

Appendix X: Technical output from statistical tests

This appendix provides technical details related to the statistics incorporated into the “Finding and Results” section of the report. The appendix is organized around each of the subsections within the “Findings and Results.”

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Table 6. Enrollment change and its relationship to fiscal health for districts statewide (2002-03 to 2004-05)

Regression Analysis – Testing relationship between growth or decline and fiscal health (compared marginal and unhealthy to healthy)

Elementary Districts

Iteration 0: log likelihood = -457.31753
Iteration 1: log likelihood = -454.84812
Iteration 2: log likelihood = -454.84669

Multinomial logistic regression

Number of observations = 487
LR chi2(2) = 4.94
Prob > chi2 = 0.0845
Log likelihood = -454.84669
Pseudo R2 = 0.0054

Type	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal decline	0.867348	0.064857	-1.9	0.057	0.749107	1.004252
Unhealthy decline	0.872552	0.076961	-1.55	0.122	0.73403	1.037215

High School Districts

Iteration 0: log likelihood = -80.987997
Iteration 1: log likelihood = -80.855246
Iteration 2: log likelihood = -80.855195

Multinomial logistic regression

Number of observations = 82
LR chi2(2) = 0.27
Prob > chi2 = 0.8756
Log likelihood = -80.855195
Pseudo R2 = 0.0016

Type	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal decline	1.120036	0.252711	0.5	0.615	.7197427	1.742957

Unhealthy decline	1.06751	0.286005	0.24	0.807	0.631422	1.804779
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Unified Districts

Iteration 0: log likelihood = -349.13695

Iteration 1: log likelihood = -347.59029

Iteration 2: log likelihood = -347.58414

Iteration 3: log likelihood = -347.58414

Multinomial logistic regression

Number of observations = 324

LR chi2(2) = 3.11

Prob > chi2 = 0.2117

Log likelihood = -347.58414

Pseudo R2 = 0.0044

Type	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal decline	0.98219	0.107368	-0.16	0.869	0.792772	1.216872
Unhealthy decline	0.81208	0.102807	-1.64	0.1	0.633633	1.040777

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Table 7. Survey responses regarding expected enrollment changes over the next three years, analyzed against district fiscal health

Reported district expectation	Number of Districts		
	Healthy	Marginal	Unhealthy
Enrollment Decline	24	24	21
Enrollment Increase	20	16	7
No Change	8	6	8
TOTAL	52	46	36

ANOVA: p-value = 0.191

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Table 8. District type and its relationship to fiscal health for districts statewide

Regression Analysis – Testing relationship between type of district and fiscal health – results compare against healthy, unified districts

Number of observations = 971

Log likelihood = -952.45924

Pseudo R2 = 0.0204

Type	RRR	Std. Error	P> z	95% Conf. Interval
Marginal				

Elementary	.4233236	.0687824	0.000 0.044	.3078702 - .5820728
High School	.5622222	.1606122		.3211752 - .9841789
Unhealthy				
Elementary	.3994538	.0750977	0.000 0.076	.2763376 - .5774219
High School	.556962	.1839855		.2915021 1.064166

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Relationship between revenue limit and fiscal health – (compared marginal and unhealthy to healthy by revenue limit)

Elementary Districts

Number of observations = 557

Log likelihood = -507.87314

Pseudo R2 = 0.0109

Type	RRR	Std. Error	P> z	95% Conf. Interval
Marginal	.9999558	.0000257	0.085	.9999055 1.000006
Unhealthy	.9998837	.0000477	0.015	.9997902 .9999772

High School Districts

Number of observations = 83

Log likelihood = -81.503244

Pseudo R2 = 0.0148

Type	RRR	Std. Error	P> z	95% Conf. Interval
Marginal	.9998049	.0001635	0.233	.9994845 1.000125
Unhealthy	.9999512	.0001014	0.630	.9997525 1.00015

Unified Districts

Number of observations = 331

Log likelihood = -345.88191

Pseudo R2 = 0.0292

Type	RRR	Std. Error	P> z	95% Conf. Interval
Marginal	0.999737	7.35E-05	0	0.999593 0.9998809
Unhealthy	0.999897	5.41E-05	0.056	0.9997907 1.000003

Relationship between district type, % of English learners, and fiscal health – no statistically significant relationship found –there is no indication that districts with more English learners are more likely to be fiscally unhealthy or moderately unhealthy.

