



IM COST-BENEFIT ANALYSIS

PJM FRMSTF

3/24/2021

QUANTIFYING RISK OF STAKEHOLDER LOSSES DUE TO DEFAULT

- Total shortfall = # of failures x average shortfall
 - Assume these occurred over 62 months (a figure used in previous IM backtesting by PJM)
- *Shortfall does not equal default*
 - What is average participant credit available divided by FTR credit requirement? Assume 20% (conservative).
 - E.g., \$.5M FTR credit requirement; \$.6M in PJM collateral account → availability ratio = 20% above requirement
 - This 20% is higher for price-sensitive bidders, and would be much higher under some proposed bid collaterals
 - Average shortfalls as ratio of IM were 13-54%
 - Any shortfalls <20% would be covered without a collateral call
 - A shortfall of 52% of IM would have only 32% (52-20) of IM as a collateral call
 - % of shortfall uncovered (by existing posted collateral) = 32/52 = 62%
- *Default does not equal stakeholder losses*
 - According to PJM¹, “vast majority” of all defaults have been cured in the past 10 years. Assume 90%.
- Example calculation:

\$0.88M shortfall per year x 62% uncovered shortfall ratio x

(1 – 90%) uncured default rate x 1 / approx. 1,000 PJM members = \$54 avg loss per member per year

1. Slide 6 from <https://pjm.com/-/media/committees-groups/task-forces/frmstf/2020/20201015/20201015-item-06a-minimum-capitalization.ashx>

QUANTIFYING RISK

						A	B	C	A x B x C		
99	IM Range (million USD)	Shortfall (% of IM)	Average Shortfall (\$ in MM)	Max Shortfall (\$ in MM)	Failure Rate (%)	Count of Observations	Total Shortfall	Shortfall per yr	% Shortfall uncovered	Uncured rate	Default per yr
	0-1	52	0.06	0.79	0.48%	76	\$4.56M	\$0.88M	62%	10%	\$54k
	1-3	43	0.76	2.32	0.06%	10	\$7.60M	\$1.47M	53%	10%	\$78k
	3-10	13	0.63	1.48	0.06%	9	\$5.67M	\$1.10M	0%	10%	\$0
	10 and above	37	7.19	22.29	0.04%	7	\$50.33M	\$9.74M	46%	10%	\$448k
97	IM Range (million USD)	Shortfall (% of IM)	Average Shortfall (\$ in MM)	Max Shortfall (\$ in MM)	Failure Rate (%)	Count of Observations	Total Shortfall	Shortfall per yr	% Shortfall uncovered	Uncured rate	Default per yr
	0-1	53	0.08	0.87	0.64%	109	\$8.72M	\$1.69M	62%	10%	\$105k
	1-3	49	0.80	2.62	0.08%	13	\$10.40M	\$2.01M	59%	10%	\$119k
	3-10	18	1.07	7.37	0.12%	20	\$21.40M	\$4.14M	0%	10%	\$0
	10 and above	32	5.63	25.41	0.06%	11	\$61.93M	\$11.99M	38%	10%	\$449k
95	IM Range (million USD)	Shortfall (% of IM)	Average Shortfall (\$ in MM)	Max Shortfall (\$ in MM)	Failure Rate (%)	Count of Observations	Total Shortfall	Shortfall per yr	% Shortfall uncovered	Uncured rate	Default per yr
	0-1	54	0.08	0.89	0.81%	138	\$11.04M	\$2.14M	63%	10%	\$134k
	1-3	32	0.55	2.74	0.17%	29	\$15.95M	\$3.09M	38%	10%	\$116k
	3-10	19	1.07	8.10	0.15%	26	\$27.82M	\$5.38M	0%	10%	\$0
	10 and above	37	5.98	26.71	0.08%	13	\$77.74M	\$15.05M	46%	10%	\$691k

WEIGH THE COST / BENEFIT

	99% Conf. Int.	97% Conf. Int.	95% Conf. Int.	Status Quo
Expected default loss per year	\$581,000	\$674,000	\$942,000	?
Expected annual default per member	\$581	\$674	\$942	?
Collateral required	(Z) \$1,716,000,000	(Y) \$1,314,000,000	(X) \$1,133,000,000	(A) \$1,334,000,000
Total cost to members	Cost of capital (CoC) * Z = \$85,800,000	CoC * Y = \$65,700,000	CoC * X = \$56,650,000	CoC * A = \$66,700,000
Marginal benefit to cost ratio	\$93,000 / [(Z-Y)*CoC] = 0.5%	\$268,000 / [(Y-X)*CoC] = 3.0%	? / [(X-A)*CoC] = ?	

