Reading: GLM.Validation
Model: Source text
Problem Type: Produce a double lift chart using the data provided

Given An actuary wants to compare two Homeowners loss cost models. They have scored each model using the following records.

Record #	Model A Loss Cost	Model B Loss Cost	Actual Loss Cost
1	$1,080	$1,000	$990
2	$1,210	$1,280	$1,170
3	$1,590	$1,460	$1,490
4	$1,130	$970	$1,230
5	$1,320	$1,240	$1,330
6	$920	$830	$920
7	$930	$780	$920
8	$1,360	$1,460	$1,350
9	$860	$740	$870
10	$730	$570	$660

Find Using quintiles, produce the standard double lift chart and alternate double lift chart then recommend a model.

Solution We're asked to use quintiles so we need to first calculate the sort ratio for each record and then group into five groups by ranking the sort ratio in ascending order.

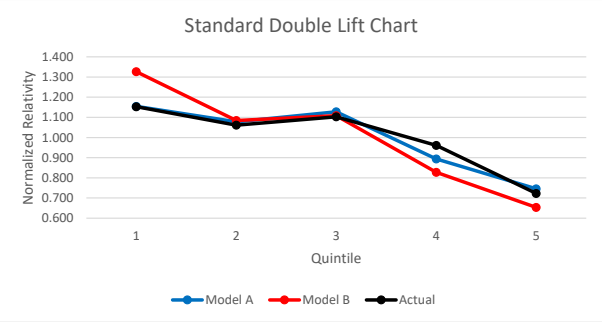
Record #	Model A Loss Cost	Model B Loss Cost	Actual Loss Cost	Sort Ratio	Rank
1	$1,080	$1,000	$990	1.080	4
2	$1,210	$1,280	$1,170	0.945	2
3	$1,590	$1,460	$1,490	1.089	5
4	$1,130	$970	$1,230	1.165	8
5	$1,320	$1,240	$1,330	1.065	3
6	$920	$830	$920	1.108	6
7	$930	$780	$920	1.192	9
8	$1,360	$1,460	$1,350	0.932	1
9	$860	$740	$870	1.162	7
10	$730	$570	$660	1.281	10

Quintile	Contains Ranks	Model A Avg Loss Cost	Model B Avg Loss Cost	Actual Avg Loss Cost
1	1, 2	$1,285	$1,370	$1,260
2	3, 4	$1,200	$1,120	$1,160
3	5, 6	$1,255	$1,145	$1,205
4	7, 8	$995	$855	$1,050
5	9, 10	$830	$675	$790
Total		**$1,113**	**$1,033**	**$1,093**

Next, normalize each column using the Total row

Quintile	Model A	Model B	Actual
1	1.155	1.326	1.153
2	1.078	1.084	1.061
3	1.128	1.108	1.102
4	0.894	0.828	0.961
5	0.746	0.653	0.723

We can now plot the normalized figures to produce the standard double lift chart.



In the standard double lift chart, Model A tracks the actual results more closely than Model B, i.e. Model A is the better model.
In the alternate view, Model A has a flatter line than Model B, so Model A better approximates the actual pure premiums.

Recommend using Model A.

To produce the alternate view, we calculate the percentage error for each quintile.

Quintile	% Error	
	Model A	Model B
1	2.0%	8.7%
2	3.4%	-3.4%
3	4.1%	-5.0%
4	-5.2%	-18.6%
5	5.1%	-14.6%

$$\%\ \text{Error} = \frac{\text{Model Pure Premium}}{\text{Actual Pure Premium}} - 1$$