Results compare against healthy districts of same type

Elementary Districts

Number of observations = 557

Log likelihood = -512.53089

Pseudo R2 = 0.0018

Type	RRR	Std. Error	P> z	95% Conf. Interval
Elementary – Marginal	1.779508	.8942664	0.251	.6645702 4.764959
Elementary - Unhealthy	1.81768	1.086215	0.317	.5634475 5.863829

High School Districts

Number of observations = 83

Log likelihood = -82.119353

Pseudo R2 = 0.0073

Type	RRR	Std. Error	P> z	95% Conf. Interval
High School – Marginal	1.112408	2.474547	0.962	.0142157 87.04803
High School - Unhealthy	.0481175	.1463201	0.318	.0001241 18.65151

Unified Districts

Number of observations = 330

Log likelihood = -347.86948

Pseudo R2 = 0.0211

Type	RRR	Std. Error	P> z	95% Conf. Interval
Unified – Marginal	.163494	.1331259	0.026	.0331441 .8064875
Unified - Unhealthy	.0242137	.0254615	0.000	.0030831 .1901641

Relationship between Revenue Limit and fiscal health

Elementary Districts

Iteration 0: log likelihood = -513.44646

Iteration 1: log likelihood = -506.53487

Iteration 2: log likelihood = -505.69536

Iteration 3: log likelihood = -505.63628

Iteration 4: log likelihood = -505.63579

Iteration 5: log likelihood = -505.63579

Multinomial logistic regression

Number of observations = 557

LR chi2(2) = 15.62

Prob > chi2 = 0.0004

Pseudo R2 = 0.0152

Log likelihood = -505.63579

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Revenue Limit	0.99988	5.3E-05	-2.33	0.02	0.99977	0.99998
Unhealthy Revenue Limit	0.99977	9.5E-05	-2.43	0.015	0.99958	0.99996

High School Districts

Iteration 0: log likelihood = -82.726838

Iteration 1: log likelihood = -81.424267

Iteration 2: log likelihood = -80.41972

Iteration 3: log likelihood = -79.988935

Iteration 4: log likelihood = -79.948766

Iteration 5: log likelihood = -79.948241

Iteration 6: log likelihood = -79.948241

Multinomial logistic regression

Number of observations = 83

LR chi2(2) = 5.56

Prob > chi2 = 0.0621

Pseudo R2 = 0.0336

Log likelihood = -79.948241

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Revenue Limit	0.99928	0.000431	-1.67	0.096	0.998439	1.000127
Unhealthy Revenue Limit	0.99994	0.000138	-0.46	0.645	0.999666	1.000207

Unified Districts

Iteration 0: log likelihood = -356.28594

Iteration 1: log likelihood = -347.57903

Iteration 2: log likelihood = -346.44264

Iteration 3: log likelihood = -346.3722

Iteration 4: log likelihood = -346.37186

Multinomial logistic regression

Number of observations = 331

LR chi2(2) = 19.83

Prob > chi2 = 0.0000

Pseudo R2 = 0.0278
 Log likelihood = -346.37186

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Revenue Limit	0.99957	0.00013	-3.35	0.001	0.999313	0.99982
Unhealthy Revenue Limit	0.99982	9.37E-05	-1.94	0.052	0.999635	1.000002

Relationship between Other revenues and fiscal health

Elementary Districts

Iteration 0: log likelihood = -513.44646
 Iteration 1: log likelihood = -511.24361
 Iteration 2: log likelihood = -510.98645
 Iteration 3: log likelihood = -510.9812
 Iteration 4: log likelihood = -510.9812

Multinomial logistic regression

Number of observations = 557
 LR chi2(2) = 4.93
 Prob > chi2 = 0.0850
 Pseudo R2 = 0.0048
 Log likelihood = -510.9812

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Other Revenues	0.99998	4.31E-05	-0.58	0.562	0.999891	1.000059
Unhealthy Other Revenues	0.99985	7.94E-05	-1.91	0.056	0.999693	1.000004

