Effectiveness And Efficiency Of Kentucky School Districts

Research Report No. 485

Office Of Education Accountability

Kentucky Legislative Research Commission

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Effectiveness And Efficiency Of Kentucky School Districts

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Foreword

KRS 157.310 states that it is the intention of the General Assembly to provide an efficient system of public schools as prescribed in the Constitution of Kentucky and to assure substantially equal public school educational opportunities for students. KRS 158.645 delineates the capacities the General Assembly intends all students to acquire within the public education system. This study conducts a longitudinal analysis of Kentucky school expenditures and outcomes associated with student academic and postsecondary success. Education expenditures are examined at the state and district levels. Elements include, but are not limited to, student assessment data, graduation rates, staffing, and postsecondary indicators of success taking into account student and district characteristics.

Office of Education Accountability staff would like to acknowledge the assistance of many individuals whose cooperation and expertise contributed to this report. Professors Michael Clark, Ronald Zimmer, and JS Butler at the University of Kentucky were instrumental in providing advice and technical expertise in the methodology used in this report.

Jay D. Hartz
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Summary

The Kentucky General Assembly, like other legislatures across the nation, must provide school funding sufficient to support the state's educational goals for all students. It must also consider school funding amounts in light of other budget priorities, and it must be mindful of some taxpayers' concerns about rising costs and questions about whether school funds are being used effectively. This study uses lessons learned from existing research on effectiveness and efficiency in education to analyze differences in educational spending and outcomes among Kentucky's 171 school districts, as well as differences between Kentucky and the nation.

Among other questions, the study seeks to understand

- how Kentucky's education spending and outcomes compare with those of the nation,
- which factors explain spending differences among Kentucky districts,
- the relationship between district spending and student outcomes, and
- characteristics of districts that are more or less effective at affecting student outcomes.

Data

Data used for this report come primarily from the Kentucky Department of Education (KDE). Staff analyzed KDE data that include student outcomes, student demographic characteristics and program eligibility, district per-pupil spending, district personnel, and teacher working conditions as reported by teachers in KDE's biennial survey of all certified educators.[a] In addition, staff analyzed data from the National Assessment of Educational Progress, the National Center for Education Statistics, the American Community Survey, and the Kentucky Center for Statistics.

Methods

The report compares Kentucky and national spending and reading and mathematics achievement over time and in 2022. The Kentucky district analysis uses reading and math data from school years 2018, 2019, and 2022 to analyze district effectiveness and its relationship with spending.[b] District effectiveness is calculated based on "impact" scores that compare the performance of students in each district with that of demographically similar students across the state.[c] Effectiveness categories of individual districts are generated for research purposes only and are not reported for individual districts.[d]

[a] In this report, district per-pupil spending reflects current per-pupil spending.
[b] Due to the COVID-19 pandemic, no assessment data were available for school year 2020, and assessment data for school year 2021 were incomplete.
[c] This approach is standard among efficiency researchers and has been used by organizations representing a variety of education policy perspectives.
[d] The impact analysis provides data that are important for interpreting the relationship between spending and outcomes for districts overall. As noted in the report, however, the methodology has limitations that in some cases might represent individual districts in relatively more positive or negative terms. The impact analysis is not intended as an alternative means of ranking districts.

In addition to district effectiveness and spending, the report analyzes characteristics of more and less effective districts using data available for all districts in areas such as district size, district geographic dispersion, labor markets, salaries, teacher working conditions, and numbers of certified and classified staff.

Findings of the report based on district effectiveness as measured by impact are also true for district effectiveness as determined by actual, unadjusted reading and math scores. District data used in this analysis are from as far back as 2018 and may be outdated for some districts. At the district level, findings from this analysis can be most appropriately used to interpret current district performance using updated data available on the KDE website and in the *District Data Profiles* published by the Office of Education Accountability (OEA).[1]

Summary Of Findings

Overall, the report found that Kentucky's spending and student outcomes make it neither much more nor much less efficient and effective, on average, than other states. Among Kentucky districts, OEA found that per-pupil spending was associated with efficiency challenges such as high percentages of higher-need students or small district size but overall was not associated with districts' effectiveness at affecting student reading and math achievement. Among districts with similar spending, effectiveness varied greatly. In the data available for this report, OEA found that teacher working conditions and teacher turnover were critical factors associated with district effectiveness. The report also found that small districts experience challenges related to efficiencies of scale that are beyond administrators' control and may negatively affect student achievement.[e]

Spending And Outcomes In Kentucky And The Nation

Between 1990 and 2015, both revenue and student achievement increased in Kentucky relative to the nation. Kentucky's per-pupil spending, however, has continued to lag the nation's despite increases over time. Although spending levels were relatively stable, student reading achievement in Kentucky and the nation began to decline in 2015. Following the COVID-19 pandemic, achievement in reading and math dropped steeply.

In 2022, Kentucky's per-pupil spending and its student achievement in reading and math were slightly below the nation's. Although comprehensive analyses of spending and outcomes among US states have not been published, available data suggest that student outcomes in Kentucky compared with the nation, relative to its spending, are neither much more nor much less than would be expected from such an analysis.

[e] For analytic purposes, this report considers small districts to be those with 1,000 students or fewer, but many Kentucky districts above that threshold would still be considered small by national standards.

Spending Differences Among Kentucky Districts

In school years 2018, 2019, and 2022, average district per-pupil spending ranged from just under $11,000 to over $24,000. The overwhelming majority of districts (92 percent) spent $11,000 to $15,000. Differences in per-pupil spending among districts reflect differences in sources of revenue, largely related to student populations, property wealth, and local tax rates.

Spending And Student Outcomes In Kentucky School Districts

Data from school years 2018, 2019, and 2022 show that district per-pupil spending is negatively associated with districts' actual reading and math scores. On average, as district per-pupil expenses increase, reading and math performance decreases. This trend is explained in part by the fact that higher-spending school districts, on average, have higher percentages of economically disadvantaged students and students eligible for special education services. In Kentucky and every other state, these populations have lower reading and math achievement than all students.

After statistically adjusting for student and community characteristics, staff found very little relationship overall between district per-pupil current spending and districts' impact on reading and math outcomes; districts with similar spending differ greatly in their impact on students' achievement in reading and math. Even after adjusting for differences in student populations, however, the highest-spending districts were more likely to be in lower-impact categories than other districts were.

District Characteristics Associated With Effectiveness

Small Size

Small districts were present in every impact category—they were among the state's highest- and lowest-impact districts. Small districts were, however, 1.5 times as likely as other districts to be in lower-impact categories. Smaller districts, on average, spent a lower percentage of available revenue on instructional services. National research indicates that small districts are more costly to operate. They face challenges related to efficiencies of scale that are beyond administrators' control. Depending on the revenue they receive, some small districts may have difficulty affording instructional services and supports available to students in other districts. Small districts that face additional challenges—such as geographic dispersion or higher labor market costs—may be especially challenged.

Most (28 of 38) of Kentucky's small districts are independent school districts (ISDs) whose boundaries are not defined by county lines. Of Kentucky's 171 districts, 51 are ISDs. Although most (28) of the ISDs are small, membership in the remaining 23 ISDs ranges as high as 5,000 and exceeds the membership of many county districts.[f]

[f] Small districts that are ISDs, on average, have district impact scores similar to those of small county districts. On average, ISDs that are not small have higher district impact scores than county districts that are not small.

Teacher Turnover

On average, lower-impact districts had higher teacher turnover rates and less experienced teachers. Lower-impact districts were more than 10 times as likely as higher-impact districts to have higher teacher turnover rates of 15 percent or more (39 percent and 3.6 percent, respectively). Districts paying less competitive wages—especially those in higher-cost labor markets—experienced greater turnover.

Teacher Working Conditions

Districts in lower-impact categories were over 5 times as likely as higher-impact districts to have less favorable teacher working conditions, as reported by teachers on KDE's biennial working conditions survey (67 percent and 13 percent, respectively). Differences among higher- and lower-impact districts were greatest on questions related to school climate, feedback and coaching, and school leadership.

Conclusions

Findings of the report related to small districts, to higher teacher turnover, and to less favorable teacher working conditions present clear barriers to effectiveness and efficiency. Addressing these challenges may require action by the General Assembly, local leaders, and local communities. As noted in KRS 158.645, public education involves shared responsibilities and "[s]tate government, local communities, parents, students, and school employees must work together to create an efficient public school system. … The cooperation of all involved is necessary to assure that desired outcomes are achieved."

Small Districts

Small districts appear among the state's highest- and lowest-impact districts. The fact that small districts are more likely to be in lower-impact categories may reflect challenges related to efficiencies of scale that lie beyond administrators' control. Local communities, as well as the General Assembly, might take action to address these challenges.

Potential Of Districts To Merge

Small ISDs that are struggling to generate revenue sufficient to support their costs have the option to request merger with their county district.[g] OEA's *Kentucky's Independent School Districts: A Primer* provided a detailed description of this process.[2] County districts have not merged in the past. KRS 160.040 describes the merger process for contiguous districts.

[g] Students' reading and math performance data alone may not be sufficient to inform such decisions, as they do not capture many important outcomes that might matter to local voters and boards.

Additional Funding For Small Districts

The General Assembly may wish to consider providing small districts—many of which are also geographically dispersed—with additional funding through the Support Education Excellence in Kentucky (SEEK) formula. Such a consideration should be informed by data beyond that provided in this report for small districts. Research suggests that challenges related to efficiencies of scale may also affect districts not considered small. An external study might recommend thresholds and associated funding weights for districts that are considered small or dispersed.[3]

Teacher Turnover And Working Conditions

Data presented in the report shows that district effectiveness varies independent of spending and is associated with factors such as teacher working conditions and competitive salaries, over which local leaders and communities have influence. Actions taken by local boards and district leaders—especially those that target resources to support teacher working conditions or relatively competitive salaries—may have made some similarly spending districts more successful than others at providing students with a stable, experienced, effective teacher workforce.

Local leaders may ultimately be limited in their ability to retain and support teachers, however, if they lack sufficient revenue to ensure that teacher salaries and benefits keep pace with labor market demands, or that teachers are provided with whatever additional supports might be associated with favorable working conditions. When considering budget allocations to support SEEK funding, the General Assembly may consider the degree to which increases in SEEK funding over time are sufficient to allow local districts to keep pace with changing labor market demands.

Chapter 1

Introduction And Overview

The Kentucky General Assembly must balance considerations of school funding with other budgeting priorities and some taxpayers' concerns that tax revenue not exceed what is necessary.

Like other legislatures across the nation, the Kentucky General Assembly must balance considerations of school funding with other priorities. Policy makers must provide school funding sufficient to support the state's educational goals for all students while also ensuring that state revenue is available to support other priority programs. In addition, policy makers face concerns of some taxpayers that tax revenue not exceed what is necessary and that school funds be used effectively.

Nationally, concerns about effectiveness and efficiency in education increased in the last decades of the 20th century.

As the cost of education in the nation increased in the last decades of the 20th century, so did concerns from policy makers and taxpayers about whether increased spending was helping to improve student outcomes and whether funds were being spent efficiently. Decades of educational research on effectiveness and efficiency followed these concerns.

School districts are the primary focus of effectiveness and efficiency studies because they are the administrative unit through which revenue flows.

Although school districts account for a relatively small amount of variation in student outcomes compared with schools and classrooms, they are the primary focus of effectiveness and efficiency studies because they are the administrative unit through which revenue flows.[a] [4] Research on school districts' effectiveness and efficiency, while leaving many questions unanswered, has identified important factors that must be taken into account when analyzing the relationships between spending and outcomes.

This study uses lessons learned from existing effectiveness and efficiency research to analyze differences in educational spending among Kentucky school districts and between Kentucky and the nation.

This study uses lessons learned from existing research on effectiveness and efficiency in education to analyze differences in educational spending and outcomes among Kentucky's 171 school districts and to present available data on spending and outcomes among US states and between Kentucky and the US over time.

[a] A 2013 10-year study of school districts in Florida and North Carolina found that 59 percent of variation in school district performance was associated with unexplained student-level factors. Of the factors that could be explained, 31.4 percent were explained by student-level controls such as economic disadvantage or race. Of the factors under educators' control, 6.7 percent was explained by teachers, 1.7 percent was explained by schools, and only 1.1 percent was explained by districts.

Among other questions, the study seeks to understand

- how Kentucky's education spending and outcomes compare with those of the nation;
- which factors explain spending differences among Kentucky districts;
- the relationship between district spending and student outcomes; and
- characteristics of districts that are more or less effective at impacting student outcomes.

District data used in the study are primarily from school years 2018, 2019, and 2022. The study is intended to look for general relationships

Description Of This Study

Study Request

In March 2023, the Education Assessment and Accountability Review Subcommittee requested that the Office of Education Accountability (OEA) conduct a longitudinal analysis of expenditures and outcomes at the state and district levels. The committee requested the study review elements that include, but are not limited to, assessment data, graduation rates, staffing, and postsecondary indicators of success and that it take student characteristics into account.

Organization Of The Report

Chapter 1 describes data, methods, and major findings; reviews literature; and compares Kentucky's outcomes with the nation's.

The remainder of Chapter 1 describes data, methods, and major findings of the report; reviews literature on efficiency and effectiveness; and compares per-pupil spending and academic outcomes in Kentucky and the nation over time and in 2022.

Chapter 2 reviews district per-pupil spending, major revenue sources, and efficiency challenges beyond administrators' control.

Chapter 2 describes differences among higher- and lower-spending districts in number of students; demographic characteristics of students; major revenue sources; and efficiency challenges related to district size, geographic dispersion, and high-cost labor markets.

Chapter 3 shows relationships between district per-pupil spending and outcomes and identifies differences among districts that are more and less effective at impacting reading and math achievement.

Chapter 3 shows the relationship between district effectiveness, as measured by impact on reading and mathematics scores, and per-pupil spending. It identifies factors that may offer partial explanation for differences in the outcomes achieved by districts relative to what they spend.

Data And Methods

Data Used For The Report

Data from the report come primarily from the Kentucky Department of Education (KDE) but also include national data and data from the Kentucky Center for Statistics.

Data used for this report come primarily from the Kentucky Department of Education (KDE), including

- student-level assessment and enrollment data,
- district-level data on district finances and personnel as calculated by OEA from KDE data and contained in OEA's *District Data Profiles*,
- Support Education Excellence in Kentucky (SEEK) transportation calculations, and
- Kentucky teacher survey data.

The Kentucky district analysis focuses on school years 2018, 2019, and 2022.

This report refers to school years by the year in which they end. For example, the 2017-2018 school year is school year 2018. The majority of the report's district-level analyses combine data from school years 2018, 2019, and 2022. The report combines years of data to increase the validity of conclusions drawn about spending and performance in the state's many smaller districts. Outcomes and expenditures in smaller districts vary more year to year than do those in larger districts. Due to the COVID-19 pandemic, no assessment data were available for school year 2020 year, and assessment data for school year 2021 were incomplete.

Data also include student-level data on career and technical education (CTE), postsecondary enrollment, and postsecondary degree completion from the Kentucky Center for Statistics.

The report also uses state-level data from the National Center for Education Statistics (NCES), the National Association of State Budget Officers, and the Stanford Education Data Archive.

Methods

Methods used to analyze effectiveness and efficiency are informed by research described later in this chapter and by the way efficiency has been interpreted in Kentucky.

To determine effectiveness, the report uses a district "impact" score, including student-level demographic and reading and math data from state tests and the ACT.

Effectiveness. The report uses district "impact" scores in reading and math to determine district effectiveness and the relationship between spending and outcomes. Impact scores compare the actual scores of students in each district to scores of students with similar demographic characteristics across the state. The impact analysis includes student-level achievement and demographic data for all

students who took regular state tests in reading and math in grades 3 through 8 and the 11th-grade ACT in 2018, 2019, and 2022.[b]

Impact scores were calculated based on the difference between actual reading and math scores and those predicted from a statistical model that took into account students' and communities' demographics.

Impact scores were calculated based on the difference between actual reading and math assessment scores and those predicted from a statistical model that took into account students' and communities' demographic characteristics. Higher-impact school districts were those in which students' reading and math achievement exceeded the performance of demographically similar students across the state; in lower-impact districts, students performed below demographically similar students.[c] Appendix A explains the statistical model used to determine district impact, along with others used to validate its findings.[d] [5]

The term *efficiency*, as legally interpreted in Kentucky, has implications for school funding and financial management as well as school quality. Effectiveness and efficiency are not entirely separate concepts in the commonwealth.

Efficiency. Efficiency is often understood in fiscal terms to identify organizations that achieve better outcomes per dollar invested. As explained later in this chapter, the term *efficiency*, as legally interpreted in Kentucky, has implications for school funding and financial management as well as school quality. Efficiency and effectiveness are not entirely separate concepts in the commonwealth.

The report shows how efficiency challenges that are beyond administrators' control apply to individual school districts. The report does not make assumptions about districts' overall efficiency.

The report summarizes differences among higher- and lower-spending districts by a variety of metrics and does make assumptions about districts' overall efficiency.[e] It also shows how efficiency challenges that are beyond district administrators' control apply to districts with different spending levels.

Standard Scores. The report places districts in categories for student outcomes, per-pupil spending, and a variety of efficiency-related challenges such as expensive labor markets and student economic disadvantage. These categories are based on "standard scores" that are valid for comparison across different data sets. Appendix B provides additional detail about standard scores and the method used to place districts in categories.

[b] The analysis does not include data for the less than 2 percent of special education students who take an alternate assessment.
[c] Use of impact scores to determine district effectiveness is for research purposes only. OEA is not suggesting that the state's reading and math achievement goals for students should differ based on student or community demographic characteristics.
[d] The incorporation of student demographic data in methods used to determine effectiveness and efficiency is common in research and policy analysis.
[e] Districts' overall effectiveness related to the state's many educational goals is not reflected in reading and math data alone. The data in this report are therefore insufficient to conclude that a lower-spending effective district is necessarily more efficient than a higher-spending effective district.

Limitations

The report does not include impact scores for individual districts.

Consistent with published research, the statistical model used by OEA in its district impact analysis does not explain most of the variance observed in outcomes among students.[f] Although the results from the model provide important information about district performance that is not available from actual, unadjusted scores, the model is not intended to provide an alternative means of ranking districts and does not report impact scores for individual districts. All statistical models have limitations that may affect some school districts more than others.[g]

Effectiveness of school districts should not be determined based on reading and math data alone. Districts are rarely among the most or least effective across multiple indicators.

Districts cannot be considered effective or efficient based on reading and math data alone, as these data do not address all capacities set as goals for the educational system as outlined in KRS 158.645 and described later in this chapter; valid and reliable outcome data are not available for all capacities.[h] As shown in Chapter 3, districts that are higher-impact in reading and math are not always higher-impact on other important outcomes, such as high school graduation or career readiness; districts are rarely among the most or least effective across multiple indicators.[i]

Finally, the per-pupil current expenditure data used in this report, and commonly used to examine district spending, do not capture all district spending. It is possible that some districts may appear

[f] As noted in Appendix A, the impact analysis explains approximately 20 percent of the variance between students' reading and math outcomes and their demographic characteristics—relatively high by social science standards. Consistent with published research, however, variation in outcomes among students remains largely unexplained by the model.

[g] For example, these models may favor districts with very high percentages of disadvantaged students, who are typically lower-performing. Districts with lower percentages of disadvantaged students must score at extremely high levels to have positive impact scores. In addition, as explained in Appendix A, the model may favor districts that identify students for special education at very high rates over those with lower rates.

[h] For example, outcome data that are valid and reliable for comparison among school districts are not available on students' mental and physical wellness, core values and qualities of good character, or grounding in the arts.

[i] The study considers students career ready if they complete a "pathway," or sequence of three courses in a CTE program area; earn an industry certificate in a CTE pathway; or pass a state-approved assessment in a CTE pathway. Criteria for career readiness have changed several times in the last decade. The state's current definition of *career readiness* does not include pathway completion, which was previously required . District impact for postsecondary enrollment and degree completion is calculated for graduates in school years 2012 to 2014.

relatively higher or lower spending based on analysis of total per-per pupil expenditures.[j]

Major Conclusions

The study reached the major conclusions listed below.

National Comparative Data

Per-pupil spending in Kentucky and the nation has increased over time, but spending in Kentucky continues to lag that of the nation.

- Adjusted for inflation, per-pupil spending in Kentucky and the nation has increased over time; relative to the nation, Kentucky spending increased the most in the decade following the 1990 Kentucky Education Reform Act. Spending increases have been moderate since 2010, however, and Kentucky's per-pupil spending continues to lag the nation's.

Relative to the nation, Kentucky students' reading and math scores increased steadily from 1990 through 2015, when Kentucky's average proficiency rates slightly surpassed the nation's.

- Students' reading and math outcomes on the National Assessment of Educational Progress (NAEP) increased steadily from 1990 through 2015, in both Kentucky and the nation. Until 2015, when Kentucky's average proficiency rates slightly exceeded the nation's, Kentucky's increases over time were relatively greater than the nation's.[k]

In 2022, Kentucky's per-pupil spending and its achievement in reading and math were slightly below the nation's. Kentucky appears to be neither much more nor much less effective and efficient than other states, on average.

- In 2022, Kentucky's per-pupil spending and its student achievement in reading and math were slightly below the nation's. Kentucky's spending and academic achievement in 2022, relative to that of other states, is approximately what would be predicted when accounting for cost of living, student populations, and increased costs associated with operating rural districts. Kentucky appears to be neither much more nor much less effective and efficient than other states, on average.

District Per-Pupil Spending

Compared with other districts, Kentucky's highest-spending districts had, on average, greater percentages of higher-need student populations and were more likely to be small. These factors increase costs necessary to educate students.

- Higher-spending Kentucky districts, on average, had greater percentages of economically disadvantaged students and

[j] Current per-pupil expenditures do not include funds spent by districts on capital expenditures or interest on school debt. These types of expenditures include new construction, building renovation, and depreciable supplies such as computers or buses. Current expenditures also do not include services provided to students who attend state-funded area technology centers or community services such as those provided by family resource youth service centers or adult education programs.

[k] In 1990, data were available in only a single grade and subject, 4th-grade math. Kentucky data in all four regularly tested subjects—4th- and 8th-grade reading and math—are available beginning with the 2003 NAEP.

students eligible for special education services, and they were more than twice as likely as all districts to be small districts.[1] These factors, which are beyond administrators' control, increase costs necessary to educate students.

Almost all of the highest-spending, small districts were independent school districts (ISDs).

- Almost all of the highest-spending, small districts were independent school districts (ISDs), whose boundaries are not defined by county lines. The higher operational costs of these districts are supported in part by higher local taxes that local communities have authorized over time.

The state's two largest school districts were also among the state's highest-spending ones. In contrast to most highest-spending districts, these two districts received greater local versus state per-pupil funding.

- The state's two largest school districts—Jefferson County Public Schools (JCPS) and Fayette County Public Schools (FCPS)—were also among the state's highest-spending districts. In contrast to most highest-spending districts, these two districts had relatively low percentages of students eligible for special education services and higher percentages of English language learners. JCPS and FCPS also received greater local versus state per-pupil funding.

District Per-Pupil Spending And Outcomes

On average, higher-spending districts had lower actual reading and math scores, in part because of their greater percentage of economically disadvantaged and special education students.

- On average, higher-spending districts had lower actual reading and math scores. As noted above, higher-spending districts, on average, had greater percentages of economically disadvantaged and special education students than other districts; these students typically score below other students on state and national tests.

Once student and community demographic characteristics were taken into account, district effectiveness at impacting reading and math achievement did not vary based on per-pupil spending, overall.

- Districts' effectiveness at impacting reading and math achievement did not vary based on per-pupil spending. After statistically adjusting for student and community characteristics, staff found very little relationship between district per-pupil current spending and districts' impact on reading and math outcomes among all districts.

Factors Associated With District Effectiveness

Relative to what they spent, some districts were much more effective than others at impacting reading and math achievement.

- District effectiveness varies greatly within spending categories. Higher- and lower-impact districts (those considered more or less effective in the study), were present in every category.

[1] For analytic purposes, this report considers small districts to be those with 1,000 or fewer students. Many Kentucky districts above that threshold would still be considered small by national standards.

Small districts experience challenges related to efficiencies of scale. These challenges are beyond administrators' control and may have negatively affected student achievement in some districts.

- Small districts were 1.5 times as likely as other districts to be in lower-impact categories for reading and math. The percentage of expenditures on instructional services for students was lower, on average, in small districts. National research has shown that, as district size decreases below certain thresholds, operational costs increase. Small districts experience challenges related to economies of scale that are beyond administrators' control and may have negatively affected student achievement in some districts.

Lower-impact (less effective) districts, on average, had less favorable teacher working conditions than higher-impact (more effective) districts.

- Compared to higher-impact (more effective) districts, on average, lower-impact (less effective) districts had less favorable working conditions as reported by Kentucky teachers in areas such as school climate, feedback and coaching, and school leadership.

Less effective districts, on average, had higher teacher turnover rates and less experienced teachers than more effective districts.

- Lower-impact districts had much higher teacher turnover rates, on average, than higher-impact districts, and less-experienced teachers. Teacher turnover was greatest, on average, in districts that paid less-competitive wages—especially those in higher-cost labor markets.

Effectiveness And Efficiency In Kentucky

In a Kentucky context, the term *efficient* has implications for the quality, funding, and financial management of schools.

In a Kentucky context, the term *efficient* has implications for the quality, funding, and financial management of schools. Section 183 of the Constitution of Kentucky states that"[t]he General Assembly shall, by appropriate legislation, provide for an efficient system of common schools throughout the State."

An efficient public education system must have the goal of providing students the opportunity to develop a variety of academic and nonacademic capacities.

In *Rose v. Council for Better Education* (1989), the Kentucky Supreme Court opined that the goal of an efficient public education system must be to provide all students with free, substantially uniform opportunities to develop seven academic and nonacademic capacities, regardless of a student's residence or economic conditions. The decision also acknowledged the importance of more traditional, economic concepts of efficiency by stating that public schools should operate "free of waste, duplication, mismanagement, and political influence."[6]

The seven capacities identified by the court are included in the eight capacities listed as KRS 158.645:

1. Communication skills necessary to function in a complex and changing civilization;

2. Knowledge to make economic, social, and political choices;
3. Core values and qualities of good character to make moral and ethical decisions throughout his or her life;
4. Understanding of governmental processes as they affect the community, the state, and the nation;
5. Sufficient self-knowledge and knowledge of his mental and physical wellness;
6. Sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage;
7. Sufficient preparation to choose and pursue his life's work intelligently; and
8. Skills to enable him to compete favorably with students in other states.[m]

KRS 158.645 states that public education involves shared responsibilities of "[s]tate government, local communities, parents, students and school employees."

The statute also notes that public education involves shared responsibilities and that

> [s]tate government, local communities, parents, students and school employees must work together to create an efficient school system. … The cooperation of all involved is necessary to assure that desired outcomes are achieved.

Review Of Research On The Relationships Between Educational Spending And Outcomes

Studies that examine the relationship between spending and outcomes fall into two broad categories:

- studies that analyze efficiency, as measured by differences among districts in the amount they spend relative to their outcomes; and
- studies that look at the relationship between changes in spending and outcomes over time.

Efficiency Studies

Most efficiency studies analyze efficiency in the traditional, economic sense and seek to identify educational organizations that appear to maximize educational outputs for funds spent.

Methods Used To Determine District Efficiency. Most efficiency studies analyze efficiency in the traditional, economic sense, using statistical techniques to identify educational organizations that appear to maximize educational outputs for funds spent. In addition to student outcomes and spending, these studies usually make adjustments for student populations and may also take into account factors such as cost of living, district size, district density, and measures of local competition. Efficiency studies evaluate districts in relation to each other, not

[m] The third capacity, regarding moral character, was added at a later date.

relative to an external standard. Each statistical approach that provides a single efficiency rating for individual districts has limitations.[n o 7]

The rate of districts identified as inefficient in these studies ranges from 6 to 30 percent, depending on the statistical model used. Studies that examine multiple indicators identify much smaller percentages of districts inefficient on all measures.

