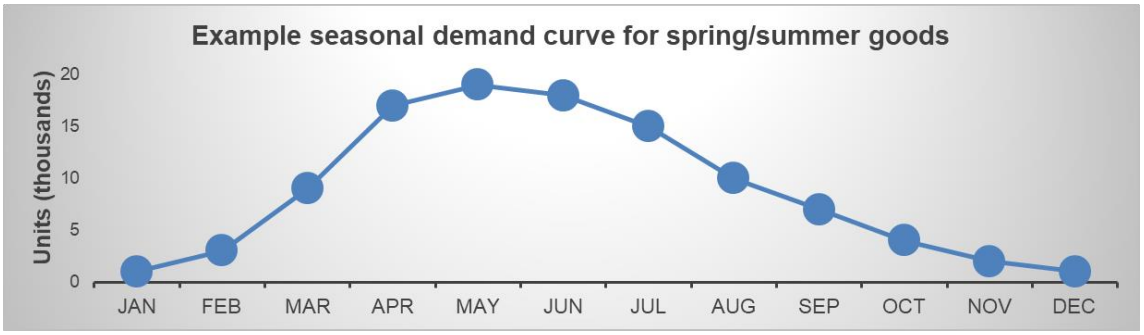
Seasonal goods are ordered weeks and months in advance of their sale in stores, after extensive pre-season financial and assortment planning has been performed by the retailer. How well goods sell to consumers is often only seen several months after ordering, when goods are already in the store.

Challenges arise when seasonal goods sell out too quickly or do not sell out as originally planned.

Goods selling out too quickly can be easily controlled with increasing the retail price, or re-ordering if there is still time to land additional goods in the season, although this is less likely to be an option with seasonal items that have an ordering lead time of several weeks or months. The worst case damage when selling out too fast is the lost opportunity cost of generating more revenue and margin than originally planned with the originally ordered quantity.

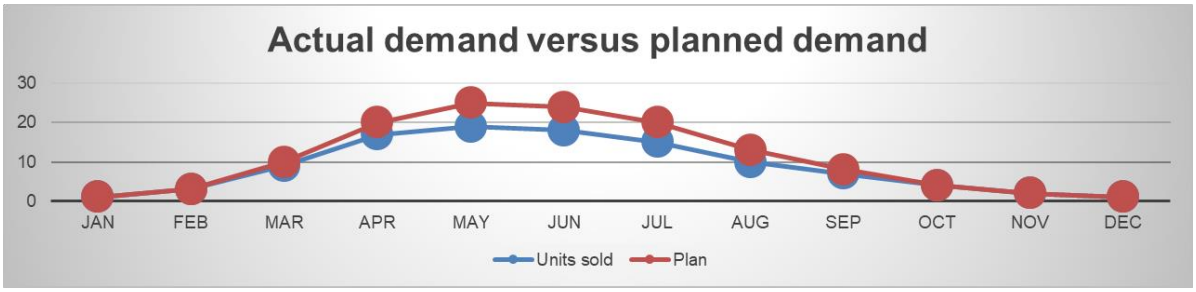
When goods are not selling as quickly as planned, the situation is more difficult to manage and carries a higher risk for generating significant alternative cost, lost revenue and lost margin.

Seasonal goods sell with a **seasonal demand curve**.



In the above diagram, a seasonal demand is demonstrated in terms of units sold for a seasonal item per month. Most units are sold in the early summer months, this item could be a swimsuit sold in the northern hemisphere, for example in North America. Items sell slow in the beginning of the season, then demand ramps up quickly. Following a peak period, demand drops again and gradually dwindles down. Seasonal demand curves vary by various types of seasonal merchandise.

Markdown is a decrease in retail price of goods made by retailers with the intent of increasing the number of units sold. Markdowns are applied when goods are not selling as quickly as planned in a season and demand needs to be increased to clear stock by end of season, so that next season's merchandise has space in the stores to be sold during the coming season. Markdowns are also called clearance.



In the above diagram two curves represent the demand for a seasonal item (blue line) and the originally planned demand for the seasonal item that the retailer has calculated the to be ordered quantity for the entire season for this seasonal item.

It is worthwhile noting that a **markdown is not a promotion**. Promotions are temporary retail price decreases used to lift demand temporarily, markdowns are retail price decreases applied with the intent of selling all remaining goods, therefore typically do not have an end date, although a deeper markdown retail price decrease may follow a previous markdown retail price decrease.