High School Districts

Iteration 0: log likelihood = -82.726838
 Iteration 1: log likelihood = -82.675206
 Iteration 2: log likelihood = -82.67519

Multinomial logistic regression

Number of observations = 83
 LR chi2(2) = 0.10
 Prob > chi2 = 0.9497
 Pseudo R2 = 0.0006
 Log likelihood = -82.67519

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Other Revenues	0.99995	0.000201	-0.27	0.785	0.999552	1.000338
Unhealthy Other Revenues	0.99995	0.000235	-0.23	0.82	0.999486	1.000407

Unified Districts

Iteration 0: log likelihood = -356.28594

Iteration 1: log likelihood = -349.77152

Iteration 2: log likelihood = -349.42755

Iteration 3: log likelihood = -349.42397

Iteration 4: log likelihood = -349.42397

Multinomial logistic regression

Number of observations = 331

LR chi2(2) = 13.72

Prob > chi2 = 0.0010

Pseudo R2 = 0.0193

Log likelihood = -349.42397

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Other Revenues	0.99961	0.000122	-3.17	0.002	0.999372	0.999852
Unhealthy Other Revenues	0.99985	0.000101	-1.52	0.129	0.999649	1.000044

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Personnel Practices

Statewide Superintendent Volatility (over 5 years)	Number of Districts		
	Healthy	Marginal	Unhealthy
1 superintendent	219	111	43
2 superintendents	217	126	95
3 superintendents	70	30	34
4 superintendents	7	7	2
5 superintendents	1	0	0
Total	514	274	174

CBOs highest degree attained	Number of CBOs		
	Healthy	Marginal	Unhealthy
AAA	5	0	2
BA/BS	12	18	8
MA/MS	24	16	17
Doctoral	7	9	4
Total	48	43	31

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Relationship between CBO training and tenure to fiscal health

CBOs who completed one or more training program	Number of CBOs		
	Healthy	Marginal	Unhealthy
1 program	28	20	19

2 programs	7	12	3
3 programs	1	1	1
4 programs	0	1	0
Total	36	34	23

Relationship between years in current district as CBO and fiscal health

	Healthy	Marginal	Unhealthy	Total
1 year or less	12	13	11	36
1+ year to 4 years	17	19	11	47
4+ years to 10 years	12	12	10	34
Greater than 10 years	9	0	3	12

Chi-Squared: P-value = 0.138

Relationship between years as CBO and fiscal health

	Healthy	Marginal	Unhealthy	Total
1 year or less	5	4	3	12
1+ year to 4 years	10	11	8	29
4+ years to 10 years	11	14	8	33
Greater than 10 years	23	16	17	56

Chi-Squared: P-value = 0.915

Relationship between AA degree area of study and fiscal health

	Healthy	Marginal	Unhealthy	Total
Business major	7	5	6	18
Education major	2	0	0	2
Public admin major	0	1	0	1
Other major	3	3	2	8

Chi-Squared: P-value = 0.480

Relationship between BA/BS degree area of study and fiscal health

	Healthy	Marginal	Unhealthy	Total
Business major	19	21	11	51
Economics major	4	4	3	11
Education major	4	4	4	12
Public admin major	1	3	2	6
Other major	11	8	5	24

Chi-Squared: P-value = 0.952

Relationship between MA/MS degree area of study and fiscal health

	Healthy	Marginal	Unhealthy	Total
Business major	11	8	10	29
Economics major	0	1	0	1
Education major	8	5	6	19
Public admin major	4	5	3	12
Other major	8	5	2	15

Chi-Squared: P-value = 0.711

Relationship between doctoral degree area of study and fiscal health

	Healthy	Marginal	Unhealthy	Total
Education major	6	7	4	17
Public admin major	0	1	0	1
Other major	1	1	0	2

Chi-Squared: P-value = 0.750

Relationship between CASBO training and fiscal health

	Healthy	Marginal	Unhealthy	Total
Completed Training	19	19	14	52
All other responses	25	20	17	62