Percentage Of Districts Deemed Inefficient. Most studies identify a small minority of districts as inefficient, though percentages range widely among studies, from 6 percent of districts in North Carolina to 10 percent in Illinois and 30 percent in Georgia.[8] These differences result primarily from the statistical model used to determine efficiency and do not necessarily reflect the relative efficiency of schools in those states. Studies that examine school district efficiency on multiple outcome indicators, or that use multiple methods, find much smaller numbers of districts that are inefficient on all metrics. For example, a 2014 study of all school districts in the nation using three methods found that only 3 percent of districts were inefficient by all methods.[9]

Efficiency studies have been inconclusive about district practices. These studies have relied on large-scale data in areas such as teacher qualifications or pupil-teacher ratios.

District Practices That Affect Efficiency. Once studies have identified particular districts as efficient or inefficient, they often use available large-scale data to explain differences among districts. Results of these types of analysis conflict among studies, however, on practices such as teacher versus administrator ratios or percentages of teachers with master's degrees, leading one scholar to opine that "the net result of decades (of research) is inconclusive."[10]

Studies on effective districts and schools have generally identified factors such as leadership, culture, or instructional management systems. Large-scale quantitative data captures these factors only partially.

The inconsistency in findings about district practices in these large-scale efficiency studies may be explained by findings from literature on district and school effectiveness. Findings from these studies generally highlight practices related to leadership, culture, and instructional management systems that are not evident in large-scale data.[p 11]

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[n] For example, by some methods an extraordinarily low-spending district might be identified as efficient even if it had low educational outcomes. In other methods, a district might be identified as inefficient if it spent relatively more on educational functions not directly related to reading and math (such as CTE, the arts, or athletics). Finally, because districts are evaluated in comparison to each other, a district determined to be inefficient or efficient in one study might have a different designation if compared to districts in a different jurisdiction.

[o] These shortcomings are usually noted in individual models and are summarized by the Center for American Progress for the models used in its report *Return On Educational Investment: 2014*.

[p] Factors highlighted in literature on effective schools or districts include high expectations; stable, instructionally focused leadership; systems of aligned expectations for curriculum and assessment; data-driven instruction; intentional human capital strategies (such as professional development and frequent teacher feedback) that raise capacity of teachers and leaders ; community investment and engagement; increased instructional time; cultures of collaboration; and

Factors beyond administrators' control may reduce efficiency:
- **higher-need student populations**
- **low student membership**
- **geographic dispersion**
- **higher-cost labor markets.**

Contextual Factors That Affect Efficiency. Efficiency research has been consistent in identifying factors that are outside the control of administrators but reduce districts' efficiency. Districts that face these contextual efficiency challenges typically spend more to achieve the same outcomes as districts with fewer challenges. Factors that reduce efficiency are

- concentrations of student populations that have traditionally achieved lower academic outcomes, such as economically disadvantaged students or students with disabilities;[q]
- low student membership, especially enrollment of 1,000 students or fewer;[r] [12]
- geographic dispersion of students;[s] [13]
- and higher-cost labor markets.[14]

Local competitive context or taxpayer scrutiny may increase efficiency.

In addition, some studies have found that local competitive contexts or taxpayer scrutiny increases efficiency.[t] [15]

Kentucky districts receive additional funding for higher-need students and for being geographically dispersed. Unlike some states, Kentucky does not provide additional funding for small districts.

As detailed in OEA's 2021 study on the SEEK funding formula, Kentucky provides additional funding for high-need student populations and some additional transportation funding for geographically dispersed districts. Unlike some states, Kentucky does not provide additional funding based on district size.[16]

Association Of Spending And Outcomes Over Time

Numerous studies have examined the relationship between spending and outcomes by comparing outcomes of schools, districts, or states, before and after changes in school funding (often court-ordered).

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targeted support for high-need schools or populations (such as high-dose tutoring or additional assistance for high-need schools).

[q] Increased costs associated with economically disadvantaged or minority students are greater as concentrations of those students increase. In lower-poverty schools, the costs of educating economically disadvantaged students may be lower.

[r] Efficiency continues to decrease for districts with fewer than 500 students and, especially, districts with fewer than 200 students. While district efficiency increases as membership exceeds 1,000 students, the efficiency rewards diminish with size, such that very large districts are not more efficient than moderate-size districts.

[s] States define *density* as the number of students per square mile but differ in the thresholds set, such as 4.5 in Michigan, 10 in Wisconsin, and 25 in New York.

[t] Competitive contexts exist when numerous districts with higher-achieving students are in close proximity. Taxpayer scrutiny may be more likely when taxes come predominantly from local versus state or federal sources. On the other hand, those districts that have capacity to generate high levels of local funding may be less efficient.

- **Student outcomes associated with funding increases may sometimes be observable more in long- than short-term data.**
- **Positive effects of funding increases may be greatest in districts with high percentages of economically disadvantaged students.**
- **State funding increases resulting from court-ordered reforms tend to focus on closing funding gaps between wealthy and less wealthy districts.**
- **Funding increases are generally associated with personnel-related spending such as decreased pupil/teacher ratios or increased teacher salaries.**

As methods have become more sensitive to these statistical and analytical challenges, they have trended toward showing positive relationships between spending changes and student outcomes and have isolated some previously less understood relationships:[17]

- While there are apparent advantages of increased investments on student achievement, these advantages are often not visible immediately but become apparent over time in long-term educational and labor market outcomes.
- As measured by reading and math scores alone, increased investments appear to provide the most benefit in districts with high percentages of economically disadvantaged students; spending-associated improvements in student outcomes may not always be apparent for students in less economically disadvantaged districts.[u]
- State funding increases that result from court-ordered reforms have tended to focus on closing gaps between property-wealthy and less property-wealthy districts; these strategies may not direct sufficient funds to the majority of economically disadvantaged students, who are enrolled in districts that fall between the two extremes.
- Differences among districts or changes in spending over time are often reflected in personnel-related data such as decreased pupil teacher ratios or increased teacher salaries.[v] [18]

Studies have not reached consensus, however, on cost-benefits questions such as the degree of improvement in student outcomes that justifies increased spending.[w] [19]

Consensus Findings

Overall, differences in the conclusions reached among researchers about the relationship between spending and outcomes reflect

[u] It is possible that these districts invest in educational opportunities such as the arts, foreign language, or CTE that are important for students but not related directly to reading and math.

[v] C. Kirabo Jackson et al. found that court-ordered spending increases were associated with reductions in pupil-to-teacher, pupil-to-counselor, and pupil-to-administrator ratios and increases in teachers' base salaries.

[w] One influential long-term study—demonstrating positive relationships between court-ordered state-funding increases and improvements in outcomes, especially for economically disadvantaged students—noted, "Our research design is poorly suited to identifying the optimal allocation of school resources across expenditure categories, or to testing whether actual allocations are close to optimal. It allows us only to say that the average finance reform—which we interpret to involve roughly unconstrained increases in resources, though in some cases the additional funds were earmarked for particular programs or tied to other reforms—led to productive (though perhaps not maximally productive) use of the funds."

researchers' general orientation toward school spending. Researchers who represent a fiscally conservative perspective, like Eric Hanushek, express skepticism that funding increases are always necessary or beneficial. They note the tendency of courts to be more concerned about the potential consequences to students of underfunded schools than the potential consequence to taxpayers when schools are funded without regard to effective or efficient use of resources.[x] [20] Researchers like Bruce Baker, who prioritize equity and adequacy in school funding, also favor program scrutiny but argue that sufficient evidence exists to support the need for increased funding, especially for economically disadvantaged students.[y] [21]

Researchers generally agree:
- **The relationship between spending and outcomes is complicated and not always observable in the short term.**
- **School districts face efficiency challenges beyond administrators' control.**
- **Programs and funding streams should be analyzed.**
- **Salaries and benefits should also be analyzed.**

Despite different orientations, researchers generally agree that
- school districts need to be sufficiently funded;
- the relationship between spending and outcomes is complicated, not entirely understood, and often not observable in the short term;
- some districts face efficiency-related challenges that are outside administrators' control;
- individual programs and funding streams should be analyzed for effectiveness and efficiency; and
- salaries and benefits are the majority of expenditures in all districts and are an important focus of analysis.

Spending And Outcomes Over Time, Kentucky And United States

Per-Pupil Spending, 1970 To 2019

Between 1970 and 2019, education spending increased substantially in Kentucky and the US. The gap between Kentucky and the nation has narrowed, but Kentucky continues to lag in per-pupil spending.

Figure 1.A show per-pupil spending, in constant 2021 dollars, in Kentucky and the US between 1970 and 2019. Education spending per pupil increased substantially in both Kentucky and the nation.

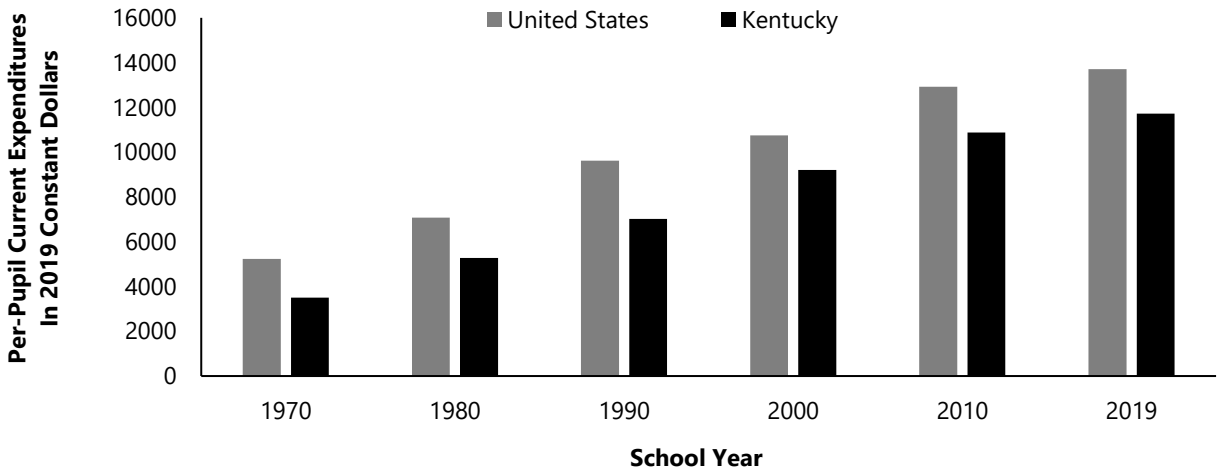
[x] Eric Hanushek has noted that research "does not indicate spending does not matter. Nor does it indicate that spending cannot matter. It does indicate that simply adding more resources without addressing how the resources will be used provides little assurance that student achievement will improve. Little progress has made in leveraging the results to uncover when more spending will have significant impact and when it will not."

[y] Baker and colleagues note that "[v]irtually all potentially effective policies and approaches require investment, often substantial investment. And there is now widespread agreement, backed by research, that we cannot improve education outcomes without providing schools—particularly schools serving disadvantaged student populations—with the resources necessary for doing so. Put simply: We can't decide how best to spend money for schools unless schools have enough money to spend."

Per-pupil spending in Kentucky consistently lagged the nation, but the gap has narrowed. In 1970, Kentucky's rate of spending was only 67 percent of the US rate; by 2000, it had increased to 86 percent. With a slight dip in 2010, Kentucky's spending relative to that of the nation has been steady since at least 2000.[z]

The sharpest increase in the percentage of Kentucky spending relative to the nation occurred from 1990 (73 percent) to 2000 (86 percent), an increase of 13 percentage points. This increase reflects additional spending in Kentucky following the 1990 Kentucky Education Reform Act.[aa] Relative to the nation, Kentucky's spending also increased steeply, by 8 percentage points, from 1970 (67 percent) to 1980 (75 percent).

Figure 1.A
Per-Pupil Current Expenditures, Kentucky And US
In Constant Dollars
1970 To 2019



Note: Per-pupil expenditures are reported in 2021 constant dollars.
Source: Staff calculation using data from the National Center for Education Statistics.

Not shown in Figure 1.A are the steep increases in spending in school years 2020 and 2021, when the federal government provided districts with additional funding to assist with challenges related to COVID-19.

Appendix C plots the relationship between district changes in per-pupil spending and ACT composite scores between 2009

[z] These percentages do not reflect regional cost-of-living adjustments. Later in this report, these adjustments are made for 2020 per-pupil spending data, showing Kentucky closer to the nation in per-pupil spending.
[aa] In the data for this report, spending for individual years between decades was not available for years prior to 2009.

and 2019. It shows very little relationship overall between changes in spending and changes in outcomes, especially when student demographic characteristics are taken into account.

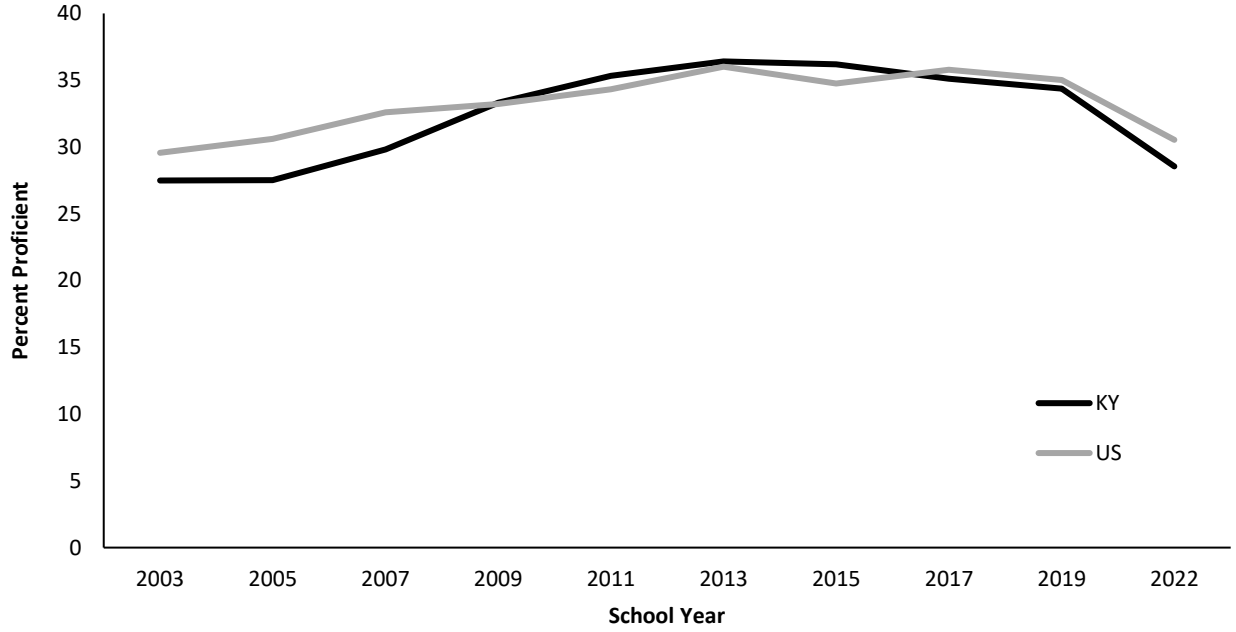
National Assessment Of Educational Progress, 2003 To 2022

Since 1990, reading and math proficiency rates have increased steadily in Kentucky and the nation. Until 2015, Kentucky's increases outpaced the nation's.

As shown in Appendix D, proficiency rates for Kentucky students and the nation as a whole rose steadily on the National Assessment of Educational Progress from 1990 through at least 2015.

Figure 1.B shows average proficiency rates for reading and math in 4th and 8th grades for Kentucky and the nation beginning in 2003, the first year all subjects and grades were tested in the same year. The figure shows the tail end of the increases from the previous decade that can be seen in individual subjects and grades in Appendix D. As shown in the appendix, the slight decline in scores that preceded the pandemic, both in Kentucky and the nation, was associated with reading. Due to school closures and other challenges related to COVID-19, scores dropped steeply in 2022.

Figure 1.B
Average Percentage Of Students Proficient Or Above, NAEP 4th- And 8th-Grade Reading And Math
School Years 2003 To 2022



Note: The data point for each year represents an average of proficiency rates in 4th- and 8th-grade reading and 4th- and 8th-grade math.

Source: US. Department of Education. Institute Of Education Sciences. National Center For Education Statistics. National Assessment of Educational Progress.

Recent Spending And Outcomes, Kentucky And United States

Per-Pupil Spending

Adjusted for regional cost-of-living differences, Kentucky's per-pupil expenditures were 94 percent of the nation's in 2020.

Table 1.1 compares Kentucky and national data on per-pupil expenditures in 2020. Adjusted for regional cost-of-living differences, Kentucky's per-pupil expenditures approach the nation's. The state's unadjusted expenditures of $11,370 are 84 percent of the nation's; its regionally adjusted expenditures of $12,700 are 94 percent of the nation's.

Table 1.1
Per-Pupil Expenditures And COLA-Adjusted Per-Pupil Expenditures, Kentucky And US 2020

	Expenditures	
Jurisdiction	**Per Pupil**	**COLA-Adjusted**
Kentucky	$11,370	$12,700
United States	13,489	13,489

Note: COLA = cost-of-living adjustment.
Source: US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Adjusted for cost of living, Kentucky's expenditures on instruction were 91 percent of the nation's in 2020.

Percentage Of Spending On Instruction. Appendix E shows that the percentage of expenditures on instruction and student support is lower in Kentucky than in the nation. In 2020, Kentucky's regionally adjusted per-pupil expenditures of $7,424 on instruction were only 91 percent of the $8,158 spent on instruction in the US—lower than the 94 percent rate for overall spending.

Typical of rural and remote states, Kentucky spends more on transportation and food than other states, on average, and less on instruction.

Kentucky's lower spending rate on instruction compared with the nation likely reflects increased costs of operating rural and remote districts. Compared with the nation, Kentucky spends a greater percentage of expenditures on food and transportation, and, to a lesser extent, on district and school administration.[bb] These differences, typical for rural and remote schools, amount to over 4 percent of total expenses.

Compared with the nation, Kentucky has almost twice the percentage of students in rural schools and more than 2.5 times the percentage of students in remote schools.

Rural Schools And Distant Or Remote Schools. As shown in Appendix F, Kentucky has almost twice the percentage of students in rural schools compared with the nation (37 percent versus 19 percent) and a higher percentage of students in schools in distant or remote towns (21 percent versus 8 percent). Due to

[bb] Appendix E shows that Kentucky spends slightly more on district and school administration, but these differences amount to only 0.6 percent of expenditures.

lower economies of scale, costs related to transportation, food, and administration are generally higher in districts with these types of schools than in districts located in cities or less geographically dispersed areas.[cc 22]

2022 NAEP

In 2022, Kentucky students performed similarly to or slightly below the nation in reading and below the nation in math, especially at the 8th-grade level.

Table 1.2 shows that, with the exception of 8th-grade math, the average percentage of Kentucky students that were proficient or above in all tested subjects in 2022 was similar to or slightly below the rate for the nation in most grades and subjects. Across all tested grades, the average rate of proficient students was 2 percentage points lower in Kentucky (28.5 percent) than in the nation (30.5 percent). Relative to the nation, Kentucky students scored much lower in 8th-grade math.

Table 1.2
Percentage Proficient Or Above On NAEP
School Year 2022

	Grade				Average Proficiency, 4th- And 8th-Grade
	4		8		
Jurisdiction	Reading	Math	Reading	Math	Math and Reading
Kentucky	31%	33%	29%	21%	28.5%
United States	32	35	29	26	30.5

Sources: US. Department of Education. National Center For Education Statistics.

The performance of Kentucky students is similar to nationwide results when considering those eligible for free or reduced-priced lunch (FRPL); it is higher for Hispanic students, and lower for Black and white students.

NAEP Performance By Student Group. Appendix G shows NAEP 2022 proficiency rates and percentage of tested students, by select subgroups. Kentucky NAEP performance by student group is, on average, similar to nationwide results for students eligible for free and reduced-price lunch (FRPL); it is higher for Hispanic students, and lower for Black and white students.

Graduation Rates

Kentucky's high school graduation rates exceed the nation's.

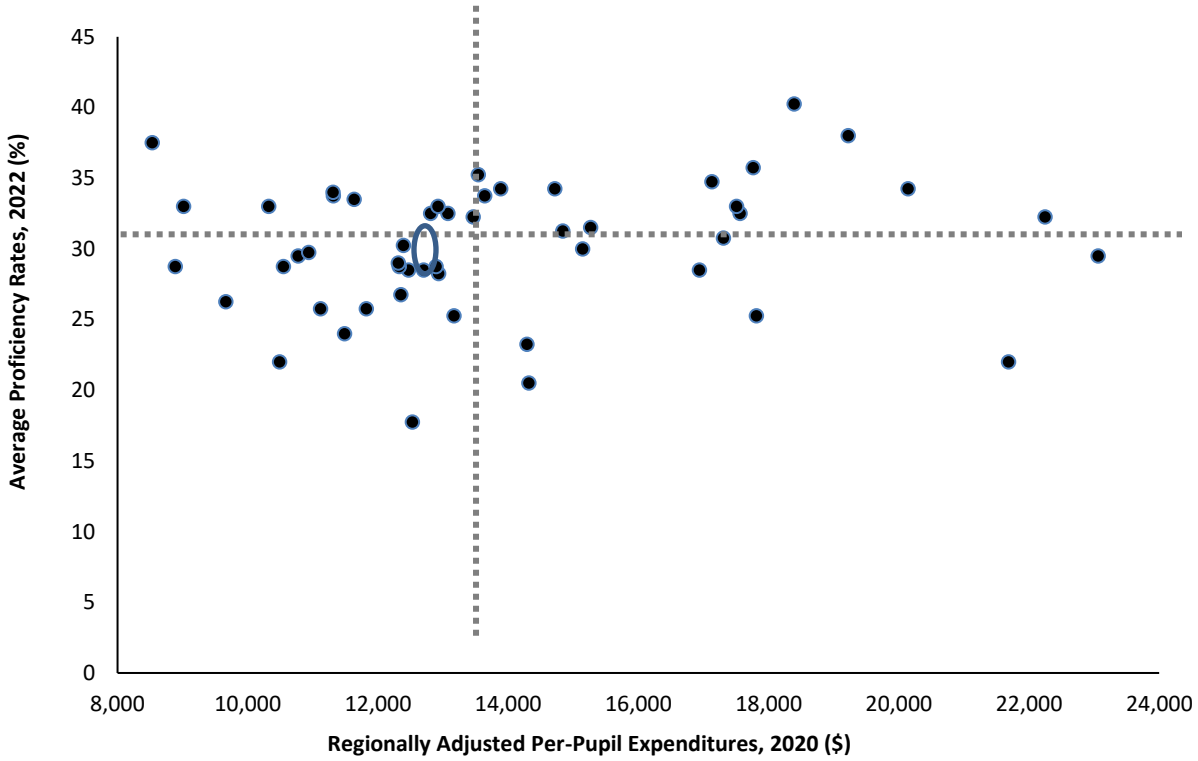
The percentage of Kentucky students who graduate from high school in 4 years is higher than the nation's—91 percent versus 86 percent in 2019.

[cc] Regardless of size, small districts must have superintendents and other district administrative staff, and most small schools must have principals. In small districts and schools, the ratio of administrators to pupils is thus higher, and the percentage of total expenditures devoted to administrators is greater. Likewise, the ratio of food and transportation personnel and related costs per pupil increases when they are divided among a smaller number of students.

NAEP Proficiency Rates And Per-Pupil Spending By State

Figure 1.C plots average 2022 NAEP average proficiency rates by state against regionally adjusted 2020 per-pupil expenditures by state.[dd] The horizontal dotted line represents the US average NAEP proficiency rates of 30.25 percent. The vertical dotted line represents the US average per-pupil expenditure of $13,489. The oval indicates Kentucky's placement as a state that both spends ($12,700 per pupil) and achieves (28.5 percent average proficiency) slightly below the national average.

Figure 1.C
NAEP Reading And Math Average Proficiency Rates, 4th And 8th Grades, 2022, And Per-Pupil COLA-Adjusted Spending By State, 2020



Note: Average proficiency rates are calculated as the average percentage of 4th- and 8th-grade students proficient or above on NAEP reading and math tests in 2022. Per-pupil expenditures are adjusted for cost of living, by state, based on 2020 per-pupil spending amounts. Although data are taken from different years, the difference among states in NAEP performance and per-pupil spending amounts is fairly consistent over time. COLA = cost-of-living adjustment.
Source: US. Department of Education. National Center For Education Statistics.

[dd] Average proficiency rates are calculated as the average percentage of 4th- and 8th-grade students proficient or above on NAEP reading and math tests in 2022. Comparative spending data were not yet available for 2022.

No comprehensive analysis exists for the relationship between spending and outcomes among US states. Such an analysis would need to account for student populations, district size, geographic dispersion, and regional cost of living.

As Figure 1.C shows, there is not a strong relationship between spending and outcomes among states. This is not surprising given the many factors—such as student populations; district/school size; and geographic dispersion—that affect spending and outcomes and are not reflected in the figure. No research comparing performance and outcomes taking all of these factors into consideration has been published. Were such research conducted, Kentucky's relative efficiency may be seen to improve somewhat to reflect its challenges as a rural state. One analysis took student populations into account to compare state NAEP scores; it suggested that Kentucky's relative position may decrease when scores are adjusted based on student characteristics.[23]

Based on the available evidence, Kentucky's outcomes are neither far above nor far below what would be predicted given its spending and other characteristics.

Based on all the evidence available, however, Kentucky's outcomes are neither far more nor far less than what would be predicted given its spending, student populations, and geographic dispersion.

States Performing Above What Might Be Predicted

Appendix H shows per-pupil spending and outcomes for all states.

Figure 1.C shows that a number of states have per-pupil expenditures similar to or lower than those in Kentucky, but have higher educational outcomes. As shown in Appendix H, most of these states are not comparable to Kentucky, in that they have much lower percentages of children living in poverty. There are, however, several states whose spending relative to Kentucky's arouses interest because they have student populations that are somewhat similar and appear to spend less than Kentucky while achieving similar outcomes.

Chapter 2

Differences Among Kentucky Districts In Per-Pupil Spending

This chapter analyzes district spending in light of student demographic characteristics and other factors that are important in understanding the relationship between spending and outcomes.

This chapter analyzes district spending in light of underlying factors—especially student demographic characteristics and district size—that are important in understanding the relationship between spending and outcomes among Kentucky districts. The chapter shows broad differences among higher- versus lower-spending districts in major sources of revenue. These differences are explained largely by differences in student populations, property wealth, and local tax rates.[a] The chapter also shows how additional efficiency challenges—geographic dispersion and higher-cost labor markets—were associated with spending. While the chapter groups districts into broad spending categories, individual districts vary within these categories. Appendix I shows district-level data on many of the metrics discussed.

Per-Pupil Current Spending

Figure 2.A shows per-pupil current expenditures by district, plotted against the percentage of students considered economically disadvantaged in each district, as indicated by their eligibility for the federal FRPL program.[b] The figure also indicates the number of students in each district.

A solid horizontal line divides the figure at the average percentage of FRPL-eligible students of all 171 districts (64 percent).[c] Dotted vertical lines divide districts into spending categories. Appendix B describes the methods used to derive the categories and set thresholds.[d] The average per-pupil spending associated with each spending category appears in Table 2.1.

[a] This chapter reports average data for districts in individual expenditure categories. These averages give the same weight to individual districts, regardless of size. In some cases, the average reported for districts may differ from state data reported elsewhere.

[b] Per-pupil current expenditures do not include capital expenditures or interest on school debt.

[c] The average is based on averaging the percentage of FRPL-eligible students by district. The average rate of FRPL-eligible Kentucky students during the same years was 61 percent.

