

A black computer monitor is shown from a slightly elevated front angle. The screen is a solid red color. On the screen, the words "GET FLIX" are written in a large, white, bold, sans-serif font. Below this, in a smaller white sans-serif font, is the text "Efficiently choose your entertainment providers".

GET FLIX

Efficiently choose your
entertainment providers

[illegible]

Your options



The Problem

Given a budget constraint, which entertainment platforms should a customer subscribe to?

What is the most efficient (cheapest) way to get the most desired programs?

Model Inputs

1. Assigned preferences for each show on a scale from 1 to 10
2. Identified budget which will serve as the constraint
3. Create filter for which shows are carried through specific distribution channels

Show availability on various platforms

Title	Premium		Hulu	Netflix	Netflix	iTunes
	Cable	Cable		Streaming	DVD	
30 Rock	Y	n	n	y	Y	Y
Always Sunny in Philadelphia	y	Y	n	Y	Y	Y
Archer	y	Y	n	Y	Y	Y
Arrested Development	N	n	N	y	y	N
Big Bang Theory	y	n	y	N	y	y
Californication	y	Y	n	n	Y	Y
Criminal Minds	y	n	y	N	y	y
Family Guy	y	n	y	y	y	y
Game of Thrones	y	Y	n	N	Y	y
Grey's Anatomy	y	N	Y	Y	Y	y
House of Cards	N	N	n	Y	n	n
How I Met Your Mother	y	y	n	Y	Y	y
Mad Men	y	Y	n	Y	Y	Y
Mike & Molly	y	n	Y	n	Y	Y
Modern Family	y	n	Y	n	Y	Y
NBC Sunday Night Football	y	N	n	n	n	N
NCIS	y	n	Y	n	y	y
NCIS: LOS ANGELES	y	n	Y	n	y	y
Parks and Recreation	y	n	Y	Y	Y	Y

Excel Solver

1. The 1-10 scale ratings assigned serve as the “utility” of each show.
2. Solver attempts to maximize total utility by choosing combinations of entertainment platforms.
3. With each additional platform comes additional utility, however Solver can’t exceed the budget constraint.
4. Utility only comes once. There is no additional utility by getting the same show from different providers.

Excel Solver

Network choices		Cable	Prem. Cable	Hulu	Netflix Stream	Netflix DVD	iTunes		Need Internet	Internet Cost		
Decision variables		0	0	0	1	0			1	\$ 19.99		
Price		\$ 64.99	\$84.99	\$ 8.99	\$ 7.99	\$ 10.99	\$ 9.99					
		Utility	Cable	Prem. Cable	Hulu	Netflix Stream	Netflix DVD	iTunes	Show included	Utility from show		You should get:
Game of Thrones		10	0	0	0	0	0	1	1	10	1	Netflix Stream
Mad Men		0	0	0	0	1	0	0	1	0	2	Game of Thrones on iTunes
Always Sunny in Philadelphia		8	0	0	0	1	0	0	1	8	3	
Archer		4	0	0	0	1	0	0	1	4	4	
Californication		0	0	0	0	0	0	0	0	0	5	
The Office		5	0	0	0	1	0	0	1	5	6	
Parks and Recreation		5	0	0	0	1	0	0	1	5	7	
How I Met Your Mother		6	0	0	0	1	0	0	1	6	8	
Big Bang Theory		5	0	0	0	1	0	0	1	5	9	
Girls		0	0	0	0	0	0	0	0	0	13	
The Walking Dead		0	0	0	0	1	0	0	1	0	14	
30 Rock		2	0	0	0	1	0	0	1	2	15	
Arrested Development		3	0	0	0	1	0	0	1	3	16	
House of Cards		5	0	0	0	1	0	0	1	5	17	
New Girl		0	0	0	0	1	0	0	1	0	18	
Sportscenter		7	0	0	0	0	0	0	0	0	19	
Cost for selected networks			\$ -	\$ -	\$ -	\$ 7.99	\$ -	\$ 9.99	Total utility	53		
Total cost		\$ 37.97										
		<=										
Budget constraint		\$ 70.00										

Excel Solver

Solver Parameters

Set Objective:

To: ☒ Max ☐ Min ☐ Value Of:

By Changing Variable Cells:

Subject to the Constraints:

\$C\$26 <= \$C\$28

\$D\$4:\$H\$4 = binary

\$I\$22 = binary

\$I\$8:\$I\$19 = binary

Add

Change

Delete

Reset All

Load/Save

☒ Make Unconstrained Variables Non-Negative

Select a Solving Method:

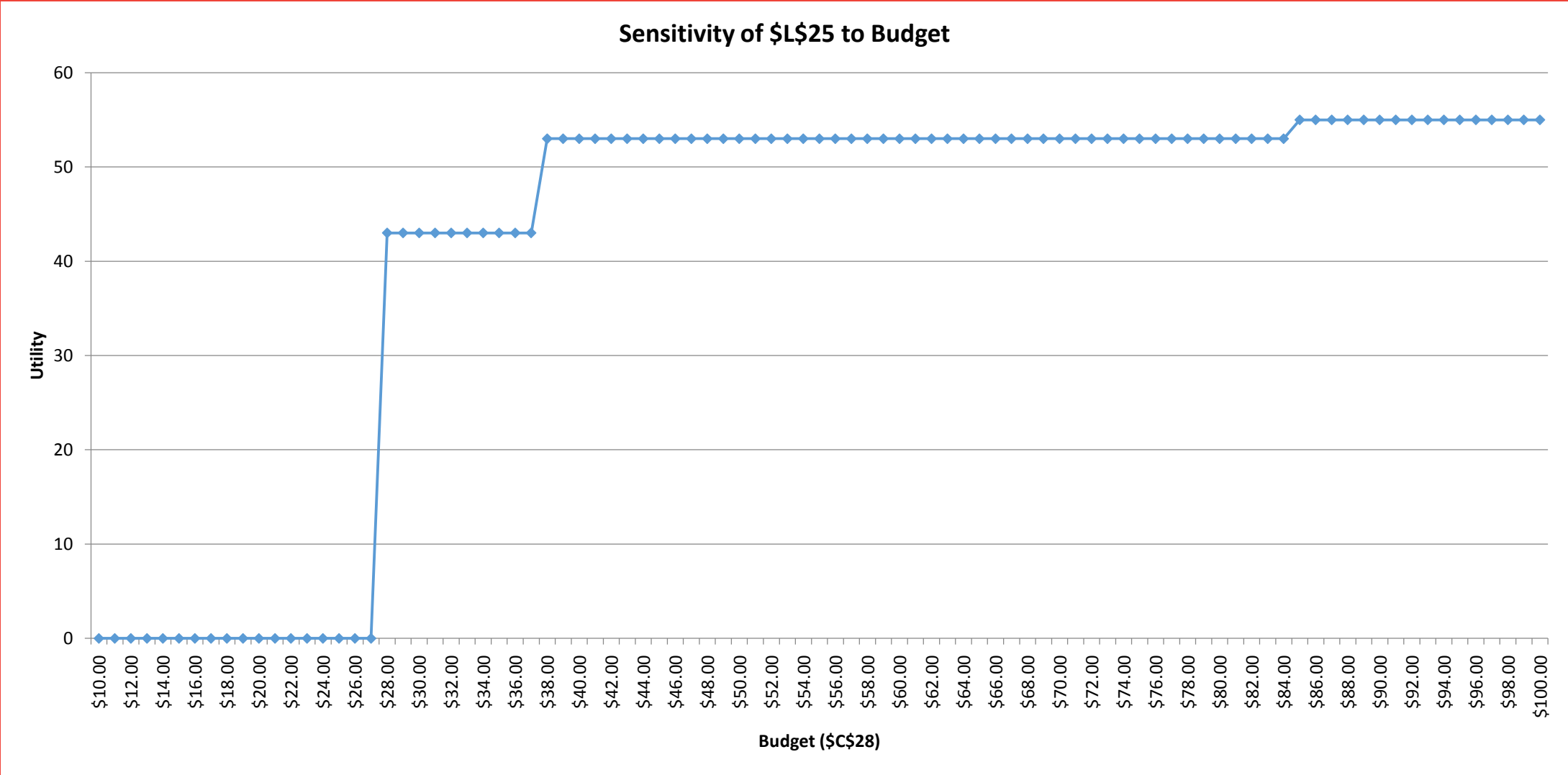
Solving Method

Select the GRG Nonlinear engine for Solver Problems that are smooth nonlinear. Select the LP Simplex engine for linear Solver Problems, and select the Evolutionary engine for Solver problems that are non-smooth.

