



MARKDOWN OPTIMIZATION – A CASE STUDY

The Problem:

Typical retailers carry thousands of style-colors at each store. When multiplied by the various sizes, the combination becomes even larger. Retailers, under pressure to move inventory while trying to maximize gross margins, have to struggle with the proliferation of these combinations. To make such a daunting task manageable, and to keep costs under control, retailers typically implement pricing, promotion and markdown decisions for a style-color uniformly for the whole chain or for groups of stores. Retailers have realized for a while that this jack-hammer approach may work for **some** stores but results in dilution of margin for some stores while it is too conservative for others leading to excess left over inventory.

Aims/Objectives:

Use Store & Style-Color level pricing in the form of markdowns to precisely stimulate demand and improve revenue, gross margins & inventory turns simultaneously or some combination thereof.

Where was the study done?

The study was conducted for the outlet stores of a major garment manufacturer within the continental US.

How did we do it?

A set of stores was selected to be “test” stores for the study. An equivalent set was chosen to be “control” stores. It was ensured up front that both sets are “equivalent” in stock-on-hand, sales volumes, geographical distributions, sales patterns etc. The sets were chosen to be large enough to provide statistical confidence in the conclusions reached.

For the study a set of product lines was selected from several candidate product lines.

Using two (2) years worth of historical data provided by the client, Apex’s mathematically sophisticated models were customized and tuned for the client’s data.

A weekly summarized activity file was transmitted by the client to Apex. Apex in turn provided a weekly feed to the client to set prices in “test” stores. Pricing in control stores

was carried out in the same manner as was being previously done.

At the end of summer/spring season (22 weeks from start), statistics like Revenue, Units Sold, Gross Margin, Average Price, Receipts for the 22 week period and weekly stock-on-hand (SOH) etc were gathered from both sets of stores and compared.

Who was involved?

The CEO, CFO, CIO and several DMMs of the client company were intimately involved in the process from the very beginning of the project. They together formed a steering committee to oversee the successful implementation of the trial. Apex transmitted the pricing decisions to DMM in charge of the product lines in the study. The DMM and his team implemented the pricing decisions in the system that fed our prices to the POS's at the stores. The prices that were overridden and the reason for the same was provided to tune the solution.

What did it achieve?

