Rebuttal Testimony in the Case of Gannon v. Kansas

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In this brief, I review 6 claims made by defendant's expert witnesses, Professor Hanushek, Professor Podgursky and Arthur Pendleton Hall in the case of Gannon v. Kansas. The claims may be summarized as follows:

Claim 1: Kansas is relatively average on per pupil spending and above average on outcomes when compared to other states

Claim 2: Kansas already spends more on higher poverty districts than on lower poverty ones

Claim 3: There exists no systematic relationship between spending and outcomes across Kansas school districts

Claim 4: Wyoming and New Jersey provide proof of the failures of court ordered school finance reform

Claim 5: Kansas teacher compensation is either adequate or could be at current spending levels

Claim 6: Court ordered spending increases would significantly harm the Kansas Economy

Defendants Expert Claim 1: Kansas is relatively average on spending and above average on outcomes compared to other states

Eric Hanushek and Michael Podgursky present several bar graphs indicating that per pupil expenditures in the state of Kansas are relatively average when compared to other states and that measured student outcomes on the National Assessment of Educational Progress (NAEP) are average to above average. Hanushek and Podgursky seem to suggest that these findings support the contention that school funding in Kansas could not possibly be constitutionally inadequate. The basic framing of this argument presents a significant misunderstanding and/or misrepresentation of plaintiffs' claims and the relevant constitutional analysis.

If plaintiffs arguments concerned the average performance of Kansas schools, and if Article 6 of the Kansas Constitution required that the legislature provide for finance of nationally somewhat-better-than- average educational outcomes, then Professors Podgursky and Hanushek might have a point.

But plaintiffs' arguments concern specifically the needs of children attending high need, under-resourced districts whose performance lags well behind the typical Kansas school district (Baker report, Section 4.0). While it may be reasonable to use national data to provide context for overall perceptions of adequacy, these comparisons are unhelpful for gauging the distribution of adequate educational opportunities across children within the State of Kansas. In my report, Section 2.1 I also make national comparisons, but in doing so, use a model that shows that Kansas is among states where the distribution from lower to higher poverty districts is relatively flat, and indeed the overall level of spending, relatively average.

Further, average spending levels or outcome levels in other states have no direct constitutional bearing on what is required by the Kansas constitution under Article 6, Section 6. Each state has its own constitutional language and its own court system to evaluate compliance with those unique constitutional mandates. That said, it may be relevant to consider appropriately the broader national context when gauging the preparedness of Kansas children to participate in a global economy. But simply assuming that if the Kansas average is above the national average it couldn't possibly be inadequate is insufficient.

While the average Kansas child may be doing reasonably well by national standards, it is my understanding, and the central thesis of my report, that this case is about those who are not.

Defendants Expert Claim 2:
Kansas already spends more on high poverty districts than on lower poverty ones

Professor Hanushek appears to assert that Kansas has already done its part to provide additional resources to districts serving higher concentrations of low income children. To make this argument, Professor Hanushek presents the following graph:

Figure R-1

Hanushek, p. 22, Ex. 3

Professor Hanushek supplements this graph with another which shows a slightly upwardly tilting trendline from the lower to higher poverty districts. Professor Hanushek seems to assert that any margin of upward tilt in spending from lower to higher poverty districts provides sufficient evidence that Kansas has put forth adequate support to meet its constitutional mandate.

Professor Hanushek sets aside entirely that the pattern presented in his own graph is not particularly systematic, even if statistically significant, with many higher poverty districts having much lower per pupil spending than others or than lower poverty districts. These patterns are indicative of the failures of the underlying General Fund formula.[1] Further, by Professor Hanushek's logic, even a $1 average difference in per pupil spending between the highest and lowest poverty districts would be sufficient. Finally, while Professor Hanushek does exclude small districts, thereby removing the economies of scale effect, he does not consider other cost factors beyond district control that may mediate this relationship.

[1] Some of these irregularities are also indicative of problems embedded in the total per pupil expenditure measure that Professor Hanushek chooses to use for his analysis, including embedding regional special education service center expenditures in district expenditures.

More thorough and more specific analyses provide deeper insights

In several sections of my original report, I show how Kansas school funding distribution provides insufficient supplemental support to high poverty districts. First, in the National School Funding Fairness Report Card (www.schoolfundingfairness.org) I show that when we estimate a model to state and local revenues per pupil, controlling for a) economies of scale, b) population density, c) competitive wage variation, in 2006-07, Kansas was among those states with regressive distributions of state and local revenue. That is, higher poverty districts had systematically less total state and local revenue per pupil. Indeed, the first few years of phase in of Montoy remedies led to a flattening of that distribution. By 2008-09, state and local revenues in Kansas were flat with respect to poverty. But, as I explain in my main report, 2008-09 represents the high point for equity and poverty-based targeting of funding in Kansas (Table 6, p. 79 of my main report shows that 2008-09 is the point at which funding gaps for high poverty districts came closest to being closed, when compared with LPA cost-study benchmarks).

Table R-1
Predicted State and Local Revenue at Varied District Poverty (Census Poverty) Rates

	Predicted at Mean Poverty	0% Poverty	10% Poverty	20% Poverty	30% Poverty	Fairness Ratio
2006-07	$10,040	$10,300	$10,023	$9,754	$9,492	0.92
2007-08	$10,649	$10,792	$10,702	$10,613	$10,525	0.98
2008-09	$11,060	$10,962	$11,023	$11,085	$11,147	1.02

Source: Compiled from annual school funding fairness reports (www.schoolfundingfairness.org)

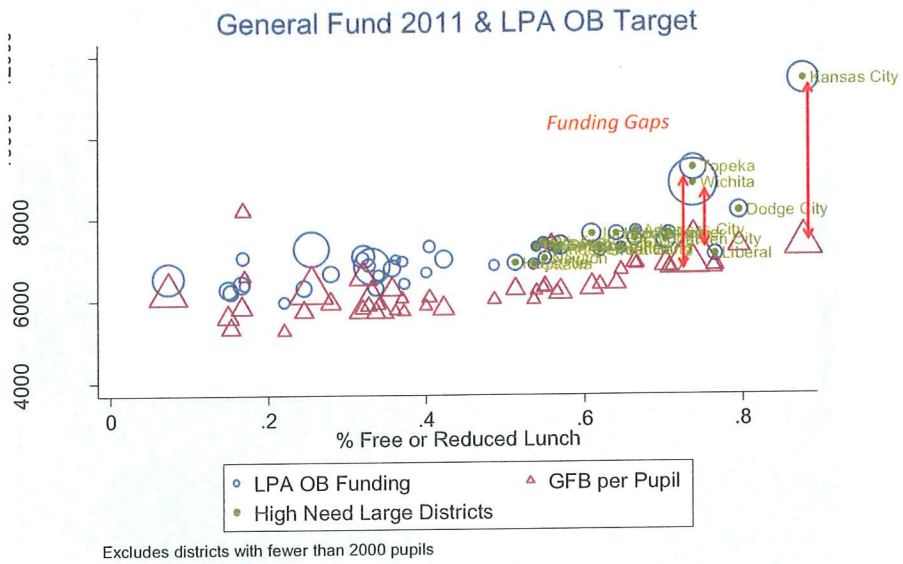
Even though the General Fund Budget is upward tilting, it falls well short of the Legislature's own estimated targets

As noted above, Professor Hanushek seems unconcerned with the magnitude or consistency of tilt in his graph, implying any positive adjustment to be sufficient. But, in the present case, the issue is not whether there exists any positive adjustment but rather whether there exists sufficient positive adjustment to provide children attending higher poverty districts with equal opportunity to achieve constitutionally adequate educational outcomes and whether that tilt is systematic.

While I concur that estimating just how much more is needed is a complex exercise resulting in no exact, perfect empirical target, I spend a great deal of time explaining in my report that the State of Kansas, under legislative oversight, twice, has endeavored to estimate how much more is needed to improve equal educational opportunity for children in high poverty districts – to establish *reasonable marks*. As I discuss at length in my report, the most recent legislative attempt to derive such estimates is presented in the Legislative Post Audit outcome based study, which provided guidance for the remedies adopted in the Montoy litigation.

The benchmarks yielded by the LPA study provide a *reasonable mark* for evaluating what the upward tilt should be. The figure below, drawn from page 55 of my report shows that the current general fund formula, as of 2010-2011 (excluding current year cuts in aid) continues to be wide of that reasonable mark.

Figure R-2



Further, in Table 3, page 59 of my report I provided more thorough (than Professor Hanushek) regression analyses of the relationship between per pupil funding measures and district low income concentrations. I estimated a "what should be" regression of the relationship between poverty and funding, controlling for economies of scale and regional wage variation, using the LPA funding targets. I found that the average effect was that a district with 100% free or reduced lunch should have a general fund target of $2,000 more in per pupil revenue than a district with 0% free or reduced lunch. But, when I estimated a similar model to actual general fund budgets the differential was about $540 per pupil – much less than the $2,000 target – and *wide of the reasonable mark*. Further, when I estimated the model to General Fund and LOB per pupil, the differential was cut to $240 per pupil and not statistically significant.

