Review of Hawai‘i’s Weighted Student Formula 2006-07

Bruce D. Baker
Associate Professor
Department of Educational Leadership & Policy Studies
& Institute for Policy and Social Research (IPSR)
University of Kansas
Lawrence, KS 66045

Scott L. Thomas
Associate Professor
Institute of Higher Education & Department of Sociology
University of Georgia
Athens, GA 30602

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Executive Summary

In our initial report, released earlier this summer, we provided an overview of (a) the underlying conceptual basis for weighted student funding, (b) examples of approaches used in weighted student funding in other states and cities and (c) evidence on costs related to location, structural and student characteristics from cost studies performed in other state and local contexts. From those analyses, we concluded that Hawai‘i’s current weighted student formula is making a move in the right direction—toward more rational, need-based distribution of financial resources across schools. However, the phase-in process is dampening those effects significantly. Further, we concluded that even when fully implemented, the student need weights in the formula are much lower than both weights in other formulas and more importantly, empirical estimates of costs associated with student needs.

We report herein on more specific analyses of education costs, cost variations, and other data issues, applied directly to numerous Hawai‘i specific data sources. Information throughout our reports should be prioritized as follows:

1. Best Information:[1] The best information one can use to guide education policies, such as the design of a weighted student formula, is information based on rigorous empirical analyses in the policy context in question using the best available data and information. That is, ideally Hawai‘i’s WSF would be guided by Hawai‘i-specific analyses of costs and cost variations across Hawai‘i schools. However, context-specific findings may not always reconcile well with a broader research base, including studies on other policy contexts. Such problems may occur because of legitimate differences in policy context or because of data inadequacy. Second-best information may be used to question and/or modify policies.

2. Second-Best Information: Second-best information in this case is information based on the body of existing, empirically rigorous research on education costs and cost variations. Second best information, which has increased in volume and reliability in recent years, may play an important role in shaping Hawai‘i’s weighted student funding formula, especially where “best” information cannot be precisely derived or estimated.

Information on policies adopted in other states or cities, such as different levels of at-risk or limited English proficiency weights, are intended only to provide context and insights into the prevalence of and different approaches to these policies. That is, these examples are illustrative. Among other things, the policies and practices of other governments may

[1] While we borrow the terminology of “best” and “second best” from *rational choice theory* in economics, we do not actually apply these terms in their usual way. Specifically, in rational choice theory, best and second-best refer to the solution (and explanation for that solution), not the evidence or information that may lead to the solution. Rather, we felt that the terms were useful for conveying our views on how and which information should be given most serious consideration as the BOE and Committee on Weights move forward.

provide insights into potential pitfalls of certain approaches (such as concerns over endogeneity—a key concept addressed in our initial report to the Hawai'i BOE).

Pupil weights used in other state or city formulas should not be used as a benchmark for whether Hawai'i's weights provide sufficient equality of educational opportunity. Such evaluations should be based on best or second-best information. We emphasize that, contrary to other recent reports, a great deal of second-best information is available for guiding Hawai'i's weighted student formula. Further, empirically rigorous methods are available (some applied herein) for generating "best" information.

We offer what we see as a particularly problematic example (blatantly ignoring this reality) in the Fordham Institute's recent report *Fund the Child*[2]: a report which claims that there are neither available methods nor specific findings regarding how pupil weights should be set and/or who is in need of pupil weighting. *Fund the Child* provides unsatisfying descriptions and critiques of *expert costing* (professional judgment) and *successful schools* (average expenditure) methods for cost analysis, somehow missing entirely more rigorous econometric literature on education costs. We are comparably skeptical of these approaches. See pages 61 to 63 of our initial report for more thorough explanations and comparisons of cost analysis methods. *Fund the Child* then points to existing weights in city district models (with no description of the application or yield of those weights) as its only evidence of appropriate weighting strategies for a WSF.[3]

The authors of the report suggest that weights should simply be used for providing incentives for schools to serve certain children (in an open enrollment model), or that weights should simply be a result of political negotiation. Political negotiation is a reality of the process in which any and all school governance and finance policies are adopted. However, political negotiation can and should be informed by *best* and *second best* information—which is and/or can be available. Our previous report documents the types of problems that may occur when pupil weighting is determined solely on the basis of political preferences.[4]

The authors of Fund the Child seem unaware of the fact that a substantial body of rigorous empirical literature has evaluated education costs and cost variations associated with student needs, labor market variation and school and district characteristics. Peer reviewed articles on these topics appear in journals including the *National Tax Journal,*[5] *Journal of Policy Analysis and Management,*[6] *Journal of*

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[2] www.100percentsolution.org

[3] Citing a table from: T.R. DeRoche, B.S. Cooper, W.G. Ouchi and L. Segal. "When Dollars Follow Students: The Political Viability, Equity, and Workability of Weighted Funding Formulas." *The School Administrator*, August 2004, 14-17.

[4] In Kansas, leading to the necessity for the State Supreme Court to intervene, declaring the pupil weighting system "*politically distorted"* and the funding formula unconstitutional (*Montoy v. Kansas)*. Further, the Federal District Court of Kansas has acknowledged (and the 10th Circuit Court has affirmed), that differences created in funding across schools (via the weighting system) may be challenged in Federal Court as violation of equal protection (*Robinson v. Kansas)*, held to a *rational basis* standard. Arguably, any reasonable pupil weighting scheme should easily surpass this legal standard. That said, some may be so politically distorted that they cannot.

[5] Including, but not limited to Downes, T. and T. Pogue (1994) "Adjusting School Aid Formulas for the Higher Cost of Educating Disadvantaged Students." *National Tax Journal* XLVII (1994): 89-110, Duncombe, W.D. and J.M. Yinger (1998) "School Finance Reforms: Aid Formulas and Equity Objectives." *National Tax Journal* 51, (2): 239-63, Imazeki, Jennifer and Andrew Reschovsky, "Is *No*

Education Finance[7] and *Economics of Education Review*[8] among others.[9] We will gladly provide references to additional literature on request. We find omissions such as these unfortunate for such a highly publicized report on a topic that we believe is of considerable importance and a reform with great potential.

Here, we summarize what we do know, and what we don't know, to date regarding key issues pertaining to Hawai'i's Weighted Student Formula and decentralized governance plan.

What we know

Costs and Student Needs

Second-Best

The most rigorous empirical analyses of additional costs associated with limited English proficient and economically disadvantaged students identify weights for economic disadvantage ranging from 60% to over 100% (109%)[10] over *average funding* for economic disadvantage when using free or reduced lunch counts as a qualifying basis and well over 100% (149%) when using U.S. Census Poverty rates, and about 100% (103%) for limited English proficient students.

Child Left Behind an Un(or under)Funded Federal Mandate? Evidence from Texas*" National Tax Journal* 57, No. 3, September 2004: 571-88.

[6] Duncombe, W.D. and J.M Yinger (1997) "Why Is It So Hard to Help Central City Schools?" *Journal of Policy Analysis and Management* 16, (1): 85-113

[7] Imazeki, Jennifer and Andrew Reschovsky, "Financing Adequate Education in Rural Settings," *Journal of Education Finance* 29 Fall 2003: 137-156.

[8] W. Duncombe and J. Yinger. *How much more does a disadvantaged student cost? Center for Policy Research, Working Paper #60*. (Syracuse, NY: Maxwell School of Citizenship and Public Affairs. Syracuse University, 2004). Retrieved March 1, 2006 from http://www-cpr.maxwell.syr.edu/cprwps/pdf/wp60.pdf. This article also appears in the *Economics of Education Review*

[9] Instead, the authors of *Fund the Child* cite a handful of non-peer reviewed, politically motivated articles including Hanushek, E. (2005) "Pseudo-Science and a Sound Basic Education," Education Next 5(4) 67-73. Arguments put forth in this particular brief by Hanushek are refuted in Duncombe, W. (Fall 2006 – in Press) Responding to the Charge of Alchemy: Strategies for Evaluating the Reliability and Validity of Costing Out Research. *Journal of Education Finance* and in Baker, B.D. (Fall 2006 – in Press) Evaluating the Reliability, Validity and Usefulness of Education Cost Analyses. *Journal of Education Finance* Pre-publication drafts available on request.

[10] Including peer reviewed journal articles and working papers applying similar econometric methods by authors who have published peer reviewed articles on those methods. See for example: W. Duncombe and J. Yinger. *How much more does a disadvantaged student cost? Center for Policy Research, Working Paper #60*. (Syracuse, NY: Maxwell School of Citizenship and Public Affairs. Syracuse University, 2004). Retrieved March 1, 2006 from http://www-cpr.maxwell.syr.edu/cprwps/pdf/wp60.pdf. This article also appears in the *Economics of Education Review.*

Best

Estimates of additional costs associated with economic disadvantage based on cost function modeling applied to core staffing expenditures across Hawai‘i’s schools yield weights for poverty around 30%. These findings are low by comparison to other second-best estimates, but are based on school-level, rather than district-level, modeling. Also, they only capture differences in core staffing costs. Additional analyses are warranted. Nonetheless, even this relatively low estimate is much larger than Hawai‘i’s current weight. It is relatively safe to assume that Hawai’i should significantly increase the weighting on poverty in the WSF.

Reconciling Best & Second-Best

A handful of data concerns raised herein lead us to believe that further analyses are still warranted using Hawai‘i specific data. Nonetheless, even our current analyses suggest the need for significant ramping upward of student need weighting. Our Hawai‘i specific analyses herein were unable to estimate and disaggregate a specific weighting for ESLL children. As such, we lean toward second best information for meeting the needs of these children.

Costs and School or District Size

Second-Best

School-level economies of scale do exist, according to a comprehensive review of peer-reviewed, research journal articles, which find that in terms of outcome production, elementary schools of approximately 300 to 500 students are optimal, and high schools of approximately 600 to 900 students are optimal. There is no theoretically sound reason to assume that costs increase for larger schools. However, existing data show some decline in performance outcomes for these schools.[11]

Best

Estimates of additional costs associated with school size, based on cost-function modeling applied to core staffing expenditures across Hawai‘i’s schools, yield weights of approximately 60% for schools with 50 to 100 students, 40-45% for schools with 100 to 150 students, 30-35% for schools with 150 to 250 students, 20% for schools with 250 to 300 students, 13-15% for schools with 300 to 400 students, and 8-10% for schools with 400 to 550 students.

[11] Andrews, M., Duncombe, W., Yinger, J. (2002). Revisiting economies of size in American education: Are we any closer to consensus? *Economics of Education Review*, *21*, 245-262.

Reconciling Best & Second-Best

Estimates based on Hawai‘i data herein align nicely with existing literature on economies of scale in education and provide a sound basis for constructing a school size adjustment for application in the WSF. Further analyses are warranted regarding (a) the intersection between school size and grade level, and how school size related costs may vary by grade level, and (b) how non-personnel related costs vary by school size.

Teacher Sorting and School Characteristics

Second-Best

Teachers are highly sensitive to school location and work conditions, including student population characteristics, when making job choices. Teachers with stronger academic backgrounds—who are more likely to produce better student outcomes—are more likely to end up teaching in more desirable schools, where desirability includes fewer poor and minority students coupled with higher student achievement outcomes.[12] All else equal, it does appear that compensating differentials can matter,[13] and principals with strong academic backgrounds can draw teachers of similar background into higher-poverty schools when such teachers are available.[14]

Best

Analyses of data on Hawai‘i’s teachers confirms that more experienced teachers and teachers with advanced degrees are more likely to be teaching in lower-poverty, higher-performing schools, especially within diverse labor markets. This contrast is particularly observed between higher-poverty schools in Leeward O‘ahu compared with adjacent Central O‘ahu.

Reconciling Best & Second-Best

Again, what we find in Hawai‘i is largely consistent with other studies of teacher labor markets. In particular, the patterns of disparity in teacher qualifications across O‘ahu districts (with Leeward and Central as a specific contrast) by student population

[12] See for example, Lankford, H., Loeb, S., Wyckoff, J. (2002) Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis. Educational Evaluation and Policy Analysis. 24 (1) 37-62. See also, Boyd, D., Lankford, H., Loeb, S., Wyckoff, J. (2005) Explaining the Short Careers of High-Achieving Teachers in Schools with Low-Performing Students. *American Economic Review* 95 (2) 166-171

[13] Boyd, D., Lankford, H., Loeb, S., Wyckoff, J. (2005) Analyzing the Determinants of Matching of Public School Teachers to Jobs: Estimating Compensating Differentials in Imperfect Labor Markets. http://www.teacherpolicyresearch.org/portals/1/pdfs/AnalyzingDeterminants.pdf

[14] Baker, B.D., Cooper, B.S. (2005) Do Principals with Stronger Academic Backgrounds Hire Better Teachers? Policy Implications for High Poverty Schools. *Educational Administration Quarterly* 41 (3) 449-479

characteristics are highly related to existing literature. More difficult to discern is how the cross labor market variations (island to island) influence teacher job choices and mobility under Hawai'i's unique set of demographic and geographic circumstances. The information provided in this and our previous report might be used to push forward a *compensating differential* plan for staffing high poverty schools.

What we don't know

Decentralization, School Quality and Student Outcomes

We know little about the potential effects on student outcomes and school quality of decentralized budget control, whether or not it is coupled with weighted student funding. Existing reports do not provide sufficient answers to this question, making oversimplified apples-to-oranges comparisons.[15] Specifically pertaining to frequently-cited comparisons of performance outcomes in Seattle and Houston (decentralized[16]) with New York, Los Angeles and Chicago (centralized), we note that New York operates with 91% of average funding for its metropolitan area[17] and Chicago 84%, while Seattle operates with 126% and Houston 104% of their respective metro area averages. Los Angeles operates with 120%.[18] Because school quality is significantly determined by teacher quality, relative resource levels within the labor market are critical. So too are relative population characteristics, which strongly influence teacher sorting and student outcomes. New York City schools have poverty rates 4.61 times that of their metro area, Chicago schools 3.88 times metro average poverty, and Los Angeles, 2.11 times metro average poverty. Meanwhile Seattle has only 1.35 times the metro average poverty rate, and Houston has 1.87 times its metro average poverty rate. Further, Houston has the lowest black student concentration relative to its metro area among these districts.[19, 20]

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[15] For examples of frequently cited work in this area see: Ouchi, W.G., Cooper, B.S., Segal, L., DeRoche, T., Brown, C., & Galvin, E. (2003). Organizational Configuration and Performance: The Case of Primary and Secondary School Systems. http://www.williamouchi.com/docs/primary_secondary.pdf.; Ouchi, W.G. (2004, Winter). Academic Freedom. http://www.educationnext.org/20041/21.html; Ouchi, W.G. (2003). Making Schools Work: A Revolutionary Plan to Get Your Children the Education They Need. New York: Simon & Schuster.

[16] Though, as we noted in our original report, while Houston initiated a decentralized governance process around 1994, a weighted student formula did not come about until 2000-2001 initially, only in 2001-02 was it fully implemented. Yet performance comparisons were based on data from 1999 to 2001.

[17] With teachers in the Bronx, in 2002-03 earning, on average about $57,000 per year compared to teachers in adjacent suburban districts earning over $70,000 per year, and 20% more, on average at the same education level and years of experience (Based on analysis of New York State Education Department, Personnel master File Data, 2002-03).

[18] Los Angeles, Seattle and Houston all exist in relatively low average spending labor markets, adjusted for regional variation in wages using the NCES, Comparable Wage Index.

[19] *Data Source:* U.S. Census Bureau, Fiscal Survey of Local Governments, Public Elementary and Secondary Education Finances (F-33) 2002-03, U.S. Census Small Area Income and Poverty Estimates (SAIPE, 2003) & U.S. Census/National Center for Education Statistics, School District Demographic System (Census 2000). Analyses performed by Bruce D. Baker. More detail available on request.

Even if better comparisons could be made among these cities, we would be hard pressed to apply the findings to Hawai‘i. In discussing the importance of *relative funding* and *relative demographics* on teacher sorting, residential sorting and school quality in major metropolitan areas, we have been known to say, “No large district is an island.” We suspect the BOE can readily understand how this view is not applicable to Hawai‘i.

Indeed many scholars including ourselves believe that decentralization can lead to positive changes.[21] But, we are willing to acknowledge that the empirical basis for this assertion remains thin at best, especially as pertains specifically to decentralized city (or state) school systems and weighted student funding. We acknowledge that there exists a wider literature available on school-based management and participatory decision-making. This literature is only tangentially related to the issue at hand, as it mostly pertains to strategies implemented individual (or a small handful of) schools, and not as broader state policy.

Rigorous empirical analyses of domestic and international decentralized systems might also provide some guidance, but these analyses tend to find mixed and in some cases negative results.[22] Evaluations of charter school performance and efficiency might provide additional guidance and some recent studies do find increased efficiency in outcome production in charter schools.[23]

Indeed, there is a recent groundswell of interest and activity around this particular approach to decentralization, coupled with weighted funding. As with our treatment of other information in this report, we don’t believe it is sufficient to argue in favor of moving forward simply because others are doing it, like it, and *believe* strongly that it works. Many educational reform movements, some potentially good, some clearly bad have come and gone on this basis.

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[20] We note that analysis of federal data between 2000 and 2004 shows no clear pattern of decentralized cities either expending more on instructional costs or having fewer administrators – see data presented in Supplementary Material Tables A3 and A4 and Figures A1 through A4 at the end of this report. That said, the relationship between shares of budgets allocated to “instruction” or administrative ratios and student outcomes is unclear. We will gladly provide additional resources on this point on request.

[21] See for example, Ouchi, W.G. (2003). Making Schools Work: A Revolutionary Plan to Get Your Children the Education They Need. New York: Simon & Schuster.

[22] See for example, Grosskopf S., Moutray C. (2001). Evaluating Performance in Chicago Public High Schools in the Wake of Decentralization. *Economics of Education Review*, *20*, 1-14 or Gunnarsson, V., Orazem, P.F., Sanchez, M., Verdisco, A. (2004) Does School Decentralization Raise Student Outcomes: Theory and Evidence on the Roles of School Autonomy and Community Participation. Working Paper, Dept. of Economics. Iowa State University. http://www.econ.iastate.edu/faculty/orazem/School%20Autonomy%20final.pdf. The Chilean experience, provides additional mixed evidence, and is documented in: Patrick J. McEwan and Martin Carnoy (2000) The Effectiveness and Efficiency of Private Schools in Chile’s Voucher System. *Educational Evaluation and Policy Analysis* 22 (3) 213-240 . See also related work from Argentina in: Galiani, S., Gertler, P. and Schargrodsky, E. (2005). Helping the Good Get Better, but Leaving the Rest Behind: How Decentralization Affects School Performance: Working Paper: http://www.bu.edu/econ/ied/seminars/pdf/Schargrodsky4-24-06.pdf; and Nicaragua: Özler, B., King, E.M. (2004). What’s Decentralization Got to do With Learning? School Autonomy and School Performance. The World Bank. http://www.worldbank.org/research/pdffiles/king&boz.pdf.

[23] Timothy J. Gronberg and Dennis Jansen (2001) Navigating Newly Chartered Waters: An Analysis of Texas Charter School Performance. Texas Public Policy Foundation

We do not know, as yet, the best strategies for redistributing teacher quality. Most studies of teacher labor market behavior indicate that non-wage factors overwhelm wage variance in determining teacher job choices. However, most studies also recognize that this likely occurs because wage variation is not sufficient to change this behavior. Among those who have attempted to estimate necessary wage differentials for recruiting teachers into higher-poverty schools, Imazeki (2001) finds the need for a wage differential of 15-30% to draw teachers into high-poverty schools compared to average-poverty schools.[24] In an empirically more compelling two-sided matching analysis, Loeb and colleagues find the need for similar if not greater compensating differentials.[25]

How it applies to Hawai'i's WSF & Decentralized Funding Plan

In short, the evidentiary basis associating student needs and costs with achieving desired outcomes across students and settings is much stronger than the evidentiary basis for the effectiveness of decentralization as a tool for school reform. If we were to set priorities on the questions of pursuing decentralization versus refining the distribution of resources through the WSF, we would advocate strongly for first refining the distribution of resources through the WSF.

We would further advocate that the changes in the distribution of resources through the WSF should follow a *tilt then lift* strategy as presented at the end of this report. That is, emphasis should be placed first on increasing student-need weights, and second on leveling up overall school allocations. Arguably, by definitions laid out in our initial report, decentralized governance can neither be fair nor effective if it is not coupled with a well-developed resource allocation strategy built on adequate, equitably-distributed resource levels, addressing all relevant cost and need factors.

Finally, we feel the need to re-emphasize that the experience of city school districts with weighted student funding is not necessarily analogous to applying decentralization and a WSF in Hawai'i. Application of decentralization and weighted funding in Hawai'i is perhaps most analogous to state financing of charter schools and conventional public school districts in states such as Arizona. Unlike city school districts, Hawai'i must consider the position of necessarily small and remote schools. Within the boundaries of Seattle, Houston, San Francisco or Cincinnati, there is arguably no legitimate policy interest in supporting schools that are too small to be scale efficient, when doing so comes at the expense of other students' needs. The state of Hawai'i, like other states (including Kansas, Texas and Arizona) using weighted pupil funding and

[24] Imazeki, J. (2001) Moving On or Moving Out? Determinants of Job and Career Changes for Teachers. Working Paper, Department of Economics, San Diego State University.

[25] Boyd, D., Lankford, H., Loeb, S., Wyckoff, J. (2005) Analyzing the Determinants of Matching of Public School Teachers to Jobs: Estimating Compensating Differentials in Imperfect Labor Markets. http://www.teacherpolicyresearch.org/portals/1/pdfs/AnalyzingDeterminants.pdf

having vast expanses of remote rural areas, will need to find ways to accommodate small, remote schools, preferably using "best" information.[26]

[26] We note recent media coverage where an outside consultant proposed that small schools should simply be given a block of "around $250,000 for elementary schools; $300,000 for middle schools and $500,000 for high schools." (http://www.honoluluadvertiser.com/apps/pbcs.dll/article?AID=/20060716/NEWS07/607160342/1012/EDUCATION). We question the analytical basis for these recommendations, which appear little more than back-of-the-napkin. We acknowledge (with all due respect to the media) that media coverage may not have accurately portrayed this recommendation.

Table E1

Component	*Best Information*	*2nd Best Information*	Policy Recommendation
Base Cost per Pupil ($4,292)	No new information.	No new information.	Minimum actual basic funding per pupil is approximately $3,842 for proposed 2006-07 phase-in. We suggest that base funding be set at minimum actual level *for the short term*, and weights increased substantially. Future base funding should be tied to analyses of the costs of meeting state outcome standards (preferably via cost function analysis using complete information on historical school level spending).
Special Education Funding	Analyses herein suggest that high-incidence, low-severity disability students are distributed too unevenly across schools for flat allocation of special-education funding to be effective.	Analyses of existing spending on high-incidence, low-severity disability students typically show ratios of about 2x spending for non-disabled children (this is really 3rd best information, if that, because it is based on spending alone).	It might be reasonable to apply a weight of 2.0 x Base Funding, per high-incidence, low-severity disability child. Low-incidence, high-severity disabilities should most likely be handled outside of the WSF.
School Size Adjustment	60% for schools with 50 to 100 students; 40-45% for schools with 100 to 150 students; 30-35% for schools with 150 to 250 students; 20% for schools with 250 to 300 students; 13-15% for schools with 300 to 400 students; 8-10% for schools with 400 to 550 students.	School-level economies of scale do exist, according to a comprehensive review of peer-reviewed, research journal articles, which find that in terms of outcome production, elementary schools of approximately 300 to 500 students are optimal, and high schools of approximately 600 to 900 students are optimal.	Apply weightings to base funding according to cost-model findings herein, acknowledging that cost-model findings account for personnel-cost variation, including administrative personnel. Conduct additional analyses applying cost modeling to more comprehensive school-level spending data.
Free or Reduced Lunch weighting	School-level cost-function analysis on core staffing expenditures yielded effective weight of approximately 30%.	Effective weights from 60% to over 100% (109%) over *average funding* when using free- or reduced-lunch counts as a qualifying basis and well over 100% (149%) when using U.S. Census Poverty rates.	Implement weight of at least 30% using current count method (free and reduced). Conduct additional analyses applying cost modeling to more comprehensive school-level spending data.
ESLL weighting	School level cost function analysis did not yield specific ESLL weight, perhaps due to data concerns addressed herein. Additional analyses found ESLL and poverty rates not highly related and ESLL	About 100% (103%) for limited English proficient students.	Increase significantly current weighting for ESLL (toward 60% or higher). Conduct additional analyses applying cost modeling to more comprehensive school-level spending data.

