

ALASKA LEGISLATURE SPECIAL COMMITTEE/SUBJECT FILES 8672

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Explorations with California Unified School Districts." In *Selected Papers in School Finance 1975*. Washington, DC: U.S. Department of Health, Education, and Welfare, Office of Education (1975).

McMahon, Walter W. "Interstate Cost Adjustments." In William J. Fowler, Jr. (Ed.), *Selected Papers in School Finance*. Washington, DC: U.S. Department of Education, National Center for Educational Statistics (1994).

Rothstein, Richard and James R. Smith. "Adjusting Oregon Education Expenditures for Regional Cost Differences: A Feasibility Study." Sacramento, CA: Management Analysis & Planning Associates, L.L.C. (1997).

Wendling, Wayne. "Cost-of-Education Indices for New York State School Districts." Denver, CO: Education Commission of the States (1979).

Wynne, Mark and Fiona Sigalla. "The Consumer Price Index." *Federal Reserve Bank of Dallas Economic Review* (2nd quarter, 1994).

Appendix A. Data Sources

Certified Staff. A primary data source for the analysis of certified school personnel (teachers, school administrators, and other professional personnel) is the *Certified Staffing Accounting Report (CSAR)* submitted by each district to ADEED. The CSAR provides basic information on the personal characteristics and job assignments of all certified school personnel in the state of Alaska. These variables include salary, total years of experience, educational background, race-ethnicity, age, gender, job title, and teaching assignment codes. Virtually all of these variables are within the control of the local district. That is, district administrators can select the characteristics of its staff as long as sufficient turnover exists in the district. AIR received four years of the CSAR data from ADEED, from the 1998-1999 school year to the 2001-2002 school year. These data were used in analysis of salaries and turnover for teachers, administrators and other certified professional staff.

Benefits. Part of our data collection involved asking districts about contributions or expenditures for such things as housing subsidies for professional staff. The data were collected on a number of benefits, including: medical, dental, vision, travel, and life insurance; housing subsidies; travel benefits; and retirement benefits.

Classified Staff. While there are some differences in the patterns of wage variations for classified staff across local school districts, they do represent a substantially smaller percentage of the overall school district budget. Moreover, there is generally a correlation between classified cost differences and those observed for teachers and other certified school personnel.²⁵ AIR collected original data from district payroll records on pay rates and hours of work per year, a limited set of personal characteristics, and job-related characteristics for a large sample of classified school personnel employed by Alaska school districts. The personal characteristics included: birthdate, gender, and race-ethnicity. These data were combined with school- and district-level data for use in the classified staff salary regression model.

School and District Data. ADEED provided AIR with a set of files containing location and enrollment data on each school. The enrollment data spanned five years, from the 1997-1998 school year to the 2001-2002 school year, and included ethnicity counts at each school. Data on school enrollments were then aggregated to the district level. Additional information was provided by ADEED on the gross square footage of each building within the school districts in Alaska.

Climate Data. Climate data were obtained from the National Oceanographic Association of America (NOAA) for all weather stations in Alaska. These datasets include data on precipitation and temperature, reported in 30-year normals by month and year. The temperature data were reported in heating, cooling, and total degree days, which were used in the salary

²⁵ The correlation between teachers' salaries and benefits and the salaries of classified staff in the superlative index is 0.71.

models. To assign data to each school, values were taken from each weather station around the school and weighted by proximity of the school to the specific station.

Census Data. The Alaska Department of Community and Economic Development (DCED) reported Census 2000 data at a community level. Data on each community fell into the four following large categories: demographic, social, economic, and housing. These communities contained in the DCED datasets were then combined with the school-level data obtained from ADEED. This provided a clearer picture of the communities within which these schools were located. The data were helpful in the analysis of comparable wages and salary models.

Appendix B. Data Collection

For a copy of the data collection instruments, please contact Eddy Jeans at the Alaska Department of Education and Early Development:

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Appendix C.

Comparable Wage Model Technical Information

District Name	Labor Market Area	Comparable Wage Index	Average Wage Index	Average Wage
North Slope Borough	31 North Slope Borough	1.33	1.61	\$49,172
Aleutians East	57 Aleutians East	1.00	0.62	\$18,991
Anchorage	62 Anchorage	1.00	1.00	\$30,606
Valdez-Cordova	75 Valdez-Cordova	0.98	1.05	\$32,193
Denali Borough	47 Denali Borough	0.96	1.06	\$32,355
Aleutians West	58 Aleutians West	0.94	0.73	\$22,319
Northwest Arctic Borough	33 Northwest Arctic Borough	0.91	1.08	\$33,125
Fairbanks	44 Fairbanks	0.90	0.88	\$26,983
Juneau	86 Juneau	0.90	0.92	\$28,089
Ketchikan	95 Ketchikan	0.88	0.78	\$23,763
Kodiak	73 Kodiak	0.88	0.68	\$20,866
Sitka	87 Sitka	0.86	0.74	\$22,576
Kenai	71 Kenai	0.84	0.83	\$25,407
MatSu	61 MatSu	0.83	0.74	\$22,741
Bristol Bay Borough	55 Bristol Bay Borough	0.81	0.57	\$17,456
Wrangell-Petersburg	91 Wrangell-Petersburg	0.81	0.66	\$20,324
Yakutat	79 Yakutat	0.78	0.63	\$19,175
Dillingham	50 Dillingham	0.78	0.75	\$22,944
Haines	85 Haines	0.78	0.58	\$17,839
Southeast Fairbanks	46 Southeast Fairbanks	0.76	0.70	\$21,493
Skagway-Angoon	80 Skagway-Angoon	0.75	0.61	\$18,619
POW-Outer Ketchikan	93 POW-Outer Ketchikan	0.75	0.67	\$20,594
Bethel	52 Bethel	0.74	0.72	\$22,012
Nome	34 Nome	0.73	0.72	\$22,141
Lake and Peninsula	59 Lake and Peninsula	0.70	0.55	\$16,925
Yukon-Koyukuk	41 Yukon-Koyukuk	0.68	0.81	\$24,838
Wade Hampton	51 Wade Hampton	0.63	0.64	\$19,719

Appendix D1.

Final Estimating Equations for Administrators, Teachers, and Classified Personnel

Exhibit D1-a. Final Econometric Model for Explaining the Patterns of Compensation for Administrators and Other Non-Teaching Personnel

The LIFEREG Procedure

Model Information

Data Set	WORK.TCHR
Dependent Variable	lsal
Dependent Variable	cens
Number of Observations	2801
Noncensored Values	2200
Right Censored Values	601
Left Censored Values	0
Interval Censored Values	0
Missing Values	731
Name of Distribution	Normal
Log Likelihood	910.50923045

Analysis of Parameter Estimates

Parameter	DF	Estimate	Standard Error	95% Confidence Limits		Chi-Square	Pr > ChiSq
Intercept	1	10.0926	0.1314	9.8352	10.3501	5903.05	<.0001
percent_teaching	1	-0.0008	0.0003	-0.0015	-0.0002	6.58	0.0103
fy2000	1	-0.0149	0.0069	-0.0284	-0.0014	4.68	0.0306
fy2001	1	0.0135	0.0074	-0.0011	0.0281	3.31	0.0690
adjexp	1	0.0334	0.0044	0.0247	0.0421	56.47	<.0001
adjexp2	1	-0.0007	0.0007	-0.0021	0.0007	1.06	0.3042
adjexp3	1	-0.0000	0.0000	-0.0001	0.0000	1.17	0.2804
adjexp4	1	0.0000	0.0000	0.0000	0.0000	4.03	0.0447
female	1	-0.0295	0.0068	-0.0429	-0.0162	18.84	<.0001
age1	1	0.0055	0.0004	0.0047	0.0063	181.27	<.0001
age_missing	1	0.1520	0.1039	-0.0516	0.3557	2.14	0.1433
degree3	1	0.0446	0.0088	0.0273	0.0619	25.45	<.0001
degree4	1	-0.0107	0.0522	-0.1131	0.0917	0.04	0.8373
degree5	1	0.0886	0.0262	0.0372	0.1401	11.41	0.0007
ethnic_black	1	-0.0177	0.0161	-0.0492	0.0138	1.21	0.2707
ethnic_hisp	1	0.0222	0.0247	-0.0263	0.0707	0.81	0.3694
ethnic_asian	1	0.0107	0.0248	-0.0379	0.0593	0.19	0.6669
ethnic_indian	1	0.0408	0.0314	-0.0207	0.1023	1.69	0.1936
ethnic_nativeAK	1	-0.0511	0.0201	-0.0905	-0.0117	6.46	0.0110
assign_elem	1	0.0065	0.0100	-0.0131	0.0260	0.42	0.5172
assign_mathsci	1	-0.0219	0.0314	-0.0835	0.0397	0.48	0.4864
assign_multgrade	1	-0.0324	0.0132	-0.0583	-0.0065	6.00	0.0143
assign_se	1	-0.0245	0.0194	-0.0624	0.0135	1.60	0.2063
assign_004	1	-0.0953	0.0625	-0.2178	0.0271	2.33	0.1271
headtchr	1	0.1020	0.0462	0.0114	0.1926	4.87	0.0274
principal	1	0.2702	0.0119	0.2468	0.2936	513.48	<.0001
asst_principal	1	0.2778	0.0151	0.2482	0.3073	339.41	<.0001
counselor	1	-0.0534	0.0124	-0.0777	-0.0290	18.45	<.0001
librarian	1	-0.0840	0.0127	-0.1090	-0.0590	43.50	<.0001
prof	1	-0.0714	0.0119	-0.0947	-0.0482	36.16	<.0001
secondary_school	1	0.0132	0.0087	-0.0038	0.0301	2.31	0.1287
totlfr_radius	1	0.2106	0.0635	0.0863	0.3350	11.02	0.0009
wage_index	1	0.2064	0.0570	0.0948	0.3180	13.13	0.0003
utilities	1	0.0193	0.0147	-0.0095	0.0481	1.73	0.1885
hdd	1	0.0000	0.0000	-0.0000	0.0000	0.95	0.3288
hdd2	1	-0.0000	0.0000	-0.0000	0.0000	0.85	0.3578
cdd	1	-0.0005	0.0004	-0.0013	0.0003	1.40	0.2370
minDistanceCC	1	0.0001	0.0000	0.0000	0.0001	8.18	0.0042
lowrain	1	0.0007	0.0130	-0.0247	0.0261	0.00	0.9563
water_radius	1	0.0100	0.0094	-0.0084	0.0284	1.13	0.2875
member_lea_1000	1	-0.0625	0.0378	-0.1366	0.0116	2.73	0.0982
member_lea_2500	1	-0.0771	0.0362	-0.1479	-0.0062	4.54	0.0330
member_lea_10000	1	-0.0822	0.0379	-0.1566	-0.0079	4.70	0.0302
member_lea_250	1	-0.1004	0.0358	-0.1706	-0.0301	7.85	0.0051
AKNative	1	0.0567	0.0211	0.0154	0.0980	7.24	0.0071
Asian	1	-0.1583	0.0545	-0.2652	-0.0514	8.42	0.0037
Black	1	0.0024	0.0627	-0.1206	0.1253	0.00	0.9697
Hispanic	1	-0.1408	0.0943	-0.3257	0.0441	2.23	0.1355

Exhibit D1-b. Final Econometric Model for Explaining the Patterns of Compensation for Full-Time Teachers

The REG Procedure
Model: MODEL1
Dependent Variable: lsalben

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	41	198.77919	4.84827	450.24	<.0001
Error	6076	65.42752	0.01077		
Corrected Total	6117	264.20670			

Root MSE	0.10377	R-Square	0.7524
Dependent Mean	10.75471	Adj R-Sq	0.7507
Coeff Var	0.96488		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	10.20922	0.05590	182.64	<.0001
adjexp	1	0.03961	0.00197	20.15	<.0001
adjexp2	1	-0.00070202	0.00023621	-2.97	0.0030
adjexp3	1	-0.00001535	0.00001040	-1.48	0.1399
adjexp4	1	3.261337E-7	1.482422E-7	2.20	0.0278
newjob	1	-0.01926	0.00449	-4.29	<.0001
female	1	0.00203	0.00303	0.67	0.5034
age1	1	0.00359	0.00017620	20.40	<.0001
age_missing	1	0.15539	0.01882	8.25	<.0001
degree1	1	-0.11023	0.03959	-2.78	0.0054
degree3	1	0.05555	0.00376	14.76	<.0001
degree4	1	0.09734	0.07405	1.31	0.1887
degree5	1	0.12567	0.03013	4.17	<.0001
ethnic_black	1	-0.00466	0.01085	-0.43	0.6679
ethnic_hisp	1	-0.04236	0.01112	-3.81	0.0001
ethnic_asian	1	-0.01910	0.01042	-1.83	0.0668
ethnic_indian	1	-0.00443	0.01528	-0.29	0.7720
ethnic_nativeAK	1	-0.04410	0.00653	-6.75	<.0001
assign_elem	1	0.00566	0.00382	1.48	0.1390
assign_mathsci	1	0.00645	0.00605	1.07	0.2867
assign_multgrade	1	-0.01482	0.00363	-4.08	<.0001
assign_se	1	0.01004	0.00493	2.04	0.0418
assign_004	1	-0.01684	0.01552	-1.09	0.2779
headtchr	1	0.11578	0.01342	8.63	<.0001
secondary_school	1	0.00838	0.00394	2.13	0.0333
totlfr_radius	1	0.07236	0.02777	2.61	0.0092
wage_index	1	0.11904	0.02117	5.62	<.0001
utilities	1	-0.01607	0.00610	-2.64	0.0084
hdd	1	-0.00001460	0.00000739	-1.97	0.0484
hdd2	1	5.6724E-10	2.7944E-10	2.03	0.0424
cdd	1	0.00188	0.00018	10.12	<.0001
minDistanceCC	1	0.00009835	0.00000947	10.39	<.0001
lowrain	1	-0.03616	0.00678	-5.34	<.0001
water_radius	1	-0.01627	0.00408	-3.99	<.0001
member_lea_1000	1	0.07546	0.01151	6.56	<.0001
member_lea_2500	1	0.06851	0.01140	6.01	<.0001
member_lea_10000	1	0.08661	0.01266	6.84	<.0001
member_lea_250	1	0.05949	0.01119	5.32	<.0001
AKNative	1	0.07309	0.00872	8.38	<.0001
Asian	1	0.07588	0.02416	3.14	0.0017
Black	1	-0.06900	0.03324	-2.08	0.0380
Hispanic	1	-0.01548	0.04912	-0.32	0.7526

Exhibit D1-c. Final Econometric Model for Explaining the Patterns of Compensation for Classified Personnel

The REG Procedure
Model: MODEL1
Dependent Variable: lsa1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	29	174.68213	6.02352	203.94	<.0001
Error	5798	171.24507	0.02954		
Corrected Total	5827	345.92720			

Root MSE	0.17186	R-Square	0.5050
Dependent Mean	2.70680	Adj R-Sq	0.5025
Coeff Var	6.34913		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	2.04715	0.08061	25.39	<.0001
YrsDist	1	0.03549	0.00105	33.90	<.0001
YrsDist2	1	-0.00077121	0.00004160	-18.54	<.0001
female	1	-0.04651	0.00557	-8.35	<.0001
age1	1	0.00150	0.00025307	5.94	<.0001
age_missing	1	0.07201	0.01702	4.23	<.0001
ethnic_black	1	0.00545	0.01213	0.45	0.6529
ethnic_hisp	1	-0.02306	0.01302	-1.77	0.0766
ethnic_asian	1	-0.04193	0.01011	-4.15	<.0001
ethnic_indian	1	-0.00034938	0.03328	-0.01	0.9916
ethnic_nativeAK	1	-0.03636	0.00882	-4.12	<.0001
computer_tech	1	0.15191	0.02723	5.58	<.0001
supervisor	1	0.36133	0.02830	12.77	<.0001
clerical	1	0.03382	0.00767	4.41	<.0001
ed_aide	1	-0.02360	0.00520	-4.54	<.0001
totlfpr_radius	1	0.09289	0.03604	2.58	0.0100
wage_index	1	0.23167	0.02726	8.50	<.0001
utilities	1	0.01002	0.00755	1.33	0.1845
hdd	1	-9.0039E-7	0.00001066	-0.08	0.9327
hdd2	1	7.05444E-10	3.99757E-10	1.76	0.0777
minDistanceCC	1	0.00013954	0.00001319	10.58	<.0001
lowrain	1	0.00392	0.01132	0.35	0.7291
water_radius	1	-0.01802	0.00602	-2.99	0.0028
member_lea_1000	1	0.02416	0.00947	2.55	0.0108
member_lea_2500	1	0.10758	0.00785	13.70	<.0001
member_lea_10000	1	0.03760	0.01262	2.98	0.0029
AKNative	1	0.08075	0.01557	5.19	<.0001
Asian	1	-0.09344	0.04261	-2.19	0.0283
Black	1	0.04845	0.05942	0.82	0.4149
Hispanic	1	0.00743	0.08426	0.09	0.9297

Appendix D2.

