

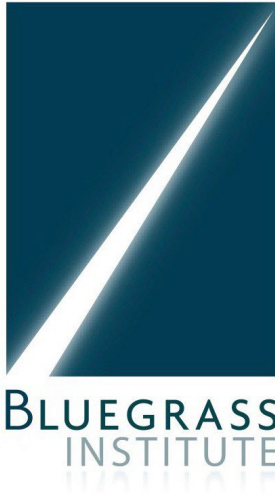
Trends in 'Bang for the Buck' in Kentucky's K-12



The Productivity of Funding in Developing Basic Skills and its Change over Time

A Bluegrass Institute Policy Point

By John Garen, Ph.D. • February 2024



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Trends in “Bang for the Buck” in Kentucky’s K-12: The Productivity of Funding in Developing Basic Skills and its Change over Time

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February 2024

Summary

This study tracks a measure of the efficiency of Kentucky’s K-12 system in generating basic reading and math skills. We calculate reading and math test score performance per \$1,000 of per pupil funding (inflation adjusted) from the 1990s forward. For 4th and 8th grade reading and math, test performance per \$1,000 of per pupil funds has declined markedly and nearly continuously. These declines are due almost entirely to the large funding increases that have occurred relative to small changes in test scores. This suggests a large deterioration in the effectiveness of K-12 funding.

Overview

This policy point presents a measure of efficiency – the “bang for the buck” – of Kentucky’s K-12 system, as well as its trend over time. This extends earlier [work](#) by the Bluegrass Institute for the year 2011. The measure of efficiency we use is basic skills test score performance per \$1,000 of inflation-adjusted per pupil funding, i.e., the productivity of K-12 funding in developing these skills. This indicates how funding translates into test score improvement. We consider the total of all funding sources; state, local, and federal. The test scores we use are the state average scale scores on grades 4 and 8 reading and math from the National Assessment of Educational Progress (NAEP). Our computations are interpreted as NAEP scale score points per \$1,000 of per pupil funding.

- For each of grades 4 and 8 reading and math tests, productivity of funding shows a dramatic fall from the 1990s to 2022.
- Productivity in 2022 ranged from 47% to 64% of the 1990s level, depending on the NAEP test.
- These drops in productivity for each NAEP score are driven almost entirely by the large increase in per pupil funding since the 1990s, but are offset slightly by some modest test score improvements.
- The decline in productivity has been almost continuously downward from the 1990s to 2022. The exception is the period just after the Great Recession (2009-2013). Some increases in productivity occurred then, but were driven primarily by the temporary drop in funding.
- Overall, the decline in productivity suggests a markedly deterioration of the effectiveness of funding in translating into basic skills test performance.

Grade 4 Reading and Math

Figures 1(a) and (b) show average NAEP Scale Score Points per \$1,000 of inflation-adjusted per pupil funding for grade 4 reading and math, respectively. The total of state, local, and federal funding, adjusted for inflation, is the measure of funding. Both figures show a persistent downward trend. Productivity dropped by 44.8% and 41.3% for grade 4 reading and math, respectively, from the initial test date in 1992 up until 2022.

Figure 1(a)

NAEP Grade 4 Reading Scale Score Points per \$1000 of Inflation-Adjusted Per Pupil Funding

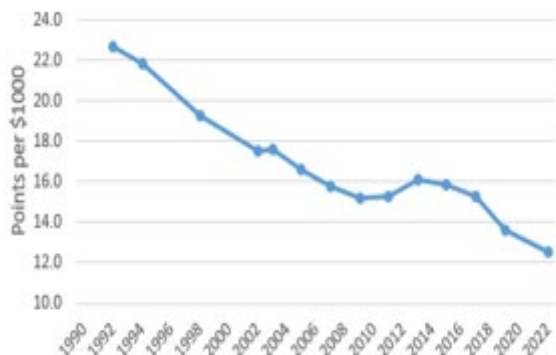
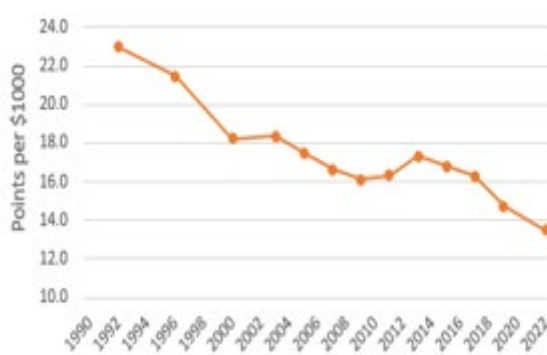