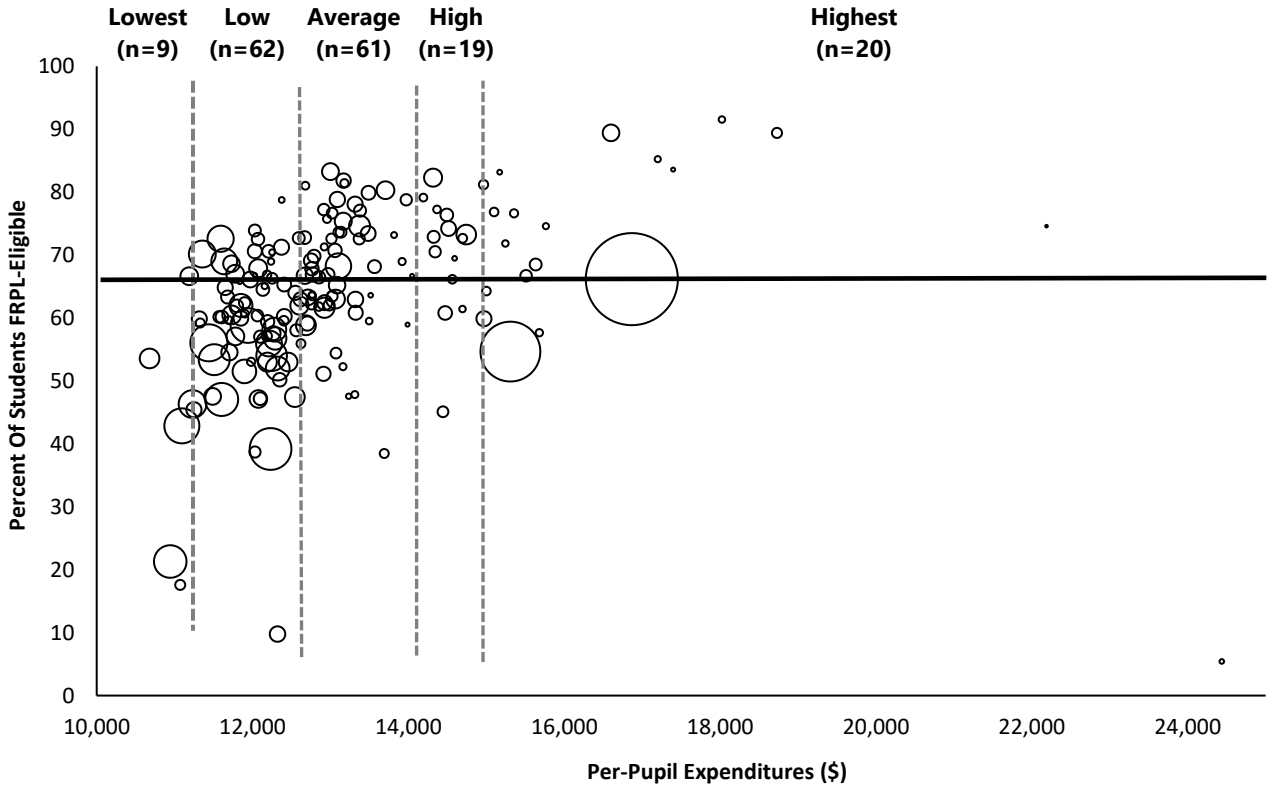
[d] As noted in Chapter 1, districts are not divided into categories based on ranking alone. Instead the categories take into account how far each district is from the state average. For this reason, there are fewer districts in the higher-

In school years 2018, 2019, and 2022, average district per-pupil spending ranged from less than $11,000 to over $24,000. The overwhelming majority of districts spent an average of $11,000 to $15,000.

Figure 2.A shows a broad range of per-pupil expenditures, from less than $11,000 (Meade County) to over $24,000 (Anchorage Independent). The overwhelming majority of districts (92 percent) fell between $11,000 and $15,000. The figure shows that most of the highest-spending districts had percentages of FRPL-eligible students above the state average and that many of these were small districts. It also shows that the state's two largest districts—JCPS and FCPS—were in the highest-spending category. The chapter shows data for JCPS and FCPS separately because they differ in several ways from most other highest-spending districts.

Following the figure, additional data illustrate trends in the distribution of districts related to per-pupil expenditures and major revenue-generating factors associated with spending.

Figure 2.A
Average Per-Pupil Expenditures, Percentage Of Students FRPL-Eligible, And Student Membership, By District
2018, 2019, And 2022



Note: District membership is represented by the size of the bubble for each district. The actual data point for each district is at the center point of each bubble. FRPL = free and reduced-price lunch.
Source: Staff analysis of data from the Kentucky Department of Education.

versus lower-spending categories. Higher-spending districts are spread very far from the state average, whereas lower-spending districts are clustered relatively closely.

Per-Pupil Expenditure Data For Individual Districts

This section shows broad differences among per-pupil spending categories based on average data for districts in each category.

Distribution Of Districts And Student Membership, By Spending Categories

Table 2.1 shows the number of districts in each spending category and the percentage of total state student membership in each of the categories. As explained in Appendix B, categories are determined by their relative distance from the average rather than by spending rank alone. Because so many districts were clustered together near and below the average for the state, there are many more districts in those spending categories. In contrast, relatively few districts spent substantially above or substantially below the average; therefore, the high, highest, and lowest categories contain relatively few districts.

Table 2.1
Average Per-Pupil Expenditures, Number Of Districts, And Percentage Of State Membership, By Per-Pupil Expenditure Category
School Years 2018, 2019, And 2022

District Spending Level	Number Of Districts	Average Per-Pupil Expenditures	Total Membership	Percent Of State Membership
Highest (all)	20	$16,757	155,333	24%
JCPS	1	16,867	94,306	15
FCPS	1	15,309	40,475	6
All other highest	18	16,832	20,552	3
High	19	14,342	30,267	5
Average	61	13,013	145,386	23
Low	62	12,000	257,667	40
Lowest	9	11,122	53,033	8
Total	171	$13,132	641,686	100%

Note: JCPS = Jefferson County Public Schools; FCPS = Fayette County Public Schools. Within the highest per-pupil expenditure category, data for JCPS, FCPS, and all other high-spending districts are shown separately.
Source: Staff analysis of data from the Kentucky Department of Education.

Table 2.1 shows that most districts fell into either the average (61 districts) or low (62 districts) per-pupil expenditure categories. Of these, more students were enrolled in the relatively larger, low-spending districts; 40 percent of students were enrolled in these low-spending districts. Only 9 of 171 districts were in the lowest-spending category; 8 percent of the state's students were enrolled in these districts. Conversely, the 20 highest-spending districts enrolled 24 percent of the state's students. As discussed above, most of these students were enrolled in

JCPS or FCPS; only 3 percent of the state's students were enrolled in the 18 other highest-spending districts.

Factors That Affect Differences In Revenue By District

Factors that increase revenue in some districts versus others include local tax rates and the percentages of students eligible for additional funding through the Support Education Excellence in Kentucky (SEEK) funding formula or through federal funding.

The per-pupil spending differences among districts shown in Figure 2.A reflect differences in the amount of revenue available to districts. While the SEEK funding formula, described below, is designed to provide an equal amount of base revenue for districts, a number of factors can increase district revenue beyond this amount, such as

- the percentage of district students eligible for SEEK add-ons;
- the amount of federal revenue received by the districts (those with higher percentages of students living in poverty get disproportionately more federal funding); and
- differences in local tax rates, indicating the degree to which voters in each district have authorized various taxes beyond the minimum necessary to generate state efforts to equalize funding.

The following sections provide data showing trends in higher- versus lower-spending districts in major sources of revenue.

Support Education Excellence In Kentucky

Local revenue is a function of district property wealth and the relative willingness of voters in a district to authorize additional taxes.

Districts' ability to financially support their schools with local revenue is a function of the property wealth of the district and the relative willingness of voters in the district to authorize additional taxes. Property-wealthy districts have far greater potential to generate local revenue than do property-poor districts.

The SEEK funding formula, which is the primary source of state funding for districts, is designed to balance revenue available to districts with greater and lower amounts of property wealth by providing relatively more state funding to districts with lower property wealth than to districts with higher property wealth.

The SEEK funding formula is generated from a base amount, which was an average of $3,994 in school years 2018, 2019, and 2022. The SEEK calculation includes add-ons for students who require various specialized services: at-risk students who qualify for federally funded free lunch; students been identified as eligible for special education services due to a disability; and students who require instruction for limited English proficiency (LEP). For a complete description of funding weights and additional funding

mechanisms (such as transportation) through the SEEK formula, see OEA's 2021 study, *Funding Kentucky Public Education: An Analysis Of Education Funding Through The SEEK Formula*.[24]

SEEK Add-On Student Populations

Districts receive additional SEEK funding for students who are eligible for FRPL, special education, or limited English proficiency instruction. Of these, special education students generate the greatest amount of additional funding.

Table 2.2 shows the average percentage, by district per-pupil revenue category, of students who were eligible for FRPL, for special education services, or for LEP instruction. All of these populations receive additional funding through the SEEK formula.[e] Of these categories, special education students generate the greatest amount of additional per-pupil funding through the SEEK calculation.[f]

Higher-spending districts, on average, had higher percentages of FRPL-eligible and special education students than did lower-spending districts.

Table 2.2 shows that higher-spending districts, on average, had higher percentages of students identified for special education and higher percentages of FRPL-eligible students than did lower-spending districts.[g]

Among highest-spending districts, JCPS and FCPS were different from most others, in having lower percentages of special education students and higher percentages of LEP students. FCPS had lower percentages of FRPL-eligible students than did other districts in the highest-spending category (55 percent versus 72 percent). The percentage of FRPL-eligible students in JCPS (66 percent) was higher than the state average, but lower than in most other higher-spending districts.[h]

[e] At-risk SEEK funding is received only for students who are eligible for free lunch, and not for students eligible for reduced-priced lunch. The overwhelming majority of FRPL students are eligible for free lunch.
[f] SEEK add-on weights are as follows: 0.15 for students eligible for free lunch; 0.096 for students eligible for limited English proficiency instruction; and weights for special education that increase depending on the perceived severity of the disability from 0.24 for "high incidence" speech-language disorders to 1.17 for "moderate incidence" such as specific learning disabilities (this includes dyslexia) or other health impairment (such as attention deficit disorder) and 2.35 for "low incidence" categories such as autism, emotional behavioral disorder, functional mental disability, and visual or hearing impairments.
[g] "Higher" refers to the high and highest categories together. "Lower" refers to the low and lowest categories together.
[h] A notable exception, Anchorage Independent, is a small, higher-spending district with the state's lowest percentage of FRPL-eligible students (5 percent).

Table 2.2
Average Percentage Of Students Eligible For FRPL, Special Education Services, Or Limited English Proficiency Services, By Per-Pupil Expenditure Category 2018, 2019, And 2022

District Spending Level	Number Of Districts	Average Percentage Of Students		
		FRPL-Eligible	Special Education	LEP
Highest (all)	20	71%	17%	4%
JCPS	1	66	12	11
FCPS	1	55	11	13
All other highest	18	72	18	3
High	19	70	18	1
Average	61	67	17	2
Low	62	60	15	2
Lowest	9	46	14	2
Total/average	171	64%	16%	2%

Note: FRPL = eligible for free and reduced-price lunch; LEP = limited English proficiency; JCPS = Jefferson County Public Schools; FCPS = Fayette County Public Schools. Each district receives the same weight in averages reported. State-reported data generally take district enrollment into account and may differ from district averages.
Source: Staff analysis of data from the Kentucky Department of Education.

In 2023, revenue associated with the SEEK exceptional child add-ons comprised approximately 13 percent of total SEEK allocations.

Revenue Associated With Exceptional Child Add-On. In 2023, the revenue generated through the SEEK exceptional child add-ons comprised approximately 13 percent of total SEEK allocations, or roughly $464 million. Substantial funding is necessary to ensure that students with disabilities are identified and receive services to which they are entitled. Special education programs are mandated and regulated at the state and federal level and monitored by KDE for compliance with state and federal guidelines.

In 2022, rates at which Kentucky districts identified students for special education ranged from 7 percent to 31 percent. Over one-half of Kentucky districts identified students at a rate above the 15 percent threshold that could trigger a child count audit according to Kentucky regulation. Audits are permitted but not required. KDE does not currently conduct audits.

Actions by individual states may affect special education costs and implementation. For example, rates of identifying students for special education services vary and do not appear to be explained by differences in student populations generally.[i] [25] In 2022, rates of special education in Kentucky districts ranged from 7 percent to 31 percent; over one-half of the 171 districts identify students for special education at a rate above the 15 percent threshold that could trigger a child count audit under 707 KAR 1:380, sec. 6(5)(e). KDE does not currently act under its authority to conduct these audits. Child count audits are permitted but not required.[j] [26]

[i] In 2021, the rates at which students ages 6-21 were identified for special education ranged from 11 percent in Texas to 20 percent in New York; Kentucky's rate was 16 percent. In 2021, the federally reported percentage of FRPL-eligible students was similar for these three states: 60 percent in Texas, 56 percent in Kentucky, and 56 percent in New York.

[j] A 2011 OEA report on special education cited an audit conducted by KDE in 2010, which found "widespread noncompliance in the collection and documentation of evidence" in the 600 student records examined. Fewer than half had the evidence required to document a particular disability.

Compared with Kentucky, some other states offer greater flexibility in special education teacher licensure requirements.

Teacher licensure requirements also vary among states; special education teachers in Kentucky must earn special education degrees, but some states offer licensure options that allow qualified, certified staff to teach special education students after earning endorsements or taking particular classes.[k] [27]

Lower- versus higher-spending districts, on average, have higher pupil-teacher ratios.

Pupil-Teacher Ratios. Table 2.3 shows differences in pupil-teacher ratios among per-pupil spending categories. The table suggests that spending differences between lowest- and highest-spending districts are explained in part by the relatively low number of teachers per pupil in lowest-spending districts. Lower per-pupil ratios in higher-spending districts were likely associated with the higher rates of special education in those districts. Students who receive special education services must be instructed by specifically certified teachers subject to caseload requirements.[l] Higher- versus lower-spending districts also serve higher percentages of economically disadvantaged students, who may require additional academic assistance from certified teachers.

Table 2.3
Average Pupil-Teacher Ratio, By Per-Pupil Spending Category
2018, 2019, And 2022

Per-Pupil Spending Category	Pupil-Teacher Ratio
Highest	13
High	14
Average	15
Low	15
Lowest	17

Source: Staff analysis of data from the Kentucky Department of Education

Average Revenue Sources By District Spending Category

Table 2.4 shows broad differences among district per-pupil spending categories and the amount of per-pupil revenue that comes from state, local, and federal sources. The table also shows average per-pupil property assessments and levied equivalent rates. The levied equivalent rate, in simple terms, is a district's total tax

[k] Kentucky and 10 other states require that teachers have a bachelor's or master's degree in special education. Other states permit qualified candidates to pass a single exceptional child course (16 states), obtain a special education endorsement (12 states), or obtain a dual bachelor's degree in general and special education (11 states). OEA's 2011 report on appropriate identification of students in special education noted the relatively low level of course content devoted to dyslexia in courses required for special education versus those that are required for reading specialists.

[l] Specified in 707 KAR 1:350.

revenue divided by its total assessment. The total assessment includes property and motor vehicles.[m] [28] Levied equivalent rates give a sense of the degree to which voters in each district have, over time, approved additional taxes or higher tax rates to provide revenue for schools.

Table 2.4
Average District Property Wealth, Levied Equivalent Rates, And Revenue Sources
By Per-Pupil Expenditure Category
2018, 2019, And 2022

		District Averages				
	Number Of	Per-Pupil Property	Levied Equivalent	Per-Pupil Revenue		
District Spending Level	Districts	Assessment	Rate	Local	State	Federal
Highest (all)	20	$576,712	90	$6,159	$8,966	$3,478
JCPS	1	904,339	91	9,086	7,065	2,822
FCPS	1	889,727	92	8,890	6,567	1,775
All other highest	18	541,121	89	5,845	9,205	3,609
High	19	353,724	81	3,541	9,752	3,308
Average	61	391,097	71	3,331	9,183	2,589
Low	62	448,634	70	3,550	8,373	1,954
Lowest	9	489,336	71	4,024	7,810	1,432
Total/average	171	$434,686	74	$3,801	$8,855	$2,482

Note: JCPS = Jefferson County Public Schools; FCPS = Fayette County Public Schools. Each district receives the same weight in averages reported. State-reported data generally take district enrollment into account and may differ from district averages.
Source: Staff analysis of data from the Kentucky Department of Education.

On average, per-pupil revenue from state sources was greater in higher-spending districts. This additional state revenue reflects, in part, higher percentages of students eligible for additional SEEK funding in those districts.

State Revenue. Table 2.4 shows that, during school years 2018, 2019, and 2022, in the lowest, low, average, and high categories, the average amount of per-pupil revenue received from state sources rose as district spending levels rose (from an average of $7,810 to an average of $9,752 in state per-pupil revenue). This additional state revenue reflects, in part, the higher percentages of students who were eligible for SEEK add-on funds.

Jefferson County Public Schools and Fayette County Public Schools received relatively less state per-pupil revenue and relatively more local per-pupil revenue than other districts.

Highest-spending districts differed in the degree to which they generated revenue primarily from state versus local sources. JCPS and FCPS received less state per-pupil revenue than the state average and less than the average amount in any of the other per-pupil revenue categories. These two districts were high-property-wealth districts that generated the majority of their SEEK dollars from local sources. Most of the other

[m] Because local school districts use and implement different types and amounts of taxes, KDE converts the districts' local tax efforts to a standardized tax rate called a levied equivalent rate.

high-spending districts received more state-per pupil revenue than districts in other spending categories, on average.

Higher-spending districts, on average, received more federal revenue than other districts. This revenue is associated with higher percentages of economically disadvantaged students in those districts.

Federal Revenue. The table also shows the average per-pupil revenue generated through federal funds. On average, higher-spending districts received far more per-pupil federal revenue than did lower-spending districts, largely because most higher-spending districts have higher percentages of economically disadvantaged students.

Local Revenue. The amount of local per-pupil revenue was greatest, on average, in the highest-spending districts. Otherwise, lowest-spending districts received more local revenue, on average, than did districts in the remaining three categories.

Levied equivalent (local tax rates) in most higher-spending districts exceeded the state average of 74. Local tax rates in lower-spending districts, on average, were below the state's.

Levied Equivalent Rates. Levied equivalent rates in most higher-spending districts exceeded the state average of 74; these districts received a greater average amount of local revenue from property than did other districts in the state. In contrast, average levied equivalent rates in lower-spending districts were below the state average. While average property wealth in these lower-spending districts was above the state average, that property was being taxed, on average, at rates lower than state averages.[n] As noted earlier, individual districts within each category diverge from that trend.[o]

Efficiency Challenges

Chapter 1 identified factors that increase district costs and are beyond administrators' control: high-need student populations, district size, expensive labor markets, and geographic dispersion. Differences among districts in student populations were reviewed earlier in this chapter. The remainder of this chapter shows the percentage of districts by spending category that face the other efficiency challenges.

[n] The levied equivalent rate also reflects districts' collections from permissive tax (occupational, utility, and excise taxes). These taxes can generate substantially more revenue in some districts than in others.

[o] Approximately one-fifth of highest-spending districts have relatively low levied equivalent rates, and approximately one-fifth of lower-spending districts (the 71 low and lowest combined) have relatively high levied equivalent rates.

District Size

Table 2.5 shows, by per-pupil spending category, the number and percentage of districts that have membership of 1,000 students or fewer. Research cited in Chapter 1 identified 1,000 students as the threshold under which districts experience the greatest efficiency challenges related to economies of scale. As district size goes further below this threshold, efficiency challenges are even greater.

Table 2.5
Number And Percentage Of Small Districts, By Per-Pupil Spending Category
2018, 2019, And 2022

District Measure	Lowest (n=9)	Low (n=62)	Average (n=61)	High (n=19)	Highest (n=20)	Total (n=171)
Number	0	9	11	8	10	38
Percent	0%	15%	18%	42%	50%	22%

Note: In this analysis, OEA considered small districts to be those with 1,000 students or fewer.
Source: Staff analysis of data from the Kentucky Department of Education.

A total of 22 percent of districts had 1,000 students or fewer and were disproportionately higher-spending; 50 percent of highest-spending were small. No lowest-spending districts were small.

As shown in Table 2.5, 22 percent of Kentucky school districts were small. These districts appeared disproportionately in the highest-spending category; 50 percent of highest-spending districts were small. None of the state's nine lowest-spending districts was small. Most (28 of 38) of the state's small districts were independent districts, whose boundaries are not defined by county lines.

Most (28 of 38) of Kentucky's small districts were ISDs, whose borders are not defined by county lines. Average local tax rates were 1.5 times as high in ISDs versus county districts.

Independent School Districts. The prevalence of small districts in the highest-spending category is explained, in part, by the high number of higher-spending districts that were ISDs.[p] Though less than 30 percent of Kentucky districts are ISDs (51 of 171), 65 percent of its highest-spending districts (13 of 20) were ISDs. Of Kentucky's 51 ISDs, 28 were small districts. On average, levied equivalent rates in ISDs were approximately 1.5 times the rates in county districts, suggesting that voters in ISDs have been willing to authorize additional taxes to support their districts' relatively high operating costs. For additional background on ISDs, see OEA's *Kentucky's Independent School Districts: A Primer*.[29]

[p] An independent school district is one whose geographic boundaries are defined not by the county lines that define most districts but by historic boundaries within counties. These historic boundaries are associated with districts that did not merge with county districts during the early 20th century, a period when many other small ISDs were consolidated into county districts.

Higher-Cost Labor Markets

Teacher labor market costs are measured by a federally developed indicator, the Comparable Wage Index for Teachers (CWIFT).

NCES developed the Comparable Wage Index for Teachers (CWIFT) to facilitate comparisons of school spending among states and districts.[q] [30] It compares regional variations in teacher labor markets based on wages of college graduates who are not teachers. The most recent CWIFT was developed in 2019. A CWIFT rating of "1" is equivalent to the national average. Higher CWIFT ratings indicate more expensive labor markets. To attract qualified workers, districts with higher CWIFT ratings likely must pay higher average salaries than those with lower CWIFT ratings.

CWIFT ratings in the commonwealth ranged from 0.69 (roughly two-thirds of average national labor costs) to 0.967 (almost equivalent to the national average). Appendix J maps the CWIFT calculated by NCES for Kentucky school districts in 2019. It also plots the relationship between districts' CWIFT and starting salary. As CWIFT increases, so do salaries, on average. The appendix shows salary variation among districts relative to CWIFT.

Districts with relatively higher-cost labor markets exist in every spending category but were disproportionately among the highest- and lowest-spending districts.

Table 2.6 shows average CWIFT by per-pupil spending category and the number and percentage of Kentucky school districts in higher-cost labor markets.[r] Districts with relatively higher-cost labor markets were distributed across the spending categories, but disproportionately in the lowest- and highest-spending categories.

Table 2.6
Number And Percentage Of Districts In Higher-Cost Labor Markets And Average CWIFT, By Per-Pupil Spending Category 2018, 2019, And 2022

District Measure	Lowest (n=9)	Low (n=62)	Average (n=61)	High (n=19)	Highest (n=20)	Total (n=171)
Number	5	17	17	5	9	53
Percent	56%	27%	28%	26%	45%	31%
Average CWIFT	0.84	0.79	0.78	0.80	0.82	0.80

Note: CWIFT = Comparable Wage Index for Teachers.
Source: Staff analysis of data from the Kentucky Department of Education.

[q] According to NCES, "The Comparable Wage Index for Teachers (CWIFT) is an experimental index created by the National Center for Education Statistics (NCES) to facilitate comparison of educational expenditures. The CWIFT is a measure of the systematic, regional variations in the wages and salaries of college graduates who are not PK-12 educators as determined by reported occupational category. It can be used by researchers to adjust school district-level finance data in order to make comparisons across geographic areas. The CWIFT is based on data from the American Community Survey (ACS), a continuous household survey conducted by the U.S. Census Bureau."

[r] Thresholds used to determine these categories are reported in Appendix B.

The CWIFT does not capture all labor market challenges, such as those experienced by geographically remote districts or districts with higher percentages of economically disadvantaged or minority students.

CWIFT ratings do not fully capture labor market challenges of individual districts. For example, geographically remote schools or districts may have difficulty attracting qualified workers who prefer to live in larger towns or cities.[31] In addition, districts in competitive labor markets may have challenges staffing schools that have higher percentages of economically disadvantaged and minority students.[s] [32] National research shows that teachers consistently leave such schools in favor of schools with lower percentages of economically disadvantaged or minority students.[t] [33] Finally, districts in proximity to higher-cost labor markets may lose teachers to higher-paying districts or other jobs.

Dispersed Districts

Dispersed districts face higher transportation costs. In OEA's analysis, dispersed districts are considered to be those with 25 students or fewer per net square mile.[u]

Average- and low-spending districts were more likely to be geographically dispersed.

Table 2.7 shows that the majority (64 percent) of districts were dispersed. Highest-, high-, and lowest-spending districts were disproportionately less likely to be dispersed (30 percent, 47 percent, and 44 percent, respectively) whereas average- and low-spending districts were more likely to be dispersed (79 percent and 68 percent, respectively).

Table 2.7
Number And Percentage Of Dispersed Districts, By Per-Pupil Spending Category
2018, 2019, And 2022

District Measure	Lowest (n=9)	Low (n=62)	Average (n=61)	High (n=19)	Highest (n=20)	Total (n=171)
Number	4	42	48	9	6	109
Percent	44%	68%	79%	47%	30%	64%

Note: Dispersed = 25 students or fewer per adjusted square mile.
Source: Staff analysis of data from the Kentucky Department of Education.

[s] OEA's 2012 report on teacher shortages showed higher percentages of FRPL-eligible and minority students in JCPS and FCPS schools with higher versus lower teacher turnover rates.

[t] Teachers report that working conditions in higher-poverty, higher-minority schools can make it difficult for teachers to teach and students to learn. Research also suggests that teachers are more likely to stay in these schools if they express satisfaction with school culture, leadership, and climate.

[u] OEA determined dispersion by dividing district membership by the adjusted square mileage used by KDE in SEEK transportation calculations. It considered dispersed schools to be those with 25 students or fewer per adjusted square mile. This is the number used by New York state. New York has a lower threshold for dispersion than some other states. KDE, however, does not use membership in transportation funding calculations. Only those students who are eligible for transportation are included in the calculation.

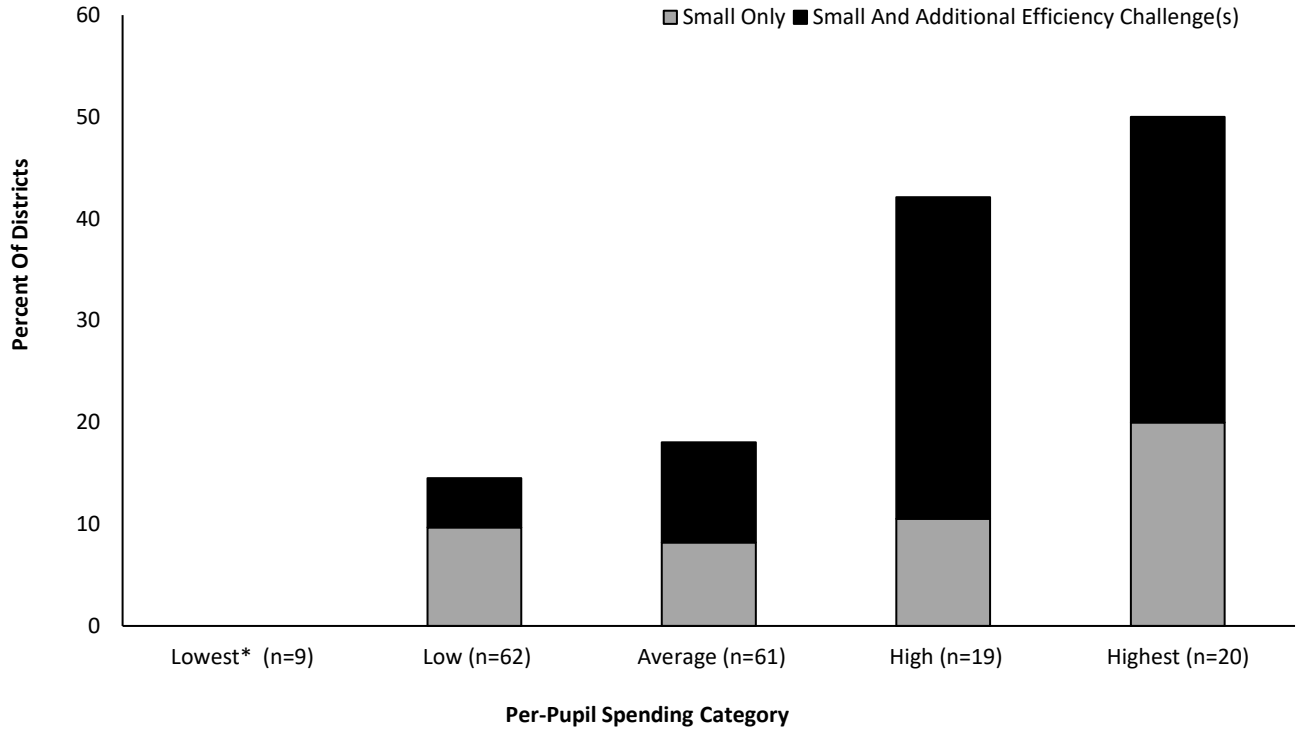
The SEEK transportation calculation takes into account district dispersion and the number of students transported and provides greater funding for more geographically dispersed areas. The formula uses a graduated measure, not a single category, to determine districts' relative dispersion.[34]

Multiple Efficiency Challenges

On average, the percentage of districts that are small and have additional efficiency challenges is greater in higher-spending districts than in others.

