

AON

Predictive Modeling of Employer Sponsored Health Plan Selection

CJ Wolfe, FSA MAAA FCA

November 15, 2021



Disclaimer

The views expressed herein are my own and do not necessarily reflect those of my employer, Aon PLC.



CJ Wolfe FSA, MAAA, FCA

Actuarial Consultant – Aon

Large/Mid-Market Lead

National Exam Coordinator

SOA FSA Exam Writer

**ASB general committee
member**

Main Topics

We will be:

- **Motivating the use of predictive modeling**
- **Demonstrating application of a predicative model**
- **Discussing considerations when interpreting and presenting results**

We will not:

- **Look at any code**
- **Discuss generalized linear models and gradient boosted models**
- **Review excel data**

Motivating The Problem

An Employer Looking To Change Their Health Plan Offering

Employer with 10,000 employees would like to change their health plan

- They offer 2 plans:

Plan A	Plan B	Plan C
No deductible 10% coinsurance \$25 copays	\$1,500 deductible 20% coinsurance \$10 copays	\$8,000 deductible 0% coinsurance Free puppy
\$600 EE contribution	\$200 EE contribution	\$20 EE contribution

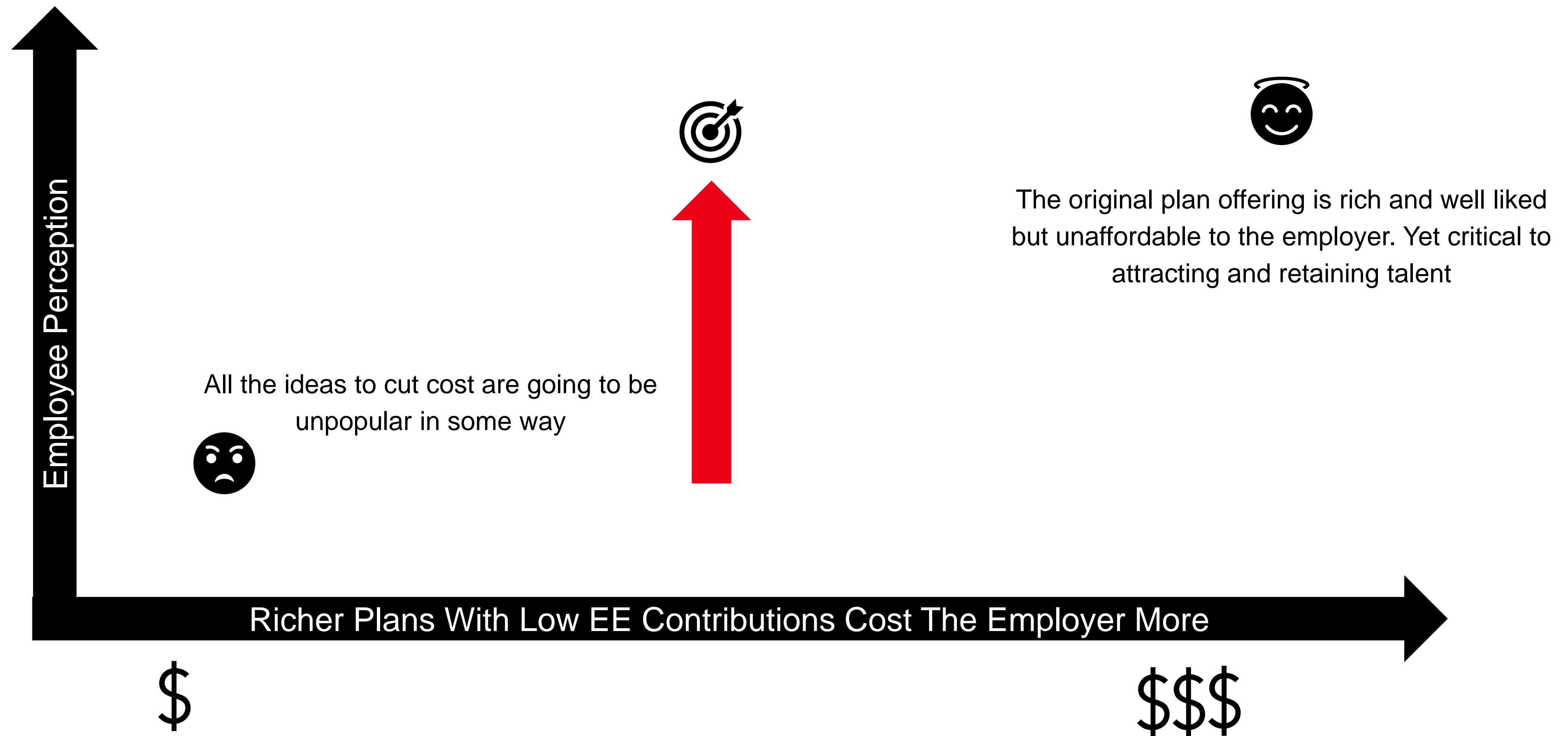
- They are concerned about cost – Ok. No Problem.
- But people need to keep the plan they have!
- Wait – there needs to be a lower cost option!!
- Now I'm worried about people migrating to a plan they end up hating!
- Best Case: Client gives you a savings target and you adjust plans within competitive benchmarks to reach goal