Extending with SolverTable

1. Run Solver multiple times with different budget constraints (in this case from \$10 - \$100 in \$1 increments)
2. Graph total utility vs. budget
3. Analyze “shadow cost” of other options based on show preferences

SolverTable results



Interpretation

1. The graph shows where I get the most bang for my buck (largest utility jumps)
2. I can assess which plateau best fits my budget if it is not concrete
3. I love Game of Thrones and It's Always Sunny in Philadelphia

With the rise of internet alternatives, should the cable companies be scared?



VS



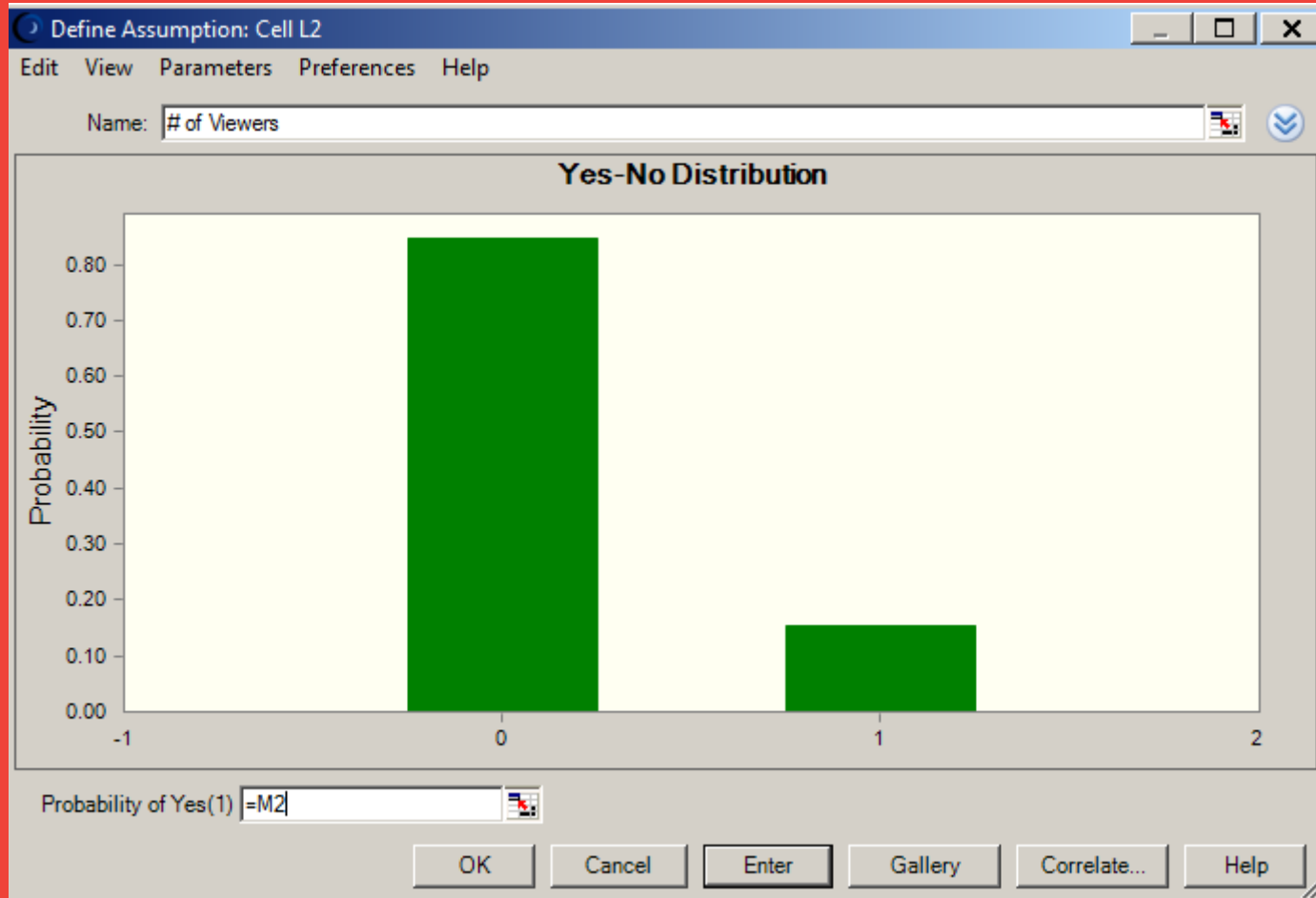
Model Inputs

1. P-values for today's most popular tv shows based on Nielsen ratings
2. Platforms that carry each show
3. Cost of each platform