Table R-2

	LPA Formula Estimate for 2011-12 (*What should be*)			GFB per Pupil 2011			GFB & Lob per Pupil 2011		
Formula Factor	*Coef.*	*Std.Err.*		*Coef.*	*Std.Err.*		*Coef.*	*Std.Err.*	
Effective Free & Reduced Weight	**$2,035**	**379.96**	*	**$539**	**556.28**		**$240**	**758.25**	
Regional Wage Adjustment	-$177	654.92		-$981	958.84		-$1,319	1306.96	
Enrollment Size									
Under 100	$5,856	390.84	*	$6,350	572.22	*	$8,294	779.97	*
100 to 299	$3,204	189.36	*	$3,101	277.23	*	$3,858	377.88	*
300 to 499	$1,595	188.39	*	$2,061	275.81	*	$2,587	375.95	*
500 to 899	$985	176.02	*	$1,407	257.70	*	$1,706	351.27	*
900 to 1499	$380	209.53	**	$772	306.77	*	$1,026	418.14	*
1500 to 1999	-$29	249.93		-$225	365.92		-$294	498.77	
Intercept	$6,657	781.86	*	$7,104	1144.69	*	$9,618	1560.28	*
R-squared [Predictability]	0.71			0.53			0.50		
Effective At Risk Weight over Minimum [1]	**30.6%**			**7.6%**			**2.5%**		

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

[1] Calculated by dividing At Risk coefficient by Effective Base

Defendants Expert Claim 3: There exists no systematic relationship between spending and outcomes across Kansas school districts

Both Eric Hanushek and Michael Podgursky use a multitude of scatterplots to conjure the age-old argument that there exists no systematic relationship between per pupil spending and student outcomes, and specifically that there exists no such relationship across Kansas school districts. I thoroughly rebut this general premise, and the *cloud of uncertainty* argument in a policy brief titled *Revisiting that Age-Old Question: Does Money Matter in Education?* (attached to my main report)[2]

Here's how the argument is cast by Professor Hanushek in his expert testimony:

> "Exhibits 23-27 provide a graphical depiction of the story in Kansas. Consider Exhibit 23. It plots the effect of more spending on district performance after adjusting for the level of poverty as measured by the free and reduced price lunch rate. In other words, after allowing for difference in the background of students, there is no consistent pattern of higher achievement with higher spending. In fact, the dominant view from the graphs is how wide the variation in performance is when looking at districts that are spending the same amounts. These patterns for 2011 scores

[2] http://www.shankerinstitute.org/images/doesmoneymatter_final.pdf

> across districts and for different grades provide a picture of widely different performance that is not explained by differences in spending. The best interpretation is that it matters how money is spent and that this is much more important than how much. The observations from the districts in Kansas also indicate that simply providing greater funds is unlikely to lead to overall improvements in achievement." (p. 4 ex 3)

And here's the argument is cast by Professor Podgursky:

> "These data show that there is no systematic or stable positive statistical relationship between spending per student in a district and student achievement. Indeed, it is much more common to find a negative relationship between the two variables. This does not mean that higher spending causes lower student achievement. Rather, it simply indicates that reliable statistical relationship between the two variables does not exist. Simply put, it is not possible to identify a level of district spending per student that can reliably predict any given level of student achievement. Alternatively, one cannot fix a level of performance and reliably 'cost out' spending that will support that level of performance, as is done in education cost function studies."

Professor Hanushek states that there is "no consistent pattern of higher achievement with higher spending" and Podgursky states that there is "no systematic or stable positive statistical relationship between spending per student in a district and student achievement."

In the recent policy brief mentioned above, I traced the roots of this argument that money matters little in improving educational outcomes.[3] That argument (framed in similar terms) can be traced primarily to the work of Eric Hanushek from the mid-1980s. In its original form, the argument also did not involve any decisive statements about the role of money in student outcomes, but rather carefully crafting language and analyses and summaries of analyses to cast a *cloud of uncertainty*. Professors Hanushek and Podgursky seem to have both borrowed from the long tradition established decades ago by Professor Hanushek. In my policy brief, I explain:

> To summarize this discussion above on whether resources matter, it is important to recognize that Hanushek's original conclusion from 1986 was merely a statement of "uncertainty" about whether a consistent relationship exists between spending and student outcomes – one that is big enough to be important. His conclusion was not that such a relationship does not exist. Nor was it a statement that schools with fewer resources are better, or that reducing funding can be an effective way to improve schools.
>
> By the early 2000s, the *cloud of uncertainty* conjured by Hanushek in 1986 had largely lifted in the aftermath of the various, more rigorous studies that followed, with finance scholars using detailed datasets to examine more finely-grained relationships between money and student outcomes.

[3] http://www.shankerinstitute.org/images/doesmoneymatter_final.pdf

> The uncertainty has been replaced with an empirically-grounded confidence that funding does matter.

Apparently, however, Professor Hanushek is still carrying his umbrella and he has loaned and extra one to Professor Podgursky.

Hanushek and Podgursky's Empirical Evidence

To validate their arguments that not only generally, but specifically in Kansas, there exists no systematic relationship between spending variation across districts and outcome variation across districts, Professors Hanushek and Podgursky provide subtly different variants of scatterplots, and provide many of them in an attempt to reinforce their point.

Professor Hanushek evaluates the relationship between spending and outcomes while "controlling" for student low income rates (free and reduced lunch) and Professor Podgursky evaluates the relationship between spending and outcome measures with no attempt to control even for student low income rates (as far as I can tell). Both, not surprisingly find that spending, when compared this way to student outcomes, shows no systematic relationship.

While Hanushek's analysis is one minor step more thorough than that of Podgursky, both are grossly inadequate to make any claims about the relationship (or lack thereof) between funding variation and outcome variation across Kansas school districts. In the following subsections, I review the major shortcomings of their analyses, and point to more thorough analyses which refute their findings.

Hanushek and Podgursky's Well Understood Omissions

First, and most importantly, both Professor Hanushek and Professor Podgursky assume that the value of the education dollar toward producing educational outcomes does not vary across Kansas school districts. Professor Hanushek does include student low income status, but leaves out everything else.[4] Their analyses, for example, assume that the costs of achieving any given level of student outcomes are no different in a southwestern Kansas district enrolling a few hundred students, versus a larger town district enrolling over 2,000. Their analyses neglect the possibility that the education dollar may have very different teacher recruitment and retention potential in the Kansas City metropolitan area, versus Wichita or Topeka. As such, a substantial portion of the cloud of uncertainty presented in their scatterplots is likely a function of substantial spending variations that are a function of substantial cost variations.

[4] Notably, when I estimate a regression model using data from 2004 to 2010, with the outcome measure as % proficient or higher in reading 5, 8 & 11 and math 4, 7 & 10, against the natural logarithm of per pupil expenditures, and including %Free or Reduced Lunch, I actually find that across districts the relationship between spending and outcomes is positive and statistically significant. See Appendix B.

William Duncombe and John Yinger, in their chapter in the Handbook of Research on Education Finance and Policy provide a thorough discussion of the various factors that affect the value of the education dollar toward achieving educational outcomes. [5]

Ignoring nearly all (Hanushek), or all (Podgursky) of these factors to produce scatterplots of the type presented by Podgursky and Hanushek seems little more than a shallow and intentional attempt to validate the forgone conclusion that there exists no "systematic" relationship between spending and outcomes. That is, to construct a visual characterization of the *cloud of uncertainty.*

To illustrate the importance of including controls for various factors omitted by Podgursky and Hanushek that affect the value of the education dollar, I provide three examples below. To be clear, the intent of the following examples is not to prove or validate that there does indeed exist a relationship between funding and outcomes across Kansas districts, but rather to illustrate that the relationship intentionally obfuscated by Hanushek and Podgursky is indeed sensitive to all of the well understood relevant factors they chose consciously to omit.

Like Hanushek and Podgursky's analyses, the following analyses simply address the relationship between spending more or spending less in a given year and having higher or lower outcomes in that year. In each case, I use an outcome measure which I used in my main report, which is the average proficiency rate across reading in grades 5, 8 and 11, and average proficiency rate in math across grades 4, 7 and 10. I use data from 2004 to 2010, so as to have more thorough and stable estimates than could be provided with a single year of data. To isolate the average effect, or differences in funding and outcomes, within year across districts I estimate a panel regression with "between effects." That is, what I'm testing here is whether there are systematic differences in funding and outcomes across districts within year, averaged across years.

In regression example 1, I test the relationship between the natural log of per pupil spending and my outcome measure, and I control for % free or reduced lunch (ksde_perfrpl) and minority populations (ccd_perblack & ccd_perhisp) drawn from the NCES common core (ccd), for various district size categories and for variations in regional competitive wages across Kansas (ctr_ecwi) using a state mean centered, over time average version of the NCES Comparable Wage Index. What the regression shows is that when estimated in this way, there does exist a statistically significant ($p<.05$) positive relationship between the spending measure and the outcome measure.

[5] Duncombe, W. and Yinger, J.M. (2008) Measurement of Cost Differentials In H.F. Ladd & E. Fiske (eds) pp. 203-221. Handbook of Research in Education Finance and Policy. New York: Routledge.

Regression Example 1:

```
. xi: xtreg outcome ln_expend ksde_perfrpl  ccd_perblack ccd_perhisp enroll_under1
> nroll900to1500 enroll1500to2000 ctr_ecwi, be

Between regression (regression on group means)  Number of obs      =      1558
Group variable: usd                             Number of groups   =       277

R-sq:  within  = 0.0038                         Obs per group: min =         1
       between = 0.3198                                        avg =       5.6
       overall = 0.1347                                        max =         6

                                                F(11,265)          =     11.32
sd(u_i + avg(e_i.))=  5.305641                  Prob > F           =    0.0000
```

outcome_mean	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_expendp~l	5.580504	2.631466	2.12	0.035	.3992628	10.76174
ksde_perfrpl	-23.93102	3.248062	-7.37	0.000	-30.32631	-17.53573
ccd_perblack	-45.65406	13.27828	-3.44	0.001	-71.7984	-19.50971
ccd_perhisp	-9.122859	3.725226	-2.45	0.015	-16.45767	-1.788052
enroll_u~100	.4909877	3.341736	0.15	0.883	-6.088745	7.070721
enroll10~300	-1.925468	1.51632	-1.27	0.205	-4.911035	1.060099
enroll30~500	-1.909223	1.352297	-1.41	0.159	-4.571837	.7533903
enroll50~900	-.6026376	1.304319	-0.46	0.644	-3.170784	1.965509
enroll9~1500	.1006169	1.428045	0.07	0.944	-2.711141	2.912375
enroll1~2000	-.6275005	1.792623	-0.35	0.727	-4.157097	2.902097
ctr_ecwi	-11.88183	4.194733	-2.83	0.005	-20.14108	-3.622587
_cons	52.57459	24.96071	2.11	0.036	3.428043	101.7211

The second regression example replaces all of the cost factors included in Example 1 (many of which were not, themselves statistically significant) with the omnibus "cost index" derived from the Duncombe and Yinger Kansas cost model. That is, I use a single comprehensive cost index measure to capture the differences in the value of the education dollar across Kansas districts – an index which embeds costs associated with a) economies of scale, b) labor cost variation and c) student needs. This regression shows an even stronger in magnitude and more highly statistically significant relationship between the expenditure measure and outcomes.