Alternative Estimating Equations for School Personnel

Exhibit D2-a. Administrators and Professional Staff: the Salary and Benefits Model

The REG Procedure
Model: MODEL1
Dependent Variable: lsalben

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	46	55.25048	1.20110	78.57	<.0001
Error	990	15.13450	0.01529		
Corrected Total	1036	70.38498			

Root MSE	0.12364	R-Square	0.7850
Dependent Mean	10.94831	Adj R-Sq	0.7750
Coeff Var	1.12933		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	10.18317	0.17910	56.86	<.0001
percent_teaching	1	0.00005879	0.00047198	0.12	0.9009
adjexp	1	0.03274	0.00648	5.06	<.0001
adjexp2	1	-0.00088241	0.00096054	-0.92	0.3585
adjexp3	1	-0.00000674	0.00005090	-0.13	0.8947
adjexp4	1	3.247347E-7	8.71209E-7	0.37	0.7094
newjob	1	-0.02233	0.01084	-2.06	0.0396
female	1	-0.03170	0.00969	-3.27	0.0011
age1	1	0.00343	0.00053109	6.45	<.0001
age_missing	1	0.10388	0.05846	1.78	0.0759
degree3	1	0.04454	0.01157	3.85	0.0001
degree4	1	0.07724	0.07310	1.06	0.2909
degree5	1	0.07501	0.03429	2.19	0.0289
ethnic_black	1	-0.00972	0.02309	-0.42	0.6739
ethnic_hisp	1	-0.01121	0.02762	-0.41	0.6850
ethnic_asian	1	-0.02282	0.03637	-0.63	0.5305
ethnic_indian	1	-0.04977	0.03717	-1.34	0.1809
ethnic_nativeAK	1	0.05248	0.02786	1.88	0.0599
assign_elem	1	-0.00574	0.01369	-0.42	0.6751
assign_mathsci	1	0.02951	0.03561	0.83	0.4075
assign_multgrade	1	0.01596	0.01940	0.82	0.4108
assign_se	1	0.11768	0.02247	5.24	<.0001
assign_004	1	-0.07090	0.06553	-1.08	0.2795
headtchr	1	0.00541	0.04435	0.12	0.9029
principal	1	0.37206	0.01623	22.93	<.0001
asst_principal	1	0.36020	0.01989	18.11	<.0001
counselor	1	0.01927	0.01676	1.15	0.2506
librarian	1	0.02399	0.01773	1.35	0.1762
prof	1	-0.00368	0.01643	-0.22	0.8227
secondary_school	1	0.01811	0.01055	1.72	0.0863
totlfr_radius	1	0.15159	0.08681	1.75	0.0811
wage_index	1	0.04946	0.07128	0.69	0.4880
utilities	1	0.00644	0.01942	0.33	0.7402
hdd	1	0.00000450	0.00002221	0.20	0.8393
hdd2	1	-1.9546E-11	8.53375E-10	-0.02	0.9817
cdd	1	-0.00127	0.00052143	-2.44	0.0147
minDistanceCC	1	0.00005793	0.00002962	1.96	0.0507
lowrain	1	-0.00261	0.02012	-0.13	0.8967
water_radius	1	0.02496	0.01445	1.73	0.0844
member_lea_1000	1	0.07868	0.04378	1.80	0.0726
member_lea_2500	1	0.03880	0.04404	0.88	0.3785
member_lea_10000	1	0.06854	0.04822	1.42	0.1555
member_lea_250	1	0.03587	0.04179	0.86	0.3910
AKNative	1	0.03740	0.02808	1.33	0.1833
Asian	1	-0.02420	0.06812	-0.36	0.7225
Black	1	-0.04890	0.09138	-0.54	0.5927
Hispanic	1	-0.15070	0.13004	-1.16	0.2468

Exhibit D2-b. Full-Time Teachers: the Turnover-Adjusted Model

The LIFEREG Procedure

Model Information

Data Set	WORK.TCHR
Dependent Variable	lsal
Dependent Variable	cens
Number of Observations	17011
Noncensored Values	14723
Right Censored Values	2288
Left Censored Values	0
Interval Censored Values	0
Missing Values	5049
Name of Distribution	Normal
Log Likelihood	9284.8514448

Analysis of Parameter Estimates

Parameter	DF	Estimate	Standard Error	95% Confidence Limits		Chi-Square	Pr > ChiSq
Intercept	1	10.1651	0.0388	10.0890	10.2412	68511.7	<.0001
fy2000	1	-0.0178	0.0023	-0.0224	-0.0133	59.04	<.0001
fy2001	1	0.0154	0.0026	0.0104	0.0205	36.20	<.0001
adjexp	1	0.0437	0.0014	0.0411	0.0463	1045.78	<.0001
adjexp2	1	-0.0010	0.0002	-0.0014	-0.0006	25.90	<.0001
adjexp3	1	-0.0000	0.0000	-0.0000	0.0000	1.87	0.1714
adjexp4	1	0.0000	0.0000	0.0000	0.0000	7.62	0.0058
female	1	0.0025	0.0021	-0.0016	0.0066	1.45	0.2293
age1	1	0.0045	0.0001	0.0043	0.0048	1248.04	<.0001
age_missing	1	0.1726	0.0320	0.1098	0.2353	29.03	<.0001
degree1	1	-0.1737	0.0259	-0.2244	-0.1230	45.13	<.0001
degree3	1	0.0631	0.0027	0.0578	0.0683	556.39	<.0001
degree4	1	0.0871	0.0467	-0.0045	0.1787	3.48	0.0623
degree5	1	0.1317	0.0215	0.0895	0.1739	37.38	<.0001
ethnic_black	1	-0.0047	0.0072	-0.0188	0.0094	0.43	0.5143
ethnic_hisp	1	-0.0209	0.0078	-0.0361	-0.0057	7.27	0.0070
ethnic_asian	1	-0.0093	0.0070	-0.0231	0.0044	1.78	0.1825
ethnic_indian	1	-0.0040	0.0098	-0.0232	0.0152	0.17	0.6823
ethnic_nativeAK	1	-0.0442	0.0045	-0.0531	-0.0354	96.06	<.0001
assign_elem	1	-0.0059	0.0025	-0.0108	-0.0010	5.48	0.0192
assign_mathsci	1	0.0054	0.0044	-0.0032	0.0140	1.52	0.2171
assign_multgrade	1	-0.0176	0.0024	-0.0223	-0.0129	54.21	<.0001
assign_se	1	0.0130	0.0032	0.0067	0.0192	16.63	<.0001
assign_004	1	-0.0378	0.0103	-0.0580	-0.0177	13.50	0.0002
headtchr	1	0.1076	0.0098	0.0884	0.1269	120.43	<.0001
secondary_school	1	0.0022	0.0031	-0.0038	0.0082	0.53	0.4665
totlfpr_radius	1	0.0819	0.0192	0.0443	0.1195	18.19	<.0001
wage_index	1	0.1443	0.0148	0.1153	0.1732	95.36	<.0001
utilities	1	-0.0129	0.0044	-0.0215	-0.0043	8.63	0.0033
hdd	1	-0.0000	0.0000	-0.0000	-0.0000	17.19	<.0001
hdd2	1	0.0000	0.0000	0.0000	0.0000	18.63	<.0001
cdd	1	0.0013	0.0001	0.0011	0.0016	100.14	<.0001
minDistanceCC	1	0.0001	0.0000	0.0001	0.0001	245.85	<.0001
lowrain	1	-0.0102	0.0043	-0.0187	-0.0017	5.53	0.0187
water_radius	1	-0.0210	0.0028	-0.0265	-0.0154	54.99	<.0001
member_lea_1000	1	0.0381	0.0091	0.0203	0.0559	17.56	<.0001
member_lea_2500	1	0.0634	0.0086	0.0465	0.0803	54.07	<.0001
member_lea_10000	1	0.0469	0.0094	0.0284	0.0653	24.82	<.0001
member_lea_250	1	0.0435	0.0087	0.0266	0.0605	25.28	<.0001
AKNative	1	0.0696	0.0061	0.0577	0.0815	130.64	<.0001
Asian	1	0.1370	0.0178	0.1021	0.1719	59.11	<.0001
Black	1	-0.1283	0.0233	-0.1739	-0.0827	30.41	<.0001
Hispanic	1	-0.0350	0.0377	-0.1089	0.0390	0.86	0.3541

Exhibit D2-c. Full-Time Teachers: the Salary Model

The REG Procedure
Model: MODEL1
Dependent Variable: lsa1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	43	622.89251	14.48587	1184.98	<.0001
Error	17547	214.50434	0.01222		
Corrected Total	17590	837.39685			

Root MSE	0.11056	R-Square	0.7438
Dependent Mean	10.72926	Adj R-Sq	0.7432
Coeff Var	1.03050		

Parameter Estimates

variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	10.13937	0.03434	295.23	<.0001
fy2001	1	0.03014	0.00221	13.67	<.0001
fy2002	1	0.04416	0.00209	21.12	<.0001
adjexp	1	0.04312	0.00127	33.97	<.0001
adjexp2	1	-0.00096498	0.00016197	-5.96	<.0001
adjexp3	1	-0.00001025	0.00000753	-1.36	0.1731
adjexp4	1	3.27428E-7	1.13326E-7	2.89	0.0039
newjob	1	-0.01993	0.00278	-7.16	<.0001
female	1	0.00271	0.00190	1.42	0.1545
age1	1	0.00397	0.00011286	35.21	<.0001
age_missing	1	0.16272	0.01638	9.93	<.0001
degree1	1	-0.18599	0.02294	-8.11	<.0001
degree3	1	0.05768	0.00238	24.22	<.0001
degree4	1	0.08579	0.04194	2.05	0.0408
degree5	1	0.11074	0.01804	6.14	<.0001
ethnic_black	1	-0.00430	0.00668	-0.64	0.5203
ethnic_hisp	1	-0.02847	0.00697	-4.09	<.0001
ethnic_asian	1	-0.01107	0.00648	-1.71	0.0877
ethnic_indian	1	-0.00736	0.00923	-0.80	0.4252
ethnic_nativeAK	1	-0.03643	0.00406	-8.97	<.0001
assign_elem	1	0.00171	0.00222	0.77	0.4410
assign_mathsci	1	0.00784	0.00391	2.01	0.0447
assign_multgrade	1	-0.01910	0.00218	-8.75	<.0001
assign_se	1	0.00918	0.00305	3.01	0.0026
assign_004	1	-0.03368	0.00940	-3.58	0.0003
headtchr	1	0.09019	0.00833	10.82	<.0001
secondary_school	1	0.00534	0.00272	1.96	0.0498
totlfr_radius	1	0.09345	0.01695	5.51	<.0001
wage_index	1	0.12976	0.01307	9.93	<.0001
utilities	1	-0.01141	0.00385	-2.96	0.0031
hdd	1	-0.00001966	0.00000449	-4.38	<.0001
hdd2	1	7.92115E-10	1.74218E-10	4.55	<.0001
cdd	1	0.00172	0.00011632	14.75	<.0001
mindistanceCC	1	0.00010924	0.00000592	18.47	<.0001
lowrain	1	-0.02297	0.00404	-5.69	<.0001
water_radius	1	-0.01678	0.00253	-6.64	<.0001
member_lea_1000	1	0.06483	0.00760	8.53	<.0001
member_lea_2500	1	0.07364	0.00729	10.10	<.0001
member_lea_10000	1	0.07755	0.00801	9.68	<.0001
member_lea_250	1	0.05326	0.00727	7.32	<.0001
AKNative	1	0.06117	0.00531	11.51	<.0001
Asian	1	0.11211	0.01560	7.19	<.0001
Black	1	-0.11687	0.02110	-5.54	<.0001
Hispanic	1	-0.02361	0.03293	-0.72	0.4735

Appendix E.

Index Values of Salary Models, and Correlations between Final and Alternative Equations

Exhibit E-1. Index Values of Salary Models

	district_ID	PRIMARY			ALTERNATIVE		
		Admin Tobit	Teacher Regression: Salary & Benefits	Classified Regression: Wage	Teacher Regression: Salary	Teacher Tobit	Admin Regression: Salary & Benefits
		admintobit	tchrben	class02	tchr02	tchrtobit	adminben
Denali Borough	2	0.97	1.00	1.01	1.01	1.03	0.94
Alaska Gateway	3	0.97	1.05	1.09	1.05	1.09	0.96
Aleutian Region	4	1.25	1.17	1.23	1.18	1.22	1.04
Anchorage	5	1.00	1.00	1.00	1.00	1.00	1.00
Annette Island	6	0.95	1.08	0.93	1.06	1.07	0.94
Bering Strait	7	1.05	1.11	1.19	1.11	1.13	1.07
Bristol Bay Borough	8	1.01	1.03	1.03	1.03	1.06	0.99
Chatham Region	9	1.05	0.95	0.92	0.94	0.96	0.93
Chugach	10	1.11	0.96	0.98	0.96	0.99	0.95
Copper River	11	0.99	0.99	1.05	1.00	1.03	0.98
Cordova City	12	0.99	1.04	0.96	1.04	1.05	0.99
Craig City	13	0.95	1.02	0.90	1.01	1.02	0.96
Delta Greely	14	0.94	1.00	0.98	1.00	1.00	0.95
Dillingham City	15	1.02	1.08	1.05	1.07	1.09	1.01
Fairbanks North Star Borough	16	0.97	1.06	1.04	1.06	1.05	0.94
Galena City	17	0.97	1.04	1.14	1.06	1.06	0.96
Haines Borough	18	0.94	0.99	0.90	0.98	0.98	0.97
Hoonah City	19	1.06	0.95	0.93	0.94	0.96	0.95
Hydaburg City	20	1.00	1.02	0.91	1.00	1.03	0.88
Iditarod Area	21	0.93	1.01	0.98	1.00	1.03	0.95
Juneau Borough	22	0.99	1.01	1.02	1.02	1.03	0.98
Kake City	23	1.09	0.97	0.93	0.96	0.99	0.96
Kenai Peninsula Borough	24	0.97	0.96	1.03	0.97	0.99	0.97
Ketchikan Gateway Borough	25	0.99	1.04	0.92	1.03	1.02	1.00
Klawock City	27	1.05	0.97	0.91	0.97	0.98	0.93
Kodiak Island Borough	28	0.97	1.03	1.03	1.04	1.06	0.98
Kuspuk	29	0.99	1.06	1.07	1.05	1.08	1.01
Lake And Peninsula	30	0.96	1.04	0.99	1.03	1.05	0.97
Lower Kuskokwim	31	1.04	1.07	1.23	1.08	1.12	1.03
Lower Yukon	32	1.02	1.09	1.13	1.08	1.09	1.06
Matanuska-Susitna Borough	33	0.96	0.98	0.96	0.98	0.98	0.97
Nenana City	34	0.93	0.99	0.98	0.98	0.98	0.95
Nome City	35	1.03	1.05	1.12	1.05	1.08	1.05
North Slope Borough	36	1.17	1.18	1.48	1.21	1.24	1.14
Northwest Arctic	37	1.07	1.14	1.24	1.14	1.16	1.06
Pelican City	38	1.03	0.95	0.90	0.94	0.96	0.93
Petersburg City	39	0.94	1.01	0.91	1.00	1.02	0.95
Pribilof Island	40	1.25	1.13	1.22	1.13	1.16	1.05
Sitka Borough	42	1.00	1.02	0.93	1.01	1.01	1.02
Skagway City	43	1.04	0.95	0.90	0.95	0.96	0.91
Southeast Island	44	1.01	0.94	0.87	0.94	0.95	0.90
Southwest Region	45	0.97	1.06	1.03	1.05	1.07	0.98
Saint Marys City	46	1.12	1.01	1.09	1.01	1.05	1.01
Unalaska City	47	1.05	1.14	1.08	1.15	1.17	1.05
Valdez City	48	1.01	1.02	0.98	1.01	1.02	1.00
Wrangell City	49	0.94	1.01	0.89	1.00	1.01	0.95
Yakutat City	50	1.09	0.97	0.97	0.97	1.00	0.97
Yukon Flats	51	0.93	1.03	1.06	1.02	1.06	0.97
Yukon Koyukuk	52	0.94	1.10	1.06	1.09	1.11	0.95
Tanana City	53	1.04	1.00	1.03	0.99	1.02	0.93
Yupit	54	0.98	1.06	1.08	1.05	1.09	0.99
Kashunamiut	55	1.02	1.08	1.14	1.08	1.12	1.03
Aleutians East Borough	56	1.10	1.14	1.12	1.13	1.15	1.05

Exhibit E-2. Correlations Between Final and Alternative Equations

Pearson Correlation Coefficients, N = 55²⁶
 Prob > |r| under H0: Rho=0

Correlation Between Primary Model and 2 Alternative Models for Teachers

	Teacher Regression: Salary	Teacher Tobit
Teacher Regression: Salary & Benefits	0.98881 <.0001	0.96753 <.0001

Correlation Between 2 Alternative Teacher Salary Models

	Teacher Tobit
Teacher Regression: Salary	0.98227 <.0001

Correlation Between Primary Model and Alternative Model for Administrators

	Admin Regression: Salary & Benefits
Admin Tobit	0.47594 .0002

²⁶ The 55 districts include the 53 districts in the study and the Alyeska and Mt. Edgecumbe school districts. In the study, the Alyeska school district receives the Anchorage index value, and the Mt. Edgecumbe school district receives the Sitka index value.

Appendix F.

Energy Prototypes

This appendix contains the basic characteristics that were used in developing the DOE2 prototype models for the Urban Cold Climate region of Alaska. The prototypes were primarily derived from plans and characteristics provided by the Anchorage School District. One model was derived from plans of West High School, which has characteristics and total fuel consumption typical of Anchorage high schools. The other model was based on plans of North Star Elementary School, which was determined to be typical of Anchorage elementary and middle schools.

West High School (Urban, Cold Climate, High School Prototype)

The West High School envelope characteristics obtained from construction plans are summarized in Table 1. These include area summaries by use zone for floor, gross wall, roof and window surfaces. It also includes the summary of exterior perimeter footing length and maps the observed use zones in to the zones utilized in the hourly computer model. The envelope area data was then scaled to a 100,000 square foot building model with seven thermal zones. Table 2 provides the summary of the floor and envelope areas scaled to the hourly model.

Additional envelope characteristics obtained from the plans are as follows:

- Wall insulation is R19 with metal stud framing.
- Roof insulation is R38 on flat roof.
- Windows are double pane with thermally broken aluminum frames.

Table 3 provides a summary of the lighting and miscellaneous equipment power densities used in the model. The lighting power densities were calculated from data obtained from the lighting plans of West High School. The equipment power densities were obtained from school prototype models based on previous work completed for the Pacific Northwest Region. These models utilized end-use metered data with extensive audit data to determine equipment power densities and consumption.

The HVAC systems include variable air volume air handlers serving the classroom zones with constant volume air handles serving other areas. There is a central plant with boilers that provide hot water for space heating, domestic water heating and swimming pool heating.

Tables 4 and 5 summarize the operational characteristics of the prototype for the regular school term and the summer school term, respectively. The operating hours are summarized by zone for lighting, miscellaneous equipment, occupants and HVAC occupied settings. The operating hours were obtained from the Operational Characteristics surveys completed by committee members representing eight school districts across the state. There were relatively small differences in operating hours reported in the surveys.

North Star Elementary School (Urban, Cold Climate, Elementary School Prototype)

The North Star Elementary School envelope characteristics obtained from construction plans are summarized in Table 6. These include area summaries by use zone for floor, gross wall, roof and window surfaces. It also includes the summary of exterior perimeter footing length and maps the observed use zones in to the zones utilized in the hourly computer model. The envelope area data was then scaled to a 100,000 square foot building model with six thermal zones. Table 7 provides the summary of the floor and envelope areas scaled to the hourly model.

Additional envelope characteristics obtained from the plans are as follows:

- Wall insulation is R15 with metal stud framing.
- Roof insulation is R38 on flat roof.
- Windows are double pane with thermally broken aluminum frames.

Table 8 provides a summary of the lighting and miscellaneous equipment power densities used in the model. The lighting power densities were calculated from data obtained from the lighting plans of North Star Elementary School. The equipment power densities were obtained from school prototype models based on previous work completed for the Pacific Northwest Region. These models utilized end-use metered data with extensive audit data to determine equipment power densities and consumption.

The HVAC systems include variable air volume air handlers serving the classroom and office zones with constant volume air handles serving other areas. Radiant baseboard heat supplements in the perimeter areas of the classroom and office spaces. There is a central plant with boilers that provide hot water for space heating and domestic water heating.

Tables 9 and 10 summarize the operational characteristics of the prototype for the regular school term and the summer school term, respectively. The operating hours are summarized by zone for lighting, miscellaneous equipment, occupants and HVAC occupied settings. The operating hours were obtained from the Operational Characteristics surveys completed by committee members representing eight school districts across the state. There were relatively small differences in operating hours reported in the surveys.

