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Conceptualizing Rurality in Education Policy: Comparative Evidence from Missouri

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Cover Page Footnote

Abby Burrola and Dorothy Rohde-Collins have made equal contributions to this article.

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For education policies to be implemented most effectively in local contexts, policymakers must consider diverse school and community geographic characteristics. For example, rural geographies often present particularly important dynamics for public schooling, including challenges with school enrollment, school funding, and teacher labor markets. We focus on Missouri, where over two-thirds of its school districts are located in rural areas. Enrollment in these districts varies over 100-fold, yet little research describes the similarities and differences between these districts and how to appropriately distinguish between them to best advise contemporary policymaking. In this study, we analyze data from the American Community Survey, the National Center for Education Statistics (NCES), and the Missouri Department of Elementary and Secondary Education to compare school, financial, teacher, and community characteristics to identify relationships between a district's size, location, and community qualities. We focus our analyses on a comparison of NCES' demarcation of rurality to one we construct based on student enrollment to highlight where conclusions may differ simply based on a lack of common definitional groundings. The findings help to distinguish rural communities and school districts and may prompt future rural education-focused research to appropriately tailor education policies to diverse rural contexts.

Of the more than 50 million public school students in the United States (NCES, n.d.-a.), 7.5 million are educated in rural schools (Showalter et al., 2019). These students are often overlooked by education leaders and researchers who have limited firsthand experience with rural areas (Lichter & Brown, 2011) and instead direct their attention on urban and suburban areas (Lavalley, 2018; Parks, 2021; Showalter et al., 2019). This is somewhat surprising given the prevalence of rural school districts; over 7,000 of the nearly 13,500 school districts across the nation are located in rural locales according to the National Center of Education Statistics (NCES) classification system (NCES, n.d.-a.) which was first introduced in 2006. Using data from the 2003-04 school year, the first report to use this system, *Status of Education in Rural America*, determined that 56% of all operating school districts were located in rural communities (Provasnik et al., 2007).

It is clear that rural school districts are an important component of the American public education system. How to accurately contextualize rural districts, however, is often less clear. The way that "rurality is defined and operationalized, whether it is measured at the school, district, or state-level, and whether it is measured by percent urbanicity or sparsity does matter" because the findings may be dependent on the context chosen (Nguyen, 2020, p.

13). While much of the extant body of educational research leverages the NCES classification system, other definitions, such as those used by the U.S. Census Bureau, are also common. The choice of "a rural definition influences the entire scope of a study" (Koziol et al., 2015, p. 2), but the lack of research specific to rural education means that researchers or policymakers may not have the requisite experience or knowledge to make an informed choice (Lichter & Brown, 2011). The definition of rurality is not merely a choice to be made on one occasion. As such, Longhurst (2021) has developed a series of guiding questions for researchers to keep rurality at the forefront of decision-making throughout the research.

The multiple considerations of rurality combined with an already sparse body of literature concerning many aspects of rural education highlight the need to broaden our collective understanding of rural communities and the school districts that serve them. Conducting research in a variety of states (Yang et al., 2021) may help identify how findings that are specific to one context may be connected to the various definitions of rurality (Nguyen, 2020).

In this study, we seek to expand the existing literature on rural education through a multi-dimensional descriptive analysis of Missouri's rural school districts, drawing quantitative comparisons between U.S. Census Bureau definitions of rurality

used by the NCES and one based on school district enrollment in rural geographies. The two research questions we address are: (1) How do economic, financial, and teacher characteristics vary among Missouri's rural school districts? And (2) Do these measures change if rural school districts and communities are categorized in different ways?

To address these questions, first we review the relevant literature regarding rural public education including its influence on students, teachers, administrators, schools, and communities. In addition, we detail Missouri's rural education context by highlighting contemporary policy debates in the state, considerations which may bear on similar dialogues in other rural state settings. Then, we define and describe the data sources and variables used in our descriptive analysis before sharing findings concerning the differences that emerge between districts when categorized either by distance from an urban center or enrollment size. We close with recommendations for practice, policy, and future research.

Relevant Literature

Defining Rurality

Rurality often evades a consistent definition—the conceptual meaning changing based on context, audience, task, or time period. That "there is no universally accepted definition of rural" (Miller, 2010, p.1) means that thought must be given to the chosen definition before determining the applicability of existing research to a new context (Koziol et al., 2015). Rurality can be defined in terms of population size or density, geographic isolation or distance from metropolitan areas, or land use (Cromartie & Bucholtz, 2008; Miller, 2012; Ratcliffe et al., 2016). Recent efforts have also been made to capture rurality through a variety of measures (Nelson & Nguyen, 2023; Waldorf, 2006). For example, to create an index of rurality Nelson and Nguyen (2023) consider both the presence and availability of resources they categorize as "non-essential," like entertainment facilities, and "essential," like schools and banks, as well as proximity to metropolitan areas. However, the two common definitions of rurality used in educational policy research are those developed by the U.S. Census Bureau and the NCES. The U.S. Census Bureau designates rural areas to be "any population, housing, or territory NOT in an urban area," (U.S. Census Bureau, n.d.; emphasis in original) thus it is important that the term urban is

clearly defined. Urban includes both urbanized areas, which have populations of more than 50,000 residents, and urban clusters, which have populations between 2,500 and 50,000 residents (U.S. Census Bureau, n.d.).

Similarly, NCES assigns a locale code — rural, town, suburban, or city — to all school districts in the United States, each of which are then more granularly categorized into Census-defined subgroups based on distance from an urban area. For rural areas, these subcategories are *rural fringe*, districts located less than or equal to five miles from an urbanized area or less than or equal to 2.5 miles from an urban cluster; *rural distant*, districts located between five and 25 miles from an urbanized area or between 2.5 and 10 miles from an urban cluster; and *rural remote*, districts located more than 25 miles from an urbanized area or more than 10 miles from an urban cluster (Provasnik et al., 2007).

To overgeneralize, what it means to be rural is often described in terms of what it is not, which is to say that rural is "not urban" (Ratcliffe et al., 2016, p. 1). However, some effort has been made to develop continuous measures of rurality and move away from definitions based on purely quantitative data (Nelson et al., 2021). The complexity inherent to defining what makes a rural community rural requires educators and researchers to "[move] beyond simplistic notions about rural schools and their communities" (Showalter et al., 2019, p. 3) and refrain from assuming research grounded in urban or suburban contexts may be indiscriminately applied to rural areas (Nelson et al., 2021). This is even more important given the tendency of researchers and policy makers to fail to see the differences that exist within and between the various categories of rurality (Miller, 2012).