Component	*Best Information*	*2nd Best Information*	Policy Recommendation
	classification to strongly influence student outcomes. As such, separate weighting is warranted.		
Transiency weighting	No new information.	No new information.	Conduct additional analyses applying cost modeling to more comprehensive school-level spending data.
Grade Level Adjustment	On average, cost model revealed higher per-pupil costs in secondary grades. However, the cost curve appears U-shaped—with higher costs in lower grades among lower grade schools and higher costs in upper grades among upper grade schools.	No new information.	Conduct additional analyses applying cost modeling to more comprehensive school-level spending data.
Between Labor Market Wage Variation	Non-teacher wages appear 17% higher on O‘ahu and 6% higher on Hawai‘i’s Big Island than in other labor markets. Non-teacher wages do not appear to translate to specific disadvantages for teachers in certain labor markets (at least from a cross-labor market perspective). While teachers on O‘ahu earn less than their peers in other professions, they appear at least equally qualified, on average, to teachers on other islands.		We do not, at this time, recommend acting on an inter-labor-market wage adjustment.
Within Labor Market Teacher Quality Variation	Analyses herein suggest significant disparities in terms of experience and degree levels across schools by poverty rates, especially on O‘ahu.	Tentative findings (listed under *what we don’t* know yet) suggest the need for wage differentials on the order of 30% in order to recruit teachers of comparable quality into higher-poverty schools within a specific labor market.	Either school administrators must be given latitude directly to use their poverty weighted funding to pay teachers a higher wage, or the BOE must develop a more highly-controlled system that grants school administrators the ability to pay compensating differentials.

1.0 Introduction

In accordance with our initial proposal to the Hawai‘i BOE (and subsequent contract) Stage 3 of our analyses and report consists of the following:

> **Stage 3 shall comprise the following: A preliminary evaluation of the cross-school distribution effects of the WSF.**
>
> The research on need-weighted state aid allocation formulas provides a number of useful lessons. Perhaps most important of these lessons is that it is as important to evaluate the actual distributions of aid to schools or districts through the formula with respect to student needs as it is to evaluate, *ex ante*, the features of the formula itself (i.e., the individual weights). As such, a preliminary evaluation of the forecast school-level budgets for School Year 2006-07 shall be prepared. This evaluation shall involve mapping those forecast revenues per pupil across Hawai‘i’s individual schools, thereby forecasting the influence of a variety of school-specific demographic measures driving funding allocations under the formula. Baker and Duncombe (2004) and Baker, Green, and Richards (in press) describe this approach as *need effect* and *implicit weight analysis*. By standardizing poverty measures (and ranges) to those used in other cost studies and state policies, one can make apples to apples comparisons of the relative strength of need adjustments.

Much of what was initially proposed for Stage 3 of our analysis has already been integrated into Stage 1 and Stage 2, results that have been delivered in our June 19, 2006 report, “Review of Hawai‘i’s Weighted Student Formula 2006-07.” This was done because, as we constructed Stage 2 analyses in particular, we felt a need to anchor those analyses to Hawai‘i-specific data. Section 3.4 of our initial report provides an overview of the *projected need effects* of Hawai‘i’s current 2005-06 allocation scheme, as well as 2006-07 proposed phase-in funding and full implementation of WSF. Table 20 (p. 74) of our earlier report provides the normalized comparisons described above for Hawai‘i’s weight for poverty compared with weights derived from recent education cost studies. Table 21 goes a step further to evaluate the cost-adjusted equity effects of phase-in versus full implementation of WSF. The analyses proposed in Stage 3, but integrated primarily into the first two sections of our report, led us to the conclusions that Hawai‘i’s new weighted student formula takes a step in the right direction toward creating more rational distribution of budgets to schools, but that the relatively slow phase in significantly dampens those effects, and further that even when fully implemented the student need weights for economically disadvantaged and limited English proficient students remain relatively small.

At the conclusion of Stage 1 and Stage 2, we noted the following:

> We suggest a series of additional analyses, some of which will be conducted within the third phase of this project. Among these analyses are:

a. Attempts to use Hawai‘i school data to estimate economies of scale weights for Hawai‘i elementary and high schools;
b. Attempts to use Hawai‘i teacher data to evaluate the need for targeted salary increases for hard-to-staff, high-need and geographically-isolated schools;
c. Attempts to evaluate the differences between performance of Hawai‘i’s unique LEP/ELL population and what is generally known and expected of LEP/ELL children; and
d. Attempts to evaluate overall, the student demographic and school contextual factors that most strongly influence performance outcomes and costs of improving those outcomes.

(P. 88, Review of Hawai‘i’s Weighted Student Formula 2006-07—Baker & Thomas, 2006)

This final stage of our analysis attempts to address these questions along with other issues raised in our report on stages 1 and 2, and it attempts to provide guidance in the phase-in of a rational, equitably-weighted student-funding formula for the State of Hawai‘i.

Our main substantive consideration in this report begins with Section 2.0, where we provide a discussion of the distribution of children with disabilities across Hawai‘i schools. In our earlier report, we indicated that special education funding for high-incidence, low-severity disabilities could be integrated with weighted student allocations as a flat, or block grant. However, the ability to do so with rational results is highly contingent upon relatively flat distribution of children with high-incidence, low-severity disabilities, such as specific learning disabilities. Next (Section 3.0), we address the labor market issues raised in our earlier report—specifically, whether higher poverty regions and schools are having difficulty recruiting similarly experienced and educated faculty under the current uniform salary schedule. Next (Section 4.0) we revisit the question of whether there is significant wage variation across labor markets in the state and whether non-teacher wage variation creates disadvantages in some regions under the current flat teacher salary system.

In Section 5.0, we provide a preliminary statistical evaluation of cost variations associated with school size and student poverty. Specifically, we use data from 2002 to 2005 to specify an education cost-function model to estimate the relative costs, under varied circumstances, of achieving state average outcomes as measured by school average scale scores on state reading and math assessments.

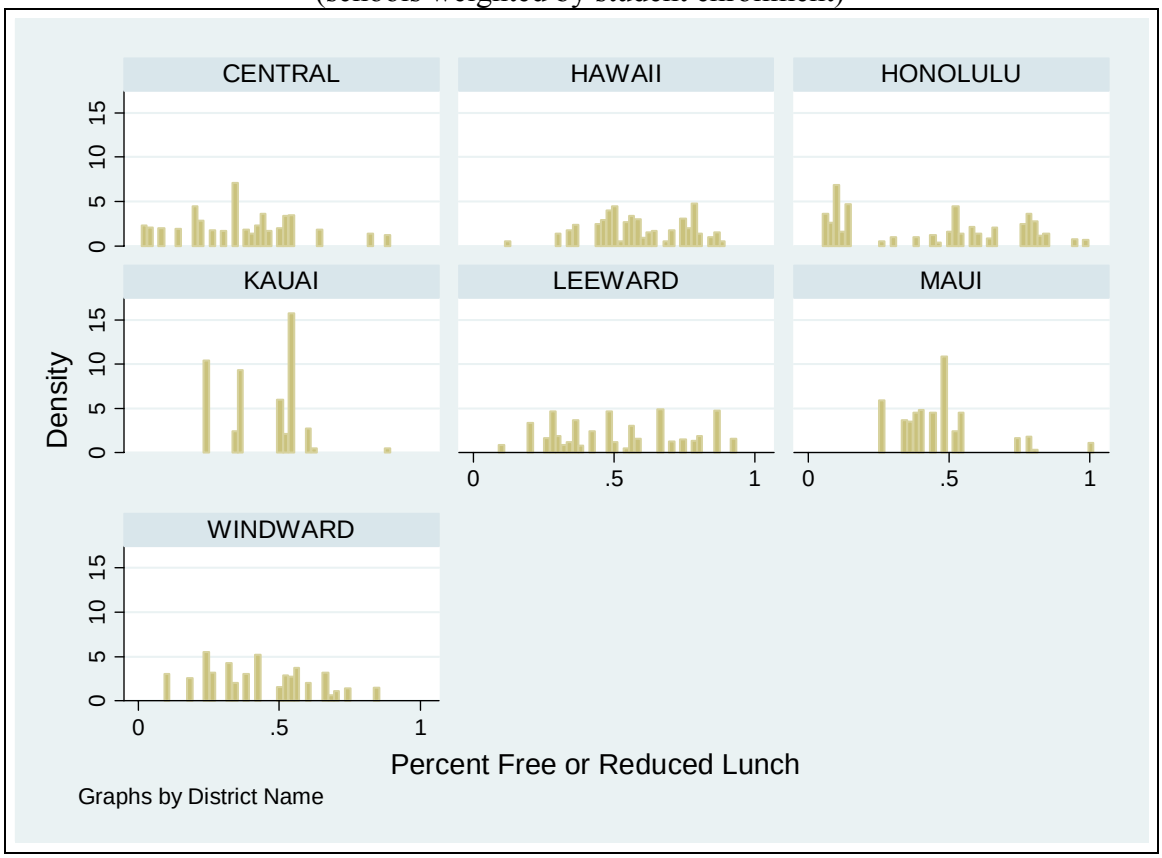
A critical omission of the Grant-Thornton cost study recently conducted for the Hawai‘i BOE were any estimates of how education costs vary from one location or setting to the next or one child to the next across the geographically and demographically diverse State of Hawai‘i. The Grant-Thornton study not only failed to consider how education costs might vary in schools of different size and for children of varied needs, but also failed to estimate a reasonable underlying competitive wage for the cost model, or how those wages might necessarily vary from one location to the next across the State of Hawai‘i.

Finally, in Section 6.0 we provide specific guidance and examples for revising the current weighted student formula.

Snapshot of Hawai'i School Demographics and their Relation to Outcomes

Before moving into the various analyses that form the backbone of our second and final report, we take a moment to provide a snapshot of the ways in which student need varies across the state schools—for this is the context within which the policy discussion about the WSF is taking place. Wide variance exists on a range of indicators that correspond to student need. These are well-known and include economic disadvantage, special education classification, and English proficiency. Figures 1 through 3 illustrate the degree to which variance exists on these measures for students in elementary schools across the state in 2005.

Figure 1
Frequency Distribution of Elementary School Subsidized Lunch Rates in 2005
(schools weighted by student enrollment)

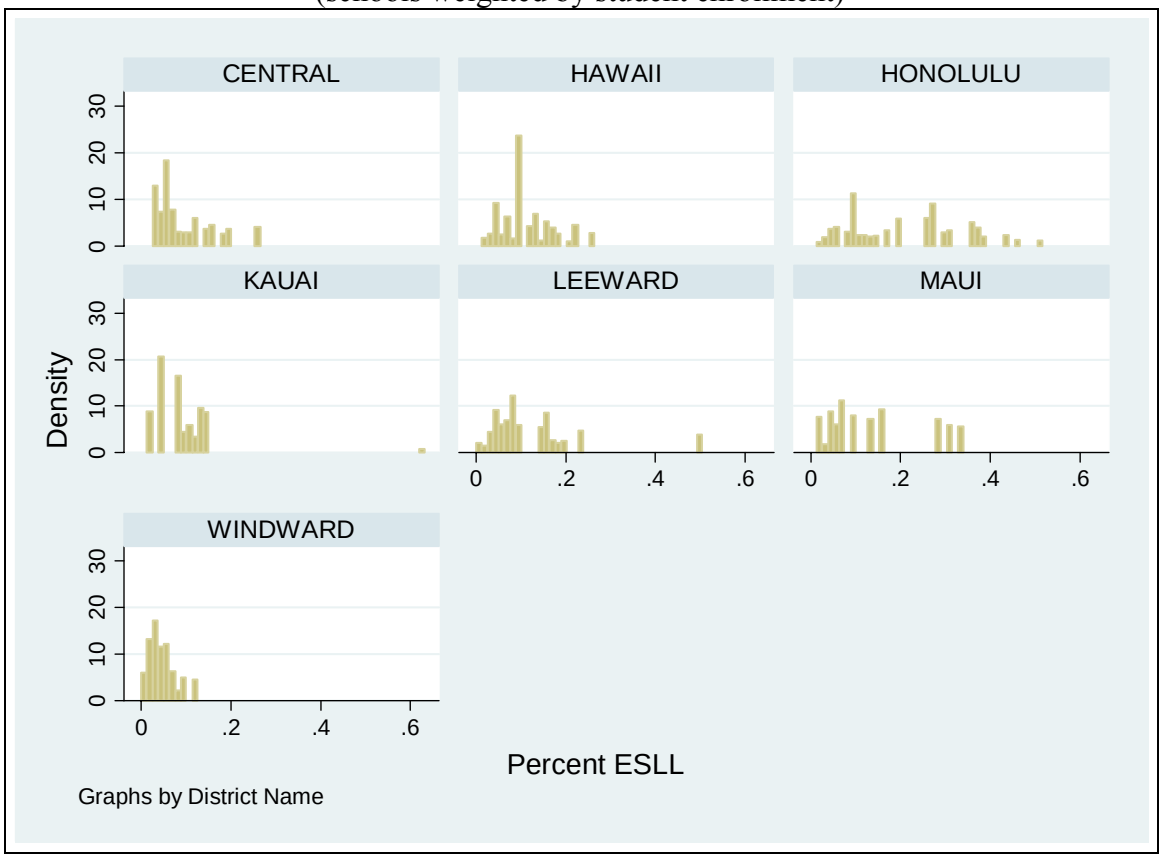


A glance at the distribution of economic disadvantage across students attending elementary schools in the various regional districts shows widely different schools in every district with the greatest ranges appearing on O'ahu. The Honolulu district, as an example, has schools with less than 5% of students being classified as disadvantaged at Kāhala Elementary to almost 100% at Palolo and Linapuni.

While not as wide ranging in incidence as disadvantage, lack of English proficiency also ranges widely among the student bodies at the state's elementary schools

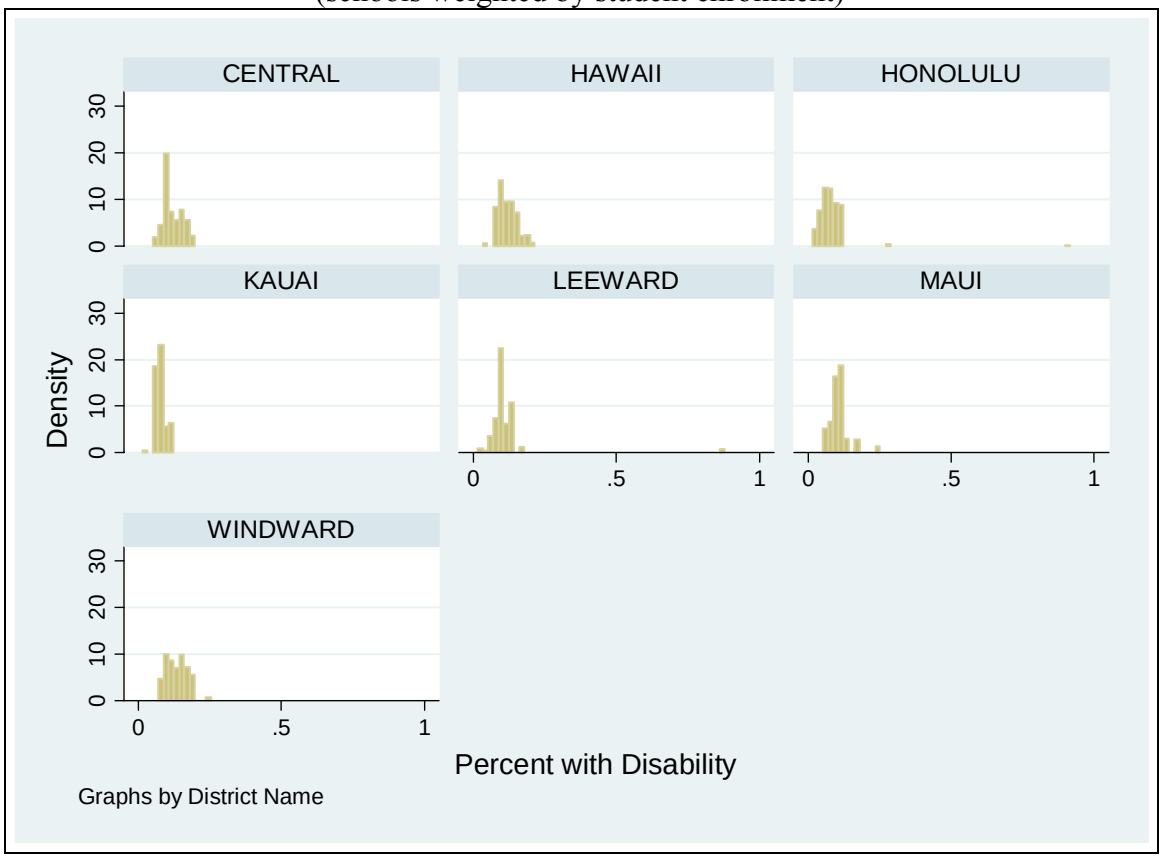
in 2005 (see Figure 2). Focusing only at elementary school students on the Big Island in 2005, as an example, reveals schools such as Keaukaha, Kaumana, and Mt. View with very few students designated as English language learners while schools such as Keaau, Honaunau, and Kahakai have close to 20% of their students identified as such.

Figure 2
Frequency Distribution of Elementary School Percent English as a Second Language Learners in 2005
(schools weighted by student enrollment)



Finally, Figure 3 shows the distribution of students identified as having special education needs across the state's elementary schools in 2005. Focusing on Kaua'i as a single example allows for a contrast between the student bodies at schools such Hanalei elementary (15%) with Eleele (4%) or Kalaheo (5%).

Figure 3
Frequency Distribution of Elementary School Percent Children with Disabilities in 2005
(schools weighted by student enrollment)



This variance in student need characteristics is no secret and is, in fact, a primary driver of the debate over equitable funding. If these factors were distributed uniformly across schools, a differential weighting scheme to adjust for the learning barriers known to be related to characteristics such as these would be unnecessary. As Figures 1 through 3 show, however, these distributions are hardly uniform, varying widely from school to school and district to district. To further illustrate the ways in which these student characteristics are associated with learning, in Table 1 we show the relationship between these factors and both elementary school reading and math performance in 2005:

Table 1
Elementary School Student Test Performance 2005

	Reading Scale Score Elementary 2005		Math Scale Score Elementary 2005	
	Coef.	**P>t**	**Coef.**	**P>t**
Student Characteristic				
Disadvantaged background	-29.639	***	-29.958	***
Special Education classified	-79.774	***	-71.951	***
ESL classified	-48.364	***	-42.566	***
Geographic location				
Honolulu				
Leeward	-16.667	***	-19.233	***
Windward	-4.953	***	-7.747	***
Central	-2.072	***	-6.108	***
Kaua‘i	-16.162	***	-13.407	***
Hawai‘i	-7.890	***	-12.661	***
Maui	-11.953	***	-14.876	***
Constant	325.005	***	288.208	***
R-Squared	.236		.230	

*p<.10, **p<.05, ***p<.01

What these simple statistical models show is that, on average, elementary school students from economically disadvantaged backgrounds performed almost 30 points lower on these tests than did their counterparts from more advantaged families. The impact of inadequate English language proficiency is roughly 48 points on reading and 43 points on math relative to the performance of proficient English speakers in Hawai‘i elementary schools in 2005. And special education students in these models scored and average of between than 72 and almost 80 points lower than their regular-education peers. Again, these are characteristics of the students themselves—characteristics over which schools have no control whatsoever. While families have some degree of control over where they choose to live, this choice is bound by factors such as family obligation, a sense of place related to ethnic heritage, and economic factors such as cost of living and labor market considerations. Clear from Table 1 also is that, relative to students attending schools in the Honolulu district, elementary school students perform less well in terms reading and math when they live on the neighbor islands and other areas on O‘ahu.

1.0 Are Children with Disabilities Distributed Sufficiently Evenly to Support Census Based Funding?

In our initial report released earlier this summer, we noted that it may be feasible to integrate at least some special education funding into the Weighted Student Formula. Review of minutes from recent meetings of the Committee on Weights suggests to us that the committee is already considering if not decided on such changes.[27] There are at least two options for integrating special education funding into the WSF:

1. Include pupil weights for children with specific disabilities, as done in Houston and Seattle;
2. Allocate a flat sum of per pupil funding across all schools to be used for *inclusive* programming (Census Based Block Grants);

The most often cited downside of the first method is that the weighted-pupil method for identifying disabilities creates incentives to identify. That is, identification of need is endogenous to the funding model, especially for marginal disabilities like mild learning disabilities or behavioral disorders. Thus, there is the alternative of providing a flat sum of per-pupil funding to all schools on the assumption that high-incidence, low-severity disabilities are *distributed uniformly*. Such a system would usually be constructed in three tiers:

> ***Tier 1***—Flat per-pupil allocation to all schools, based on assumed uniform percent of high-incidence, low-severity disabilities (specific learning disability, speech/language, other health impairment, emotional disturbance). This flat rate might be set at somewhere between 1.9 to 2.1 times (See Table 16, page 67) base costs times expected uniform percent qualifying.
>
> ***Tier 2***—Safety-valve adjustment for schools identified as serving disproportionately high shares of high-incidence, low-severity disabilities.
>
> ***Tier 3***—Direct funding on an individual need basis of programs for children with lower incidence, more severe disabilities.

This three-tiered example is based roughly on the model adopted in the state of Vermont in the early 1990s.

The effectiveness of Tier 1 funding is contingent almost entirely on the uniformity of distribution of children with high-incidence, low-severity disabilities. Tier 2 is included so the state may account for those *exceptions* where schools, by no choice of their own, are serving disproportionate numbers of children with disabilities. A relatively straightforward approach for deciding whether such a structure is appropriate is to

[27] Committee on Weights 2, July 12, 2006.

evaluate the extent that Tier 2 is necessary. Where the exception becomes the rule (Tier 2 dominates Tier 1), the state should choose to simply fund on a need basis (drop Tier 1).

One reason why states have moved to census-based funding was the apparent rapid growth in identification rates of children with mild to moderate disabilities, especially in states where funding was tied to identification and services. Census-based funding was initially intended to reduce incentives to increase identification rates and/or provide more restrictive placements in addition to providing greater flexibility to local school administrators.