Table 1: West High School Building Envelope Areas

Use Zone:	Floor Area, sq. ft.	Floor Area, percent	Model Zone Name	Wall Area, sq. ft.	Roof Area, sq. ft.	Perimeter Length, ft.	Window Area, sq. ft.
Classroom	109,566	35.5%	Class	48,639	91,386	3,253	6,520
Office/admin	19,932	6.5%	Office	5,479	19,644	403	564
Gym/auditorium	26,912	8.7%	Auditorium	7,942	17,760	94	0
kitchen	2,720	0.9%	Kitchen	0	2,720	0	0
dining	10,920	3.5%	Auditorium	7,254	10,920	348	148
library	13,088	4.2%	Office	2,164	13,088	148	0
hall/corridor	53,444	17.3%	Hall	1,260	48,804	880	992
locker room/bathroom	13,789	4.5%	Hall	5,087	12,924	329	200
mechanical/electrical	13,018	4.2%	Storage	7,784	5,506	208	0
swimming pool	10,368	3.4%	Pool	8,200	10,368	192	32
Storage	15,204	4.9%	Storage	4,724	13,448	308	56
Theatre	20,048	6.5%	Auditorium	13,800	10,448	320	0
Total	309,009	100%		112,333	257,016	6,483	8,512

Table 2: High School Building Envelope Areas Scaled to Prototype Model

Model Zone	Floor Area, %	Floor Area, sq. ft.	Exterior Wall Area, sq. ft.	Roof Area, sq. ft.	Perimeter Length, ft.	Window Area, sq. ft.
Class	35%	35,000	15,740	29,574	1,053	2,110
Kitchen	1%	1,000	-	880	-	-
Auditorium	19%	19,000	9,384	12,662	247	48
Hall	22%	22,000	2,054	19,976	391	386
Pool	3%	3,000	2,654	3,355	62	10
Storage	9%	9,000	4,048	6,134	167	18
Total	100%	100,000	36,353	83,174	2,098	2,755

Table 3: High School Model Lighting and Equipment Power Densities

Model Zone	Lighting Watts per sq. ft.	Equipment Watts per sq. ft.
Class	1.94	1.0
Kitchen	1.30	35.0
Auditorium	1.20	1.0
Hall	0.63	1.0
Pool	1.80	1.0
Storage	0.66	1.0

Table 4: High School Operating Hours for Regular School Term

Model Zone	lights	Equipment	People	HVAC
Class	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16
Office	hrs 8-17	hrs 8-17	hrs 8-17	hrs 8-17
Kitchen	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16
Auditorium	hrs 8-22	hrs 8-22	hrs 8-22	hrs 8-22
Hall	hrs 8-22	hrs 8-22	hrs 8-22	hrs 8-16
Pool	hrs 8-22	hrs 8-22	hrs 8-22	hrs 8-22
Storage	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16

Heating setpoint occupied: 71F; unoccupied: 71F

Table 5: High School Operating Hours for Summer School Term

Model Zone	lights	Equipment	People	HVAC
Class	hrs 8-12	hrs 8-12	hrs 8-12	hrs 8-12
Office	hrs 8-17	hrs 8-17	hrs 8-17	hrs 8-17
Kitchen	none	none	none	none
Auditorium	hrs 8-17	hrs 8-17	hrs 8-17	hrs 8-17
Hall	hrs 8-12	hrs 8-12	hrs 8-12	hrs 8-12
Pool	hrs 8-17	hrs 8-17	hrs 8-17	hrs 8-17
Storage	hrs 8-12	hrs 8-12	hrs 8-12	hrs 8-12

Heating setpoint occupied: 71F; unoccupied: 71F

Table 6: North Star Elementary School Building Envelope Areas

Use Zone:	Floor Area, sq. ft.	Floor Area, percent	Model Zone Name	Wall Area, sq. ft.	Roof Area, sq. ft.	Perimeter Length, ft.	Window Area, sq. ft.
Classroom	34,720	47.0%	Class	15,873	38,220	1,221	2,358
Office/admin	3,628	4.9%	Office	2,808	4,000	216	384
Gym/auditorium	6,776	9.2%	Auditorium	1,846	6,776	0	0
kitchen	1,512	2.0%	Kitchen	650	1,700	50	0
dining	4,488	6.1%	Auditorium	998	4,488	24	0
library	2,480	3.4%	Office	2,522	2,500	158	216
hall/corridor	12,168	16.5%	Hall	1,495	13,500	10	0
locker room/bathroom	2,592	3.5%	Hall	0	2,900	0	0
mechanical/electrical	2,794	3.8%	Storage	390	3,000	30	0
swimming pool		0.0%		0	0	0	0
Storage	2,636	3.6%	Storage	806	2,900	62	0
Theatre	0	0.0%		0	0	0	0
Total	73,794	100%		27,388	79,984	1,771	2,958

Table 7: Elementary School Building Envelope Areas Scaled to Prototype Model

Model Zone	Floor Area, %	Floor Area, sq. ft.	Exterior Wall Area, sq. ft.	Roof Area, sq. ft.	Perimeter Length, ft.	Window Area, sq. ft.
Class	47%	47,000	21,510	51,793	1,655	3,195
Office	8%	8,000	7,223	8,808	507	813
Kitchen	2%	2,000	881	2,304	68	-
Auditorium	15%	15,000	3,854	15,264	33	-
Hall	20%	20,000	2,026	22,224	14	-
Pool	0%	-	-	-	-	-
Storage	8%	8,000	1,621	7,995	125	-
Total	100%	100,000	37,114	108,388	2,400	4,008

Table 8: Elementary School Model Lighting and Equipment Power Densities

Model Zone	Lighting Watts per sq. ft.	Equipment Watts per sq. ft.
Class	1.61	1.0
Office	1.42	2.7
Kitchen	1.30	35.0
Auditorium	1.95	1.0
Hall	0.46	1.0
Pool	0.00	1.0
Storage	0.66	1.0

Table 9: Elementary School Operating Hours for Regular School Term

Model Zone	lights	Equipment	People	HVAC
Class	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16
Office	hrs 8-17	hrs 8-17	hrs 8-17	hrs 8-17
Kitchen	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16
Auditorium	hrs 8-22	hrs 8-22	hrs 8-22	hrs 8-21
Hall	hrs 8-22	hrs 8-22	hrs 8-22	hrs 8-16
Pool	n/a	n/a	n/a	n/a
Storage	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16

Heating setpoint occupied: 72F; unoccupied: 72F

Table 10: Elementary School Operating Hours for Summer School Term

Model Zone	lights	Equipment	People	HVAC
Class	hrs 8-12	hrs 8-12	hrs 8-12	hrs 8-12
Office	hrs 8-17	hrs 8-17	hrs 8-17	hrs 8-17
Kitchen	none	none	none	none
Auditorium	hrs 8-16	hrs 8-16	hrs 8-16	hrs 8-16
Hall	hrs 8-12	hrs 8-12	hrs 8-12	hrs 8-12
Pool	n/a	n/a	n/a	n/a
Storage	hrs 8-12	hrs 8-12	hrs 8-12	hrs 8-12

Heating setpoint occupied: 72F; unoccupied: 72F

Appendix G.

Detailed Analysis Of The Cost Of Goods

Chapter V discusses the approach to creating and the analysis of the various non-personnel indices. Here, we look at an example of how one would apply an equation used to calculate one of those indices. The example is of the index for any good. The general equation is the first equation found below. All calculations were made at the school level and then aggregated to the district level by pupil enrollment weights. The index for each good is calculated by taking the pupil-weighted values of each school, considering the proper proportion of times each method is used to ship the goods. In this discussion, "total cost" is the cost of the item plus the cost of shipping. The district value is then divided by the value of the Anchorage School District. The equation for each good is found below, where the subscript "i" represents the district for which the index value is generated, and subscript "A" stands for the base Anchorage School District. Any good is represented by subscript "k" in school "j."

$$\text{Good Index}_{ik} = \frac{\sum (\text{school enrollment})_{ijk} \times \{[(\text{method \#1 total cost})_{ijk} \times (\% \#1)_{ijk}] + [(\text{method \#2 total cost})_{ijk} \times (\% \#2)_{ijk}]\}}{\sum (\text{school enrollment})_{ij}} \div \frac{\sum (\text{school enrollment})_{Aik} \times \{[(\text{method \#1 total cost})_{Aik} \times (\% \#1)_{Aik}] + [(\text{method \#2 total cost})_{Aik} \times (\% \#2)_{Aik}]\}}{\sum (\text{school enrollment})_{Aj}}$$

We now that this equation and use it in an example of how the equation is actually applied. First, we specify what the general terms, so that we can calculate the index value for the district in our example.

General term	Example
District <i>i</i>	District 57
School <i>j</i>	School 1 School 2 School 3
Good <i>k</i>	One case (10 reams) of white copier paper (8.5" by 11")

Next, look at the data for the district.

District #57

			One case (10 reams) of white copier paper (8.5" x 11")						
			Method #1 of purchasing item			Method #2 of purchasing item			
School ID	School Name	School Enrollment	Trans. Method code	Cost of one case	Cost of item plus shipping	Trans. Method code	Cost of item when bought using this method	Cost of item plus shipping	Percent of copier paper bought using this other method
570001	School 1	23	A_S	\$29.90	\$38.48	W	\$27.90	\$43.95	30%
570002	School 2	15	A_S	\$29.90	\$38.48	W	\$27.90	\$43.95	20%
570003	School 3	23	A_S	\$29.90	\$38.48	A_C	\$30.25	\$58.50	10%

To calculate the index for instructional and office supplies in district 57, let's look at one school at a time.

The general equation for each school in the district is:

$$\text{School}_{jk} = \{[(\text{method \#1 total cost})_{jk} \times (\% \#1)_{jk}] + [(\text{method \#2 total cost})_{jk} \times (\% \#2)_{jk}]\}$$

We start with School 1, and examine the data we are given for this school. School 1 uses two methods to get paper. Usually, the school receives paper via scheduled air delivery, which comes to a total cost of \$38.48 for the case of paper plus shipping. However, 30 percent of the time, School 1 must use a more costly method of obtaining paper. When School 1 ships via water, we see that the cost of the item is \$2 less, but the total cost of the item is \$43.95. School 1 uses this alternative method 30 percent of the time. The equation for the cost of paper at School 1 is:

$$\text{Average Cost of Paper for School 1} = \{[(\$38.48) \times (.70)] + [(\$43.95) \times (.30)]\} = \$40.12$$

As the data reveal, School 2 in District 57 has the same cost for shipping paper to it as School 1. However, School 2 ships paper via scheduled air 80 percent of the time. Therefore, our equation for the cost of paper at School 2 is:

$$\text{Average Cost of Paper for School 2} = \{[(\$38.48) \times (.80)] + [(\$43.95) \times (.20)]\} = \$39.57$$

School 3 has the same cost for method #1 as do the other two schools, but it utilizes this method 90 percent of the time. The alternative method for School 3 is via chartered air, which has a total cost of \$58.50. The average cost of School 3 is:

$$\text{Average Cost of Paper for School 3} = \{[(\$38.48) \times (.90)] + [(\$58.50) \times (.10)]\} = \$40.48$$

To aggregate these costs to the district level, we must consider how much each school consumes. The way we have chosen to do this is to weight the average cost at each school by the pupil enrollment. First, we sum the total enrollment of the three schools at District 57, which equal 61. Then, we weight the average cost of paper at each school by its enrollment divided by the district enrollment. This means that the average cost at School 1 is multiplied by 23/61 because it has 23 students. Since School 2 has only 15 students, the average cost of paper at this school is weighted by 15/61. School 3 also has 23 students, so its average cost receives the same weight as School 1.

$$\text{Average Cost of Paper for District 57} = \{[(\$40.12) \times (23/61)] + [(\$39.57) \times (15/61)] + [(\$40.48) \times (23/61)]\} = \$40.12$$

This is the same as saying we multiply the average cost of paper at each school by its enrollment, then sum together these totals and divide by the district enrollment

$$\text{Average Cost of Paper for District 57} = \frac{\{[(\$40.12) \times (23)] + [(\$39.57) \times (15)] + [(\$40.48) \times (23)]\}}{61} = \$40.12$$

Finally, divide the Average Cost in District 57 by the base district Anchorage to get the instructional and office supplies index value for District 57. The average cost of paper in Anchorage is \$21.44.

[note: the average cost of paper for Anchorage is calculated using the same method as hypothetical District 57]

$$\text{Instructional Supplies Index for District 57} = \frac{\$40.12}{\$21.44} = 1.87$$

The final index value for instructional and office supplies is 1.87 for District 57.

Appendix H.

Detailed Analysis Of The Cost Of Travel

The costs of non-personnel services, such as travel costs, are examined in Chapter V of the report. District-wide professional development would entail travel from each school site to the district office. To calculate the cost of such professional development, we developed a set of equations described below. Here, we use the example of hypothetical District 57. The general equation is the first equation found below. All calculations were made at the school level and then aggregated to the district level by weighting by the teacher full-time equivalents (FTE) at each school. The trip index considers whether or not the school is located in a remote area of the district. A school is termed "remote" if travel to the school site from the district office requires an overnight stay. Travel to remote schools is more costly due to required lodging and additional meals. The addition of a \$450 per diem calculated into the cost of lodging and meals. This per diem figure of \$450 was determined through a series of conversations with the TWG. The district value is then divided by the value of the Anchorage School District. The equation for this cost index is found below, where the subscript "i" represents the district for which the index value is generated, and subscript "A" stands for the base Anchorage School District. Any school "j" found within a district is denoted by the subscript "r" if it is a remote school, while non-remote schools contain the subscript "n."

$$\text{Trip Index}_i = \frac{\text{Trip Cost}_{ir} + \text{Trip Cost}_{in}}{\frac{\sum (\text{school FTE})_{Aj} \times (\text{roundtrip cost from school to d.o.})_{Aj}}{\sum (\text{school FTE})_{Aj}}}$$

where

$$\text{Trip Cost}_{ir} = \frac{\sum (\text{school FTE})_{ijr} \times (\text{roundtrip cost from school to d.o.})_{ijr} + (450)_{ijr}}{\sum (\text{school FTE})_{ij}}$$

and

$$\text{Trip Cost}_{in} = \frac{\sum (\text{school FTE})_{ijn} \times (\text{roundtrip cost from school to d.o.})_{ijn}}{\sum (\text{school FTE})_{ij}}$$

We now look at the general equation and use it in an example of how the equation is actually applied. First, we specify what the general terms, so that we can calculate the index value for the district in our example.

General term	Example
District <i>i</i>	District 57
Remote School <i>jr</i>	School 3
Non-remote Schools <i>jn</i>	School 1
	School 2

Next, look at the data for the district.

District #57						
			School to District Office Travel			
School ID	School Name	School FTE	Trans. Method code	One-way travel time (hh:mm)	Roundtrip cost	Overnight stay required
570001	School 1	3	A_S	2:00	\$939	N
570002	School 2	1	A_S	1:30	\$840	N
570003	School 3	2	A_C	5:00	\$1,210	Y

To calculate the index for travel between each school and the district office in district 57, let's look at one school at a time.

First, we must see if each school is a "remote" school or a "non-remote" school. By looking in the data column titled "Overnight stay required," we see that only School 3 is a remote school. Schools 1 and 2 are non-remote.

Therefore, the equation for School 3 must be that of a remote school, which adds the per diem of \$450.

$$\text{Cost of Travel from District Office to School 3} = \$1,210 + \$450 = \$1,660$$

Schools 1 and 2 do not require an overnight stay, so their equations follow the non-remote general form.

$$\text{Cost of Travel from District Office to School 1} = \$939$$

$$\text{Cost of Travel from District Office to School 2} = \$840$$

To aggregate these costs to the district level, we must consider how many trips are made from each school to the district office. The way we have chosen to do this is to weight the average cost at each school by the pupil enrollment. First, we sum the total enrollment of the three schools at District 57, which equal 61. Then, we weight the average cost of a trip from each school by its enrollment divided by the district enrollment. This means that the average cost of \$1,660 at School 1 is multiplied by 3/6 because it has 3 of the district's 6 FTEs. Since School 2 has only 1 FTE, the average cost of a trip from this school is weighted by 1/6. School 3 has 2 FTEs, so its average cost receives a weight of 2/6.

$$\text{Average Cost of Travel to D.O. for District 57} = \{[(\$1,660) \times (3/6)] + [(\$939) \times (1/6)] + [(\$840) \times (2/6)]\} = \$1,267$$

This is the same as saying we multiply the average cost of a trip from each school by its FTE, then sum together these totals and divide by the district FTE.

$$\text{Average Cost of Travel to D.O. for District 57} = \frac{\{[(\$1660) \times (2)] + [(\$939) \times (1)] + [(\$840) \times (3)]\}}{6} = \$1,267$$

Finally, divide the Average Cost in District 57 by the base district Anchorage to get the instructional and office supplies index value for District 57. The average cost of a trip from the district office to a school in Anchorage is \$6.50.

[note: the average cost of a trip from the district office to a school for Anchorage is calculated using the same method as that used for hypothetical District 57]

$$\text{Index for Travel between Schools and District Office for District 57} = \frac{\$1,267}{\$6.50} = 195$$

The final index value for travel between schools and the district office is 195 for District 57.

Appendix I. Calculation of the GCEI

Index Calculation and Formulas

Fixed-Market-Basket (FMB) Approach

Briefly, the FMB index approach makes the assumption that the public school district purchases the *same inputs* over time to produce educational services for the students enrolled. It makes use of data about the prices and quantities of these inputs (e.g., teachers and instructional aides). Exhibit I-A illustrates how a fixed-market-basket index may be constructed for a public school district. In this simple example, it is assumed that there are only two inputs utilized by this school district: namely, teachers and instructional aides. Obviously, a real public school district uses many inputs to produce educational services, and the GCEI presented in this report reflects these other inputs. However, for the purposes of illustration, this simple two-input model of a public school district may be used to demonstrate one of the problems that arises in the construction of price indexes. The problem is that the combinations of inputs (i.e., market-baskets) used to produce a given level of services or outputs are not fixed, and the estimated index of cost differences (whether geographic or inflationary) will depend upon which observation is chosen as a base for purposes of calculating the index.

Exhibit I-A shows the budget or expenditures of a two-input school under alternative assumptions for two different districts, A and B, designated in column 1. *[The reader should note that districts A and B can either be the same district at two points in time or different districts at a single point in time. The analysis and interpretation will be the same]* Columns 2 through 5 represent the prices (S, W) and quantities (T, A) of the two inputs -- teachers and aides -- purchased by districts A and B. The first six columns are relatively self-explanatory. In district A, district A paid annual wages amounting to \$31,000 per full-time-equivalent (FTE) teacher and employed 0.0500 FTE teachers per pupil (i.e., 1 teacher for every 20 students). In addition, district A paid an average price of \$15,000 per FTE instructional aide and employed 0.0125 FTE aides per pupil (i.e., 1 FTE aide for every 80 students). In district B, the annual wage of a full-time teacher is \$33,000 (10 percent higher than district A) and the district employed 0.0550 FTE teachers per pupil (i.e., 1 FTE teacher for every 18.2 pupils). FTE salaries for instructional aides are \$15,500 in district B (3.3 percent higher than in district A) and the district employed 0.02 FTE aides per pupil (i.e., 1 for every 50 students).

The total in column 6 is the actual per pupil budget of each district. Based on these figures, district A spends \$1,688 per pupil and district B spends \$2,125 or 25.93 percent more than district A. But how much of this increase in the budget was due to inflation in the prices of school inputs, and how much was due to increases in the quantities of school inputs purchased?

Exhibit I-A. Hypothetical Example of a Fixed-Market-Basket Public School District Price Index

District (1)	Average Annual Teacher Wage (2)	FTE Teachers per Pupil (3)	Average Annual Wage for Aides (4)	FTE Aides per Pupil (5)	Total Budget per Pupil (6)	Simulated Budgets Using Inputs From:		Alternative FMB, CEIs Using Inputs From:	
						District A (7)	District B (8)	District A (9)	District B (10)
A	\$30,000	0.0500	\$15,000	0.0125	\$1,688	\$1,688	\$1,950	100.00	91.76
B	\$33,000	0.0550	\$15,500	0.0200	\$2,125	\$1,844	\$2,125	109.26	100.00
Index: B/A	1.1000	1.1000	1.0333	1.6000	1.2593	1.0926	1.0897	1.0926	1.0897
% Diff.	10.00%	10.00%	3.33%	60.00%	25.93%	9.26%	8.97%	9.26%	8.97%

Columns 7 and 8 simulate the budget for these sample districts under alternative assumptions about the market basket of school inputs purchased. Column 7 simulates what the each district's budget would have been if it had purchased the same quantities of school inputs as district A. Column 8 simulates what the district budget would have been in each year if it had purchased the same quantities of school inputs as did district B.