Figure 1(b)

NAEP Grade 4 Math Scale Score Points per \$1000 of Inflation-Adjusted Per Pupil Funding



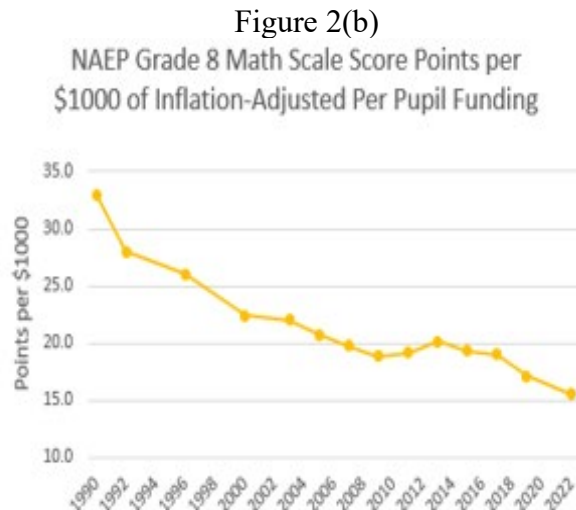
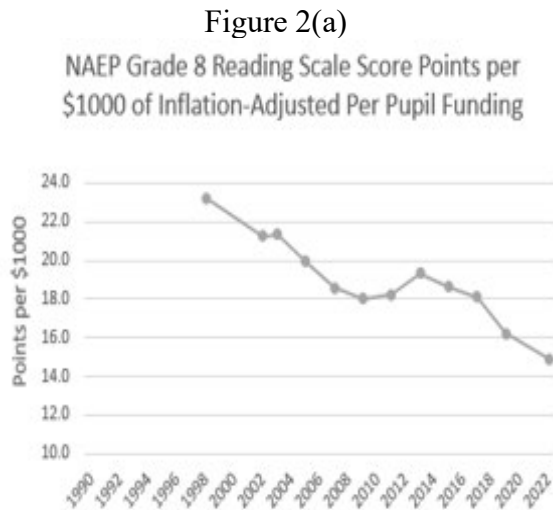
The primary driver of the overall decline in productivity was the increase in per pupil funding of 85.1% (inflation adjusted) from 1992 to 2022. This was somewhat offset by the modest increases of NAEP scores over these 30 years of 2.1% for reading and 8.8% for math. These are summarized below in Tables 1(a) and (b). (The full data is in the appendix.)

Both figures show brief upturns in productivity from 2009 to 2013. The primary reason is the temporary decline in per pupil funding in these years just following the Great Recession. Test scores changed little during this time.

Table 1(a)				Table 1(b)			
Grade 4 Reading				Grade 4 Math			
	NAEP Score	Funding per pupil	Score per \$1K		NAEP Score	Funding per pupil	Score per \$1K
1992	212.5	\$9,366	22.7	1992	215.0	\$9,366	23.0
2022	217.0	\$17,337	12.5	2022	234.0	\$17,337	13.5
Change	4.5	\$7,891	-10.2	Change	19.0	\$7,891	-9.5
Pct. Chg.	2.1%	85.1%	-44.8%	Pct. Chg.	8.8%	85.1%	-41.3%

Grade 8 Reading and Math

Figures 2(a) and (b) show average NAEP Scale Score Points per \$1,000 of inflation-adjusted per pupil funding for grade 8 reading and math, respectively. As with grade 4, both show a persistent downward trend. Productivity dropped by 36.6% for reading from 1998 to 2022 and by 53.0% for math from 1990 to 2022.¹



As with grade 4, the primary driver of the overall decline in productivity was the increase in per pupil funding of 53.6% (from 1988 to 2002) for the reading scores and of 122.4% (from 1990 to 2022) for the math scores. The decline in the NAEP reading score made the drop in productivity slightly worse, while the modest increase of math scores (relative to 1990) served to slightly offset the productivity decline in math. This is summarized below in Tables 2(a) and 2b).

As above, both figures show brief upturns in productivity from 2009 to 2013. The reason is the same as discussed above regarding grade 4.