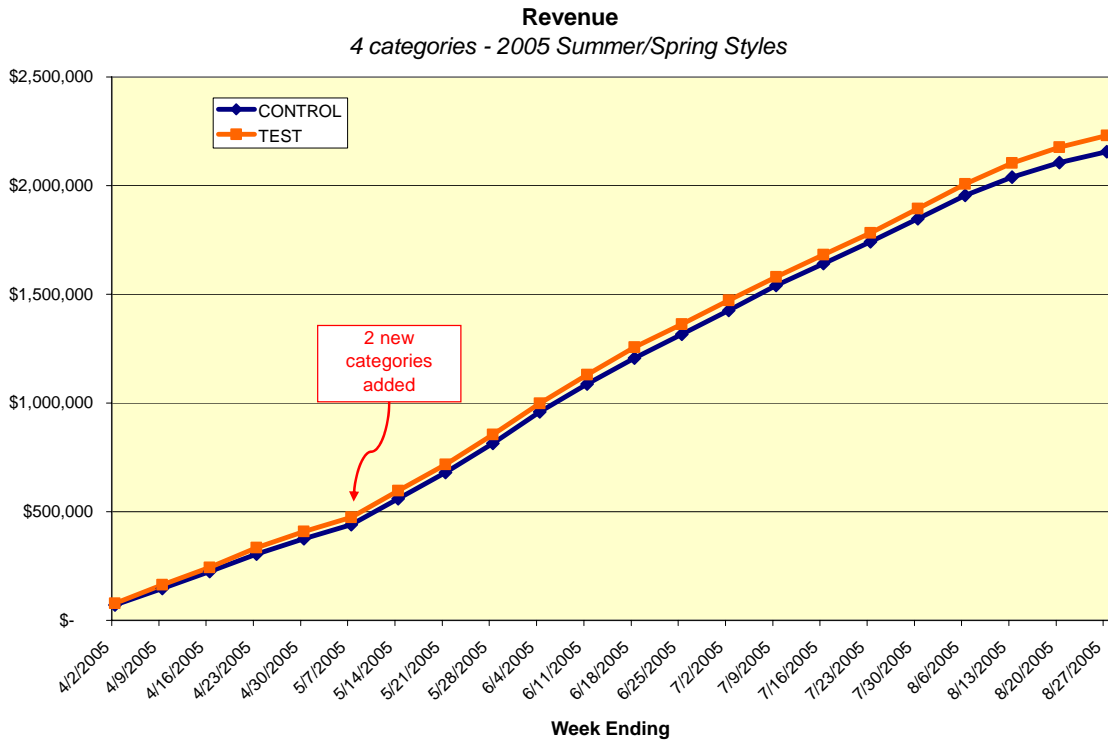
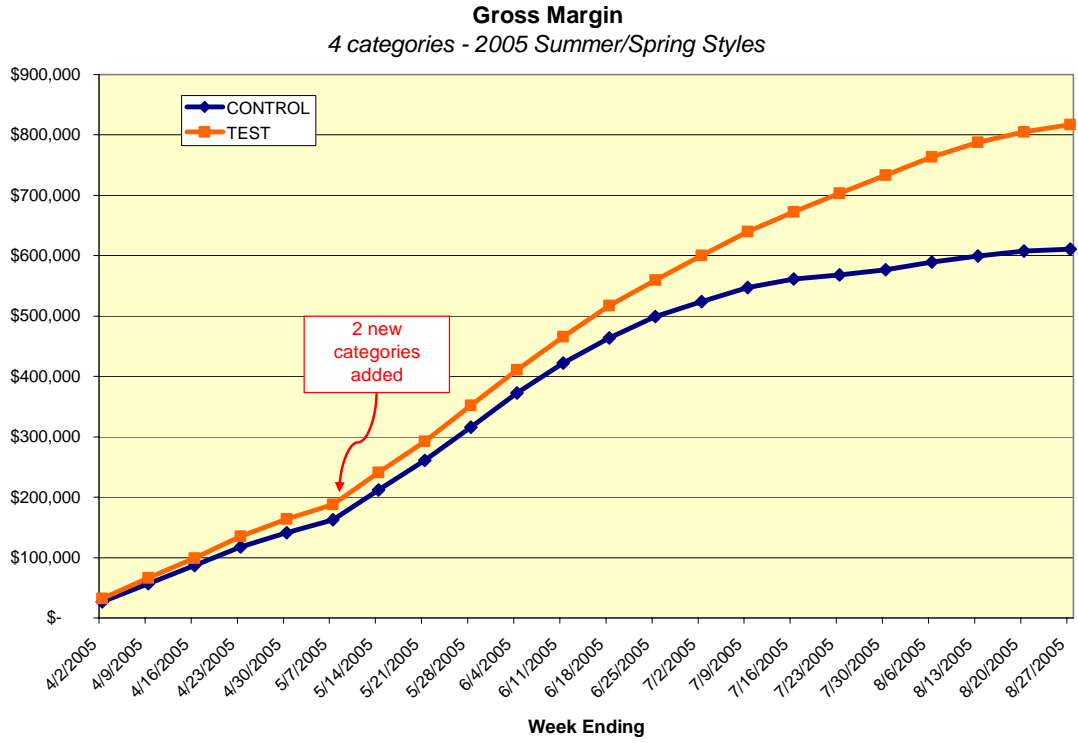
In the 22-weeks of the study the test stores, which were using optimal prices produced by Apex at the store-style-color level, performed **far superior** to the control stores that were using traditional pricing methodologies. Following is results summary:

Measure	Control Stores	Test Stores	Difference	% Improvement
Revenue	\$ 2,155,650	\$ 2,231,262	\$ 75,611	3.5%
GM\$	\$ 611,171	\$ 816,825	\$ 205,654	33.6%
MD\$	\$ 936,663	\$ 615,313	\$(321,350)	34.3%
Avg Price	\$ 10.19	\$ 11.42	\$ 1.23	12.1%
Units Sold	211,639	195,380	(16,259)	-7.7%
YTD Rcpts	277,560	270,160	(7,400)	-2.7%
GM%	28.4%	36.6%	8.26%	
SOH	65,921	74,780	8,859	
Initial SOH	158,209	161,980	3,771	