Comparison of these simulated budgets using the fixed-market-baskets of inputs permits one to develop estimates of price inflation between the two years, since the only differences between the two budgets presented in each column are the differences in prices of the inputs. For example, using district A purchases of inputs as the base, one defines the *CEI* to be 100.00 for district A (the base district), and computes an index of 109.26 (the ratio of \$1,844 to \$1,688) for district B. Since the quantities of inputs are fixed, the only difference between these two simulated budgets are in the prices paid for the inputs. An estimate of inflation between the two years using year 1 as the base is calculated as follows:

$$\begin{aligned}\text{Estimate of price inflation} &= 100 \times (1,844 - 1,688)/1,688 \\ &= 9.26\%\end{aligned}$$

If districts A and B are simply the same district in two different years and A represents the first year of the series and B represents a subsequent year of the series, this representation of the *CEI* would be referred to as a *Laspeyre index* (which is defined as the index based purchases in the earliest year in the series of data).

The problem that arises becomes apparent when a different base district (or year) is selected to calculate the FMB index. If district B purchases of inputs are used as the base (see columns 8 and 10), the *CEI* for district A is 91.76 and the *CEI* for district B is 100.00. Once again, since the quantities of inputs are fixed, the only difference between these two simulated budgets are in the prices paid for the inputs. An estimate of inflation between the two districts using district B as the base is calculated as follows:

$$\begin{aligned}\text{Estimate of price inflation} &= 100 \times (\$2,125 - \$1,950) / \$1,950 \\ &= 8.97\%\end{aligned}$$

In both cases, the ratio is the difference, divided by district A's simulated budget. Again, if this comparison is of the same district at two points in time, the *CEI* calculated based on the later year's purchases of inputs (district B in this case) is commonly referred to by economists as a *Paasche index*.

Both of these indexes represent fixed-market-basket public school district price indexes. Each essentially represents a weighted average of the price inflation for the two school inputs where the weights are the quantities of inputs purchased. These weights simply measure the importance of each input in the overall budget for school services. It is no surprise that the two indexes result in different estimates of inflation because each uses a different set of weights. The *Laspeyre index*, which uses district A (i.e., year 1) budget shares, in this instance provides a higher estimate of inflation (9.26 percent) than the *Paasche index* (8.97 percent), which uses district B (i.e., year 2) budget shares.

It should also be noted that in this simple example the *quality* of school inputs is assumed to be constant between districts A and B. Consequently, salary differences in this simple example are assumed to reflect differences in the prices of comparable teachers and aides.

Because data are simply not available on all of the detailed quantities and prices of the individual items actually purchased by school districts, it is necessary to use an alternative expression to define the FMB *CEI*. That is, data on the quantities and prices of books and computers and even different categories of personnel (administrators, teachers, custodians, and aides) are not available in the simple form expressed in Exhibit I-A. The data that are available are generally expressed in the form of shares of school district budgets allocated to different categories of inputs and different indexes from various sources on the changes in the prices paid for individual inputs.

The FMB *CEI* presented above can be expressed in the following form:

$$\text{Eq. I-1} \quad \text{FMB-CEI} = \text{TCI}_B \times \text{TSHARE}_A + \text{ACI}_B \times \text{ASHARE}_A$$

where

$$\begin{aligned}\text{TCI}_B &= \text{the teacher cost index for district B (the ratio of FTE teacher salaries for district B to FTE teacher salaries in the base district A in this case);} \\ \text{TSHARE}_A &= \text{the proportion of school district budgets allocated to teachers salaries in the base district A (i.e., the budget share for teachers);}\end{aligned}$$

ACI_B = the instructional aide cost index for district B (the ratio of FTE aide salaries for district B to FTE aide salaries in the base district A in this case);

$ASHARE_A$ = the proportion of school district budgets allocated to instructional aides in the base district A (i.e., the *budget share* for aides).

Using the data from table 1, one can calculate the *Laspeyre index* as follows:

$$TCI_B = 100 \times \$33,000/\$30,000 = 110.00$$

$$TSHARE_A = \$30,000 \times 0.0500/\$1,688 = .89$$

$$ACI_B = 100 \times \$15,500/\$15,000 = 103.33$$

$$ASHARE_A = \$15,000 \times 0.0125/\$1,688 = .11$$

$$\text{Eq. I-2 Laspeyre Index (comparing B to A)} = 110.00 \times .89 + 103.33 \times .11 = 109.26$$

The *Laspeyre index* is the one most commonly used for the development of price indexes and is currently the methodology used by the Bureau of Labor Statistics (BLS) for the calculation of the consumer price index. However, it should be noted that the BLS does change the budget weights (shares) corresponding to each component about every ten years to account for differences in spending patterns over time.

Using the data from table 1, one can calculate the *Paasche index*, which uses district B as the base district, as follows:

$$TCI_A = 100 \times \$30,000/\$33,000 = 90.91$$

$$TSHARE_B = \$33,000 \times 0.0550/\$2,125 = .85$$

$$ACI_A = 100 \times \$15,000/\$15,500 = 96.77$$

$$ASHARE_B = \$15,500 \times 0.0200/\$2,125 = .15$$

$$\text{Eq. I-3 Paasche Index (comparing A to B)} = 90.91 \times .85 + 96.77 \times .15 = 91.76.$$

Inverting this *Paasche index* to compare district B to district A, the index of relative cost differences is 108.97 ($=100 \times 100/91.76$).

It can be seen that whichever way the indices are calculated (i.e., using actual quantities or budget shares as weights), the *Laspeyre* and *Paasche* indices are different because each uses a different base measurement. While both indices purport to measure the true cost difference between district A and B, it can be shown that the *Laspeyre* index over-estimates the rate of inflation (using district A and B to represent the same district at two points in time), while the *Paasche* index under-estimates the rate of inflation. The reason for this lies in the fact that neither of these FMB indexes account for the substitution of one input for another that occurs as

relative prices of the inputs change. This is commonly referred to as *commodity substitution* in the literature on the development of price indices.

The notion underlying commodity substitution is easily understood, though more difficult to measure. It is simply the notion that one can produce the same level of educational quality (or consumer satisfaction) with various combinations of the inputs, i.e., teachers and aides. Using the example in table 1, the relative price of teachers is higher in district B. There are two ways to illustrate this. First, district B pays 10 percent higher teachers salaries than district A, while district B pays only 3.3 percent higher salaries for aides. Second, the ratio of teacher salaries to aide salaries is higher in district B (i.e., $2.13 = 33,000/15,500$) than district A (i.e., $2.00 = 30,000/15,000$).

Whichever way one measures it, one might expect that district B could produce the same quality educational services as district A by substituting teachers aides for teachers. But it is precisely this impact on quality of educational services that one cannot measure. In fact, in the simple example in table 1, one can see that there has been a substitution away from teachers to aides in district B relative to district A. That is, the ratio of teachers to teacher aides is higher in district A (i.e., ratio of teachers to aides is $4.0 = 0.0500/0.0125$) than in district B (i.e., ratio of teachers to aides is $2.75 = 0.0550/0.0200$). But district B purchases more of both inputs because it simply has greater revenues to spend on educational services. While the FMB *CEI* controls for the level of usage of teachers and aides in calculating the impact of inflation, it does not account for the possibility of this substitution between inputs that may tend to occur in educational production. Substituting purchases away from the relatively more costly input will tend to reduce the difference in expenditure required to achieve a given level of educational output (or quality).

Superlative Indexes and Commodity Substitution Bias

Recognizing this problem, how does one deal with the commodity or input substitution bias that occurs with the FMB estimates of the *CEI*. Economists for years contended that the only way of resolving this problem required detailed knowledge of the parameters that underlie the input-output relationships in education. As Caves, Christensen, and Diewert (November, 1982) state it:

Comparisons based on econometric estimates of the structure of production have often been viewed as being more desirable than index number comparisons; this view is based on the belief that index numbers are consistent only with restricted structures of production. Our results show that this belief is erroneous; in fact, the structures of production, which we have considered in this paper are so general that they would be difficult to estimate econometrically. (p. 1411)

What Caves, Christensen, and Diewert show is a way to estimate the differences in the costs of living between two individuals at a point in time or for the same individual between two points in time using exclusively observed information on prices and quantities purchased. They show that an index number originally proposed by Tornqvist (1936) can be used to measure the geometric mean of two cost of living indexes based on the utility functions of two different consumers facing different prices, purchasing different quantities, and with differences in taste. This is the equivalent of saying that this Tornqvist index can be used to compare the costs of education between two districts with differing perceived technologies for producing educational services and facing different prices and purchasing different quantities of school inputs. Formally, this index may be written as follows:

$$\text{Eq. 1-4.} \quad \ln TCEI(B,A) = \sum_r (1/2) \cdot (P_r(B) + P_r(A)) \cdot [\ln (CI_r(B,A))]$$

where $TCEI(B,A)$ = the *Tornqvist* cost-of-education index between districts B and A,

$\sum_r$ = the sum over all school inputs, r

$CI_r(B,A)$ = the cost index for the r^{th} school input (e.g., teachers, school administrators, teachers' aides, books, supplies and materials) comparing districts B relative to A;

$P_r(B), P_r(A)$ = the average proportion of total expenditures allocated to the r^{th} school input in districts B and A, respectively.²⁷

One of the critical features of this formula relative to that of the FMB CEI is that to calculate the superlative index requires information on the budget shares for each input from each observation included in the analysis as well as relative price differences. Again, districts A and B may represent a single district at two points in time or two districts at the same point in time.

Expanding the comparisons of two districts A and B to a multilateral setting necessitates the use of a benchmark district. In Alaska, that benchmark district is Anchorage. In the formula above, district A is Anchorage and district B represents any other district in the state. Each school district in turn is compared to the Anchorage.²⁸

²⁷ The Tornqvist index assumes a translog production technology with identical second-order coefficients on the school input prices. This equality also requires expenditure-minimizing behavior and permits only the identification of the geometric averages of the true indexes rather than each individual index derived from the perspective of each district. Diewert (1976) showed that the Tornqvist index is exact for the homogeneous translog form and is, for this reason, regarded as a *superlative index*. A *superlative index* is defined as one that is exact for a 'flexible' aggregator functional form (Diewert, 1976).

²⁸ The use of the arithmetic mean value of the various statistics in equation 6 preserves the transitivity of the index in comparisons across more than two districts. For a more complete discussion of the issues involved in multilateral comparisons, the reader is referred to Caves, Christensen, and Diewert (March 1982).

Exhibit I-B illustrates the steps involved in calculation of the Tornqvist's superlative cost-of-education index (SCEI) between district B and the hypothetical district A. New columns 4 and 7 have been added to Exhibit I-A to present the budget shares needed to calculate the SCEI in equation 6. The natural log ($\ln$) of the cost index for each input component (i.e., teachers and aides) is presented below columns 2 and 5. The average budget share for each input, which is required to calculate the SCEI is presented below columns 4 and 7. The natural log of the SCEI is calculated as follows:

$$0.08727 - 0.09531 \times 0.8715 + 0.03279 \times 0.1285$$

Exhibit I-B. Hypothetical Example Comparing the Tornqvist Index to the Fixed-Market-Basket Index for Public Schools

District	Teachers			Aides			Total Budget per Pupil	Simulated Budgets Using Inputs From:		Alternative FMB, CEIs Using Inputs From:	
	Average Annual Wage	FTE per Pupil	Budget Share	Average Annual Wage	FTE per Pupil	Budget Share		District A	District B	District A	District B
A	\$30,000	0.0500	\$1,500 88.89%	\$15,000	0.0125	\$188 11.11%	\$1,688	\$1,688	\$1,950	100.00	91.76
B	\$33,000	0.0550	\$1,815 85.41%	\$15,500	0.0200	\$310 14.59%	\$2,125	\$1,844	\$2,125	109.26	100.00
Index Calculations											
$CI(B,A)$											
$CI(B,A)$	1.1000			1.0333			1.2593	1.0926	1.0897	1.0926	1.0897
Tornqvist Index											
			Avg Share			Avg Share	$\ln TCEI(B,A)$	Tornqvist Index			
$\ln CI(B,A)$	0.09531		87.15%	0.03279		12.85%	0.097276518	1.0912			

Finally, the SCEI - $\ln(0.08727) = 1.0912$ which falls between the Layspayre or district A-based index of 1.0926 and the Paasche or district B-based index of 1.0897 calculated previously.

Budget Matrix

Below is the budget matrix corresponding to the function and objects of expenditure included in the operating budget reported by Alaska school districts to the ADEED. Each cell contains a symbol corresponding to the school input cost index that will be assigned to that share of the budget. Under an FMB-GCEI, we would use the Anchorage budget data to calculate the appropriate standardized budget shares against which the index would be calculated for every school district. Under the SGCEI approach, we would use the budget share data for each district relative to the budget shares for Anchorage as in Equation I-4 to calculate the overall cost index.

Legend to the budget matrix on the following page:

- *teachers* is the budget share allocated to teachers only, which are those cells associated with direct instruction within the operating codes ranging from 100 to less than 400
- *classified* is for all classified staff at the school or district level
- *teach/class* refers to the benefits section of the budget share being divided among teachers and classified staff, with the weighting determined by the proportion of salaries given to each group within an operating fund
- *admin* is for administrators from schools and the district office, as well as certified staff not coded as teachers (e.g., specialists, guidance counselors)
- *admin/class* refers to the benefits section of the budget share being divided among administrators and classified staff, with the weighting determined by the proportion of salaries given to each group within an operating fund
- *energy* is the amount spent on energy and utility services
- *paper* is the amount spent on instructional materials and office supplies (the cost of purchasing and transporting a case of paper is used as a proxy of this cost, and that is why the budget share is named as such)
- *food* is the amount spent on food supplies (the cost of purchasing and transporting a case of milk cartons is used as a proxy of this cost, and that is why the budget share is named as such)
- *window* is the amount spent on maintenance (the cost of purchasing and transporting a window is used as a proxy of this cost, and that is why the budget share is named as such)
- *travel_1* is for teacher professional development to the district office and to Anchorage (with 50 percent of the total going to each budget share)
- *travel_2* is between schools and the district office (which may include specialists, other itinerant staff, district administrator support, or travel for personnel)
- *travel_3* is for school administrators
- *travel_4* is for district administrators
- *travel_5* is for maintenance and operation, what is referred to as purchased services in Chapter 5

Exhibit I-1. Budget Matrix

ALASKA DEPARTMENT OF EDUCATION AND EARLY DEVELOPMENT
FY00 AUDITS

these codes correspond with the 1996 C.O.A.

Date: 11/6/2000

School District

	100	200	220	300	350	400	510	550	600	700		Total Including Instruction
Operating Fund	Instruction	Spec. Ed. Instruction	Spec. Ed. Support	Support Students	Support Instruction	School Admin.	District Admin.	Dist. Admin. Support	Operations & Maint.	Student Activities		
Certified Salaries	teacher	teacher	teacher	teacher	teacher	admin	admin	admin	admin	admin		0
Non-Certified Salaries	classified	classified	classified	classified	classified	classified	classified	classified	classified	classified		0
Employee Benefits	teacher/class	teacher/class	teacher/class	teacher/class	teacher/class	admin/class	admin/class	admin/class	admin/class	admin/class		0
Professional/Tech Services	admin	admin	admin	admin	admin	admin	admin	admin	admin	admin		0
Staff Travel	travel_1	travel_2	travel_2	travel_2	travel_2	travel_3	travel_4	travel_2	travel_5	travel_2		0
Student Travel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		0
Utilities Services	energy	energy	energy	energy	energy	energy	energy	energy	energy	energy		0
Other Purch. Svcs./Insurance	travel_1	travel_2	travel_2	travel_2	travel_2	travel_3	travel_4	travel_2	travel_5	travel_2		0
Supplies, Materials, Media	paper	paper	paper	paper	paper	paper	paper	paper	energy	paper		0
Tuition and Stipends	teacher	teacher	teacher	teacher	teacher	admin	admin	admin	admin	admin		0
Other/Indirect	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		0
Capital Outlay/EQ/Property												0
TOTALS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Special Rev. Funds	Transportation	Food Service	Teacher Housing	Community Service	Special Ed.							
					Title 1	Title 1 Carryover	Title VI	Title VI Carryover	Other Special Revenue Funds		Title VI-B	Title 1 Migrant Ed
Expenditures:					Title 1 Instruction	Title 1 Support	Title VI Instruction	Title VI Support	Instruction	Support		
Certified Salaries	admin	admin	admin	admin	teacher	teacher	teacher	teacher	teacher	teacher	teacher	teacher
Non-Certified Salaries	classified	classified	classified	classified	classified	classified	classified	classified	classified	classified	classified	classified
Employee Benefits	admin/class	admin/class	admin/class	admin/class	teacher/class	teacher/class	teacher/class	teacher/class	teacher/class	teacher/class	teacher/class	teacher/class
Professional/Tech Services	admin	admin	admin	admin	admin	admin	admin	admin	admin	admin	admin	admin
Staff Travel	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2
Student Travel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Utilities Services	energy	energy	energy	energy	energy	energy	energy	energy	energy	energy	energy	energy
Other Purch. Svcs./Insurance	travel_2	food	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2	travel_2
Supplies, Materials, Media	paper	food	paper	paper	paper	paper	paper	paper	paper	paper	paper	paper
Tuition and Stipends	admin	admin	admin	admin	teacher	teacher	teacher	teacher	teacher	teacher	teacher	teacher
Other/Indirect	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Capital Outlay/EQ/Property												
TOTALS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Exhibit I-2. Listing of the Budget Shares and Their Corresponding Indexes for use in the SGCEI and FMB-GCEI

<i>Budget Share</i>	<i>Index</i>
Budget Share: ADMINS	Index: Administrators (Tobit)
Budget Share: CLASSIFIED	Index: Classified Staff (Regression)
Budget Share: ENERGY	Index: Energy
Budget Share: SUPPLIES: Food	Index: Food
Budget Share: Amount with NO CODE	"Index value of 1"
Budget Share: SUPPLIES: Instructional and Office	Index: Office and Teaching Supplies
Budget Share: TEACHERS	Index: Teachers (Salary & Benefits Regression)
Budget Share: TRAVEL: District Admins	Index: Superintendent P.D. in ANC Travel
Budget Share: TRAVEL: Maintenance	Index: Maintenance Travel
Budget Share: TRAVEL: School Admins	Index: School Oversight Travel
Budget Share: TRAVEL: Schools to D.O.	Index: Schools to D.O. Travel
(0.5) * Budget Share: TRAVEL: Teachers	Index: Teachers P.D. to D.O. Travel
(0.5) * Budget Share: TRAVEL: Teachers	Index: Teachers P.D. to ANC Travel
Budget Share: SUPPLIES: Maintenance	Index: Maintenance Supplies