Data in Chapter 3 shows that average student reading and math outcomes are lower in districts that face multiple efficiency challenges than in other districts. Figure 2.B shows the percentage of districts, by per-pupil spending category, that were small and the percentage that faced additional efficiency challenges related to higher labor costs or geographic dispersion (or both). Both the percentage of small districts and the percentage of districts that were small and faced additional challenges increased as per-pupil expenditures increased.

Figure 2.B
Percentage Of Districts Facing Efficiency Challenges
Due To Small Size And Additional Factors, By Impact Category
2018, 2019, And 2022



*As shown in the figure and in Table 2.5, none of the nine lowest-spending districts are small.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Chapter 3

Relationships Among District Spending, Student Reading And Mathematics Outcomes, And District Characteristics

This chapter shows the relationship between district spending and student outcomes based on impact scores that compare a district's students with demographically similar students across the state.

This chapter shows the relationships among district effectiveness in reading and math, district per-pupil spending, and other characteristics. It relies primarily on district impact scores in reading and math to determine effectiveness. Impact scores compare students' actual reading and math scores with those of demographically similar students across the state.

Once student demographics are taken into account, students' reading and math outcomes vary little by district spending.

As shown in Chapter 2, higher-spending districts, on average, faced greater efficiency challenges associated with higher-need student populations or small district size than did other districts. This chapter shows that, once student demographics are taken into account, student outcomes in reading and math varied little by district per-pupil spending category, though outcomes of students in the highest-spending districts were relatively lower than those in other districts.

District effectiveness within spending categories varies broadly, however. More effective districts are more likely to have experienced teachers who remain in the district and report favorable working conditions.

Within each spending category, some districts were much more effective than others at impacting student reading and math achievement. District effectiveness in reading and math was associated with a variety of additional district characteristics. Lower- versus higher-impact districts, on average, had higher teacher turnover rates; less experienced teachers; relatively less competitive salaries; and less favorable working conditions as reported by teachers on KDE's working conditions survey.[35]

In addition, small districts are more likely than other districts to be less effective.

Small districts (1,000 students or fewer) were 1.5 times as likely as other districts to be in lower reading and math impact categories. Smaller, less effective districts were also likely to experience additional challenges such as geographic dispersion or higher labor costs.

Findings related to teacher workforce data and small district size are also applicable when district effectiveness is determined by "actual" scores (not adjusted for student demographics).

The chapter relies primarily on impact data to identify factors associated with district effectiveness; as shown in Appendix K, however, all of the major findings related to characteristics of effective districts were also applicable when schools were grouped by actual scores.

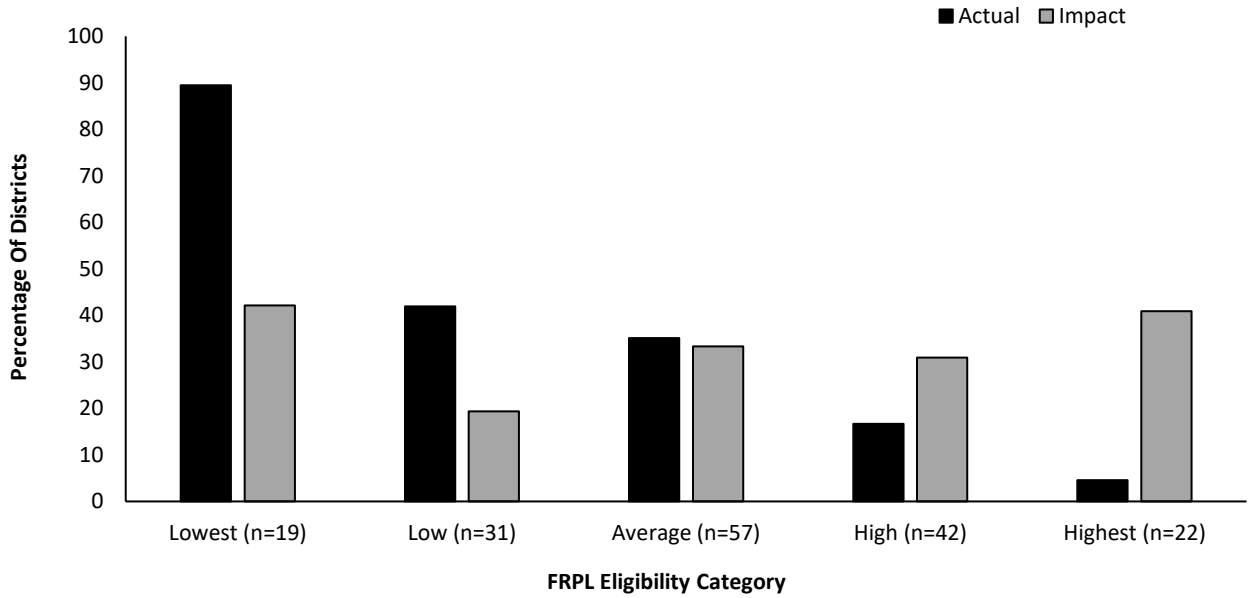
This chapter focuses on districts' effectiveness as measured by reading and math data, but also reports findings illustrating why these data alone are insufficient to determine districts' overall effectiveness.

This chapter focuses primarily on district effectiveness as measured by reading and math achievement. Data reported at the end of the chapter serve as an important reminder that reading and math data alone are incomplete measures of districts' overall effectiveness; districts that were relatively more effective at impacting student reading and math achievement were not always more effective at impacting other important outcomes.

Reading And Math Effectiveness Indicators: Actual And Impact

Figure 3.A shows the percentage of districts with higher reading and math performance as measured by actual and impact scores.[a] Districts were divided according to the percentage of students who were economically disadvantaged, as measured by eligibility for FRPL.

Figure 3.A
Percentage Of Districts With Higher Actual And Impact Scores, By Student FRPL Eligibility Category
2018, 2019, And 2022



Note: Higher actual or impact performance includes districts that fall in the high or highest category as determined by methods explained in Appendix B. FRPL = students eligible for free or reduced-price lunch. FRPL-eligibility categories are based on the percentage of students eligible for the federal free or reduced-priced lunch program. Appendix B provides the thresholds and describes the method by which OEA determined category thresholds.
Source: Staff analysis of data from the Kentucky Department of Education.

[a] As noted in Chapter 1, reading and math data in this report are converted into standard scores. Any district with a standard score above 0 is considered positive in this analysis.

When district effectiveness was measured by actual reading and math scores, it was strongly associated with the percentage of economically disadvantaged students in each district.

When district effectiveness in reading and math was measured by actual scores alone, almost all (17 of 19) of the districts with the lowest FRPL eligibility appeared effective compared with almost none (1 of 22) of the highest FRPL-eligibility districts.[b]

When district effectiveness was measured with impact scores, districts serving various percentages of economically disadvantaged students appeared effective.

When district effectiveness was measured with impact scores, the percentage of districts that appeared relatively more effective were distributed more evenly among district FRPL-eligibility categories.

Use Of Impact Scores To Analyze Relationships Between Effectiveness And Spending

This chapter uses the terms "higher-impact districts" (effective) and "lower-impact districts" (less effective) to mean districts that were relatively more or less effective at impacting students' reading and math achievement.

Both actual scores and impact scores provide important information about district effectiveness. Because impact data takes into account efficiency challenges associated with higher-need student populations, the report uses it to determine district effectiveness, to examine the relationship between spending and outcomes, and to report characteristics of relatively more or less effective districts. This chapter uses the terms "higher-impact districts" and "lower-impact districts" to mean relatively more or less effective districts, respectively.

Student demographic characteristics are used in effectiveness and efficiency studies as well as studies attempting to identify practices of higher-performing districts. For example, the Council of Great City Schools analyzes impact scores of school districts that elect to participate as separate jurisdictions in NAEP.[36]

District Impact In Reading And Math Methodology

Impact scores compare students' actual scores with scores that were statistically predicted for the student, taking a variety of demographic and community characteristics into account.

Impact scores take into account the performance of students in each district relative to students with similar demographic characteristics across the state. Appendix A describes the student and community characteristics taken into account, along with their relative impact on the adjusted scores. These include student economic disadvantage; eligibility for special education; LEP; homeless programs; whether a student moved during the academic year; race or ethnicity; whether the student is enrolled in a highest-poverty school; and the percentage of adults in a student's community with a bachelor's degree or higher. Impact scores were computed by subtracting the score that was statistically predicted for a district, based on the demographic characteristics of students tested in the district, from the districts' actual score.

[b] The one highest-poverty higher-performing district is of note as the only district in this category to be in higher performance categories for actual scores.

A district in which students' actual performance exceeds predicted performance is in a higher-impact category; a district in which students' actual performance falls short of predicted performance is in a lower-impact category.

The report groups districts into five categories, from lowest to highest. Appendix B describes the process by which OEA established the thresholds for these categories. A district in which actual performance exceeded predicted performance is in a higher impact category; a district in which actual performance fell short of predicted performance is in a lower impact category. Both the actual and the impact analysis were computed from individual student-level scale scores that were transformed into standard scores valid for comparison across subjects, grades, and years.

District Changes From Actual To Impact Scores

District effectiveness does not shift dramatically when determined through impact versus actual scores.

When actual versus impact data were used to determine district effectiveness categories, most districts remained in the same category, or moved up or down by no more than one category. Most districts in higher-impact categories were also in higher categories of actual performance (40 of 55 districts; 73 percent). Most districts in lower-impact categories were also in lower categories of actual scores (51 of 64 districts; 80 percent). No lower-impact districts were in higher-performance categories of actual scores. Only three districts in lower categories of actual scores were in higher categories of impact scores.

Relationship Between Per-Pupil Spending And Reading And Math Outcomes

The relationship between per-pupil spending and outcomes looks different for actual, unadjusted outcomes versus impact scores.

Relationship Between Per-Pupil Spending And Reading And Math Unadjusted, Actual Outcomes

Table 3.1 shows the percentage of districts that fell in each category of reading and mathematics actual performance and per-pupil spending. The table shows that more than three-quarters (77 percent) of lowest-spending districts were in higher actual performance categories, whereas almost all (85 percent) of highest-spending districts were in lowest actual performance categories. The percentage of districts in higher-performance categories decreased as expenditures increased.

Table 3.1
Percentage Of Districts By Actual Reading And Math And Per-Pupil Spending Categories
2018, 2019, And 2022

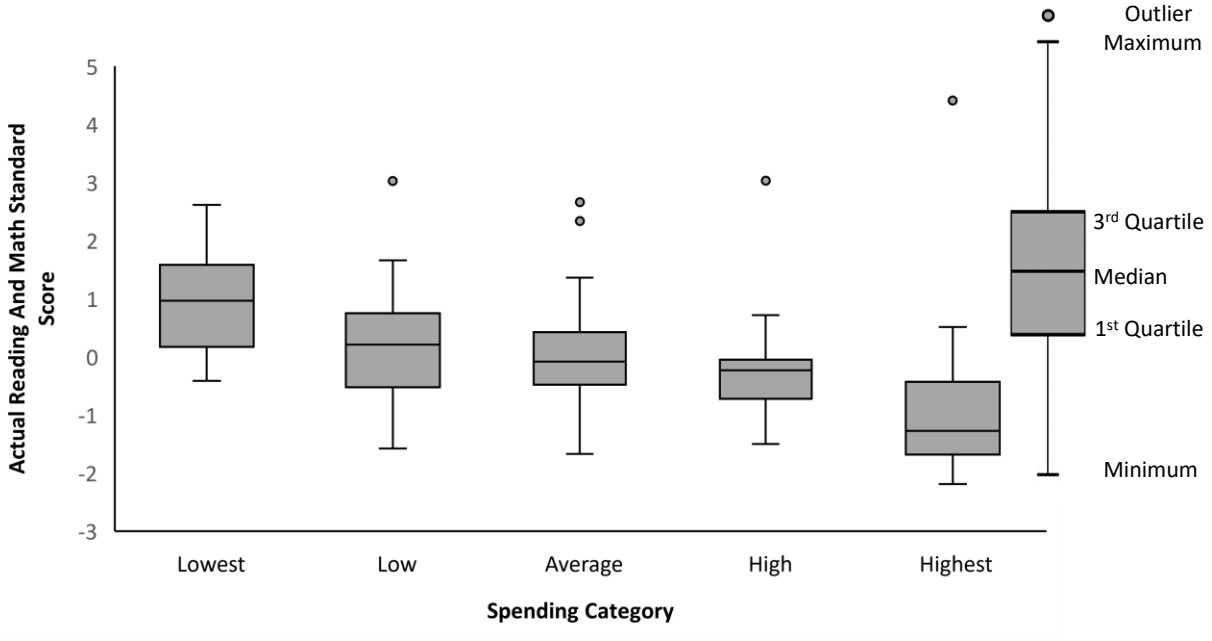
	Per-Pupil Spending Category					
Reading And Math Actual Category	Lowest (n=9)	Low (n=62)	Average (n=61)	High (n=19)	Highest (n=20)	All (n=171)
Highest (n=23)	44%	18%	10%	5%	5%	13%
High (n=35)	33	26	23	5	5	20
Average (n=46)	11	27	30	47	5	27
Low (n=45)	11	27	30	26	20	26
Lowest (n=22)	0	2	8	16	65	13

Source: Staff analysis of data from the Kentucky Department of Education.

Higher-spending districts, on average, had higher percentages of economically disadvantaged and special education students than other districts and lower actual reading and math outcomes. In Kentucky and in all US states, these student groups scored below state averages.

Figure 3.B shows the relationship between district per-pupil spending and actual reading and math scores. The figure shows a generally negative association between per-pupil spending and actual scores; as per-pupil expenditure categories increased, average actual reading and math scores generally decreased—a trend explained, in part, by the demographic characteristics of students in each per-pupil spending category. As noted in Chapter 2, students in districts that were in higher- versus lower-spending categories were much more likely to be economically disadvantaged or eligible for special education services. In Kentucky and in every US state, reading and math outcomes for these groups are lower than state averages. The range in actual scores was greatest in the highest-spending category, which contained both the highest- and lowest-scoring districts.

Figure 3.B
District Reading And Math Actual Scores, By Per-Pupil Spending Category
2018, 2019, And 2022



Note: Outliers are defined in this figure as beyond 1.5 times the interquartile range.
Source: Staff analysis of data from the Kentucky Department of Education.

Relationship Between Per-Pupil Spending And Reading And Math Adjusted Outcomes (Impact)

Table 3.2 shows that districts were more evenly distributed among impact categories than actual performance categories; however, impact data for the lowest-spending districts remain relatively higher than other districts, and impact data for highest-spending districts remains relatively lower. The percentage of districts in the lower two impact categories is 37 percent for all districts, 11 percent for the lowest-spending districts, and 60 percent for highest-spending districts.

Table 3.2
Percentage Of Districts By Reading And Math Impact And Per-Pupil Spending Categories
2018, 2019, And 2022

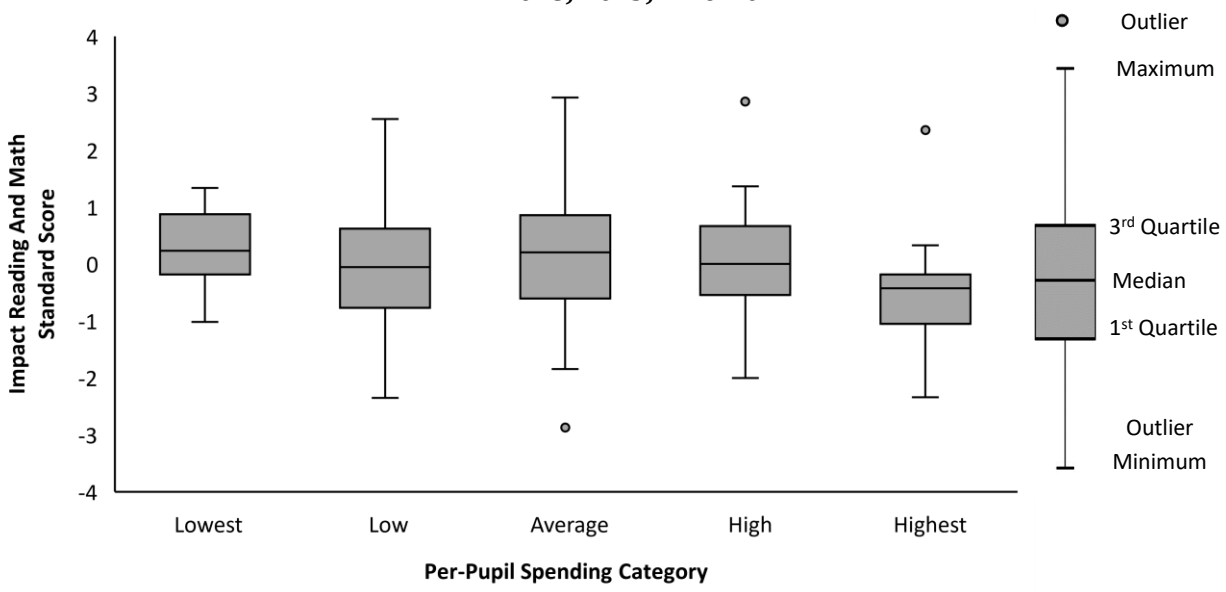
	Per Pupil Spending Category					
Reading And Math Impact Category	**Lowest (n=9)**	**Low (n=62)**	**Average (n=61)**	**High (n=19)**	**Highest (n=20)**	**All (n=171)**
Highest (n=24)	22%	13%	18%	11%	5%	14%
High (n=31)	11	21	21	21	0	18
Average (n=52)	56	26	28	37	35	30
Low (n=40)	0	24	23	21	35	23
Lowest (n=24)	11	16	10	11	25	14

Source: Staff analysis of data from the Kentucky Department of Education.

Once student and community demographic characteristics were taken into account, district effectiveness varied little based on district spending. Differences remained among the lowest- and highest-spending districts, however.

Figure 3.C shows the relationship between district per-pupil spending and reading and math impact scores. Once student demographic characteristics were taken into account, district effectiveness among all 171 districts varied relatively little based on spending. Some differences remained among the relatively small number of districts in the lowest- and highest-spending categories, however; highest-spending districts had relatively lower impact than other districts, and lowest-spending districts had relatively higher impact than other districts.

Figure 3.C
District Reading And Mathematics Impact Scores, By Per-Pupil Spending Category
2018, 2019, And 2022



Note: Outliers are defined in this figure as beyond 1.5 times the interquartile range.
Source: Staff analysis of data from the Kentucky Department of Education.

Additional efficiency challenges—especially district small size—offer further insight into the relationship between spending and outcomes.

Of the efficiency factors known to affect the relationship between spending and outcomes, Figure 3.C takes only student populations into account. The following sections show differences among higher- and lower-impact district in additional efficiency challenges. They show that the relatively lower impact of highest-spending districts was associated with the disproportionate presence of small districts in the highest-spending categories.

Relationships Among District Impact And Size, Geographic Dispersion, And Higher-Cost Labor Markets

Research indicates that operational costs are greater for districts that are small, geographically dispersed, and in higher-cost labor

markets.[c] Compared with other similarly spending districts, those that face these efficiency challenges may have less purchasing power for services that directly impact instruction. Almost all Kentucky districts (89 percent) experience at least one of these challenges, and just over one-fifth (22 percent) experience two or more.

Compared with all districts, districts that were geographically dispersed, in higher-cost labor markets, or small were more likely to be in lower-impact categories.

Table 3.3 shows that the percentage of districts in the lower two impact categories is greater for small districts (50 percent), geographically dispersed districts (40 percent), and districts in higher-cost labor markets (40 percent) than for all districts (37 percent). Unlike geographically dispersed districts, small districts and districts in higher-cost labor markets were also less likely than all districts to be in higher-impact categories.

Table 3.3
Percentage Of Districts By Impact Category And District Size, Geographic Dispersion, And Higher-Cost Labor Markets
2018, 2019, And 2022

Impact Category		All	Small (n=38)	Geographically Dispersed (n=109)	Higher-Cost Labor Markets (n=53)
Highest	(n=24)	14%	11%	11%	9%
High	(n=31)	18	13	22	13
Average	(n=52)	30	26	28	38
Low	(n=40)	23	32	27	17
Lowest	(n=24)	14	18	13	23

Note: In the analyses conducted for this report, districts were considered small if they had 1,000 students or fewer, geographically dispersed if they had 25 students or fewer per net square mile, and in higher-cost labor markets if they fell in the "highest" or "high" category on the Comparable Wage Index for Teachers as determined by methods explained in Appendix B.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

The following section discusses efficiency challenges of small districts. Challenges of districts in higher-cost labor markets are addressed later in the chapter, in the discussion of teacher turnover.

Small Districts

Small districts were among the highest- and lowest-impact districts but were 1.5 times as likely as all districts to be in lower-impact categories.

Small districts were present in every impact category—they were among the state's highest- and lowest- impact districts. Small districts were, however, 1.5 times as likely as all districts to be in lower- versus higher-impact categories. Of the state's 38 small districts, 50 percent were in lower-impact categories, compared with 34 percent of districts that were not small. Nine of 38 small

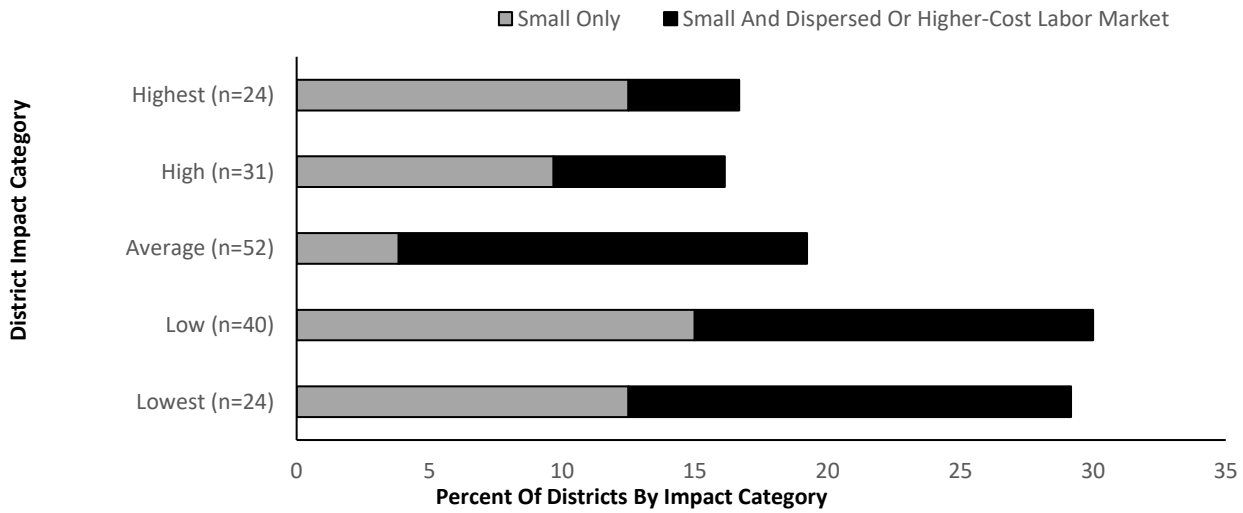
[c] Chapter 2 discusses metrics used to identify districts in these categories.

districts (24 percent) were in higher-impact categories, compared with 35 percent of other districts.

Lower-impact small districts were more likely than higher-impact small districts to experience efficiency challenges related to geographic dispersion or higher-cost labor markets.

Small Districts With Additional Efficiency Challenges. Figure 3.D shows the percentages of districts, by impact category, that faced efficiency challenges because they were small, or small and also dispersed or in a higher-cost labor market. The figure shows that challenges of small districts were present in all district impact categories but disproportionately affected lower-impact districts. Small districts in average- and lower-impact categories were also more likely than districts in higher-impact categories to face a combination of efficiency challenges beyond small size alone.

Figure 3.D
Percentage Of Districts Facing Efficiency Challenges Due To Small Size And Additional Factors, By Impact Category 2018, 2019, And 2022



Note: Additional factors are higher-cost labor markets, geographic dispersion, or both.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Geographic dispersion and higher-cost labor markets add challenges to those already experienced by small districts.

Geographic dispersion and higher-cost labor markets increase the costs of providing educational opportunities for students, adding challenges to those already experienced by small districts.

Consistent with small districts nationally, Kentucky's small districts spent a relatively low percentage on instructional services and a relatively high percentage on overhead costs.

Spending Patterns Of Small And Dispersed Districts. Appendix L shows that, on average, the percentage of expenditures on instructional services was relatively low in small districts versus others. Instructional services expenditures are those provided directly to students in classrooms. They include teachers' salaries and benefits and other expenditures related directly to instructing

students. The relatively low rate of expenditures on instructional services is associated with relatively high percentages of expenditures on overhead costs in small districts. The percentage of expenditures on district administration and business support was greater in small districts versus others. All districts are required to have certain district administrative staff such as superintendents, transportation directors, and special education directors. These positions represent a larger percentage of staff in smaller districts than in larger districts.

Due to transportation costs, small districts that were also dispersed spent an even lower percentage on instructional services than other small districts.

Due to transportation costs, small districts that were also dispersed spent an even lower percentage on instructional services than other small districts. The average rate of expenditure on instructional services was 57 percent in small, dispersed districts, compared with 61 percent in districts that were not small and not dispersed.

Over half the higher-spending, lower-impact districts were small; of these, almost all were ISDs.

Higher-Spending, Lower-Impact Districts. Small districts appeared disproportionately in the higher per-pupil spending categories. Of the 18 districts that were in the higher (top two) spending categories and lower (bottom two) impact categories, 10 were small. Together, however, these small districts enrolled less than 1 percent of the state's students. Of the 10 small, higher-spending, lower-impact districts, 9 were ISDs.

Independent Districts

Twenty-eight of the state's 51 ISDs were small. The majority of the state's small districts were ISDs.

Most—but not all—ISDs were small. Of 51 ISDs, 28 had 1,000 students or fewer, and 23 had more than 1,000 students. Five ISDs had more than 3,000 students; one had almost 5,000. The majority (28 of 38) of the state's small districts, however, were ISDs.

Impact Scores Of Independent Districts

Average impact scores of small ISDs were similar to those of small county districts.

Average impact scores of the 28 small districts that were ISDs were similar to those of the 10 small county districts, (-0.27 and -0.25, respectively), but small ISDs were slightly more likely to be in lower-impact categories than were county districts (54 percent versus 40 percent). Of the 19 small, lower-impact districts, 15 were ISDs.

Average impact scores for ISDs that were not small exceeded those for county districts that were not small.