Regression Example 2:

```
. xi: xtreg outcome ln_expend wd_index, be

Between regression (regression on group means)  Number of obs      =      1628
Group variable: usd                             Number of groups   =       287

R-sq:  within  = 0.3098                         Obs per group: min =         1
       between = 0.1759                                        avg =       5.7
       overall = 0.2000                                        max =         6

                                                F(2,284)           =     30.31
sd(u_i + avg(e_i.))=  6.149017                  Prob > F           =    0.0000
```

outcome_mean	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_expendp~l	11.56563	2.671208	4.33	0.000	6.307747	16.8235
wd_index	-.2868517	.0368798	-7.78	0.000	-.3594442	-.2142592
_cons	.885298	23.38539	0.04	0.970	-45.14538	46.91598

Finally, I use the comprehensive cost index as a basis for adjusting the value of the education dollar input and test the relationship between adjusted education spending and the outcome measure. And this relationship is also strong, and positive between districts within years. That is, within years, districts with higher average need and cost adjusted spending per pupil do have systematically higher outcomes.

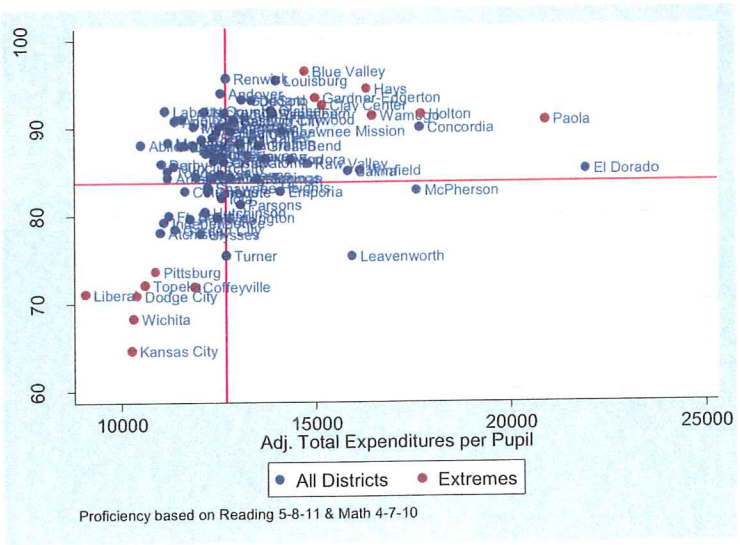
Regression Example 3:

```
. xi: xtreg outcome  ln_adjexpend, be

Between regression (regression on group means)  Number of obs      =      1628
Group variable: usd                             Number of groups   =       287

R-sq:  within  = 0.3098                         Obs per group: min =         1
       between = 0.0919                                        avg =       5.7
       overall = 0.1725                                        max =         6

                                                F(1,285)           =     28.83
sd(u_i + avg(e_i.))=  6.443554                  Prob > F           =    0.0000
```

outcome_mean	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_adjexpend	14.69926	2.737435	5.37	0.000	9.311109	20.08742
_cons	-57.30815	25.72309	-2.23	0.027	-107.9395	-6.676802

The visual display of the relationship characterized in the third regression example appeared as Figure 52 in my original report and was used not to validate that there exists such a relationship but rather to identify more and less advantaged districts in Kansas worthy of further exploration. Here, again, is that figure, displaying that there indeed exists a relationship between need and cost adjusted per pupil spending and outcomes across Kansas Districts.

Figure R-3



These are anything but decisive, conclusive or perfect demonstrations that indeed money does matter across Kansas districts. But one thing is for sure. They are more thorough and more reasonable tests of this relationship than those provided by Professors Hanushek and Podgursky.

The legislature's own findings

Recall also that the legislature itself has overseen analyses that resulted in similar estimates of a positive relationship between spending and student outcomes. That evidence is specifically conveyed in Table 4

in Appendix C of the Legislative Post Audit outcome based cost study. Table 4 provides the regression estimates of the Cost Function model prepared by William Duncombe and John Yinger. Table 4 shows a positive, statistically significant and policy relevant relationship between outcome goals and the costs of achieving them.

In other words, this analysis shows that spending needed to achieve higher outcomes is higher, all else equal. Further, the benefit of the cost function approach for studying the spending-outcome relationship is that this approach more logically accounts for both exogenous "cost factors" and factors that may compromise efficiency. As explained by Duncombe and Yinger in the section that follows, this approach is actually superior to the production function approach for determining the sensitivity of the relationship between outcomes and spending.

Table 4. Cost Model Results[a]

Variables	Coefficients	P-value[d]
Intercept	-6.84027	0.19
Performance measure[b]	0.83013	0.00
Cost variables:		
Teacher salaries[b]	1.01765	0.02
Percent free lunch students	0.00636	0.00
Free lunch multiplied by pupil density	0.00065	0.06
Adjusted percent bilingual headcount[c]	0.00139	0.05
Enrollment categories:		
100 to 150 students	-0.12987	0.05
150 to 300 students	-0.29443	0.00
300 to 500 students	-0.38580	0.00
500 to 750 students	-0.44523	0.00
750 to 1,000 students	-0.45612	0.00
1,000 to 1,700 students	-0.52671	0.00
1,700 to 2,500 students	-0.57252	0.00
2,500 to 5,000 students	-0.56802	0.00
5,000 students and above	-0.55366	0.00
Efficiency-related variables:		
Consolidated districts	0.14780	0.00
Per pupil income[b]	0.13097	0.00
Per pupil property values[b]	0.05341	0.02
Total aid/income ratio	0.80593	0.00
Local tax share[b]	-0.02102	0.40
Percent of adults that are college educated (2000)	-0.00666	0.00
Percent of population 65 or older (2000)	-0.00347	0.02
Percent of housing units that are owner occupied (2000)	-0.00218	0.07
Year indicator variables:		
2001	-0.02209	0.31
2002	-0.01666	0.62
2003	-0.08637	0.14
2004	-0.13924	0.09
Adjusted R-square	0.4868	
Sample Size	1468	

[a]Estimated with linear 2SLS with the log of per pupil base spending as the dependent variable. Performance and teacher salaries are treated as endogenous with instruments based on variables for adjacent counties. See Appendix D for methodology. Data is for 1999-2000 to 2003-04.

[b]Measured as natural logarithm.

[c]Calculated by first regressing the share of bilingual headcount from KSDE on the Census measure of poor English (with no intercept). The predicted value from this regression is used as the estimate of the share of bilingual headcount, except in those districts where the share of bilingual headcount is greater than zero. See text for more details.

[d]Probability of being wrong if the hypothesis that the coefficient is equal to zero is rejected. P-values are based on robust standard errors, which correct for heteroskedasticity.

Page C-18. Post Audit Cost Study Report

Comments on Education Cost Functions

Both Professors Hanushek and Podgursky introduce criticisms of the method used by Professors Duncombe and Yinger in their report to LPA. Professor Hanushek, for example, states (p. 6 ex 3)

> "A central problem with all of these costing out approaches is that they build in inefficiencies of the current school operations. Specifically, all assume that the general structure of teacher salaries should be retained and that the only policy to be used is a general pay increase for all teachers- both effective and ineffective. Any other poorly designed or poorly executed program is also retained in the estimation of "necessary" costs." (Hanushek, Ex 3, p. 6)

And Professor Podgursky claims:

> "Alternatively, one cannot fix a level of performance and reliably 'cost out' spending that will support that level of performance, as is done in education cost function studies."

But these arguments have already been thoroughly rebutted in existing literature. William Duncombe and John Yinger Explain:

> "Recently cost functions have been criticized as a tool for estimating required spending associated with performance standards on several grounds (Costrell et al., 2008; Hanushek, 2005; Loeb, 2007). Critics argue that cost functions do not adequately control for efficiency differences across districts, so that their estimates cannot be given a cost interpretation. CHL point to the large differences in results between cost functions and production functions using spending to measure inputs as evidence of the inadequacy of cost functions. We argue that this criticism misses the mark in several ways. First, the cost variables in a cost function can be given a cost interpretation because the cost function controls for student performance and the omitted variable problem associated with inefficiency. Although much work remains to be done to improve efficiency controls in cost functions, it is inaccurate to suggest that no effort to account for efficiency has been made. The fact that production functions produce different estimates is also not an indicator of the weakness of cost functions but instead indicates the serious measurement problems that arise when spending is used as a composite measure of inputs in a production function.
>
> We demonstrate that to use spending in this way requires extreme, indeed, ridiculous assumptions about production technology. Another fundamental problem with the criticisms of CHL is that they do not propose an alternative approach to forecasting the best-practice spending required to support student performance standards. Although we do not claim that the cost function approach provides perfectly accurately forecasts of required spending, we do not know of any other method that is as comprehensive and allows for low-cost testing of forecasting accuracy."[6]

I, myself explain:

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[6] William Duncombe & John Yinger (2011): Are Education Cost Functions Ready for Prime Time? An Examination of Their Validity and Reliability, Peabody Journal of Education, 86:1, 28-57

"Arguing that it is unreasonable to estimate "costs" of educational outcomes based on practices as they currently exist, on the untested assumption that a better and more efficient system exists somewhere out there, is unhelpful at best and destructive at worst. If one believes that a "better way" exists—a more efficient and productive use of educational resources—then one should try implementing that "better way" in a number of school districts across a state. Once this new approach takes hold in select settings across a state and produces its expected efficiency gains, updated cost function models on the state system should pick up these changes or at least identify schools implementing such highly efficient approaches as significant outliers, which may then inform future policies.