Table 2(a)				Table 2(b)			
Grade 8 Reading				Grade 8 Math			
	NAEP Score	Funding per pupil	Score per \$1K		NAEP Score	Funding per pupil	Score per \$1K
1998	262.3	\$11,286	23.2	1990	257.1	\$7,793	33.0
2022	258.0	\$17,337	14.7	2022	269.0	\$17,337	15.5
Change	-4.3	\$6,051	-8.5	Change	11.9	\$9,544	-17.5
Pct. Chg.	-1.6%	53.6%	-36.6%	Pct. Chg.	4.6%	122.4%	-53.0%

¹ Initial testing years varied for the different NAEP tests.

Data Appendix

Year	NAEP, Grade 4 read ^a	NAEP, Grade 4 math ^a	NAEP, Grade 8 read ^a	NAEP, Grade 8 math ^a	Total K-12 Funding (thou.\$) ^b	Avg. Daily Attendance ^b	PCE Price Index ^c	Infla. Adj. Per Pupil Funding (\$)	Gr. 4 read, Productivity	Gr. 4 math, Productivity	Gr. 8 read, Productivity	Gr. 8 math, Productivity
1993					3,071,172	579,446	65.000	9,462				
1994	212				3,194,404	578,020	66.356	9,665	21.9			
1995					3,240,926	572,952	67.754	9,688				
1996		220		267	3,492,890	571,934	69.203	10,241		21.5		26.0
1997					3,794,129	570,431	70.407	10,963				
1998	218		262		3,932,068	569,694	70.967	11,286	19.3		23.2	
1999					4,210,793	568,603	72.001	11,935				
2000		219		270	4,330,619	565,693	73.822	12,034		18.2		22.4
2001					4,509,893	564,198	75.302	12,318				
2002	219		265		4,650,146	566,451	76.291	12,487	17.5		21.2	
2003	219	229	266	274	4,764,253	569,538	77.894	12,462	17.6	18.4	21.4	22.0
2004					5,077,772	570,911	79.827	12,929				
2005	220	231	264	274	5,379,257	574,380	82.127	13,233	16.6	17.5	19.9	20.7
2006					5,909,930	580,937	84.440	13,981				
2007	222	235	262	279	6,141,245	583,102	86.607	14,112	15.8	16.7	18.6	19.7
2008					6,561,268	585,775	89.170	14,577				
2009	226	239	267	279	6,641,128	585,556	88.921	14,801	15.2	16.1	18.0	18.9
2010					6,873,286	587,102	90.514	15,009				
2011	225	241	269	282	6,993,349	593,323	92.804	14,738	15.3	16.3	18.2	19.1
2012					7,086,717	594,440	94.534	14,634				
2013	224	241	270	281	7,120,960	618,774	95.781	13,943	16.1	17.3	19.3	20.1
2014					7,137,145	622,088	97.121	13,708				
2015	228	242	268	278	7,453,976	617,642	97.299	14,393	15.8	16.8	18.6	19.3
2016					7,634,758	618,606	98.284	14,572				
2017	224	239	265	278	7,782,860	616,281	100.000	14,655	15.3	16.3	18.1	19.0
2018					8,458,983	600,115	102.047	16,029				
2019	221	239	263	278	8,651,926	597,333	103.513	16,238	13.6	14.7	16.2	17.1
2020					8,757,350	592,315	104.635	16,397				
2021					9,218,839	592,130	109.001	16,575				
2022	217	234	258	269	10,378,779	598,652	116.043	17,337	12.5	13.5	14.9	15.5

^aAll NAEP data are from <https://www.nationsreportcard.gov/ndecore/xplore/NDE>

^bSee <https://nces.ed.gov/programs/digest/> and <https://nces.ed.gov/ccd/files.asp#Fiscal:1,LevelId:2,SchoolYearId:37,Page:1>.

Data for 2022 are from <https://www.education.ky.gov/districts/FinRept/Pages/Fund%20Balances,%20Revenues%20and%20Expenditures,%20Chart%20of%20Accounts,%20Indirect%20Cost%20Rates%20and%20Key%20Financial%20Indicators.aspx>

^cFrom <https://www.bea.gov/data/personal-consumption-expenditures-price-index>.

^dSAll productivity measure are the NAEP score over inflation-adjusted per pupil funding.