Every step of this process:

- Takes time
- Takes resources
- Gets old very fast

The Universe Of Plan Options Is Infinite

What Would Every Offering Cost? How Will Employees Perceive The Offer?



Predicting Cost, Perception, and Selection

How do you know what people will like and choose?

We conducted an adaptive choice-based conjoint analysis with 10,000 participants

These participants had employer sponsored insurance across every industry and demographic

Which plan would you be most likely to purchase for yourself? Select one of the three, or skip.

Annual Contribution	\$4,000 (\$333 per month)	\$2,000 (\$150 per month)	\$1,000 (\$83 per month)
Deductible	\$5,000	\$3,000	\$4,000
Out-of-Pocket Maximum	\$5,000	\$6,000	\$4,000
Coinsurance	30%	20%	10%
General Services Copay	\$20	\$50	\$80
Prescription Drug Copay	\$80	\$40	\$20

These results are used to calculate employee perception scores ranging from 0 to 100 for every offering.

A higher score indicates that the health program's offerings would be perceived more favorably.

Results are customized to specific populations based on employee age, gender, ZIP code, salary, and coverage tier.

Key Takeaways About Perception

We Learned A Few Things

Overall Value



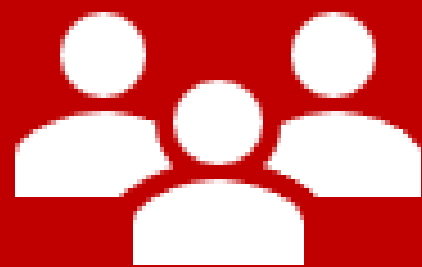
- Contribution levels impact perception more than any individual plan design component.
- Copays are preferred to coinsurance even if actual cost is somewhat higher.
- Deductible level and contributions are much more impactful to employee perception than out-of-pocket maximum.

Salary



- Higher salary groups show a greater preference for funds such as HSA/HRA.
- Lower salary groups have a greater preference for copays versus coinsurance.

Age

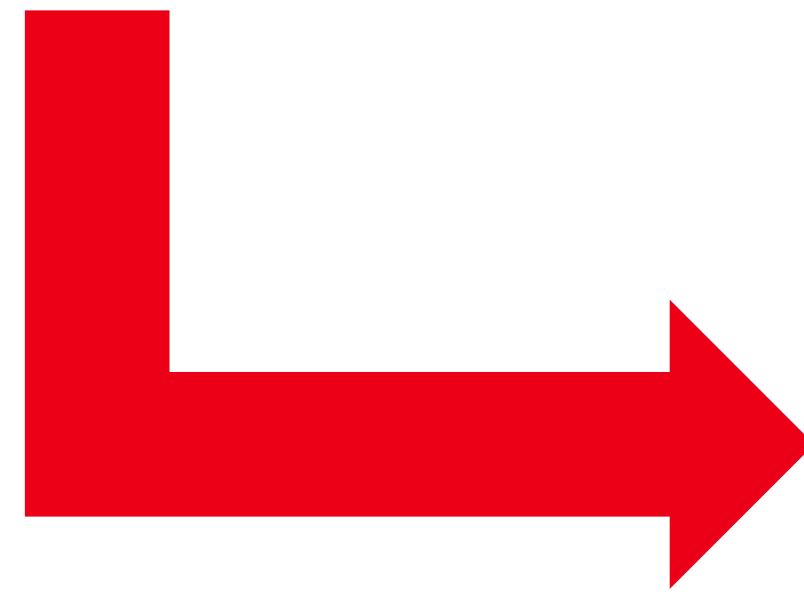


- Younger participants are less focused on out-of-pocket maximum levels, and place significant value on low copays.
- Older participants value copays relative to coinsurance, even more so than younger participants.