Table 2, based on special education data provided to us by the BOE, summarizes the percentages of children with any and all disabilities and percentages of children with specific learning disabilities across schools serving lower grades from 2002 to 2005. To perform this and numerous other analyses that follow in this report, we use a panel data set, including data from years 2002 to 2005, integrating a variety of school-level student population characteristics provided to us by DOE, teacher characteristics and student assessment outcomes, collapsed to the school level. We identify schools by grade level according to an index we created based on the average grade level of children in a school who took state assessments in a given year. Schools serving lower grades in Table 1 are schools where the average grade level of test takers was lower than grade 6, of which there are approximately 183 having complete data across the State of Hawai‘i.

Assuming data on incidence rates to be accurate, Table 2 suggests that Hawai‘i is not confronted by problems associated with expanding special education populations. Rather, since 2002, the special education population, including the potentially volatile category of specific learning disabilities, has been in steady decline. We express some doubt about the legitimacy of the apparent rapid rate of decline identified here. Assuming relative precision, though, the primary rationale for Hawai‘i to pursue block grant funding would be flexibility rather than control over growth in costs.

Table 2

Students with Disabilities across Schools Serving Lower Grades in 2005

Year	Mean	Std. Dev.	Freq. (All Students)	Obs. (Schools)
All Disabilities				
2002	15.4%	13.0%	95,713	174
2003	12.6%	9.6%	94,461	181
2004	12.3%	9.9%	93,608	183
2005	10.9%	6.0%	91,775	183
Specific Learning Disabilities				
2002	7.0%	8.2%	95,998	176
2003	4.4%	5.8%	94,461	181
2004	4.1%	5.7%	93,608	183
2005	3.2%	3.4%	91,775	183

Data Source: Report to BOE, Children with Disabilities

Across schools serving lower grades, the average percentage of children classified as having (a) specific learning disabilities, (b) emotional disturbance, (c) speech impairment, or (d) developmental delay, is approximately 8% in 2005 (having been about 12% in 2002. Let’s assume that the state is interested in providing the equivalent of a 90% add-on for an assumed 8% of students, and rolling that funding into the WSF. At the

proposed base of $4,292, for a school of 500 total students, with 40 high-incidence, low-severity disability students, the block grant would be:

(.90 x $4,292) x (8% x **500**) = $154,512

Or

$154,512 / 500 = $309 per pupil (all enrolled)

In the equations above, the only value that is variable by school is the total school enrollment. The funding weight of 90%, the base aid, and qualifying share (8%) are assumed to be constant across schools. Funding is based on the total census (total enrollment), not need-specific census. Again, as long as most schools have roughly 8% high-incidence, low-severity disabilities, this can work, and result in significant increases in flexibility to local school officials.

Figure 4, however, casts at least some doubt on the feasibility of this funding method for Hawai‘i schools. Figure 4 shows the pupil-weighted distribution of disability shares across schools serving lower grades in 2005. Distributions for other years appear similar (but at higher average levels). In 2005, lower school mild- to moderate-disability shares spread out from 0% to 20%, but with most children attending schools having between 5% and 10%. Indeed the state BOE may have some latitude to reshuffle students across schools, but only within compliance of providing services in the least restrictive environment, where one consideration is proximity to the student’s home.

If the hypothetical school noted above had 10% students with disabilities instead of 8%, the school would actually need (assuming the expenditure ratio of 90% to meet need), $193,140 to serve those children, but under the 8% assumption, would receive $154,512, nearly $40,000 short. Figure 4 shows that a large percentage of schools fall at least this distance from the 8% mark.

Figure 4
Distribution Students with Mild to Moderate Disabilities across Schools Serving Lower Grades in 2005

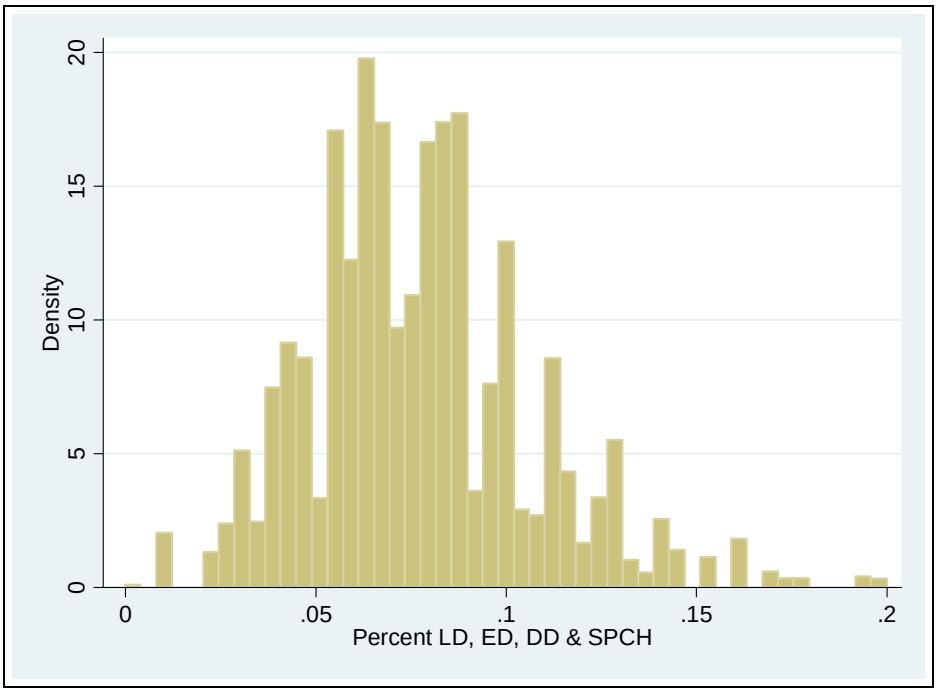


Table 3 shows the correlations across schools for certain disabilities. One reason for conducting this analysis is to evaluate the extent to which certain schools experience higher concentrations of more than one disability subgroup. Where high correlations exist across populations and schools, there remains greater necessity to target funding to schools on a need basis, rather than allocating flatly across schools. Across lower grade schools especially, there are very high correlations between concentrations of LD and ED children. As such, flat allocations of special education funding would be likely to disadvantage those schools high on both counts.

Table 3
Correlations of Disability Concentrations across Schools Serving All Grades and Lower Grades Only in 2005

	% Specific Learn. Dis.	% Emotional Dis.	% Other Health	% Speech	% Devel. Delay
All Grade Levels					
% Specific Learn. Dis.	1.000				
% Emotional Dis.	**0.546**	1.000			
% Other Health	**0.267**	**0.301**	1.000		
% Speech	-0.131	-0.105	0.014	1.000	
% Devel. Delay	-0.316	-0.219	0.035	0.232	1.000
% Aut./Mult./TBI	-0.082	-0.049	-0.069	**0.371**	-0.014
Across Lower Grades					
% Specific Learn. Dis.	1.000				
% Emotional Dis.	**0.822**	1.000			
% Other Health	0.171	0.191	1.000		
% Speech	0.065	0.039	0.067	1.000	
% Devel. Delay	-0.020	-0.025	0.266	0.151	1.000
% Aut./Mult./TBI	-0.027	-0.015	-0.023	-0.081	0.257

Data Source: Report to BOE, Children with Disabilities

Conclusions & Recommendations

From this we conclude that a typical, three-tiered census based funding formula is likely **not** the best option for the state of Hawai‘i given the dispersion of and correlation among disabilities across schools.

If the BOE wishes to integrate special education funding into the WSF, granting local school administrators greater control and flexibility to provide integrated services, the state might consider using a **single pupil weight** for high-incidence, low-severity disabilities, potentially to include specific learning disabilities, emotional disturbance, speech impairment and developmental delay. Multiple, graduated and tiered weights may increase local gaming, and serve to encourage even more intense political battles at the state level over specific weight setting.

We believe that the weight should be applied to school-specific incidence rates rather than a uniform (census-based) share. Such a weight might be based on data from the special education expenditures project. However, it is critically important to understand that SEEP findings are based only on historical spending, regardless of outcomes, rather than actual costs of achieving desirable outcomes. If the state makes the move to decentralized, weighted funding for high-incidence, low-severity outcomes, the state should also initiate a longitudinal study of student outcomes for students with disabilities. The state should likely retain centralized control over delivery of services to children with more severe disabilities.

2.0 Are Higher-poverty Schools Disadvantaged on the Teacher Labor Market?

A major impediment to flexible local governance that we identified in our initial report is the potential for local school administrators to be constrained by having to work within the state's current uniform salary schedule. We identified similar problems with the average salary buy-back system used in the City of Seattle. Specifically, the uniform pricing schedule can disadvantage school administrators in high-poverty, hard-to-staff schools, especially when they must compete in the same labor market with schools that may appear more desirable to teachers pursuing employment.

Arguably, the most important control a local school administrator can exercise over his or her school is in the creation and maintenance of the right team of teachers. Administrators must have control over the mix of teacher quality and teacher quantity in their school. Arguably, teacher quality trumps teacher quantity. That is, an exceptional teacher in front of a class of 25 is likely to yield better results than a poor teacher in front of a class of 20. The fallout of statewide class-size reduction policies in California is informative in this regard. That said, teacher salaries are not always tied tightly to teacher quality because salaries are driven primarily by experience and degree levels.

One might assume that given a certain, weighted-pupil budget, a higher-poverty school can choose to hire more experienced teachers or teachers with advanced degrees within the current salary schedule. Indeed that would be an option. However, a significant constraint to this option is that there is a limited supply of these teachers, and the higher-poverty school is only able to pay these teachers the same wage they would receive for a the same job in a lower-poverty, more desirable school. The likely result is that the higher-poverty schools will be backed into purchasing higher quantities of less-experienced, less-educated teachers.

Even if we assume that the higher-poverty school can recruit teachers of similar years experience and degree level at the same wage, there would likely be more important quality differences among the teachers in high versus low poverty schools. For example, a significant body of teacher labor market literature suggests that higher-poverty schools would likely have teachers who (a) attended less selective and rigorous undergraduate colleges; (b) were more likely to have had lower test scores themselves and (c) were more likely to have failed teacher certification exams at least once.[28] Related research suggests that the career decisions of teachers by their backgrounds are primarily sensitive to work conditions and relatively insensitive to pay differences.[29] However, even the most cynical research in this regard acknowledges that this finding is likely a result of the lack of sufficient pay differences to actually draw higher-quality teachers into higher-need, less-desirable schools.

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[28] Lankford, H., Loeb, S., Wyckoff, J. (2002) Teacher sorting and the plight of urban schools. *Educational Evaluation and Policy Analysis* 24 (1) 37-62

[29] Hanushek, E., Kain, J., O'Brien, D., Rivken, S. (2004) The Market for Teacher Quality. Annual Meeting of the American Economic Association. Philadelphia, PA

In this section of our report, we conduct preliminary analyses to determine the distribution of Hawai‘i schoolteachers by years of experience, degree level (master’s or higher) and salary. Due to time constraints on this project, we focus only on elementary school teachers in this section, using data from 2002 to 2005.

Table 4 summarizes monthly salaries of elementary teachers across districts. Notably, monthly salaries are primarily an aggregate indicator of experience and degree level, the two main drivers of teacher salary in Hawai‘i (and elsewhere). Elementary teachers in the Central district of O‘ahu were paid, on average $4,046 per month, had 15.5 years experience and nearly 60% rate of holding a master’s degree or higher. By contrast, in adjacent Leeward schools on O‘ahu, teachers were paid $3,761, had 11.6 years of service and less than 50% held a master’s degree or higher.

Table 4

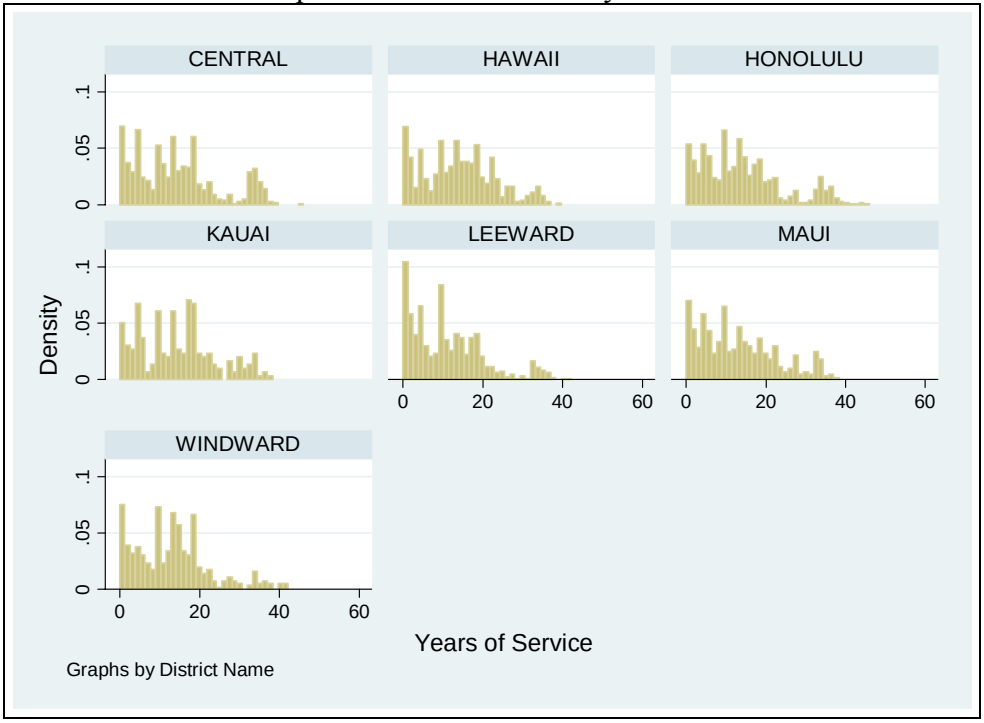
Elementary Teachers 2002 to 2005

District	Monthly Salary Mean 2002 to 2005	Years of Service Mean 2002 to 2005	Master’s Degree or Higher
CENTRAL	**$4,046**	**15.53**	**58.89**
HONOLULU	$3,999	14.64	60.86
KAUA‘I	$3,950	15.04	45.26
HAWAI‘I	$3,914	14.06	44.10
Average	$3,908	13.80	51.73
WINDWARD	$3,860	13.53	49.43
MAUI	$3,823	13.13	43.59
LEEWARD	**$3,761**	**11.59**	**49.31**

Data Source: BOE_WSF_POS_SF5_LIC_ED_0102 (through 0405). Elementary teachers only (occpgpdesc = ELEM TEACHER). Teacher duplicates removed.

Figure 5 displays experience distributions by regional district. Notably, Leeward in particular has a very high percentage of less-experienced teachers, while districts like Central O‘ahu have more evenly-distributed experience levels.

Figure 5
Experience Distributions by District



Data Source: BOE_WSF_POS_SF5_LIC_ED_0102 (through 0405). Elementary teachers only (occpgpdesc = ELEM TEACHER). Teacher duplicates removed.

Table 5 summarizes the mean percent subsidized lunch for schools serving lower grades by regional district. While the average is relatively high across districts, there is significant contrast between the adjacent O‘ahu districts of Central and Leeward.

Table 5
School % Free or Reduced Lunch by District (Lower Grades)

Name	2002	2003	2004	2005	Total
CENTRAL	39%	40%	38%	36%	38%
WINDWARD	44%	45%	44%	43%	44%
KAUA‘I	43%	46%	44%	44%	44%
HONOLULU	45%	46%	45%	44%	45%
MAUI	42%	46%	45%	46%	45%
Total	47%	49%	47%	46%	47%
LEEWARD	54%	54%	53%	51%	53%
HAWAI‘I	58%	61%	61%	59%	60%

Data Source: Lunch%SY0102 to 0405

Table 6 provides statistical models of teacher experience and degree levels across districts, controlling for school-level student population characteristics. Table 5 shows that on average, teachers in Leeward O‘ahu, Hawai‘i, Honolulu, Maui and Windward O‘ahu are all less experienced than teachers in Central O‘ahu, controlling for poverty, ESLL and school size. On average, controlling for differences in districts, within districts teachers in higher-poverty schools have less experience. This coefficient is only marginally significant when controlling for regional district. Differences in average

poverty levels of regional districts seem to be influencing more strongly, average experience levels.

Where degree level is concerned, a teacher in a school with 100% poverty is only 54% as likely as a teacher in a school with 0% poverty to hold a master's degree or higher. After controlling for poverty rates, language proficiency rates and school size, teachers on Hawai'i, Maui and Kaua'i, as well as Windward O'ahu, are much less likely to hold a master's degree or higher than teachers in Central O'ahu. Only teachers in Honolulu were more likely to hold a master's degree or higher.

Table 6
Statistical Models of Experience and Degree Level

	Years of Service		Likelihood of Holding a Master's or Higher	
	Coef.	**P>t**	**Odds Ratio**	**P>t**
Year				
2003	0.039	***	1.02	
2004	0.010		1.00	
2005	0.045	***	1.03	
School Characteristics				
% Free/Reduced	-0.061	*	**0.54**	***
% ESLL	0.066		0.91	
Enrollment	0.000		1.00	***
District				
HAWAI'I	-0.058	***	0.61	***
HONOLULU	-0.110	***	1.21	***
KAUA'I	0.012		0.51	***
LEEWARD	**-0.238**	***	0.93	
MAUI	-0.149	***	0.43	***
WINDWARD	-0.130	***	0.71	***
Constant	2.745	***		
R-squared	.02			

*p<.10, **p<.05, ***p<.01

Table 7 presents two statistical models of teacher monthly salaries, one linear and one, the more common log-log functional form (natural logarithm of monthly salary). The regression models in Table 7 control for degree level, years and months of service. The models also include district indicators to evaluate if, for any reason, salaries vary by district above and beyond the primary drivers of salary. For example, ideally, teachers in hard-to-staff locations would actually be earning more than those in more popular areas. In the state of Washington, which also functions under a statewide salary schedule, we do find some patterns of this type, which result from the uneven allocation of supplemental pay which is distributed outside of the uniform salary schedule.

Overall, the models explain the vast majority of variation in teacher salaries, However, somewhat disturbingly, in both the linear and logged model, **we find that all else equal, teachers in higher-poverty schools are earning less than teachers in lower-poverty schools—even after controlling for experience and degree level.** That is, there is a yet-to-be-explained, negative salary bias working against higher-poverty schools. That negative salary bias is sufficiently large such that teaching in a school with

100% poverty, compared to teaching in a school with 0% poverty, would offset 50% of the wage increase associated with holding an advanced degree. The most likely explanation for this finding is that among teachers with a master's degree or higher, teachers in the highest poverty schools have the lowest average education level. Our choice to aggregate this specific measure removes variation that might explain this wage gap. However, additional models in which we disaggregate this grouping in varied degrees fail to erase entirely the negative wage bias in higher-poverty schools.

Table 7
Salary Models

	Linear Form		Log-Log Form	
	Coef.	**P>t**	**Coef.**	**P>t**
Qualifications				
Master's or Higher	200.676	***	0.023	***
Service Years	67.898	***	0.245	***
Service Months	7.407	***	0.013	***
Year				
2003	308.074	***	0.075	***
2004	253.936	***	0.059	***
2005	487.468	***	0.110	***
District				
HAWAI'I	0.748		-0.021	***
HONOLULU	-13.724		-0.007	
KAUA'I	-23.858		-0.014	**
LEEWARD	9.738		0.000	
MAUI	-21.832		-0.015	**
WINDWARD	-40.559	*	-0.025	***
School Characteristics				
% Free/Reduced	**-102.300**	*******	**-0.024**	*******
% ESLL	136.011	*	0.045	**
Constant	2628.231	***	7.587	***
R-Squared	*0.855*		*0.823*	

*p<.10, **p<.05, ***p<.01

Conclusions and Recommendations

There is clearly a necessity to apply policy leverage to draw more experienced teachers and teachers with higher degrees into higher-poverty schools, especially within labor markets that provide a diverse set of career options for teachers. Salary differentials may play a key role, and may be handled in either of two ways.

1. *Fully Decentralized:* Assuming sufficient weighted student funding is allocated to high-poverty, hard-to-staff schools, school administrators might be granted the latitude to make quality/quantity tradeoff decisions, using their additional weighted student funding to pay compensating differentials on top of the existing wage structure. In effect, this would mean granting control over the contractual relationships with teachers to school-level officials. That contractual control could include granting school officials flexibility not only on salary, but also on workload (hours per day, etc.). The effectiveness of this approach is highly contingent upon the availability of sufficient weighting

(sufficient for high poverty schools to recruit greater numbers of teachers, at sufficiently higher salary, than low poverty schools in the same labor market). This approach is also contingent on political palatability of such decentralization among all relevant parties.

2. *Partially Decentralized:* Alternatively, as part of the statewide teacher contractual agreement, the state may adopt specific salary differential levels (and/or alternative step scales) available for use by school administrators in schools of varied concentrations of poverty and ESLL. Under this more centralized model, school administrators in high-poverty schools might request from the BOE, to fill specific vacancies with teachers salaried on the alternative schedules, or with specific *ongoing* compensating differentials (controlled by BOE). Further, school administrators in schools of varied concentrations of poverty and ESLL may also request from the BOE the option to provide defined bonuses (alternative salary schedules), to existing outstanding teachers in their schools to avoid losing those teachers.

In addition, the state may wish to play a role in equalizing other work condition factors across schools, especially within labor markets. In fact, one option might be to attempt to make working conditions in higher-poverty, harder-to-staff schools even better than in lower-poverty, easier-to-staff schools. For example, it may be worthwhile to explore differences in the quality of facilities and other work environment factors to determine whether investments in these areas might offset some of the apparent disadvantages of higher-poverty schools in recruiting experienced, highly educated teachers. While this may seem like a costly alternative, especially in terms of up-front costs, this approach may be less costly than sustaining compensating differentials at high levels for all teachers in high poverty schools over time.

Finally, the state may wish to also use compensating differentials as a strategy for recruiting high-quality school leaders, with strong academic backgrounds of their own and high academic standards, to take the helm at the state's highest-need schools. As with altering working conditions, it may turn out to be less expensive in the long run to pay substantial bonuses to recruit high-quality principals for high-need schools, than to spread that leverage across all teachers.

No doubt, even if high-quality principals can be obtained for hard-to-staff schools, and even if working conditions can be substantially improved, unless student population characteristics and outcomes can also be equalized, significant compensating differentials for teachers will still be required.

3.0 Are there Significant Wage Variations among Non-Teachers across Labor Markets?

In this subsection, we explore more fully an issue raised in our first report—whether there is significant variation in wages among non-teachers, at similar age and degree level, across labor markets. Further, we explore whether these variations work specifically to the disadvantage of teachers in those labor markets.

Table 8 summarizes the computed numbers of teachers and non-teachers based on Census 2000, 5% sampling. Notably, the sample of K-12 teachers that appears in Table 8 includes only elementary and secondary teachers (including those at private schools), for a total predicted population of around 15,000 (compared to actual public school estimates around 11,000 in 2005, based on personnel data from the BOE). On average, in 2000, teachers with a bachelor's were slightly older than non-teachers with a bachelor's, but teachers with a master's were slightly younger than non-teachers with a master's. In all three labor markets, teachers' annual wages were somewhat lower than the annual wages of similarly educated workers in other fields. Differences in household income were smaller.