In contrast, average impact scores of the 23 ISDs that were not small exceeded those of the 110 county districts that were not small (0.45 vs -0.01). Thirty percent of ISDs that were not small

were in highest-impact categories, compared with 11 percent of county districts that were not small.

Efficiency in ISDs may be positively affected by taxpayer scrutiny and local competitive contexts.

Efficiency in ISDs may be positively affected by taxpayer scrutiny and locally competitive contexts. The relatively high average levied equivalent rates in ISDs versus county districts (91 cents versus 66 cents) indicate that property was taxed at higher rates in ISDs than in county districts. In addition, students enrolled in ISDs were more likely than students in county districts to be from families who had opted to have their students attend school in a district other than their district of residence. On average, roughly 20 percent of students enrolled in ISDs resided in other districts, compared to an average of roughly 2 percent in county districts.[d]

Practice-Related Differences Among Higher- And Lower-Impact Districts

Data presented in this section address areas of practice that are within administrators' control. The differences between higher- and lower-impact districts reported in this section may reflect choices of local leaders.

The following sections report practice-related differences observed in higher- versus lower-impact districts. Unlike the efficiency challenges already discussed, these practice-related differences are from areas of practice that are within district administrators' control. The differences reported in this section may reflect choices of local leaders in higher- versus lower-impact districts.

Spending Patterns By District Impact Category

Highest-impact districts spent approximately 3 percentage points more of total expenditures on instructional services than did lowest-impact districts.

As a percentage of expenditures, highest-impact districts spent an average of approximately 3 percentage points more on instructional services than did lowest-impact districts (69 percent versus 66 percent); percentages decreased as level of impact decreased.[e] Highest-impact districts, on average, spent slightly less than lower-impact districts on most other spending categories, such as district and school administrative expenses or instructional support services. Instructional support services are those that benefit and support instruction but are not provided directly in the classroom. Examples of staff considered as instructional support

[d] This calculation is a weighted average that takes into account district membership. It excludes data from the four ISDs that provide education for students in kindergarten through 8th grade only: Anchorage Independent, East Bernstadt Independent, Science Hill Independent, and Southgate Independent.

[e] Percentages were calculated out of current expenditures, not including those related to food and transportation. Food and transportation costs vary by district size and geographic dispersion in ways that are not entirely under administrators' control. Both lowest- and low-impact districts spend an average of 66 percent on instructional services.

services include school counselors, psychologists, and school nurses.

Among small districts, higher- versus lower impact districts also spent a greater percentage on instructional services (66 percent versus 64 percent).

Pupil-teacher ratios did not differ among impact categories.

Data available for this report do not reveal whether higher- versus lower- impact districts spent more on particular types of instructional services. The relative number of teachers per student did not differ among impact categories; pupil-teacher ratios were similar, roughly 15 students per teacher, in all categories.

Teacher Workforce Data

Higher- versus lower-impact districts, on average, were more likely to pay relatively competitive salaries, to have lower turnover rates, to have more experienced teachers, and to have higher percentages of teachers who reported favorable working conditions.

Higher-impact districts were more likely than lower-impact districts to pay more competitive teacher salaries.

Relatively Competitive Teacher Salaries. Table 3.4 shows that higher-impact districts were more likely to pay relatively more competitive salaries than lower-impact districts.[f]

Table 3.4
Percentage Of Districts With Relatively Competitive Average Teacher Salaries
By District Reading And Math Impact Category
2018, 2019, And 2022

Impact Category		Rank 3 0-Year Salary (Starting Salary)	Rank 1 10-Year Salary
Highest	(n=24)	63%	71%
High	(n=31)	55	55
Average	(n=52)	54	40
Low	(n=40)	33	40
Lowest	(n=24)	38	38

Note: Competitive salary was determined by comparing starting salary to the starting salary that would be predicted based on a district's Comparable Wage Index for Teachers. See Appendix J for an explanation of this calculation. "Rank 1 10-Year Salary" represents the salary schedule for teachers with Rank 1 and 10 years of experience. Rank 1 teachers are those who hold a master's degree or equivalent.
Source: Staff analysis of data from the Kentucky Department of Education.

[f] Higher- versus lower-impact districts also have higher average administrator salaries. The administrator salary differences, however, might reflect differences in administrator experience. Administrator salary schedules were not obtained for this report.

Small districts were less likely than others to pay competitive salaries. Salary disparities may especially affect small districts in higher-cost labor markets.

Small districts were less likely than others to pay competitive salaries (29 percent versus 53 percent). Salary disparities may especially affect small districts in higher-cost labor markets.[g] In higher-cost labor markets, small districts were much less likely than others to pay competitive starting salaries (21 percent versus 59 percent).

Higher-impact districts had lower average rates of teacher turnover than lower-impact districts. Over half of lowest-impact districts and no highest-impact districts had teacher turnover rates that exceeded 15 percent.

Teacher Turnover And Experience. Table 3.5 shows that higher- versus lower-impact districts had lower average rates of teacher turnover. The table also shows the percentage of districts within each impact category that had higher turnover rates (at least 15 percent).[h] Over half of lowest-impact districts had higher teacher turnover rates, compared with none of the highest-impact districts. Appendix M maps teacher turnover among Kentucky districts.

Table 3.5
Teacher Turnover, By District Impact Category
2018, 2019, And 2022

Impact Category		Average District Teacher Turnover Rate	Percent Of Districts With Higher Teacher Turnover Rates (15 Percent Or Greater)
Highest	(n=24)	11%	0
High	(n=31)	11	6
Average	(n=52)	13	27
Low	(n=40)	13	30
Lowest	(n=24)	17	54

Note: Higher teacher turnover rate categories were determined using methods explained in Appendix B. Teacher turnover rates show the percentage of teachers who leave a district each year.
Source: Staff analysis of data from the Kentucky Department of Education.

In higher-cost labor markets, districts with competitive salaries, on average, had lower rates of teacher turnover than other districts.

Appendix M shows that districts in higher-cost labor markets that have relatively less competitive salaries had higher average teacher turnover rates than districts in those labor markets with relatively more competitive salaries. Turnover rates by salary categories varied in the other labor markets.

Teacher turnover rates are higher when calculated at the school level, especially in larger districts.

Note that teacher turnover rates reported in Table 3.5 show the percentage of teachers who leave a district each year. These rates do not reflect teacher turnover within a school. When teacher turnover is calculated based on the number of teachers who leave

[g] Higher-cost labor markets are those that are highest or high based on thresholds explained in Appendix B. Competitive salary is determined by comparing starting salary to the starting salary that would be predicted by a district's Comparable Wage Index for Teachers.
[h] Higher teacher turnover rate categories were determined using methods explained in Appendix B.

schools, turnover rates were higher in most districts, but especially in larger districts. The difference between district and school teacher turnover rates was an average of 5 percentage points greater in larger districts versus 2 percentage points in small districts.[i]

Higher-impact districts, on average, had more experienced teachers than lower-impact districts.

Table 3.6 shows that differences among impact categories in teacher turnover rates are reflected by differences in average teacher experience and percentage of new teachers. On average, higher- versus lower-impact districts had more experienced teachers and lower percentages of teachers with 5 or fewer years of experience.

Table 3.6
Teacher Experience, By District Impact Category
2018, 2019, And 2022

Impact Category		Average Years Of Teacher Experience	Percent Of Teachers With 5 Or Fewer Years Of Experience
Highest	(n=24)	13	25%
High	(n=31)	13	26
Average	(n=52)	12	29
Low	(n=40)	12	30
Lowest	(n=24)	11	35

Source: Staff analysis of data from the Kentucky Department of Education.

Teacher Working Conditions. Table 3.7 shows the average percentage of favorable responses to various categories of questions answered by Kentucky teachers on a 2020 KDE teacher survey. This survey is administered every other year to all certified educators; approximately three-quarters of teachers respond. Aggregate data by school and district are publicly available.

On average, percentages of teachers reporting favorable working conditions were greater in higher- versus lower-impact districts, especially on questions related to school climate, feedback and coaching, school leadership, and student behavior.

Table 3.7 shows substantial differences between teachers in higher- versus lower-impact schools in the percentages of favorable responses to questions in each category. Favorable responses were especially differentiated in the categories of school climate, feedback and coaching, school leadership, and student behavior.

[i] Based on methods described in Appendix B, OEA identified largest districts to be the eight districts whose membership exceeded 6,500 students.

Table 3.7
Average Percentage Of Teachers
With Favorable Responses On 2020 Teacher Working Conditions Survey
By Impact Category
2018, 2019, And 2022

Question Category	Highest (n=24)	High (n=31)	Average (n=52)	Low (n=40)	Lowest (n=24)	Percentage Point Difference, Highest And Lowest
School climate	72%	68%	64%	58%	55%	17
Feedback and coaching	64	60	56	52	49	15
School leadership	74	69	67	61	59	15
Managing student behavior	75	71	67	63	61	14
Resources available	56	49	47	42	44	12
Professional learning	65	60	58	53	53	12
Staff-leadership relationships	82	78	77	73	73	10

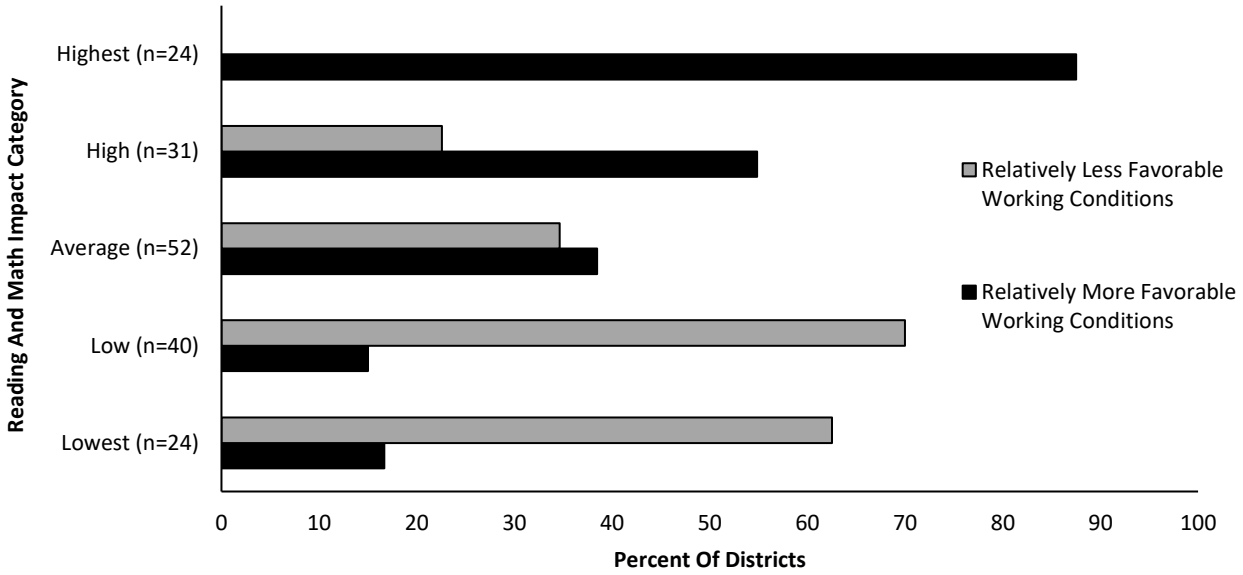
Source: Staff analysis of data from the Kentucky Department of Education.

None of the highest-impact districts and over 60 percent of the lowest-impact districts had relatively less favorable working conditions across all question categories.

Staff placed districts in categories of relatively more or less favorable working conditions based on the average percentage of favorable responses in all question categories.[j] Figure 3.E shows differences in the percentages of districts in the relatively more and less favorable working conditions categories by reading and math impact categories. For example, 88 percent of highest-impact districts, versus 17 percent of lowest-impact districts, were in the relatively more favorable working conditions category. While 58 percent of lowest-impact districts were in the relatively less favorable working conditions category, none of the highest-impact districts were in the relatively less favorable working conditions category.

[j] Average favorable responses by district ranged from 40 percent to 84.5 percent. Average favorable responses in districts with more favorable responses was 71 percent, versus 55 percent in those with less favorable working conditions.

Figure 3.E
Percentage Of Districts, By Impact And Working Conditions Categories
2018, 2019, And 2022



Note: OEA derived these relatively more or less favorable working conditions categories by averaging the percentage of favorable responses, by district, in individual question categories. Districts with relatively more favorable working conditions are those in the top two quintiles; districts with relatively less favorable conditions are those in the bottom two quintiles.
Source: Staff analysis of data from the Kentucky Department of Education.

Relationship Between Impact On Reading And Math And Impact On Graduation Rates And Career Readiness

As noted in Chapter 1 and earlier in this chapter, no single indicator can capture the degree to which an individual district or school is assisting students to achieve all of the capacities set as goals for Kentucky public schools.

Staff calculated district impact data for graduation rates and percentages of graduates who met career readiness indicators.

In addition to reading and math, staff calculated district impact data for district graduation rates and the percentages of graduates who met one of three career readiness indicators.[k] Methods used were similar to those used for the reading and math impact data.

Of districts that were higher-impact in reading and math, just over half were also higher-impact for graduation rates; roughly one-fifth were higher-impact for career readiness. Only eight districts were in higher- or lower-impact categories on all three indicators.

Table 3.8 shows the number of districts that were higher or lower in reading and math impact and also higher or lower in the two

[k] Graduates were considered career ready if they completed a sequence of three courses in an individual CTE pathway, earned an industry certificate, or passed a state-approved CTE assessment. Of these, pathway completion is no longer required as an indicator of career readiness, but it has been required in the past.

other outcome measures. Just over half of the higher-impact reading and math districts were also higher-impact for graduation rate. Approximately 21 percent of higher-impact reading and math districts were also higher-impact in career readiness. Similarly, a minority of districts (approximately 28 percent) that were lower in reading and mathematics were also lower on the other outcome measures. Overall, there were eight districts that were higher in all three outcome indicators, and eight districts that were lower.

Table 3.8
Number Of Higher- Or Lower-Impact Districts
In Reading And Math, Graduation Rate, And Career Readiness
2018, 2019, And 2022

District Category	Reading And Math	Reading, Math, And Graduation Rate	Reading, Math, And Career Readiness	Reading, Math, Graduation Rate, And Career Readiness
Higher-impact	55	30	12	8
Lower-impact	64	25	18	8

Note: Districts in the highest or high group were considered higher-impact; districts in the low or lowest group were considered lower-impact.
Source: Staff analysis conducted on data from the Kentucky Department of Education.

These data are an important reminder that reading and math data do not fully capture district effectiveness.

These data serve as an important reminder that reading and math data presented in this chapter do not fully capture district effectiveness at ensuring that students develop the variety of capacities that are set as goals for Kentucky public schools.

Appendix N shows relatively higher relationships between district ACT impact and relatively higher long-term postsecondary education outcomes for district graduates. Of district graduates in higher-impact ACT districts in school years 2012, 2013, and 2014, a total of 60 percent were also in higher-impact categories for postsecondary enrollment and degree attainment through 2022.

Conclusion

Small district size, higher teacher turnover, and less favorable teacher working conditions are barriers to effectiveness and efficiency statewide.

This chapter has identified three areas that merit attention from state and local leaders concerned about district effectiveness and efficiency:

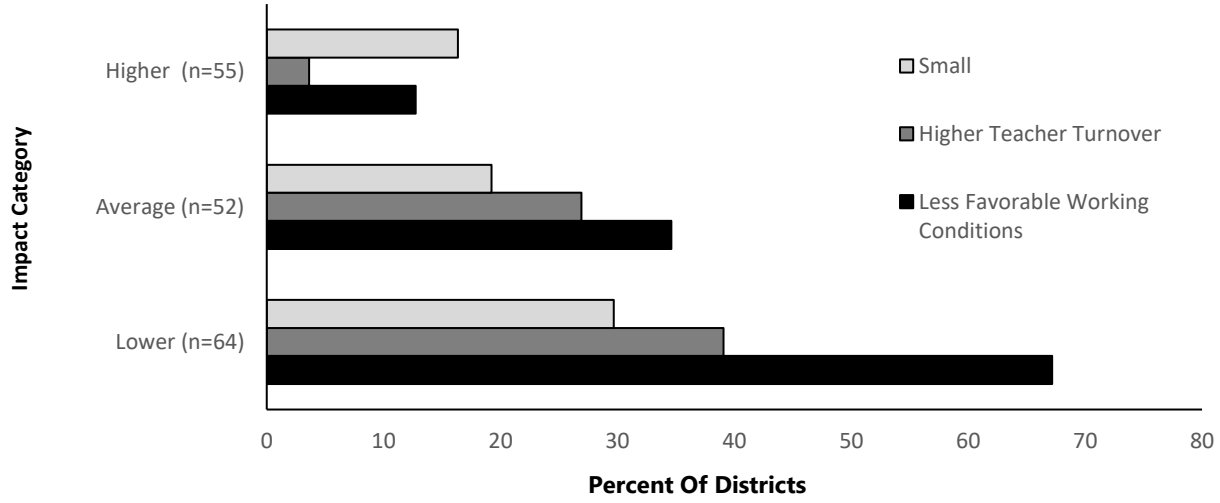
- Efficiency challenges of small districts
- Teacher turnover rates
- Teacher working conditions

Together, these areas present clear challenges to districts across the state and barriers to effectiveness and efficiency.[1]

Lower-impact districts were more likely to be small and much more likely to have high teacher turnover rate or less favorable teacher working conditions.

Figure 3.F summarizes data shown earlier in this chapter showing higher percentages of lower- versus higher-impact districts that were small, that had higher teacher turnover rates, and that had relatively less favorable working conditions.

Figure 3.F
Percentage Of Districts By Reading And Math Impact Category That Were Small, Had Higher Teacher Turnover Rates, Or Had Less Favorable Working Conditions 2018, 2019, And 2022



Note: Higher-impact districts include those in the highest or high groups; lower-impact districts include those in the low or lowest groups.
Source: Staff analysis of data from the Kentucky Department of Education.

Challenges For Small Districts

Depending on the revenue they receive, some small districts may be unable to provide instructional services and supports available to students in other districts. Small districts that are also geographically dispersed or in higher-cost labor markets may be especially challenged.

Because they lack economies of scale, smaller districts spent a lower average percentage of available revenue on instructional services than did other districts. Depending on the revenue they receive, some small districts may have difficulty affording instructional services and supports available to students in other districts. Small districts that face additional challenges, such as geographic dispersion or higher labor market costs, may be especially challenged.

[1] While data in this chapter focus on impact scores, Appendix K shows that these challenges also apply to districts that have higher versus lower actual reading and math scores.

Small ISDs have the option to request merger with the larger county district in which they are located. Since 2005, five ISDs have merged with county districts.

Merger Options For School Districts. The relatively higher operational costs in small ISDs have been borne in part by voters who have been willing to authorize additional taxes. Small ISDs that are struggling to generate revenue sufficient to support their costs have the option to request merger with the larger county district in which they are located. OEA's *Kentucky's Independent School Districts: A Primer* details the process by which this may occur.[37] Since 2005, five ISDs have merged with county districts.[m]

Contiguous county districts can merge, but none have done so.

No county districts have merged. KRS 160.040 describes the process by which contiguous districts can merge.

The General Assembly may wish to consider providing small districts with additional funding through the SEEK formula.

Small District Funding Weights. The General Assembly may wish to consider providing small districts—many of which are also geographically dispersed—with additional funding through the SEEK formula. Such a consideration might be informed by external research such as has been conducted recently for legislatures in Texas and Vermont. An external study might recommend thresholds and associated funding weights for districts that are considered small or dispersed.[38]

Teacher Turnover

On average, lower- versus higher-impact districts had higher teacher turnover rates and less experienced teachers. Districts paying relatively less competitive wages—especially those districts located in higher-cost labor markets—experienced greater turnover than other districts.

Local boards and district leaders can take actions to promote favorable working conditions and competitive salaries. These actions can promote stability and experienced teacher workforces.

Data presented in this chapter suggest that actions taken by local boards and district leaders—especially those that target resources to support teacher working conditions or relatively competitive salaries—may have made some similarly spending districts more successful than others at providing students with a stable, experienced teacher workforce.

Local leaders' ability to retain teachers may also be affected by the degree to which SEEK and other revenue keep pace with labor market demands.

Local leaders may ultimately be limited in their ability to retain teachers, however, if they lack sufficient revenue to ensure that teacher salaries keep pace with labor market demands. When considering budget allocations to support SEEK funding, the General Assembly should take into account, among other considerations, the degree to which increases in SEEK funding

[m] Harrodsburg with Mercer County in 2006; Providence with Webster County in 2007; Monticello with Wayne County in 2014; Silver Grove with Campbell County in 2020; Westpoint with Hardin County in 2021.

over time are sufficient to allow local districts to keep pace with changes in labor markets generally.

Teacher Working Conditions

Districts in lower-impact categories were over five times as likely as higher-impact districts to have relatively less favorable teacher working conditions as reported by teachers on KDE's biennial working conditions survey. None of the highest-impact districts had less favorably reported working conditions.

The KDE working conditions survey provides data valuable in guiding improvement at the local level and informing state policies or programs aimed at strengthening teacher working conditions.

The KDE working conditions survey provides valuable data for state and local leaders. These data are important in guiding improvements at the local level through administrator evaluations, district improvement planning, or school improvement planning. Data on teacher working conditions can also inform state policies or programs aimed at strengthening working conditions in areas such as school climate, teacher feedback and coaching, school leadership, and managing student behavior.

Appendix A

Statistical Methods Used To Determine District Effectiveness

This appendix describes, in detail, the ordinary least squares linear regression model that staff used to calculate the impact scores reported in Chapter 3. The appendix later describes additional models that staff used to validate the findings reported in the chapter. Although these additional models resulted in some small differences in districts identified in particular impact categories, they all validated the broader conclusions of the chapter.

Ordinary Least Squares Linear Regression Models Reading And Math Model

Ordinary least squares (OLS) regression modeling was used to quantify the relationship between student, community, and school characteristics with reading and math performance. The models were structured with the standard scores for reading and math by grade and year as the dependent variable.[a]

Students included in the OLS model were 3rd- through 8th-grade students with Kentucky Performance Rating for Educational Progress (K-PREP) reading and math scores, and 11th-grade students with ACT reading and math scores for school years 2018, 2019, and 2022. Scores for reading and math were treated as separate observations for all students in the data. There were 2,043,234 total observations in the OLS model for this time period.

The model controlled for student-level subgroup categories for race and ethnicity, eligibility for free or reduced-price lunch (FRPL), participation in an individualized education program (IEP), students with limited English proficiency (LEP), and whether a student was homeless. These student-level characteristics are represented in the equations for the model as βDEMO.

The model also controlled for whether a student attended a school where 75 percent or more of the population received free or reduced-price lunch, as an indicator for attending a "high-poverty" school (βSchoolPoverty).

The final student-level control used was whether a student moved schools during school year 2018, 2019, or 2022 (βMoved).

The model also included a community characteristic control for the percentage of residents that had earned a bachelor's degree or more, by zip code (βBachelorZip). The bachelor's degree data by zip code was obtained from the American Community Survey, and was matched up to the zip code of student residence for each observation.[b] The residual error term finishes the equation (ε).

[a] Standard scores were computed independently for each subject, grade, and year. For instance, standard scores for 3rd-grade K-PREP reading were computed at the student level for school years 2018, 2019, and 2022. The same was computed for 3rd-grade K-PREP math, and then repeated for all grades, subjects, and years.
[b] When a student-level zip code was not available, a district-level percentage of residents that earned a bachelor's degree or more was used.

Model 1: Standard Score = α + βDEMO + ε
Model 2: Standard Score = α + βDEMO + βSchoolPoverty + ε
Model 3: Standard Score = α + βDEMO + βSchoolPoverty + βMoved + ε
Model 4: Standard Score = α + βDEMO + βSchoolPoverty + βMoved + βBachelorZip + ε

Computed Beta Coefficients And Explained Variance

Table A.1 shows the beta coefficients and standard errors for each iteration of the Reading and Math model, with Model 4 representing the most comprehensive version.

All control variables in each version of the model have strong statistical significance, but most of the explained variance comes from student demographics.[c] This can be determined by examining the R-squared value for Model 4, which was approximately 18 percent, and the R-squared value from Model 1 that included only student demographics as control variables, which was approximately 16 percent.

Student demographics accounted for almost all the explained variance, but the other control variables that were added in Models 2 through 4 had strong statistical significance; they just did not contribute much to the total explained variance from Model 4, the primary model for this analysis.

Most of the control variables have negative coefficients, which means those factors according to the model were associated with lower reading and math scores. FRPL status and IEP status were among the strongest negative predictors from the student demographic controls.

The percentage bachelor's degree by zip code and other race were associated with higher scores relative to other students, according to the model. The beta coefficient for percentage bachelor's degree by zip code indicates that for every 1 percent increase in the rate of population with bachelors' degrees, the expected scores for reading and math would increase by approximately 0.006 standard deviations. For example, if 50 percent of residents in a particular zip code had bachelor's degrees, that would be associated with an expected increase in reading and math scores of nearly a third of one standard deviation.

The other control variables are categorical and not continuous like the percentage bachelor's degree variable. Therefore, the coefficients are applied only to students who are in the populations of controlled variables in the model. For example, a student with FRPL status would have a negative beta coefficient of -0.3762, but a student not eligible for FRPL would not have this coefficient applied when computing the expected scores.

Students can be in more than one control group. For instance, a student could be eligible for FRPL and could have moved at least once during the observation period. In this instance, the coefficients for each of those variables would be applied to that student observation during the computation of expected scores.

[c] Each of the control variables from Models 1 through 4 had t-statistics and p-values that indicate a confidence interval for the beta coefficients greater than 99 percent. This is also indicated in the small standard errors associated with each control variable.

Table A.1
Regression Output For Reading And Math Scale Scores, Grades 3 Through 8 And 11, Models 1 Through 4
School Years 2018, 2019, And 2022

	OLS Regression, Reading and Math Performance, School Years 2018, 2019, And 2022							
	Model 1		Model 2		Model 3		Model 4	
Controls	Beta Coefficient	Standard Error	Beta Coefficient	Standard Error	Beta Coefficient	Standard Error	Beta Coefficient	Standard Error
Black	**-0.3914**	0.0018	**-0.3821**	0.0018	**-0.3617**	0.0018	**-0.3831**	0.0018
Hispanic	**-0.0608**	0.0028	**-0.0606**	0.0028	**-0.0552**	0.0028	**-0.0757**	0.0028
Other race	**0.2911**	0.0040	**0.2905**	0.0039	**0.2826**	0.0039	**0.2432**	0.0039
FRPL	**-0.4456**	0.0014	**-0.4293**	0.0014	**-0.4092**	0.0014	**-0.3762**	0.0014
LEP	**-0.7335**	0.0044	**-0.7304**	0.0044	**-0.7052**	0.0044	**-0.7224**	0.0044
IEP	**-0.5622**	0.0020	**-0.5510**	0.0020	**-0.5464**	0.0020	**-0.5452**	0.0020
Homeless	**-0.1723**	0.0043	**-0.1293**	0.0043	**-0.1168**	0.0043	**-0.1084**	0.0043
Male	**-0.0469**	0.0013	**-0.0468**	0.0013	**-0.0465**	0.0013	**-0.0466**	0.0013
Moved ever			**-0.3912**	0.0033	**-0.3814**	0.0033	**-0.3930**	0.0033
School FRPL population 75 percent or more					**-0.1289**	0.0016	**-0.0956**	0.0017
Percent bachelor's or more by zip code							**0.0058**	0.0001
Intercept (α)	**0.4500**		**0.4597**		**0.4699**		**0.3131**	
R-Squared	0.1607		0.1692		0.1718		0.1774	
Number of observations	2,043,234		2,043,234		2,043,234		2,043,234	

Note: The intercept (α) represents the control group mean of 2018, 2019, and 2022 reading and math scale score for each of the models. Beta coefficients have been rounded to the nearest ten-thousandth. FRPL = free or reduced-price lunch; LEP = limited English proficiency; IEP = individualized education program. Each of the control variables from Models 1 through 4 had t-statistics and p-values that indicate a confidence interval for the beta coefficients greater than 99 percent.
Source: Staff analysis of data from the Kentucky Department of Education and US Census Bureau.