Predicting Choice and Perception



For every client – their unique employee census is passed through every simulated scenario

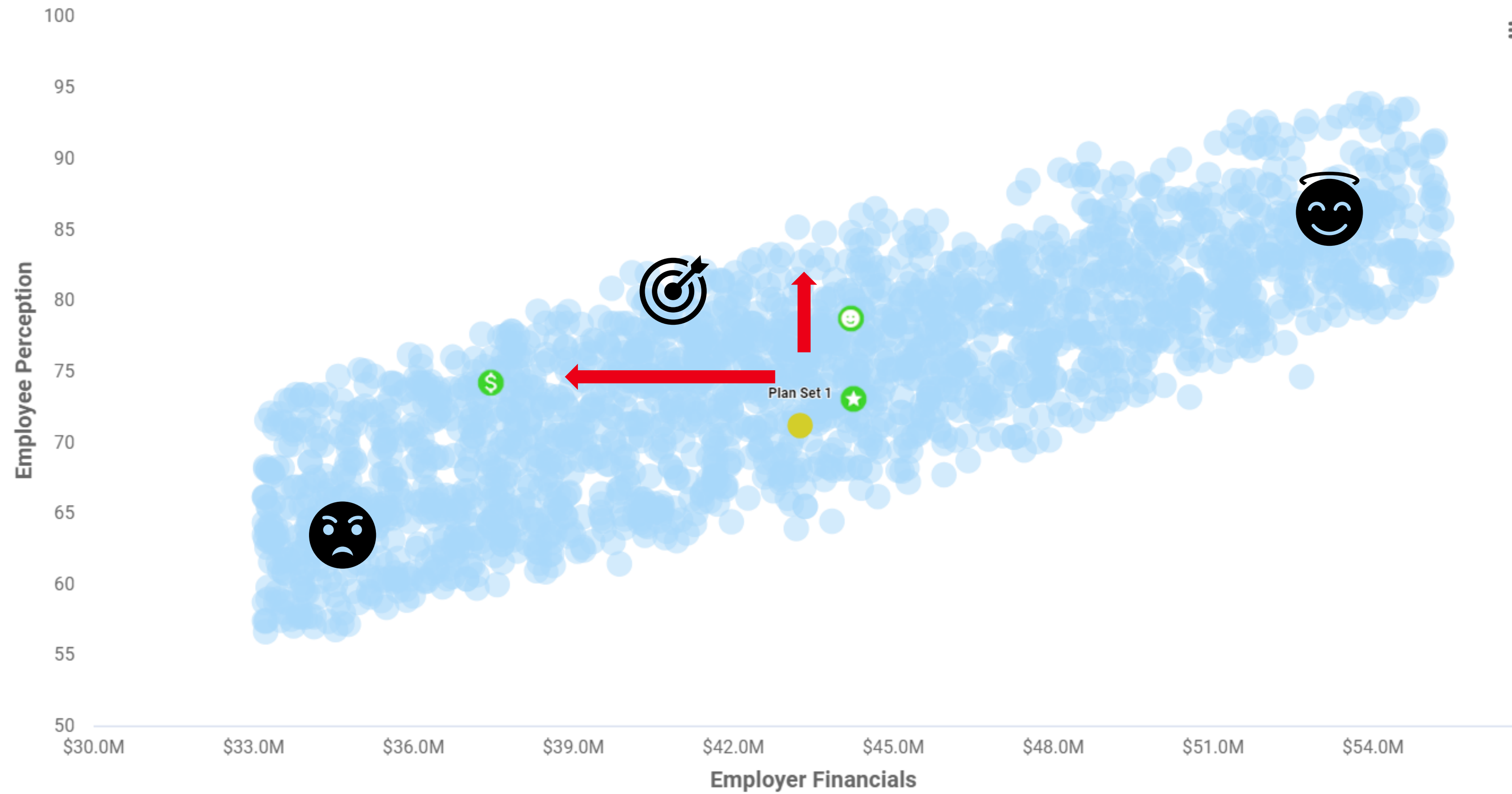


For every single scenario – the plan each employee will select, their cost on that plan and their perception of the overall offering is predicted