With regard to school districts, the practical application of these definitions varies from state-to-state to "account for the variation and history behind district formation" (Gutierrez & Terrones, 2023, p. 15). States often base policies on district categorizations of "sparse," "small," and "isolated" although there is no standardized definition of these terms. For example, in Florida, small refers to a district of fewer than 24,000 students, while in Vermont the term "small" is used where there are fewer than 20 students enrolled in one grade (Gutierrez & Terrones, 2023). Conceptual and practical differences like that highlighted above underscore the importance of contextualizing education research within local geographic contexts, including differences across rural and non-rural

spaces *and* within the still-broad categorization like "rural."

America's Rural Schools

Though those who study rural education likely do not require a reminder, it bears repeating that rural American communities are not a monolith and, therefore, should not be treated that way by policymakers (Nguyen, 2020). Schools often reflect their communities, and further understanding rural areas can help create education policies that better support the intricacies of a rural school. In order to fairly discuss potential policy changes, it is important to first provide a brief overview of rural communities and their schools.

In 2011, nearly 50 million people, one out of every six, lived in rural communities, though this percentage has both decreased over time (White House Rural Council, 2011) and varies significantly depending on the definition that is used (Cromartie & Bucholtz, 2008). Rural areas are home to over half of the nation's public school districts and nearly one-third of its public schools (White House Council, 2011). During the 2016-2017 school year, more than 15% of all public school students were enrolled in rurally-classified districts. Individual schools may also be identified as rural, even if the district as a whole is not, and when students attending these schools are included, the population of rural students grows to over nine million (Showalter et al., 2019).

It is likely all rural communities depend on schools. In fact, a school may be one of only a few local institutions present in a rural community. By contributing to the sense of local identity and facilitating civic engagement, rural schools are central to the community (Schafft, 2016). Schools may prove to be even more influential now that the country's rural population has begun to decline. Over the past decade (2010 to 2020), the rural population declined by 0.6 percentage points. While the change was small, it is a departure from the growth of rural population seen during both the decades of 2000 to 2010 and 1990 to 2000 (Johnson, 2022). However, schools attract residents to nonmetropolitan areas and the more remote an area is geographically, the more the school's quality impacts the area's ability to attract residents (Marré & Rupasingha, 2020).

Challenges Faced by Rural Schools

Rural school districts face unique challenges, often as a result of their geographic isolation and oft-limited labor markets. One particularly pressing concern for rural schools and districts is that of school staffing (Rhinesmith et al., 2023). Although teachers in rural areas have higher rates of retention than the largest cities, they leave their jobs more frequently than their suburban counterparts (Miller, 2012). This distance from more populated areas can contribute to teacher feelings of loneliness and isolation, both in personal as well as professional domains (Beesley et al., 2010). At the same time, the smaller, more tight-knit community in a rural area can appeal to some teachers since they are able to establish strong ties with their students and the community (Tran et al., 2020), a factor which may improve rural teacher retention (Seelig & McCabe, 2021). However, rural schools have more vacant teaching positions than those in other urbanicities, even when controlling for other variables such as teacher, student, and community characteristics, possibly as a result of the distance from post-secondary teacher education programs (Goldhaber et al., 2020).

In general, rural schools employ a less racially diverse teaching workforce than do urban and suburban schools (NCES, 2019) and preservice teachers of color are less likely to consider taking a position in a rural school (Oyen & Schweinle, 2021). Teachers in rural areas may also differ from their suburban and urban counterparts in terms of credentials and experience; rural teachers are less likely to hold graduate degrees (Nguyen, 2020) or to have attended competitive or selective colleges and universities (Miller, 2012; Nguyen, 2020).

The difficulty of staffing rural schools extends beyond just teachers. For example, the number of applicants for principal vacancies decreases with increasing distance from urban areas, especially with regard to job candidates who are female or people of color (Yang et al., 2021). Rural schools are less likely than those in other areas to be led by a female principal or to hire a female to fill a vacant principal position (Fuller et al., 2018). The lack of administrator and teacher diversity is reflective of the student demographics, which tend to be less racially diverse than urban schools, although they often have a higher percentage of students who qualify for free or reduced-price lunch (Nguyen, 2020). The geographic isolation of their communities may lead some students to be reluctant to engage with academic material or to question the relevance of formal education to their future, professional or otherwise, highlighting a connection between local community attributes and educational outcomes (Budge, 2006).

School finance and enrollment considerations also may vary with rurality. Given their below-average budgets, rural school districts often are not well-supported to absorb negative funding shocks which, in turn, negatively impacts student achievement (Rauscher, 2020). Schools located in less densely populated areas spend more to attain similar academic outcomes as schools located in more densely populated areas (Kolbe et al., 2021). Additional demographic changes may also occur as a result of rural school closures. In one rural New York district that experienced school closure, for example, the local population of senior citizens increased while the population of younger residents decreased (Buzzard, 2016), reinforcing demographic challenges that originally precipitated the closure intervention.

The extra expense required to manage small schools (e.g., diseconomies of scale) and the scarcity of resources in rural areas are often cited as rationales for permanently closing schools or consolidating districts (Lavalley, 2018), a policy decision that may reinforce the problems it seeks to solve. Individual school closures may cause population decline at the county level (Sageman, 2022), while district consolidation leads to decreases in the surrounding town's population, property values, and, most obviously, the number of schools in the community (Smith & Zimmer, 2022). In one example of enrollment-based legislation, Arkansas state law requires a school district to reorganize with another district if it falls under the enrollment cutoff of 350 students (Smith & Zimmer, 2022). Arkansas' policy did little to affect student achievement and, perhaps surprisingly, nothing to improve cost efficiencies nor augment instruction-oriented expenditures (McGee et al., 2022).