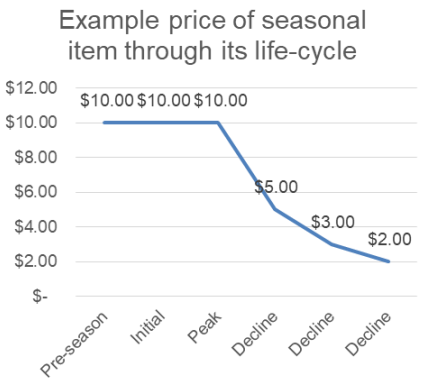
Once in clearance, an item's price never increases, only decreases.

Life cycle of a seasonal item consists of:

1. ***pre-season*** period when items are planned and ordered with a planned retail price
2. an ***initial*** period (also known as "do not touch" period) when the item arrives in the store and is first measured for actual demand, sold at its initial retail price
3. a ***maturity*** period of top selling performance
4. ***decline*** period as seasonal demand drops.

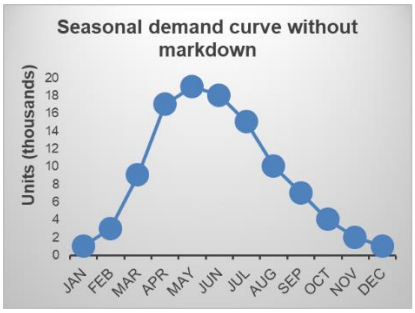
Markdowns are applied, following an initial 'do not touch' period, in case the item is selling slower than planned. Multiple markdowns may be applied with specific pre-determined decreases in price, called a price ladder.

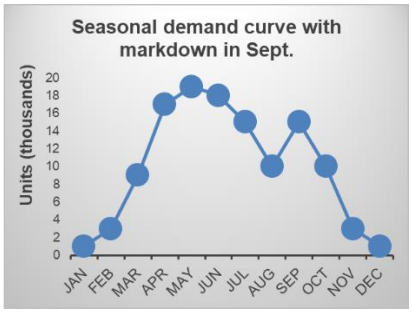
Markdowns are applied in retail to *seasonal merchandise* at the end of their seasonal life-cycle, with the purpose of **clearing stock by a pre-defined date** in order to make room for the next season's merchandise in the store. Using our swimwear example, selling swimwear in October in North America will be met with less interest by customers than selling swimwear in June or July, when most people are going on summer holidays to lakes and the sea.

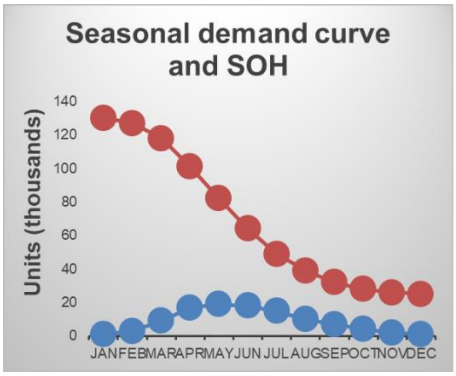


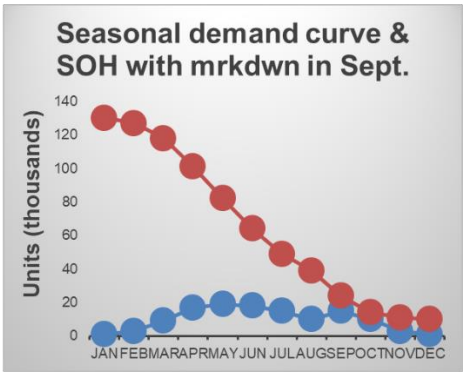
In the diagram to the right, a **seasonal item's pricing** is displayed through its seasonal life cycle. Initially the item is sold at 10$ during its initial and peak periods. As the item enters its seasonal decline phase and demand drops, the price is decreased to motivate customers to still purchase the item and clear remaining stock from the store. The price initially sinks to 5$ then 3$, finally to 2$.

Markdowns are applied by retailers to lift demand to sell seasonal stock before next season begins in order to free up space for next season's merchandise. In the diagrams below, a seasonal item's seasonal demand curve is shown on the left without a markdown, while the same items' seasonal demand curve is shown on the right with a markdown applied in September.









In the above diagram we see the seasonal demand curve of a seasonal item marked with blue dotted line, and the same item's total stock on hand marked with the red dotted line. Similarly to the previous diagram, we apply no markdowns in the left hand side diagram, while in the right hand side diagram we apply a markdown in September, increasing the item's demand for the month of September, thus selling more items in September than without the markdown price decrease. As a result, on the right hand side, the total stock on hand of the item is lower at the end of the season than on the left hand side diagram, demonstrating how a markdown can reduce stock remaining at the end of a season.