Simulating Plan Offerings

Universe of Scenarios



- Scenarios
- 😊 Optimize Perception
- 💰 Optimize Financials
- ★ Status Quo
- User Scenarios

Global Filters

Employer Financials (\$M)	33.2	-	55.3
Employee Perception	55	-	95
Individual Deductible	0	-	7100
Individual OOPM	0	-	7100
Lowest Individual Contribution	0	-	800

Number of Plans

All 1 2 3 4+

Include Funded Plans

None HRA HSA

RESET APPLY

Scenarios Highlighted By The Model

Status Quo Compared to High Savings and High Perception Scenarios

Status Quo	Architect Highlighted Financials	Architect Highlighted Perception																																				
\$44,300,000	\$37,500,000	\$44,200,000																																				
73	74	79																																				
2 Plan(s) AVs: 79% - 87%	3 Plan(s) AVs: 70%- 95%	5 Plan(s) AVs: 73%- 95%																																				
<table border="1"> <thead> <tr> <th></th> <th>Individual</th> <th>Family</th> </tr> </thead> <tbody> <tr> <td>Deductibles:</td> <td>\$1,000- \$3,000</td> <td>\$2,000- \$6,000</td> </tr> <tr> <td>OOP Max:</td> <td>\$3,500- \$6,000</td> <td>\$7,000- \$12,000</td> </tr> <tr> <td>Contributions:</td> <td>\$47- \$112</td> <td>\$145- \$356</td> </tr> </tbody> </table>		Individual	Family	Deductibles:	\$1,000- \$3,000	\$2,000- \$6,000	OOP Max:	\$3,500- \$6,000	\$7,000- \$12,000	Contributions:	\$47- \$112	\$145- \$356	<table border="1"> <thead> <tr> <th></th> <th>Individual</th> <th>Family</th> </tr> </thead> <tbody> <tr> <td>Deductibles:</td> <td>\$500- \$6,500</td> <td>\$1,000- \$13,000</td> </tr> <tr> <td>OOP Max:</td> <td>\$500- \$6,650</td> <td>\$1,000- \$13,300</td> </tr> <tr> <td>Contributions:</td> <td>\$136- \$182</td> <td>\$423- \$564</td> </tr> </tbody> </table>		Individual	Family	Deductibles:	\$500- \$6,500	\$1,000- \$13,000	OOP Max:	\$500- \$6,650	\$1,000- \$13,300	Contributions:	\$136- \$182	\$423- \$564	<table border="1"> <thead> <tr> <th></th> <th>Individual</th> <th>Family</th> </tr> </thead> <tbody> <tr> <td>Deductibles:</td> <td>\$500- \$2,500</td> <td>\$1,000- \$5,000</td> </tr> <tr> <td>OOP Max:</td> <td>\$500- \$6,650</td> <td>\$1,000- \$13,300</td> </tr> <tr> <td>Contributions:</td> <td>\$25- \$157</td> <td>\$78- \$488</td> </tr> </tbody> </table>		Individual	Family	Deductibles:	\$500- \$2,500	\$1,000- \$5,000	OOP Max:	\$500- \$6,650	\$1,000- \$13,300	Contributions:	\$25- \$157	\$78- \$488
	Individual	Family																																				
Deductibles:	\$1,000- \$3,000	\$2,000- \$6,000																																				
OOP Max:	\$3,500- \$6,000	\$7,000- \$12,000																																				
Contributions:	\$47- \$112	\$145- \$356																																				
	Individual	Family																																				
Deductibles:	\$500- \$6,500	\$1,000- \$13,000																																				
OOP Max:	\$500- \$6,650	\$1,000- \$13,300																																				
Contributions:	\$136- \$182	\$423- \$564																																				
	Individual	Family																																				
Deductibles:	\$500- \$2,500	\$1,000- \$5,000																																				
OOP Max:	\$500- \$6,650	\$1,000- \$13,300																																				
Contributions:	\$25- \$157	\$78- \$488																																				
Coinsurance: 20% - 30%	Coinsurance: 0%- 20%	Coinsurance: 0%- 40%																																				
Office Visit Copays: PCP: Yes	Office Visit Copays: PCP: Yes	Office Visit Copays: PCP: Yes																																				
Other Copays: ER: Yes IP: Yes OP: Yes	Other Copays: ER: Yes IP: Yes OP: Yes	Other Copays: ER: Yes IP: Yes OP: Yes																																				
Voluntary Benefits: Acc: No CI: Yes HI: No	Voluntary Benefits: Acc: No CI: Yes HI: No	Voluntary Benefits: Acc: No CI: Yes HI: No																																				
EXPLORE	EXPLORE	EXPLORE																																				