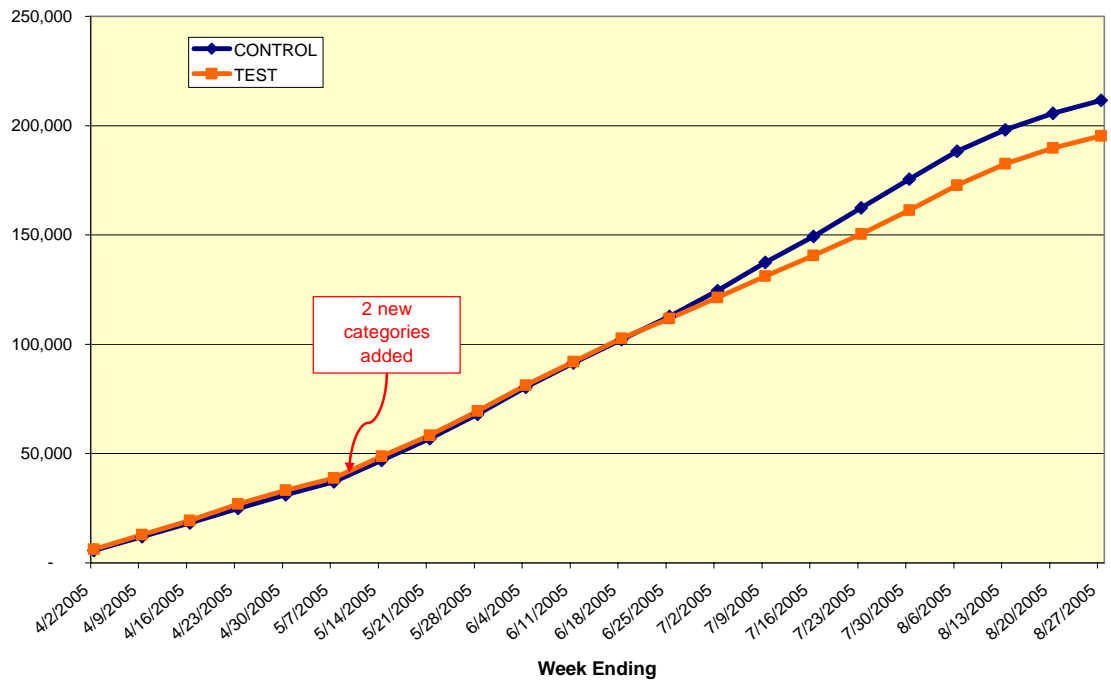
To account for the fact that the Test stores had more left-over-inventory than the control stores our client indicated that a good assumption would be the difference can be sold at 50% of the cost of garment. This adjustment impacted the revenue, gross margin and GM% figures. The revised figures, after adjustments, are:

Measure	Control Stores	Test Stores	Difference	% Improvement
Revenue	\$ 2,156,580	\$ 2,261,766	\$ 105,186	4.9%
GM\$	\$ 610,241	\$ 786,321	\$ 176,080	28.9%
GM%	28.3%	34.8%	6.47%	

