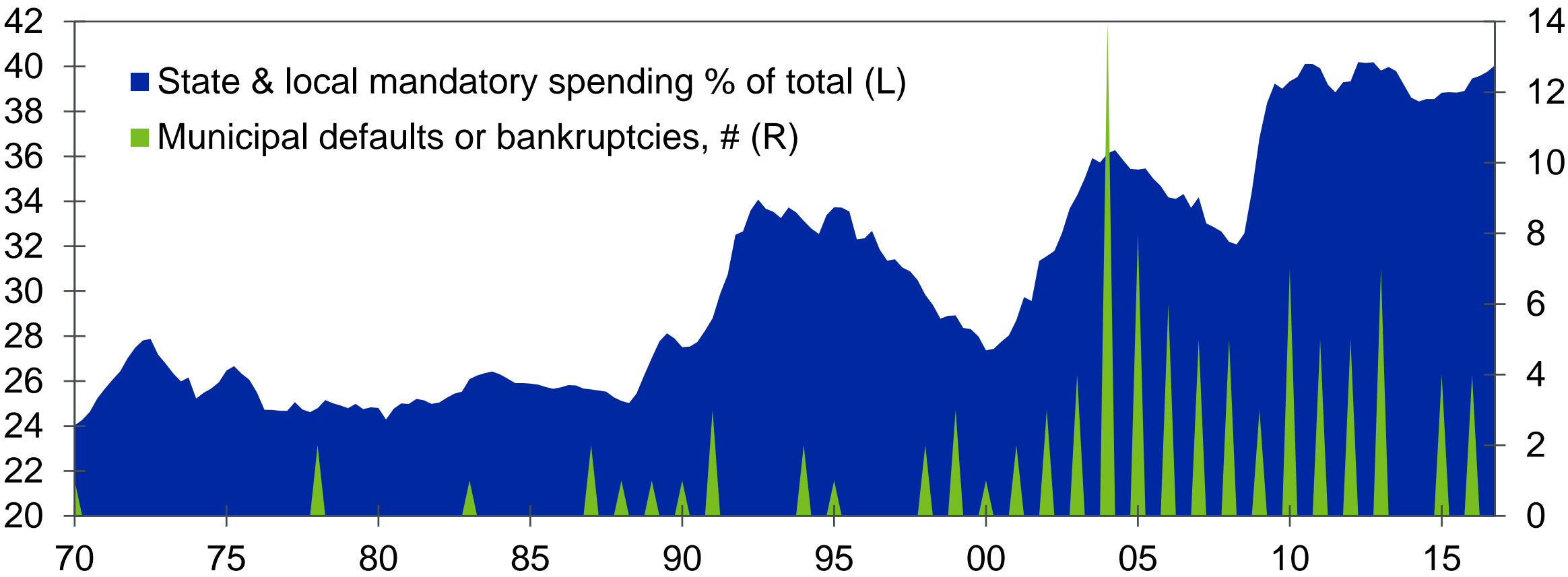


Methodology Update: QRATE™

Dan White, Director of Fiscal Policy Research

January 2019

Muniland Becoming a Riskier Place



Sources: BEA, Moody's Investors Service, Moody's Analytics

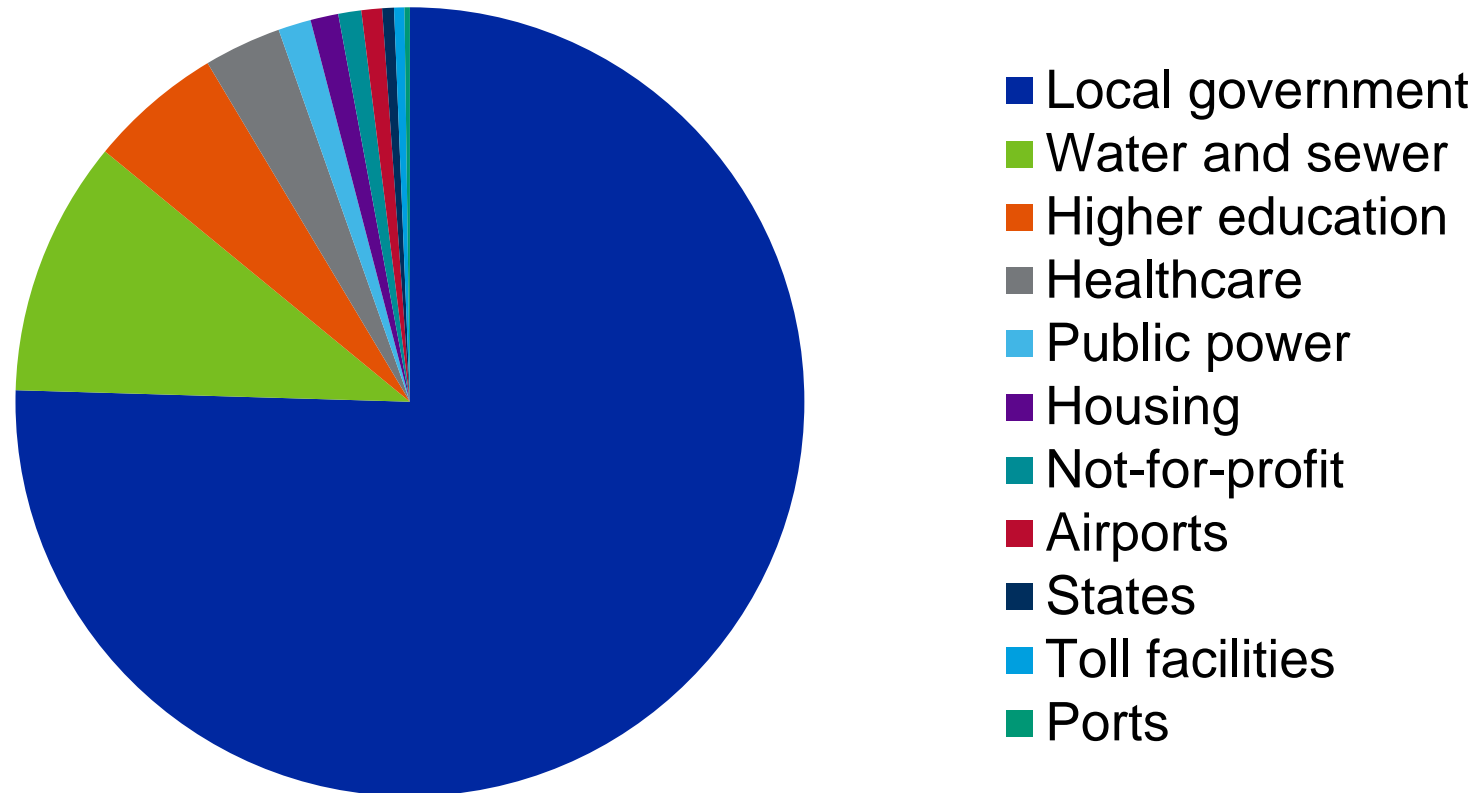
QRATE Quantitative Ratings Estimator

- » QRATE equations generate a numerical QSCORE which can be mapped to the MIS global ratings scale to estimate a quantitative credit rating
- » Individual equations for each sector in the muni universe, with additional subsectors accounted for as well

QSCORE	Estimated rating	QSCORE	Estimated rating
< 1.5	Aaa	10.5 to < 11.5	Ba1
1.5 to < 2.5	Aa1	11.5 to < 12.5	Ba2
2.5 to < 3.5	Aa2	12.5 to < 13.5	Ba3
3.5 to < 4.5	Aa3	13.5 to < 14.5	B1
4.5 to < 5.5	A1	14.5 to < 15.5	B2
5.5 to < 6.5	A2	15.5 to < 16.5	B3
6.5 to < 7.5	A3	16.5 to < 17.5	Caa1
7.5 to < 8.5	Baa1	17.5 to < 18.5	Caa2
8.5 to < 9.5	Baa2	18.5 to < 19.5	Caa3
9.5 to < 10.5	Baa3	19.5 to < 20.5	Ca
		> 20.5	C