Exploring Individual Scenarios

Architect Demo: Status Quo

Expand All | Collapse All

	⊕ Bronze HSA ⊖	⊕ PPO ⊖
▼ Deductible (Ind Family)	\$3000 \$6000	\$500 \$1000
▼ Out Of Pocket Max (Ind Family)	\$6000 \$12000	\$2500 \$5000
Ded/OOP Type:	Family/Embedded	Embedded
Network:	OON Included	OON Included
Member Coinsurance:	30%	20%
▼ Primary Care Physician:	Ded 30%	\$15
▼ Specialist:	Ded 30%	\$25
▼ Emergency Room:	Ded 30%	\$100
▼ Urgent Care:	Ded 30%	\$50
▼ Inpatient Hospital:	Ded 30%	\$150
▼ Outpatient Surgery:	Ded 30%	\$100
▼ Other:	See Details	See Details
▼ Pharmacy:	Integrated	Integrated
▼ Rx Retail:	See Details	See Details
▼ Rx Mail Order:	See Details	See Details
▼ Fund:	HSA \$500 \$1000	None
▼ Contributions: 🗣️	\$47 \$94 \$84 \$145	\$112 \$230 \$207 \$356
▼ Voluntary Benefits:	CI	CI
Actuarial Value:	79%	90%
% Enrolled	13.9%	71.1%

Scenario History

📊 \$44,300,000 😊 73

✕ 📊 \$45,500,000 😊 76

Adding Plans In Real Time

Architect Demo: Status Quo

Expand All | Collapse All

	⊕ Bronze HSA ⊖	⊕ PPO ⊖	⊕ Plan 3 ⊖
▼ Deductible (Ind Family)	\$3000 \$6000	\$1000 \$2000	\$2000 \$4000
▼ Out Of Pocket Max (Ind Family)	\$6000 \$12000	\$3500 \$7000	\$4500 \$9000
Ded/OOP Type:	Family/Embedded	Embedded	Embedded
Network:	OON Included	OON Included	OON Included
Member Coinsurance:	30%	20%	20%
▼ Primary Care Physician:	Ded 30%	\$15	\$15
▼ Specialist:	Ded 30%	\$25	\$25
▼ Emergency Room:	Ded 30%	\$100	\$100
▼ Urgent Care:	Ded 30%	\$50	\$50
▼ Inpatient Hospital:	Ded 30%	\$150	\$150
▼ Outpatient Surgery:	Ded 30%	\$100	\$100
▼ Other:	See Details	See Details	See Details
▼ Pharmacy:	Integrated	Integrated	Integrated
▼ Rx Retail:	See Details	See Details	See Details
▼ Rx Mail Order:	See Details	See Details	See Details
▼ Fund:	HSA \$500 \$1000	None	None
▼ Contributions: 📄	\$47 \$94 \$84 \$145	\$112 \$230 \$207 \$356	\$85 \$175 \$150 \$250
▼ Voluntary Benefits:	CI	CI	CI
Actuarial Value:	79%	87%	85%
% Enrolled	14.4%	63.2%	7.4%

Scenario History

📄 \$44,300,000 😊 73

✕ 📄 \$44,400,000 😊 74



Client Case Study Union Negotiations

Union Negotiations

Client Case Study #1

Project:

- **Client held months-long negotiation with their largest union**
- **Modeled several scenarios designed to maximum union perception**

Challenge:

- **Required extremely rapid modeling of various plan offerings at the table**
- **Real-time estimates of the union's counter-offers**
- **Modeling risk of migration to costly plans or loss or employee contributions**

Outcome:

- **Union agreed to contribution increases in exchange for maintaining plan designs**
- **A High-Deductible Plan was introduced but not a single person elected it**



Client Case Study

Merger and Harmonization

Merger and Harmonization

Client Case Study #2

Project:

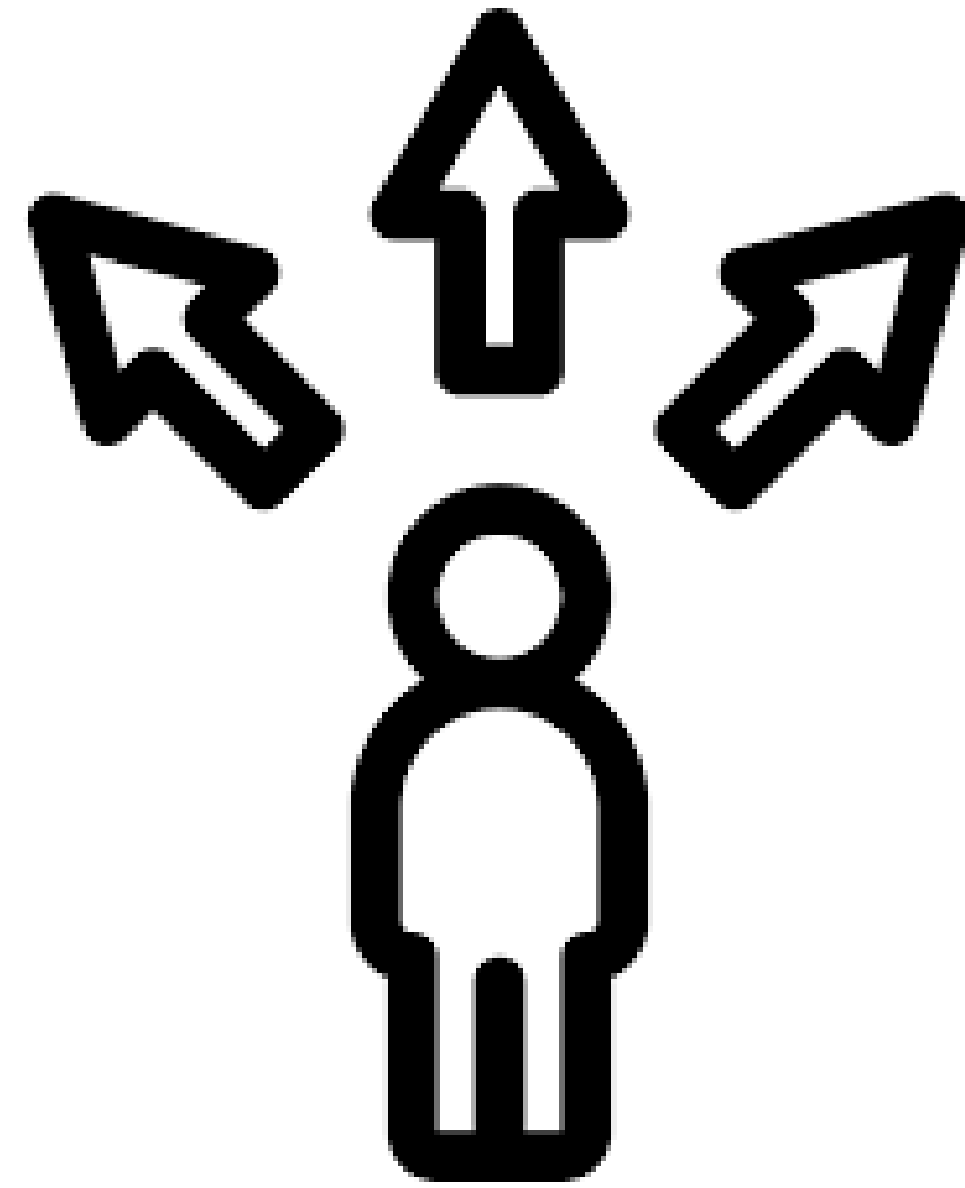
- **2 similarly sized companies sought to align their health plan offering**
- **Which company's plan should be adopted by the new larger company?**

Challenge:

- **2 very different sets of plan designs between the companies**
- **1 company was fully-insured and the other was self-funded**
- **Tasked with reducing the benefits budget by 25%**

Outcome:

- **The acquiring company moved to the self-funded plan designs**
- **Significant employee contribution increases on the richest plans**



Client Case Study Migration Testing

Migration Testing

Client Case Study #3

Project:

- **Very large company considering a radical change to their plan offerings**

Challenge:

- **Design a catastrophic plan that was ACA compliant, cheap yet appealing**
- **Determine risk of extreme migration into new lowest cost option**

Outcome:

- **A fairly priced catastrophic plan option was introduced**
- **Employee contributions set to hedge against excess migration into the plan**

Thank You