Chi-Squared: P-value = 0.879

Relationship between certificate program training and fiscal health

	Healthy	Marginal	Unhealthy	Total
Completed Training	6	8	3	17
All other responses	28	26	21	75

Chi-Squared: P-value = 0.560

Relationship between CBO Mentor training and fiscal health

	Healthy	Marginal	Unhealthy	Total
Completed Training	3	3	0	6
All other responses	29	30	21	80

Chi-Squared: P-value = 0.352

Relationship between ACSA CBO Academy training and fiscal health

	Healthy	Marginal	Unhealthy	Total
Completed Training	15	21	9	45
All other responses	23	19	16	58

Chi-Squared: P-value = 0.343

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Characteristics of boards and fiscal health

Relationship between high quality board training and fiscal health

	Healthy	Marginal	Unhealthy	Total
Yes of High Quality	26	14	11	51
All other responses	27	32	25	84
Total	53	46	36	135

Chi-Squared: P-value = 0.094

Relationship between high quality procedures to limit staff spending and fiscal health

	Healthy	Marginal	Unhealthy	Total
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Yes of High Quality	28	19	11	58
All other responses	25	27	25	77
Total	53	46	36	135

Chi-Squared: P-value = 0.110

Relationship between high quality written board policies and fiscal health

	Healthy	Marginal	Unhealthy	Total
Yes of High Quality	39	30	16	85
All other responses	14	16	20	50
Total	53	46	36	135

Chi-Squared: P-value = 0.019

Relationship between high quality regulations that are updated regularly and fiscal health

	Healthy	Marginal	Unhealthy	Total
Yes of High Quality	21	14	9	44
All other responses	32	32	27	91
Total	53	46	36	135

Chi-Squared: P-value = 0.327

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Relationship between availability of procedures to evaluate impact of budget amendments and fiscal health (question 3d)

	Healthy	Marginal	Unhealthy	Total
Yes of High Quality	12	12	6	30
All other responses	41	34	30	105
Total	53	46	36	135

Chi-Square: P-value = 0.593

Relationship between ability to cut programs not aligned with strategic goals and fiscal health (question 3e)

	Healthy	Marginal	Unhealthy	Total
Yes of High Quality	12	12	6	30
All other responses	18	5	7	30
Total	53	46	36	135

Chi-Square: P-value = 0.0.20

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Relationship between process to analyze significant expenditures to ensure control and fiscal health (question 11a)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	42	34	21	97
All other responses	11	12	15	38
Total	53	46	36	135

Chi-Square: P-value = 0.0.92

Relationship between process to analyze contract cost fluctuations and fiscal health (question 11b)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	42	34	21	97
All other responses	8	10	15	33
Total	53	46	36	135

Chi-Square: P-value = 0.092

Relationship between ability to identify internal control weaknesses and fiscal health (question 11f)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	35	28	17	80
All other responses	18	18	19	55
Total	53	46	36	135

Chi-Square: P-value = 0.200

Relationship between assigning responsibility to address internal control weaknesses and fiscal health (question 11g)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	40	25	19	84
All other responses	13	21	17	51
Total	53	46	36	135

Chi-Square: P-value = 0.038

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Position Control

Relationship between effective position control and fiscal health (question 11c)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	17	22	15	54
All other responses	36	23	21	80
Total	53	45	36	134

Chi-Square: P-value = 0.235

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Debt Capacity by fiscal health

Relationship between strategic use of debt and fiscal health (question 12a)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	28	32	19	79
All other responses	21	14	15	50
Total	49	46	34	129

Chi-Square: P-value = 0.350

Relationship between written debt policies and fiscal health (question 12b)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	17	16	7	40
All other responses	32	28	27	87
Total	49	44	34	127

Chi-Square: P-value = 0.274

Relationship between debt service requirements/timely payment and fiscal health (question 12c)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	41	44	27	112
All other responses	6	2	7	15
Total	47	46	34	127

Chi-Square: P-value = 0.081

Relationship between federal compliance/bond covenants and fiscal health (question 12d)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	411	41	33	115
All other responses	7	5	1	13
Total	48	46	34	128

Chi-Square: P-value = 0.224

Relationship between formal process for debt capacity evaluation and fiscal health (question 12e)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	32	34	16	82
All other responses	15	12	18	45
Total	47	46	34	127