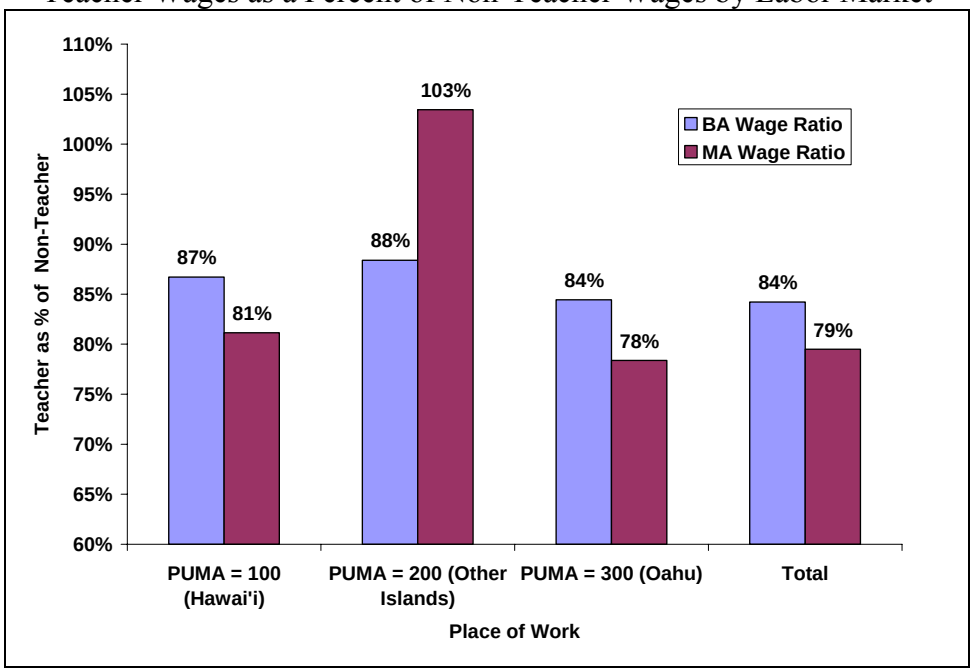
Table 8
Teacher vs. Non-teacher Wages in 2000

	Individuals with Bachelor's Degree			Individuals with Master's Degree		
	Non-Teachers	K12 Teachers	All	Non-Teachers	K12 Teachers	All
Population Wtd. Sample						
PUMA = 100 (Hawai'i)	11,328	1,648	12,976	2,471	698	3,169
PUMA = 200 (Other Islands)	8,105	1,294	9,399	2,277	782	3,059
PUMA = 300 (Oʻahu)	75,290	7,544	82,834	21,455	3,470	24,925
Total	94,723	10,486	105,209	26,203	4,950	31,153
Mean Age						
PUMA = 100 (Hawai'i)	42.7	44.3	42.9	48.0	42.5	46.8
PUMA = 200 (Other Islands)	43.5	43.0	43.5	48.7	45.2	47.8
PUMA = 300 (Oʻahu)	40.3	41.7	40.4	44.1	45.5	44.3
Total	40.8	42.3	41.0	44.8	45.0	44.9
Income from Wages						
PUMA = 100 (Hawai'i)	$36,028	$31,237	$35,419	$44,982	$36,499	$43,114
PUMA = 200 (Other Islands)	$32,348	$28,596	$31,831	$34,459	$35,646	$34,762
PUMA = 300 (Oʻahu)	$40,029	$33,801	$39,462	$49,520	$38,808	$48,029
Total	$38,894	$32,756	$38,282	$47,784	$37,983	$46,226
Household Income						
PUMA = 100 (Hawai'i)	$85,599	$77,600	$84,583	$97,849	$85,536	$95,137
PUMA = 200 (Other Islands)	$79,696	$72,464	$78,700	$91,644	$85,696	$90,124
PUMA = 300 (Oʻahu)	$99,287	$98,375	$99,204	$114,344	$100,801	$112,458
Total	$95,974	$91,913	$95,569	$110,816	$96,262	$108,503

Data Source: Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander. *Integrated Public Use Microdata Series: Version 3.0* [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor], 2004. IPUMS 2000 5% Density Sample, individuals between 25 and 65 years of age.

Figure 6 shows teacher wages as a percent of non-teacher wages by labor market and degree level. Teachers on O'ahu earned from 78% to 84% of their non-teacher counterparts. Teachers on Hawai'i's Big Island fared only slightly better. Teachers with a master's degree on other islands earned more than their counterparts with a master's degree.

Figure 6
Teacher Wages as a Percent of Non-Teacher Wages by Labor Market



Data Source: Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander. *Integrated Public Use Microdata Series: Version 3.0* [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor], 2004. IPUMS 2000 5% Density Sample, individuals between 25 and 65 years of age.

An important caveat to the comparisons in Figure 6 is that they account only for what individuals in different areas get paid and NOT what teachers would need to get paid for schools in different labor markets to recruit teachers of comparable quality. Taylor (2005), for example, explains that the relative concentration of teachers versus other professionals is generally higher in rural areas and lower in more urban areas. Thus, teacher wages are a larger part of the rural economy and typically more comparable to other wages in that economy.[30] A multitude of other employment options exist in urban economies, but this does not necessarily suggest that these other options put pressure on the teaching profession. Podgursky, Monroe and Watson (2004) express some skepticism regarding teacher moves to higher paying professions in the same labor market.[31]

[30] Taylor, L.L. (2005) Comparing Teacher Salaries: Insights from the U.S. Census. Working Paper. Bush School of Government and Public Policy. Texas A&M University. http://bush.tamu.edu/research/working%5Fpapers/ltaylor/Comparing_Teacher_Salaries.pdf

[31] Podgursky, M., Monroe, R., Watson, D. (2004) The Academic Quality of Public School Teachers: An analysis of entry and exit behavior. *Economics of Education Review* 23 (4) 507-518.

A common argument against comparing annual pay of teachers to non-teachers is that teachers enjoy the benefit of long vacations, including summer time off. Table 9 compares hourly wages of teachers and non-teachers by labor market. In particular, teachers on O‘ahu earn about 92% of non-teacher hourly earnings among those holding a master’s degree. Teachers on other islands fare better.

Table 9
Comparisons of Teacher Hourly pay to Non-Teacher Hourly Pay by Labor Market

	Non-Teachers	K12 Teachers	All	Teacher Ratio
Individuals with Bachelor’s Degree				
PUMA = 100 (Hawai'i)	$18.22	$23.65	$18.91	129.8%
PUMA = 200 (Other Islands)	$18.00	$17.90	$17.99	99.4%
PUMA = 300 (O‘ahu)	$20.09	$19.20	$20.01	95.6%
Total	$19.69	$19.74	$19.69	100.3%
Individuals with Master’s Degree				
PUMA = 100 (Hawai'i)	$23.02	$26.67	$23.82	115.9%
PUMA = 200 (Other Islands)	$18.71	$20.28	$19.11	108.4%
PUMA = 300 (O‘ahu)	$23.16	$21.27	$22.90	91.9%
Total	$22.76	$21.88	$22.62	96.1%

Data Source: Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander. *Integrated Public Use Microdata Series: Version 3.0* [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor], 2004. IPUMS 2000 5% Density Sample, individuals between 25 and 65 years of age.

Table 10 revisits an analysis presented in our original report, showing that controlling for education levels, personal attributes, occupation and industry, significant regional differences persist in non-teacher wages (among 25 to 65 year olds, employed and holding a master’s or bachelor’s degree).

Table 10
Inter-Island variation in competitive wages for working individuals holding a bachelor’s or master’s

Public Use Microdata Area Place of Work	Predicted Wage in 1999 (age 40 with Master’s Degree)	Wage Ratio to Minimum
PUMA = 100 (Hawai‘i)	$33,254	1.06
PUMA = 200 (Other Islands)	$31,341	
PUMA = 300 (O‘ahu)	$36,709	1.17

Data Source: Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander. *Integrated Public Use Microdata Series: Version 3.0* [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor], 2004. IPUMS 2000 5% Density Sample, individuals between 25 and 65 years of age.

We must re-emphasize the caveat that while, on the one hand, the evidence in Table 9 and Table 10 might provide the basis for arguing in favor of a wage adjustment for teachers on O‘ahu, other factors may offset this argument. On Pages 17 through 21 of our original report, we discuss alternative approaches to adjusting for wage variation. In particular, we express strong preference for a methodological approach called *hedonic wage modeling* rather than competitive wage models and comparisons. Hedonic wage modeling accounts for differences in the desirability of working in location “A” versus working in location “B.” The previous subsection of this report revealed relatively low

percentages of advanced degrees held by teachers in Maui and Kauaʻi and relatively low experience levels in Maui.

Conclusions and Recommendations

We conclude this section unsatisfied that our analyses herein provide compelling basis for wage adjustment across labor markets. Indeed, on Oʻahu, teachers with masters and bachelors degrees are earning less annually and hourly than their peers in non-teaching jobs. Further, non-teachers on Oʻahu earn 17% more than non-teachers on other islands and non-teachers on Hawai'i earn 6% more. Nonetheless, we assume Oʻahu and Hawaiʻi to possess amenities perceived desirable to teachers that may enhance the ability of schools on these islands to recruit and retain teachers of comparable if not higher quality than on other islands, even at the same wage. Additional investigation is warranted. At present, our greater concerns center on the distribution of teaching quality within labor markets—most notably Oʻahu, across districts and individual schools with widely varying student population characteristics.

4.0 What are the Estimated Costs of Small Schools and Student Characteristics under an *Equal Opportunity* Model?

We begin this subsection by reflecting on definitions provided at the outset of our initial report. In short, the goal of this section is to use data on Hawai'i public schools to estimate, via statistical modeling, the additional costs of achieving specific levels of student outcomes associated with various factors beyond the control of school officials. In our earlier report, we cited the BOE's choice of the terms *Relevance* and *Equity* pertaining to the choice and application of cost factors in the weighted student formula. We provided definitions of those terms as follows:

> **RELEVANCE** = Factors tied to weighting and *cost* adjustment are factors legitimately associated with increased costs of achieving a specific quality of outcome. History dictates that a wide variety of factors may be introduced into weighted student formulas through the political process. In some cases, illegitimate factors identified as "political preferences," goals or targets are introduced with such strong effects that they cancel out if not reverse legitimate cost-related factors. We base legitimacy on the preponderance of rigorous empirical evidence regarding factors that significantly affect the cost of producing educational outcomes at the district or school level.
>
> **EQUITY** = *Horizontal* and *Vertical Equity*. Horizontal equity can be defined roughly as equal treatment across individuals. Clearly, however, the goal of a WSF is to allocate *appropriately different* treatment, rather than equal treatment. Nonetheless, equal treatment across Hawai'i schools might be a step forward from arbitrarily different treatment, if such treatment exists under the current allocation formula. Vertical equity speaks directly to *appropriately differentiated treatment,* but begs the question of *who* should receive such treatment, *how much* they should receive, and on what basis *who* and *how much* questions are defined and measured? Adopting our outcomes-based philosophy, who should be defined by the Relevance parameter above, and how much should be defined in terms of the marginal costs associated with achieving the state mandated outcome levels, with different children under different circumstances?

This section is specifically concerned with vertical equity–how the costs of desired outcome levels vary across children and the circumstances in which they learn. In this section, we use four years of data on personnel allocations, student population characteristics, school characteristics, and student achievement outcomes (math and reading scale scores) to estimate additional costs of achieving state average outcomes for children attending small schools, as well as for children attending schools serving varied demographic mixes. As such, the weights we derive from our analyses herein are based on an *equal opportunity* standard, specifically, equal opportunity to achieve state average math and reading outcomes.

Technical Background on the Cost Function Model

In this section, we use education cost function analysis with the primary goal of determining how costs vary across Hawai‘i schools attempting to achieve a common set of educational outcomes—state average Math and Reading Scale Scores (combined). Education cost function analysis uses historical data on spending, along with historical data on schooling outcomes and school and student population characteristics. The goal of the cost function is to estimate the statistical relationship between current spending behavior and outcomes, given student population and school characteristics outside control of local school administrators. Then, the model is used to forecast the "costs" of achieving desired levels of educational outcomes.

In this section, our goal is only to identify how the costs of a given outcome vary from one school or district to the next, given the conditions faced by that school or district. The goal of this analysis is NOT to identify baseline costs per pupil or the actual dollar costs of achieving any specific educational outcome. It is common in such analyses, to attempt to estimate the specific costs of achieving NCLB-compliant outcome levels on state assessments.

We do not go down this road for several reasons. Foremost among these reasons is that we do not have comprehensive school-level data for expenditures per pupil. Rather, we rely on data on salaries and assignments of certified staff in schools to compute core personnel budgets per pupil. As such, we model only how those core personnel budgets might vary (or need to vary) toward accomplishing specific educational outcomes. We use our models to generate overall cost indices for each school in the State of Hawai‘i, and then observe how those indices vary across schools by poverty levels and by size.

Figure 7
Factors Driving Cost Index Estimation

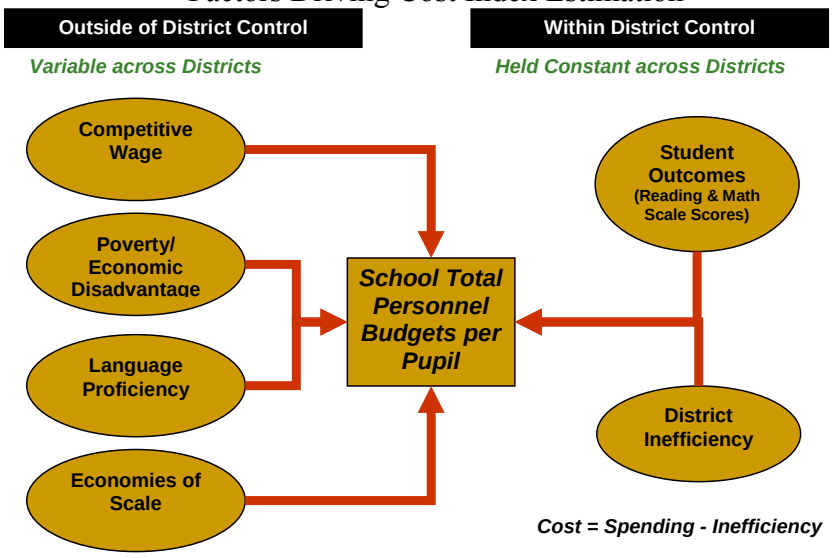


Figure 7 presents a schematic overview of factors that influence the "costs" of achieving any given set of educational outcomes, as discussed extensively in our original report. As presented previously, those factors may be grouped as those inside and those

outside of school control. The wages a school must pay to recruit teachers of specific qualifications are outside the control of the school. Similarly, the demographics of a school's student population are outside of the control of local officials. School size may be within the control of state policymakers. We assume, for now, that school size is outside the control of local and state officials, and make no statement or recommendation regarding the need for consolidation. Outcomes and the efficiency with which those outcomes are produced are within school control.

Figure 7 may be translated to the following equation:

$$\textbf{Spending per Pupil}_s - \textbf{Inefficiency}_s = f(\textbf{Outcomes}_s, \textbf{Students}_s, \textbf{Organization}_{sd}, \textbf{Price}_r)$$

where spending per pupil at the school-level is the dependent variable (less school-level inefficiency), and independent variables include outcomes of students at the school-level (though conceptually *endogenous*), student population characteristics including poverty and language proficiency rates, school organizational characteristics (school "$_s$" in context of district "$_d$") including size, location and grade range. Note that costs are spending less inefficiency, captured as a portion of the *error term* (difference between predicted spending and actual spending) in our models.

Another unique feature of the analysis herein is that the goal is to estimate a school-level cost function. Most cost function analysis uses district-level data on spending and outcomes. Ideally, we would have available, detailed school-level expenditure data for multiple years, including both personnel and non-personnel expenditures, at the school level. We are unsure whether such data are, in fact available. Time constraints limited our ability to pursue these issues further. Cost models are preferably run over multiple years of data. Budgeted school expenditures are less appropriate for our analyses than actual resources consumed in a given year in the process of producing a given level of student outcomes.

As such, we take an alternative approach also applied recently with school-level analysis in the State of Washington. For this analysis, school-level personnel budgets were calculated from the state personnel master file. FTE assignments and relevant salaries of school-level staff were collapsed into school-level personnel budgets (per pupil) for school years 2002 to 2005. FTE positions included in the school personnel budget totals are listed in Appendix A, using 2005 data as an example.

Cost function analysis requires estimation of a statistical model where (a) all relationships cannot be assumed to work in a single direction and (b) inefficiency is difficult to reliably measure. As such, a few key decisions are in order when setting up the school-level cost function. On the first issue, it is generally assumed that educational outcomes are "endogenous" to spending per pupil, which conceptually they are. Spending affects outcomes, and achieving higher outcomes requires higher spending. The relationship goes both ways. Further, in district-level models which are more common, it is assumed that district voters in setting their spending level choices through local property taxes, are simultaneously expressing their preference for certain levels of outcomes. This model is obviously less applicable to school-level costs in Hawai'i, where schools must do what they can with the resources allocated to them by the state. In some ways, these differences simplify the estimation process. We need be less conceptually concerned with the simultaneity of local voter preferences, spending and outcomes.

Typically, in statistical modeling, the presence of endogeneity requires statistical correction. That is, a set of purely exogenous variables (instruments) would be used to create non-biased (not influenced by the dependent variable, spending) predictions of the endogenous variable outcomes. For the models herein, as in the Texas cost function analysis performed by Gronberg, Jansen, Taylor and Booker (2004), the outcome measures in this analysis proved not to be statistically endogenous.[32],[33] Therefore, a single stage regression model is used following the work of Gronberg, Jansen, Taylor and Booker (2004) as well as Ruggiero (2005).[34]

Most if not all recent cost function analyses have attempted, either via direct or indirect measures, to sort out the extent to which districts presently spend more than would be required, at a minimum, to achieve a given set of educational outcomes. Direct accommodations for efficiency include stochastic frontier cost models[35] and Data Envelopment Analysis frontier cost models.[36] Indirect attempts to account for efficiency differences often use competition density indices, such as a Herfindahl index to capture the extent that competition density among school districts should lead to greater efficiency[37] or a variety of fiscal capacity indicators of proximal districts which may lead to inefficient ratcheting of spending.[38] Again, school-level analysis in Hawai‘i presents an alternative scenario where relative fiscal capacity of neighboring schools is less relevant if at all relevant. As such, we apply stochastic frontier cost modeling, following the work of Gronberg et al.

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[32] T. Gronberg, D. Jansen, L.Taylor and K. Booker *School Outcomes and Schools Costs: The Cost Function Approach*. (College Station, TX: Bush School of Government and Public Service, Texas A&M University, 2004). Retrieved March 1, 2006 from http://bush.tamu.edu/research/faculty_projects/txschoolfinance/papers/SchoolOutcomesAndSchoolCosts.pdf

[33] By way of the IVENDOG test in Stata 9.2.

[34] J. Ruggiero (2004) *Determining the Cost of an Adequate Education in Minnesota*. (Minneapolis, MN: Minnesota Center for Public Finance Research, Minnesota Taxpayers Association, 2004). Retrieved March 1, 2006 from www.mntax.org/cpfr

[35] T. Gronberg, D. Jansen, L.Taylor and K. Booker *School Outcomes and Schools Costs: The Cost Function Approach*. (College Station, TX: Bush School of Government and Public Service, Texas A&M University, 2004). Retrieved March 1, 2006 from http://bush.tamu.edu/research/faculty_projects/txschoolfinance/papers/SchoolOutcomesAndSchoolCosts.pdf

[36] J. Ruggiero (2004) *Determining the Cost of an Adequate Education in Minnesota*. (Minneapolis, MN: Minnesota Center for Public Finance Research, Minnesota Taxpayers Association, 2004). Retrieved March 1, 2006 from www.mntax.org/cpfr

[37] J. Imazeki and A. Reschovsky "Is No Child Left Behind and Un (or Under) Funded Federal Mandate? Evidence from Texas" *National Tax Journal* 57 (2004): 571-588

[38] W. Duncombe and J. Yinger *Estimating the Costs of Meeting Student Performance Outcomes Mandated by the Kansas State Board of Education*. (Topeka, KS: Kansas Legislative Division of Post Audit, 2006—January) Retrieved March 1, 2006 from http://www.kslegislature.org/postaudit/audits_perform/05pa19a.pdf

Application of the Model to Hawai'i

The model dependent variable is the natural logarithm of school-level personnel expenditures per pupil. Table 11 summarizes state average school-level personnel expenditures per pupil from 2002 to 2005.

Table 11
Core Personnel Expenditures[39] per Pupil in Hawai'i Schools

Year	Mean	Std. Dev.	Students	Schools[a]
2002	$2,736	$356	180339	251
2003	$2,752	$370	179357	252
2004	$2,750	$361	178488	253
2005	$2,928	$454	179555	255

[a] includes only those schools with complete data on all elements

In effect, our models estimate the extent to which core, school-level personnel budgets—including school administrators, librarians, and counselors—vary with respect to outcomes and costs. Variations in the quantities and qualities of teachers and administrators are assumed to make up a large share of variations in education costs associated with school size and with raising achievement levels of higher poverty, and non-English speaking students. Recall from our report that most education cost variation relates back to the simple personnel budget equation of *Price x Quantity = Cost.* Smaller schools require more teachers per child simply to get the same job done. And schools with higher poverty levels and greater numbers of ESLL students will require greater numbers of qualified teachers and ideally higher quality, or at least teachers of similar quality.

Our student outcome measure used in the models is the natural logarithm of the sum of Math and Reading Scale scores. The assumption of this type of modeling is that higher student outcomes come at higher costs per pupil, and likely result in reality from higher historical spending per pupil. In fact, the vast majority of, if not all, available peer-reviewed, published education cost function studies confirm this assertion.[40] So too do the models estimated herein. We find, in most models, a positive statistically significant relationship (in some cases significant at $p < .10$) between our combined outcome index measure and school-level personnel budgets per pupil.[41] In models where we tested reading outcomes alone, the relationship was more consistently shown to be statistically significant.

[39] See Appendix A for an example of included categories of staff.

[40] See Baker, B.D. (2006—in press) Evaluating the Reliability, Validity and Usefulness of Education Cost Studies. *Journal of Education Finance.* For a thorough discussion of how and why money matters and does relate to student achievement and other outcomes, and refutation of arguments to the contrary, see Heckman, J.J. & Krueger, A.B. (2003) Inequality in America: What Role for Human Capital Policies. Cambridge, MA: MIT Press.

[41] We are comfortable relaxing the level of significance to $p < .10$ in a few instances here given that we are analyzing what is effectively the population.

To estimate costs associated with school size, we group schools by total enrollments. For grade level of schools, we rely on the distribution of test takers that make up our outcome index and split schools into two groups. For each school, we compute the average grade level of test takers. We then count as elementary schools, those schools whose average test taker was in less than 6th grade and for middle/secondary schools, those whose average test taker was above the 6th grade level.

An important note on grade level is that in the current model, we are unable to link schools by feeder patterns. Rather we estimate costs of specific outcomes at whatever grade levels a school in question is offering, and include controls for those grade levels. Typically, achievement gaps associated with poverty (and race/ethnicity) grow through grade levels. As such, in a school-level model of the type estimated herein, we are likely to find the need for greater leverage to be applied to close poverty related achievement gaps in secondary schools. Arguably, it would be a more efficient policy to take those findings (the potentially larger poverty weight on the larger achievement gap at the secondary level) and apply it to interventions in the earlier grades.

Among student population characteristics, we include the total percentage of children in each school having disabilities and the percentage of children classified as having more severe disabilities (multiple disabilities, autism or traumatic brain injury).[42] We also include the percent of children who speak English as a second language, the percent of children qualifying for free or reduced lunch and percent qualifying for free or reduced lunch squared, to pick up poverty concentration effects on student outcomes and costs.