OLS Models For Career Readiness and Graduation Rate

Models for career readiness and graduation rate were also conducted for school years 2018 and 2019. These models were used as alternative metrics of district performance to determine if there were districts that consistently performed above or below what the models projected.

Career Readiness Model

The career readiness model was a student-level model that included only high school graduates from school years 2018 and 2019. The control variables for this model were the same that were used in the reading and math model described earlier in this appendix. The strongest predictor from this model was whether a student moved schools. The models were structured with districts' career readiness rates by grade and year as the dependent variable.

When looking at the actual career readiness rates relative to the residuals produced by this model, there was very little district movement up or down when ranking districts relative to the other districts using standard scores.

Graduation Rate

The graduation rate model was a district-level model that included district data from 2018 and 2019. This model controlled for the percentages of students who were eligible for FRPL, percentage of students with an IEP, percentage of Black students, percentage of students of other race, percentage of students with LEP, percentage of homeless students, and the percentage of residents with bachelor's degrees within the district. The models were structured with districts' graduation rates by grade and year as the dependent variable. This model accounted for nearly 19 percent of the explained variance between the controls and the dependent variable. One of the strongest predictors for this model was the percentage of students eligible for FRPL.

Additional Methods That Validate Findings Of Chapter 3

Ordinary Least Squares Regression Model Without Controls For Race

The same OLS model was performed, but the controls for race and ethnicity were removed to examine if the model explained the same amount of variance without the controls for race and ethnicity. The OLS model without race/ethnicity controls had higher magnitude coefficients for FRPL and for students who attended a school where 75 percent or more of students were eligible for FRPL. The OLS model without race/ethnicity controls accounted for roughly 2 percentage points less of the explained variance relative to the full OLS model described above.

Mixed-Effects Model

A mixed-effects model was also performed on this data. Mixed-effects models account for both fixed and random effects and are typically used when using panel data, or when repeated measurements are made on the same students over multiple years, for instance. Mixed-effects

models are also used when units can be clustered together— for example, students within schools.[39]

The clustering unit for this mixed-effects model was schools, and the model was performed using the same student-level data for school years 2018, 2019, and 2022 that was used for the OLS model described above.

The coefficients and computed residuals for the mixed-effects output were slightly different from those from the OLS model, but the categorization of districts by impact was still computed using the standard score of the residual, in this case from the mixed-effects model. There were 57 districts that were in a different impact category relative to the OLS model output, with 28 moving down one category and 28 moving up one category. One district moved up from the average category to the highest category when the mixed-effects model output was used.

Standard Score Comparison—IEP Students Relative To Other Students

As noted in Chapter 2, Kentucky districts range broadly in the percentage of students identified as eligible for special education. This variation may reflect naturally occurring differences among the student populations in each district. It may also reflect, in part, differences among districts in the standards or practices used to identify students for special education. Should these differences in identification practices exist, they could affect the scores of individual districts in the impact model.

Table A.2 compares the average actual standard scores for reading and math performance for IEP students relative to the rest of the student population. Districts are grouped by the percentage of IEP students. The third column is the difference in the average standard scores for these student groups. The table shows that the difference between the scores of IEP students and other students is the smallest for districts with the highest percentages of IEP students and increases as the percentage of IEP students decreases.

Table A.2
Average District Standard Scores For Reading And Math
Comparison Between IEP And Not IEP Students
School Years 2018, 2019, And 2022

	Standard Score		
IEP % Category	**IEP Students**	**Not IEP Students**	**Difference**
Highest	-0.35	0.02	-0.37
High	-0.61	-0.04	-0.56
Average	-0.61	0.06	-0.68
Low	-0.56	0.04	-0.60
Lowest	-0.47	0.27	-0.74
Total	-0.52	0.07	-0.59

Note: IEP = students eligible for individualized education programs.
Source: Staff analysis of data from the Kentucky Department of Education.

Table A.2 shows that actual, unadjusted scores of IEP students are highest among districts that identify students for special education at the highest rates and lowest among districts that identify students for special education at the lowest rates. These differences could potentially reflect differences in the effectiveness of practices used to educate IEP students in those districts. Data reported in Table A.2 might also indicate differences among districts in the standards or practices used to identify students as eligible for special education.

Table A.3 shows the district counts for impact category grouped by district IEP percentage category. Overall, 15 of the 27 districts in the highest IEP percentage category were in the high- or highest-impact categories.

Table A.3
District Count For Reading And Math Model Impact Category
By District Exceptional Child Percentage
School Years 2018, 2019, And 2022

	All Students Model Category						
IEP % Category	Highest	High	Average	Low	Lowest	Total	Average EC %
Highest	8	7	6	5	1	27	19
High	1	4	8	6	3	22	15
Average	6	11	20	14	6	57	13
Low	5	3	14	12	13	47	11
Lowest	4	6	4	3	1	18	9
Total	24	31	52	40	24	171	13

Note: IEP = students eligible for individualized education programs; EC = exceptional child.
Source: Staff analysis of data from the Kentucky Department of Education.

Table A.4 also shows the district counts for impact category grouped by district IEP percentage category, but the impact model for this table excluded IEP students entirely. With IEP students removed from the model, only 11 of the 27 highest IEP percentage districts were in the highest-impact category.

Table A.4
District Count For Reading And Math Model Without IEP Students
Impact Category By District Exceptional Child Percentage
School Years 2018, 2019, And 2022

	No IEP Students Model Category					
EC Category	Highest	High	Average	Low	Lowest	Total
Highest	6	5	6	10	0	27
High	1	3	9	7	2	22
Average	6	16	18	13	4	57
Low	5	8	10	11	13	47
Lowest	5	5	5	2	1	18
Total	23	37	48	43	20	171

Note: IEP = students eligible for individualized education programs.
Source: Staff analysis of data from the Kentucky Department of Education.

Appendix B

Standard Scores And Thresholds

Standard Scores. Because the report combines data from a variety of measures and years, it transforms each data point into a "standard score" that represent the data by units that can be compared across data sets. Standard scores take into account the difference of each data point from the mean, as well as the general distribution of data from the mean, as determined by the measure of standard deviation. Data that are more widely distributed have relatively higher standard deviations of units measured, and data that are packed close together have lower standard deviations. A standard score of 0 is equal to the average. Most measures fall between 0 and a standard score of positive or negative 1 standard score.

Categories

Following commonly used cut points, OEA considers data that are within one-third standard deviation of the mean as average, and data that are more than one-third standard deviation above or below the mean are considered high or low.[40] On occasion, the report further divides high and low categories into highest or lowest; these categories are based on data that are 1 or more standard deviations above or below the mean. Because of differences in the way that different data sets are distributed in relation to the mean, different numbers of districts fall into each category, depending on the data set used.

Table B.1
Thresholds For Categories Used In This Report

Category Of Metric	Range Of Metric	District FRPL Percent	Per-Pupil Expenditures	Reading And Math Standard Actual Score	Reading And Math Impact Residual
Highest	Low	76.9	$14,964	0.191	0.138
	High	91.4	$24,237	0.872	0.416
High	Low	68.3	$13,816	0.056	0.038
	High	76.3	$14,742	0.184	0.132
Average	Low	59.6	$12,561	-0.082	-0.06
	High	67.9	$13,706	0.051	0.037
Low	Low	50.4	$11,439	-0.215	-0.155
	High	59.0	$12,549	-0.087	-0.062
Lowest	Low	05.5	$10,678	-0.457	-0.431
	High	50.0	$11,355	-0.232	-0.159

Note: FRPL = students eligible for free and reduced-price lunch.
Source: Staff analysis of data from the Kentucky Department of Education.

Table B.2
Average Proficiency Rates For Reading And Math And Average ACT Composite For Districts Grouped By Actual Reading And Math Performance Categories 2018, 2019, And 2022

	Actual Performance Category					
Metric	**Highest**	**High**	**Average**	**Low**	**Lowest**	**Total**
Average of 11th-grade ACT composite	20.6	18.9	18.5	18.0	17.3	18.6
Average of elementary school math proficiency	62.1	49.9	44.1	38.5	28.5	44.2
Average of elementary school reading proficiency	66.4	56.9	51.9	45.9	37.5	51.4
Average of middle school math proficiency	58.8	51.0	42.0	36.4	28.9	43.0
Average of middle school reading proficiency	68.0	58.7	55.6	49.9	43.1	54.8

Source: Staff analysis of data from the Kentucky Department of Education.

Table B.3
Average Proficiency Rates For Reading And Math And Average ACT Composite For Districts Grouped By Impact Reading And Math Performance Categories 2018, 2019, And 2022

	Impact Performance Category					
Metric	**Highest**	**High**	**Average**	**Low**	**Lowest**	**Total**
Average of 11th-grade ACT composite	19.5	18.7	18.6	18.2	17.8	18.6
Average of elementary school math proficiency	58.8	48.5	45.0	38.4	32.3	44.2
Average of elementary school reading proficiency	64.0	56.3	52.0	46.5	39.7	51.4
Average of middle school math proficiency	54.7	49.4	42.8	37.4	32.4	43.0
Average of middle school reading proficiency	64.3	58.7	55.1	51.4	45.3	54.8

Source: Staff analysis of data from the Kentucky Department of Education.

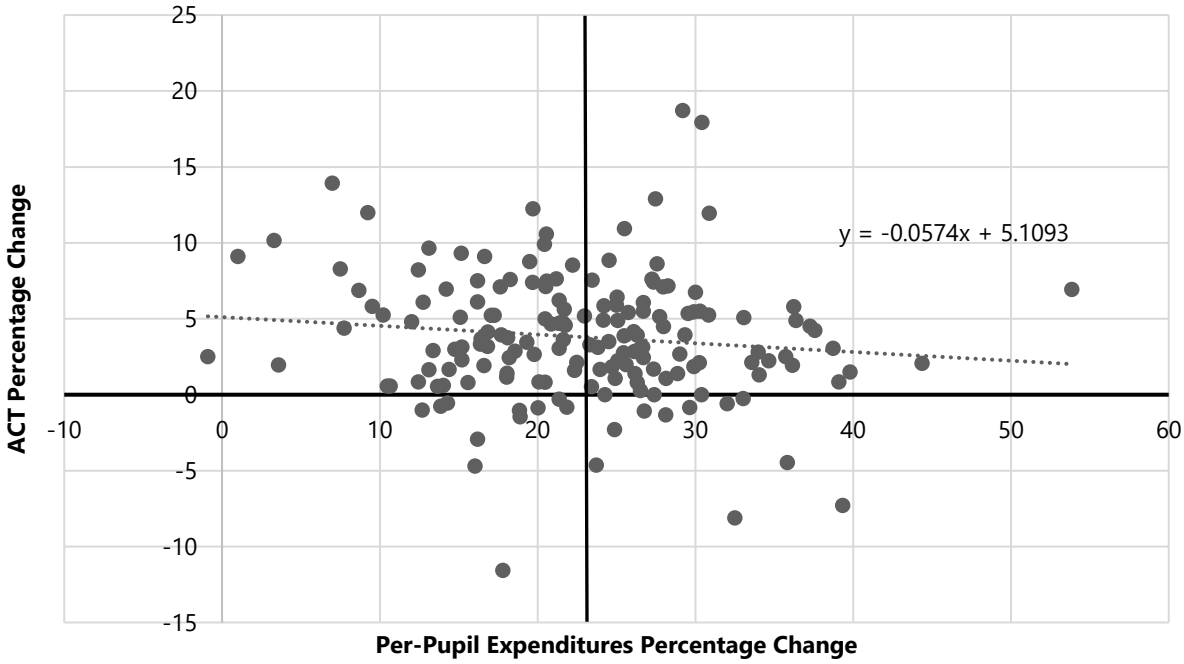
Appendix C

Change In Per-Pupil Spending And ACT Composite Over Time

This analysis looks at the percentage change in ACT composite scores by district over 10 years. Data for school years 2009 and 2010 were combined to form the beginning years of the analysis, and data for school years 2018 and 2019 were combined to form the final years of the comparison between the two eras.

Figure C.A. shows a scatter-plot of districts with the percentage change in ACT composite scores on the vertical axis, and the percentage change in per-pupil expenditures on the horizontal axis. When plotting these two metrics, without any statistical adjustments, there is a slight negative relationship between the two measures of change.

Figure C.A
Percentage Change In Per-Pupil Spending Relative To Percentage Change In ACT Scores 2009 And 2010 Averages Relative To Averages For 2018 and 2019



Source: Staff analysis of data from the Kentucky Department of Education.

Table C.1 shows the demographic changes that occurred during the 10 years for districts that were grouped by change in per-pupil expenditures categories. Districts that were in the highest per-pupil expenditures change group had the largest change in the percentage of students eligible for free or reduced-price lunch and change in the percentage of students with limited English proficiency. Districts from the lowest change in per-pupil expenditures group had lower percentages of FRPL students in 2018 and 2019 relative to 2009 to 2010.

Table C.1
Demographic Changes In Districts, Grouped By Percentage Change In Per-Pupil Spending
School Years 2010 To 2019

Change In Per-Pupil Expenditures	Percentage Point Difference From School Year 2010 To School Year 2019							
Category	Membership	FRPL	White	Black	Hispanic	Other Race	IEP	LEP
Highest	-3.77	4.32	-7.56	-1.08	4.71	3.93	0.14	1.43
High	-2.67	1.94	-4.35	-0.37	2.59	2.14	0.40	0.82
Average	-2.39	2.20	-3.37	-0.86	2.29	1.95	0.31	0.51
Low	-0.80	1.20	-3.27	-1.23	2.49	2.01	-0.60	0.64
Lowest	-3.27	-2.77	-3.48	-0.19	2.21	1.47	0.42	0.72
Total change	-2.42	1.44	-4.13	-0.75	2.70	2.19	0.13	0.76

Note: FRPL = eligible for free and reduced-price lunch; IEP = students with an individualized education program; LEP = students with limited English proficiency.
Source: Staff analysis of data from the Kentucky Department of Education.

Table C.2 shows percentage of small districts, and the percentage of not small districts grouped by the percentage change in ACT composite scores category. The smaller districts were disproportionately in the highest and lowest categories for ACT score change.

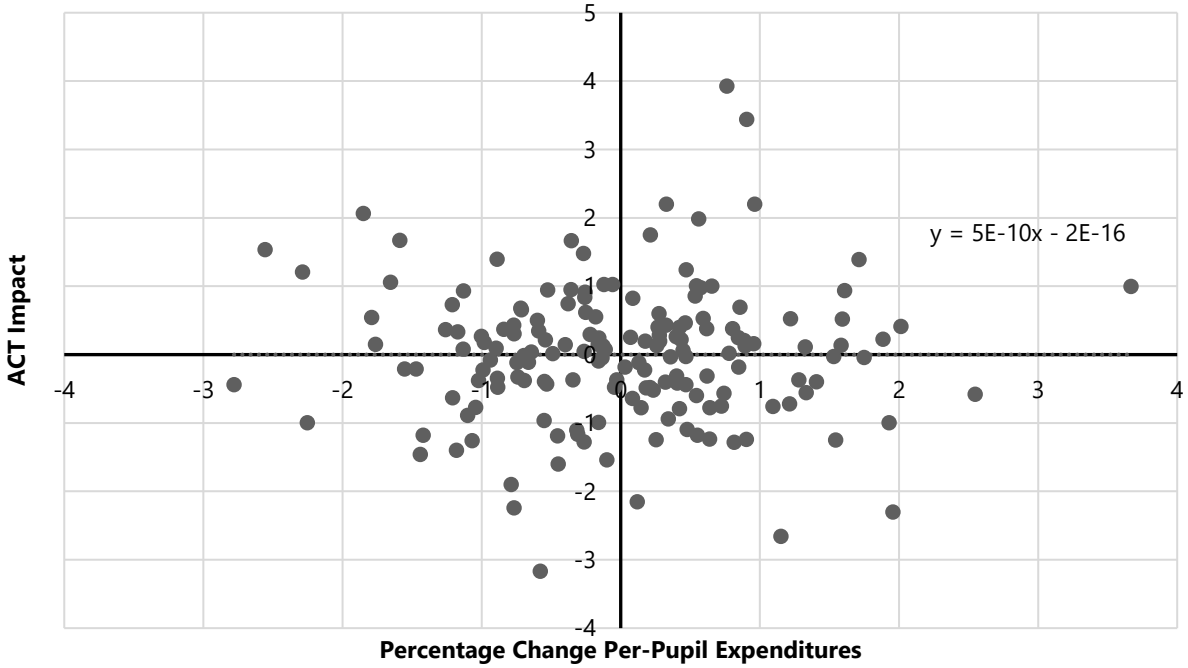
Table C.2
Percentage Of Districts Small Or Not,
Grouped By Percentage Change In ACT Composite Scores
2009 And 2010 Averages Relative To 2018 And 2019 Averages

Percentage Change ACT Category	Percent Small Districts	Percent Other Districts	Total
Highest	33.33%	66.67%	100.00%
High	20.00	80.00	100.00
Average	20.41	79.59	100.00
Low	16.28	83.72	100.00
Lowest	36.84	63.16	100.00
Average/total	22.75%	77.25%	100.00%

Source: Staff analysis of data from the Kentucky Department of Education.

Figure C.B shows a scatter-plot of districts with the ACT district impact score on the vertical axis, and percentage change in per-pupil expenditures on the horizontal axis. The ACT impact scores were computed with an ordinary least squares regression, similar to the model described in Appendix A, that had change in ACT composite scores as the dependent variable, and the percentage change in district demographics, percentage change in membership, and percentage change in per-pupil expenditures as control variables. The scatter-plot indicates no apparent relationship between percentage change in ACT impact scores and the percentage change in per-pupil expenditures after adjusting for the controls in the ACT percentage change model.

Figure C.B
Change In ACT Impact Score Relative To Change In Per-Pupil Expenditures
2009 And 2010 Averages Relative To 2018 And 2019 Averages



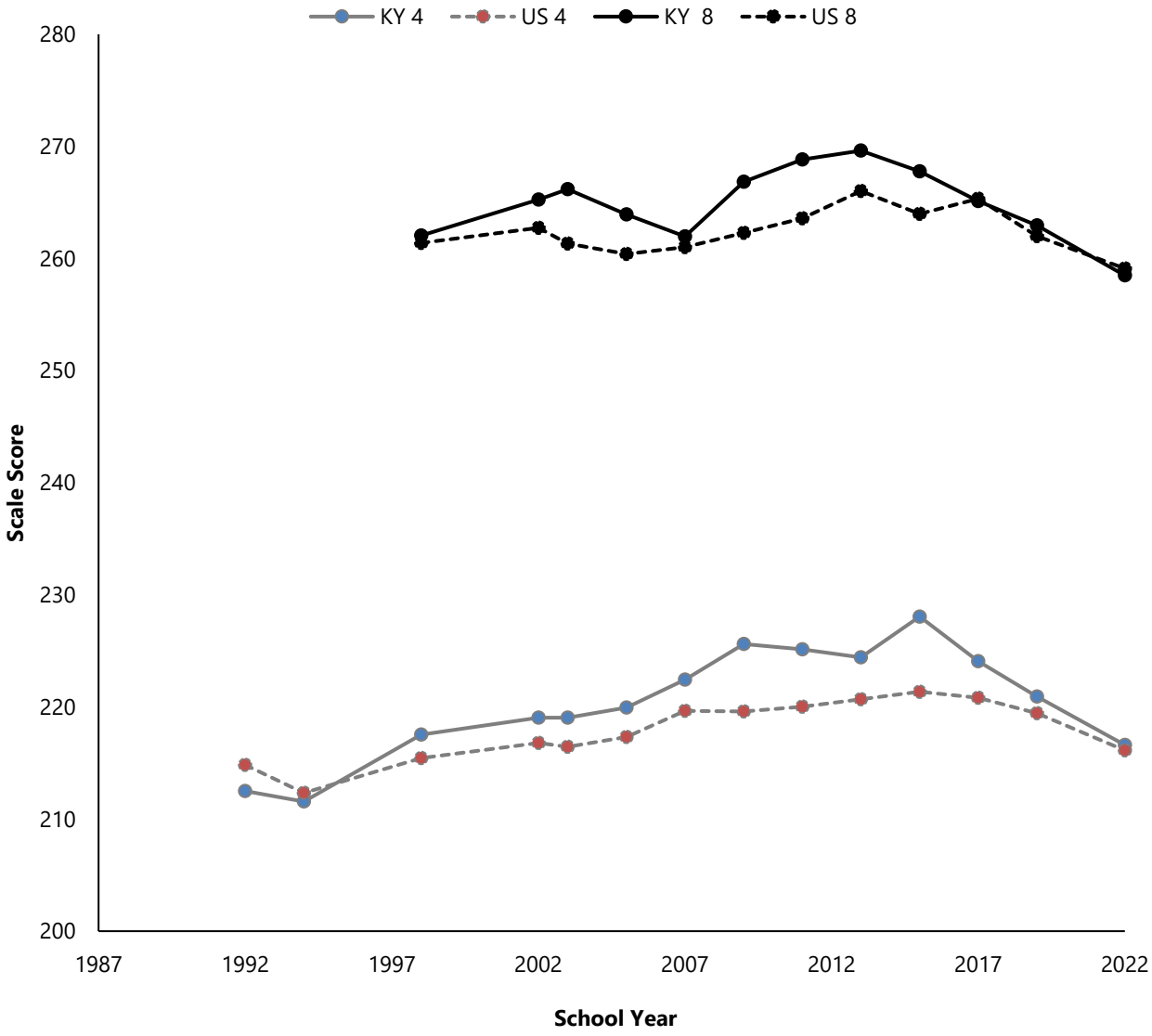
Source: Staff analysis of data from the Kentucky Department of Education.

Appendix D

NAEP Reading And Math Scores, Kentucky And Nation 1990 To 2022

Figure D.A shows NAEP 4th- and 8th-grade reading scale scores for Kentucky and the US between 1990 and 2022 for all years available.

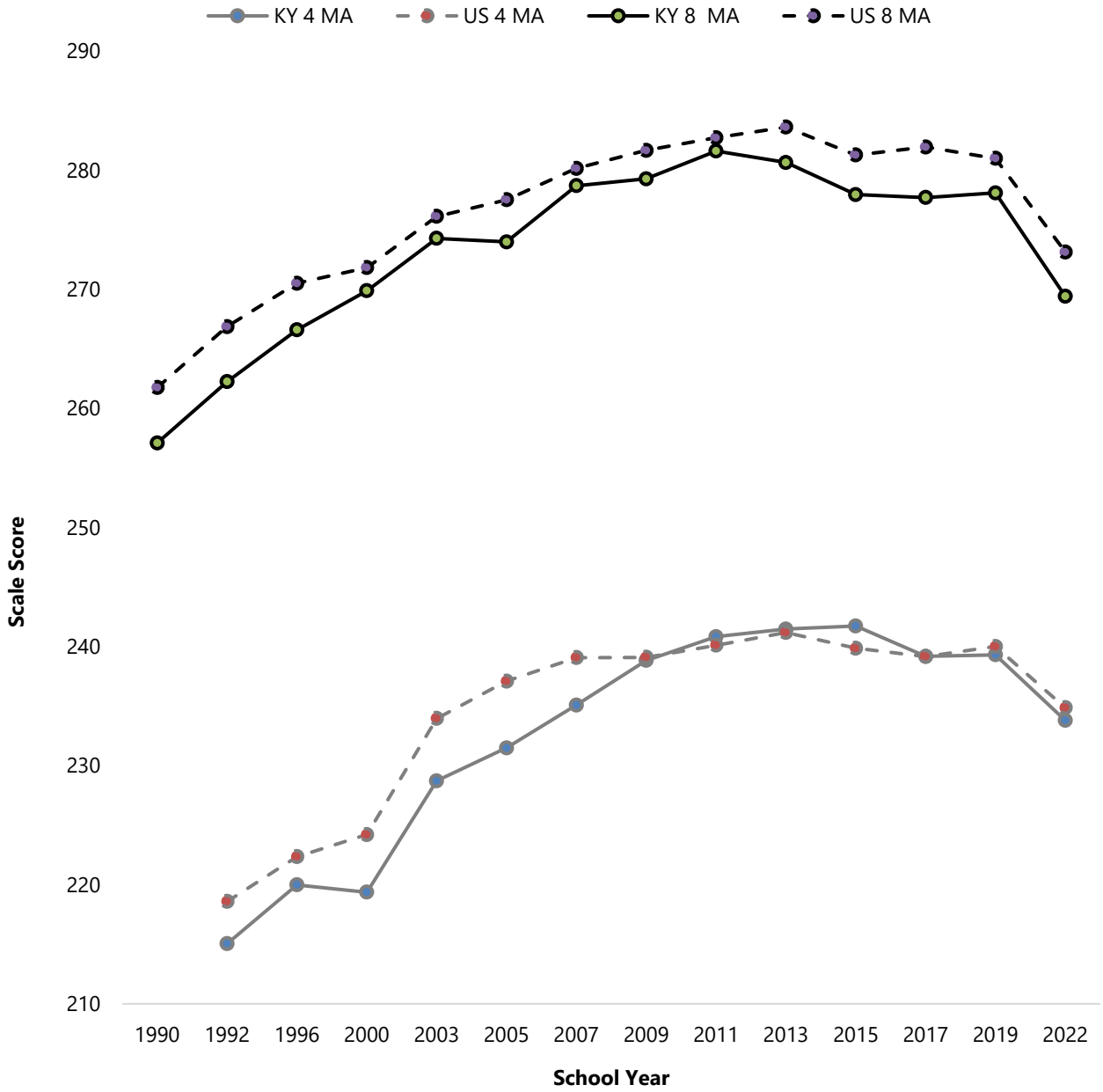
Figure D.A
NAEP Reading Scale Scores, 4th And 8th Grades, Kentucky And US
1990 To 2022



Notes: Prior to 2000, testing accommodations were not permitted on NAEP. US data reported from national public data
Source: Staff compilation of data from the National Center of Education Statistics.

Figure D.B shows NAEP 4th- and 8th-grade math scale scores for Kentucky and the US between 1990 and 2022 for all years avaialble.