For example, Hanushek frequently argues that a major source of inefficiency in public schooling is the single salary schedule that drives school spending but lacks strong relationship to teaching quality (see Hanushek, 2007). I do not refute this point and find many of Hanushek's arguments in this regard compelling. But the single salary schedule does exist and pretending that it does not, that it could simply disappear and that which replaces it would necessarily be more efficient, is far more speculative than even the most outrageous extrapolations from regression models of current data on current practices.

Much of the efficiency straw man argument is negated when one refocuses the school finance argument on equal opportunity of outcomes—equity—rather than on some absolute measure of educational adequacy. Indeed it is statistically more problematic to estimate precisely how much money, in total, is required to achieve the state's desired outcomes, especially under the constraint of a hypothetical perfect efficiency assumption (pure definition of cost) and in a system where no one school district is perfectly efficient. It is potentially even more problematic to attempt to attach this evasive pure cost estimate to the ambiguous "adequacy" requirements of state constitutions.

The role of efficiency in equity analysis is relative, not absolute. It is patently unfair to argue that the state legislative obligation toward poor urban, high minority concentration districts is merely to fund those districts at the minimum, pure cost (0% inefficiency) level required to achieve constitutionally adequate outcomes while accepting that other districts in the state are afforded the opportunity to achieve or exceed the same outcomes at only average efficiency—many far worse than average efficiency and many better than average. An equitable school finance system holds the poor urban district and/or other high-need districts to the same efficiency standard, not a hypothetical, elusive, and higher standard."[7]

[7] Bruce D. Baker (2011): Exploring the Sensitivity of Education Costs to Racial Composition of Schools and Race-Neutral Alternative Measures: A Cost Function Application to Missouri, Peabody Journal of Education, 86:1, 58-83

Defendants Expert Claim 4:
Wyoming and New Jersey provide proof of the failures of court ordered school finance reform

Professor Hanushek posits that the track record of school finance reform, specifically where court ordered, is a dismal one, with states being required to dramatically scale up funding for decades while reaping no benefits to some or all children in terms of outcomes. These arguments and supporting anecdotes are largely drawn from Chapter 6, *The Effectiveness of Judicial Remedies* of Eric Hanushek and Alfred Lindseth's book *Courting Failure.* A thorough rebuttal of this book and its assertions regarding the effectiveness of school finance reforms is provided in the article submitted with my main report, coauthored with Kevin G. Welner and titled *School Finance and Courts: Does Reform Matter and How Can we Tell?*[8]

In the present case, Professor Hanushek refers only to New Jersey and Wyoming, asserting the following:

> Regarding New Jersey: "The dramatic spending increases called for by the courts (Exhibit 34) have had little to no impacts on achievement. Compared to the rest of the nation, performance in New Jersey has not increased across most grades and racial groups. These results suggest caution in considering the ability of courts to improve educational outcomes." (p. 5, Ex. 3)
>
> Regarding Wyoming: "Wyoming courts have intervened to provide dramatically higher spending growth there as compared to the rest of the nation and as compared to Kansas (Exhibit 42). The comparison of the experience in Wyoming with that in Kansas is especially interesting. The populations of the two states are quite similar. Given the slightly stronger family backgrounds and given the large infusions of funds, the students in Wyoming might be expected to do dramatically better than those in Kansas."

Professor Hanushek goes on to argue that this is not the case. But, I explain herein that it is no more relevant to compare Wyoming to Kansas than it is to compare Kansas to New Jersey. Yet Professor Hanushek goes ahead with both comparisons, and misrepresents each.

Wyoming School Finance Reform: Implications for Kansas?

Professor Hanushek contends that Wyoming is sufficiently similar to Kansas for extrapolating the supposed failures of Wyoming school finance reform to Kansas and foreshadowing a similarly bleak future for Kansas should the court choose to intervene on behalf of plaintiffs.

But for their generally rectangular shape, Wyoming is sufficiently different from Kansas on enough dimensions that such extrapolations are unreasonable, even if one accepts Professor Hanushek's

[8] http://www.tcrecord.org/content.asp?contentid=16106

characterization of Wyoming school finance reforms, expenditure increases and lagging outcomes as accurate, which it is not.

First, it is important to understand that Wyoming per pupil spending relative to surrounding states actually remained relatively constant through the 1990s to mid-2000s, as Kevin Welner and I show in our TC Record Article in Figure 4 (Figure in Appendix C). Funding per pupil did increase in more recent years, but much of that increase was actually a function of declining enrollment (reduction in the denominator) rather than dramatic increase in the numerator (spending). Between 1995-96 and 2005-06, Wyoming enrollments dropped from nearly 100,000 to 84,000.[9] Indeed Wyoming spends more per pupil than surrounding states, but during the period from 1993 to 2001, that differential actually became smaller, before increasing again in subsequent years.

Perhaps more importantly, comparing per pupil spending and outcomes in Kansas and Wyoming is no more reasonable than comparing per pupil spending in large Kansas City metropolitan area districts with tiny, sparsely populated districts scattered across the high plains of western Kansas.

Table R-3 shows that Wyoming less than a third the number of total schools as Kansas and those schools are spread across a larger geographic area and scattered through rough mountainous terrain in the western part of the state.

Table R-3

	level				
state	1-Primary	2-Middle	3-High	4-Other	Total
Kansas	768	254	346	44	1,412
Wyoming	194	70	80	19	363
Total	962	324	426	63	1,775

Common Core of Data (CCD) "Public Elementary/Secondary School Universe Survey" 2009-10 v.1a

Table R-4 shows that by 2009-10, Wyoming had about 88,000 students (rebounding somewhat since the mid-2000s) and Kansas about 470,000. Again, these 88,000 students are spread across vast expanses, aggregated into larger consolidated county districts.

[9] At least according to data from the NCES Common Core of data, which provide the basis for the per pupil spending calculations used by me and Kevin Welner, as well as those used by Hanushek & Lindseth.

Table R-4

state	level 1-Primary	2-Middle	3-High	4-Other	Total
Kansas	231,770	91,364	138,333	7,826	469,293
Wyoming	42,103	20,161	24,214	1,674	88,152
Total	273,873	111,525	162,547	9,500	557,445

Common Core of Data (CCD) "Public Elementary/Secondary School Universe Survey" 2009-10 v.1a

Table R-5 shows that the average Wyoming high school has nearly 200 fewer students per pupil than the average Kansas high school.

Table R-5

state	level 1-Primary	2-Middle	3-High	4-Other	Total
Kansas	393.82565	510.7508	976.62346	726.62535	593.92965
	179.49566	217.24983	636.23651	687.92645	465.19316
	231770	91364	138333	7826	469293
	766	253	336	33	1388
Wyoming	303.15652	529.7956	783.66747	167.24851	484.39861
	98.512113	294.12613	518.74873	57.065323	374.44252
	42103	20161	24214	1674	88152
	194	70	78	14	356
Total	379.88691	514.19363	947.87955	628.05726	576.60888
	172.66981	232.7002	623.46007	658.18677	453.73648
	273873	111525	162547	9500	557445
	960	323	414	47	1744

Common Core of Data (CCD) "Public Elementary/Secondary School Universe Survey" 2009-10 v.1a

Figure R-4 shows the geographic distribution by school enrollment size (circle size) of Kansas schools, with red boundaries indicating districts. Most Kansas schoolchildren attend schools concentrated in metropolitan areas and midsize to larger towns and small cities. And it is in those locations that the per pupil costs associated with economies of scale and population sparsity are lowest (though in many cases per pupil costs associated with student needs are highest).

Figure R-4

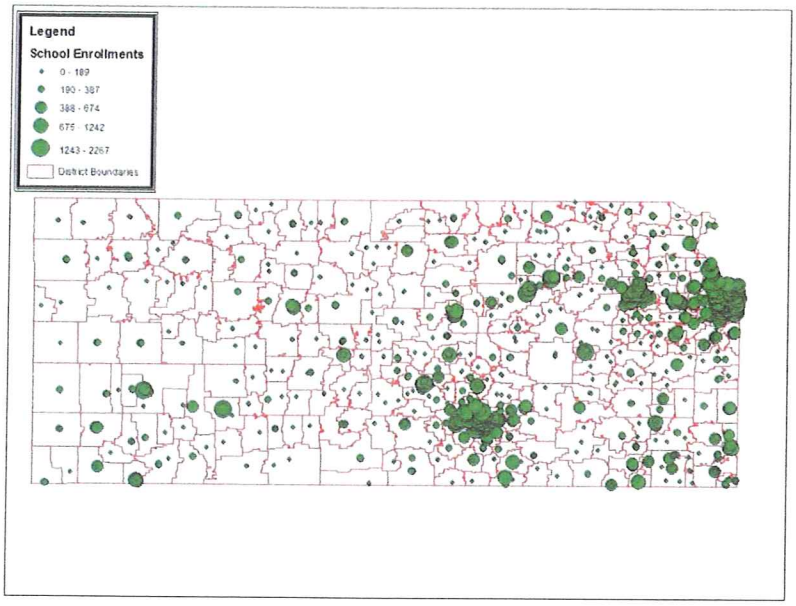
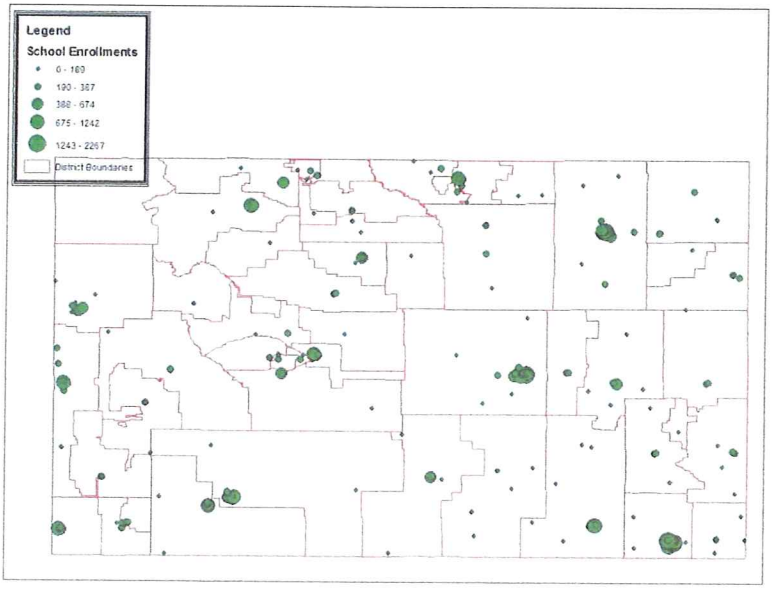


Figure R-5 shows the geographic distribution of schools in Wyoming. Schools are scattered far and wide. While it turns out that Kansas and Wyoming have roughly the same percent of total children attending unified districts with 2000 or more pupils (Appendix A), Wyoming districts are covering far more vast expanses and more geographically complex expanses.