In some models, we include and in others we exclude a dummy variable for each *district,* in an attempt to capture any potential, subtle variations in operating costs that might exist by geographic location.

Table 12 summarizes the cost model coefficients, using Stochastic Frontier Analysis (SFA), assuming a normal-half-normal random error term. When comparable models are estimated via ordinary least squares (OLS) regression analysis, the models explain from 63% to 70% of variance in the school-level personnel expenditure measure.

[42] We tested a number of alternative groupings for the more severe category, finding this particular grouping to draw out a large, significant, positive cost coefficient.

Table 12
Cost Model Findings

	Region Indicator		No Region Indicator		Middle/ Secondary		Elementary	
	Coef.	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**
Combined Reading/Math Index (ln)	0.090	*	0.175	***	0.181	**	0.086	*
School Enrollment								
51 to 100	0.465	***	0.475	***			0.524	***
101 to 150	0.326	***	0.350	***			0.378	***
151 to 200	0.310	***	0.328	***			0.324	***
201 to 250	0.308	***	0.321	***	0.373	***	0.311	***
251 to 300	0.198	***	0.209	***	0.442	***	0.172	***
301 to 350	0.141	***	0.144	***	0.245	***	0.134	***
351 to 400	0.125	***	0.119	***	0.175	***	0.122	***
401 to 450	0.080	***	0.084	***	0.248	***	0.081	***
451 to 500	0.099	***	0.107	***	0.233	***	0.079	***
501 to 550	0.085	***	0.089	***	0.087	**	0.071	***
551 to 600	0.037	***	0.045	***	0.062		0.025	**
Demographics								
Percent Disability	0.060	*	0.070	**	0.339	***	0.021	
Percent Severe (Mult., Aut., TBI)	2.733	***	2.797	***	3.055	***	1.977	***
Percent ESLL	0.009		-0.011		-0.114	*	0.025	
Percent Free or Reduced	0.464	***	0.465	***	0.299	**	0.402	***
Percent Free or Reduced Squared	-0.220	***	-0.225	***	0.075		-0.194	***
Region/District								
Central	0.047	***			0.000		0.076	***
Hawai‘i	0.006				-0.061	***	0.030	**
Kaua‘i	-0.012				-0.028		0.014	
Leeward	-0.051	***			-0.075	***	-0.027	**
Maui	-0.009				-0.021		-0.027	*
Windward	0.034	***			0.024		0.065	***
Mean Grade Level of Test Takers	0.019	***	0.020	***	0.016	***	-0.038	***
Year								
2002	-0.062	***	-0.059	***	0.015		-0.063	***
2003	-0.062	***	-0.060	***	-0.012		-0.054	***
2004	-0.066	***	-0.063	***	0.064	***	-0.064	***
Constant	7.021	***	6.482	***	6.405	***	7.375	***
R-squared (OLS equivalent model)	0.666		0.631		0.703		0.667	

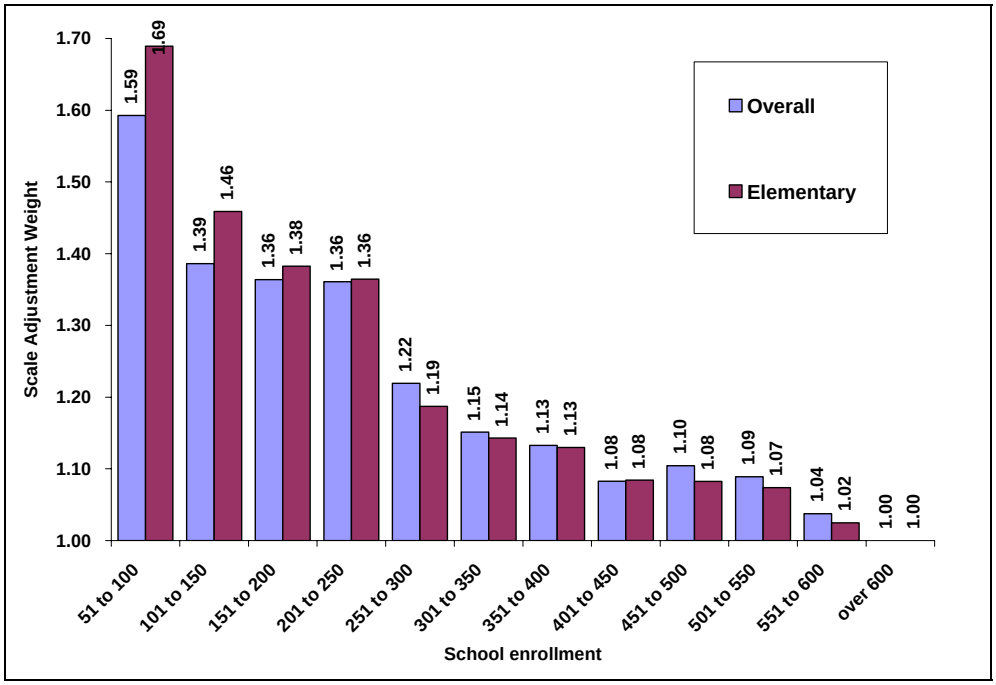
*p<.10, **p<.05, ***p<.01

As a starting point, most importantly, the models validate that it does indeed cost more to achieve higher student outcomes. That is, the coefficient on the student outcome measure, in relation to the spending measure, is positive and statistically significant, though significant at the less conservative level of p< .10 in two of four models. In addition, it costs more, at similar outcome levels, in smaller schools, and schools with higher concentrations of children in poverty. It also costs more in schools with higher percentages of children with disabilities, and much more where more severe disabilities are present.

Economies of Scale and Equal Opportunity

Figure 8 provides graphic representation of the economies of scale weights estimated from the model. Because of the relatively smaller sample size of schools serving only higher grades, scale weights were somewhat more erratic. However, Figure 8 provides relatively clear guidance on weight setting for school size, reasonably applicable across all grade levels. Again, these weights are estimated according to an equal opportunity standard, where the goal is to estimate marginal costs associated with achieving constant outcomes across students and settings.

Figure 8
Economies of Scale across All and Across Lower Grade Schools



Poverty and Equal Opportunity

Figure 9 maps the marginal costs associated with differing poverty levels (free or reduced lunch share) across scale-efficient (>600 students) elementary schools. Figure 9 shows that the cost of average outcomes in an elementary school with 80% poverty is approximately 27% higher than the cost of average outcomes in a school with 0% poverty. Recall again that we are capturing only those costs associated with salaries of core personnel in schools (including administrators, nurses, counselors, etc.). As such, the implication here is that for equal opportunity to be achieved, the core staffing budgets alone in these schools should vary as much as in Figure 9.

Figure 9

Predicted Marginal Costs across Lower Grade Schools by Poverty

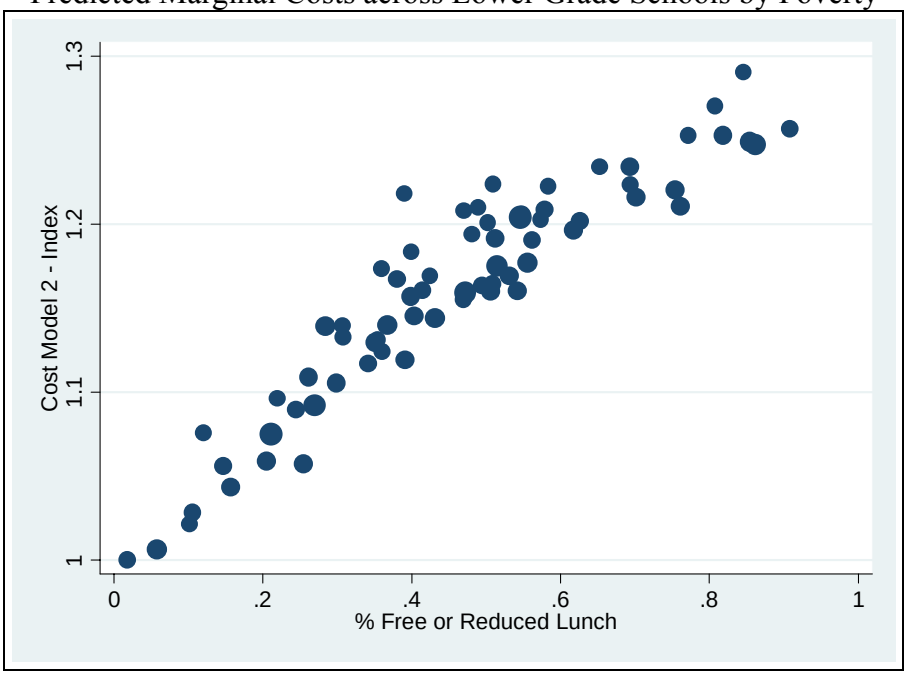


Table 12 puts the findings in Figure 9 back into context, based on findings from other studies examined and referenced in our earlier report, and including a measure of the poverty effect of the fully implemented currently proposed WSF. Recall that the current WSF is expected to have a *poverty effect* slope of about .129 across elementary schools in relation to subsidized lunch rates. Our cost models of core staffing expenditures reveal slopes around 0.30. Indeed these findings are relatively low compared to other studies in Table 12. Depending on the model selected, and subset of schools, our slopes increase toward 0.40, closer to findings on similar school-level personnel data from the State of Washington.

Table 12
Relationship between Median Centered Indexed Costs and Subsidized Lunch Rates
(K-12 Districts Enrolling >2,000 Students, not weighted)

			Relationship between Indexed Costs & Subsidized Lunch Rates[a]		
State	*Unit of Analysis*	***Method***	***Need Effect***		***R-squared***
Minnesota	District	Cost function, Ruggiero (2004)	0.855	[b]	0.468
Kansas	District	Cost Function, Duncombe & Yinger (2006)	0.799		0.769
Texas	District	Cost Function, Rescchosky & Imazeki (2004)	0.739		0.610
New York	District	Cost Function, Duncombe & Yinger (2004)	0.687		0.385
Nebraska	District	Cost Function (2005)	0.660		0.849
Texas	District	Resource Cost, Smith & Guthrie (2004)	0.624		0.707
Nebraska	District	Resource Cost, Augenblick & Colleagues (2002)	0.611		0.694
Kansas	District	Resource Cost, Augenblick & Colleagues (2002)	0.598		0.697
Washington	SCHOOL (Enroll >400)	Tentative estimate (Bruce D. Baker)	.37 to .40	[c]	0.610 [c]
New York	District	Resource Cost (2004)	0.381		0.283
Texas	District	Cost Function (2004)	0.354		0.741
Hawai'i	**SCHOOL (Enroll>600)**	**Cost Function (2006)**	**Approx. 0.30**		**0.871**
Arkansas	District (based on SCHOOL)	Resource Cost (2004)	0.176		0.780
Hawai'i	ELEM. SCHOOL (Enroll >300)	2006-07 WSF Formula (Full Implementation)	0.129		0.624

[a] SY2000 Subsidized Lunch Rate (NCES Common Core of Data, Fiscal/Non-Fiscal Longitudinal File)
[b] Slope decreases dramatically when Minneapolis and St. Paul are removed from analysis, even when analysis is not weighted by district enrollment
[c] Preliminary findings.

Additional analyses along these lines are warranted. Specifically, it would be useful to estimate models based on more comprehensive school-level expenditure data, over multiple years, including non-certified staffing, materials supplies and equipment, and facilities operation costs (utilities, etc.). Analyses reported in this section are somewhat tentative, but may inform the direction of the current WSF, as the findings herein concur with findings from other studies.

Children with Limited English Language Proficiency

Also left unresolved in our cost models are costs associated with language proficiency status. As often happens in such analyses, it has been difficult for us to estimate and disaggregate a statistically significant weight for limited English proficient children. Across all schools, the correlation between subsidized lunch rates and language proficiency status is about .43, which is not incredibly high for these measures, meaning separate weights are likely warranted.

We express some concern about the school-by-school reporting of these measures, over time, which may have compromised our ability to generate good cost estimates. Figure 10 shows the relationship between elementary school poverty and ESLL rates as reported in 2002, revealing a very weak to no relationship, and revealing some reasonably large schools reporting very low poverty but in excess of 40% ESLL.

Figure 10
Relationship between Subsidized Lunch and ESLL in 2002
across Elementary Schools

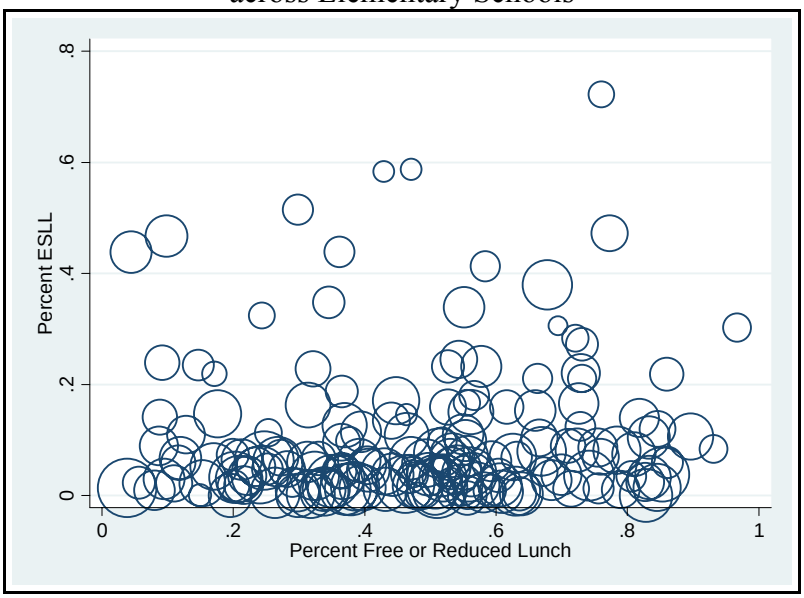
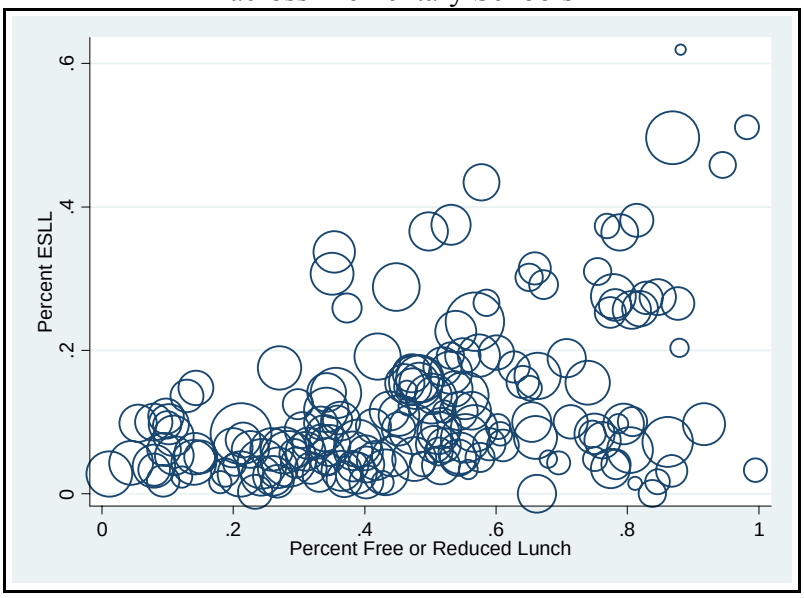


Figure 11 shows that the 2005 data reveal a much stronger relationship between poverty concentration and ESLL concentration. Either reporting patterns have changed over time, or ESLL children have become more concentrated in higher-poverty schools. To the extent that the two populations are concentrated in the same locations, a single weight might be appropriate. However, even in Figure 11, there remains substantial variance among higher-poverty schools in their concentrations of ESLL children.

Figure 11
Relationship between Subsidized Lunch and ESLL in 2005
across Elementary Schools



Based on analysis of student level data, from state assessments, we find it unlikely that in 2002 far more ESLL children were simply not from economically disadvantaged backgrounds. Student level analyses indicate that in 2002, an economically disadvantaged child was 2.75 times as likely as a non-economically disadvantaged child to also be ESLL. In 2005, that ratio had increased, but only to 2.95 times as likely. That is, at the individual level, there is in 2005 and was in 2002 a strong association between an individual child coming from economically disadvantaged background and being limited in their English proficiency.

This relationship is significantly moderated by ethnicity. For example, among white children, a child from economic disadvantage is only 37% more likely to also be limited in English proficiency. Among Japanese children, the economically disadvantaged child is 40% more likely to also be limited English proficient. By contrast, among Filipino children, a child from economic disadvantage is 2.6 times as likely to also be limited English proficient. The ratio is similar for Samoan children.

Given additional time, we would suggest reconstructing school-level population characteristics off of the student level performance and demographic data to enable a more complete picture of these patterns.

5.0 Applying the Findings Herein to the WSF

In this final section of this report, we provide some more specific guidance on how the findings in our reports might be applied to modifying Hawai'i's weighted student formula. To do so, we construct a school by school simulation, reporting one version of our simulation in Appendix B. In general in this section, we promote a *tilt then lift,* rather than *lift then tilt* strategy for modifying the system over time. We also accept the constraint that it is likely to be politically infeasible to dramatically reduce the budgets of some schools in order to shift funding into student need weights.

Advocates of weighted student funding as a *cost saving* strategy have overlooked this important reality. A recent *New York Daily News* (7/2/06) editorial opined:

> "Rather than simply pumping more gas into this broken down car, it's time to design a much smarter and more effective way to get from Point A to Point B. A reform idea called 'weighted student funding' does just that, making intelligent use of the resources we already devote to education. How? Unlike the current system—which funds school districts through an incredibly complicated calculus—weighted student funding ties the money to the student."[43]

Increasingly, pundits supporting this view of WSF use the analogy of students carrying with them a need-based *backpack* of funding.

Hawai'i's BOE and Committee on Weights now recognizes that in a system already constrained by limited resources, targeting sufficient need-based weighting simply costs more, not less or the same amount of money. As noted in our original report, we do not envy the members of committee charged with redistributing limited resources. If, as our estimates suggest, some schools need 40% more than others on the basis of poverty alone (we believe this to be a low estimate), and if this is to be done with no new money added to the system, then others must necessarily give up 40% of their funding.

In other words, assume Johnny and Malaya both need backpacks and currently they both have $10, sufficient to buy an ordinary backpack at Target or Wal-Mart. But, Malaya, by virtue of combined economic disadvantage and limited English proficiency, needs a $20 backpack. Johnny may need only an $8 backpack—the cheapest available (but with less padded shoulder straps than Johnny is used to). Unfortunately, if we redistribute the necessary resources to Malaya, then Johnny is out of luck altogether. If we leave Johnny with enough for the $8 backpack, then Malaya is out of luck. It's a lose/lose proposition. For both Johnny and Malaya to get the backpack (read *education*) they need through a WSF, we will likely have to find more money. We ourselves might view this issue differently if it was plainly obvious that Hawai'i's schools are flush with funds and simply squandering those funds on unnecessary, frivolous endeavors.[44] We lack any evidence to support this conclusion.

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[43] Cooper, B.S. (2006) School Funding Solution is in a Backpack. *New York Daily News.* July 2, 2006

[44] Note that the above mentioned editorial was squarely targeted at New York City public schools, arguing that New York city public schools are flush with funds and simply need to spend them better, through weighted student funding. Recall our points at the outset of this report, when we noted that New York City schools actually have less funding than surrounding districts and pay their teachers, on average,

We suspect that Hawai‘i’s BOE and Committee on Weights are also now well aware that the calculus of WSF is not necessarily simpler or clearer than other alternatives. That said, we continue to strongly support the notion of rationally tying school budgets to student needs and schooling conditions. Further, we argue that doing so remains a necessary prerequisite to decentralized control if a primary objective of the implementation of a WSF is to address concerns of vertical equity.

Tilt then Lift

By *tilt then lift,* we specifically mean that the BOE and Committee on Weights should place first emphasis on increasing student-need weighting and including the appropriate economies of scale adjustments, and second emphasis on leveling up, over time, the base level of funding per pupil. We make this recommendation in part on the premise that all schools would be buffered against loss by a 100% hold-harmless provision. In short, the *tilt the lift* recommendation is that new funds be added to the system and those new funds be targeted primarily, if not entirely, to the student weights rather than being distributed across all schools in the base funding ($4,292.30) or as a foundation grant. In fact, because all schools would be buffered against losses by a hold-harmless provision, the underlying base aid per pupil could be reduced to the actual minimum WSF funding per pupil proposed for 2006-07, which, based on the version we received at the outset of this project, was to be around $3,842 per pupil. It makes little sense to set a theoretical base aid level that exceeds significantly the base aid that will actually be provided.

The following figures provide illustrative examples based on our simulations. In each case, we apply poverty weights of 40%, based on our estimates herein and on existing literature, and ESLL weights of 60%, which are much higher than present, but lower than the best available research. We test options including the current base of $4,292 and our alternative base of $3,842, and we test the effects of including a labor market wage adjustment based on analyses herein. Table 13 displays the parameters of the simulation and costs of alternatives, based on the schools in our simulation (reported in Appendix B).

Figure 12 displays as-is 2005-06 funding alongside WSF phase in 2006-07 funding and simulated per pupil budgets based on our $3,842 base with 40% poverty and 60% ESLL weight, and with our economies of scale adjustment. Figure 12 excludes schools with fewer than 600 students to avoid the complicating effects of the scale adjustment. Note that our cost assumptions in Table 13 assume 100% hold-harmless. That is, blue diamonds that currently fall above the red circle for the same school, would receive their current level of funding. Clearly, this provision creates unfortunate inequities, but ones that may be extremely difficult to overcome politically in the short term. Note that the 40% poverty weight creates a strong upward slope that then forks out based on differing levels of ESLL concentration. This slope is the TILT to which we refer in our *tilt then lift* approach. In this approach, schools that would gain the most would be

20% less at the same levels of education and experience than adjacent suburban districts. We expect that it would be comparably difficult to actually “fix” New York City public schools simply by reallocating funds through a WSF, with no additional funding for increased weights.

the highest poverty schools. Arguably, the BOE need not constrain the gains of these schools to only *x*% or *y*% if sufficient funds were available. Instead, the BOE might wish to provide guidance on the use of those funds for recruiting (preferably with wage differentials), new faculty and possibly new principals for high need schools receiving well justified windfalls.

Specifically regarding the abruptness of such changes, with emphasis only on class size, Jepsen and Rivken find that

> the results show that smaller classes raise third-grade mathematics and reading achievement on average, holding all else equal, and that the abruptness of the change does not appear to diminish the benefits of smaller classes.[45]

We estimate that the total increases in funding required to generate the scenario in Figure 12 are approximately $35 million (pending accuracy and completeness of data shown in Appendix B). The BOE may wish to focus first on driving additional need-based funding toward elementary schools, reducing these costs.