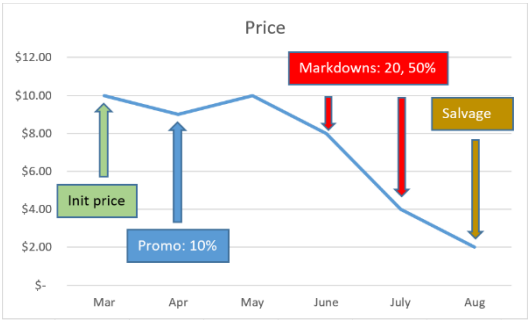
Markdown optimization is the process of finding the best timing and best decrease in retail price in order to maximize profit while clearing goods until a pre-defined date.

Simply put, the question retailers ask when items are selling slower than planned is:

When should I mark down and how much?

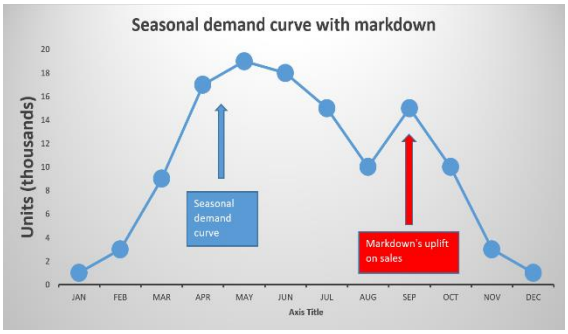
In order to answer "When do I mark down and how much?", we need to be clear on what our objectives are. Typically, these are: sell as many goods as possible, with maximum margin, by a pre-determined date. In other words, markdown optimization criteria are:

1. **Markdown price** set for markdown – what is my markdown price?
2. **Timing** of markdown – when do I mark down (could be multiple times)?
3. The **targeted end date** of a seasonal item, also known as the exit date, is a constraint that optimization needs to take into account and work against as an objective.



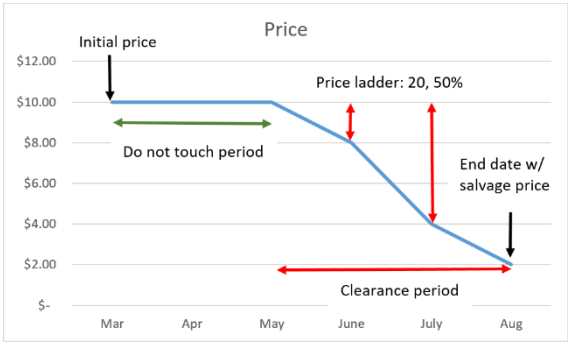
4. **Additional factors** that need to be taken into account when optimizing markdowns are **planned and actual sales performance**.

In order to calculate **how much markdown needs to be made when**, to increase sales to planned levels, we need to measure and know two key metrics about our goods:



1. **Seasonality** – what is the seasonal demand curve of my item?
2. **Elasticity** – how reactive is my customer to price changes of my item? If I decrease the price 10%, what % change will I see in demand.

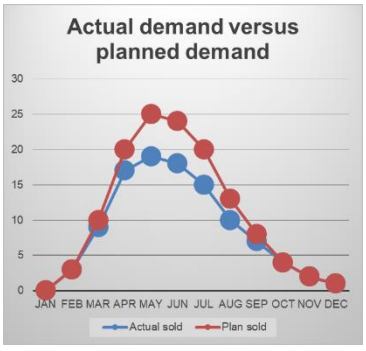
In addition to seasonality and elasticity, we also need to consider **markdown rules** and **business constraints** when making markdown decisions as a retailer:



1. **Do not touch periods** – what is the earliest date I am allowed to mark down?
2. **Price ladders and rules** – do I need to follow pre-defined guidelines for determining the markdown price? Always end in .99, always mark down at least 20%, first markdown must be at least X%, etc.
3. **End date** – when is my exit date for my seasonal merchandise, when all goods must be removed from my stores?
4. **Buy back price** – will my supplier or another channel (wholesale, discount retailers) buy my unsold goods at the end of season? If yes, for how much?

What do I model? Examples

When identifying what items need to be marked down, when and how much, modeling, a.k.a. simulation, needs to be performed to determine the **price values and markdown dates** that get my total sales results to my targets.