Covering the Whole Muni Market

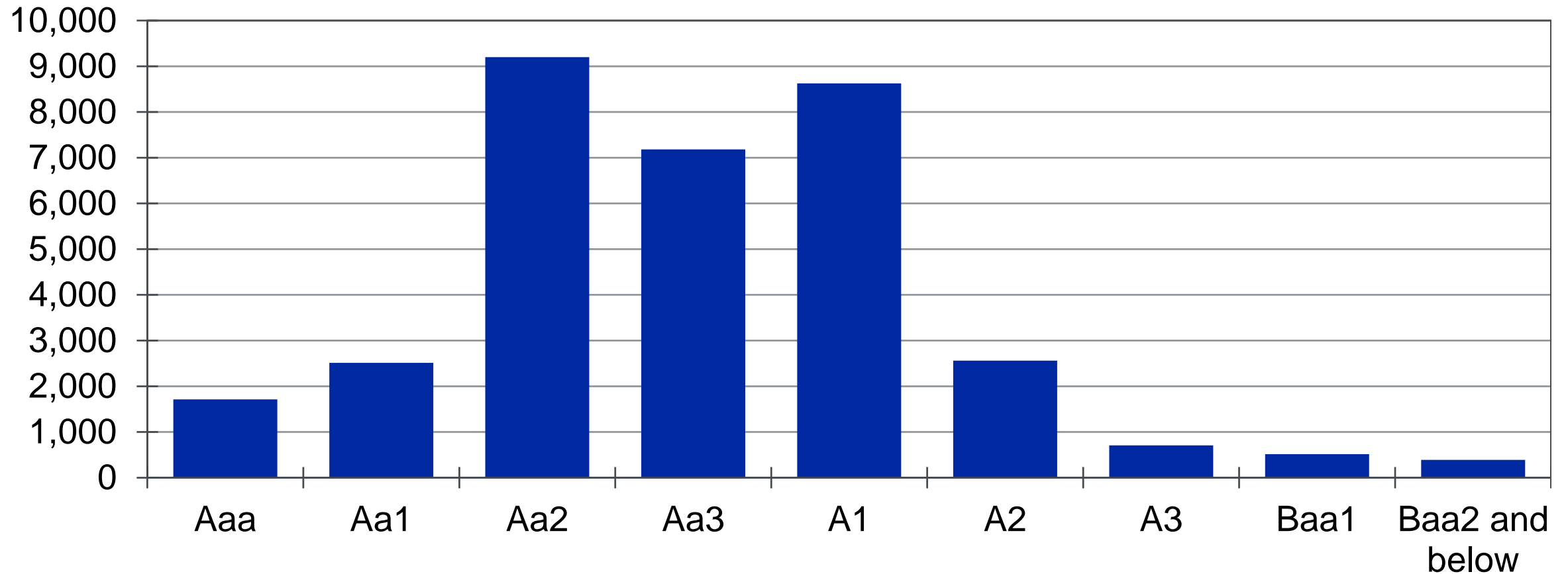
Makeup of 2015 issuers, MFRA Database



Source: Moody's Analytics

Longer Sample, More Robust Dataset

Ratings distribution by category, local government, 2011-2015



Sources: Moody's Investors Service, Moody's Analytics

Bringing Economics Into the Equation

Example QSCORE calculation, Campbell County, VA

Total Full Value (\$000)	\$5,281,404
Net Cash Balance (\$000)	\$15,031
Fund Balance as % of Revenues	40.2%
Debt and pension liabilities as a % of revenues	57.0%
Median Household Income as % of US median	68.9%
Total Number of Households ('000)	56
Subsector	County
QSCORE	3.95
Estimated Rating	Q.Aa3