Missouri's Policy Context

In Missouri, 26% of students, 40% of schools, and 69% of districts are classified as rural (NCES, n.d.-a.). These percentages surpass the national averages for rural students (15%) and rural schools (29%) (Showalter et al., 2019), rendering Missouri to be of particular interest for rural education policy research. The schools attended by the approximately 200,000 rural Missouri students are relatively racially homogenous and have above-average rates of student disability, poverty, and household mobility. These schools are also subject to inequitable funding formulas and have high transportation costs relative to other schools in the state. (In fact, though Missouri school funding statutes recommend the state furnish

75% of school transportation costs, historically it has provided far less funding often amounting to less than 20%, a particularly challenging shortfall for geographically large rural districts (Anglum, 2020)). Because of these concerns, the Rural School and Community Trust identified Missouri as one of the top ten states in need of rural education policy solutions (Showalter et al., 2019).

In addition, new policy initiatives like four-day school weeks (Anglum & Park, 2021; Riley, 2022), teacher recruitment and retention (Missouri Blue Ribbon Commission, 2022), state-wide charter school expansion initiatives (Nelson, 2022), and open enrollment or transfers across district boundaries (Weinberg, 2022) are expected to impact rural areas in Missouri as education remains a popular focus with legislators (Preis, 2022).

In 2019, 16% of Missouri's 362 rural districts operated on a four-day school week, the shortened work week potentially serving as an attractive non-pecuniary benefit for employee recruitment and retention and a strategy for districts to remain competitive in local labor markets with other districts nearby (Anglum & Park, 2021). This is a policy consequence due, at least in part, to the staffing difficulties present in rural districts (Goldhaber et al., 2020). A record number of all Missouri districts, 25%, and the state's rural districts, 39%, now operate on a four-day school week (Riley, 2022) with many indicating that the move was necessitated by teacher recruitment challenges.

In December 2021, the Missouri State Board of Education acknowledged the urgent need to address and improve teacher recruitment practices across the state through the creation of a Teacher Recruitment and Retention Blue Ribbon Commission (Missouri Blue Ribbon Commission, 2022). However, in its final report delivered in October 2022, no mention was made of educational challenges specific to rural locales, related to teacher recruitment or otherwise. The report does briefly recommend expanding the state's "Urban Flight and Rural Needs Scholarship Program Fund," though without description of its efficacy specific to rural schooling circumstances (or urban for that matter) (Missouri Blue Ribbon Commission, 2022).

Education policy changes at the state level may exert particular impacts on its rural areas. For example, proposed legislation to permit open enrollment and transfers across school district boundaries (Weinberg, 2022) may affect student mobility patterns. In a study of open enrollment patterns in Michigan, 15% of rural students were

found to attend a nonresident district, a rate similar to that of students in nonrural areas. If students lived further away from their residentially assigned school, they were more likely to select a nonresident district (Edwards, 2021). If this pattern holds in Missouri, open enrollment policies could bring changes to rural education. Additionally, while charter schools only operate within the geographic boundaries of three Missouri districts currently (St. Louis Public Schools, Kansas City Public Schools, and Normandy Schools Collaborative), (Department of Elementary and Secondary Education [DESE], n.d.a), there have been repeated attempts to expand charter schools and other forms of school choice to other areas of the state, a development that could affect funding and school operations in rural areas (Nelson, 2022). However, other states see a more prominent presence of rural charter schools among their rural student population. While there are no rural charter schools in Missouri, nearly half of Hawaii's and 41% of Oregon's charter schools are rural (Marshall et al., 2022). While charter expansion or open enrollment legislation has yet to be enacted, a clear understanding of the current funding situation for Missouri's rural schools would be helpful to allow district administrators to develop sound responses to new policies and programs.

Some rural education policies are predicated on particular school characteristics, including enrollment thresholds like those analyzed subsequently in this paper. For example, Missouri provides hold-harmless funding for all districts with declining enrollment (Shuls, 2017). Essentially, regardless of how dramatic an enrollment drop a district may have seen since the 2005-06 school year, a district may never receive less state funding (either total funding or per-pupil funding, depending on a district's enrollment) than they did in that year. In the 2020-2021 fiscal year, 182 districts (of 516 traditional public districts in the state) – 35% of the state's districts – qualified as hold harmless (DESE, n.d.-b.). To further complicate matters, a districts' hold harmless status may change over the years. Using sharp enrollment cutoffs as the measure for categorization conveys meaningful policy implications given the direct links between enrollment numbers and funding policies in Missouri.

The circumstances challenging rural communities and their school systems are likely to persist in the years to come, reinforcing the importance of broadening the body of literature in this area. As states explore the development and implementation of policies — such as school choice, open enrollment, and teacher recruitment — that may disproportionately impact rural districts given their unique challenges, a thorough understanding of what it means to be rural will also grow in importance. With this study, we hope to provide data relevant to proposed policy changes in the state of Missouri and the nation as a whole.

Data & Methods

In this descriptive study, we explore district, financial, economic, teacher, and community factors, with respect to various categorizations of district enrollment and rurality. The data for this project was collected from the NCES, the U. S. Census Bureau's American Community Survey (ACS) 5-year estimates, and the Missouri DESE. Using the Stata API package from the Education Data Portal at the Urban Institute, we obtained data elements from the NCES Common Core of Data for School Districts including Directory and Finance data from 2009-10 to 2019-20 (2017-18 regarding school finance, the most recently available year at the time of our analyses). Generally, the directory data includes school district location, grade range, enrollment, and staffing, while the finance data details revenues and expenditures based on categories such as instructional needs, salaries, and benefits.

Perhaps most important to this study is the inclusion of the NCES already-assigned urbanicity categories. As mentioned previously, NCES methodically categorizes districts into four main types of urbanicity—city, suburban, town, and rural. Each of those groups is decomposed into three respective subgroups, indicating further specificity based on population size or proximity to populated areas (NCES, n.d.-b.). We selected the NCES definition as the basis for identifying Missouri's rural districts since these categories have been previously used and accepted in education research; per Thier et al. (2021), NCES categorizations are used most frequently in rural education research. Of course, this definition may not be perfect, especially as the general understanding of rurality is nascent in some domains of education research, but it is a good starting point for research seeking to describe rural districts.