Figure 12
Comparing the Poverty Weight to WSF 06-07 Phase in and As-Is 05-06 Funding

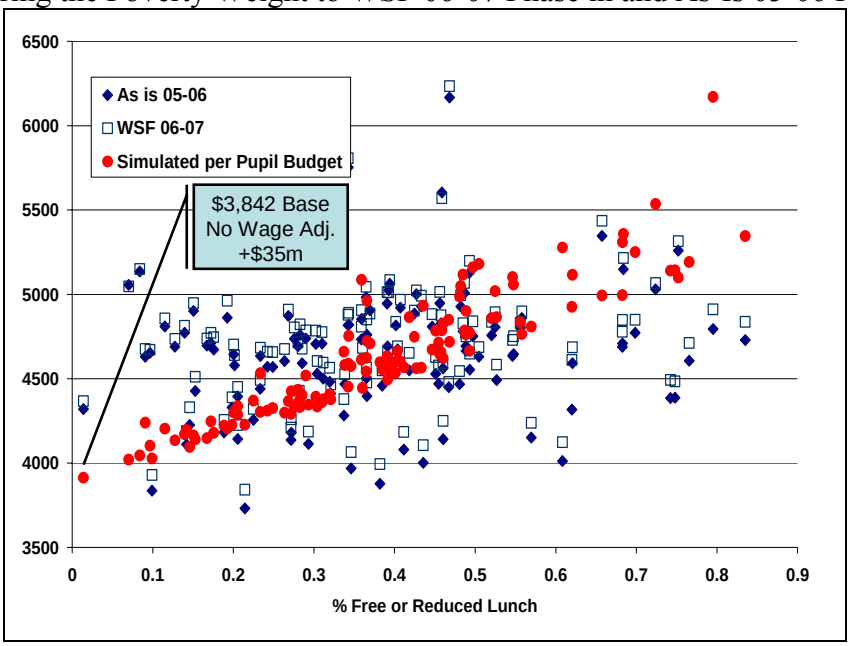


Figure 13 shows the effects of adding on a labor market adjustment, increasing funding by 17% in O‘ahu and 6% in Hawai‘i. This proves a very expensive option, at $113 million additional. Given our tentativeness about this option to begin with, we are not strong advocates of this approach. We argue that similar sums of funding might be better allocated toward increasing compensating differentials within labor markets to more equitably distribute teaching quality.

[45] Jepsen, C., Rivken, S. (2003) What is the tradeoff between smaller classes and teacher quality?

Figure 13
Comparing the Poverty Weight with Regional Wage Adjustment to WSF 06-07 Phase in and As Is 05-06 Funding

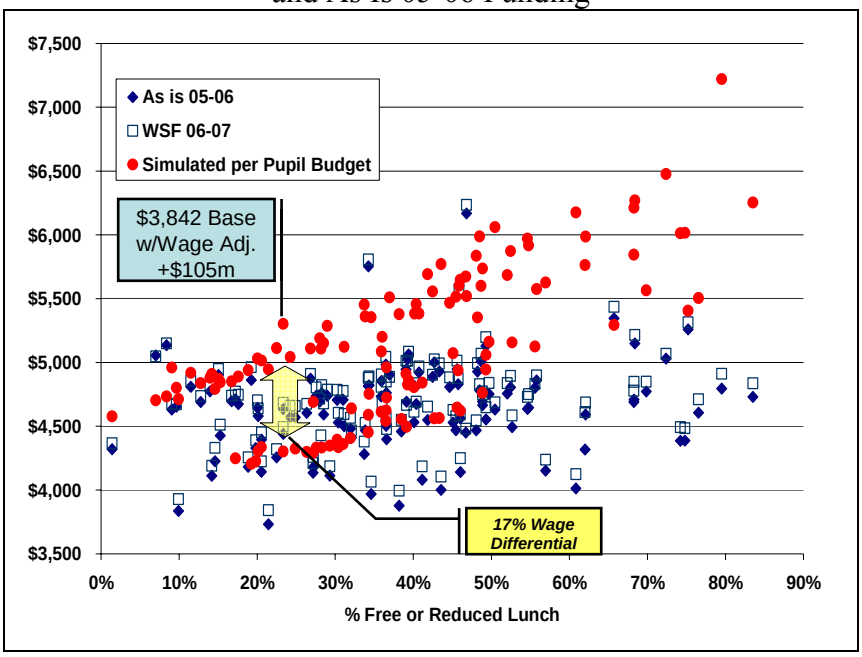


Figure 14 shows the underlying economies of scale effect, drawn from our cost models and applied as a weight in our simulation.

Figure 14
Scale Weight for Simulation

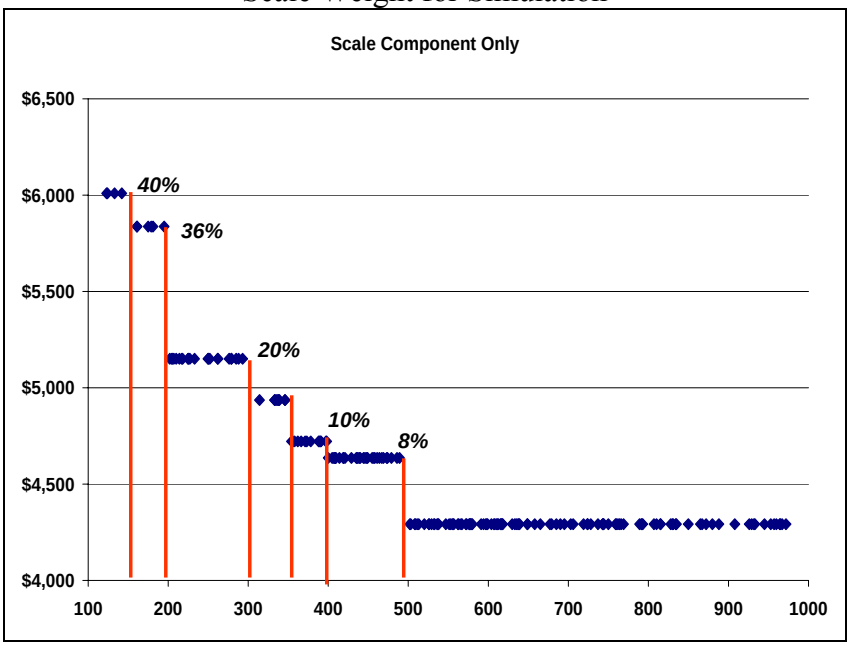
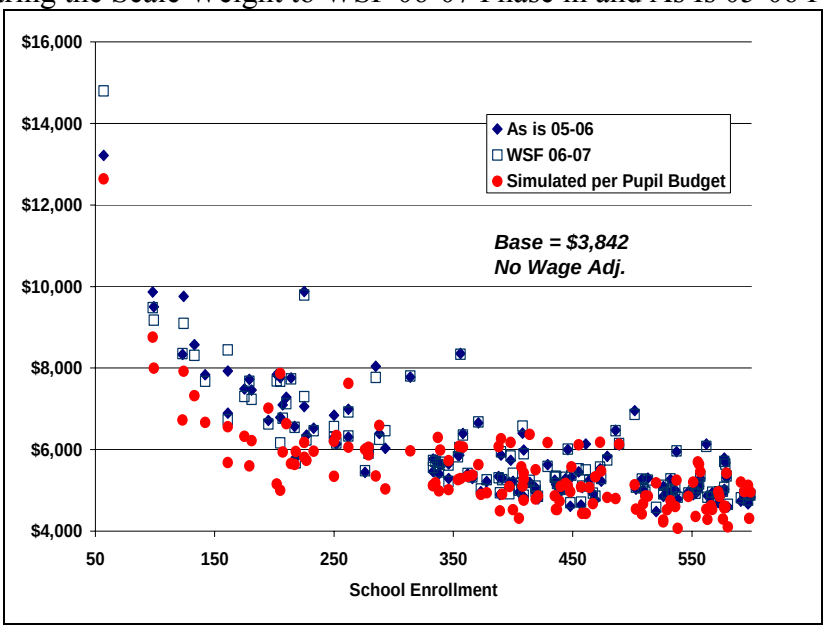


Figure 15 shows the full simulated effects of funding, with 60% ESLL, 40% poverty weight, our scale adjustment on a $3,842 base, applied to schools with less than

600 enrolled students. Simulated budgets per pupil fall somewhat below hold-harmless levels for small schools, but track the general shape of scale-related differences in current funding. As such, with subsequent increases to base funding, using the scale weight estimated herein, these small schools should be quickly phased off from a hold-harmless provision. Some outliers will persist.

Figure 15
Comparing the Scale Weight to WSF 06-07 Phase in and As Is 05-06 Funding



Finally, Table 13 provides our estimates of total costs of a handful of options, each assuming hold-harmless at 100% of As Is 2005-06 funding levels. Clearly, inclusion of a large labor market adjustment for the state's most heavily populated island dramatically increases total costs and may be neither feasible nor warranted. By contrast, resetting the base level of funding to the actual proposed minimum for 2006-07, including weights more closely aligned with external research and Hawai'i-specific analyses, may cost as little as $35 million additional dollars, with the majority of new dollars being targeted to where they are most needed.

Table 13
Simulated Policy Options for Weighted Funding

	At Proposed Base		Base at 2006-07 Minimum	
Base Aid per Pupil	$4,292	$4,292	**$3,842***	$3,842
Free/Reduced Weight	40%	40%	**40%**	40%
ESLL Weight	60%	60%	**60%**	60%
Labor Market Adjustment (on=1, off=0)	0	1	**0**	1
TOTAL Cost of Increases over 2005-06 (in Millions)	$102	$212	**$35**	$113

*Appendix B example

Appendix A

Occupation Groups (2005) in Personnel Budgets per Pupil

Occp Gp Desc	Freq.	Percent	Cum.
10-MO STUDENT SVCS COORD	42	0.14	0.14
10-MONTH REGISTRAR	2	0.01	0.14
12-MO COUNSELOR	13	0.04	0.19
12-MO DIST OFF TCHR	73	0.24	0.43
12-MO ELEM PRIN II	2	0.01	0.43
12-MO ELEM TEACHER	21	0.07	0.5
12-MO LIBRARIAN	14	0.05	0.55
12-MO MT ELEM PRIN V	3	0.01	0.56
12-MO MT INTER PRIN VII	2	0.01	0.57
12-MO MT VICE PRIN III	15	0.05	0.61
12-MO SECONDARY TEACHER	55	0.18	0.8
12-MO SPED TCH/EMOT DSTRB	4	0.01	0.81
12-MO SPED TCHR/MR-LD	35	0.12	0.92
12-MO STUDENT SVCS COORD	775	2.55	3.47
12-MO VICE PRIN II	6	0.02	3.49
12-MONTH REGISTRAR	220	0.72	4.21
12-MONTH SAC TEACHER	80	0.26	4.48
COMM SCH PRIN III	1	0	4.48
COMM SCH PRIN IV	3	0.01	4.49
COMM SCH PRIN V	5	0.02	4.51
COMM SCH PRIN VI	11	0.04	4.54
COMM SCH VICE PRIN I	4	0.01	4.56
COMM SCH VICE PRIN II	2	0.01	4.56
COMM SCH VICE PRIN III	9	0.03	4.59
COMM SCH VICE PRIN IV	9	0.03	4.62
COMPLX SCH RENEW SPEC II	65	0.21	4.83
COUNSELOR	1,525	5.01	9.85
COUNSELOR/ALIENATION	155	0.51	10.36
COUNSELOR/DORMITORY	8	0.03	10.38
COUNSELOR/HIGH RISK	436	1.43	11.81
CSSS RESOURCE TEACHER	103	0.34	12.15
DIAG TM/PSYCH EXAMINER	12	0.04	12.19
DIST OFF TCHR	291	0.96	13.15
DISTRICT EDUC SPEC II	2	0.01	13.16
ELEM PRIN I	24	0.08	13.23
ELEM PRIN II	175	0.58	13.81
ELEM PRIN III	144	0.47	14.28
ELEM PRIN IV	12	0.04	14.32
ELEM TEACHER	8,528	28.03	42.35
GEN EDUC/ARTICLE VI TCHR	1,800	5.92	48.26
HIGH SCH PRIN V	8	0.03	48.29
HIGH SCH PRIN VI	22	0.07	48.36
HIGH SCH PRIN VII	21	0.07	48.43
HIGH SCH PRIN VIII	31	0.1	48.53
INTER PRIN IV	8	0.03	48.56
INTER PRIN V	33	0.11	48.67
INTER PRIN VI	38	0.12	48.79
LIBRARIAN	1,350	4.44	53.23
LITERACY TEACHER	30	0.1	53.33
ROTC INSTRUCTOR	61	0.2	53.53
SCH ATHLETIC DIR I	24	0.08	53.61
SCH ATHLETIC DIR II	3	0.01	53.62
SCH ATHLETIC DIR III	56	0.18	53.8
SCH BUS MGR II	1	0	53.81
SCHOOL ASSESSMENT LIAISON	63	0.21	54.01
SECONDARY TEACHER	8,075	26.54	80.55
SPEC ED TCHR/EMOT DSTRB	92	0.3	80.85
SPEC ED TCHR/HRG IMPAIRED	48	0.16	81.01
SPEC ED TCHR/MR-LD	4,263	14.01	95.02
SPEC ED TCHR/MULT HNDCP	229	0.75	95.77
SPEC ED TCHR/ORTHO HNDCP	18	0.06	95.83
SPEC ED TCHR/PRE-SCHOOL	682	2.24	98.07
SPECIAL SCH TEACHER	11	0.04	98.11
TITLE I LINKER TEACHER	29	0.1	98.21
VICE PRIN (SUPPORT) I	22	0.07	98.28

Occp Gp Desc	Freq.	Percent	Cum.
VICE PRIN (SUPPORT) II	9	0.03	98.31
VICE PRIN (SUPPORT) III	10	0.03	98.34
VICE PRIN (SUPPORT) IV	11	0.04	98.38
VICE PRINCIPAL I	159	0.52	98.9
VICE PRINCIPAL II	65	0.21	99.11
VICE PRINCIPAL III	137	0.45	99.56
VICE PRINCIPAL IV	133	0.44	100

Appendix B

Simulation Output at $3,842 Base, 40% Poverty Wt., 60% ESLL Wt., No Wage Adj.

School Code	School Name	Sept. 05 Enroll	Free/ Reduced	ESLL	Trans	As is 05-06	WSF Full	WSF 06-07	Scale Wt.	Wage Adj.	Scale & Wage Adjusted Base	Poverty Add-on	ESLL Add-on	Simulated per Pupil Budget	HH Budget per Pupil
100	AINA HAINA	458	39	26	29	$5,070	$4,878	$5,105	1.08	1.17	$4,149	$141	$141	$4,432	$5,070
101	ALA WAI	473	271	205	80	$5,528	$5,402	$5,573	1.08	1.17	$4,149	$951	$1,079	$6,179	$6,179
102	ALIIOLANI	276	126	55	36	$5,440	$5,319	$5,479	1.20	1.17	$4,610	$842	$551	$6,004	$6,004
103	ANUENUE	354	186	21	9	$5,856	$5,742	$5,822	1.10	1.17	$4,226	$888	$150	$5,265	$5,856
104	CENTRAL MID	489	362	148	55	$6,114	$5,482	$6,148	1.08	1.17	$4,149	$1,229	$754	$6,132	$6,132
105	DOLE MID	769	526	155	53	$5,149	$4,893	$5,215	1.00	1.17	$3,842	$1,051	$465	$5,358	$5,358
106	FARRINGTON HI	2579	1569	560	132	$4,012	$4,620	$4,125	1.00	1.17	$3,842	$935	$501	$5,277	$5,277
107	FERN	555	395	183	66	$5,012	$5,872	$5,066	1.00	1.17	$3,842	$1,094	$760	$5,696	$5,696
108	HAHAIONE	436	36	43	34	$5,151	$4,913	$5,347	1.08	1.17	$4,149	$137	$246	$4,532	$5,151
109	HOKULANI	409	52	65	10	$5,168	$4,905	$5,189	1.08	1.17	$4,149	$211	$396	$4,756	$5,168
110	JARRETT MID	314	191	56	16	$7,777	$5,680	$7,802	1.15	1.17	$4,418	$1,075	$473	$5,966	$7,777
111	JEFFERSON	474	220	105	87	$5,224	$5,108	$5,289	1.08	1.17	$4,149	$770	$551	$5,471	$5,471
112	KAAHUMANU	557	294	194	76	$5,292	$5,271	$5,350	1.00	1.17	$3,842	$811	$803	$5,456	$5,456
113	KAEWAI	250	11	59	21	$6,844	$5,546	$6,563	1.20	1.17	$4,610	$81	$653	$5,344	$6,844
114	KAHALA	538	17	42	14	$4,789	$4,836	$4,829	1.00	1.17	$3,842	$49	$180	$4,071	$4,789
115	KAIMUKI HI	1297	629	298	98	$4,781	$4,695	$4,828	1.00	1.17	$3,842	$745	$530	$5,117	$5,117
116	KAIMUKI MID	744	112	29	34	$4,902	$4,824	$4,948	1.00	1.17	$3,842	$231	$90	$4,163	$4,902
117	KAIULANI	414	325	153	64	$5,193	$5,396	$5,243	1.08	1.17	$4,149	$1,303	$920	$6,372	$6,372
118	KALAKAUA MID	1009	689	183	65	$4,709	$5,096	$4,848	1.00	1.17	$3,842	$1,049	$418	$5,309	$5,309
119	KALANI HI	1161	112	57	50	$4,653	$4,378	$4,672	1.00	1.17	$3,842	$148	$113	$4,103	$4,653
120	KALIHI	210	139	61	38	$7,283	$5,655	$7,124	1.20	1.17	$4,610	$1,221	$804	$6,635	$7,283
121	KALIHI-KAI	706	511	178	62	$5,029	$5,251	$5,066	1.00	1.17	$3,842	$1,112	$581	$5,536	$5,536
122	KALIHI-UKA	252	144	62	42	$6,138	$5,501	$6,157	1.20	1.17	$4,610	$1,054	$681	$6,345	$6,345
123	KALIHI-WAENA	556	414	158	51	$5,101	$5,267	$5,155	1.00	1.17	$3,842	$1,144	$655	$5,641	$5,641
124	KAPALAMA	728	382	117	44	$4,806	$5,143	$4,894	1.00	1.17	$3,842	$806	$370	$5,019	$5,019
125	KAULUWELA	398	301	105	27	$5,736	$5,331	$5,843	1.10	1.17	$4,226	$1,278	$669	$6,174	$6,174
126	KAWANANAKOA MID	815	364	51	35	$4,809	$4,970	$4,883	1.00	1.17	$3,842	$686	$144	$4,673	$4,809
127	KOKO HEAD	293	30	25	15	$6,032	$5,190	$6,461	1.20	1.17	$4,610	$189	$236	$5,035	$6,032
128	KUHIO	337	228	87	41	$5,679	$5,341	$5,635	1.15	1.17	$4,418	$1,196	$684	$6,298	$6,298
129	LANAKILA	288	188	81	26	$6,396	$5,406	$6,253	1.20	1.17	$4,610	$1,204	$778	$6,592	$6,592
130	LIHOLIHO	333	80	34	13	$5,769	$5,025	$5,729	1.15	1.17	$4,418	$425	$271	$5,114	$5,769
131	LIKELIKE	455	344	130	74	$5,451	$5,314	$5,531	1.08	1.17	$4,149	$1,255	$711	$6,116	$6,116
132	LILIUOKALANI	123	53	16	11	$8,335	$6,014	$8,351	1.40	1.17	$5,379	$927	$420	$6,726	$8,335
133	LINAPUNI	205	200	108	28	$7,767	$6,318	$7,673	1.20	1.17	$4,610	$1,799	$1,457	$7,867	$7,867
134	LINCOLN	449	255	87	46	$5,325	$5,170	$5,370	1.08	1.17	$4,149	$943	$482	$5,574	$5,574
135	LUNALILO	579	293	201	44	$5,312	$5,266	$5,350	1.00	1.17	$3,842	$778	$800	$5,420	$5,420
136	MAEMAE	724	101	36	25	$4,773	$4,800	$4,814	1.00	1.17	$3,842	$214	$115	$4,171	$4,773
137	MANOA	635	73	51	17	$4,810	$4,857	$4,857	1.00	1.17	$3,842	$177	$185	$4,204	$4,810
138	MCKINLEY HI	1945	935	343	131	$4,468	$4,642	$4,545	1.00	1.17	$3,842	$739	$407	$4,987	$4,987

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139	NIU VALLEY MID	461	53	17	36	$6,136	$4,811	$5,501	1.08	1.17	$4,149	$191	$92	$4,432	$6,136
140	NOELANI	526	60	47	29	$5,093	$4,848	$5,125	1.00	1.17	$3,842	$175	$206	$4,223	$5,093
141	NUUANU	389	41	14	7	$4,894	$4,790	$4,938	1.10	1.17	$4,226	$178	$91	$4,496	$4,894
142	PALOLO	262	242	124	25	$6,991	$5,773	$6,919	1.20	1.17	$4,610	$1,703	$1,309	$7,623	$7,623
143	PAUOA	440	190	41	29	$4,974	$5,000	$5,022	1.08	1.17	$4,149	$717	$232	$5,098	$5,098
145	PUUHALE	355	255	89	34	$5,861	$5,386	$6,047	1.10	1.17	$4,226	$1,214	$636	$6,076	$6,076
146	ROOSEVELT HI	1672	376	132	70	$4,255	$4,457	$4,321	1.00	1.17	$3,842	$346	$182	$4,370	$4,370
147	ROYAL	388	250	116	59	$5,341	$5,311	$5,310	1.10	1.17	$4,226	$1,089	$758	$6,074	$6,074
148	STEVENSON MID	604	277	63	57	$5,604	$5,059	$5,571	1.00	1.17	$3,842	$705	$240	$4,787	$5,604
150	WAIKIKI	346	142	76	18	$5,651	$5,146	$5,619	1.15	1.17	$4,418	$725	$582	$5,726	$5,726
151	WAILUPE VALLEY	161	26	6	5	$7,927	$5,715	$8,445	1.36	1.17	$5,225	$338	$117	$5,679	$7,927
152	WASHINGTON MID	1066	521	143	92	$4,665	$5,051	$4,750	1.00	1.17	$3,842	$751	$309	$4,902	$4,902
153	WILSON	607	55	68	28	$4,631	$4,836	$4,675	1.00	1.17	$3,842	$139	$258	$4,239	$4,631
154	KAISER HI	1025	86	33	47	$5,135	$4,423	$5,150	1.00	1.17	$3,842	$129	$74	$4,045	$5,135
155	KAMILOIKI	400	59	21	31	$5,220	$4,970	$5,416	1.08	1.17	$4,149	$245	$131	$4,525	$5,220
200	AIEA EL	390	327	96	40	$5,864	$5,313	$5,944	1.10	1.17	$4,226	$1,417	$624	$6,268	$6,268
201	AIEA INT	577	225	32	40	$5,792	$5,000	$5,708	1.00	1.17	$3,842	$599	$128	$4,569	$5,792
202	AIEA HI	1280	433	122	70	$4,469	$4,521	$4,526	1.00	1.17	$3,842	$520	$220	$4,582	$4,582
203	ALIAMANU EL	766	222	77	161	$4,739	$4,991	$4,786	1.00	1.17	$3,842	$445	$232	$4,519	$4,739
204	ALIAMANU INT	880	251	47	111	$4,592	$4,902	$4,678	1.00	1.17	$3,842	$438	$123	$4,403	$4,592
206	HALEIWA	225	146	30	29	$7,057	$5,572	$7,297	1.20	1.17	$4,610	$1,197	$369	$6,176	$7,057
207	HALE KULA	479	152	29	111	$5,833	$4,992	$5,744	1.08	1.17	$4,149	$527	$151	$4,827	$5,833
208	HELEMANO	594	286	99	84	$4,823	$5,143	$4,902	1.00	1.17	$3,842	$740	$384	$4,966	$4,966
209	HICKAM	792	121	22	141	$4,427	$4,846	$4,511	1.00	1.17	$3,842	$235	$64	$4,141	$4,427
210	ILIAHI	435	159	19	40	$5,252	$4,975	$5,323	1.08	1.17	$4,149	$607	$109	$4,865	$5,252
211	KAALA	429	332	127	74	$5,629	$5,348	$5,588	1.08	1.17	$4,149	$1,284	$737	$6,171	$6,171
212	KIPAPA	615	247	38	76	$4,816	$4,996	$4,836	1.00	1.17	$3,842	$617	$142	$4,602	$4,816
214	LEILEHUA HI	1878	717	137	136	$3,878	$4,513	$3,994	1.00	1.17	$3,842	$587	$168	$4,597	$4,597
215	MAKALAPA	612	298	52	101	$5,009	$5,031	$5,067	1.00	1.17	$3,842	$748	$196	$4,786	$5,009
216	MILILANI HI	2421	240	35	118	$3,836	$4,247	$3,929	1.00	1.17	$3,842	$152	$33	$4,028	$4,028
217	MOANALUA EL	690	88	29	41	$4,690	$4,803	$4,736	1.00	1.17	$3,842	$196	$97	$4,135	$4,690
218	MOANALUA HI	2016	286	119	99	$4,111	$4,376	$4,190	1.00	1.17	$3,842	$218	$136	$4,196	$4,196
219	MOANALUA MID	831	146	24	75	$4,673	$4,832	$4,747	1.00	1.17	$3,842	$270	$67	$4,179	$4,673
220	MOKULELE	508	139	35	86	$5,272	$4,924	$5,278	1.00	1.17	$3,842	$421	$159	$4,421	$5,272
221	NIMITZ	553	164	15	102	$4,923	$4,907	$4,927	1.00	1.17	$3,842	$456	$63	$4,360	$4,923
222	PEARL HARBOR	617	228	80	78	$4,905	$5,006	$4,887	1.00	1.17	$3,842	$568	$299	$4,709	$4,905
223	PEARL HARBOR KAI	639	179	45	79	$4,693	$4,926	$4,715	1.00	1.17	$3,842	$430	$162	$4,435	$4,693
224	RADFORD HI	1343	276	75	105	$4,395	$4,434	$4,451	1.00	1.17	$3,842	$316	$129	$4,287	$4,395
225	RED HILL	467	114	22	89	$4,919	$4,871	$4,929	1.08	1.17	$4,149	$405	$117	$4,672	$4,919
226	SOLOMON	743	300	65	126	$4,674	$5,053	$4,692	1.00	1.17	$3,842	$621	$202	$4,664	$4,674
227	SCOTT	567	170	56	84	$4,938	$4,935	$4,956	1.00	1.17	$3,842	$461	$228	$4,530	$4,938
228	SHAFTER	205	33	7	41	$6,787	$5,086	$6,163	1.20	1.17	$4,610	$297	$94	$5,002	$6,787