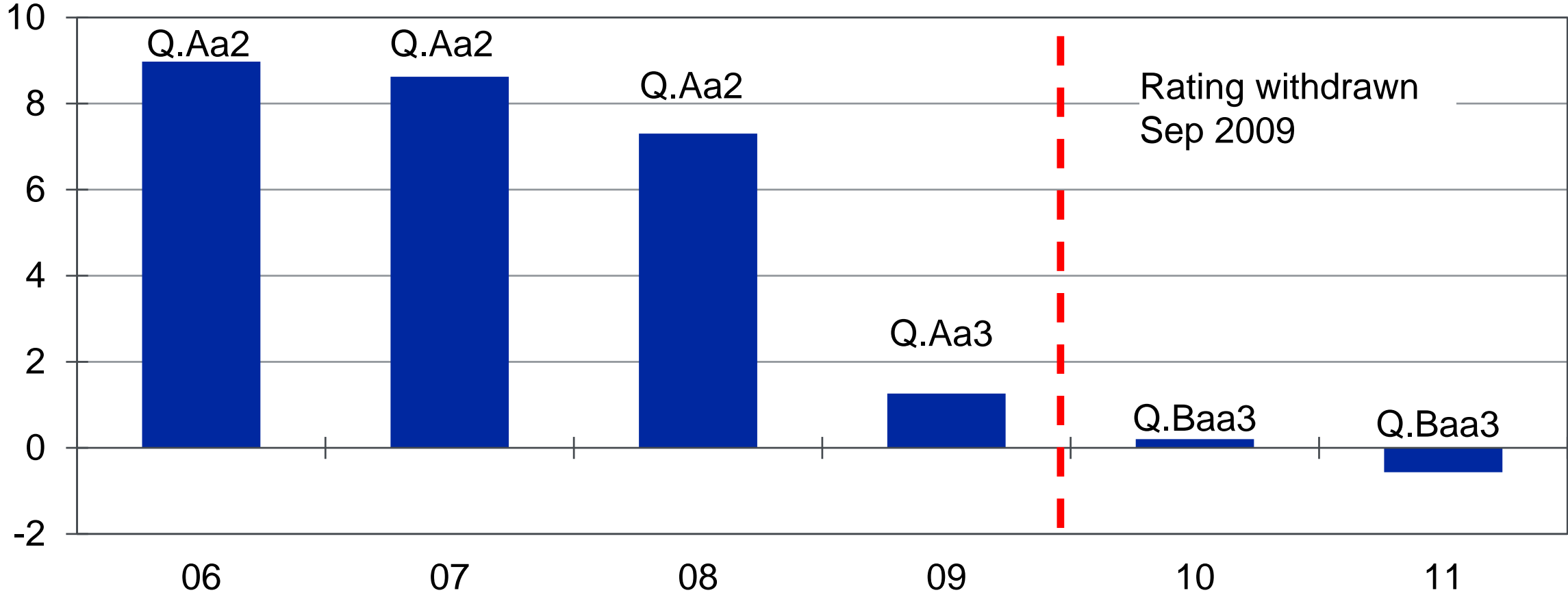
Accurate, Statistically Sound, and Documented

Accuracy of QRATE estimates versus actual MIS ratings

	AP	HC	HE	LG	NP	WS	ST	PT	HS	TF	PP
% spot on	39%	31%	40%	44%	26%	39%	37%	37%	50%	17%	41%
% within 1 notch	85%	78%	87%	88%	74%	85%	90%	80%	80%	55%	83%
% within 2 notches	97%	96%	97%	97%	92%	97%	98%	96%	94%	84%	96%