Leveraging Crystal Ball we used the p-values to dictate binary decisions which simulated overall customer demand

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Title	Requested Y/N	=IF(L2=1,"Y","N")							Mean	StDev	# of Viewers	P Value
2	NBC Sunday Night Football	N					Y		NBC Sunday Night Football	18,247,875.00	3,169,325.14	0	0.155
3	SURVIVOR	N					N		SURVIVOR	16,236,715.00	5,935,775.27	0	0.138
4	NCIS	N							NCIS	15,525,728.00	4,925,059.27	0	0.132
5	NCIS: LOS ANGELES	N							NCIS: LOS ANGELES	13,797,400.00	6,031,939.47	0	0.117
6	GREY'S ANATOMY	N							GREY'S ANATOMY	13,745,900.00	4,939,385.40	0	0.117
7	Criminal Minds	N							Criminal Minds	12,337,112.00	3,437,939.08	0	0.105
8	Big Bang Theory	N							Big Bang Theory	12,205,858.00	4,223,499.36	0	0.104
9	VOICE	N							VOICE	11,502,000.00	4,134,098.45	0	0.098
10	Game of Thrones	N							Game of Thrones	10,400,000.00	4,521,061.82	0	0.088
11	Modern Family	N							Modern Family	10,271,200.00	3,322,813.15	0	0.087
12	MIKE & MOLLY	N							MIKE & MOLLY	8,943,500.00	4,062,698.08	0	0.076
13	The Walking Dead	N							The Walking Dead	8,940,000.00	3,397,528.51	0	0.076
14	How I Met Your Mother	N							How I Met Your Mother	8,399,778.00	1,750,325.81	0	0.071
15	The Office	N							The Office	7,360,000.00	1,272,966.79	0	0.063
16	Family Guy	N							Family Guy	7,210,834.00	2,334,163.11	0	0.061
17	The Middle	N							The Middle	6,900,000.00	2,249,366.58	0	0.059
18	30 Rock	N							30 Rock	5,600,000.00	1,044,714.59	0	0.048
19	Arrested Development	N							Arrested Development	5,600,000.00	1,070,825.23	0	0.048
20	Parks and Recreation	N							Parks and Recreation	4,832,000.00	753,737.35	0	0.041
21	Sportscenter	N							Sportscenter	2,786,454.00	1,554,692.46	0	0.024
22	House of Cards	N							House of Cards	2,400,000.00	1.00	0	0.020
23	Mad Men	N							Mad Men	1,955,834.00	626,565.37	0	0.017
24	Always Sunny in Philadelphia	N							Always Sunny in Philadelphia	1,351,400.00	453,221.58	0	0.011
25	Archer	N							Archer	1,050,000.00	238,047.61	0	0.009

The probability of a yes was linked to its corresponding cell for each show



This drove the inputs of our model, creating yes/no decisions which translated into total cost for each individual trial's optimal decision