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229	WAHIAWA EL	409	239	50	66	$5,988	$5,140	$5,896	1.08	1.17	$4,149	$970	$304	$5,424	$5,988
230	WAHIAWA MID	957	498	90	80	$4,757	$5,031	$4,837	1.00	1.17	$3,842	$800	$217	$4,859	$4,859
231	WAIALUA EL	513	258	54	35	$5,302	$5,041	$5,252	1.00	1.17	$3,842	$773	$243	$4,858	$5,302
232	WAIALUA HI & INT	677	317	46	36	$6,167	$5,023	$6,234	1.00	1.17	$3,842	$720	$157	$4,718	$6,167
233	WAIMALU	617	262	68	50	$4,887	$5,006	$4,903	1.00	1.17	$3,842	$653	$254	$4,749	$4,887
234	MILILANI WAENA	598	157	17	78	$4,868	$4,922	$4,904	1.00	1.17	$3,842	$403	$66	$4,311	$4,868
235	WEBLING	526	100	31	31	$4,855	$4,876	$4,911	1.00	1.17	$3,842	$292	$136	$4,270	$4,855
236	WHEELER EL	658	268	38	138	$4,921	$5,023	$4,968	1.00	1.17	$3,842	$626	$133	$4,601	$4,921
237	WHEELER MID	562	224	20	85	$6,137	$5,035	$6,079	1.00	1.17	$3,842	$613	$82	$4,537	$6,137
238	MILILANI MID	1872	273	24	131	$4,226	$4,720	$4,330	1.00	1.17	$3,842	$224	$30	$4,096	$4,226
239	SALT LAKE	789	330	130	76	$4,550	$5,058	$4,654	1.00	1.17	$3,842	$643	$380	$4,865	$4,865
240	MILILANI 'IKE	932	13	20	49	$4,320	$4,718	$4,367	1.00	1.17	$3,842	$21	$49	$3,913	$4,320
241	MILILANI MAUKA	685	48	21	43	$5,056	$4,810	$5,047	1.00	1.17	$3,842	$108	$71	$4,020	$5,056
242	MILILANI UKA	760	127	16	66	$4,696	$4,839	$4,738	1.00	1.17	$3,842	$257	$49	$4,147	$4,696
243	PEARL RIDGE	576	111	40	16	$4,925	$4,889	$4,976	1.00	1.17	$3,842	$296	$160	$4,298	$4,925
250	AHRENS	1270	641	310	99	$4,631	$4,985	$4,687	1.00	1.17	$3,842	$776	$563	$5,180	$5,180
251	BARBERS POINT	529	176	39	134	$4,947	$4,981	$4,950	1.00	1.17	$3,842	$511	$170	$4,523	$4,947
252	CAMPBELL HI	2283	790	200	155	$3,969	$4,416	$4,065	1.00	1.17	$3,842	$532	$202	$4,576	$4,576
253	EWA EL	933	436	117	87	$4,450	$4,964	$4,481	1.00	1.17	$3,842	$718	$289	$4,849	$4,849
254	EWA BEACH EL	665	306	80	120	$4,562	$4,987	$4,592	1.00	1.17	$3,842	$707	$277	$4,826	$4,826
255	HIGHLANDS INT	1011	245	42	62	$4,571	$4,867	$4,660	1.00	1.17	$3,842	$372	$96	$4,310	$4,571
256	IROQUOIS POINT	563	116	31	165	$4,869	$4,887	$4,829	1.00	1.17	$3,842	$317	$127	$4,286	$4,869
257	MAILI	807	599	55	149	$4,385	$5,115	$4,493	1.00	1.17	$3,842	$1,141	$157	$5,140	$5,140
258	MAKAHA	597	459	26	78	$4,666	$5,121	$4,756	1.00	1.17	$3,842	$1,182	$100	$5,124	$5,124
259	MAKAKILO	509	219	36	69	$5,014	$4,999	$5,058	1.00	1.17	$3,842	$661	$163	$4,666	$5,014
260	MANANA	378	137	15	29	$5,216	$4,950	$5,258	1.10	1.17	$4,226	$613	$101	$4,940	$5,216
261	NANAIKAPONO	964	721	63	163	$4,387	$5,068	$4,484	1.00	1.17	$3,842	$1,149	$151	$5,142	$5,142
262	NANAKULI EL	511	334	3	58	$4,916	$5,017	$4,958	1.00	1.17	$3,842	$1,004	$14	$4,860	$4,916
263	NANAKULI HI & INT	1303	727	37	128	$4,859	$4,717	$4,899	1.00	1.17	$3,842	$857	$65	$4,765	$4,859
264	PALISADES	333	104	20	29	$5,462	$5,048	$5,559	1.15	1.17	$4,418	$552	$159	$5,129	$5,462
265	PEARL CITY EL	547	267	61	78	$4,961	$5,059	$4,934	1.00	1.17	$3,842	$750	$257	$4,849	$4,961
266	PEARL CITY HI	1980	373	77	107	$4,182	$4,388	$4,256	1.00	1.17	$3,842	$290	$90	$4,221	$4,221
267	PC HIGHLANDS	338	89	13	23	$5,407	$4,944	$5,448	1.15	1.17	$4,418	$465	$102	$4,986	$5,407
268	LEHUA	397	151	35	58	$5,194	$5,348	$4,914	1.10	1.17	$4,226	$643	$224	$5,093	$5,194
269	POHAKEA	551	341	98	68	$4,891	$5,153	$4,985	1.00	1.17	$3,842	$951	$410	$5,203	$5,203
270	WAIANAE EL	591	452	47	118	$4,732	$5,146	$4,817	1.00	1.17	$3,842	$1,175	$183	$5,201	$5,201
271	LEIHOKU	737	457	42	91	$4,317	$4,875	$4,611	1.00	1.17	$3,842	$953	$131	$4,926	$4,926
272	WAIANAE HI	2068	1178	82	163	$4,151	$4,519	$4,238	1.00	1.17	$3,842	$875	$91	$4,809	$4,809
273	WAIANAE INT	1131	772	51	122	$4,689	$5,064	$4,779	1.00	1.17	$3,842	$1,049	$104	$4,995	$4,995
274	WAIPAHU EL	1035	823	497	176	$4,795	$5,364	$4,911	1.00	1.17	$3,842	$1,222	$1,107	$6,171	$6,171
275	KAMAILE	649	542	62	122	$4,730	$5,192	$4,837	1.00	1.17	$3,842	$1,283	$220	$5,346	$5,346
276	HONOWAI	791	491	110	101	$4,592	$5,116	$4,686	1.00	1.17	$3,842	$954	$321	$5,117	$5,117

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277	WAIPAHU HI	2544	1108	465	129	$4,001	$4,519	$4,105	1.00	1.17	$3,842	$669	$421	$4,933	$4,933
278	WAIPAHU INT	1320	723	214	106	$4,645	$5,046	$4,751	1.00	1.17	$3,842	$842	$374	$5,057	$5,057
279	ILIMA INT	1201	546	90	118	$4,470	$4,950	$4,578	1.00	1.17	$3,842	$699	$173	$4,713	$4,713
280	HOLOMUA	1442	289	94	139	$4,644	$4,781	$4,702	1.00	1.17	$3,842	$308	$150	$4,300	$4,644
281	KAIMILOA	679	371	124	83	$4,635	$5,122	$4,730	1.00	1.17	$3,842	$840	$421	$5,103	$5,103
282	KAPOLEI EL	1126	302	55	117	$4,872	$4,906	$4,909	1.00	1.17	$3,842	$412	$113	$4,367	$4,872
283	KANOELANI	834	235	33	63	$4,334	$4,861	$4,428	1.00	1.17	$3,842	$433	$91	$4,366	$4,366
285	MOMILANI	405	29	8	8	$4,955	$4,770	$4,999	1.08	1.17	$4,149	$119	$49	$4,317	$4,955
286	MAUKA LANI	577	257	23	91	$5,028	$5,019	$5,075	1.00	1.17	$3,842	$685	$92	$4,618	$5,028
287	KALEIOPUU	967	326	126	94	$4,282	$4,922	$4,379	1.00	1.17	$3,842	$518	$300	$4,660	$4,660
288	WAIAU	608	219	13	29	$4,614	$4,910	$4,682	1.00	1.17	$3,842	$554	$49	$4,445	$4,614
290	WAIKELE	724	169	104	64	$4,634	$4,974	$4,683	1.00	1.17	$3,842	$359	$331	$4,532	$4,634
291	KAPOLEI MID	1580	492	39	140	$4,500	$4,865	$4,596	1.00	1.17	$3,842	$479	$57	$4,377	$4,500
292	KAPOLEI HI	2333	500	56	147	$3,732	$4,326	$3,842	1.00	1.17	$3,842	$329	$55	$4,227	$4,227
300	AIKAHI	580	62	25	31	$4,596	$4,799	$4,657	1.00	1.17	$3,842	$164	$99	$4,106	$4,596
301	CASTLE HI	1747	512	41	104	$4,113	$4,443	$4,186	1.00	1.17	$3,842	$450	$54	$4,346	$4,346
302	ENCHANTED LAKE	373	128	14	12	$4,966	$4,968	$5,037	1.10	1.17	$4,226	$580	$95	$4,901	$4,966
303	HAUULA	262	171	23	52	$6,305	$5,347	$6,333	1.20	1.17	$4,610	$1,204	$243	$6,057	$6,305
304	HEEIA	533	249	18	51	$4,973	$4,953	$4,985	1.00	1.17	$3,842	$718	$78	$4,638	$4,973
305	KAAAWA	142	76	6	21	$7,834	$5,707	$7,672	1.40	1.17	$5,379	$1,152	$136	$6,667	$7,834
306	KAHALUU	207	131	12	33	$7,096	$5,378	$6,768	1.20	1.17	$4,610	$1,167	$160	$5,938	$7,096
307	KAHUKU HI	1879	865	59	99	$4,142	$4,660	$4,250	1.00	1.17	$3,842	$707	$72	$4,622	$4,622
308	KAILUA EL	444	231	28	56	$5,286	$5,031	$5,320	1.08	1.17	$4,149	$864	$157	$5,170	$5,286
309	KAILUA HI	972	415	27	53	$5,001	$4,583	$5,024	1.00	1.17	$3,842	$656	$64	$4,562	$5,001
310	KAILUA INT	793	241	9	51	$4,529	$4,869	$4,604	1.00	1.17	$3,842	$467	$26	$4,335	$4,529
311	KAINALU	536	223	28	51	$5,005	$4,959	$5,023	1.00	1.17	$3,842	$639	$120	$4,602	$5,005
312	KALAHEO HI	1060	204	31	68	$4,862	$4,484	$4,962	1.00	1.17	$3,842	$296	$67	$4,205	$4,862
313	KANEOHE	630	166	14	33	$4,604	$4,862	$4,676	1.00	1.17	$3,842	$405	$51	$4,298	$4,604
314	PUOHALA	279	165	17	30	$6,046	$5,170	$5,909	1.20	1.17	$4,610	$1,091	$169	$5,870	$6,046
315	KAPUNAHALA	612	173	15	19	$4,759	$4,867	$4,822	1.00	1.17	$3,842	$434	$57	$4,333	$4,759
317	KEOLU	181	77	6	20	$7,462	$5,375	$7,233	1.36	1.17	$5,225	$889	$104	$6,218	$7,462
318	KING INT	764	331	19	65	$4,929	$4,937	$4,992	1.00	1.17	$3,842	$666	$57	$4,565	$4,929
319	LAIE	599	363	48	48	$4,829	$5,040	$4,883	1.00	1.17	$3,842	$931	$185	$4,958	$4,958
321	MAUNAWILI	419	145	11	18	$4,951	$4,921	$4,973	1.08	1.17	$4,149	$574	$65	$4,789	$4,951
322	MOKAPU	759	297	17	146	$4,692	$4,981	$4,666	1.00	1.17	$3,842	$601	$52	$4,495	$4,692
323	PARKER	362	207	21	51	$5,407	$5,078	$5,412	1.10	1.17	$4,226	$967	$147	$5,340	$5,407
324	POPE	279	192	18	44	$6,028	$5,253	$6,012	1.20	1.17	$4,610	$1,269	$178	$6,058	$6,058
325	SUNSET BEACH	391	121	24	16	$5,296	$4,927	$5,262	1.10	1.17	$4,226	$523	$156	$4,905	$5,296
326	WAIAHOLE	99	67	5	10	$9,503	$6,291	$9,175	1.60	1.17	$6,147	$1,664	$186	$7,998	$9,503
327	WAIMANALO EL & INT	537	409	55	58	$5,946	$5,296	$5,965	1.00	1.17	$3,842	$1,170	$236	$5,249	$5,946
330	KAELEPULU	179	26	4	6	$7,724	$5,342	$7,678	1.36	1.17	$5,225	$304	$70	$5,599	$7,724
331	KAHUKU EL	572	334	55	37	$4,698	$5,062	$4,792	1.00	1.17	$3,842	$897	$222	$4,961	$4,961

School Code	School Name	Sept. 05 Enroll	Free/ Reduced	ESLL	Trans	As is 05-06	WSF Full	WSF 06-07	Scale Wt.	Wage Adj.	Scale & Wage Adjusted Base	Poverty Add-on	ESLL Add-on	Simulated per Pupil Budget	HH Budget per Pupil
335	AHUIMANU	437	90	6	19	$5,119	$4,828	$5,167	1.08	1.17	$4,149	$342	$34	$4,525	$5,119
351	DE SILVA	346	87	20	24	$5,290	$4,907	$5,215	1.15	1.06	$4,418	$444	$153	$5,016	$5,290
352	HAAHEO	161	73	20	10	$6,894	$5,583	$6,733	1.36	1.06	$5,225	$948	$389	$6,562	$6,894
353	KEAAU EL	743	519	108	84	$4,772	$5,169	$4,849	1.00	1.06	$3,842	$1,073	$335	$5,251	$5,251
354	KEAAU HI	867	482	52	88	$4,802	$4,708	$4,831	1.00	1.06	$3,842	$854	$138	$4,835	$4,835
355	HILO HI	1558	641	63	105	$4,080	$4,509	$4,185	1.00	1.06	$3,842	$632	$93	$4,567	$4,567
356	HILO INT	637	314	18	56	$5,128	$5,024	$5,199	1.00	1.06	$3,842	$758	$65	$4,665	$5,128
357	HILO UNION	520	405	32	77	$4,480	$5,112	$4,584	1.00	1.06	$3,842	$1,197	$142	$5,181	$5,181
358	HOLUALOA	448	163	38	43	$4,611	$5,012	$4,696	1.08	1.06	$4,149	$604	$211	$4,964	$4,964
359	HONAUNAU	124	100	31	29	$9,760	$6,150	$9,094	1.40	1.06	$5,379	$1,735	$807	$7,921	$9,760
360	HONOKAA HI & INT	835	328	39	70	$5,025	$4,700	$5,012	1.00	1.06	$3,842	$604	$108	$4,553	$5,025
361	HONOKAA EL	366	180	46	36	$5,294	$5,079	$5,330	1.10	1.06	$4,226	$831	$319	$5,376	$5,376
363	HOOKENA	133	93	18	23	$8,574	$6,001	$8,312	1.40	1.06	$5,379	$1,504	$437	$7,320	$8,574
365	KALANIANAOLE EL & INT	371	212	64	45	$6,652	$5,529	$6,676	1.10	1.06	$4,226	$966	$437	$5,630	$6,652
366	KOHALA MID	214	105	11	12	$7,758	$5,933	$7,734	1.20	1.06	$4,610	$905	$142	$5,657	$7,758
367	KAPIOLANI	407	288	41	43	$5,108	$5,134	$5,175	1.08	1.06	$4,149	$1,174	$251	$5,575	$5,575
368	KAU HI/PAHALA EL	502	296	84	41	$6,955	$5,421	$6,863	1.00	1.06	$3,842	$906	$386	$5,134	$6,955
369	KAUMANA	227	128	7	31	$6,354	$5,293	$6,237	1.20	1.06	$4,610	$1,040	$85	$5,736	$6,354
370	KEAAU MID	633	476	28	95	$5,259	$5,148	$5,315	1.00	1.06	$3,842	$1,156	$102	$5,100	$5,259
371	KAHAKAI	618	298	125	101	$4,928	$5,153	$4,995	1.00	1.06	$3,842	$741	$466	$5,049	$5,049
372	KEAUKAHA	250	208	5	25	$6,297	$5,390	$6,303	1.20	1.06	$4,610	$1,534	$55	$6,200	$6,297
373	KOHALA HI	285	101	9	18	$8,044	$5,652	$7,770	1.20	1.06	$4,610	$654	$87	$5,351	$8,044
374	KONAWAENA HI	929	366	55	70	$5,063	$4,620	$5,084	1.00	1.06	$3,842	$605	$136	$4,584	$5,063
375	KONAWAENA EL	573	258	79	54	$4,883	$5,081	$4,960	1.00	1.06	$3,842	$692	$318	$4,852	$4,883
376	KONAWAENA MID	446	212	32	27	$6,000	$5,230	$6,011	1.08	1.06	$4,149	$789	$179	$5,117	$6,000
377	LAUPAHOEHOE HI & EL	225	127	13	33	$9,877	$6,635	$9,790	1.20	1.06	$4,610	$1,041	$160	$5,811	$9,877
379	MT VIEW EL	419	334	6	86	$5,066	$5,158	$5,106	1.08	1.06	$4,149	$1,323	$36	$5,508	$5,508
380	NAALEHU	358	264	83	92	$6,396	$5,672	$6,356	1.10	1.06	$4,226	$1,247	$588	$6,061	$6,396
381	PAHOA EL	339	252	33	67	$5,627	$5,259	$5,689	1.15	1.06	$4,418	$1,314	$258	$5,990	$5,990
383	PAHOA HI & INT	750	493	46	74	$5,347	$5,044	$5,436	1.00	1.06	$3,842	$1,010	$141	$4,994	$5,347
384	WAIAKEA EL	815	402	61	41	$4,553	$5,034	$4,649	1.00	1.06	$3,842	$758	$173	$4,773	$4,773
385	WAIAKEA INT	908	364	30	43	$4,531	$4,927	$4,614	1.00	1.06	$3,842	$616	$76	$4,534	$4,534
386	WAIAKEAWAENA	695	318	34	61	$4,828	$5,000	$4,876	1.00	1.06	$3,842	$703	$113	$4,658	$4,828
387	WAIMEA EL	638	336	59	108	$4,492	$5,073	$4,583	1.00	1.06	$3,842	$809	$213	$4,865	$4,865
388	KEALAKEHE	960	433	104	102	$4,529	$4,987	$4,628	1.00	1.06	$3,842	$693	$250	$4,785	$4,785
389	WAIAKEA HI	1312	421	24	72	$4,412	$4,451	$4,466	1.00	1.06	$3,842	$493	$42	$4,377	$4,412
390	KEALAKEHE INT	965	377	80	82	$4,945	$4,966	$5,013	1.00	1.06	$3,842	$600	$191	$4,633	$4,945
391	KEONEPOKO	610	467	46	87	$4,606	$5,139	$4,712	1.00	1.06	$3,842	$1,177	$174	$5,192	$5,192
392	KEALAKEHE HI	1530	416	110	126	$4,180	$4,477	$4,259	1.00	1.06	$3,842	$418	$166	$4,426	$4,426
393	WAIKOLOA	566	206	54	70	$4,831	$5,025	$4,850	1.00	1.06	$3,842	$559	$220	$4,621	$4,831
395	KOHALA EL	409	232	30	33	$4,841	$5,063	$4,879	1.08	1.06	$4,149	$941	$183	$5,273	$5,273
400	BALDWIN HI	1574	312	54	77	$4,329	$4,410	$4,389	1.00	1	$3,842	$305	$79	$4,226	$4,329