Exhibit I-3. Budget Shares

District Name	Budget Share: ADMINS	Budget Share: CLASSIFIED	Budget Share: ENERGY	Budget Share: Amount with NO CODE	Budget Share: SUPPLIES: Instructional and Office	Budget Share: TEACHERS	Budget Share: TRAVEL: District Admins	Budget Share: TRAVEL: Maintenance	Budget Share: TRAVEL: School Admins	Budget Share: TRAVEL: Schools to D.O.	Budget Share: TRAVEL: Teachers	Budget Share: TRAVEL: Teachers: Half	Budget Share: SUPPLIES: Maintenance
Alaska Gateway	10.54%	17.57%	17.11%	-0.53%	4.02%	46.15%	0.38%	2.44%	0.03%	0.90%	0.38%	0.19%	0.99%
Aleutian Region	33.95%	9.94%	5.16%	3.30%	7.82%	27.93%	6.29%	1.45%	0.03%		0.81%	0.40%	3.33%
Aleutians East Borough	8.50%	12.95%	8.83%	3.03%	3.80%	49.33%	1.52%	3.09%	0.10%	2.52%	5.13%	2.56%	1.20%
Anchorage	5.69%	23.51%	4.20%	-0.01%	3.14%	57.79%	0.02%	3.58%	0.07%	0.49%	0.15%	0.08%	1.41%
Annette Island	10.24%	19.86%	7.16%	2.19%	2.71%	52.04%	0.98%	1.12%	0.18%	2.83%	0.64%	0.32%	0.04%
Bering Strait	6.39%	22.73%	11.32%	1.73%	3.55%	44.63%	0.96%	1.02%		1.84%	4.60%	2.30%	1.22%
Bristol Bay Borough	8.07%	17.49%	9.93%	2.40%	2.02%	51.19%	0.15%	3.91%	0.16%	0.66%	3.57%	1.78%	0.46%
Chatham Region	13.83%	15.14%	10.81%	2.23%	2.74%	49.61%	1.73%	1.40%	0.35%	0.62%	0.59%	0.30%	0.94%
Chugach	9.89%	15.90%	9.54%	-0.70%	6.23%	40.60%	2.30%	1.99%		4.75%	1.74%	0.87%	7.77%
Copper River	8.55%	20.82%	7.86%	-0.03%	6.77%	45.90%	0.79%	1.51%	0.09%	2.30%	0.61%	0.31%	4.82%
Cordova City	7.15%	19.41%	7.65%	0.16%	4.14%	54.56%	0.39%	2.10%	0.05%	1.84%	1.12%	0.56%	1.45%
Craig City	9.53%	17.08%	4.66%	2.64%	4.46%	50.97%	0.55%	1.89%	0.02%	2.47%	4.71%	2.36%	1.04%
Delta Greely	8.31%	18.58%	8.10%	0.72%	2.74%	54.59%	0.35%	2.51%	0.13%	0.91%	1.16%	0.58%	1.89%
Denali Borough	8.65%	20.91%	10.86%	1.17%	7.24%	47.40%	0.85%	1.44%	0.04%	0.62%	0.40%	0.20%	0.43%
Dillingham City	7.10%	17.92%	5.94%	3.95%	3.82%	55.18%	0.58%	1.04%	0.06%	3.12%	0.36%	0.18%	0.92%
Fairbanks North Star Borough	5.79%	21.97%	4.63%	0.28%	3.56%	60.83%	0.09%	0.77%	0.01%	1.14%	0.74%	0.37%	0.21%
Galena City	6.50%	14.23%	9.64%	1.80%	30.96%	24.29%	0.97%	1.87%	2.13%	1.52%	1.33%	0.67%	4.76%
Haines Borough	10.27%	19.05%	7.46%	1.55%	2.06%	57.62%	0.82%	0.65%	0.07%	0.02%	0.15%	0.08%	0.27%
Hoonah City	10.31%	19.98%	10.36%	0.50%	3.83%	44.21%	0.24%	5.98%	0.08%	2.36%	1.41%	0.71%	0.74%
Hydaburg City	14.21%	12.08%	8.29%	3.57%	15.67%	36.85%	0.89%	4.42%	0.17%	0.66%	0.26%	0.13%	2.94%
Iditarod Area	5.07%	22.01%	17.61%	-0.27%	6.58%	42.72%	0.98%	0.83%	0.22%	0.95%	2.00%	1.00%	1.31%
Juneau Borough	5.55%	25.31%	3.69%	-0.48%	3.20%	59.29%	0.08%	0.82%	0.08%	1.35%	0.76%	0.38%	0.35%
Kake City	10.16%	17.98%	9.74%	2.74%	3.53%	47.97%	0.78%	3.60%	0.02%	2.81%	0.07%	0.04%	0.59%
Kashunamiut	13.99%	19.58%	7.52%	2.34%	7.56%	40.73%	1.37%	0.75%	0.16%	1.08%	1.28%	0.64%	3.65%
Kenai Peninsula Borough	5.87%	16.31%	5.72%	0.45%	2.28%	58.16%	0.08%	8.15%	0.08%	0.56%	0.51%	0.25%	1.82%
Ketchikan Gateway Borough	7.56%	19.49%	6.88%	0.99%	3.30%	57.65%	0.13%	1.13%	0.07%	0.88%	0.23%	0.12%	1.48%
Klawock City	10.54%	16.25%	8.87%	2.70%	3.62%	53.88%	1.83%	0.66%	0.30%	0.22%	0.68%	0.34%	0.45%
Kodiak Island Borough	8.01%	19.68%	7.89%	1.14%	2.85%	56.78%	0.18%	0.76%	0.20%	0.37%	0.39%	0.19%	1.76%
Kuspuk	7.44%	24.97%	11.26%	1.26%	2.87%	47.39%	0.76%	1.38%	0.16%	1.54%	0.04%	0.02%	0.93%
Lake and Peninsula	4.63%	14.64%	16.46%	3.03%	4.79%	47.04%	1.30%	2.15%	0.17%	3.59%	0.08%	0.04%	2.13%
Lower Kuskokwim	7.88%	30.58%	9.45%	-0.46%	3.58%	41.87%	0.21%	1.36%	0.26%	2.49%	1.59%	0.79%	1.18%
Lower Yukon	8.73%	18.53%	10.97%	0.91%	2.64%	52.27%	1.39%	1.17%	0.21%	1.73%	0.13%	0.06%	1.34%
Matanuska-Susitna Borough	5.19%	20.76%	4.95%	-0.05%	3.00%	63.36%	0.05%	1.35%	0.03%	0.34%	0.24%	0.12%	0.79%
Nenana City	8.48%	12.10%	7.24%	2.23%	26.64%	31.97%	0.64%	1.88%	0.09%	0.97%	1.00%	0.50%	6.75%
Nome City	4.74%	20.75%	9.70%	0.66%	2.34%	56.66%	0.31%	1.34%	0.25%	1.21%	0.48%	0.24%	1.56%
North Slope Borough	4.09%	35.19%	8.67%	1.75%	3.84%	40.93%	0.45%	0.64%	0.08%	1.27%	0.47%	0.23%	2.62%
Northwest Arctic	7.50%	22.15%	14.30%	-0.31%	4.80%	41.33%	0.60%	4.30%	0.18%	2.78%	0.35%	0.17%	1.52%
Pelican City	12.61%	28.29%	7.78%	5.19%	6.50%	29.19%	0.23%	2.18%		0.64%	0.51%	0.25%	6.90%
Petersburg City	6.63%	17.40%	10.42%	1.08%	3.11%	58.83%	0.22%	1.20%	0.11%	0.42%	0.05%	0.03%	0.55%
Pribilof Island	9.30%	22.41%	10.62%	2.02%	3.91%	43.47%	1.42%	1.37%	0.10%	1.54%	0.96%	0.48%	2.89%
Saint Marys City	12.31%	15.82%	10.20%	2.97%	4.23%	42.23%	2.87%	1.83%	0.28%	0.55%	0.66%	0.33%	6.05%
Sika Borough	9.63%	12.73%	4.67%	0.41%	2.89%	64.72%	0.45%	3.25%	0.08%	0.28%	0.38%	0.19%	0.51%
Skagway City	8.51%	20.02%	7.52%	3.33%	5.33%	47.87%	0.33%	2.05%	0.08%	0.33%	0.16%	0.08%	4.47%
Southeast Island	8.57%	20.44%	7.52%	0.51%	4.35%	49.48%	0.84%	4.80%	0.01%	1.80%	1.18%	0.59%	0.70%
Southwest Region	8.41%	17.48%	9.01%	0.46%	7.01%	49.66%	0.88%	2.16%	0.13%	1.13%	1.33%	0.67%	2.33%
Tanana City	21.56%	17.76%	19.98%	3.00%	4.41%	30.45%	0.69%	1.40%		0.22%	0.02%	0.01%	0.40%
Unalaska City	13.25%	14.94%	8.98%	4.58%	3.38%	49.89%	1.04%	1.63%	0.07%	0.35%	0.38%	0.19%	1.50%
Valdez City	8.24%	20.16%	8.27%	1.46%	2.39%	59.17%	0.21%	0.82%	0.18%	0.37%	0.04%	0.02%	0.68%
Wrangell City	7.42%	20.78%	6.07%	1.57%	4.16%	55.77%	1.03%	0.80%	0.09%	0.38%	0.51%	0.26%	1.42%
Yakutat City	11.24%	11.24%	7.81%	0.39%	4.28%	48.46%	1.74%	0.95%	0.49%	0.92%	0.70%	0.35%	2.00%
Yukon Flats	11.05%	17.39%	21.55%	1.66%	4.71%	35.19%	1.85%	2.41%	0.08%	0.80%	0.12%	0.06%	1.81%
Yukon Koyukuk	11.77%	14.84%	16.79%	-0.59%	4.69%	43.38%	2.07%	2.00%	0.46%	2.07%	1.02%	0.51%	1.51%
Yupik	10.37%	27.66%	6.69%	1.59%	7.69%	35.75%	2.20%	1.52%	0.04%	2.44%	1.59%	0.79%	2.48%

Exhibit I-4. Index Values

District Name	Superlative Index Value	FMB Index Value	Index: Administrators	Index: Classified Staff	Index: Energy	Index: Maintenance Travel	Index: Office and Teaching Supplies	Index: Teachers P.D. to D.O. Travel	Index: Teachers P.D. to ANC Travel	Index: Schools to D.O. Travel	Index: Superintendent P.D. in ANC Travel	Index: School Oversight Travel	Index: Teachers	Index: Maintenance Supplies
Alaska Gateway	1.28	1.29	0.97	1.09	3.79	1.87	1.54	2.21	10.60	2.21	1.89	2.21	1.05	4.95
Aleutian Region	1.46	2.90	1.25	1.23	4.97	5.20	1.87	276.38	30.02	222.60	3.22	166.27	1.17	2.42
Aleutians East Borough	1.49	1.67	1.10	1.12	3.23	3.62	1.45	77.08	14.10	52.08	2.27	25.89	1.14	2.75
Anchorage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Annette Island	1.03	1.05	0.95	0.93	0.75	1.06	1.50	1.00	12.71	1.00	2.30	1.00	1.08	1.71
Bering Strait	1.55	2.37	1.05	1.19	4.09	4.96	1.57	186.23	19.68	150.48	2.06	113.05	1.11	4.43
Bristol Bay Borough	1.19	1.20	1.01	1.03	2.96	2.12	1.82	1.00	9.14	1.00	1.64	1.00	1.03	2.51
Chatham Region	1.20	1.58	1.05	0.92	3.72	2.27	5.24	74.36	9.92	49.55	1.54	23.57	0.95	2.50
Chugach	1.29	1.40	1.11	0.98	1.43	1.94	2.82	74.34	6.08	44.89	1.00	14.04	0.96	2.89
Copper River	1.15	1.15	0.99	1.05	2.37	1.39	1.43	1.67	7.03	1.67	1.25	1.67	0.99	4.08
Cordova City	1.07	1.07	0.99	0.96	1.64	0.99	1.40	1.00	8.82	1.00	1.60	1.00	1.04	2.27
Craig City	1.09	1.08	0.95	0.90	1.87	1.15	1.31	1.00	22.46	1.00	4.07	1.00	1.02	2.80
Delta Greely	1.09	1.11	0.94	0.98	2.33	1.09	2.01	1.00	6.07	1.00	1.10	1.00	1.00	2.32
Denali Borough	1.09	1.08	0.97	1.01	1.66	1.36	1.58	1.89	7.91	1.89	1.41	1.89	1.00	1.79
Dillingham City	1.13	1.16	1.02	1.05	2.16	1.10	1.24	1.00	9.20	1.00	1.67	1.00	1.08	3.39
Fairbanks North Star Borough	1.08	1.09	0.97	1.04	1.61	1.05	1.22	1.00	8.34	1.00	1.50	1.00	1.06	1.56
Galena City	1.26	1.21	0.97	1.14	2.87	1.33	1.40	1.00	10.74	1.00	1.94	1.00	1.04	4.11
Haines Borough	1.03	1.06	0.94	0.90	1.80	1.52	1.58	1.00	9.82	1.00	1.78	1.00	0.99	2.16
Hoonah City	1.12	1.16	1.06	0.93	4.62	1.28	1.35	1.00	12.09	1.00	2.19	1.00	0.95	2.13
Hydaburg City	1.10	1.07	1.00	0.91	1.23	1.35	1.63	1.00	11.41	1.00	2.07	1.00	1.02	3.32
Iditarod Area	1.40	2.47	0.93	0.98	5.12	5.13	1.73	236.19	18.62	182.40	1.74	126.07	1.01	1.65
Juneau Borough	1.02	1.03	0.99	1.02	0.74	1.02	1.45	1.00	9.92	1.00	1.77	1.00	1.01	1.89
Kake City	1.09	1.11	1.09	0.93	2.38	2.35	1.16	1.00	12.27	1.00	2.22	1.00	0.97	2.41
Kashunamiut	1.25	1.29	1.02	1.14	2.76	2.72	1.49	1.00	12.95	1.00	2.34	1.00	1.08	4.41
Kenai Peninsula Borough	1.03	1.04	0.97	1.03	1.34	1.15	1.05	3.63	6.92	3.63	1.20	3.63	0.96	2.50
Ketchikan Gateway Borough	1.01	1.03	0.99	0.92	0.75	0.91	1.12	1.00	10.22	1.00	1.85	1.00	1.04	2.65
Klawock City	1.04	1.05	1.05	0.91	1.87	1.02	1.35	1.00	11.66	1.00	2.11	1.00	0.97	2.65
Kodiak Island Borough	1.12	1.21	0.97	1.03	1.95	1.31	1.10	19.98	10.07	12.65	1.78	4.97	1.03	4.55
Kuspuk	1.21	1.44	0.99	1.07	1.67	1.87	2.54	40.21	13.33	40.21	1.83	40.21	1.06	4.22
Lake And Peninsula	1.46	2.08	0.96	0.99	4.62	4.14	1.71	165.38	13.56	111.59	1.84	55.26	1.04	6.35
Lower Kuskokwim	1.39	1.61	1.04	1.23	3.43	2.52	1.62	67.95	10.62	46.04	1.67	23.10	1.07	4.47
Lower Yukon	1.40	2.36	1.02	1.13	3.17	5.34	4.08	169.94	21.54	146.50	2.22	121.96	1.09	4.09
Matanuska-Susitna Borough	0.99	1.01	0.96	0.96	1.06	1.07	0.98	1.49	6.09	1.49	1.08	1.49	0.98	2.81
Nenana City	1.17	1.09	0.93	0.98	1.81	1.21	1.60	1.00	8.14	1.00	1.47	1.00	0.99	4.15
Nome City	1.16	1.17	1.03	1.12	2.40	1.31	1.28	1.00	12.80	1.00	2.31	1.00	1.05	2.63
North Slope Borough	1.58	2.16	1.17	1.48	9.31	4.25	1.57	96.64	17.02	70.35	2.56	42.82	1.18	1.45
Northwest Arctic	1.48	1.56	1.07	1.24	4.93	2.99	1.21	33.45	12.76	26.58	2.06	19.39	1.14	1.18
Palican City	1.14	1.38	1.03	0.90	1.28	0.91	13.57	1.00	13.96	1.00	2.53	1.00	0.95	2.55
Petersburg City	1.01	1.02	0.94	0.91	1.24	0.92	1.10	1.00	12.86	1.00	2.33	1.00	1.01	2.14
Pribilof Island	1.29	1.34	1.25	1.22	1.31	3.89	1.96	3.18	16.08	3.18	2.87	3.18	1.13	2.96
Saint Marys City	1.28	1.29	1.12	1.09	3.94	2.55	1.96	1.00	12.27	1.00	2.22	1.00	1.01	3.79
Sitka Borough	1.03	1.09	1.00	0.93	0.91	0.95	1.61	1.00	9.82	1.00	1.78	1.00	1.02	5.97
Skagway City	1.00	1.00	1.04	0.90	1.65	1.46	1.07	1.00	10.43	1.00	1.89	1.00	0.95	1.09
Southeast Island	1.07	1.15	1.01	0.87	1.12	1.52	4.11	16.77	14.76	14.33	2.51	11.77	0.94	1.14
Southwest Region	1.26	1.37	0.97	1.03	3.41	1.51	1.54	20.45	10.83	20.45	1.67	20.45	1.06	5.64
Tanana City	1.29	1.27	1.04	1.03	4.67	1.53	2.17	1.00	11.04	1.00	2.00	1.00	1.00	4.24
Unalaska City	1.19	1.21	1.05	1.08	1.69	1.42	1.59	1.00	14.76	1.00	2.67	1.00	1.14	2.82
Ukuk City	1.05	1.07	1.01	0.98	1.61	1.02	1.35	1.00	8.29	1.00	1.50	1.00	1.02	2.65
Wrangell City	1.00	1.02	0.94	0.89	1.05	1.52	0.98	1.00	10.23	1.00	1.85	1.00	1.01	1.75
Yakutat City	1.17	1.24	1.09	0.97	3.39	2.10	1.33	15.09	11.18	11.62	1.92	7.98	0.97	3.09
Yukon Flats	1.46	1.94	0.93	1.06	5.43	2.81	2.57	146.14	14.76	92.35	2.34	36.02	1.03	2.95
Yukon Koyukuk	1.44	1.86	0.94	1.06	4.73	2.20	1.73	65.49	11.71	53.82	1.56	41.60	1.10	3.77
Yupit	1.31	1.34	0.98	1.06	3.58	2.25	2.47	6.43	10.48	6.43	1.81	6.43	1.06	4.54