	A	B	C	D	E	F	G	H	I	J	K	L	M
	Title	Requested Y/N	=IF(L2=1,"Y","N")							Mean	StDev	# of Viewers	P Value
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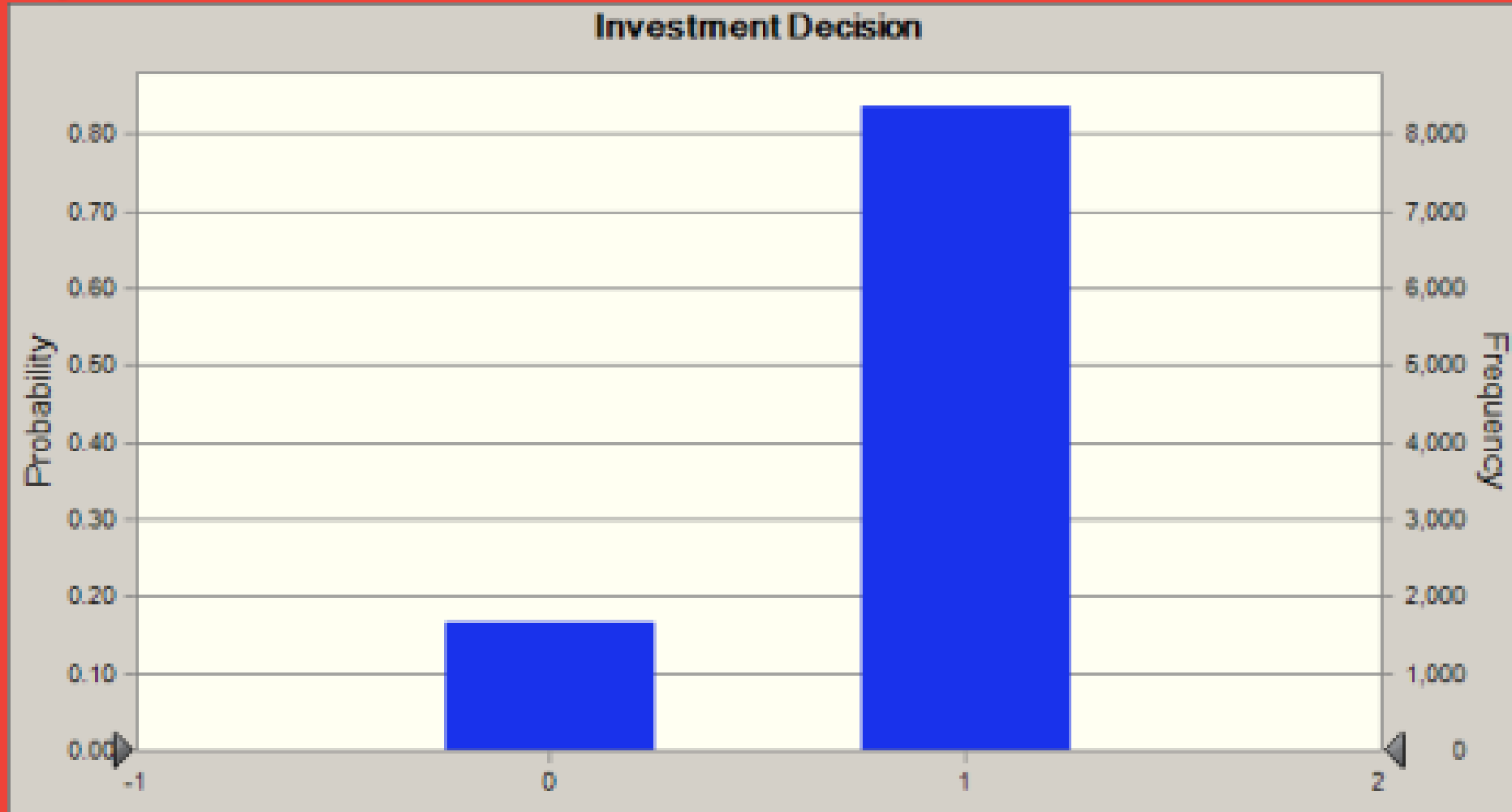
Crystal Ball

1. The “yes/no show” demand decision determines whether a show is factored into the platform pricing
2. Crystal Ball runs 10,000 trials and monitors the outcome of Cable or Internet for media consumption.
3. Average cost for each platform was also forecasted.

An example of the model output after 1 trial. In this instance the internet alternative was the best choice.

	A	B	C	D	E	F
1						
2		Total Cost of Cable	64.99			
3		Total Cost of Internet Alternative	27.98			
4						
5		<i>Investment Decision</i>	1			
6					1	Internet
7			Internet		0	Cable
8						
9						
10						
11						

Our simulation shows the internet-based option to be optimal in $> 80\%$ of trials



And the average cost of cable is more than double the average cost of the internet-based solutions...

Statistics:		Forecast values
Trials		10,000
Base Case		0.00
Mean		59.78
Median		64.99
Mode		64.99
Standard Deviation		27.94
Variance		780.73
Skewness		-1.41
Kurtosis		3.64
Coeff. of Variation		0.4674
Minimum		0.00
Maximum		84.99
Range Width		84.99
Mean Std. Error		0.28

Cable

Statistics:		Forecast values
Trials		10,000
Base Case		19.99
Mean		27.36
Median		27.98
Mode		27.98
Standard Deviation		4.60
Variance		21.19
Skewness		0.4589
Kurtosis		4.36
Coeff. of Variation		0.1682
Minimum		19.99
Maximum		38.97
Range Width		18.98
Mean Std. Error		0.05

Internet alternative

Interpretation

1. Most of our selected shows were offered via the internet, whose options are generally cheaper than cable
2. Digital delivery of media content will most likely continue to put price pressure on cable companies
3. People love NCIS and The Voice

Questions?