What items need to be marked down, or at least reviewed, can be determined by comparing actual performance of items in terms of sales and stock on hand with the original plans. If the item is performing poorer than planned, a markdown needs to be considered to mitigate loss.

EXAMPLE: In the example to the right, I originally planned to sell 130 items at 10$ each over the course of 12 months, during a spring/summer season.

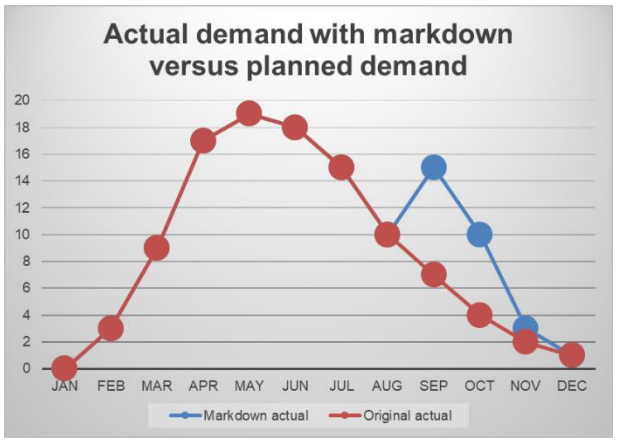
My **target result is1300$** revenue.

However, my actual results are below my plan and I am only selling 105 units with 10$ unit price, that is 1050$ revenue. My 25 units of unsold goods can be salvaged at 2$ each, making **my actual total results 1100$** which is below my plan.

When a markdown needs to be considered, **timing and markdown amount** can be calculated systematically by considering multiple options within known constraints.

Choosing the option best serving business objectives will deliver improved business results.

EXAMPLE: In the example to the right, I apply a 30% markdown in September that raises demand for September and on, but reduces unit price to 7$ for September and on.



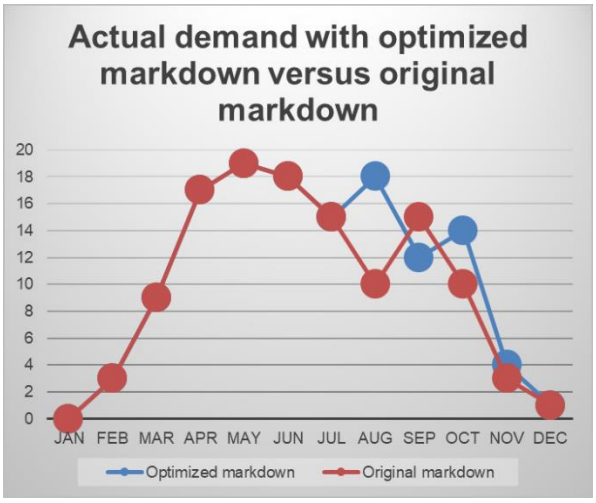
At end of season I have 10 items left in stock, with a salvage value of 20$

My new net result is 1133$.

To consider multiple options for markdowns, **actual results and remaining period forecasts need to be analyzed**.

The calculated **impact of various markdown timings and amounts** need to be simulated based on their impact on demand, which is calculated by considering the item's measured elasticity and seasonality.

EXAMPLE: In the example to the right, I apply a 20% markdown in August that raises demand for August and on, but reduces unit price to 8$ for August and on. I apply a second discount of 50% from original price in October, making the retail price 5$ and lifting demand again.



At end of season I have 0 items left in stock, with a salvage value of 0$

However, **my new net result is 1145$.**

Performance of markdowns can be measured by comparing margin produced by sales performance of markdown items with the originally planned margin amount for the same items.

In the examples presented in this document, results were:

KPIs	Original plan	Without markdown	With 1 markdown	With 2 markdowns
Items purchased	130	130	130	130
Items sold	130	105	120	130
Sale price	$ 10.00	$ 8.08	$ 8.72	$ 8.81
Revenue + salvage income	$ 1,300.00	$ 1,100.00	$ 1,133.00	$ 1,145.00
Weighted average cost	$ 5.00	$ 5.00	$ 5.00	$ 5.00
Cost of goods purchased	$ 650.00	$ 650.00	$ 650.00	$ 650.00
Total margin	$ 650.00	$ 400.00	$ 483.00	$ 495.00

Next steps

Contact us if you have questions, need more information, detail, examples! We are happy to talk to you in more detail or about specific questions!

We provide value assessment services to forecast the impact of optimizing your markdowns in your business.

We recommend and implement solutions that provide markdown optimization recommendations and process automation and support.

You can reach us on our website at www.qbcs.com.