Exhibit I-5. Categorical Information

District Name	Total District Operating Fund: FY00	District Enrollment	MSA Code	Geographic Region Name	Size	Distance from D.O. to nearest center of commerce	Classroom Teachers (Full- Time Equiv)
Alaska Gateway	\$5,373,281.00	490	75	South Central	2 250-999	4 At least 100 miles	9.30
Aleutian Region	\$1,228,458.00	61	58	Southwest	1 0 to <250	5 At least 500 miles	2.00
Aleutians East Borough	\$5,464,362.00	301	57	Southwest	2 250-999	5 At least 500 miles	11.48
Anchorage	\$311,273,670.00	49526	62	South Central	5 10,000+	1 Less than 10 miles	44.74
Annette Island	\$3,677,542.00	331	93	Southeast	2 250-999	2 At least 10 miles	9.20
Bering Strait	\$23,419,588.00	1735	34	Far North	3 1000-2499	5 At least 500 miles	11.98
Bristol Bay Borough	\$2,904,805.00	277	55	Southwest	2 250-999	4 At least 100 miles	10.96
Chatham Region	\$2,704,458.00	248	80	Southeast	1 0 to <250	3 At least 50 miles	8.25
Chugach	\$1,713,906.00	177	75	South Central	1 0 to <250	3 At least 50 miles	3.04
Copper River	\$5,765,693.00	700	75	South Central	2 250-999	4 At least 100 miles	9.32
Cordova City	\$3,797,526.00	478	75	South Central	2 250-999	4 At least 100 miles	16.64
Craig City	\$3,193,801.00	543	93	Southeast	2 250-999	3 At least 50 miles	16.25
Delta Greely	\$6,420,459.00	850	46	Interior	2 250-999	3 At least 50 miles	13.98
Denali Borough	\$3,875,143.00	312	47	Interior	2 250-999	3 At least 50 miles	10.47
Dillingham City	\$5,426,491.00	578	50	Southwest	2 250-999	4 At least 100 miles	20.61
Fairbanks North Star Borough	\$108,243,790.00	15659	44	Interior	5 10,000+	1 Less than 10 miles	37.76
Galena City	\$15,147,510.00	3340	41	Far North	4 2500-9999	4 At least 100 miles	16.73
Haines Borough	\$3,552,705.00	402	85	Southeast	2 250-999	3 At least 50 miles	10.96
Hoonah City	\$3,041,735.00	226	80	Southeast	1 0 to <250	2 At least 10 miles	9.45
Hydaburg City	\$1,505,246.00	91	93	Southeast	1 0 to <250	2 At least 10 miles	4.25
Iditarod Area	\$6,252,546.00	656	41	Far North	2 250-999	4 At least 100 miles	5.20
Juneau Borough	\$36,362,688.00	5494	86	Southeast	4 2500-9999	1 Less than 10 miles	41.05
Kake City	\$1,909,779.00	166	91	Southeast	1 0 to <250	3 At least 50 miles	6.15
Kashunamiut	\$3,210,513.00	313	51	Southwest	2 250-999	4 At least 100 miles	21.30
Kenai Peninsula Borough	\$73,233,548.00	9925	71	South Central	4 2500-9999	1 Less than 10 miles	22.68
Ketchikan Gateway Borough	\$17,489,593.00	2517	95	Southeast	4 2500-9999	1 Less than 10 miles	21.12
Klawock City	\$2,118,136.00	191	93	Southeast	1 0 to <250	3 At least 50 miles	7.14
Kodiak Island Borough	\$22,517,580.00	2743	73	South Central	4 2500-9999	4 At least 100 miles	23.53
Kuspuk	\$6,627,779.00	474	52	Southwest	2 250-999	4 At least 100 miles	4.58
Lake And	\$8,895,930.00	528	59	Southwest	2 250-999	4 At least 100 miles	4.86
Lower Kuskokwim	\$44,153,971.00	3695	52	Southwest	4 2500-9999	4 At least 100 miles	14.73
Lower Yukon	\$18,551,676.00	1898	51	Southwest	3 1000-2499	4 At least 100 miles	15.71
Matanuska-Susitna Borough	\$79,543,329.00	13008	61	South Central	5 10,000+	2 At least 10 miles	32.85
Nenana City	\$4,027,766.00	1889	41	Far North	3 1000-2499	4 At least 100 miles	14.84
Nome City	\$6,455,807.00	761	34	Far North	2 250-999	5 At least 500 miles	22.87
North Slope Borough	\$40,696,630.00	2187	31	Far North	3 1000-2499	5 At least 500 miles	25.45
Northwest Arctic	\$25,615,962.00	2188	33	Far North	3 1000-2499	5 At least 500 miles	19.41
Pelican City	\$597,493.00	23	80	Southeast	1 0 to <250	3 At least 50 miles	3.40
Petersburg City	\$4,994,592.00	678	91	Southeast	2 250-999	4 At least 100 miles	15.70
Pribilof Island	\$1,914,471.00	144	58	Southwest	1 0 to <250	5 At least 500 miles	7.84
Saint Marys City	\$1,658,111.00	143	51	Southwest	1 0 to <250	4 At least 100 miles	12.50
Sitka Borough	\$11,760,802.00	1640	87	Southeast	3 1000-2499	3 At least 50 miles	27.42
Skagway City	\$1,647,449.00	132	80	Southeast	1 0 to <250	3 At least 50 miles	11.90
Southeast Island	\$3,212,107.00	285	93	Southeast	2 250-999	1 Less than 10 miles	4.91
Southwest Region	\$9,916,963.00	771	50	Southwest	2 250-999	4 At least 100 miles	12.55
Tanana City	\$1,176,712.00	80	41	Far North	1 0 to <250	4 At least 100 miles	6.00
Unalaska City	\$3,952,718.00	355	58	Southwest	2 250-999	5 At least 500 miles	14.07
Valdez City	\$8,040,397.00	863	75	South Central	2 250-999	4 At least 100 miles	19.41
Wrangell City	\$4,043,265.00	497	91	Southeast	2 250-999	3 At least 50 miles	10.94
Yakutat City	\$2,022,629.00	168	79	Southeast	1 0 to <250	4 At least 100 miles	13.63
Yukon Flats	\$6,229,257.00	349	41	Far North	2 250-999	4 At least 100 miles	8.36
Yukon Koyukuk	\$8,179,716.00	495	41	Far North	2 250-999	4 At least 100 miles	6.25
Yupik	\$5,242,263.00	404	52	Southwest	2 250-999	4 At least 100 miles	11.34

Exhibit I-6. Comparison of the AIR GCEI and the Current Alaska Cost Index
(data are sorted alphabetically by district name)

District Name	Superlative GCEI	Current Alaska Cost Index	Difference between the Superlative GCEI and the Current Index	Districts with an absolute difference ≥ 0.15 (=1)	Districts with an absolute difference ≥ 0.10 (=1)	Districts with an absolute difference < 0.05 (=1)
Alaska Gateway	1.28	1.29	(0.01)	0	0	1
Aleutian Region	1.46	1.74	(0.28)	1	1	0
Aleutians East Borough	1.49	1.42	0.07	0	0	0
Alyeska	1.00	1.00	-	0	0	1
Anchorage	1.00	1.00	(0.00)	0	0	1
Annette Island	1.03	1.01	0.02	0	0	1
Bering Strait	1.55	1.53	0.03	0	0	1
Bristol Bay Borough	1.19	1.26	(0.08)	0	0	0
Chatham Region	1.20	1.12	0.08	0	0	0
Chugach	1.29	1.29	(0.00)	0	0	1
Copper River	1.15	1.18	(0.02)	0	0	1
Cordova City	1.07	1.10	(0.02)	0	0	1
Craig City	1.09	1.01	0.08	0	0	0
Delta Greely	1.09	1.11	(0.01)	0	0	1
Denali Borough	1.09	1.31	(0.22)	1	1	0
Dillingham City	1.13	1.25	(0.13)	0	1	0
Fairbanks North Star Borough	1.08	1.04	0.04	0	0	1
Galena City	1.26	1.35	(0.09)	0	0	0
Haines Borough	1.03	1.01	0.02	0	0	1
Hoonah City	1.12	1.06	0.07	0	0	0
Hydaburg City	1.10	1.09	0.02	0	0	1
Iditarod Area	1.40	1.47	(0.07)	0	0	0
Juneau Borough	1.02	1.01	0.02	0	0	1
Kake City	1.09	1.03	0.07	0	0	0
Kashunamiut	1.25	1.39	(0.14)	0	1	0
Kenai Peninsula Borough	1.03	1.00	0.03	0	0	1
Ketchikan Gateway Borough	1.01	1.00	0.01	0	0	1
Klawock City	1.04	1.02	0.03	0	0	1
Kodiak Island Borough	1.12	1.09	0.03	0	0	1
Kuspuk	1.21	1.43	(0.22)	1	1	0
Lake And Peninsula	1.46	1.56	(0.10)	0	1	0
Lower Kuskokwim	1.39	1.49	(0.10)	0	1	0
Lower Yukon	1.40	1.44	(0.04)	0	0	1
Matanuska-Susitna Borough	0.99	1.01	(0.02)	0	0	1
Mt. Edgecumbe	1.03	1.00	0.03	0	0	1
Nenana City	1.17	1.27	(0.10)	0	1	0
Nome City	1.16	1.32	(0.16)	1	1	0
North Slope Borough	1.58	1.50	0.07	0	0	0
Northwest Arctic	1.48	1.55	(0.07)	0	0	0
Pelican City	1.14	1.29	(0.15)	1	1	0
Petersburg City	1.01	1.00	0.01	0	0	1
Pribilof Island	1.29	1.42	(0.13)	0	1	0
Saint Marys City	1.28	1.35	(0.07)	0	0	0
Sitka Borough	1.03	1.00	0.03	0	0	1
Skagway City	1.00	1.14	(0.14)	0	1	0
Southeast Island	1.07	1.12	(0.05)	0	0	0
Southwest Region	1.26	1.42	(0.16)	1	1	0
Tanana City	1.29	1.50	(0.21)	1	1	0
Unalaska City	1.19	1.25	(0.05)	0	0	0
Valdez City	1.05	1.10	(0.04)	0	0	1
Wrangell City	1.30	1.00	0.00	0	0	1

District Name	Superlative GCEI	Current Alaska Cost Index	Difference between the Superlative GCEI and the Current Index	Districts with an absolute difference ≥ 0.15 (=1)	Districts with an absolute difference ≥ 0.10 (=1)	Districts with an absolute difference < 0.05 (=1)
Yakutat City	1.17	1.05	0.13	0	1	0
Yukon Flats	1.46	1.67	(0.21)	1	1	0
Yukon Koyukuk	1.44	1.50	(0.06)	0	0	0
Yupit	1.31	1.47	(0.16)	1	1	0
Mean value	1.19	1.24	-0.04			
Standard deviation	0.17	0.21	0.09			
Minimum value	0.99	1.00	-0.28			
Maximum value	1.58	1.74	0.13			
Number of districts with significant differences in index values				9	17	24

The personnel index reported in *Alaska School District Cost Study: Volume I – Summary of Results* reflects a district-level aggregation of all three personnel indices. To arrive at this index value, one must consider only the budget share spent by the district on personnel. Each of the three personnel budget shares (i.e., teachers, administrators and other certified, and classified) is then divided by the sum of the personnel budget for that district. This provides us with the new budget shares to calculate this aggregate personnel index, which will give us the overall cost of personnel considering the usage of each of the three groups of employees comprising this category. Each of the three personnel indices is weighted by its appropriate budget shares, as derived by taking the average recalculated budget shares of the district and the base district Anchorage. This creates a Tornqvist cost-of-personnel index, similar to the Tornqvist cost-of-education index described in greater mathematical detail earlier in this appendix.

The other indices presented in *Alaska School District Cost Study: Volume I – Summary of Results* – that is, the energy index, the cost-of-goods index, and the travel index – were all created similarly, using the methods described above. The energy index considers only the index value for energy, so its aggregate is the same as the energy index presented in this volume of the study. The cost-of-goods index uses the appropriately-rescaled budget share weights of the index values for instructional supplies and small capital items in its aggregate construction. The rescaling of the budget weights for the aggregate goods index uses the sum of the instructional supplies budget share and small capital items budget share as the denominator. The aggregate travel index uses the appropriately-rescaled budget share weights of the index values for any and all travel indices considered in this volume of the study, using the sum of the travel budget shares as the denominator when rescaling.

The tables on the following pages present the four aggregate indices, along with a breakdown of their individual index components. The columns next to the individual index components show the appropriately-rescaled budget weight for the corresponding index component. To calculate the overall index for that category, one would sum the logarithm of each component index, each weighted by the respective budget weight. Then, take the exponential of the logarithmic form. This will generate the overall index value for that particular aggregate – the value presented in the column after the district name.

Goods Index

	Overall Goods Index	Index: Paper	Budget Weight: Paper	Index: Window	Budget Weight: Window
Denali Borough	1.61	1.58	81.65%	1.79	18.35%
Alaska Gateway	2.07	1.54	74.59%	4.95	25.41%
Aleutian Region	2.02	1.87	69.54%	2.42	30.46%
Anchorage	1.00	1.00	68.95%	1.00	31.05%
Annette Island	1.53	1.50	83.71%	1.71	16.29%
Bering Strait	2.10	1.57	71.71%	4.43	28.29%
Bristol Bay Borough	1.97	1.82	75.26%	2.51	24.74%
Chatham Region	4.25	5.24	71.65%	2.50	28.35%
Chugach	2.85	2.82	56.73%	2.89	43.27%
Copper River	2.09	1.43	63.69%	4.08	36.31%
Cordova City	1.61	1.40	71.53%	2.27	28.47%
Craig City	1.58	1.31	75.06%	2.80	24.94%
Delta Greely	2.11	2.01	64.09%	2.32	35.91%
Dillingham City	1.60	1.24	74.73%	3.39	25.27%
Fairbanks North Star Borough	1.28	1.22	81.74%	1.56	18.26%
Galena City	1.78	1.40	77.82%	4.11	22.18%
Haines Borough	1.69	1.58	78.66%	2.16	21.34%
Hoonah City	1.51	1.35	76.35%	2.13	23.65%
Hydaburg City	1.93	1.63	76.56%	3.32	23.42%
Iditarod Area	1.71	1.73	76.17%	1.65	23.83%
Juneau Borough	1.53	1.45	79.60%	1.89	20.40%
Kake City	1.36	1.16	77.30%	2.41	22.70%
Kenai Peninsula Borough	1.45	1.05	62.28%	2.50	37.72%
Ketchikan Gateway Borough	1.46	1.12	69.00%	2.65	31.00%
Klawock City	1.56	1.35	78.98%	2.65	21.02%
Kodiak Island Borough	1.79	1.10	65.39%	4.55	34.61%
Kuspuk	2.93	2.54	72.26%	4.22	27.74%
Lake And Peninsula	2.56	1.71	69.07%	6.35	30.93%
Lower Kuskokwim	2.15	1.62	72.11%	4.47	27.89%
Lower Yukon	4.09	4.08	67.68%	4.09	32.32%
Matanuska-Susitna Borough	1.26	0.98	74.06%	2.61	25.94%
Nenana City	2.04	1.60	74.37%	4.15	25.63%
Nome City	1.66	1.28	64.44%	2.63	35.56%
North Slope Borough	1.52	1.57	64.18%	1.45	35.82%
Northwest Arctic	1.22	1.23	72.45%	1.18	27.55%
Pelican City	6.81	13.57	58.73%	2.55	41.27%
Petersburg City	1.28	1.10	77.01%	2.14	22.99%
Pribilof Island	2.28	1.96	63.22%	2.96	36.78%
Sitka Borough	2.18	1.61	76.92%	5.97	23.08%
Skagway City	1.08	1.07	61.65%	1.09	38.35%
Southeast Island	3.08	4.11	77.52%	1.14	22.48%
Southwest Region	2.21	1.54	72.01%	5.64	27.99%
Saint Marys City	2.64	1.96	55.03%	3.79	44.97%
Unalaska City	1.90	1.59	69.10%	2.82	30.90%
Valdez City	1.62	1.35	73.46%	2.65	26.54%
Wrangell City	1.16	0.98	71.79%	1.75	28.21%
Yakutat City	1.73	1.33	68.57%	3.09	31.43%
Yukon Flats	2.67	2.57	70.58%	2.95	29.42%
Yukon Koyukuk	2.14	1.73	72.30%	3.77	27.70%
Tanana City	2.48	2.17	80.29%	4.24	19.71%
Yupit	2.93	2.47	72.30%	4.54	27.70%
Kashunamiut	2.11	1.49	68.22%	4.41	31.78%
Aleutians East Borough	1.73	1.45	72.46%	2.75	27.54%