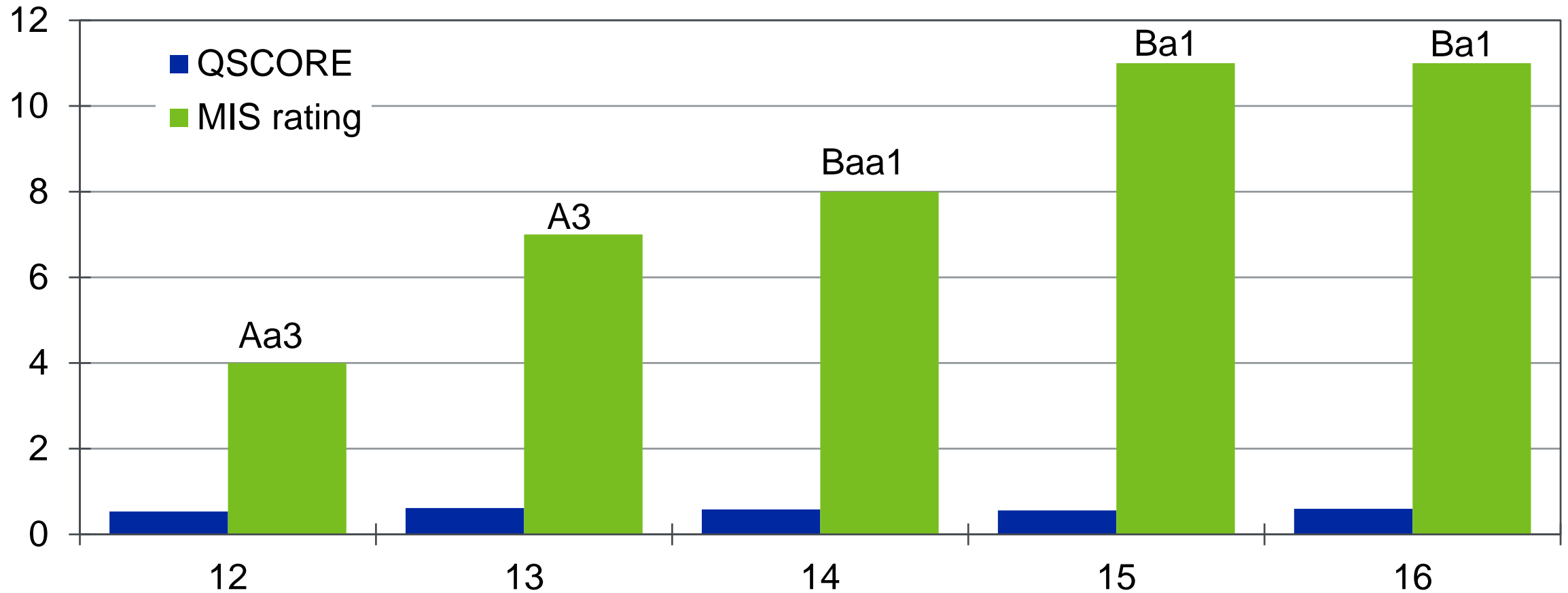
A Clearer View of Unrated Issuers

Fund balances as a % of revenues, San Bernardino (City), CA



Source: Moody's Analytics

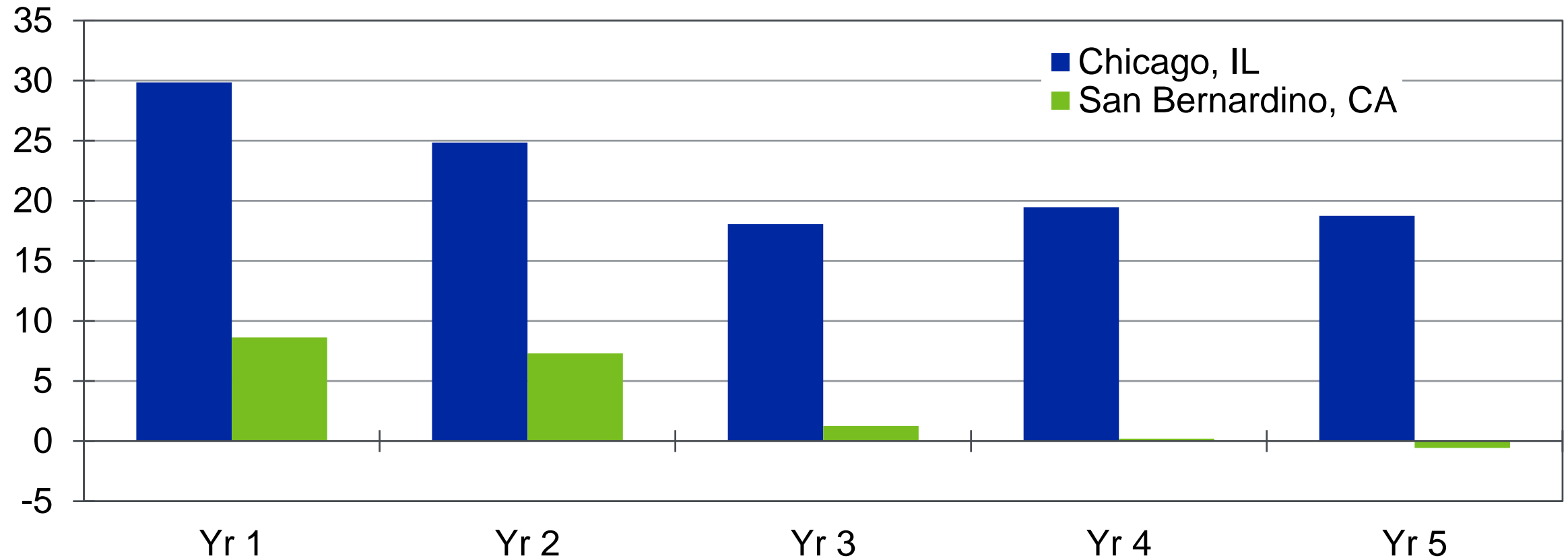
Spotting Qualitative Concerns



Source: Moody's Analytics

What a Difference a State Makes

Fund balances as a % of revenues



Source: Moody's Analytics

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