Figure D.B
NAEP Math Scale Score, 4th And 8th Grades, Kentucky And US
1990 To 2022



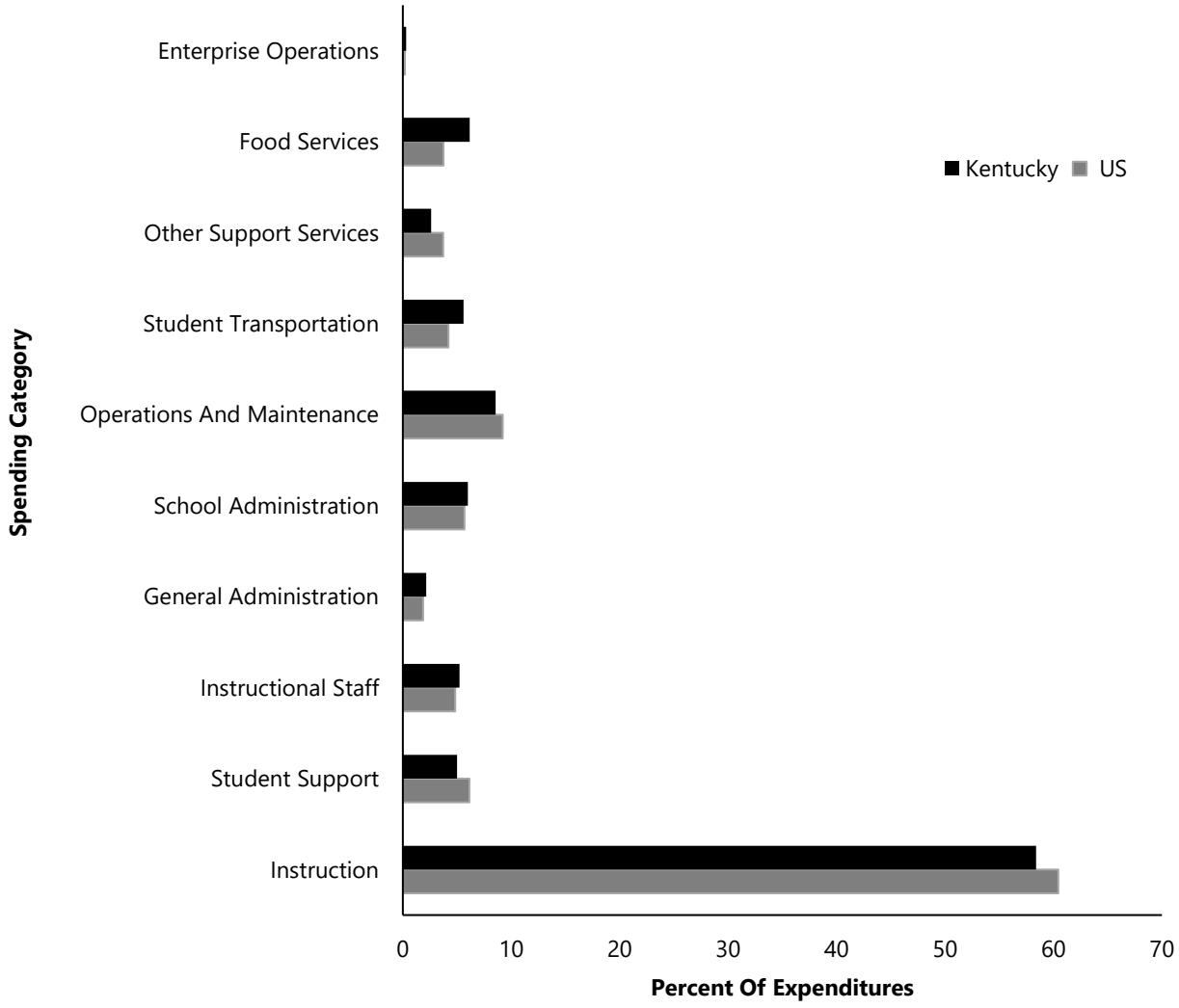
Notes: Prior to 2000, testing accommodations were not permitted on NAEP. US data reported from national public data.
Source: Staff compilation of data from the National Center of Education Statistics.

Appendix E

Education Spending By Category Comparisons, Kentucky And US 2019

Figure E.A and Table E.1 show the percentage of current expenditures by category for Kentucky and the US in 2019. Table E.1 also shows the ratio, by category, of Kentucky expenditures to the US.

Figure E.A
Percentage Of Current Expenditures By Category, Kentucky And US 2019



Source: Staff compilation of data from US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Table E.1
Percent Of Expenditures By Function, Kentucky And US
2019

Function	US	Kentucky	Ratio Kentucky To US
Instruction	60.4%	58.4%	0.97
Student support	6.1	5.0	0.81
Instructional staff	4.8	5.2	1.08
General administration	1.9	2.2	1.16
School administration	5.7	6.0	1.06
Operations and maintenance	9.2	8.5	0.93
Student transportation	4.2	5.6	1.34
Other support services	3.7	2.6	0.70
Food services	3.7	6.2	1.65
Enterprise operations	0.2	0.3	1.64

Source: US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Appendix F

Geographic Location Of Students, Kentucky And US 2019

Table F.1
Number And Percentage Of Students, By Geographic Location, Kentucky And US 2019

	Number Of Students		Percent Of Students	
	US	Kentucky	US	Kentucky
Total, All Students	50,437,821	691,868*		
City Total	15,425,261	151,869*	31%	22%*
Large	8,508,016	125,062	17	18
Midsize	3,257,629	N/A	6	N/A
Small	3,662,616	26,807	7	4
Suburban Total	19,727,941	117,620	39	17
Large	16,921,422	88,788	34	13
Midsize	1,822,788	13,836	4	2
Small	983,731	14,996	2	2
Town Total	5,469,164	163,583	11	24
Fringe	1,400,748	17,644	3	3
Distant	2,578,723	92,198	5	13
Remote	1,489,693	53,741	3	8
Rural Total	9,815,455	258,796	19	37
Fringe	6,024,263	127,540	12	18
Distant	2,798,354	90,817	6	13
Remote	992,838	40,439	2	6

Note: N/A = not applicable. Percentage totals may not sum to figures shown, due to rounding.
* Total is partial due to lack of data for midsize cities.
Source: Staff compilation of data from US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Appendix G

NAEP Performance By Student Subgroups, Kentucky And US

Table G.1 shows NAEP 2022 proficiency rates and percentage of tested students, by select student subgroups. Kentucky NAEP performance by student group is, on average, similar to that of the nation for students eligible for free and reduced-price lunch (FRPL), higher for Hispanic students, and lower for Black and white students.

Compared with the nation, a higher percentage of Kentucky students are eligible for FRPL (58 percent versus 51 percent) and white (73 percent versus 45 percent), and a lower percentage are Black (10 percent versus 15 percent) or Hispanic (9 percent versus 29 percent).

Table G.1
Average Percentage Of Students Proficient Or Above By Student Group And Average Percentage Of Student Group Relative To All Students NAEP Reading And Math, 4th and 8th Grades, Kentucky And US 2022

		Student Subgroup				
Category	Jurisdiction	Eligible For FRPL	Ineligible For FRPL	Black	Hispanic	White
Percent proficient or above	Kentucky	18%	43%	11%	21%	32%
	United States	18	44	14	19	40
Percent of tested students	Kentucky	58	42	10	9	73
	United States	51	48	15	29	45

Note: NAEP = National Assessment of Educational Progress; FRPL = free or reduced-price lunch.
Source: US. Department of Education. Institute of Education Sciences. National Center For Education Statistics. National Assessment Of Educational Progress. Data Tools: State And National Public Snapshots.

Appendix H

NAEP Scores, Kentucky and US 2022

Table H.1
Average Percentage Of Students Proficient Or Above, NAEP Reading and Math, 4th And 8th Grades, 2022, COLA-Adjusted Per-Pupil Spending, 2020, And Percentage Of Children Living In Poverty, 2021, Kentucky And US

State	COLA-Adjusted Per-Pupil Expenditures, 2020	Percent Child Poverty, 2021	Per-Pupil Expenditure Category	Child Poverty Category	Average NAEP Proficiency, 2022
Utah	$8,532	8%	Lowest	Lowest	37.50
Arizona	8,886	17	Lowest	Average	28.75
Idaho	9,015	13	Lowest	Low	33.00
Nevada	9,661	19	Lowest	High	26.25
Florida	10,321	18	Lowest	High	33.00
Oklahoma	10,489	21	Lowest	Highest	22.00
Texas	10,549	20	Low	High	28.75
North Carolina	10,775	18	Low	High	29.50
Tennessee	10,935	18	Low	High	29.75
Mississippi	11,116	28	Low	Highest	25.75
Colorado	11,309	12	Low	Low	34.00
South Dakota	11,313	15	Low	Average	33.75
Alabama	11,485	22	Low	Highest	24.00
Indiana	11,633	16	Low	Average	33.50
Arkansas	11,820	22	Low	Highest	25.75
Missouri	12,312	16	Low	Average	29.00
South Carolina	12,325	20	Low	High	28.75
Oregon	12,353	14	Low	Low	26.75
Georgia	12,391	20	Low	High	30.25
California	12,471	16	Low	Average	28.50
New Mexico	12,526	24	Low	Highest	17.75
Kentucky	**12,700**	**22**	**Low**	**Highest**	**28.50**
Montana	12,808	14	Low	Low	32.50
Kansas	12,892	13	Average	Low	28.75
Virginia	12,922	13	Average	Low	33.00
Michigan	12,932	18	Average	High	28.25
Iowa	13,072	13	Average	Low	32.50
Louisiana	13,166	27	Average	Highest	25.25
Washington	13,461	12	Average	Low	32.25
Wisconsin	13,539	13	Average	Low	35.25
Minnesota	13,639	11	Average	Lowest	33.75
Nebraska	13,887	13	Average	Low	34.25
Delaware	14,288	17	Average	Average	23.25
West Virginia	14,319	21	Average	Highest	20.50
Ohio	14,718	19	Average	High	34.25

State	COLA-Adjusted Per-Pupil Expenditures, 2020	Percent Child Poverty, 2021	Per-Pupil Expenditure Category	Child Poverty Category	Average NAEP Proficiency, 2022
Hawaii	14,838	14	Average	Low	31.25
Maryland	15,144	14	High	Low	30.00
North Dakota	15,265	10	High	Lowest	31.50
Maine	16,938	15	High	Average	28.50
New Hampshire	17,130	9	High	Lowest	34.75
Rhode Island	17,308	15	High	Average	30.75
Pennsylvania	17,508	17	Highest	Average	33.00
Illinois	17,562	16	Highest	Average	32.50
Wyoming	17,762	13	Highest	Low	35.75
Alaska	17,811	12	Highest	Low	25.25
Massachusetts	18,392	13	Highest	Low	40.25
New Jersey	19,224	14	Highest	Low	38.00
Connecticut	20,140	13	Highest	Low	34.25
District of Columbia	21,684	24	Highest	Highest	22.00
Vermont	22,245	10	Highest	Lowest	32.25
New York	23,063	19	Highest	High	29.50

Note: NAEP = National Assessment of Educational Progress; COLA = cost-of-living adjustment. Per-pupil expenditure and child poverty categories were derived based on methods described in Appendix B.
Sources: Staff analysis of National Assessment of Educational Progress data and per-pupil expenditures from National Center for Education Statistics; and child poverty data from the Annie E. Casey Foundation Kids Data Center.

Appendix I

District Data

Table I.1 shows categories by district of select measures mentioned in Chapters 2 and 3.

Table I.1
Select Financial And Teacher Workforce Data, By District
2018, 2019, And 2022

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Adair County	High	Low	Low	✓		Lowest	Low	$36,000	$272
Allen County	Average	Low	Lowest	✓		Average	Low	37,605	395
Anchorage Independent	Lowest	Highest	Highest		✓	Highest	Average	41,494	2,574
Anderson County	Lowest	Low	Low	✓		Low	Low	36,560	-366
Ashland Independent	Average	Average	High			Low	Average	36,048	-593
Augusta Independent	Average	High	Highest		✓	Average	Average	37,798	588
Ballard County	Average	Average	Low	✓		Average	High	35,979	-1,331
Barbourville Independent	Average	Low	High		✓	Average	Low	34,644	-2,396
Bardstown Independent	Average	High	High			Low	Lowest	41,029	4,104
Barren County	Low	Average	Average	✓		Average	Low	37,361	151
Bath County	High	Low	Low	✓		Average	Average	35,394	-1,817
Beechwood Independent	Lowest	Lowest	Highest			Highest	Low	40,643	1,964
Bell County	Highest	Average	Average	✓		Average	Low	32,753	-4,286
Bellevue Independent	High	Highest	Highest		✓	Highest	Highest	39,346	924
Berea Independent	Average	High	Highest			Average	Average	37,923	456
Boone County	Lowest	Low	Average			Highest	Low	40,097	1,761
Bourbon County	Average	Average	Low	✓		Low	High	36,125	-629
Bowling Green Independent	Average	Average	Highest			Average	Average	38,231	764
Boyd County	Average	Highest	Average	✓		Low	Average	35,860	-781
Boyle County	Low	Average	Average	✓		Average	Average	39,197	2,143

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Bracken County	Low	Lowest	Lowest	✓		Average	High	35,825	-1,386
Breathitt County	Highest	High	Low	✓		Average	Average	37,422	41
Breckinridge County	Average	Average	Low	✓		High	Average	38,701	907
Bullitt County	Lowest	Low	Average			Low	Average	39,780	2,855
Burgin Independent	Lowest	Average	Average	✓	✓	High	Average	35,626	-2,155
Butler County	Average	Low	Lowest	✓		Average	Average	35,839	-1,428
Caldwell County	Average	Low	Low	✓		Lowest	Average	36,569	228
Calloway County	Average	Low	Lowest	✓		Average	Low	36,563	-776
Campbell County	Lowest	Average	Average			Highest	Average	39,742	1,321
Campbellsville Independent	High	High	Average			Lowest	Average	37,526	1,798
Carlisle County	Low	Average	Low	✓	✓	High	Average	35,730	-2,136
Carroll County	High	Highest	Highest	✓		High	Highest	39,428	1,591
Carter County	Average	Low	Low	✓		Lowest	Low	36,277	-207
Casey County	High	Average	Low	✓		Lowest	Average	36,105	377
Caverna Independent	Highest	Highest	Average		✓	Average	Highest	38,976	1,752
Christian County	High	Low	Lowest	✓		Average	Highest	37,610	171
Clark County	Average	Average	Average	✓		High	High	37,500	-280
Clay County	Highest	Average	High	✓		Average	Lowest	35,871	-1,169
Clinton County	High	Average	Low	✓		Lowest	Lowest	35,530	-198
Cloverport Independent	Average	Low	High		✓	High	Highest	35,409	-2,386
Corbin Independent	Average	Lowest	Average			Lowest	Lowest	38,316	1,932
Covington Independent	Highest	Highest	Highest			Highest	Highest	39,145	467
Crittenden County	Average	Low	Lowest	✓		Lowest	Average	37,017	675
Cumberland County	Highest	High	Low	✓	✓	Lowest	High	35,438	-290
Danville Independent	Average	Highest	Highest			Average	High	39,894	2,840
Daviess County	Low	Low	Average	✓		High	Low	39,706	2,139
Dawson Springs Independent	High	Low	High		✓	Lowest	Average	34,004	-2,337

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Dayton Independent	Highest	High	Highest		✓	Highest	Highest	38,315	-107
East Bernstadt Independent	Average	Low	Average		✓	Lowest	Average	38,003	1,676
Edmonson County	Average	Low	Lowest	✓		Average	Low	35,256	-2,011
Elizabethtown Independent	Lowest	Low	Highest			Highest	Low	39,168	874
Elliott County	High	Average	Lowest	✓	✓	Lowest	Low	33,717	-2,767
Eminence Independent	Average	Low	Highest		✓	High	Highest	36,668	-1,169
Erlanger-Elsmere Independent	High	Average	Highest			Highest	Highest	38,507	-171
Estill County	High	Low	Low	✓		Average	Average	37,699	318
Fairview Independent	High	Low	Highest		✓	Low	Highest	36,403	-237
Fayette County	Low	Highest	Highest			Highest	Low	42,262	3,911
Fleming County	Average	Low	Lowest	✓		Average	Average	35,702	-1,508
Floyd County	High	Average	Low	✓		Lowest	Average	38,279	2,322
Fort Thomas Independent	Lowest	Low	Highest			Highest	Lowest	40,780	2,358
Frankfort Independent	Low	Highest	Highest		✓	Average	Average	37,310	-29
Franklin County	Low	Low	Average			Average	Average	38,734	1,395
Fulton County	High	High	Low	✓	✓	High	Highest	35,834	-2,032
Fulton Independent	Highest	Highest	Highest		✓	High	Highest	35,686	-2,180
Gallatin County	High	Average	High	✓		High	Highest	36,755	-1,083
Garrard County	Average	Low	Average	✓		Average	Average	36,974	-407
Glasgow Independent	Average	Average	High			Average	Low	37,748	537
Grant County	High	Low	Low	✓		High	Highest	36,107	-1,730
Graves County	Low	Low	Lowest	✓		High	Average	37,290	-576
Grayson County	Average	Low	Low	✓		High	Low	36,979	-816
Green County	Average	Average	Low	✓		Average	Low	36,216	-1,051
Greenup County	Average	Average	High	✓		Average	Average	35,531	-1,680
Hancock County	Low	Average	Average	✓		High	Average	38,729	934
Hardin County	Low	Low	Average	✓		Highest	Average	39,003	710

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Harlan County	Highest	Average	Low	✓		Low	Low	34,748	-1,821
Harlan Independent	Average	Average	Average		✓	Low	Average	34,561	-2,009
Harrison County	Average	Low	Low	✓		Average	Low	36,098	-1,113
Hart County	Average	Average	Average	✓		Average	Average	35,706	-1,561
Hazard Independent	Average	Average	Average		✓	Low	Average	37,867	1,298
Henderson County	Low	Low	Average	✓		Average	Average	36,603	-721
Henry County	Low	Low	Average	✓		High	High	36,187	-1,651
Hickman County	Average	High	Low	✓	✓	High	Average	35,757	-2,109
Hopkins County	Average	Low	Low	✓		Lowest	Average	36,549	208
Jackson County	High	High	Average	✓		Average	Lowest	36,101	-1,280
Jackson Independent	Low	High	High		✓	Average	Highest	34,358	-3,023
Jefferson County	Average	Highest	Highest			Highest	Low	42,914	3,994
Jenkins Independent	Highest	Highest	Highest	✓	✓	Lowest	Highest	37,842	1,885
Jessamine County	Low	Low	Average			Average	Average	38,299	1,117
Johnson County	Average	Average	Low	✓		Lowest	Low	37,344	1,388
Kenton County	Lowest	Lowest	Average			Highest	Average	42,492	3,814
Knott County	High	High	Low	✓		Lowest	Average	38,082	2,126
Knox County	Highest	High	Low	✓		Average	Average	34,880	-2,160
LaRue County	Low	Low	Low	✓		Average	Lowest	38,986	1,719
Laurel County	High	Low	Low	✓		Lowest	Low	38,055	1,728
Lawrence County	Average	Average	Low	✓		Lowest	Average	35,754	-729
Lee County	Highest	Average	Lowest	✓	✓	High	Low	36,393	-1,387
Leslie County	High	Average	Low	✓		Average	Low	35,602	-1,438
Letcher County	High	Average	Average	✓		Lowest	Average	38,068	2,112
Lewis County	High	Low	Lowest	✓		Average	Low	36,293	-918
Lincoln County	Average	Average	Low	✓		Average	High	36,403	-978
Livingston County	Average	Highest	Lowest	✓		Lowest	Low	38,005	1,663

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Logan County	Low	Low	Lowest	✓		Low	Average	36,698	-270
Ludlow Independent	High	High	Highest		✓	Highest	Low	40,268	1,590
Lyon County	Average	Low	Lowest	✓	✓	Lowest	Average	37,991	1,649
Madison County	Low	Low	Average			Average	Low	38,114	647
Magoffin County	Highest	Average	Average	✓		Lowest	Lowest	36,134	178
Marion County	Average	Average	Average	✓		Average	Low	38,972	1,705
Marshall County	Low	Low	Low	✓		High	Low	39,887	2,021
Martin County	High	Average	Low	✓		High	Low	36,654	-1,055
Mason County	Average	Average	Low	✓		Average	Low	38,043	833
Mayfield Independent	Highest	Average	Highest			High	Low	37,970	104
McCracken County	Low	Low	Lowest			Average	Lowest	39,068	1,758
McCreary County	Highest	Average	Lowest	✓		Low	Average	36,745	-209
McLean County	Low	Low	Low	✓		Low	Average	35,359	-1,609
Meade County	Low	Lowest	Low	✓		High	Lowest	38,016	221
Menifee County	Highest	Average	Low	✓	✓	Average	Highest	35,368	-2,014
Mercer County	Low	Average	Average	✓		High	Average	37,718	-62
Metcalfe County	High	Average	Average	✓		Lowest	Low	35,328	-400
Middlesboro Independent	High	Highest	Low			Average	High	35,920	-1,120
Monroe County	High	High	Average	✓		Average	Lowest	35,144	-2,067
Montgomery County	Average	Low	Low	✓		Low	High	36,976	221
Morgan County	High	Average	Average	✓		Lowest	Average	36,390	-94
Muhlenberg County	Average	Average	Lowest	✓		Low	Low	37,481	513
Murray Independent	Lowest	High	Average			Average	Average	38,101	762
Nelson County	Low	Low	High	✓		Low	Highest	38,909	1,983
Newport Independent	Highest	Highest	Highest			Highest	Highest	38,837	416
Nicholas County	Average	Low	Lowest	✓		Average	Low	35,350	-1,861
Ohio County	Average	Lowest	Low	✓		Average	Average	38,763	1,495

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Oldham County	Lowest	Lowest	High			Highest	High	37,295	-1,013
Owen County	Average	Low	Average	✓		High	Highest	35,448	-2,389
Owensboro Independent	High	High	Highest			High	Low	40,315	2,748
Owsley County	Highest	Highest	Low	✓	✓	Average	Low	33,791	-3,590
Paducah Independent	High	High	High			Average	Average	40,255	2,945
Paintsville Independent	Lowest	Average	Highest		✓	Lowest	Lowest	37,326	1,370
Paris Independent	High	Highest	High		✓	Low	Highest	35,980	-774
Pendleton County	Average	Low	Average	✓		High	High	35,413	-2,424
Perry County	High	Average	Low	✓		Low	Average	36,482	-87
Pike County	High	Average	Highest	✓		High	Lowest	38,503	794
Pikeville Independent	Lowest	Average	High			High	Lowest	41,392	3,682
Pineville Independent	Highest	Low	High		✓	Average	High	34,013	-3,026
Powell County	High	Average	Lowest	✓		High	Average	34,682	-3,098
Pulaski County	High	Low	Low	✓		Low	Low	36,750	-204
Raceland-Worthington Independent	Low	Low	Highest		✓	Average	Lowest	36,171	-1,040
Robertson County	High	High	Average	✓	✓	Average	Average	35,708	-1,503
Rockcastle County	High	Average	Lowest	✓		Average	Lowest	37,207	-174
Rowan County	Average	Low	Average	✓		Lowest	Low	35,961	-522
Russell County	High	Low	Low	✓		Low	Low	35,952	-1,002
Russell Independent	Lowest	Low	High			Average	Lowest	38,753	1,542
Russellville Independent	High	Highest	Highest		✓	Low	Highest	36,672	-297
Science Hill Independent	Average	Average	Average		✓	Low	Lowest	37,811	857
Scott County	Lowest	Lowest	Average			Highest	Average	38,768	-908
Shelby County	Low	Low	Average	✓		High	Highest	37,614	-224
Simpson County	Average	Average	Low	✓		Low	Low	38,951	1,982
Somerset Independent	Average	Low	High			Low	Low	38,699	1,745
Southgate Independent	High	Highest	Highest		✓	Highest	High	37,186	-1,235

District	FRPL	Per-Pupil Exp.	Levied Equiv. Rate	Dispersed	Small	Labor Market Costs	Teacher Turnover Rate	Teacher Starting Salary	Difference From CWIFT-Predicted Salary
Spencer County	Lowest	Lowest	Low	✓		Low	Low	39,882	2,957
Taylor County	Low	Low	Average	✓		Lowest	Average	36,750	1,022
Todd County	Average	Average	Lowest	✓		Low	Highest	34,974	-1,995
Trigg County	Low	Average	Low	✓		Lowest	Low	38,136	1,795
Trimble County	Low	Average	Average	✓		High	Average	36,180	-1,657
Union County	Average	Average	Average	✓		Lowest	Average	35,742	-599
Walton-Verona Independent	Lowest	Low	Highest			Highest	Lowest	38,934	598
Warren County	Low	Low	Low			Average	Average	37,848	381
Washington County	Average	Average	Average	✓		Low	Average	37,613	688
Wayne County	Highest	Average	Low	✓		Low	Low	35,965	-989
Webster County	Average	Low	Low	✓		Lowest	High	35,032	-1,309
Whitley County	Highest	Average	Low	✓		Lowest	Lowest	36,457	130
Williamsburg Independent	High	Average	Low		✓	Lowest	Low	34,386	-1,941
Williamstown Independent	Low	Average	Highest		✓	High	Highest	35,372	-2,465
Wolfe County	Highest	Highest	Lowest	✓		Average	Lowest	36,576	-805
Woodford County	Lowest	Low	Average	✓		High	High	38,538	758

Note: FRPL= eligible for free and reduced-price lunch; Exp. = expenditures; Equiv. = equivalent; CWIFT= comparable wage index for teachers. CWIFT is a measure developed by the National Center for Education Statistics that allows researchers to compares regional variations in teacher labor markets based on wages of college graduates who are not teachers. Difference from CWIFT-predicted salary was calculated as described in Appendix K.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Appendix J

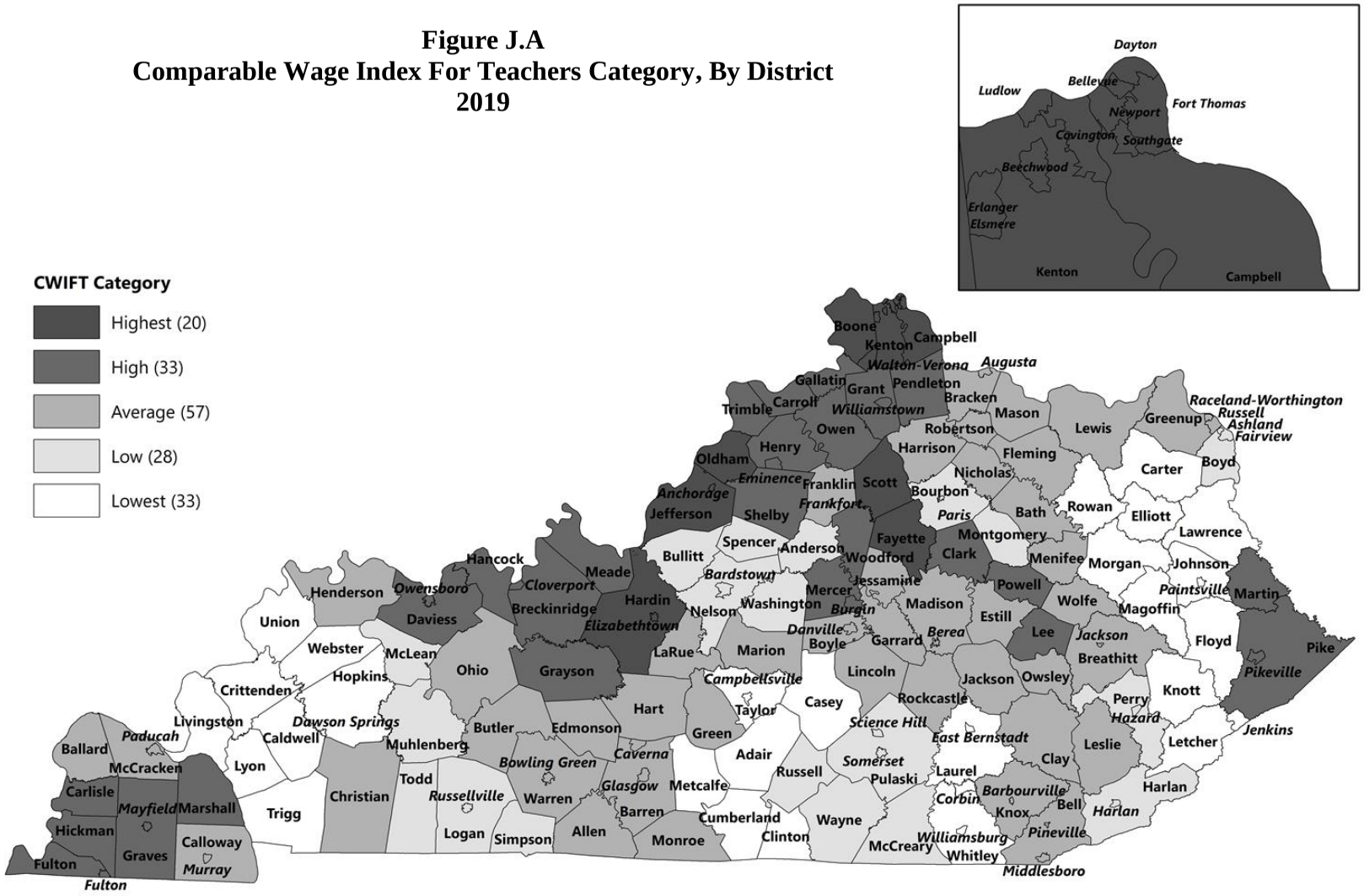
Comparable Wage Index For Teachers

NCES developed the Comparable Wage Index for Teachers (CWIFT) to facilitate comparisons of school spending among states and districts.[a] [41] The CWIFT compares regional variations in teacher labor markets based on wages of college graduates who are not teachers. The most recent CWIFT was developed in 2019. A CWIFT rating of "1" is equivalent to the national average; higher CWIFT ratings indicate more expensive labor markets. CWIFT ratings in the commonwealth range from a low of 0.69 (approximately two-thirds of national labor costs) to a high of 0.967 (almost equivalent to the national average).