We obtained ACS data through Social Explorer (Social Explorer, 2022) at the school district level (elementary and unified districts) and included measures related to the local community, including population, land area, demographics, employment
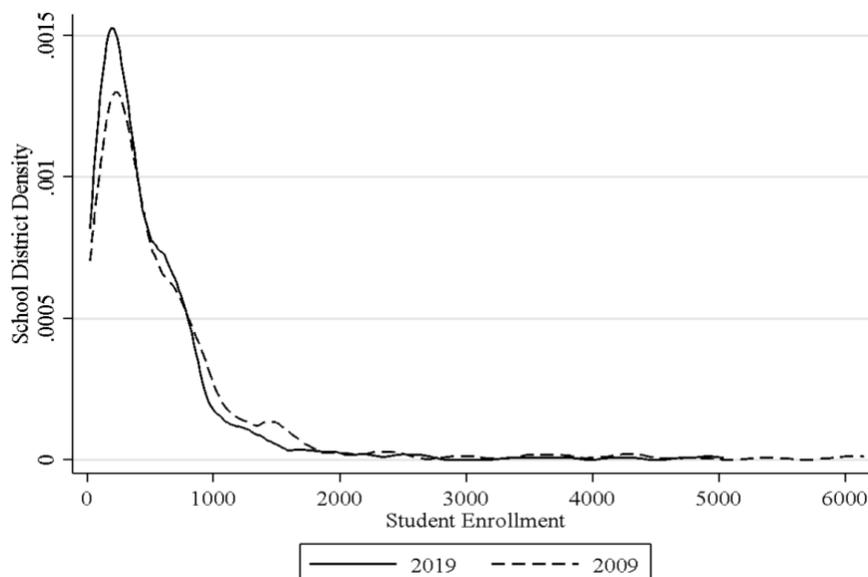
Figure 1: Missouri Rural District Enrollment Density. Each line indicates a kernel density plot of district-level student enrollment.

characteristics, educational attainment, and housing. Following U.S. Census Bureau recommendations to avoid the use of overlapping data (i.e., overlapping years) (U.S. Census Bureau, 2020), we chose to use the 2005-2009 and 2015-2019 5-year rolling average estimates.[1] Additionally, we used the Educational Data Portal at Urban Institute to collect data from the Small Area Income and Poverty Estimates (SAIPE) as confirmation of the poverty levels revealed through ACS data. It should also be acknowledged that, although appropriate for our research questions, use of the 5-year estimates makes it difficult to identify trends over time in less populated areas (U. S. Census Bureau, 2020), such as Missouri's rural school districts. That there are fewer opportunities to identify trends in rurally situated data is yet another challenge for research on rural communities.

Finally, we obtained teacher-level administrative data from the Missouri DESE. The data, covering all public school teachers across the state, comes from the 2020-21 school year, the latest year available at the time of our analyses. Available teacher characteristics include teacher race and ethnicity, gender, salary (both regular term base salary and extra duty salary), teaching experience (in the specific district, in Missouri public schools, and total

public school experience), and highest academic degree (e.g., bachelors, masters, etc.).

Once the data was collected, we created a categorical variable to identify rural districts. This variable included the NCES categorizations of rural fringe, rural distant, and rural remote. In addition, we excluded all non-traditional public school districts, including charter school local education agencies (LEA), special school districts, community colleges, and career centers as well as any district with an enrollment equal to zero. NCES, ACS, and Missouri teacher data were merged using unique district identifiers, allowing us to analyze the measures from each data set based on enrollment and rurality. While there are many possible time frames for analyzing this data, we chose to start the district-level panel data in 2009 because it would offer a full decade of data from 2009 to 2019 (fall year). We attempted to replicate the same time frame with the NCES data, but the most recent data for many of the finance variables was 2017, slightly fewer years of observations than the ACS data but still in close proximity to the 2009 to 2019 time frame. Though we do not track changes to Missouri's teacher workforce over time, we are able to differentiate across different categorizations of rural districts, highlighting key similarities and differences.

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[1] One- and three-year ACS school district data only is collected for larger school districts (geographic areas

with more than 65,000 and 20,000 individuals, respectively), effectively excluding most rural school districts.

We consider two district categorizations. First, given the wide range of student enrollment in Missouri's rural districts (Figure 1) and the prevalence of enrollment cutoff-based policies, we organized rural districts into three equal-sized tertiles based on 2009 district enrollment. The tertiles were established using the 2009 district enrollment data and these same tertiles were then applied to all subsequent years in order to draw comparisons over time for stable groupings of districts. Second, we leverage districts' 2009 NCES rurality category (i.e., fringe, distant, remote) in order to consider the relationship of geographic distance from an urban area. Like with the enrollment tertiles, rurality was established for each district based on their 2009 classification and then applied to subsequent years to create a stable panel of data. In Figure 2 we map Missouri's rural districts according to each categorization. We note that the map based on student enrollment reflects a far greater heterogeneity of local school district context than does that reflecting NCES rurality. Indeed, large clusters of districts in the northeast and southeast regions of the state, for example, are overwhelmingly classified as rural remote, yet serve a wide variety of student enrollment sizes. For each categorization, we use NCES, ACS, and DESE data to analyze three sets of measures—first, economic and community factors,

Panel A: District Enrollment Tertiles
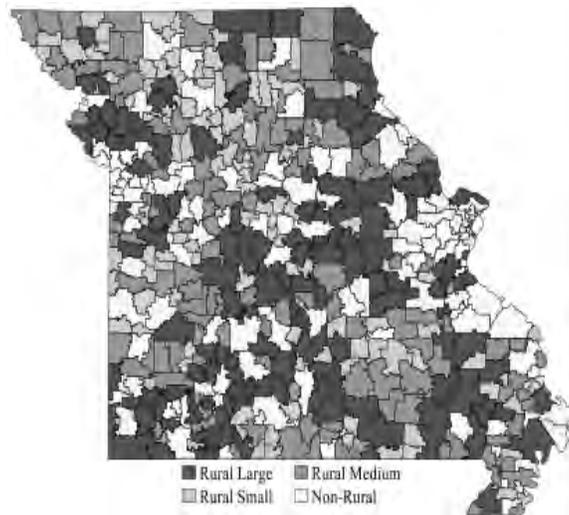
Panel B: NCES Rurality