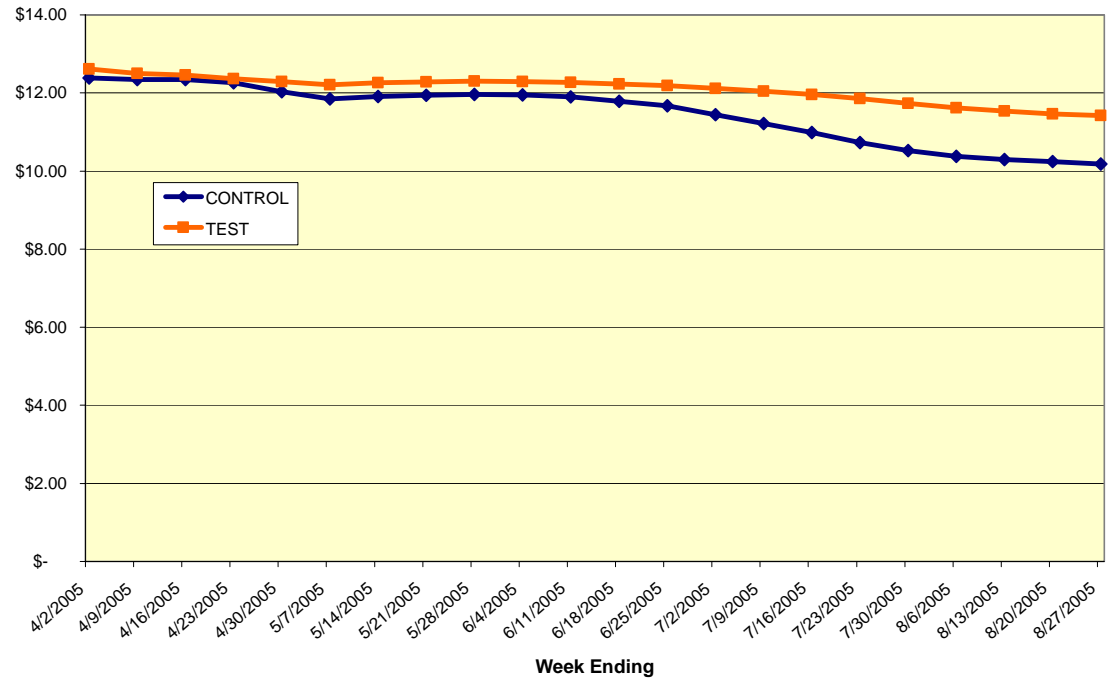
Following charts show the weekly progression of various key-performance indicators (KPI's) used by the client for one of the selected product-lines.

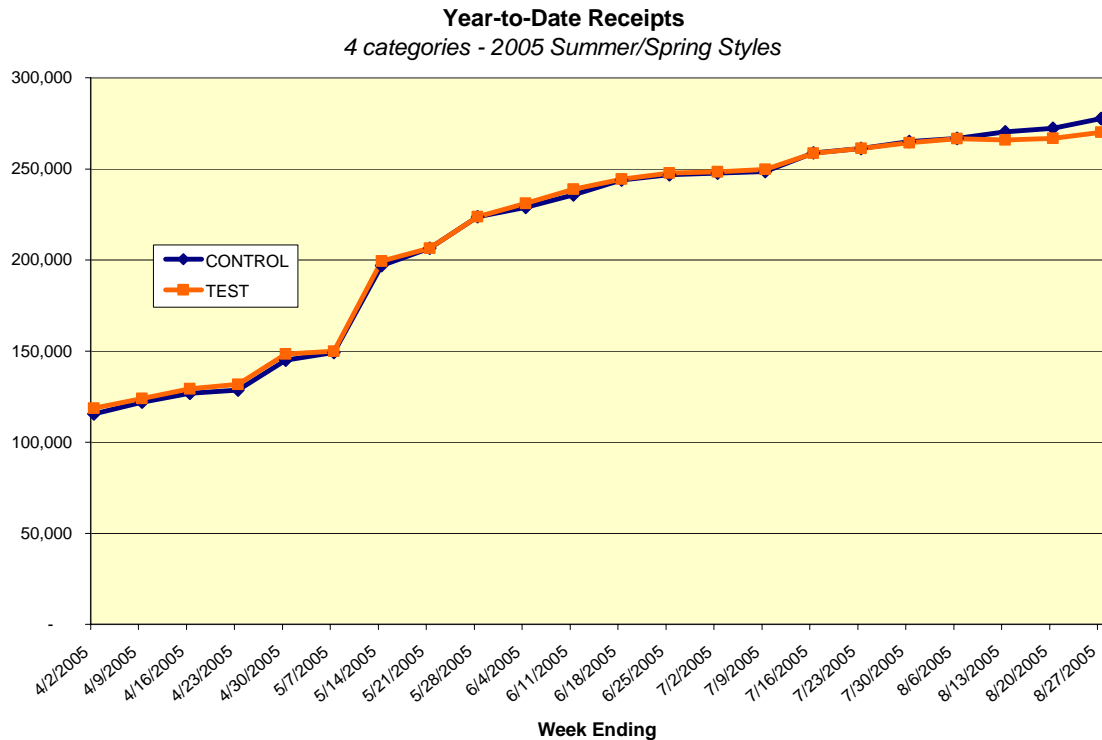


Units Sold
4 categories - 2005 Summer/Spring Styles



Average Price
4 categories - 2005 Summer/Spring Styles





Were store trends or traffic taken into account?