Chi-Square: P-value = 0.038

Relationship between financing alternatives when making acquiring capital assets and fiscal health (question 12f)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	41	34	20	95
All other responses	9	12	14	35
Total	50	46	34	130

Chi-Square: P-value = 0.062

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Relationship between software for capital project tracking and fiscal health (question 9b)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	17	17	7	41
All other responses	36	29	29	94
Total	53	46	36	135

Chi-Square: P-value = 0.218

Relationship between ability to produce reports from financial system that are easy for board to understand and fiscal health (question 9d)

	Healthy	Marginal	Unhealthy	Total
Completely Agree (practice is in place)	12	9	4	25
All other responses	41	37	32	110
Total	53	46	36	135

Chi-Square: P-value = 0.379

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Relationship between preparation of high quality expenditure estimates prior to collective bargaining (question 25a)

	Healthy	Marginal	Unhealthy	Total
Yes, of High Quality	32	28	20	80
All other responses	21	18	16	55
Total	53	46	36	135

Chi-Square: P-value = 0.869

Relationship between preparation of high quality revenue estimates prior to collective bargaining (question 25b)

	Healthy	Marginal	Unhealthy	Total
Yes, of High Quality	31	31	21	83
All other responses	22	15	15	52
Total	53	46	36	135

Chi-Square: P-value = 0.598

Relationship between providing high quality training to bargaining teams and fiscal health (question 25f)

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Retiree health benefits – regression analysis

Elementary Districts

Iteration 0: log likelihood = -269.79432

Iteration 1: log likelihood = -269.76352

Iteration 2: log likelihood = -269.7635

Multinomial logistic regression

Number of observations = 277

LR chi2(2) = 0.06

Prob > chi2 = 0.9696

Log likelihood = -269.7635

Pseudo R2 = 0.0001

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]
Marginal Benefits End	0.95	0.397062	-0.12	0.902	0.418751 2.15522

Unhealthy Benefits End	0.8848	0.445019	-0.24	0.808	0.330163	2.371186
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High School Districts

Iteration 0: log likelihood = -64.570035

Iteration 1: log likelihood = -63.986421

Iteration 2: log likelihood = -63.984588

Iteration 3: log likelihood = -63.984588

Multinomial logistic regression

Number of observations = 66

LR chi2(2) = 1.17

Prob > chi2 = 0.5569

Log likelihood = -63.984588

Pseudo R2 = 0.0091

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Benefits End	2.17241	1.859789	0.91	0.365	0.405728	11.63189
Unhealthy Benefits End	2.17241	2.465906	0.68	0.494	0.234825	20.09745

Unified Districts

Iteration 0: log likelihood = -263.64473

Iteration 1: log likelihood = -260.96637

Iteration 2: log likelihood = -260.90765

Iteration 3: log likelihood = -260.90752

Multinomial logistic regression

Number of observations = 246

LR chi2(2) = 5.47

Prob > chi2 = 0.0648

Log likelihood = -260.90752

Pseudo R2 = 0.0104

Type per ADA	RRR	Std. Err	z	P> z	[95% Conf. Interval]	
Marginal Benefits End	0.32905	0.178678	-2.05	0.041	0.113516	0.953837
Unhealthy Benefits End	0.33708	0.201422	-1.82	0.069	0.104495	1.087344

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Relationship between providing training related to fiscal management and budgeting to principals and fiscal health (question 6f)

	Healthy	Marginal	Unhealthy	Total
To a great extent	12	6	3	21
All other responses	41	40	33	114
Total	53	46	36	135

Chi-Square: P-value = 0.159

Relationship between linking site resources to outcomes and fiscal health (question 6b)

	Healthy	Marginal	Unhealthy	Total
To a great extent	26	17	6	49
All other responses	27	29	30	86
Total	53	46	36	135

Chi-Square: P-value = 0.008

Relationship between providing site budgeting flexibility and fiscal health (question 6c)

	Healthy	Marginal	Unhealthy	Total
To a great extent	24	8	2	34
All other responses	29	38	34	101
Total	53	46	36	135

Chi-Square: P-value = 0.000