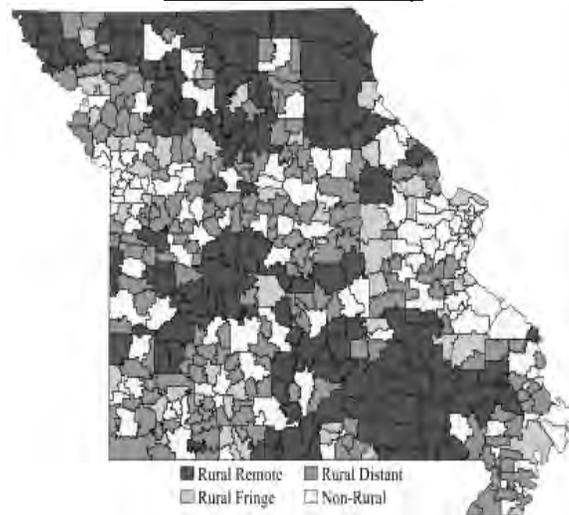

Figure 2. Missouri's rural districts, by NCES Rurality and District Enrollment Tertiles *Notes*. Each map employs 2009 classifications of traditional public districts by enrollment tertiles (Panel A) and NCES rurality classification (Panel B).

second, school characteristics and finances, and third, teacher characteristics. The economic and community factors were selected to better understand how a school district's surrounding population may shape the district's characteristics and vice versa. In addition, these measures provide additional ways to describe rural areas besides their proximity from an urban core. The school and teacher characteristics may have a more direct relationship to education policy than the economic characteristics and add another dimension in understanding the contexts of rural schools. Each of these measures help us to explain how money and resources are allocated and spent at the district level.

To aid in our interpretation of these comparisons, we report the p-values from analysis of variance (ANOVA) calculations within each district categorization (i.e., small/medium/large and fringe/distant/remote) for each variable. Each p-value indicates whether differences between each set of three district groups are statistically significant (e.g., at an alpha level of 0.01, 0.05 or 0.1).

Findings

Missouri Rural District Enrollment Variation

The enrollment of Missouri's rural districts varies considerably, reinforcing the value of exploring rural districts both by NCES definitions of rurality and by variation in rural district enrollment. In 2009, the state contained 386 rural districts with a mean enrollment of 643 students, ranging from a minimum of 22 students to a maximum of 6,150 students. According to NCES classifications (i.e., ignoring the longitudinally stable district labels we employ in subsequent analyses per districts' 2009 NCES classifications), mean enrollment in 2019 declined to 509 students and ranged from a minimum of 21 students to a maximum of 5,042 students. Kernel density plots (Figure 1) illustrate most rural districts enroll fewer than 1,000 students, a greater concentration of such districts in 2019 than a decade prior. In fact, 85% of rural districts in 2009 fell into this category and by 2019 that proportion grew to 90%.

Table 1 displays average enrollment by district tertile; for simplicity, we label the tertiles small, medium, and large, but it should be noted that those size descriptions are intended to apply only to the rural districts in our sample at this specific point in time. In other words, the definition of a small, medium, and large district may be different if the

sample was changed to include other urbanicities or years. The tertiles center around enrollments of 144 students, 409 students, and 1,381 students in 2009, respectively, with slightly smaller enrollments for each group by 2019 due to a small number of school district closures. This table includes 2009 data since that is the base year for the tertiles as well as 2019 data to explore potential changes over time.

Economic and Community Measures

The economic and community measures, shown in Table 1 and Table 2, explore the relationship between Missouri's school districts with different enrollment sizes along key economic characteristics. Though local population expectedly varies between tertiles in Table 1, surprisingly, there are few major differences between the small, medium, and large districts along other indicators. Notably, both adult and child poverty rates were very similar across these rural groupings. This similarity may buck intuition since communities with smaller school districts may be assumed to have less economic opportunity for residents than larger school districts. Conversely, gaps in poverty, educational attainment, and income grow significantly when we consider rural districts along their NCES sub-categories as shown in Table 2. Median income, in particular, varies substantially by rurality but little by district enrollment.

School Characteristics and Finance Measures

The school characteristics and finance data examined in Tables 3 and 4, however, reveal important differences among districts of different categorizations. One notable difference is that small rural districts have a higher average per-pupil revenue and expenditure than districts of other sizes, driven principally by increased local revenue collection and significant state funding differences as well. In 2017, small districts accrued a revenue of $5,500 per pupil more than the large rural districts, resulting in higher per-pupil spending on instruction and employee salaries. This also represents a growing disparity, increasing from $3,720 a decade prior. In addition, average student-teacher ratios vary significantly, nearly two standard deviations higher in large rural districts (13.2 students per teacher) than in small districts (8.9 per teacher) in 2017. Contrary to the prior community comparisons, many district differences attenuate when examining differences by NCES rurality. For example, spending differences remain evident, though with far less variation. In

Table 1
District Economic and Community Characteristics, By Enrollment Tertiles

	2009-10				2019-20			
	Small	Medium	Large	P-value	Small	Medium	Large	P-value .
Enrollment	144 (68)	409 (111)	1,381 (1,105)	0.000	131 (64)	374 (117)	1,352 (1,190)	0.000
Population	1,062 (492)	2,606 (897)	7,897 (5,943)	0.000	1,081 (477)	2,543 (849)	8,382 (6,831)	0.000
White	96.9 (3.1)	95.8 (3.8)	95.4 (3.6)	0.001	96.6 (3.3)	95.1 (3.6)	95.0 (3.3)	0.000
Gini coefficient	0.5 (0.05)	0.4 (0.04)	0.40 (0.04)	0.510	0.41 (0.04)	0.42 (0.05)	0.42 (0.05)	0.009
Median income	$46,604 (10,420)	$44,533 (10,028)	$48,466 (13,026)	0.020	$48,117 (9,650)	$45,733 (10,221)	$48,788 (12,645)	0.064
< High School	17.3 (7.3)	19.1 (6.5)	18.1 (6.7)	0.112	13.4 (7.0)	14.0 (5.4)	13.2 (5.6)	0.536
BA+	12.9 (5.6)	11.6 (4.3)	14.6 (6.0)	0.000	15.9 (5.8)	15.4 (5.9)	17.5 (7.1)	0.022
Unemployment	6.1 (4.0)	6.4 (3.2)	7.1 (2.9)	0.077	4.2 (3.0)	4.7 (2.7)	4.8 (2.6)	0.205
Adult poverty	12.7 (6.4)	13.8 (5.6)	13.1 (6.5)	0.404	13.7 (6.6)	15.3 (7.0)	14.3 (6.8)	0.159
Child poverty	19.9 (12.3)	22.0 (10.8)	19.7 (10.6)	0.198	20.0 (14.0)	21.9 (11.7)	21.4 (11.0)	0.439
Observations	129	129	128		125	129	128	