As part of the study we analyzed the 2005 versus 2004 traffic in the control and test stores. The table below depicts the 2005 traffic as compared to 2004 for test and control stores for the same period.

		Change in 2005	
		Customers	Transaction
Control		-4.1%	-2.6%
Test		-7.0%	-6.4%
		-2.9%	-3.7%

The traffic in both set of stores was down for 2005 as compared to 2004. However, traffic in the test stores was down ~3% extra as compared to control stores. The number of categories in the store was small enough so that it did not disrupt the transaction numbers significantly. Additionally, the conversion percentages were verified to be similar in 2004 versus 2005.

If the measured benefit figures were scaled to account for the trend differences the benefit figures would be even larger.

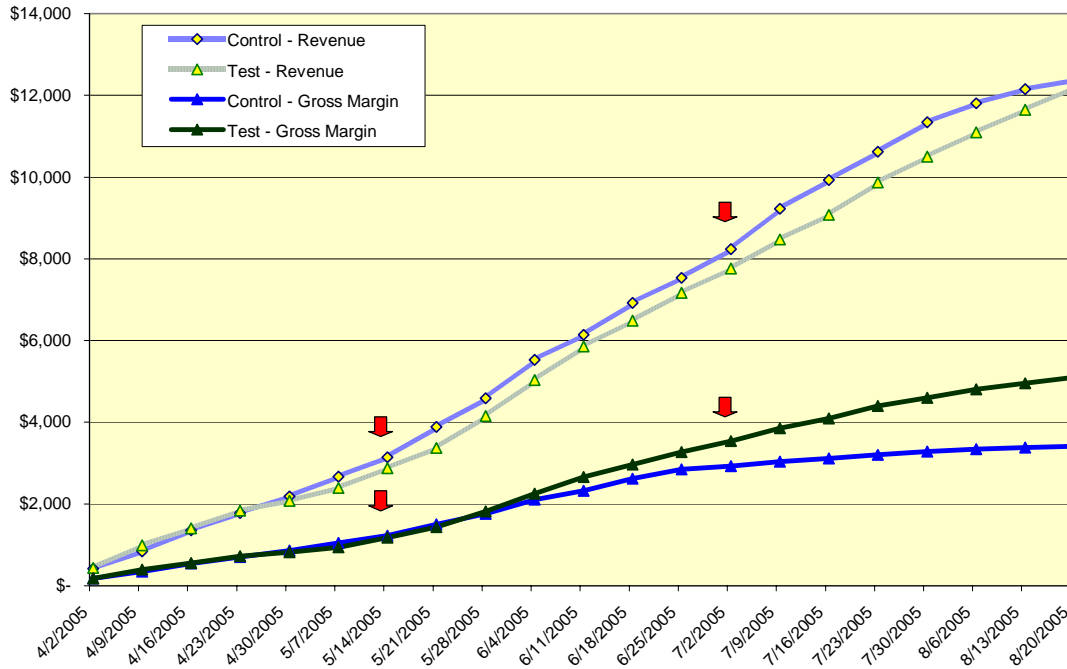
Where did the benefits come from?

The study revealed that the primary source of benefits is the ability to forecast at the very granular store style-color level reliably and use them to calculate the pricing decisions. Using an “average” company-wide approach did not permit the client to adequately control prices to achieve the desired impact from pricing changes.