Figure R-5

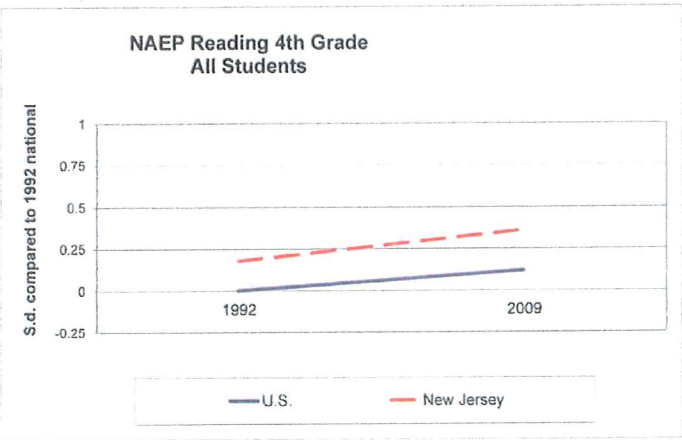


This geographic distribution if districts and organization of districts makes Wyoming hardly comparable to Kansas as a basis for projecting the potential impact of school finance reform in Kansas.

Deceptive Analysis & Incorrect Conclusions for New Jersey

Professor Hanushek's representation of the New Jersey case is deceptive for a number of reasons which Kevin Welner and I explain in our recent article in Teachers' College Record. Professor Hanushek uses the same argument and updated versions of the same illustrations in his expert testimony in the present case, supporting his above statement with Figures 35 to 40 of his analysis. Below is one example:

Figure R-6



Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools. Princeton, NJ: Princeton University Press.

Gannon et al. vs. Kansas

As explained in my main report, Kevin Welner and I raise questions regarding "who" would have benefited from specific reforms and "when" specific reforms were implemented and/or faded out. Hanushek and Lindseth in their book identify four states, Kentucky, Massachusetts, New Jersey and Wyoming as states which have, by order of their court systems, (supposedly) infused large sums of money into school finance reforms over the past 20+ years. Given this simple classification, Hanushek and Lindseth take the National Assessment (NAEP) Scores for these states, including scores for low income children, and racial subgroups, and plot those scores against national averages from 1992 to 2007.

Professor Hanushek has updated these figures to extend to the 2009 NAEP assessments. Still, no statistical tests are performed, but graphs are presented to illustrate that there would appear to be no difference in growth of scores in these states relative to national averages. In his report in the present case, Professor Hanushek provides a graph that shows that per pupil spending in New Jersey has grown relative to national average spending. Thus, by his assertion, spending has increased and outcomes haven't. Therefore court-ordered school finance reforms are ineffective.

Beyond the points already laid out in my original report, two additional points are in order here. First, Professor Hanushek's illustration of relative growth in spending in New Jersey versus the national average fails to take into account geographic cost differences and differences geographic escalation of competitive wages (applying instead, a single inflation adjustment to both NJ and national spending). Such major omissions undoubtedly substantially skew this representation. Figure 5 of my article with Kevin Welner shows that relative to neighboring states, New Jersey per pupil state and local revenue has remained higher than average, but did not grow at a disproportionate rate from 1992-2006 (Appendix D).

Second, Professor Hanushek's representation of NAEP achievement growth in New Jersey relative to national averages is intentionally deceptive, crunching the vertical axis to minimize the viewer's ability to see that the New Jersey scores actually did, in many cases grow much faster than national mean scores. This is true in the Grade 4 reading scores above, and this is especially true in Grade 8 math scores. Others including esteemed expert in testing and measurement, Howard Wainer, formerly of Educational Testing Services and currently of the National Board of Medical Examiners have recently refuted the claim that New Jersey students have done poorly relatively to national scores and by subgroup since 1992.[10] Kevin Welner and I provide additional evidence in our re-analysis of New Jersey data (Appendix E).

Even if we accept as a relevant comparison, Professor Hanushek's argument that spending in New Jersey has outpaced national averages, it is quite apparent that New Jersey outcomes have also outpaced national averages. Admittedly, like Hanushek's original argument, my counter-analyses herein and those provided by Kevin Welner and me, also lack sufficient rigor to make conclusive statements. Among other things, neither Hanushek's original casting of the broad window of reform and long term outcome shifts, nor our recasting of that same window pay sufficient attention to the "when," "whether" and "who" details raised in my original report (Section 5.1). Kevin Welner and I, in the article attached to my main report, review the various more rigorous published studies on the issue finding that generally, school finance reforms have led to substantive positive effects.

Further, even if we did accept the unfounded argument that infusions of funding in New Jersey haven't resulted in any shift in educational outcomes, would that be sufficient basis for arguing that the Kansas legislature should not provide the additional funds it found to be necessary for high poverty districts in its own previous analyses? If we accept that Hanushek's illustration suggests that there might be some risk that the additional dollars could be used inefficiently, does that justify arguing that therefore the legislature must not allocate them? That the present levels of deprivation should persist because we can't be sure that the additional funds would help? And isn't it the state's responsibility to adopt and enforce accountability measures to increase the likelihood that the additional resources have their intended positive effect?

[10] http://www.njspotlight.com/stories/11/1130/1236/

Defendants Expert Claim 5:
Kansas teacher compensation is either adequate or could be at current spending levels

Professor Podgursky's testimony includes a brief section in which introduces two arguments about teacher compensation in Kansas. Recall from my main report, Section 2.4 that I explained and validated with one original analysis and one external source, that Kansas teacher wages a) are relatively non-competitive compared to non-teachers of similar age and education level and b) that Kansas teacher wages have lagged behind over time. Professor Podgursky makes two assertions of note.

First, that Kansas has decided to focus on teacher quantity over teacher quality over time. That Kansas districts have disproportionately provided smaller class sizes and lower pupil to teacher ratios than districts in other states and that "If Kansas increased its student to teacher ratio to the national average it would be possible to raise the salary of every teacher in Kansas by 17 percent." (p. 24)

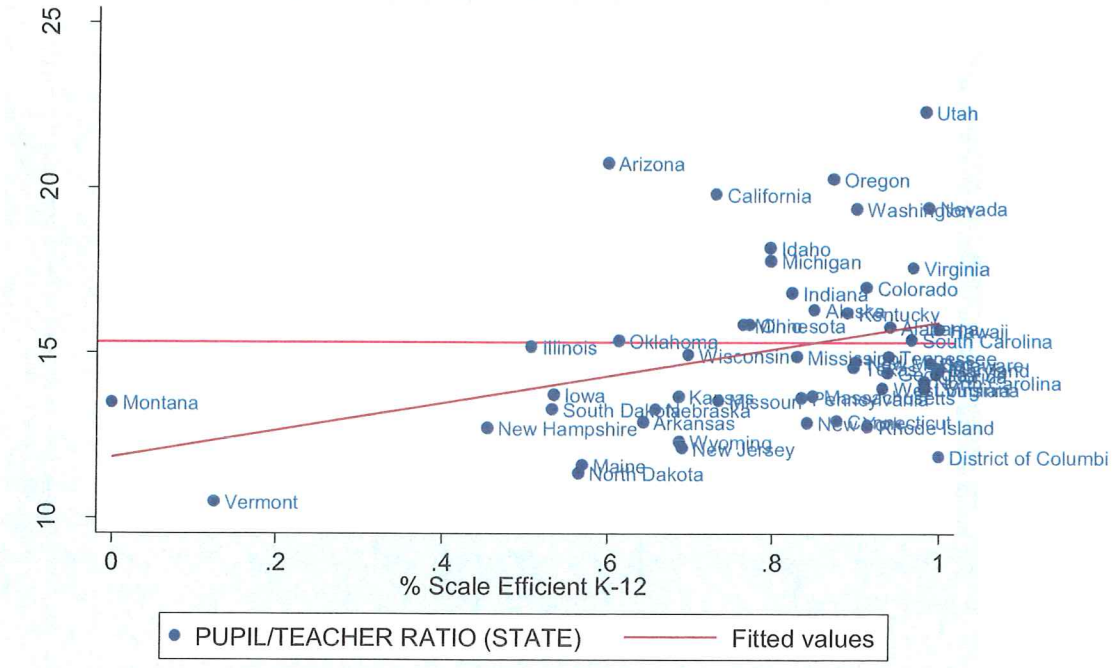
Second, and along totally separate lines, Professor Podgursky asserts that merely having sufficient numbers of minimally credentialed applicants indicates that funding for Kansas districts is adequate. He explains: "An important indicator of the adequacy of teacher salaries is the ratio of qualified applicants to vacancies. If schools are able to staff their classes with qualified teachers, this suggests a basic level of adequacy of salary and benefits."