Table 2
District Economic and Community Characteristics, By NCES Rurality

	2009-10				2019-20			
	Remote	Distant	Fringe	P-value	Remote	Distant	Fringe	P-value
Enrollment	423 (359)	502 (496)	1,752 (1,578)	0.000	404 (353)	461 (476)	1,769 (1,709)	0.000
Population	2,702 (2,240)	2,987 (2,629)	10,599 (8,308)	0.000	2,733 (2,300)	3,053 (2,763)	11,541 (9,646)	0.000
White	96.5 (2.8)	96.0 (3.8)	94.6 (4.2)	0.006	96.4 (2.5)	95.5 (3.6)	93.6 (4.8)	0.000
Gini coefficient	0.41 (0.05)	0.4 (0.04)	0.4 (0.05)	0.001	0.429 (0.04)	0.41 (0.05)	0.41 (0.04)	0.001
Median income	40,728 (7,737)	49,331 (10,344)	53,244 (15,630)	0.000	42,197 (7,648)	49,895 (9,799)	54,134 (15,932)	0.000
< High School	18.9 (6.5)	18.3 (7.2)	15.2 (6.0)	0.003	14.1 (5.5)	13.7 (6.5)	11.1 (5.2)	0.007
BA+	11.6 (4.4)	13.0 (5.1)	17.6 (7.2)	0.000	14.6 (5.0)	16.3 (5.9)	21.5 (8.5)	0.000
Unemployment	6.6 (3.5)	6.5 (3.3)	6.5 (3.2)	0.985	4.8 (3.2)	4.5 (2.5)	4.2 (2.4)	0.320
Adult poverty	15.2 (6.0)	11.9 (5.9)	11.9 (6.5)	0.000	16.6 (6.8)	13.4 (6.4)	12.1 (6.9)	0.000
Child poverty	23.4 (11.4)	19.1 (11.2)	17.4 (9.7)	0.000	23.5 (12.8)	20.2 (12.2)	17.6 (9.9)	0.005
Observations	148	189	49		144	189	49	

Table 3

District School Finance Characteristics, By Enrollment Tertiles

	2009-10				2017-18			
	Small	Medium	Large	P-value	Small	Medium	Large	P-value
Students per teacher	9.3 (2.3)	12.1 (2.8)	13.5 (1.4)	0.000	8.9 (2.5)	11.7 (1.7)	13.2 (1.2)	0.000
Total revenue	14,227 (4,061)	11,361 (1,878)	10,507 (2,431)	0.000	16,871 (5,438)	12,456 (1,964)	11,259 (1,431)	0.000
Federal revenue	2,547 (914)	2,174 (579)	1,893 (514)	0.000	1,547 (668)	1,264 (571)	1,037 (417)	0.000
State revenue	5,030 (1,819)	4,019 (877)	3,506 (844)	0.000	6,942 (2,980)	5,011 (1,231)	4,449 (1,052)	0.000
Local revenue	6,651 (3,019)	5,168 (1,780)	5,108 (2,943)	0.000	8,382 (2,624)	6,181 (1,970)	5,772 (2,182)	0.000
Total expenditures	15,428 (4,379)	12,187 (2,422)	10,914 (2,101)	0.000	16,506 (5,580)	12,314 (2,515)	10,865 (1,716)	0.000
Instructional expenditures	7,604 (2,170)	6,363 (876)	5,844 (670)	0.000	7,962 (2,361)	6,362 (1,079)	5,863 (682)	0.000
Total salary	8,160 (2,111)	6,442 (815)	5,887 (650)	0.000	8,397 (2,701)	6,229 (995)	5,802 (689)	0.000
Instructional salary	5,260 (1,470)	4,272 (576)	4,021 (473)	0.000	5,393 (1,726)	4,147 (721)	3,926 (454)	0.000
Employee benefits	2,079 (684)	1,760 (311)	1,583 (254)	0.000	2,292 (727)	1,893 (357)	1,738 (242)	0.000
Observations	129	129	128		125	129	128	

Table 4

District School Finance Characteristics, By NCES Rurality

	2009-10				2017-18			
	Remote	Distant	Fringe	P-value	Remote	Distant	Fringe	P-value
Students per teacher	11.0 (3.4)	11.5 (2.4)	13.2 (3.3)	0.000	10.7 (2.5)	11.1 (2.6)	13.1 (3.2)	0.000
Total revenue	12,585 (3,958)	11,888 (3,030)	10,728 (2,358)	0.003	13,570 (3,870)	13,876 (4,736)	11,608 (2,223)	0.003
Federal revenue	2,418 (781)	2,154 (654)	1,725 (741)	0.000	1,377 (534)	1,281 (637)	974 (537)	0.000
State revenue	4,369 (1,701)	4,252 (1,184)	3,319 (1,037)	0.000	5,341 (2,068)	5,811 (2,443)	4,326 (1,223)	0.000
Local revenue	5,799 (2,670)	5,482 (2,900)	5,684 (2,315)	0.570	6,852 (2,869)	6,783 (3,151)	6,308 (2,107)	0.514
Total expenditures	13,511 (4,192)	12,636 (3,355)	11,425 (3,030)	0.002	13,297 (3,877)	13,578 (5,035)	11,230 (2,248)	0.003
Instructional expenditures	7,023 (2,043)	6,474 (1,217)	5,737 (1,087)	0.000	6,893 (1,712)	6,812 (1,963)	5,730 (999)	0.000
Total salary	7,230 (2,079)	6,733 (1,360)	5,905 (1,150)	0.000	7,007 (2,008)	6,909 (2,219)	5,803 (1,069)	0.001
Instructional salary	3,998 (762)	4,433 (860)	4,774 (1,395)	0.000	4,580 (1,273)	4,541 (1,392)	3,877 (695)	0.002
Employee benefits	1,590 (367)	1,774 (418)	1,913 (619)	0.000	1,724 (364)	1,979 (568)	2,028 (553)	0.005
Observations	148	189	49		144	189	49	

Table 5
Rural Teacher Characteristics, By Enrollment and NCES-defined Rurality, 2020-21