Travel Index

	Overall Travel Index	Index: Teachers P.D. to D.O. Travel	Budget Weight: Teachers P.D. to D.O. Travel	Index: Teachers P.D. to ANC Travel	Budget Weight: Teachers P.D. to ANC Travel	Index: Schools to D.O. Travel	Budget Weight: Schools to D.O. Travel	Index: Super. P.D. in ANC Travel	Budget Weight: Super. P.D. in ANC Travel	Index: School Oversight	Budget Weight: School Oversight	Index: Maint. Travel	Budget Weight: Maint. Travel
Denali Borough	1.56	1.89	3.89%	7.91	3.89%	1.89	15.05%	1.41	12.84%	1.89	0.88%	1.36	63.44%
Alaska Gateway	2.05	2.21	3.25%	10.60	3.25%	2.21	16.69%	1.89	4.77%	2.21	0.67%	1.87	71.36%
Aleutian Region	4.85	276.38	3.26%	30.02	3.26%	222.60		3.22	36.84%	166.27	0.44%	5.20	50.41%
Anchorage	1.00	1.00	1.80%	1.00	1.80%	1.00	11.57%	1.00	0.37%	1.00	0.56%	1.00	83.89%
Annette Island	1.22	1.00	3.70%	12.71	3.70%	1.00	30.38%	2.30	8.71%	1.00	1.84%	1.06	51.67%
Bering Strait	17.18	186.23	14.55%	19.58	14.55%	150.48	16.72%	2.06	5.91%	113.05		4.96	48.00%
Bristol Bay Borough	2.11	1.00	11.46%	9.14	11.46%	1.00	9.71%	1.64	1.07%	1.00	1.22%	2.12	65.09%
Chatham Region	4.15	74.36	4.05%	9.92	4.05%	49.55	12.35%	1.54	18.67%	23.57	4.04%	2.27	56.85%
Chugach	5.48	74.34	4.94%	6.08	4.94%	44.89	27.83%	1.00	10.85%	14.04		1.94	51.16%
Copper River	1.55	1.67	3.79%	7.03	3.79%	1.67	27.41%	1.25	7.66%	1.67	1.17%	1.39	56.18%
Cordova City	1.15	1.00	5.98%	8.82	5.98%	1.00	22.51%	1.60	3.77%	1.00	0.70%	0.99	61.06%
Craig City	1.69	1.00	13.12%	22.46	13.12%	1.00	18.59%	4.07	3.04%	1.00	0.38%	1.15	51.74%
Delta Greely	1.20	1.00	6.64%	6.07	6.64%	1.00	14.75%	1.10	3.68%	1.00	1.53%	1.09	66.76%
Dillingham City	1.15	1.00	2.66%	9.20	2.66%	1.00	35.96%	1.67	5.79%	1.00	0.90%	1.10	52.04%
Fairbanks North Star Borough	1.22	1.00	7.63%	8.34	7.63%	1.00	26.61%	1.50	1.78%	1.00	0.44%	1.05	55.92%
Galena City	1.38	1.00	5.16%	10.74	5.16%	1.00	15.51%	1.94	6.40%	1.00	13.88%	1.33	53.89%
Haines Borough	1.59	1.00	3.13%	9.82	3.13%	1.00	6.31%	1.78	24.21%	1.00	2.33%	1.52	60.88%
Hoonah City	1.35	1.00	4.41%	12.09	4.41%	1.00	17.49%	2.19	1.37%	1.00	0.68%	1.28	71.63%
Hydaburg City	1.39	1.00	1.90%	11.41	1.90%	1.00	10.98%	2.07	7.12%	1.00	1.64%	1.35	76.45%
Iditarod Area	15.10	236.19	10.97%	18.62	10.97%	182.40	15.33%	1.74	9.99%	126.07	2.45%	5.13	50.28%
Juneau Borough	1.20	1.00	7.05%	9.82	7.05%	1.00	27.56%	1.77	1.54%	1.00	1.63%	1.02	55.17%
Kake City	1.90	1.00	1.15%	12.27	1.15%	1.00	25.08%	2.22	5.56%	1.00	0.40%	2.35	66.66%
Kenai Peninsula Borough	1.37	3.63	2.25%	6.92	2.25%	3.63	8.79%	1.20	0.64%	3.63	0.69%	1.15	85.38%
Ketchikan Gateway Borough	1.04	1.00	3.25%	10.22	3.25%	1.00	23.78%	1.85	2.92%	1.00	1.70%	0.91	65.10%
Klawock City	1.39	1.00	5.50%	11.66	5.50%	1.00	8.73%	2.11	25.04%	1.00	4.30%	1.02	50.93%
Kodiak Island Borough	2.72	19.98	5.99%	10.07	5.99%	12.65	15.59%	1.78	4.85%	4.97	5.53%	1.31	62.04%
Kuspuk	4.66	40.21	1.14%	13.33	1.14%	40.21	25.66%	1.83	10.01%	40.21	2.33%	1.87	59.72%
Lake And Peninsula	11.52	165.38	1.16%	13.56	1.16%	111.59	30.43%	1.84	9.08%	55.26	1.45%	4.14	56.72%
Lower Kuskokwim	8.26	67.95	7.62%	10.62	7.62%	46.04	26.82%	1.67	1.99%	23.10	2.48%	2.52	53.47%
Lower Yukon	12.27	169.94	1.58%	21.54	1.58%	146.50	24.47%	2.22	15.26%	121.96	2.53%	5.34	54.59%
Matanuska-Susitna Borough	1.22	1.49	3.87%	6.09	3.87%	1.49	14.32%	1.08	1.38%	1.49	0.96%	1.07	75.60%
Nenana City	1.33	1.00	6.37%	8.14	6.37%	1.00	16.40%	1.47	7.16%	1.00	1.30%	1.21	62.39%
Nome City	1.36	1.00	4.26%	12.80	4.26%	1.00	22.57%	2.31	4.48%	1.00	3.82%	1.31	60.62%
North Slope Borough	11.51	96.64	4.92%	17.02	4.92%	70.35	27.68%	2.56	7.91%	42.82	1.65%	4.25	52.92%
Northwest Arctic	5.23	33.45	1.90%	12.76	1.90%	26.58	21.76%	2.06	3.62%	19.39	1.29%	2.99	69.53%
Pelican City	1.08	1.00	4.46%	13.96	4.46%	1.00	14.74%	2.53	3.45%	1.00		0.91	72.60%
Petersburg City	1.03	1.00	1.53%	12.86	1.53%	1.00	16.35%	2.33	5.66%	1.00	3.12%	0.92	71.81%
Pribilof Island	3.82	3.18	5.36%	16.08	5.36%	3.18	20.07%	2.87	13.36%	3.18	1.19%	3.89	54.65%
Sitka Borough	1.06	1.00	3.06%	9.82	3.06%	1.00	8.99%	1.78	5.27%	1.00	1.18%	0.95	78.44%
Skagway City	1.46	1.00	2.22%	10.43	2.22%	1.00	11.36%	1.89	5.84%	1.00	1.72%	1.46	76.65%
Southeast Island	2.72	16.77	4.41%	14.76	4.41%	14.33	15.27%	2.51	5.15%	11.77	0.33%	1.52	70.43%
Southwest Region	3.25	20.45	6.80%	10.83	6.80%	20.45	15.82%	1.67	8.03%	20.45	1.42%	1.51	61.12%
Saint Marys City	2.24	1.00	3.58%	12.27	3.58%	1.00	10.26%	2.22	23.33%	1.00	2.51%	2.55	56.75%
Unalaska City	1.61	1.00	3.61%	14.76	3.61%	1.00	10.80%	2.67	15.16%	1.00	1.28%	1.42	65.54%
Valdez City	1.08	1.00	1.54%	8.29	1.54%	1.00	17.21%	1.50	6.73%	1.00	5.77%	1.02	67.21%
Wrangell City	1.61	1.00	5.47%	10.23	5.47%	1.00	12.53%	1.85	18.43%	1.00	1.88%	1.52	56.23%
Yakutat City	3.41	15.09	4.54%	11.18	4.54%	11.62	15.36%	1.92	18.28%	7.98	5.39%	2.10	51.88%
Yukon Flats	4.83	146.14	1.47%	14.76	1.47%	92.35	13.38%	2.34	17.78%	36.02	1.02%	2.81	64.88%
Yukon Koyukuk	5.32	65.49	4.24%	11.71	4.24%	53.82	19.38%	1.56	13.78%	41.60	3.31%	2.20	55.05%
Tanana City	1.53	1.00	1.10%	11.04	1.10%	1.00	12.36%	2.00	14.34%	1.00		1.53	70.81%
Yupit	3.21	6.43	6.01%	10.48	6.01%	6.43	21.44%	1.81	14.32%	6.43	0.54%	2.25	51.69%
Kashunamiut	2.29	1.00	7.81%	12.95	7.81%	1.00	17.41%	2.34	14.93%	1.00	2.03%	2.72	50.01%
Aleutians East Borough	8.98	77.08	11.27%	14.10	11.27%	52.08	15.99%	2.27	6.33%	25.89	0.69%	3.62	54.43%

Energy Index

	Overall Energy Index	Budget Weight: Energy
Denali Borough	1.66	100.00%
Alaska Gateway	3.79	100.00%
Aleutian Region	4.97	100.00%
Anchorage	1.00	100.00%
Annette Island	0.75	100.00%
Bering Strait	4.09	100.00%
Bristol Bay Borough	2.96	100.00%
Chatham Region	3.72	100.00%
Chugach	1.43	100.00%
Copper River	2.37	100.00%
Cordova City	1.64	100.00%
Craig City	1.87	100.00%
Delta Greely	2.33	100.00%
Dillingham City	2.16	100.00%
Fairbanks North Star Borough	1.61	100.00%
Galena City	2.87	100.00%
Haines Borough	1.80	100.00%
Hoonah City	4.62	100.00%
Hydaburg City	1.23	100.00%
Iditarod Area	5.12	100.00%
Juneau Borough	0.74	100.00%
Kake City	2.38	100.00%
Kenai Peninsula Borough	1.34	100.00%
Ketchikan Gateway Borough	0.75	100.00%
Klawock City	1.87	100.00%
Kodiak Island Borough	1.95	100.00%
Kuspuk	1.67	100.00%
Lake And Peninsula	4.62	100.00%
Lower Kuskokwim	3.43	100.00%
Lower Yukon	3.17	100.00%
Matanuska-Susitna Borough	1.06	100.00%
Nenana City	1.81	100.00%
Nome City	2.40	100.00%
North Slope Borough	9.31	100.00%
Northwest Arctic	4.93	100.00%
Pelican City	1.28	100.00%
Petersburg City	1.24	100.00%
Pribilof Island	1.31	100.00%
Sitka Borough	0.91	100.00%
Skagway City	1.65	100.00%
Southeast Island	1.12	100.00%
Southwest Region	3.41	100.00%
Saint Marys City	3.94	100.00%
Unalaska City	1.89	100.00%
Valdez City	1.61	100.00%
Wrangell City	1.05	100.00%
Yakutat City	3.39	100.00%
Yukon Flats	5.43	100.00%
Yukon Koyukuk	4.73	100.00%
Tanana City	4.67	100.00%
Yupit	3.58	100.00%
Kashunamiut	2.76	100.00%
Aleutians East Borough	3.23	100.00%

Personnel Index

	Overall Personnel Index	Index: Admin	Budget Weight: Admin	Index: Classified	Budget Weight: Classified	Index: Teacher	Budget Weight: Teacher
Denali Borough	1.00	0.97	8.89%	1.01	27.10%	1.00	64.01%
Alaska Gateway	1.05	0.97	10.37%	1.09	25.34%	1.05	64.29%
Aleutian Region	1.20	1.25	26.91%	1.23	20.43%	1.17	52.66%
Anchorage	1.00	1.00	6.55%	1.00	27.02%	1.00	66.43%
Annette Island	1.02	0.95	9.50%	0.93	25.60%	1.08	64.90%
Bering Strait	1.13	1.05	7.61%	1.19	28.92%	1.11	63.47%
Bristol Bay Borough	1.03	1.01	8.53%	1.03	24.91%	1.03	66.56%
Chatham Region	0.95	1.05	12.07%	0.92	23.15%	0.95	64.78%
Chugach	0.98	1.11	10.72%	0.98	25.48%	0.96	63.79%
Copper River	1.01	0.99	8.95%	1.05	27.34%	0.99	63.71%
Cordova City	1.01	0.99	7.68%	0.96	25.48%	1.04	66.85%
Craig City	0.99	0.95	9.41%	0.90	24.52%	1.02	66.07%
Delta Greely	0.99	0.94	8.37%	0.98	24.91%	1.00	66.71%
Dillingham City	1.07	1.02	7.70%	1.05	24.68%	1.08	67.62%
Fairbanks North Star Borough	1.05	0.97	6.54%	1.04	25.91%	1.06	67.55%
Galena City	1.06	0.97	10.49%	1.14	29.32%	1.04	60.19%
Haines Borough	0.96	0.94	9.18%	0.90	24.47%	0.99	66.35%
Hoonah City	0.96	1.06	10.19%	0.93	26.92%	0.95	62.89%
Hydaburg City	0.99	1.00	14.52%	0.91	23.08%	1.02	62.40%
Iditarod Area	0.99	0.93	6.91%	0.98	29.28%	1.01	63.82%
Juneau Borough	1.01	0.99	6.35%	1.02	27.55%	1.01	66.10%
Kake City	0.97	1.09	9.95%	0.93	25.32%	0.97	64.73%
Kenai Peninsula Borough	0.98	0.97	6.92%	1.03	23.66%	0.96	69.41%
Ketchikan Gateway Borough	1.01	0.99	7.73%	0.92	24.99%	1.04	67.28%
Klawock City	0.97	1.05	9.81%	0.91	23.58%	0.97	66.61%
Kodiak Island Borough	1.03	0.97	8.01%	1.03	25.16%	1.03	66.83%
Kuspuk	1.05	0.99	7.94%	1.07	29.16%	1.06	62.91%
Lake And Peninsula	1.02	0.96	6.77%	0.99	24.55%	1.04	68.69%
Lower Kuskokwim	1.12	1.04	8.18%	1.23	32.54%	1.07	59.28%
Lower Yukon	1.09	1.02	8.76%	1.13	25.16%	1.09	66.08%
Matanuska-Susitna Borough	0.97	0.96	6.18%	0.96	25.13%	0.98	68.69%
Nenana City	0.98	0.93	11.34%	0.98	25.03%	0.99	63.63%
Nome City	1.06	1.03	6.16%	1.12	26.14%	1.05	67.70%
North Slope Borough	1.28	1.17	5.83%	1.48	35.45%	1.18	58.73%
Northwest Arctic	1.17	1.07	8.56%	1.24	29.11%	1.14	62.33%
Pelican City	0.94	1.03	12.27%	0.90	33.69%	0.95	54.04%
Petersburg City	0.98	0.94	7.27%	0.91	24.01%	1.01	68.72%
Pribilof Island	1.17	1.25	9.46%	1.22	28.41%	1.13	62.13%
Sitka Borough	1.00	1.00	8.80%	0.93	20.82%	1.02	70.38%
Skagway City	0.94	1.04	8.85%	0.90	26.61%	0.95	64.54%
Southeast Island	0.93	1.01	8.73%	0.87	26.53%	0.94	64.74%
Southwest Region	1.05	0.97	8.84%	1.03	25.08%	1.06	66.08%
Saint Marys City	1.04	1.12	12.02%	1.09	24.76%	1.01	63.23%
Unalaska City	1.11	1.05	11.76%	1.08	23.08%	1.14	65.16%
Valdez City	1.01	1.01	7.98%	0.98	25.02%	1.02	67.00%
Wrangell City	0.97	0.94	7.69%	0.89	25.88%	1.01	66.43%
Yakutat City	0.99	1.09	10.78%	0.97	25.30%	0.97	63.92%
Yukon Flats	1.03	0.93	11.96%	1.06	27.18%	1.03	60.87%
Yukon Koyukuk	1.07	0.94	11.68%	1.06	24.11%	1.10	64.21%
Tanana City	1.01	1.04	18.72%	1.03	26.24%	1.00	55.04%
Yupik	1.06	0.98	10.30%	1.08	32.26%	1.06	57.44%
Kashunamiut	1.09	1.02	12.69%	1.14	26.69%	1.08	60.63%
Aleutians East Borough	1.13	1.10	9.28%	1.12	22.66%	1.14	68.06%

SCOMM

137:23



Representative Beth Kerttula

Alaska State Legislature District 3

House Bill 200

Pupil/Teacher Ratio in Public Schools

Sponsor Statement

The education of our children is the most important thing the people have entrusted to government. House Bill 200 provides the Alaska State Legislature with a common sense opportunity to improve the quality of Alaska's public education system.

Volumes of research have shown that smaller class sizes lead to a better educational experience for children, parents, and teachers. Alaska's Class Size Reduction Project, conducted from 1993 to 1996 by the Institute of Social and Economic Research at the University of Alaska Anchorage, was designed to "assess the effectiveness of reduced class size...on student achievement and attitude, school discipline, and parental involvement in education." With smaller class sizes, the study found significant improvement in

- Student attitude toward learning and school;
- Classroom climate and behavior;
- Academic achievement;
- Students' self-esteem; and
- Parental involvement in their children's education.

House Bill 200 sets maximum pupil teacher ratios for classes at 18:1 in grades kindergarten through three, 20:1 in grades four through six, and 25:1 in grades seven through twelve. Classes in art, library, music, computer science, vocational-technical, and physical education are not subject to the maximum pupil teacher ratio. House Bill 200 also allows for a phase-in period by allowing larger class sizes, so long as the ratio of students to teachers is two less than it was in the pervious year.

By reducing class sizes, House Bill 200 will help all of Alaska's students achieve in our public education system.

SCOMM

137:24

STATE OF ALASKA



Interim:

119 North Cushman St., Rm. 205
Fairbanks, Alaska 99701
(907) 456-7423
Fax: (907) 451-9293

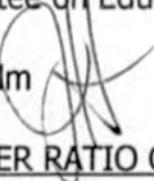
Session:

State Capitol Building
Juneau, Alaska 99801
(907) 465-3466
Fax: (907) 465-2937

REPRESENTATIVE JIM HOLM DISTRICT 9

DATE: January 25, 2006

TO: Representative Mark Neuman, Chair
House Special Committee on Education

FROM: Representative Jim Holm 

RE: HB 228, PUPIL-TEACHER RATIO GRADES K-3

Please schedule HB 228 for hearing in your committee as soon as possible.

The attached Sponsor Statement addresses the blank Committee Substitute version LS0673\F, which I hope your committee will adopt. Also attached is the original bill and other pertinent information.

Thanks so much for your help with this bill.

STATE OF ALASKA



Interim:

119 North Cushman St., Rm. 205
Fairbanks, Alaska 99701
(907) 456-7423
Fax: (907) 451-9293

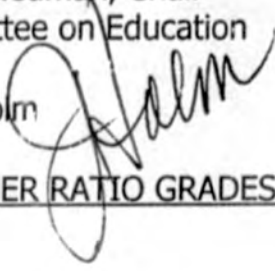
Session:

State Capitol Building
Juneau, Alaska 99801
(907) 465-3466
Fax: (907) 465-2937

REPRESENTATIVE JIM HOLM DISTRICT 9

DATE: April 28, 2005

TO: Representative Mark Neuman, Chair
House Special Committee on Education

FROM: Representative Jim Holm 

RE: HB 228, PUPIL-TEACHER RATIO GRADES K-3

Please schedule HB 228 for hearing in your committee as soon as possible.

The attached Sponsor Statement addresses the blank Committee Substitute version LS0673\F, which I hope your committee will adopt.

Thanks so much for your help with this bill.

Education
Committee

April 18, 2006

HB 228
Representative Holm

Pupil-Teacher Ratio
Grades K-3

1

HB 228
Sponsor Statement

2

CS for HB 228
HB 228

3

HB 228
Legislative Research

4

Current
Pupil-Teacher
Ratios

5

Fiscal
Notes

6

7

Representative Jim Holm
Alaska State Legislature
District 9

Session

Capitol Building, Room 110
Juneau, AK 99801
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Interim

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Fairbanks, AK 99701
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CS HB 228
Sponsor Statement

4/28/05

"An Act imposing a maximum pupil-teacher ratio for grades kindergarten through three in public schools"

Today we all recognize the difficulties of complying with "No Child Left Behind." Classroom instruction is impacted by a number of factors including discipline, materials, curriculum, teacher competency, and the number of students per class. HB 228 is an attempt to fix one of the major classroom problems, the pupil-teacher ratio (PTR). Generally we have turned to school boards to manage classroom size, but it has not worked as well as we'd like.

If the problem in higher grades is a lack of preparedness, discipline, and motivation, then I suggest this could be mitigated by laying a better foundation in early grades with a lower PTR.

Our kindergarten through third grade teachers are now expected to provide for each individual child's different learning style. One of the major retention problems in these grades is PTR. The old "sit quietly and learn together" idea is obsolete – so it requires space, to separate children who just can't learn while sitting still, from those who learn best that way and are distracted by those who can't. It also requires a great deal of individual attention. Neither is possible with a PTR higher than 20-1.

It's my intent that schools be given four years to comply, starting with Kindergarten the first year, then K+1, K+1-2, and finally K+1-3 in year four. Districts should also be allowed to have multi-age classrooms as long as the ratio remains no higher than 20-1.

Requiring a maximum PTR of 20-1 in grades K-3 will allow teachers to give our kids a much better foundation, and I urge your support for HB 228.

Education
Committee

April 18, 2006

HB 228
Representative Holm

Pupil-Teacher Ratio
Grades K-3

1

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CS for HB 228
HB 228

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24-LS0763VF
Mischel
4/27/05

CS FOR HOUSE BILL NO. 228()
IN THE LEGISLATURE OF THE STATE OF ALASKA
TWENTY-FOURTH LEGISLATURE - FIRST SESSION

BY

Offered:
Referred:

Sponsor(s): REPRESENTATIVE HOLM

A BILL

FOR AN ACT ENTITLED

1 **"An Act imposing a maximum pupil-teacher ratio for grades kindergarten through**
2 **three in public schools."**

3 **BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:**

4 *** Section 1.** AS 14.03 is amended by adding a new section to read:

5 **Sec. 14.03.065. Maximum pupil-teacher ratio.** (a) In a public school, the
6 ratio of pupils to a teacher may not exceed 20 to one in a class in grades kindergarten
7 through three.

8 (b) The pupil-teacher ratio established under (a) of this section does not
9 preclude mixed-age classes as long as the ratio is not exceeded in a class with students
10 in grades kindergarten through three.

11 (c) In this section, "teacher" means a person who holds a teacher certificate
12 under AS 14.20.020 and is engaged in classroom teaching in a regular instructional
13 program.

14 *** Sec. 2.** The uncodified law of the State of Alaska is amended by adding a new section to

1 read:

2 TRANSITION. The pupil-teacher ratio established under AS 14.03.065, added by
3 sec. 1 of this Act, shall be implemented after the effective date of this Act as follows:

4 (1) during the first school year, the ratio of pupils to a teacher may not exceed
5 20 to one in a class in grade kindergarten;

6 (2) during the second school year, the ratio of pupils to a teacher may not
7 exceed 20 to one in a class in grades kindergarten through one;

8 (3) during the third school year, the ratio of pupils to a teacher may not exceed
9 20 to one in a class in grades kindergarten through two; and

10 (4) during the fourth school year and thereafter, the ratio of pupils to a teacher
11 may not exceed 20 to one in a class in grades kindergarten through three.