\$674k - \$581k

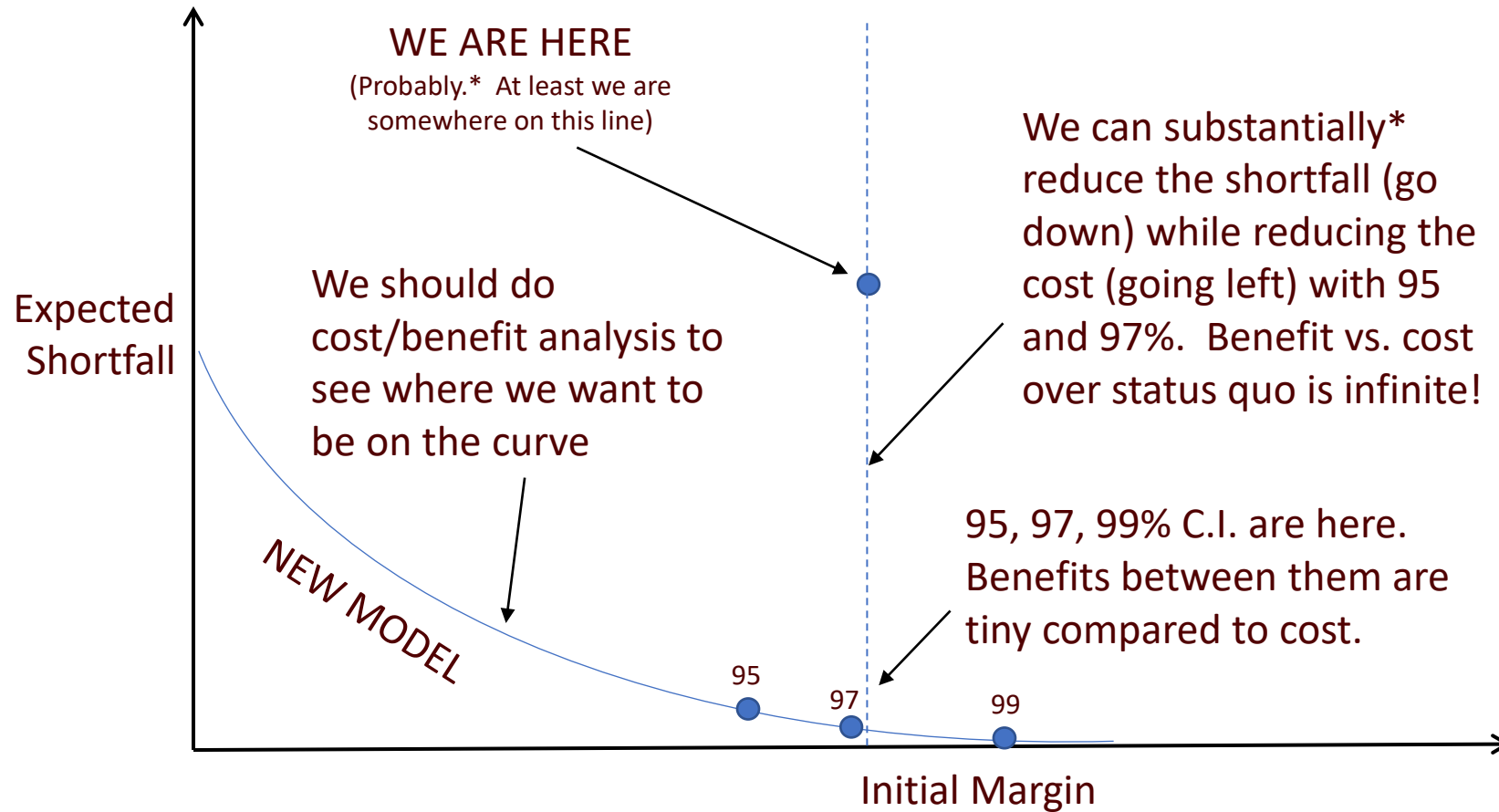
\$942k - \$674k

Going from 97% to 99%, every \$1 extra spent posting collateral (or every \$20 posted) prevents only \$0.005 in loss

Going from 95% to 97%, every \$1 extra spent posting collateral (or every \$20 posted) prevents only \$0.03 in loss

- The membership posting an extra \$181M going from 95% C.I. to 97% C.I. (which costs an additional \$9.05M based on 5% cost of capital) saves only \$268,000
- Spending \$9.05M to save \$268k does not make sense
- Assuming the status quo expected default loss per year is greater than \$942k (very likely), moving to 95% reduces cost to members while reducing default losses. This is an infinite cost-benefit payoff!

COST VS. BENEFIT



If we can substantially* reduce the total expected shortfall loss to the membership without increasing total cost, that's great! 95% and 97% accomplish that.

Even going from 95% to 97% is a marginal benefit with significantly more cost.

99% is nearly off the charts in terms of poor cost/benefit performance. Posting an additional \$20 at a cost of \$1 (using 5% cost of capital) saves only half a penny compared to 97%.

*We know the status quo has a much higher failure rate but we don't know the average shortfall. With the much higher failure rate, it is probably safe to assume the total shortfall is much higher.