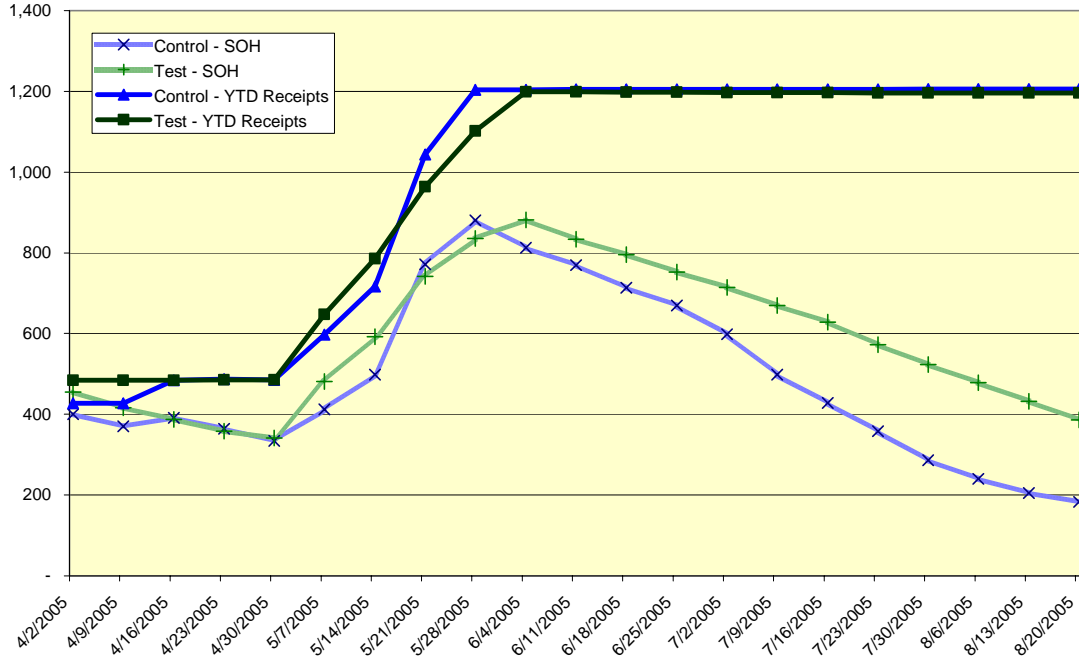
Given below is a comparison of prices for one style-color set in each of the “test” stores when compared to a single price set in all 15 control stores:

TEST STORE	Apr 2	Apr 9	Apr 16	Apr 23	Apr 30	May 7	May 14	May 21	May 28	Jun 4	Jun 11	Jun 18	Jun 25	Jul 2	Jul 9	Jul 16	Jul 23	Jul 30	Aug 6	Aug 13	Aug 20	
S 1	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$10
S 2	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14
S 3	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$10	\$10	\$8	\$8
S 4	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14
S 5	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$10	\$10	\$10	\$10
S 6	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$10	\$10	\$10	\$8
S 7	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18
S 8	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$10	\$10	\$10	\$10
S 9	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14
S 10	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$10	\$10
S 11	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$10	\$10
S 12	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$10	\$10
S 13	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$10	\$10	\$10	\$10	\$10	\$8
S 14	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14
S 15	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14
CONTROL	\$18	\$18	\$18	\$18	\$18	\$18	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$10	\$10	\$10	\$10	\$10	\$10	\$10	

Revenue & Gross Margin
Style Color 1



Year-to-Date Receipts & Stock-on-Hand
Style Color 1



Did the markdowns in Test stores result in extra labor costs?

When a style-color is marked down at a store the staff is required to locate the garments on the floor and mark each garment individually as well as to ensure that appropriate signage is displayed on the rack. An analysis was carried out to determine the number of markdown events at a store style-color level (S/S-C) were carried out in each of the Control and Test store groups. In addition, the total number of garments touched was analyzed for each group of stores. The table below depicts the results of the analysis:

	CONTROL		TEST	
	S/S-C	Units	S/S-C	Units
Category 1	348	21,302	361	20,424
Category 2	1,645	32,317	1,327	39,942
Category 3	1,568	34,935	1,072	27,387
Category 4	13,368	161,916	10,759	137,620
Total	16,929	250,470	13,519	225,373

As is clear from the table the test stores had fewer markdown events and fewer garments touched which can potentially lead to reduced costs.

What were the challenges?

Apex's models can be tuned for various business objectives desired by the client. Even though the client has been operating the business successfully for several years it was difficult for us to obtain the trade-off between revenue, gross-margins and left-over inventory in hard numbers that were required by our models. The difficulties were overcome by performing multiple simulations with client's data and asking them to identify the scenario they most desired. The settings of the chosen scenarios were used by Apex's models for "test" stores.

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