	Small	Medium	Large	P-value	Remote	Distant	Fringe	P-value
Female	82.0	78.7	78.2	0.001	79.2	78.5	78.5	0.394
White	98.9	99.3	98.3	0.000	99.2	98.5	98.1	0.000
Regular term salary	36,176 (5,760)	38,601 (5,861)	44,302 (8,734)	0.000	38,653 (6,191)	40,077 (6,678)	47,338 (9,322)	0.000
Extra duty salary	860 (1,858)	1,464 (2,640)	1,658 (3,107)	0.000	1,438 (2,766)	1,497 (2,770)	1,659 (3,173)	0.000
Total salary	37,036 (6,224)	40,064 (6,584)	45,960 (9,487)	0.000	40,090 (7,016)	41,573 (7,426)	48,997 (10,114)	0.000
Experience in district	8.2 (7.3)	9.1 (7.7)	9.4 (7.4)	0.000	9.2 (7.6)	8.9 (7.4)	9.6 (7.4)	0.003
Experience in MO	11.1 (8.3)	11.9 (8.4)	12.1 (8.1)	0.000	11.9 (8.2)	11.6 (8.2)	12.4 (8.1)	0.001
Total experience	11.6 (8.6)	12.3 (8.6)	12.6 (8.3)	0.000	12.3 (8.4)	12.0 (8.4)	12.9 (8.3)	0.000
Master's degree +	40.7	46.6	53.0	0.000	47.2	46.1	57.4	0.000
Observations	1,775	4,029	12,614		4,880	7,014	6,524	

Table Notes. Mean (standard deviation) reported. P-values are associated analysis of variance (ANOVA) between group means. Race, educational attainment, unemployment, poverty, gender, and degree completion data are reported in percentages. Regular term salaries represent teachers' base salary while extra duty salaries represent compensation for additional efforts, such as athletics coaching. Master's degree + indicates the percentage of teachers who hold a masters degree, specialist degree, or doctorate. Enrollment tertiles (small, medium, large) and rural urbanicity (remote, distant, fringe) are identified in 2009-10 and held constant to 2020-21 to create stable samples of comparison, with the exception of districts which permanently shuttered over the panel. All finance variables are reported in real terms ($2019); district expenditures are reported per pupil using district enrollment figures.

2017, only $2,000 differentiated fringe and remote rural district per-pupil spending while disparities in local revenue collection nearly disappeared. Notably, fringe districts, the highest-enrolled rural districts by rurality, spend less per-pupil than do lower-enrolled rural districts. Differences in student-teacher ratios are nearly halved as well. These attenuations by rurality classification lend further credence to a diversified consideration of categorical rural labels.

Finally, we examine Missouri's rural school district teacher characteristics, again drawing comparisons between districts along their NCES-defined rurality classification and their enrollment size. Over 18,000 teachers educate students in Missouri's rural school districts, nearly all of whom (more than 98%) identify as White and approximately four in five of whom identify as female. Though often statistically different (in part, as a function of the large sample size), we do not observe meaningfully different proportions of White and female teachers, nor teaching experience (whether locally, in the state, or total) across our rurality and enrollment groupings. Teacher salary, on the other hand, varies significantly by rurality and district enrollment; teachers in larger rural districts and fringe districts earn between $8,000 and $9,000 more than their counterparts in smaller districts and remote districts, respectively, differences that cannot be explained by disparities in experience. On the other hand, teachers in large and fringe districts are much more likely (10 to 12 percentage points) to hold an advanced degree.

Despite a large majority of rural teachers teaching in larger rural districts, we observe few differences in teacher characteristics when we look across the sets of comparisons. In other words, we observe similar differences between teachers in small, medium, and large districts as we do when we compare teachers in remote, distant, and fringe districts. This departs considerably from our prior school and community comparisons, with possible implications for policies pertaining to school funding and teacher labor markets in rural locales.

Conclusion & Discussion

Though at first glance it may appear that Missouri's rural school districts are substantially similar, many differences may emerge, depending on the chosen method of sub-categorization. For example, we found there is wide variation among Missouri rural schools by enrollment, poverty, and educational attainment by NCES categorization but not by enrollment tertiles. We also found large disparities in per-pupil revenue and spending by district enrollment size, though complicated by differences in rurality where expenditure differences are almost halved. This last finding, that small districts have higher per-pupil revenues and spending, is consistent with Gutierrez and Terrones' (2023) analysis, suggesting further research would be beneficial given its relevance to policies governing consolidation, cost-saving efforts, and instructional expenditures like teacher salaries. State policies like hold harmless funding and district policies like permanent four-day school weeks, for example, are highly relevant in such low-enrolled rural districts.

Another critical consideration is the higher local funding contribution per student in low-enrolled districts as compared to medium and large rural districts. Small rural districts typically have smaller populations, meaning that the local tax contributions may weigh more heavily on their residents where there is a smaller population over which to spread the local tax burden. Further, these districts offer lower average teacher salaries than do their larger rural counterparts, a phenomenon linked with increased likelihood of adopting permanent four-day school weeks (Anglum & Park, 2021). Of particular relevance to rural districts, Missouri is home to some of the lowest average teacher salaries in the nation, including a statutory minimum starting teacher salary of only $25,000 and an average starting salary of $32,970 (Anglum et al., 2022).

It is important that research on rural schools be as informative and useful to policymakers as possible so that the specific and unique needs of rural communities can be appropriately addressed. Policymakers must not assume that all rural areas are the same and, instead, should draw from research emanating from contexts with shared characteristics beyond a geographic label. Our look at Missouri's rural school districts reinforces the idea that a clear definition and image of rural school districts may be difficult to identify. Rather, the nuances of rurality in a statewide context may be better explored through careful analysis of the cultural and social settings that surround rural schools. Importantly, Missouri's rural school districts assuredly differ on qualitative and quantitative attributes beyond those we have explored in these data.

Implications for Policy

Research on rural schools presents many opportunities to address the specific and unique needs

that confront rural communities to inform considerations of possible solutions. At a broad level, for those situated in rural and non-rural areas alike, a consistent definition of rurality in education often remains elusive. The current catch-all use of rural without a clear definition means that labeling a community as rural "does not actually explain what is being measured" (Koziol et al., 2015, p. 8), limiting opportunities to promote long-lasting, context-specific change. Despite this need for continuity in definitions, there should also be an understanding that not all rural contexts are the same and heterogeneity across rural contexts should be taken into account. In fact, the variation in rural communities makes it hard for policies geared toward rural areas to properly fit the majority of rural areas (Hartman et al., 2022, p. 61-62) suggesting that increased scholarly attention on definitions of rurality may also increase policy attention.