Both are rather astounding assertions for Professor Podgursky whose own research strongly emphasizes the importance of teacher quality and academic preparedness of teachers, and for a professor working in the same region. First, on the point of whether there is a reasonable explanation for why Kansas has lower than average pupil to teacher ratios, when compared with all other states. Kansans know full well (and Missourians should certainly understand) that economies of scale and population sparsity play a significant role in dictating the organization of public schooling systems. Specifically, small remote rural districts simply have lower pupil to teacher ratios, as a function of being small, remote and rural and not as a function of indulgence in teacher quantity. Thus, it is reasonable that states with a larger percent of children attending small, remote rural schools would have lower average pupil to teacher ratios. Thus, these states should be compared to each other on such a measure and not compared to more population dense states. Using one limited measure we provided in the School Funding Fairness report, Kansas has a much smaller percent of children in its public school system that attend scale efficient (2,000 students or more) unified K-12 districts (see also Appendix A). Kansas is similar to Nebraska and Arkansas in this regard. According to the 2009-10 NCES Common Core of Data, Kansas has pupil to teacher ratios quite similar to these states as well.

Therefore, it is odd to assert that Kansas could logically adjust its class sizes and pupil to teacher ratios to match the national average, and recapture all of the additional funding to allocate toward teacher wage increases. At least with regard to population density and shares of children in small remote schools, Kansas is not average.

Figure R-7 displays pupil to teacher ratios with respect to percent of children attending scale efficient unified school districts. While there exists significant variation in pupil to teacher ratios explained by other factors, Kansas falls within the pack of states including Missouri, Nebraska, Arkansas, South Dakota and Iowa, but does have lower pupil to teacher ratios than Oklahoma, where Oklahoma is also a much lower spending state (second to last nationally according to our School Funding Fairness report in 2006-07).

Figure R-7



Now, to the next argument advanced by Professor Podgursky regarding sufficient numbers of minimally credentialed applicants for position openings as evidence of adequate funding. Again, I was struck by this argument coming from Professor Podgursky who has long asserted that teacher quality matters and that teacher academic preparation matters and varies.[11]

Note that I have already addressed in my main report the positive, systematic relationship between district poverty concentration and the presence of novice teachers (Figure 52) and the fact that teachers

[11] Ballou, D., Podgursky, M. (1995) Recruiting Smarter Teachers. *Journal of Human Resources* 30 (2) 326-338 http://www.jstor.org/stable/10.2307/146122

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 (5) 507-518 http://www.sciencedirect.com/science/article/pii/S0272775704000263

in high need, low resource districts have marginally lower salaries than otherwise similar teachers in low need, high resource districts, when in fact higher salaries would be required to compensate for the more difficult working conditions. In fact, these two findings may be linked, in that the lower average competitive wages of teachers in high poverty settings coupled with the tougher working conditions may be associated with higher turnover rates and thus, larger shares of novice teachers present in any given year.

Here, I provide some additional insights regarding teacher sorting in Kansas, focusing on the Kansas City metropolitan area. For these analyses I use data on recently certified teachers in Kansas provided (as originally disseminated) by the Kansas Department of Education in 2010 through a colleague and collaborator on related research. These data indicate the school and district in which a teacher certified by a particular institution teaches in her first, second, and third years and so on. I focus on the first year of teaching and use data on entrants to the field from 2004 to 2009. I also use data from the Integrated Postsecondary Education Data System (IPEDS) panel of data from 1999 to 2009 (Delta Project Panel) to determine the average 25%ile and 75%ile ACT scores for undergraduate institutions as a broad indicator of undergraduate selectivity. Note that ACT scores and undergraduate selectivity measures have often been used in research involving the sorting of teachers across k-12 settings.

The following comparisons are for illustrative purposes only, and lead to no decisive statements about the quality of certifying institutions or the teachers they produce. But these analyses do raise question about how teachers sort across available teaching positions in the Kansas City metropolitan area.

Table R-6 shows the distribution of new teachers from certifying institutions to Shawnee Mission, Blue Valley, Olathe and De Soto and Table R-7 shows the distributions to Kansas City, KS. More than 50% of teachers in the suburban Johnson County districts attended either of the state's two major research universities, with over a quarter from the state flagship university, which also has the highest range of ACT scores.

Table R-6

Shawnee Mission, Blue Valley, Olathe & De Soto

Certifying Institution	Freq.	Percent	25%ile ACT	75%ile ACT
UNIVERSITY OF KANSAS	239	26.15	21.67	27.00
KANSAS STATE UNIVERSITY	237	25.93	19.88	25.75
EMPORIA STATE UNIVERSITY	135	14.77	18.29	23.86
OTTAWA UNIVERSITY	89	9.74	18.33	24.00
MIDAMERICA NAZARENE UNIVERSITY	68	7.44	19.17	25.83
PITTSBURG STATE UNIVERSITY	56	6.13	18.76	24.04
BAKER UNIVERSITY	35	3.83	20.25	26.00
FORT HAYS STATE UNIVERSITY	17	1.86	18.82	24.00
WASHBURN UNIVERSITY	15	1.64	18.75	24.63
WICHITA STATE UNIVERSITY	6	0.66	20.01	25.32
UNIVERSITY OF SAINT MARY	5	0.55	18.71	23.17
BENEDICTINE COLLEGE	3	0.33	19.88	26.00
SOUTHWESTERN COLLEGE	3	0.33	19.13	24.88
OTHER KANSAS INSTITUTIONS	2	0.22		
BETHEL COLLEGE	1	0.11	20.13	27.00
NEWMAN UNIVERSITY	1	0.11	19.25	25.63
STERLING COLLEGE	1	0.11	18.75	24.88
TABOR COLLEGE	1	0.11	19.00	25.88

ACT based on 10yr average from IPEDS/Delta Project 1999-2009

Figure R-8 presents a visual representation of the distribution of teaching candidates into select Johnson County districts.

Figure R-8

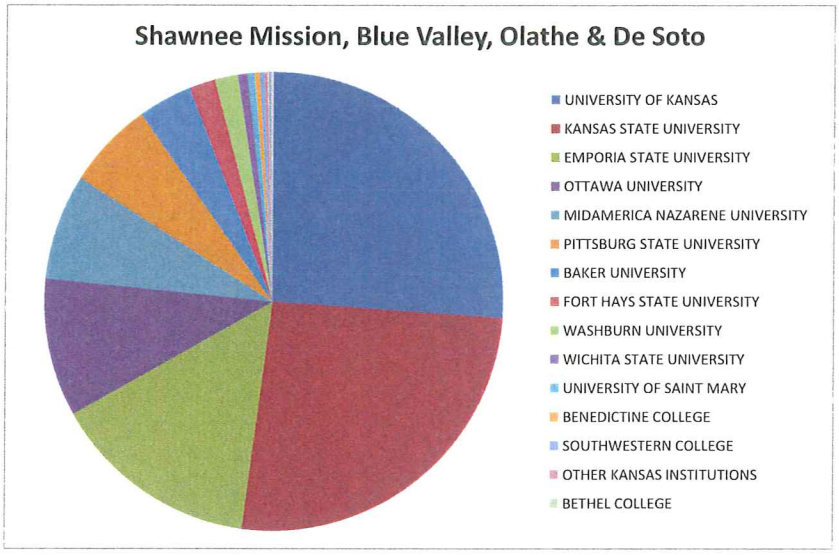


Table R-7 shows the distribution of teaching candidates entering Kansas City, KS from 2004 to 2009. The Largest shares were certified by Pittsburg State University, which operates Kansas City's Teaching Fellows program. As I understand it, the program provides as its primary training, a 7-week summer institute, and has only minimum qualifications for entrance, but does require a subject-area

undergraduate degree.[12] Such programs are common stop-gap measures for districts having difficulty recruiting and retaining teachers from leading programs. I have little means for judging the relative quality of these candidates, but sufficient evidence herein that Kansas City is not competing well with its suburban counterparts for teaching candidates from the state's two major research universities and no evidence to suggest that the teaching fellows participants are academically superior to graduates of the state flagship university.

Table R-7

Kansas City, KS

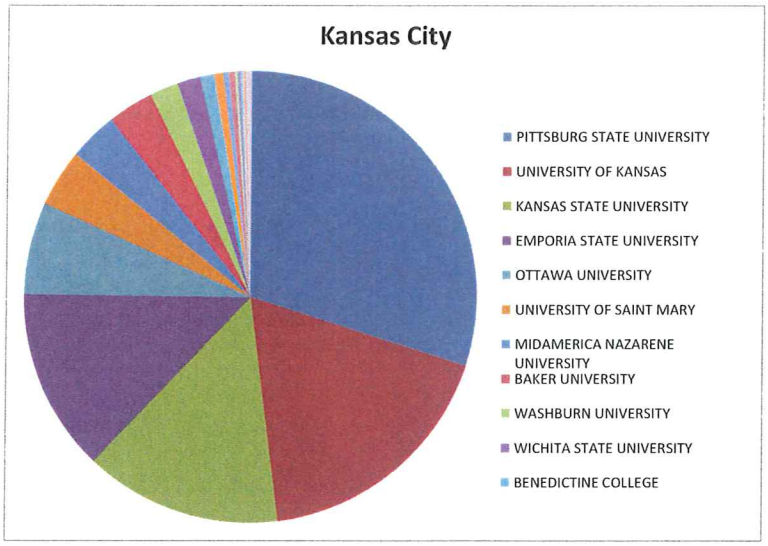
Certifying Institution	Freq.	Percent	25%ile ACT	75%ile ACT
PITTSBURG STATE UNIVERSITY*	146	29.92	18.76	24.04
UNIVERSITY OF KANSAS	88	18.03	21.67	27.00
KANSAS STATE UNIVERSITY	69	14.14	19.88	25.75
EMPORIA STATE UNIVERSITY	64	13.11	18.29	23.86
OTTAWA UNIVERSITY	32	6.56	18.33	24.00
UNIVERSITY OF SAINT MARY	20	4.1	18.71	23.17
MIDAMERICA NAZARENE UNIVERSITY	17	3.48	19.17	25.83
BAKER UNIVERSITY	16	3.28	20.25	26.00
WASHBURN UNIVERSITY	10	2.05	18.75	24.63
WICHITA STATE UNIVERSITY	8	1.64	20.01	25.32
BENEDICTINE COLLEGE	5	1.02	19.88	26.00
STERLING COLLEGE	3	0.61	18.75	24.88
FRIENDS UNIVERSITY	2	0.41	17.83	24.33
NEWMAN UNIVERSITY	2	0.41	19.25	25.63
BETHANY COLLEGE	1	0.2	18.57	24.14
BETHEL COLLEGE	1	0.2	20.13	27.00
FORT HAYS STATE UNIVERSITY	1	0.2	18.82	24.00
MCPHERSON COLLEGE	1	0.2	18.88	23.38
SOUTHWESTERN COLLEGE	1	0.2	19.13	24.88
TABOR COLLEGE	1	0.2	19.00	25.88

ACT based on 10yr average from IPEDS/Delta Project 1999-2009

Figure R-9 provides the visual representation of the distribution of preparation of Kansas City, KS Teachers.