Education
Committee

April 18, 2006

HB 228
Representative Holm

Pupil-Teacher Ratio
Grades K-3

1

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3

HB 228
Legislative Research

4

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7

Legislative Research Services

Alaska State Legislature
Legislative Affairs Agency
Division of Legal and Research Services

State Capitol, Juneau, AK 99801
Phone: 907-465-3991
Fax: 907-465-3908

April 12, 2005

Memorandum

TO: Representative Jim Holm

FROM: Chuck Burnham
Legislative Analyst

RE: Effects of Reducing Class Size in Primary Grades
LRS Report 05.250

You asked about research on the effects of reducing class sizes. Specifically, you asked that we provide a compilation of research that discusses the effects of limiting the size of kindergarten through third grade classes.

A number of states have implemented class size reduction policies in recent years in response to studies showing that smaller classes positively impact several aspects of education including students' level of academic achievement, their attitudes and attendance, and teacher morale and retention. The growing body of research on the subject indicates that small classes at the kindergarten through third, or "primary," grade levels provide the greatest and most long-lasting benefits.

Overall, at least 21 states have established maximum class sizes, most of which place particular emphasis on reducing the size of primary classes. Several states—California and Tennessee, for example—have undertaken large-scale studies on the impact of their class size reduction programs. Although the results of these studies are somewhat varied, there is growing consensus among researchers that policies encouraging smaller class sizes are generally beneficial. These positive results must be measured, however, against the sometimes drastic increases in costs associated with class size reduction programs, which include capital costs for expanding facilities and increased spending for the hiring of more teachers and staff. Further, researchers warn that the positive aspects of class size reduction can be reduced or eliminated where shortages of qualified, high quality teachers force school administrators to hire sub-par instructors.

A number of organizations involved with developing education policy have examined the body of research on class size and have synthesized the findings of that research into published reports. We provide, as attachments, three such reports as follows:

Attachment A: ERIC Clearinghouse on Educational Management, "Class Size: Can School Districts Capitalize on the Benefits of Smaller Classes?" *Policy Report*, No. 1, Spring 2000.

Attachment B: Ivor Pritchard, "Reducing Class Size: What Do We Know," U.S. Department of Education, Office of Educational Research and Improvement, November 1999.

Attachment C: National Conference of State Legislatures, "Small Learning Communities," 2004.

I hope you find this information to be useful. Please do not hesitate to contact us if you have questions or need additional information.

Attachment A

ERIC Clearinghouse on Educational Management, "Class Size: Can School Districts Capitalize on the Benefits of Smaller Classes?" *Policy Report*, No. 1, Spring 2000; available online at
http://eric.uoregon.edu/pdf/policy_reports/Class%20Size%20Policy%20Report.pdf

Alternatives to Class-Size Reduction

By Lawrence O. Picus

The research shows that reducing class size can, and probably does, lead to improved student performance. It is, however, a very expensive option: In addition to hiring more teachers, schools need additional classroom space. Before embarking on a substantial CSR program, policymakers may want to consider whether more cost-effective alternatives exist. Current research suggests that such alternatives are available and should be considered, either instead of—or in addition to—class-size reduction. One range of options deals with teacher knowledge and skills, while others relate to the structure of the education program offered at individual schools.

Teacher Knowledge and Skills

Reducing class size gives students greater access to teacher resources. There is evidence this will help students learn. However, what the teacher knows and is able to do is at least as important in helping students learn.

Darling-Hammond (1998) argues that "teacher expertise is one of the most important factors in determining student achievement." She quotes Greenwald, Hedges, and Laine's work (1996), which demonstrated the relative impact of spending \$500 more per pupil on increased teacher education, increased teacher experience, and increased teacher salaries. All three of these appear to have a greater impact on student test scores than does lowering the pupil-teacher ratio. For an expenditure of \$500, the greatest gains in student test scores (measured in standard deviation units from a range of tests in 60 studies) were achieved through increasing teacher education. Lowering the "pupil-teacher ratio was the least cost effective of the four methods. Increasing teacher salaries and experience fell between lower pupil-teacher ratios and teacher education in terms of cost effectiveness."

Ferguson (1991) found that the effects of teacher expertise in Texas

were so great that after controlling for socioeconomic status, disparities in achievement between black and white students were virtually entirely explained by differences in teacher qualifications. He found that teacher qualifications explained 43 percent of the variation among the factors affecting math score test gains, whereas small classes and schools only accounted for 8 percent of the gain. Home and family factors were identified as explaining the remaining 49 percent of the variance.

Darling-Hammond (1998) summarizes these findings by stating that "teachers who know a lot about teaching and learning and who work in settings that allow them to know their students well are the critical elements of successful learning." Smaller classes are clearly desirable in her view, but given limited funds to invest, her work suggests policymakers should at least take a close look at improving access to high-quality professional development first.

Professional development is frequently poorly funded in school districts and often the first item to be cut when finances become tight. Darling-Hammond's research suggests this may be a mistake, and in fact, more resources should be put into professional development. Even if class size is reduced,

professional development still may be essential to help teachers maximize their skills and capitalize on the benefits of having a reduced number of children for whom they are responsible. Certainly investments in professional development would be complementary to class-size-reduction programs.

Reducing class size and providing greater training opportunities for teachers are not the only options available for improving student learning. There are many things school board members and site leaders themselves can do to restructure their schools for improved learning. Several of these are briefly discussed below.

VIEWPOINT

"If you make the class size smaller and the teacher isn't doing a good job in the first place, it won't make a difference."

**- Kathy Christle,
Education
Commission of
the States**

Reorganizing Schools

Many of today's educational reforms are restructuring how educational resources are used. A number of the reform designs supported by the New American Schools (NAS), for example, rely on using teaching resources differently, rather than purchasing more. While seven designs supported by NAS require some investment on the part of a school or school district, most are less expensive than dramatic reductions in class size or pupil-teacher ratios. Most also come with substantial teacher-training components.

Odden and Busch (1998) found substantial gains in student performance, often as high as one-third of a standard deviation, at NAS design schools. These schools reach these performance levels with relatively little additional expenditures, generally averaging around \$50,000 to \$250,000 a year for a school of 500 students (an extra \$100 to \$500 per pupil each year). Odden and Busch argue that any school can reorganize itself into one of the NAS designs by looking closely at its current allocation of teachers and aides and reassigning them as needed to meet the design specifications. In many instances this calls for eliminating aides in favor of more teachers. Results of the Tennessee STAR project show that spending for teacher aides may not be productive anyway.

Another option schools can consider is restructuring the use of time. The National Commission on Time and Learning (1994) reported on a number of successful schools and school districts that had improved student performance through different ways of organizing the school day to give students more access to, and time with, teachers. Models that provide more access to learning resources, particularly teachers, may also be substantially more cost-effective than class-size reduction.

In conclusion, class-size reduction is currently one of the most

popular—and most expensive—educational reforms today. At least 21 states have enacted mandatory or voluntary policies aimed at reducing class size in the primary grades, and one (California) has even created an incentive to reduce the number of students in ninth-grade English and math classes.

The question facing state policymakers is whether substantial investments in smaller classes should be made. The research shows that such investments will lead to improved student outcomes. However, the research also shows that attention to teacher training and expertise may have a bigger payoff per dollar spent. Moreover, as California's experience shows, states that jump into a major CSR program quickly may find they have a shortage of qualified teachers. Given the importance of high-quality teaching to student learning, investment in the quality of the teaching force first might be a better way to maximize the potential of the dollars that are used to reduce class size.

In short, few people appear to oppose class-size reduction. However, there are a number of things states and school districts can do to ensure that the substantial investment made in teachers and classrooms pays off to the maximum extent possible. Virtually all of them revolve around ensuring that the state has the highest quality teaching force possible.

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Other Proposed Alternatives

Is there a way to achieve some of the benefits of small classes without actually decreasing their size? Class-size reduction has the disadvantage of requiring more funding and more teachers, both of which are in short supply.

To avoid these problems of CSR, some policymakers, legislative analysts, and school officials have proposed alternative forms of instruction and grouping that may help to produce the same effects as reduced class size. These strategies, unlike the alternatives discussed by Dr. Picus in the accompanying article, have not been found by research to have benefits comparable to a reduced pupil/teacher ratio.

- The use of cooperative-learning groups, block groups, and other kinds of small groups to give students intensive small-group instruction in areas such as reading, writing, and math; these methods might be used in conjunction with large-class instruction.
- Scheduling changes that decrease the size of some targeted classes throughout the school day.
- Peer tutoring where students get one-on-one attention.
- Use of parent and community volunteers to provide enrichment and assistance in the classroom.
- Team teaching.
- Use of computers and other individualized aids, such as learning centers.
- Pullout programs for students with special needs.
- The use of teacher aides to work in an instructional capacity.

Addressing Professional Development

It is ironic that smaller class size has become a policy goal at a time when teachers, at least in some states and in some subject areas, are in short supply. Where will the teachers come from to fill the extra classrooms smaller size dictates? To hire the two million teachers the U.S. Department of Education estimates will be needed during the next ten years because of retirements and increasing enrollment, some of the nation's school districts may have to hire teachers who are only marginally well trained in the fields they are expected to teach. Enter the need for professional development

Excellent professional development that focuses on standards and sound instructional delivery can give inexperienced teachers the skills and knowledge they need to capitalize on smaller class size. Followup support and feedback can help teachers retain and refine those skills. Highly skilled and trained teachers also benefit from professional development that keeps them motivated and enthusiastic.

In California, many teachers have received emergency credentials to fulfill CSR requirements. Recent legislation in that state requires school districts to provide professional-development programs for all teachers who are assigned to smaller classes. The law specifies that professional development for these teachers must focus on individualized instruction, effective classroom management, and responsiveness to student needs.

A task force that recently conducted the first comprehensive examination of teacher quality in California in over ten years recommended that the state offer districts financial incentives of "up to \$250 per student to restructure the teaching day and year to enable teachers to participate in well-crafted programs of professional learning experiences" (Bradley 1999).

In North Carolina, the "Success Starts Small" study followed four teachers in a class-size-reduction

project. During the first year, the teachers received twenty hours of "staff development studying strategies for more active learning for six-year olds." They also visited small-size classrooms in surrounding districts and met on a weekly basis to debrief and plan. They attended seminars and were introduced to computer-based learning. These teachers focused on finding ways to work with all children.

Professional development must be flexibly designed to meet the needs of each school situation. One

of its primary goals is to create a professional community for teachers. Group work, peer tutoring, and mentor programs that match master teachers with new teachers are tactics that can be used. Professional development should also address the diverse needs of students as teachers learn to identify and respond to learning problems (McRobbie 1998).

Professional development should also provide an opportunity for inquiry and reflection. Some educators believe that the primary focus of professional development should be to enable teachers to gain practice in new methods and to apply and adapt those methods to their individual classroom settings (Evertson and Randolph 1992).

Other educators have explored different priorities. Some believe that teachers benefit from assistance that broadens their theoretical understanding of student learning based on current research. According to Evertson and Randolph, student gains resulting from small class size will be most likely to be maintained when professional development (1) is embedded in school culture, (2) is based on a systematic approach to actual problems specific to teaching, and (3) supports change in teachers' thinking and practice. CL

VIEWPOINT

For \$1.2 billion you could retrain today's teachers so they knew their subject. You could give each of the nation's 2.7 million teachers a \$1,000 tuition grant to go learn math or really effective techniques for teaching reading. The question the public needs to ask is: 'What else could the money be used for?' and 'Do you make a national policy change on the basis of a hunch?'

- Chester Finn, Hudson Institute

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CLASS-SIZE-REDUCTION INITIATIVES, BY STATE

State (Date Began)	Policy Intent, Elements	Funding (1999-00 School Year)	Target	Level of Implementation	Implementation Issues
Alaska (1997, 1998)	Mandate. Enacted in 1997, amended in 1998. Legislation authorizes formation of smaller classes and provides funding for those schools choosing to do so.	\$1.58 million.	K-4	K-4—20 students per class	Approximately 20,000 new teachers were needed, so state relaxed teacher certification requirements. Other concerns include a surge of teachers moving from "less-advantaged" to more desirable districts to fill the newly created positions; a shortage of substitute teachers; supervision and training of noncertificated teachers.
California (1996)	Class Size Reduction Program. Goal is to improve early literacy by lowering K-3 class size to 20. Voluntary. Incentive dollars offered for each pupil in K-3 class of no more than 20. Professional development required, using existing funds.	\$1.53 billion.	All K-3 students, a total of approximately 1.3 million Implementation occurs in 1 st grade, then 2 nd , then K and/or 3 rd .	1997-98: 84%	Intense public pressure to implement quickly. Not enough qualified teachers (21% of 1996-7 new hires on emergency permits). Not enough classroom space. Enrollment boom. Equity.
Florida (1996)	Goal: 20 students per teacher.	\$100 million.	K-3 with a priority on K-1.		
Illinois (1981, 1988)	Initially a pilot program. Now statewide, mandatory.	\$5 million.	In 1988-89: K-1—18 students, 2-3 grade—20 students.		Teachers have reported improved student behavior, higher test scores, more efficient classrooms. Program evaluations, however, indicated a weak relationship between lower class size and student achievement, but significant improvement in teachers' morale and attitudes.
Indiana (1981)	Prime Time Program. Programs are decided at local level; funds are allocated at district level.	\$35.6 million.	For 1995-99: 18-20 students. For 1999-00: 15-18 students, depending on at-risk index.	Of 293 districts, only 3 do not participate.	
Iowa (1999)	Goal. Reduce K-3 class size to 17 for basic skills instruction. Great flexibility: districts can reduce class size, add kindergarten, hire paraprofessionals, provide professional development.	First year (1999-00) \$10 million, second year \$20 million, third year \$30 million, fourth year at least \$30 million.	K-3	All districts have established goals for the program.	Not enough dollars for some districts to hire new teachers. Lack of space in some buildings to add classrooms.
Louisiana (1986)	Districts that meet requirement not to exceed 20 students in K-3 classes can use CSR funds to hire certified teachers for other grades.	\$31.94 million.	K-3 classes not to exceed 20 (unless authorized in writing by superintendent).	All districts (except one small rural district) and all Type II charter schools are participating.	Difficulty locating and hiring certified teachers. Lack of classroom space.
Maryland (1999)	Learning Success Program. Goal is to reduce class size in grades 1 and 2 to 20 students, particularly in reading.	\$11.6 million.	Requires school systems to set performance targets; has a goal of hiring 1,000 teachers.	All districts will participate.	
Minnesota (1993)	Learning and Development Program. Goal is to reduce class size in grades K-6 to 17 students.	\$134.8 million, plus \$2.9 million from another program. Additional funding of \$98 million over 1999-00 and 2000-01 school years is directed at K-3 grades.	K-6 classes not to exceed 17 students.		
Nevada (1989)	Mandatory Phased-in program to lower early-grade size from average of 25 to 16.	\$82.9 million. Funding for 1998-99 could be used to reduce 3 rd grade to 19:1, or to adopt proven comprehensive programs for achievement. Funds teachers, not facilities.	Grades 1 & 2, at-risk K, and some 3.	Began with 1 st grade and some at-risk K, and expanded to 2 nd in 1991-2.	Not enough classroom space. Enrollment boom.
New York (1999)	Class Size Reduction Program. Goal is to reduce class size in grades K-3 to 20 students.	First year (1999-00) \$75 million; second year \$150 million; third year \$225 million.	Funds can be used for teacher salaries and benefits and for one-time startup costs for each new classroom; funds can't be used for professional development or for new buildings.		Few problems, the most pressing of which is lack of space for new classrooms.

State (Date Began)	Policy Intent, Elements	Funding (1999-00 School Year)	Target	Level of Implementation	Implementation Issues
Oklahoma (1990)	Mandate Fiscal and accreditation penalties for noncompliance. Physical education, music, vocational not subject to penalty.	Funding addressed through foundation program.	K, 1-3, 4-6. No more than 20 students in class.		
Ohio (1999)	To reduce class size in grades K-1.	\$131 million.	K-1	30% of school districts qualify for state funding.	Districts have complained of having difficulty locating classroom space and certified teachers.
South Carolina (1997)	Matching grant program (districts match state funds based on their ability to pay). Priority is given to districts with most critical needs and to districts with higher percentages of students qualifying for free or reduced-fee lunches.	\$34.16 million.	1-3. Goal is to reduce student-teacher ratio to 15:1 over time.	84 of 85 districts participating.	Facilities (state is addressing the issue through a \$750 million school facility bond bill for FY 2000).
Tennessee (1985)	Mandate: Class size in grades K-3 may not exceed 20. Districts have until 2002 to comply. Districts are allocated additional teachers to reduce pupil-teacher ratio to 15:1 for one-third of students on free and reduced lunch.	Total cost is state funded (no figure available).	K-3	In 1996-97, 98.2% of public school classes were at or below the class size maximums for individual classrooms.	Study showed greatest gains in inner-city small classes. Classes with teacher aides achieved slightly higher scores than regular classes, but differences were not statistically different.
Texas (1984, 1995)	Mandate Districts may not enroll more than 22 students per classroom, with a ratio of not less than 1 teacher to each 20 students in average daily attendance. Some exceptions apply.	Funds are not allocated specifically to CSR, which is required by law and funded through general aid to education.	K-4		
Utah (1990)	Goal: Focus on reading. Lower class size to 10 in K and to 15 in grades 1-3. Funding: Distributed: 80% per student, 20% to low income on a per-school basis. Evolving toward 100% allotment on per student basis.	\$67.03 million.	Initially K-4 (with half of district allocation to focus on K-2). 1996-7: Expanded to K-6. 1998-9: Expanded to K-8.	Most K-6 classes now number 21-25 students. Greatest reductions have taken place in K-4.	Not enough classroom space in nonrural areas. Enrollment boom (now leveling off).
Virginia (1996)	Voluntary	State funding, based on incremental cost of providing lower class sizes. Districts must provide matching funds.	K-3 schools with high or moderate concentrations of at-risk students.		
Washington (1986)	To enhance staffing in grades K-4 by funding an additional 4.2 certificated instructional staff (CIS) per 1,000 FTE students in grades K-3 (over the minimum of 49 CIS) and an additional 7.2 CIS in grade 4 (over the minimum of 46 CIS).	\$99 million.	K-4 (Prior to 1999-00, targeted grades were K-3).	In 1998-99, participation rate was 96.4%.	Most common reason districts give for not using the maximum available funding is lack of classroom space.
Wisconsin (1996)	Student Achievement Guarantee in Education (SAGE). Goal is to improve academic achievement through four methods, one of which is small classes of no more than 15 students in grades K-3. Originally limited to high-poverty schools, the SAGE law was changed this school year to allow any school to apply.	\$18.2 million. 2000-01: \$58.5 million.	K-3	Implementation takes place in waves. First wave of schools began in 1996-97 at K-1 grades, then added grade 2 in 1997-98 and grade 3 in 1998-99. Second wave began in 1998-99. Third wave will start in 2000-01.	
Wyoming	Education code says each district "shall endeavor to maintain when practicable" an average class size of no more than 20 students per teacher in grades K-3.	State funding mechanism encourages districts to achieve goal of reduced class size.	K-3		

Editor's Note: The Clearinghouse compiled the information contained in this table through telephone and email correspondence with contact persons in state departments of education in March and April 2000.