A specific policy change that may significantly affect rural areas is the expansion of school choice legislation, one Missouri's legislature has actively considered for several years and is expected to emphasize in future legislative sessions (Preis, 2022). Given that central schooling challenges for the expansion of rural school choice policies include small local school-age populations and, geographic distance and sparsity (AASA, 2017; Lavalley, 2018), school choice policy debates may be best informed by a deep understanding of local rural school districts, their relationships with local communities, and the long-term viability of choice expansion in contexts of already contracting enrollments. For example, until 2022 school choice in Missouri largely was restricted to residents of two urban districts, Saint Louis Public Schools (SLPS) and Kansas City Public Schools (KCPS) (DESE, n.d.a). Repeated attempts by the Missouri legislature have sought to enact more geographically lenient charter school laws throughout the state (Nelson, 2022). In 2022, a single, new charter school opened its doors to students, albeit within the boundaries of a suburban St. Louis County district (Bernhard, 2022).

Along the same lines, the recently passed MOScholars tax-credit scholarship program in Missouri provides qualifying students with a scholarship to use on an array of educational expenses and is funded through donations, donors then receive a tax-credit toward their state taxes. The program is limited to schools and families in the four counties with a charter form of governance in the state (all of which are centered around the urban cores of Kansas City and St. Louis) and cities with a population of 30,000 or more which, by statute, automatically excludes the vast majority of rural Missouri from participation (Burrola et al., 2021). Though public focus of Missouri's tax credit scholarship program largely has been devoted to its application for private school tuition, scholarships also may be used for supplementary educational services, which may appeal to rural legislators and residents alike who wish to avail increased educational services while maintaining local traditional public school enrollment.

Missouri's state school funding formula represents another area where further research may shed light on the efficacy of its support of rural schools. Our results indicated considerable differences in funding levels between small, medium, and large rural districts, as well as fringe districts. This may signal that the funding formula does, indeed, account for the needs of different types of rural schools, mainly because of a higher cost to educate students, possibly due to being located further from labor market hubs (Miller, 2012). Our findings may also point to inequities that should be rectified in the funding formula, some linked to district enrollment. Portions of Missouri's school funding formula hinge on enrollment and property assessment values dating back to 2005. As a result, resultant funding allocations, by their construction, ignore enrollment and property changes that occurred during the Great Recession as well as the COVID-19 pandemic (and other trends over the intervening 17 years), resulting in an outdated funding determination. Lastly, revisiting Missouri's funding formula may present an opportunity to redress chronically low rural teacher salaries, among the lowest in the nation (Will, 2019), in efforts to bolster challenging rural labor markets and deter possibilities of increased teacher turnover and attrition from the profession.

Although some contemporary policy decisions, like those for school and district closure (Lavalley, 2018; Smith & Zimmer, 2022; McGee et al., 2022), use enrollment as a defining characteristic of rural school districts, our findings suggest that there may be additional, efficient ways to understand and categorize rural districts. For example, the state's recent Blue Ribbon Commission Report identifies a series of descriptive statistics and policy recommendations for reforms to teacher salaries based on arbitrary district enrollment thresholds (i.e., less than 250 students, 250 to 499 students, 500 to 999 students, etc.) (Missouri Blue Ribbon Commission, 2022). Citing Arkansas legislation, the

Commission recommended policies seeking to achieve greater parity in teacher pay across districts of varying enrollment size, though without specifying other characteristics along which those districts may vary.

In lieu of enrollment thresholds, other quantitative measures or qualitatively assessed attributes may differ among Missouri's rural school districts that are not captured in these data. Education policymakers may consider both a community's distance from an urban area or hub of employment (e.g., distance from many important local resources) *and* enrollment size to inform considerations to revise Missouri's funding formula construction. This suggestion to look at both attributes is supported by the idea of a "rural-urban interface" that occurs as a result of the blurring of boundaries between rural and urban areas and the interdependence created as a result (Lichter & Brown, 2011, p.1), and the differences we find in finances and teacher compensation between the enrollment tertiles.

Opportunities for Future Research

Many opportunities exist for future research regarding rural education in Missouri and beyond. One such important priority should be to deepen our collective understanding of how rurality is defined within the educational context because of the lack of cohesive understanding of rurality (Thier et al., 2021). It is our hope that researchers will adapt the methodology outlined in this paper to data sets created for other states or regions.

While the U.S. Census geographical definitions may be the most commonly used, they do not necessarily align with other municipal boundaries such as those for counties, towns, and cities, making their application difficult for policy purposes (Miller, 2010). The rural typology based on economic, industry, and social characteristics developed by the U.S. Department of Agriculture presents an interesting model that could be adapted for educational use. In this typology, counties are defined according to the industry (i.e. farming, mining,

manufacturing, government, recreation, or nonspecialized) on which they are economically dependent as well as other key policy descriptors regarding poverty, employment, population, and education (USDA, 2019). A similarly structured education-specific typology for school districts might consider educational attainment and/or geographic proximity to institutions of higher education among other characteristics. Future research that describes the social context of rural schools would also be useful for understanding the layers of rural communities, as Nelson and Nguyen's (2023) recent work has initiated. The school and workforce factors explored in our study may suggest a possible basis for these definitions. The development of practical, applicable definitions of rurality will improve the quality of research thereby making rural education more visible to policymakers.

Continued research on rural schools offers the potential to help policymakers and researchers understand the intricacies of rural school districts in a more complete manner than previously achieved. While our study (perhaps surprisingly) did not yield major differences between enrollment tertiles regarding community differences, there remain other dimensions along which we can analyze rural districts such as population density or geographical district size. Qualitative approaches may be uniquely important to understand how rural districts differ from one another, deepening existing knowledge of student educational achievement and attainment and long-term outcomes pertaining to labor and earnings. Our study did find, however, interesting differences among school finance measures between enrollment tertile sizes. These numbers are a direct function of both Missouri's school funding formula and local revenue capacities, which have yet to be analyzed from the lens of how they – with close attention to the hold harmless provision – affect rural districts. Analyzing rural districts along enrollment size provides some insights, but the rural school district context is more nuanced, requiring additional types of analysis like the NCES categorizations to supplement it.

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