[12] A description of the program can be found here: http://www.jccc.edu/files/pdf/ce/community-career-services/job-search-materials-documents/kck-teaching-fellows.pdf

Figure R-9

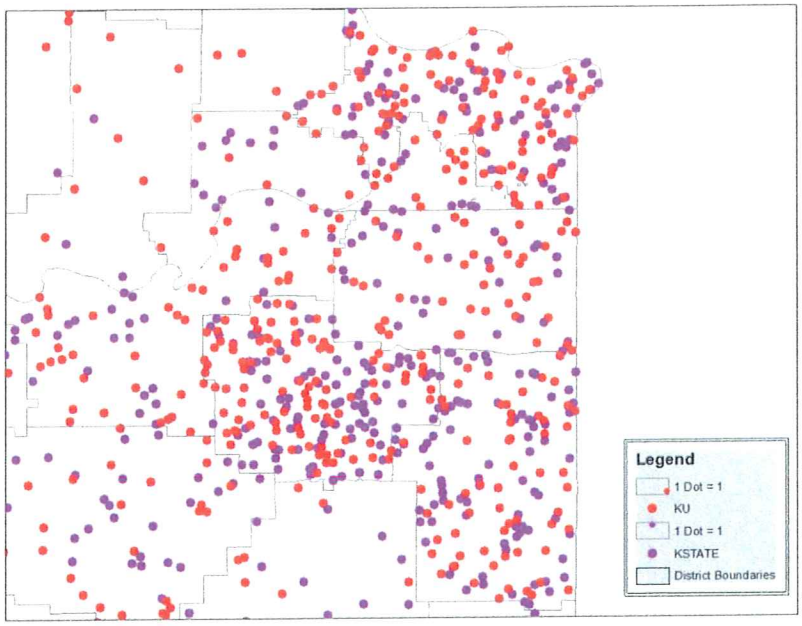


Finally, the following maps are telling of an additional issue which may relate back to my finding in my main report regarding the concentration of novice teachers in Kansas City, KS. Figure R-10 shows the distribution of KU and K-State graduates across Kansas City Area districts and Figure R-11 shows the distribution of Emporia, Hays and Pitt State Grads.

Again, KU and K-State graduates tend to be concentrated in Olathe and Blue Valley, but also do appear in Kansas City, but are still a smaller proportion of total hires.

Figure R-10

Distribution of KU and K-State Graduates to Kansas City Area School Districts

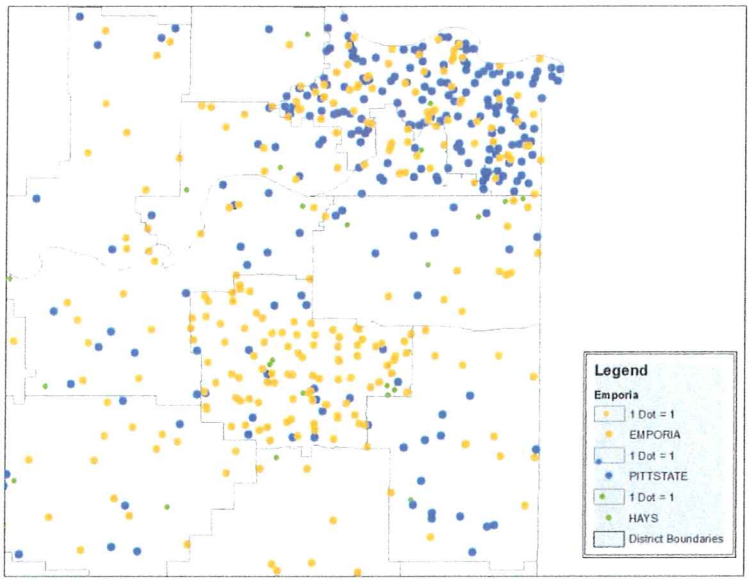


Notably, Blue Valley and Olathe have significant numbers of dots in Figure R-10 and Shawnee Mission far fewer. This is because Blue Valley and Olathe continued to grow in enrollments and therefore needed new teachers from 2004 to 2009, but Shawnee Mission did not. Kansas City, KS did not grow substantially during this time period, by comparison to Blue Valley or Olathe, but Kansas City, KS still has a significant number of dots, especially when we look at figure R-11 which includes graduates of Pitt, Emporia and Hays. These patterns, coupled with the high novice teacher share in Kansas City, are suggestive of disproportionate teacher turnover.

In other words, even if Kansas City is able to fill its positions each year, it continues to lose disproportionate numbers of teachers each year. Further, it seems to be filling large shares of those positions with teachers developed through expedited career-transition programs, and has seemingly less access to graduates of the state's major research universities.

Figure R-11

Distribution of Pitt-State, Ft. Hays and Emporia Graduates to Kansas City Area School Districts



Finally, on the general issue of teacher quality in relation to school finance, both Professor Podgursky and Professor Hanushek present a smokescreen argument that of course teacher quality matters, but that equitable and adequate school funding has little or nothing to do with teacher quality.[13] This argument is patently absurd, and unfounded in existing high quality empirical research.

As I explain in my recent policy brief on the evidence regarding how and why money matters:

> To summarize, despite all the uproar about paying teachers based on experience and education, and its misinterpretations in the context of the "Does money matter?" debate, this line of argument misses the point. To whatever degree teacher pay matters in attracting good people into the profession and keeping them around, it's less about *how* they are paid than *how much*.
>
> Furthermore, the average salaries of the teaching profession, with respect to other labor market opportunities, can substantively affect the quality of entrants to the teaching profession, applicants to preparation programs, and student outcomes. Diminishing resources for schools can constrain salaries and reduce the quality of the labor supply. Further, salary differentials between schools and districts might help to recruit or retain teachers in high need settings. In other words, resources used for teacher quality matter.[14]

[13] Hanushek: Ex 3, p. 5 "The one general policy area that has been identified as having real leverage for improving student outcomes is increasing teacher quality."

[14] http://www.shankerinstitute.org/images/doesmoneymatter_final.pdf

Defendants Expert Claim 6:
Court ordered spending increases would significantly harm the Kansas Economy

Arthur Pendleton Hall

Here, I address briefly, Arthur Pendleton Hall's assertion that the potential tax increases required to finance a hypothetical spending increase for K-12 education would necessarily cause significant harm to the Kansas economy.

First, I have pointed out in my original report that Kansas is relatively average among states in its effort to finance K-12 education systems. Kansas drifted above average by 2009 (forthcoming School Funding Fairness report), but has since cut its effort to an extent yet to be measured in comparison to other states. Needless to say, Kansas is not out of line with other states to the extent that any required shift would necessarily substantially compromise competitiveness.

Second, Arthur Pendleton Hall's arguments assume there to be absolutely no counterbalancing benefit to having an adequately funded, high quality system of public schooling. Rather, he assumes only that higher taxes will adversely affect the Kansas economy, setting out scenarios which require an all-else-equal assumption. That is, what would the damage to the economy be assuming that the quality of public services/amenities remained constant? Each of the economic impact simulations provided by Mr. Hall adopts the assumption that there is "0" economic value to any additional investment in elementary and secondary education. This assumption is patently absurd. On a related point, I addressed in my original report that economic conditions, job growth and migration patterns are sensitive to far more than tax policy in isolation.[15]

Finally, as I understand it, Article 6 of the Kansas constitution requires that the legislature shall make suitable provision for finance of the educational interests of the state, and that the court would be evaluating the present case in light of this requirement specifically. The legislature would then be in the position to determine how to meet this mandate and whether or not compliance necessarily required the extent, type or distribution of taxation suggested by Mr. Hall. The question at hand is whether the legislature has met its responsibility to comply with Article 6 to the court's satisfaction, independent of how they choose to meet this obligation.