School Code	School Name	Sept. 05 Enroll	Free/ Reduced	ESLL	Trans	As is 05-06	WSF Full	WSF 06-07	Scale Wt.	Wage Adj.	Scale & Wage Adjusted Base	Poverty Add-on	ESLL Add-on	Simulated per Pupil Budget	HH Budget per Pupil
401	HAIKU	421	175	4	42	$4,791	$4,963	$4,853	1.08	1	$4,149	$690	$24	$4,863	$4,863
402	HANA HI & EL	356	224	0	31	$8,358	$5,856	$8,337	1.10	1	$4,226	$1,064	$0	$5,290	$8,358
404	IAO INT	830	251	31	67	$4,707	$4,892	$4,785	1.00	1	$3,842	$465	$86	$4,393	$4,707
405	KAHULUI	865	430	208	79	$4,752	$5,160	$4,839	1.00	1	$3,842	$764	$554	$5,160	$5,160
406	KAMEHAMEHA III	744	272	180	55	$4,761	$5,143	$4,851	1.00	1	$3,842	$562	$558	$4,962	$4,962
407	KAUNAKAKAI	218	148	7	25	$5,806	$5,397	$5,671	1.20	1	$4,610	$1,252	$89	$5,951	$5,951
409	KIHEI	810	278	135	90	$4,820	$5,056	$4,891	1.00	1	$3,842	$527	$384	$4,754	$4,820
410	KILOHANA	98	104	0	7	$9,866	$6,412	$9,481	1.60	1	$6,147	$2,609	$0	$8,757	$9,866
412	KULA	439	147	5	45	$5,002	$4,920	$5,050	1.08	1	$4,149	$556	$28	$4,733	$5,002
413	LAHAINA INT	578	187	64	40	$5,676	$5,028	$5,643	1.00	1	$3,842	$497	$255	$4,594	$5,676
414	LAHAINALUNA HI	1033	208	70	59	$4,579	$4,500	$4,640	1.00	1	$3,842	$309	$156	$4,308	$4,579
415	LANAI HI & EL	616	211	59	24	$5,752	$5,248	$5,807	1.00	1	$3,842	$526	$221	$4,589	$5,752
416	LIHIKAI	1102	403	153	98	$4,397	$4,939	$4,477	1.00	1	$3,842	$562	$320	$4,724	$4,724
417	MAKAWAO	469	292	28	39	$4,769	$5,127	$4,856	1.08	1	$4,149	$1,033	$149	$5,331	$5,331
418	MAUI HI	1709	351	133	95	$4,142	$4,450	$4,225	1.00	1	$3,842	$316	$179	$4,337	$4,337
419	MAUNALOA	57	149	1	9	$13,215	$9,083	$14,798	1.60	1	$6,147	$6,428	$65	$12,640	$13,215
420	KALAMA INT	945	293	17	42	$4,708	$4,875	$4,776	1.00	1	$3,842	$476	$41	$4,360	$4,708
421	MOLOKAI HI	408	227	5	51	$6,403	$5,421	$6,576	1.08	1	$4,149	$923	$31	$5,103	$6,403
422	PAIA	195	158	6	18	$6,714	$5,589	$6,627	1.36	1	$5,225	$1,693	$96	$7,015	$7,015
424	WAIHEE	850	327	45	44	$4,459	$4,952	$4,550	1.00	1	$3,842	$591	$122	$4,555	$4,555
425	WAILUKU	953	348	91	77	$4,503	$4,928	$4,567	1.00	1	$3,842	$561	$220	$4,623	$4,623
426	PUKALANI	457	228	20	26	$4,640	$5,036	$4,709	1.08	1	$4,149	$828	$109	$5,086	$5,086
428	MAUI WAENA INT	1017	365	97	62	$4,733	$4,961	$4,809	1.00	1	$3,842	$552	$220	$4,613	$4,733
429	NAHIENAENA	649	233	195	50	$4,854	$5,151	$4,906	1.00	1	$3,842	$552	$693	$5,086	$5,086
430	LOKELANI INT	762	210	22	56	$4,737	$4,872	$4,804	1.00	1	$3,842	$424	$67	$4,332	$4,737
431	KAMALII	703	121	43	83	$4,711	$4,920	$4,772	1.00	1	$3,842	$265	$141	$4,248	$4,711
435	KEKAULIKE HI	1388	377	19	81	$4,136	$4,426	$4,211	1.00	1	$3,842	$417	$32	$4,291	$4,291
447	KAPAA MID	719	328	32	32	$4,947	$4,953	$5,014	1.00	1	$3,842	$701	$103	$4,646	$4,947
448	KAMAKAHELEI MID	926	317	34	33	$4,816	$4,908	$4,879	1.00	1	$3,842	$526	$85	$4,453	$4,816
451	ELEELE	464	156	68	21	$5,249	$4,952	$5,242	1.08	1	$4,149	$558	$365	$5,072	$5,249
452	HANALEI	217	110	7	16	$6,567	$5,316	$6,544	1.20	1	$4,610	$935	$89	$5,634	$6,567
453	KALAHEO	503	218	7	19	$5,032	$4,976	$5,079	1.00	1	$3,842	$666	$32	$4,540	$5,032
454	KAPAA EL	872	426	64	54	$4,694	$5,017	$4,773	1.00	1	$3,842	$751	$169	$4,762	$4,762
455	KAPAA HI	1108	354	36	38	$4,481	$4,503	$4,565	1.00	1	$3,842	$491	$75	$4,408	$4,481
456	KAUA'I HI	1290	301	57	40	$4,440	$4,432	$4,493	1.00	1	$3,842	$359	$102	$4,302	$4,440
457	KAUMUALII	532	214	66	46	$5,268	$5,027	$5,281	1.00	1	$3,842	$618	$286	$4,746	$5,268
458	KEKAHA	233	130	27	17	$6,526	$5,351	$6,462	1.20	1	$4,610	$1,029	$321	$5,960	$6,526
459	KILAUEA	335	91	36	24	$5,745	$4,939	$5,705	1.15	1	$4,418	$480	$285	$5,183	$5,745
460	KOLOA	175	65	18	19	$7,488	$5,560	$7,302	1.36	1	$5,225	$776	$322	$6,324	$7,488
462	WAIMEA HI	828	302	50	21	$4,983	$4,680	$5,044	1.00	1	$3,842	$561	$139	$4,542	$4,983
463	WILCOX	888	221	39	30	$4,569	$4,866	$4,658	1.00	1	$3,842	$382	$101	$4,326	$4,569
464	WAIMEA CANYON	486	162	19	22	$6,475	$5,103	$6,459	1.08	1	$4,149	$553	$97	$4,800	$6,475

School Code	School Name	Sept. 05 Enroll	Free/ Reduced	ESLL	Trans	As is 05-06	WSF Full	WSF 06-07	Scale Wt.	Wage Adj.	Scale & Wage Adjusted Base	Poverty Add-on	ESLL Add-on	Simulated per Pupil Budget	HH Budget per Pupil
475	OLOMANA	202	40	13	130	$7,838	$5,713	$7,686	1.20	1	$4,610	$365	$178	$5,154	$7,838

SUPPLEMENTARY MATERIAL

Table A1

Current Expenditures per Pupil 2003-04 for K-12 Districts Ranked High to Low
Adjusted using NCES Comparable Wage Index 2004

State	Adj. Current Expend[a]	Std. Dev.	Census Poverty (SAIPE 2003)[b]	Std. Dev.	Students in K-12 Districts	K-12 Districts
NY	$9,875	$1,570	18%	11%	2,790,502	638
VT	$9,778	$1,785	10%	5%	33,188	36
DC	$9,702	$0	29%	0%	65,099	1
NJ	$9,471	$1,852	11%	9%	1,006,624	218
WY	$9,412	$1,632	11%	3%	86,305	46
MT	$9,264	$3,613	17%	7%	17,583	55
ME	$9,008	$1,403	12%	6%	174,869	112
AK	$8,695	$3,360	10%	6%	133,153	53
MA	$8,514	$1,693	11%	8%	870,466	210
RI	$8,453	$948	15%	12%	154,963	32
DE	$8,405	$962	11%	3%	105,771	16
CT	$8,374	$1,246	9%	9%	519,199	113
WV	$8,064	$707	23%	6%	280,561	55
NH	$7,884	$1,480	6%	3%	158,407	67
WI	$7,880	$868	10%	8%	837,637	368
PA	$7,695	$1,235	13%	9%	1,755,099	498
ND	$7,539	$1,707	11%	5%	97,224	156
IN	$7,511	$1,175	11%	7%	1,005,344	291
NE	$7,453	$1,325	10%	5%	269,015	233
SD	$7,402	$1,559	13%	7%	121,178	159
OH	$7,321	$1,245	12%	9%	1,797,593	610
HI	**$7,317**	**$0**	**13%**	**0%**	**183,609**	**1**
KS	$7,279	$1,306	11%	6%	468,984	297
MI	$7,249	$1,058	13%	9%	1,665,914	525
NM	$7,065	$1,625	24%	9%	323,066	89
IA	$7,011	$881	10%	4%	477,889	348
MD	$7,006	$933	10%	6%	869,113	24
MN	$6,893	$1,256	8%	6%	815,498	325
AVERAGE	$6,850	$1,649	16%	9%	43,855,461	10526
LA	$6,813	$690	25%	7%	715,911	66
AR	$6,665	$951	21%	8%	452,480	307
KY	$6,570	$983	20%	8%	662,055	171
OR	$6,566	$1,034	15%	5%	538,826	175
GA	$6,524	$921	18%	8%	1,520,538	175
VA	$6,501	$956	11%	6%	1,191,035	132
SC	$6,479	$843	18%	6%	695,414	84
MO	$6,470	$1,134	14%	8%	902,722	447
IL	$6,423	$872	17%	10%	1,301,699	398
CO	$6,328	$945	11%	7%	754,442	174
AL	$6,185	$639	20%	8%	729,120	128
MS	$6,124	$1,011	26%	9%	491,175	148
ID	$6,117	$1,234	13%	4%	251,307	106
FL	$6,107	$654	18%	4%	2,592,997	67
TX	$5,988	$1,234	20%	11%	4,255,114	974
NC	$5,936	$751	16%	5%	1,317,905	115
WA	$5,891	$891	13%	6%	1,012,282	246
TN	$5,844	$745	17%	6%	890,831	122
OK	$5,815	$1,141	19%	8%	602,956	429
CA	$5,708	$892	19%	10%	4,456,163	333
AZ	$5,566	$1,218	16%	10%	563,980	97
NV	$5,208	$856	14%	2%	385,345	16
UT	$4,494	$844	10%	4%	487,311	40

[a] U.S. Census Bureau, Fiscal Survey of Local Governments, Elementary and Secondary Finances variable "tcurelsc" (current elementary and secondary expenditures) divided by variable "v33" (enrollment). http://www.census.gov/govs/www/school.html. For documentation of variables, see: http://www.census.gov/govs/www/school04doc.html. Then divided by National Center for Education Statistics, Comparable Wage Index (http://nces.ed.gov/edfin/prodsurv/data.asp) for 2004. Average is weighted by pupil enrollment (v33)

[b] U.S. Census Bureau, Small Area Income and Poverty Estimates, Public School Districts, 2003. http://www.census.gov/hhes/www/saipe/district.html

Table A2
CBSA Centered Expenditures and Demographics of Selected Large City Districts

City	Expenditure Ratio to CBSA Mean (F-33 2002-03)	Poverty Ratio to CBSA Mean (SAIPE, 2003)	% Black Ratio to CBSA Mean (Census 2000)
New York	91%	461%	306%
Chicago	84%	388%	508%
Los Angeles	120%	211%	200%
Seattle	127%	135%	382%
Houston	105%	187%	188%

Data Source: U.S. Census Bureau, Fiscal Survey of Local Governments, Public Elementary and Secondary Education Finances (F-33) 2002-03, U.S. Census Small Area Income and Poverty Estimates (SAIPE, 2003) & U.S. Census/National Center for Education Statistics, School District Demographic System (Census 2000)

Table A3

What Do Federal School Finance and Personnel Data Say about Large Cities and the State of Hawai'i in 2003-04?

Name	Enrollment[a]	Instructional Expenditure as % of Current Expenditure[b]	Teachers per 1000 Students[c]	Administrators per 1000 Students[d]	Administrative Staff Share[e]
NEW YORK CITY SCHOOL DISTRICT	1,041,976	75%*	68.55	2.94	4%
LOS ANGELES UNIF SCH DIST	747,009	58%	47.51	2.68	5%
CITY OF CHICAGO SCHOOL DISTRICT 299	434,419	63%	52.83	4.33	7%
HOUSTON IND SCH DIST 912	211,499	59%	58.05	6.35	10%
PHILADELPHIA SCHOOL DISTRICT	189,779	56%	53.72	2.69	5%
HAWAI'I PUBLIC SCHOOLS	183,609	60%	60.61	3.77	5%
SEATTLE SCH DIST 1	47,588	58%	54.16	3.68	6%

[a] variable "v33" from U.S. Census Bureau, Fiscal Survey of Local Governments, Elementary and Secondary Finances. http://www.census.gov/govs/www/school.html. For documentation of variables, see: http://www.census.gov/govs/www/school04doc.html

[b] variable "tcurinst" divided by variable "tcurelsc" from U.S. Census Bureau, Fiscal Survey of Local Governments, Elementary and Secondary Finances. http://www.census.gov/govs/www/school.html. For documentation of variables, see: http://www.census.gov/govs/www/school04doc.html

[c] variable "tottch03" divided by variable "member03" divided by 1000, from National Center for Education Statistics, Common Core of Data, Local Education Agency Universe Survey 2003-04. For variable documentation, see: http://nces.ed.gov/ccd/data/txt/pau031blay.txt

[d] variables "leaadm03" and "schadm03" divided by "member03" divided by 1000, from National Center for Education Statistics, Common Core of Data, Local Education Agency Universe Survey 2003-04. For variable documentation, see: http://nces.ed.gov/ccd/data/txt/pau031blay.txt

[e] adm_share=(leaadm03+ schadm03)/(leaadm03+ schadm03+ tottch03+ totgui03+ libspe03), from National Center for Education Statistics, Common Core of Data, Local Education Agency Universe Survey 2003-04. For variable documentation, see: http://nces.ed.gov/ccd/data/txt/pau031blay.txt

*We certainly question the validity of this high instructional share for New York City. However, these figures are likely at least equally valid to those reported by Ouchi and colleagues in multiple sources, including *Making Schools Work* and *Academic Freedom,* in *Education Next* (Winter, 2004). These federal source data, for all their problems, remain the best available, using standardized accounting guidelines. Interestingly, this figure is consistent with the independent data set (NCES, CCD, LEAU) which also shows higher numbers of teachers per 1,000 pupils in NYC and relatively low administrative shares. Data from NY State Annual Financial Reports show NYC allocating consistently between 38% and 39% of expenditures to teacher salaries. This is not however, an apples to apples comparison with the numbers above. When compared with other New York State districts on this same measure, New York City is higher than (a) the state average, (b) the average of upstate cities (Syracuse, Rochester and Buffalo) and (c) Yonkers, and about the same as (d) the average of Westchester County cities (Mount Vernon, New Rochelle and White Plains). Table A4 shows changes over time.

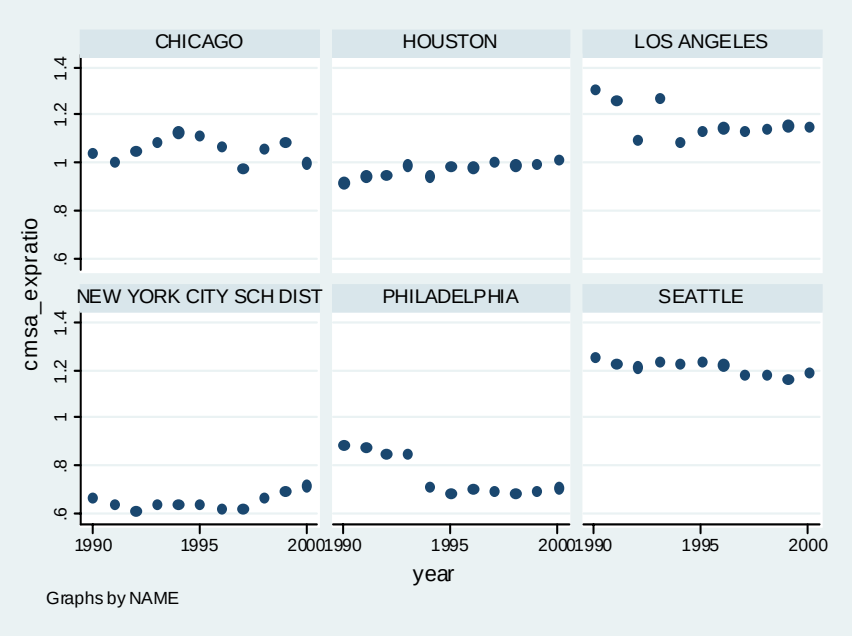
Table A4

What Do Federal School Finance and Personnel Data Say about Large Cities and the State of Hawai‘i over Time?

Year	Enrollment	Instructional Expenditure as % of Current Expenditure	Teachers per 1000 Students	Administrators per 1000 Students	Administrative Staff Share
CITY OF CHICAGO SCHOOL DISTRICT 299					
2000	431750	61.0%	54.33	3.03	5.02%
2001	435261	62.7%	54.99	3.14	5.14%
2002	437418	61.8%	55.01	4.22	6.79%
2003	436048	62.0%	56.38	4.18	6.59%
2004	434419	63.2%	52.83	4.33	7.18%
HAWAI‘I PUBLIC SCHOOLS					
2000	185860	63.0%	58.47	3.38	5.08%
2001	184360	60.2%	59.27	3.32	4.91%
2002	184546	60.5%	59.64	3.56	5.21%
2003	183829	59.7%	59.69	3.48	5.10%
2004	183609	60.2%	60.61	3.77	5.43%
HOUSTON IND SCH DIST 912					
2000	209716	58.0%	55.49	2.92	4.80%
2001	208462	58.0%	53.71	2.81	4.76%
2002	210950	58.4%	57.35	7.41	11.02%
2003	212099	59.1%	58.40	7.78	11.32%
2004	211499	59.3%	58.05	6.35	9.51%
LOS ANGELES UNIF SCH DIST					
2000	710007	62.3%	47.54	2.19	4.28%
2001	721346	64.9%	48.73	2.31	4.41%
2002	735058	64.3%	49.13	2.44	4.61%
2003	746852	58.2%	47.51	2.44	4.77%
2004	747009	58.4%	47.51	2.68	5.19%
NEW YORK CITY SCHOOL DISTRICT					
2000	1075710	73.8%	59.49	3.12	4.79%
2001	1066516	74.4%	61.17	3.34	4.98%
2002	1049831	74.9%	62.68	3.53	5.13%
2003	1077381	76.0%	61.08	3.77	5.53%
2004	1041976	74.9%	68.55	2.94	3.97%
PHILADELPHIA SCHOOL DISTRICT					
2000	205199	55.4%	55.67	2.43	4.00%
2001	201190	56.4%	55.99	2.51	4.11%
2002	197083	56.4%	54.22	2.29	3.88%
2003	192683	57.4%	51.20	2.67	4.74%
2004	189779	55.9%	53.72	2.69	4.57%
SEATTLE SCH DIST 1					
2000	47989	56.4%	51.93	3.64	6.17%
2001	47575	54.8%	53.60	3.85	6.33%
2002	47449	57.4%	55.88	4.13	6.51%
2003	47853	58.1%	55.64	3.99	6.31%
2004	47588	58.4%	54.16	3.68	6.03%

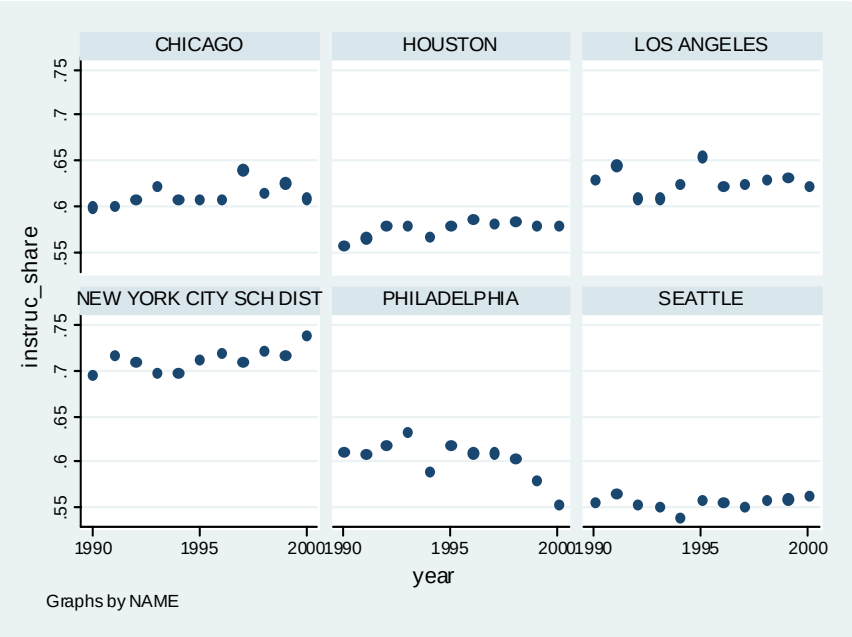
All data same as in Table A3 and calculations performed as in Table A3

Figure A1
Ratio of Expenditures per Pupil to Metro Average from 1990 to 2000



Data Source: NCES Fiscal-Non-Fiscal Longitudinal File
http://www.nces.ed.gov/edfin/links/findata.asp

Figure A2
Percent of Current Expenditures Allocated to Instructional Spending from 1990 to 2000



Data Source: NCES Fiscal-Non-Fiscal Longitudinal File
http://www.nces.ed.gov/edfin/links/findata.asp

Figure A3
Instructional Shares in Texas Cities

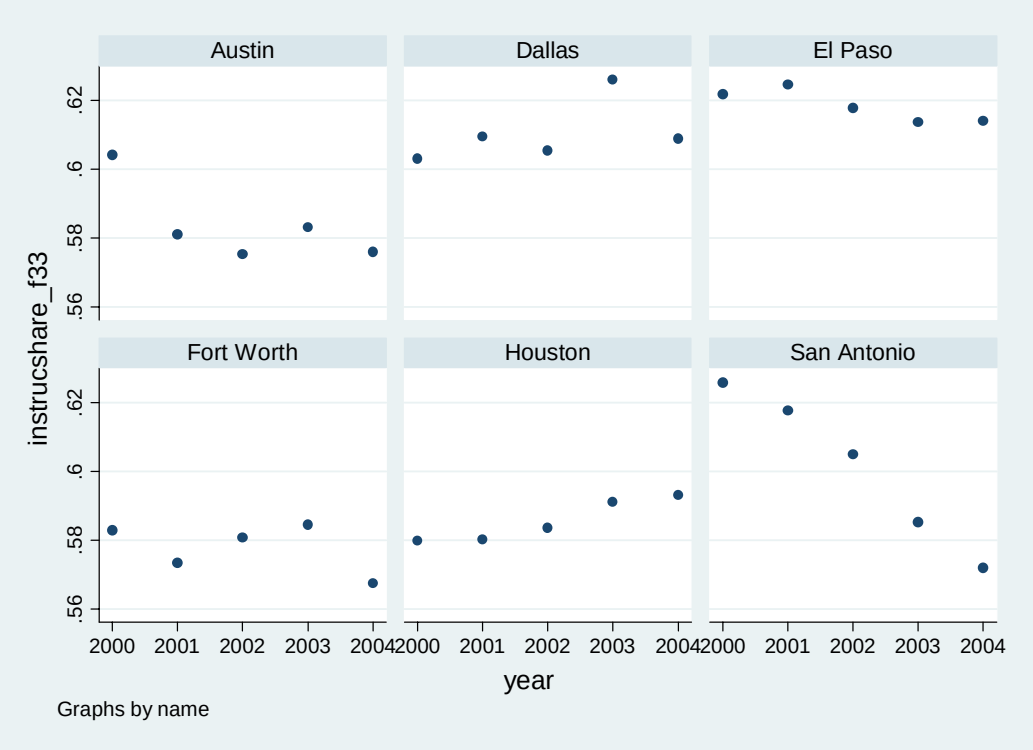


Figure A4
Administrative Staffing Shares in Texas Cities