Figure J.A displays the CWIFT calculated by NCES for Kentucky school districts in 2019. Darker colors indicate higher-cost labor markets. CWIFT categories, based on the data, were derived by OEA using methods described in Appendix B.

[a] According to NCES, "The Comparable Wage Index for Teachers (CWIFT) is an experimental index created by the National Center for Education Statistics (NCES) to facilitate comparison of educational expenditures. The CWIFT is a measure of the systematic, regional variations in the wages and salaries of college graduates who are not PK-12 educators as determined by reported occupational category. It can be used by researchers to adjust school district-level finance data in order to make comparisons across geographic areas. The CWIFT is based on data from the American Community Survey (ACS), a continuous household survey conducted by the U.S. Census Bureau."

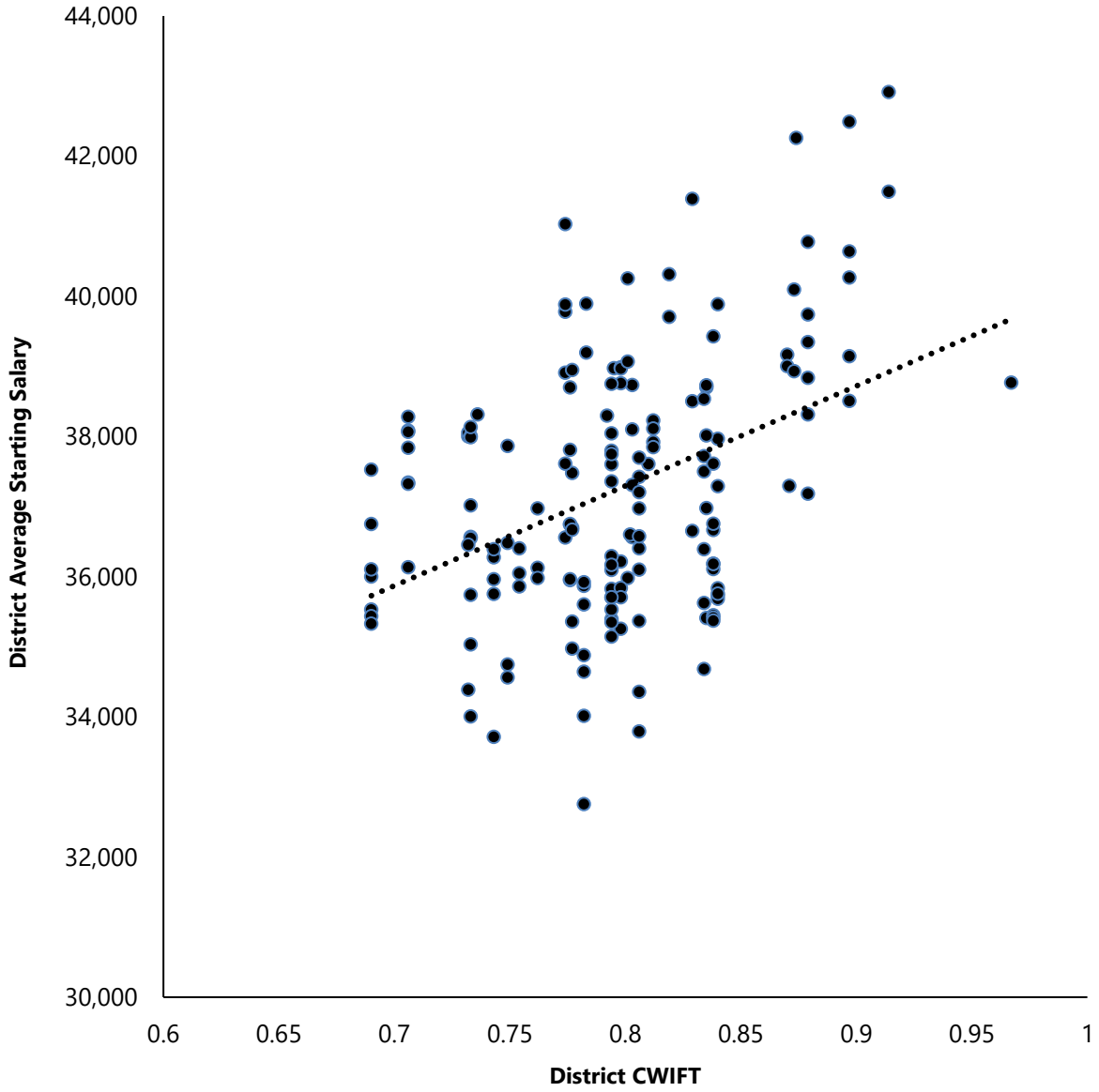
Figure J.A
Comparable Wage Index For Teachers Category, By District
2019



Note: Italics indicate independent district.
Source: US. Department of Education. Institute of Education Sciences. National Center For Education Statistics. Comparable Wage Index for Teachers (CWIFT). Web.

Figure J.B plots the relationship between districts' CWIFT and starting salary in 2019. As district CWIFTs increase, so do starting salaries, on average. The dotted line in the figure represents the statistically predicted relationship between CWIFT and starting salary. Districts that fall above the line have starting salaries above what would be predicted, whereas those that fall below the line have salaries below what would be predicted.

Figure J.B
2019 CWIFT And Average Starting Salary For Kentucky School Districts
2018, 2019, And 2022



Note: The dotted line in the figure shows the statistically predicted relationship between CWIFT and average starting salary.
Sources: Staff calculation using data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Appendix K

District Characteristics Related To Effectiveness As Measured By Actual, Unadjusted Scores

Table K.1 shows that while 39 percent of all districts are in the two lowest-performance categories, 56 percent of small districts and 47 percent of districts in higher-cost labor markets are in those categories.

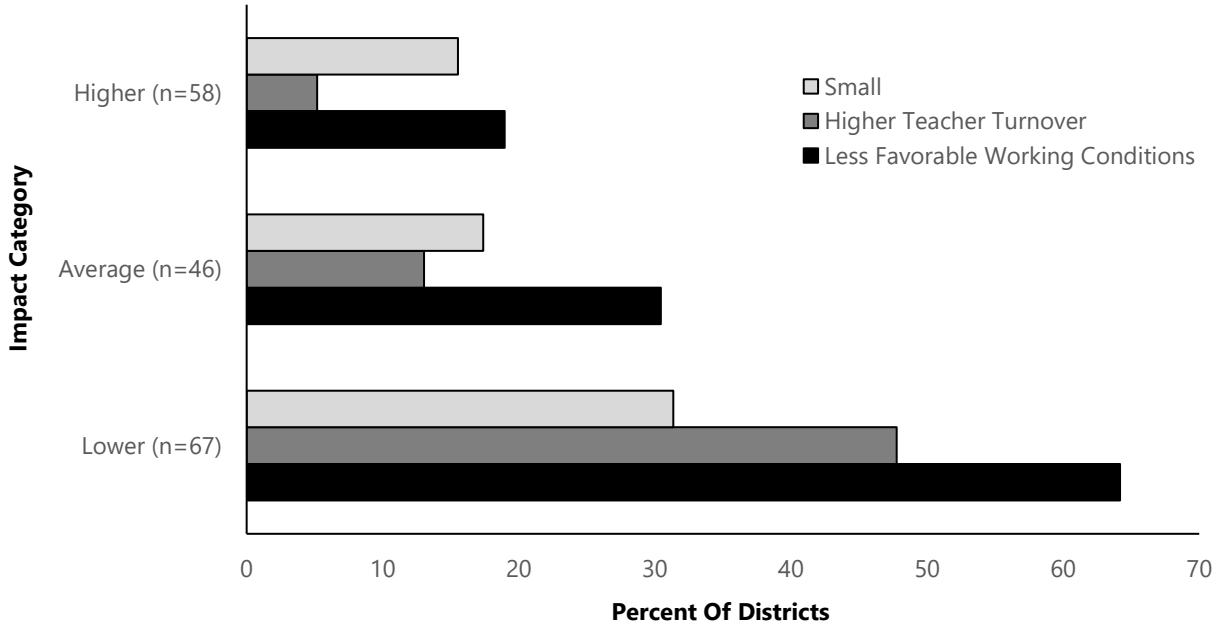
Table K.1
Percentage Of Districts, By Performance Category And District Size, Geographic Dispersion, And Higher-Cost Labor Market

Actual Performance Category		All (n=171)	Small (n=38)	Dispersed (n=109)	Higher-Cost Labor Markets (n=53)
Highest	(n=23)	13%	11%	7%	19%
High	(n=35)	20	13	22	23
Average	(n=46)	27	21	32	11
Low	(n=45)	26	24	30	28
Lowest	(n=22)	13	32	8	19

Note: In this analysis, districts are considered small if they have 1,000 students or fewer; geographically dispersed if they have 25 students or fewer per net square mile; and in higher-cost labor markets if they fall in the "highest" or "high" category on the CWIFT, as determined by methods explained in Appendix B.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Figure K.A shows that, as with impact categories, the percentage of districts that are small, have higher teacher turnover rates of 15 percent or greater, and have less favorable working conditions is greater for lower versus higher performance categories. Compared with impact scores, the differences among categories are greatest in teacher turnover relative to less favorable working conditions. The percentage of lower-performing districts with higher teacher turnover rates is over nine times the percentage of higher-performing districts with higher turnover rates (48 percent versus 5 percent).

Figure K.A
Percentage Of Districts
By Reading And Math Performance Category Of Actual, Unadjusted Scores
That Are Small, Have Higher Attrition Rates,
Or Have Relatively Less Favorable Working Conditions
2018, 2019, And 2022



Note: Higher-impact districts include those that are highest or high; lower-impact districts include those that are low or lowest.
Source: Staff analysis of data from the Kentucky Department of Education.

Appendix L

Expenditures By District Dispersion And Size

Table L.1 shows that, compared with other districts, average total per-pupil spending is greater in small districts. As a percentage of all spending, spending in small districts versus other districts is greater on district administration and business supplies and is lower on instruction services. On average, the small, dispersed districts spend less on instruction services than all other types of districts. In addition to higher district administration and business supply costs, the small, dispersed districts also have higher transportation costs than nondispersed districts.

Table L.1
Per-Pupil Expenditures And Expenditure As Percentage Of Total Current Expenses By Expenditure Category And District Status As Small Or Dispersed 2018, 2019, And 2022

	Average Per-Pupil Spending				Average Percent Of Expenditures			
	Small		Other		Small		Other	
Expenditure	Dispersed		Dispersed		Dispersed		Dispersed	
Category	Yes	No	Yes	No	Yes	No	Yes	No
Business support	$505	$538	$298	$330	4%	4%	2%	2%
District administration	730	898	372	413	5	6	3	3
Food service	1,005	951	860	772	7	7	7	6
Instructional services	8,048	8,376	7,418	8,021	57	58	59	61
Instructional support	1,151	1,333	1,106	1,310	8	9	9	10
Plant operations	1,201	1,234	1,114	1,139	9	9	9	9
School administration	644	762	685	755	5	5	5	6
Transportation	726	324	799	511	5	2	6	4
Total	$14,008	$14,416	$12,651	$13,250	100%	100%	100%	100%

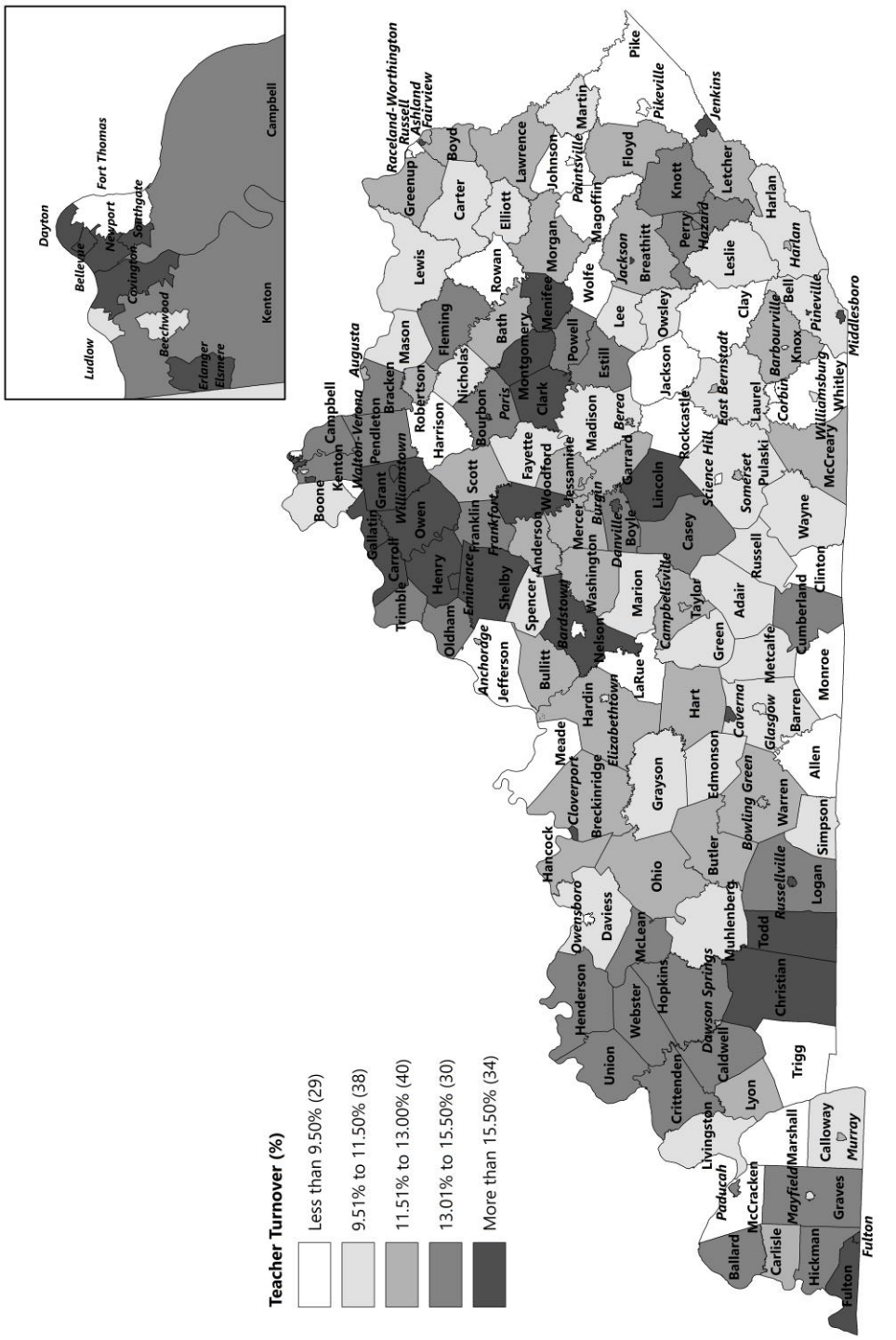
Note: In this report, small districts are considered to be those with 1,000 or fewer students. Dispersed districts are considered to be those with 25 or fewer students per square mile. Figures may not sum to totals shown, due to rounding.
Source: Staff analysis of data from the Kentucky Department of Education.

Appendix M

Teacher Turnover

Figure M.A shows the average percentage of teachers who left each district in school years 2018, 2019, and 2022.

Figure M.A
Percentage Of Teacher Turnover, By District
2018, 2019, And 2022



Note: Italics indicate independent districts.
Source: Staff analysis of data from the Kentucky Department of Education.

Table M.1 shows the average turnover rate of districts by categories of competitive salary or labor market, relative to other districts. Staff determined competitive salary categories based on the difference between districts' starting teacher salary and what was statistically predicted by its CWIFT. Based on that difference, districts were placed in categories using methods described in Appendix B. Competitive labor market categories were determined using methods described in Appendix B, but based on districts' CWIFT.

The table shows that, on average, teacher turnover rates are lowest overall in higher competitive salary categories (12 percent) compared with districts in categories of average or below (roughly 14 percent).

Table M.1
Average Teacher Turnover Rate
By Competitive Teacher Starting Salary And Labor Market Categories
2018, 2019, And 2022

		Competitive Labor Market					
Competitive Salary Category		**Highest (n=20)**	**High (n=33)**	**Average (n=57)**	**Low (n=28)**	**Lowest (n=33)**	**All Districts**
Highest	(n=34)	11%	9%	13%	13%	13%	12%
High	(n=28)	13	13	12	11	11	12
Average	(n=41)	22	13	12	15	11	14
Low	(n=38)	15	15	12	14	14	13
Lowest	(n=30)	N/A	17	13	13	11	14
Average		14%	15%	12%	14%	12%	13%

Note: Relatively competitive labor market is based on districts' 2019 Comparable Wage Index for Teachers (CWIFT). Relatively competitive salary is determined by whether district starting salary falls above or below what would be predicted based on its CWIFT category. See Appendix J for a description of the CWIFT and competitive salary.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Relative salary may affect teacher turnover rates more in higher-cost labor markets than in others. Average attrition rates of districts with competitive salaries of average or below were 16.4 percent for districts in higher-cost labor markets (those in the higher and high categories) compared with an average of 12.5 percent for districts with average or below salaries in other labor markets (those in average, low, and lowest).

Table M.2 shows the average difference between actual and predicted starting salary by relatively competitive starting salary and labor markets.

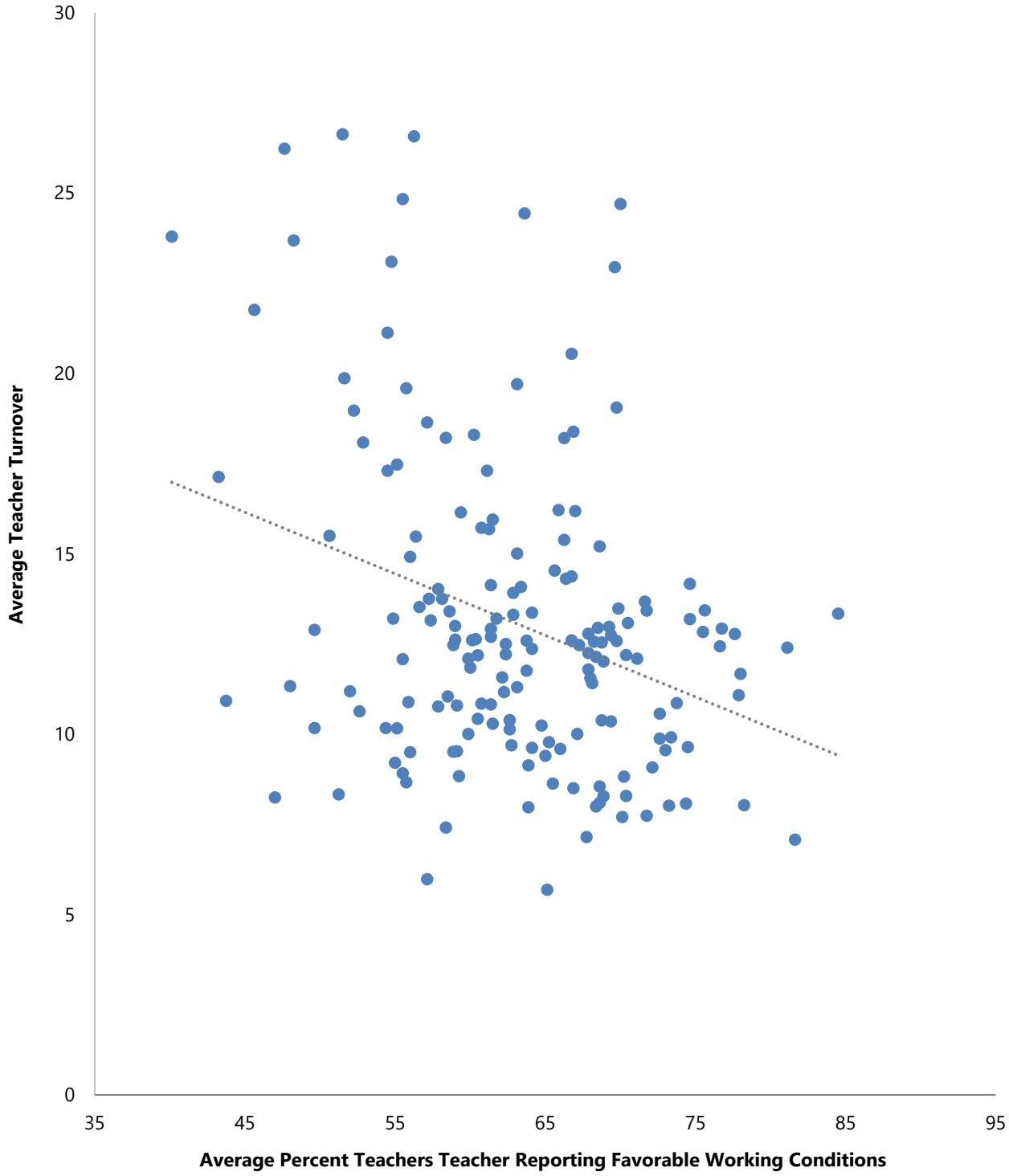
Table M.2
Average Difference Actual And Predicted Starting Salary,
Relatively Competitive Teacher Starting Salary,
And Relatively Competitive Labor Market
2018, 2019, And 2022

Relatively Competitive Salary Category		Relatively Competitive Labor Market					All Districts
		Highest (n=20)	High (n=33)	Average (n=57)	Low (n=28)	Lowest (n=33)	
Highest	(n=34)	$2,911	$2,648	$2,123	$2,604	$1,904	$2,367
High	(n=28)	1,003	997	1,016	947	1,221	1,039
Average	(n=41)	151	-48	167	-104	-27	23
Low	(n=38)	-1,052	-1,105	-1,174	-911	-879	-1,080
Lowest	(n=30)	N/A	-2,230	-2,494	-1,941	-2,348	-2,319
Average		$1,192	-$581	-$442	$190	$459	$0

Note: Relatively competitive labor market is based on districts' 2019 Comparable Wage Index for Teachers (CWIFT). Relatively competitive salary is determined by whether district starting salary falls above or below what would be predicted based on its CWIFT category. See Appendix J for a description of the CWIFT and competitive salary.
Sources: Staff analysis of data from the Kentucky Department of Education and US. Department of Education. Institute of Education Sciences. National Center For Education Statistics.

Figure M.B shows the relationship between the average percentage of teachers reporting favorable working conditions in 2020 and the average percentage of teacher turnover in 2018, 2019, and 2022. As noted in Chapter 3, each variable was associated with district effectiveness. This figure can be used to understand the relationship between these two variables as used in the report. The data reported in Figure M.2 are not appropriate for drawing general conclusions about the relationship between teacher working conditions and teacher turnover, because district turnover rates in larger districts do not reflect teacher turnover of schools within each district. In addition, teacher turnover may be more highly associated with specific elements captured in the working conditions survey than with the average across all survey elements that was calculated by OEA. Finally, teacher turnover in the years most closely associated with the survey may be different from the average teacher turnover of 2018, 2019, and 2022 used in the report.

Figure M.B
Average Percentage Teachers Reporting Favorable Working Conditions, 2020, And Average Teacher Turnover, 2018, 2019, And 2022
By District



Source: Staff analysis of data from the Kentucky Department of Education.

Appendix N

Early Cohort Persistence Across Metrics

This Appendix shows results of OEA's analysis of long-term postsecondary education outcomes.

Staff also reviewed data for long-term workforce outcomes of graduates from individual districts. These data are not included in the report due to concerns about the effect of out-of-state workers on data calculated for districts that border other states. Graduates of border districts were disproportionately underrepresented in workforce data.

This analysis was conducted using student-level data for high school graduates from school years 2012, 2013, and 2014. Statistical models were used to determine the impact coefficients for student demographics and school characteristics on ACT scores and whether those students enrolled in postsecondary education or earned a bachelor's degree or higher.[a]

The residuals for districts from each model were ranked in categories using the methodology described in Appendix B. The presentation of this data is grouped in separate tables that are described below.[b]

Table N.1 shows the number of districts that were in the higher- (high/highest) and lower- (low/lowest) impact categories for ACT performance, postsecondary enrollment rate, and degree attainment. Of the 58 districts that were higher-impact on the ACT, approximately 60 percent were also in the higher-impact categories for postsecondary enrollment and bachelor's degree attainment (33 and 34 districts, respectively). Of the 58 districts with higher impact on ACT, 27 (approximately 47 percent) were higher in both postsecondary enrollment rate and bachelor's degree attainment.

Of the 63 districts that were lower-impact for ACT performance, 28 (approximately 44 percent) were also lower-impact for postsecondary going rate. Of those 63 districts, 38 (more than 60 percent) were also lower-impact for degree attainment.

[a] A district-level model from the High School Feedback Report from the Kentucky Center for Statistics was used for a statistical model on the postsecondary going rate for these students.
[b] The district impact scores for each of the Early Cohort models showed a slightly positive relationship with per-pupil expenditures for school years 2012 through 2014.

Table N.1
Number Of Higher- And Lower-Impact Districts For ACT Performance, Postsecondary Enrollment, And Bachelor's Degree Attainment For High School Graduates School Years 2012, 2013, And 2014

Impact Category	ACT	ACT And Postsecondary Enrollment	ACT And Degree Attainment	ACT, CGR, And Degree
Higher	58	33	34	27
Lower	63	28	38	23

Note: CGR = college going rate.
Source: Staff analysis of data from the Kentucky Center for Statistics.

Table N.2 shows district counts for higher- and lower-impact categories for career readiness, postsecondary enrollment, and degree attainment. Career readiness did not have the same relationship as ACT performance with the postsecondary going rate and bachelor's degree attainment metrics. A little more than one-third of districts that were in the higher category for career readiness were also in the higher categories for postsecondary going rate, and less than one-quarter of those districts were in the high categories for degree attainment.

Table N.2
Counts Of High- And Low-Performing Districts For ACT Performance, Postsecondary Enrollment, And Bachelor's Degree Attainment For High School Graduates 2012, 2013, And 2014

Impact Category	CR	CR And CGR	CR And Degree Attainment	CR, CGR, And Degree
Higher	60	21	14	10
Lower	65	14	20	9

Note: CR = career readiness; CGR = college going rate.
Source: Staff analysis of data from the Kentucky Center for Statistics.

Of the 65 districts that were lower impact in career readiness, 20 (approximately 30 percent) were also in the lower categories for degree attainment. A brief description of each of the models used for this analysis concludes this appendix.

ACT Model

The ACT performance model for high school graduates from school years 2012, 2013, and 2014 used the computed standard scores for each cohort as the dependent variable. For instance, the standard scores for 2012 high school graduates were computed using the 2011 ACT composite scores for those students.

Student demographic controls included eligibility for free and reduced-price lunch (FRPL), individualized education program status, limited English proficiency status, race and ethnicity controls, gender, whether a student moved schools, and whether a student attended a school where 75 percent or more of the population were eligible for FRPL.

The ACT model included more than 119,000 student observations for those graduating cohorts, and the model accounted for nearly 24 percent of the explained variance between the dependent variable and the controls.

The residuals from the ACT performance model for the early cohort had a slightly positive relationship with per-pupil expenditures for those years.

Bachelor's Degree Or Higher Model

The ordinary least squares model for attainment of a bachelor's degree or higher included the same control variables as the ACT model described above. This model was also a student-level model with more than 130,000 observations for those graduating cohorts, and the model accounted for approximately 16 percent of the explained variance between the dependent variable and the control variables.

Postsecondary Going Rate Model

The model for postsecondary going rate used district-level data from the High School Feedback Report from the Kentucky Center for Statistics. This model used data that was also provided by the Kentucky Center for Statistics to control for the percentage of Black students, Hispanic students, students labeled other race, students eligible for FRPL, percentage of students with an individualized education program, percentage of students with limited English proficiency, and percentage of homeless students in the district for school years 2012, 2013, and 2014. This model accounted for approximately 20 percent of the explained variance between the dependent variable and the control variables.

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