[15] See for example: http://www.cbpp.org/files/8-4-11sfp.pdf

Appendix A
Percent of Students attending Scale Efficient Unified Districts

State	Non K-12	K-12	Non K-12 Enrollment over 2,000	K-12 Enrollment Over 2,000	Total	% Scale Efficient K-12
District of Columbia	0	44,331	0	44,331	44,331	100.0%
Hawaii	0	179,478	0	179,478	179,478	100.0%
Maryland	0	843,781	0	843,781	843,781	100.0%
Florida	0	2,623,067	0	2,614,741	2,623,067	99.7%
Delaware	1,158	108,852	0	108,852	110,010	98.9%
Nevada	67	430,918	0	425,355	430,985	98.7%
Louisiana	0	646,462	0	635,045	646,462	98.2%
Utah	0	532,433	0	522,929	532,433	98.2%
North Carolina	7,895	1,444,169	7,895	1,426,001	1,452,064	98.2%
Virginia	1,704	1,233,360	0	1,195,957	1,235,064	96.8%
South Carolina	0	714,290	0	690,825	714,290	96.7%
Alabama	0	744,133	0	700,084	744,133	94.1%
Tennessee	27,133	944,351	14,012	912,679	971,484	93.9%
Georgia	33,818	1,615,780	32,716	1,546,501	1,649,598	93.8%
West Virginia	0	281,908	0	262,818	281,908	93.2%
Rhode Island	3,109	138,412	0	129,391	141,521	91.4%
Colorado	0	812,068	0	740,555	812,068	91.2%
New Mexico	0	328,737	0	295,794	328,737	90.0%
Washington	8,050	1,027,857	0	932,013	1,035,907	90.0%
Texas	12,276	4,631,604	2,873	4,165,658	4,643,880	89.7%
Kentucky	1,679	668,179	0	596,132	669,858	89.0%
Connecticut	33,421	505,829	4,502	473,052	539,250	87.7%
Oregon	368	552,590	0	481,909	552,958	87.2%
Alaska	0	130,236	0	110,749	130,236	85.0%
Massachusetts	66,969	838,309	12,968	768,465	905,278	84.9%
New York	46,211	2,649,404	27,631	2,269,459	2,695,615	84.2%
Pennsylvania	540	1,684,192	0	1,406,524	1,684,732	83.5%
Mississippi	154	490,008	0	406,353	490,162	82.9%
Indiana	247	1,028,012	0	846,137	1,028,259	82.3%
Michigan	1,440	1,536,075	0	1,225,659	1,537,515	79.7%
Idaho	131	266,505	0	212,351	266,636	79.6%
Ohio	0	1,729,072	0	1,335,360	1,729,072	77.2%
Minnesota	1,626	794,629	0	609,048	796,255	76.5%
Missouri	10,626	883,181	0	656,785	893,807	73.5%
California	1,532,425	4,512,875	1,341,653	4,418,920	6,045,300	73.1%
Wisconsin	36,663	828,586	4,349	604,348	865,249	69.8%
New Jersey	330,611	999,826	133,060	919,394	1,330,437	69.1%
Wyoming	0	86,971	0	59,781	86,971	68.7%
Kansas	2,041	466,654	0	321,929	468,695	68.7%
Nebraska	0	288,158	0	189,938	288,158	65.9%
Arkansas	0	473,039	0	304,485	473,039	64.4%
Oklahoma	22,251	621,284	0	394,739	643,535	61.3%
Arizona	351,359	628,868	324,738	587,147	980,227	59.9%
Maine	14,660	128,654	0	81,683	143,314	57.0%
North Dakota	2,012	89,593	0	51,775	91,605	56.5%
Iowa	5,618	481,598	0	260,737	487,216	53.5%
South Dakota	135	124,201	0	66,323	124,336	53.3%
Illinois	801,215	1,305,883	553,268	1,070,731	2,107,098	50.8%
New Hampshire	61,400	135,122	18,082	89,529	196,522	45.6%
Vermont	57,909	28,095	0	10,775	86,004	12.5%
Montana*						

*excluded due to data irregularities

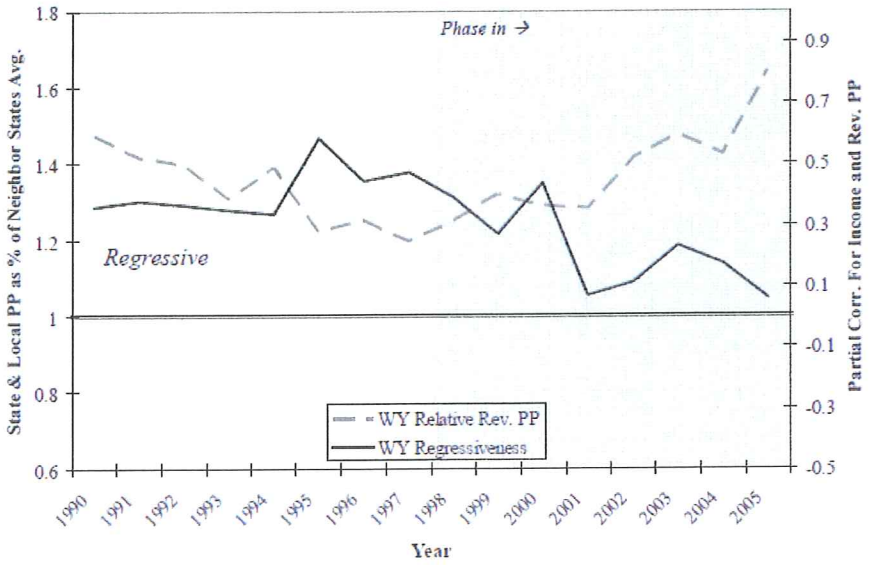
Appendix B

```
Between regression (regression on group means)      Number of obs      =      1641
Group variable: usd                                 Number of groups   =       292

R-sq:  within  = 0.0090                             Obs per group: min =         1
       between = 0.3071                                            avg =       5.6
       overall = 0.1757                                            max =         6

                                                    F(2,289)           =     64.04
sd(u_i + avg(e_i.))=  5.629952                      Prob > F           =    0.0000
```

outcome_mean	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_expend	8.305055	2.155674	3.85	0.000	4.062242	12.54787
ksde_perfrpl	-29.91045	2.646417	-11.30	0.000	-35.11914	-24.70175
_cons	14.98475	19.96348	0.75	0.453	-24.3075	54.277

Appendix C

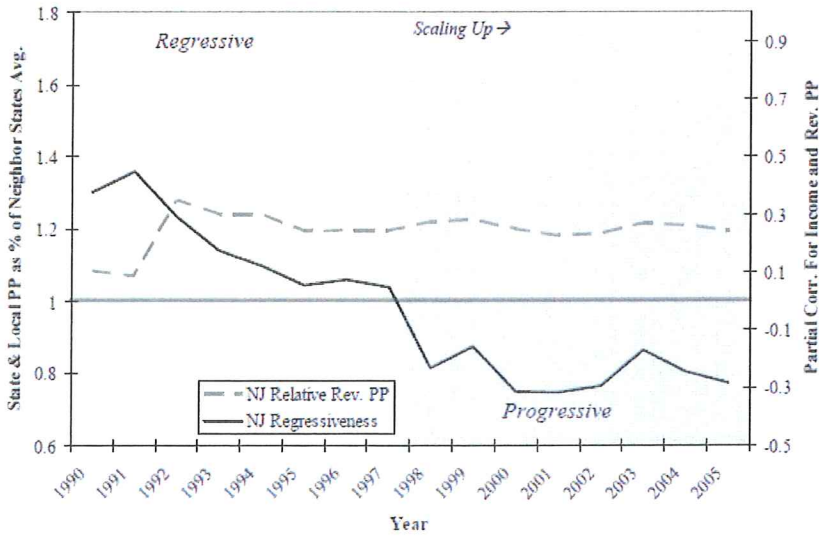
Figure 4. Effect of School Finance Reforms in Wyoming



Data source: 15 year panel of match 10,181 K-12 unified school districts, using fiscal data from U.S. Census Fiscal Survey of Local Governments (F-33). Uses Median Household Income data from 1989 through 1995, and from 1999 for 1995 to 2005. Based on regression of state and local revenue (ln) as a function of (a) enrollment (ln) and enrollment (ln) squared, (b) NCES Comparable Wage Index (held at 1997 values back through 1990) and (c) median household income (slope and partial R)

Appendix D

Figure 5. Effect of School Finance Reforms in New Jersey



Data source: 15 year panel of match 10,181 K-12 unified school districts, using fiscal data from U.S. Census Fiscal Survey of Local Governments (F-33). Uses Median Household Income data from 1989 through 1995, and from 1999 for 1995 to 2005. Based on regression of state and local revenue (ln) as a function of (a) enrollment (ln) and enrollment (ln) squared, (b) NCES Comparable Wage Index (held at 1997 values back through 1990) and (c) median household income (slope and partial R)

Appendix E

Table 1. Summary of NAEP Reading Progress in Reform States

	Avg. Yearly Gain	2007	2005	2003	1998
All Students					
Reading Grade 4					
National Public	0.76	220	217	216	213
Kentucky	0.55	222	220	219	218
Massachusetts	**1.44**	236	231	228	223
New Jersey	**1.39**	231	223	225	
Wyoming	**0.78**	225	223	222	218
Reading Grade 8					
National Public	0.04	261	260	261	261
Kentucky	(0.04)	262	264	266	262
Massachusetts	**0.50**	273	274	273	269
New Jersey	**0.59**	270	269	268	
Wyoming	**0.34**	266	268	267	263
FRL Eligible Students					
Reading Grade 4					
National Public	1.07	205	203	201	195
Kentucky	0.62	212	212	209	206
Massachusetts	**1.31**	214	211	210	203
New Jersey	**1.75**	210	203	203	
Wyoming	0.78	214	216	212	207
Reading Grade 8					
National Public	0.26	247	247	246	245
Kentucky	0.16	252	256	257	251
Massachusetts	**0.98**	256	256	251	247
New Jersey	**1.33**	251	252	246	
Wyoming	**0.35**	255	259	255	252

http://www.nces.ed.gov/nationsreportcard/statecomparisons/Default.aspx

Table 2. Summary of NAEP Math Progress in Reform States

	Avg. Yearly Gain	2007	2005	2003	2000	1996*
ALL STUDENTS						
Math Grade 4						
National Public	1.52	239	237	234	224	222
Kentucky	1.37	235	231	229	219	220
Massachusetts	**2.13**	252	247	242	233	229
New Jersey	**1.94**	249	244	239		227
Wyoming	**1.88**	244	243	241	229	223
Math Grade 8						
National Public	0.88	280	278	276	272	271
Kentucky	**1.10**	279	274	274	270	267
Massachusetts	**1.85**	298	292	287	279	278
New Jersey	**1.79**	289	284	281		
Wyoming	**1.11**	287	282	284	276	275
*Eligible Students						
Math Grade 4						
National Public	1.86	227	225	222	208	207
Kentucky	1.53	226	224	220	207	209
Massachusetts	**2.12**	237	231	226	210	213
New Jersey	**2.41**	233	227	221		206
Wyoming	**2.11**	236	236	233	219	213
Math Grade 8		2007	2005	2003	2000	1996
National Public	1.21	265	261	258	253	252
Kentucky	**1.37**	267	264	261	255	252
Massachusetts	**1.90**	275	273	261	257	254
New Jersey	**2.62**	266	262	256		
Wyoming	1.18	275	272	271	262	262

http://www.nces.ed.gov/nationsreportcard/statecomparisons/Default.aspx
*accommodations not permitted