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Labor Dynamics of School Principals in Rural Contexts

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Abstract

Although numerous studies confirm the importance of school principals, schools often experience high turnover rates and principal shortage. However, we know little about the staffing challenges in rural schools and what promotes applicants to apply for and be hired for principalship. In partnership with the Wisconsin Education Career Access Network, we examine the principal labor dynamics in rural schools using statewide job-openings and application information in Wisconsin. We find that all rural communities—*rural fringe*, *rural distant*, and *rural remote*—receive equal or high number of applications compared to urban districts. Female candidates are significantly less likely to apply to rural districts, while working in the same district is a considerable advantage to being hired. Among district characteristics, the percentage of students eligible for free or reduced-price lunch tends to reduce the number of applicants in rural schools. Our results highlight the need for policies that are better attuned to the subtle differences in rural contexts.

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I. Introduction

Many studies show that principals play an important role in student learning, teacher retention, and school climate (Day et al., 2016; DeMatthews, 2018; Leithwood et al., 2010). However, it is often reported that not all schools are able to fill their principal positions (Bartanen et al., 2019; Rangel, 2018). One in five principals leaves their position every year and about one in two is not retained after their third year as school leader, a statistic that exceeds the average rate of teacher turnover (Goldring & Taie, 2018; Latterman & Steffes, 2017). Scholars also reveal that principal staffing seems to be more challenging in areas serving high-poverty or low-achieving student populations (DeAngelis & White, 2011; Pijanowski et al., 2009).

Despite increasing attention to principals, relatively little is known about the labor dynamics of principal (e.g., recruiting, hiring, and retaining) in rural schools. In fact, while nearly one in five students lives in rural areas in the U.S. (Showalter et al., 2019), most studies focus on the nature of the principal labor market in urban settings, which inhibits our understanding of the principal labor market issues in rural communities (Johnson et al., 2014; Myung et al., 2011). This emphasis, in turn, leads to policy recommendations for rural schools that are often rooted in metropolitan and urban-centric perspectives (Biddle & Berliner, 2002). Furthermore, the few studies that examine principal staffing in rural areas (Browne-Ferrigno & Allen, 2006; Cruzeiro & Boone, 2009; DeAngelis & White, 2011; Roza, 2003) rely largely on descriptive surveys (Roza, 2003), perceptions of superintendents (Cruzeiro & Boone, 2009), or turnover of principals (DeAngelis & White, 2011).

What is more, research and media discourse frequently portray rural schools as homogeneous communities—although most rural schools are far from similar in student composition, size, structure, or distance from a city (Budge, 2006; Cromartie & Bucholtz, 2008; Tieken, 2017). In particular, proximity to an urban area closely correlates to more educational resources such as advanced course offerings for students (Lavalley, 2018), professional development for teachers (Howley & Howley, 2005), and a pool of highly qualified applicants (Holme et al., 2018). For example, *rural fringe,* a region that is less than or equal to five miles from an urban area, tends to have more educational resources than *rural remote*, which is more than 25 miles from an urban area (Johnson & Howley, 2015). Nonetheless, policy and research have paid little attention to these nuanced differences, which has led to recommendations that are often unresponsive to rural needs (Budge, 2006; Tieken, 2017).

To close these gaps in the literature, we use statewide job-openings and application data that include most job market activities from 2014 through 2016 in Wisconsin. We combine the application data with administrative staffing records, thereby including all applicants who apply for and are appointed as principals, along with their demographic characteristics and work histories. We merge the data with district-level information from the Common Core Data and the

Stanford Education Data Archive. In this study, we focus on rural school principals only, thus not including any other leadership positions. We seek to answer questions that have gone unanswered in previous research: (1) To what extent does a principal staffing look like in rural schools? (2) How does the application pool differ by rural community (*rural fringe*, *rural distant*, and *rural remote*)? (3) What district-level characteristics attract applicants? (4) Which applicant characteristics lead to individuals being hired as principals in rural schools?

II. Background

1. Rural School Principals

Principals face complex tasks every day. They need to identify and articulate visions and goals, motivate teachers, develop high-performance expectations, allocate resources, engage in student discipline, and foster organizational structures to support a professional learning environment (Day et al., 2016; DeMatthews, 2018; Quinn, 2002; Sebastian & Allensworth, 2012). Federal programs such as Race to the Top have recognized the importance of principals and recommended that school districts hire and retain those with strong leadership skills (Johnson & Howley, 2015). The U.S. Department of Education (2009) has also recommended that districts attract and hire effective principals to turn around chronically low-performing schools.

Principals in rural areas are often required to be flexible and versatile in their school operations. The principals wrestle not only with declining student enrollments (Lavalley, 2018) and limited school resources (Baker et al., 2014) but also, due to geographic isolation, with high teacher turnover (Azano & Stewart, 2015; Holme et al., 2018) and lack of professional development opportunities (Howley & Howley, 2005; Knapczyk et al., 2001). Moreover, rural principals often serve as leaders for multiple schools (Clarke & Stevens, 2006) and sometimes teach students across multiple grades (Preston et al., 2013).

Rural school principals often live, relate, and participate in a rural lifestyle and culture (Budge, 2006). While rural places tend to have high levels of social cohesion and strong sense of belonging (Burnell, 2003), which build strong school-community linkages, many rural principals experience a lack of privacy and often respond to out-of-school needs. Some scholars describe the professional lives of school leaders as "never off duty" (Cruzeiro & Boone, 2009, p. 7) or "public property" (Lock et al., 2012, p. 70), with community members expecting principals to be on call 24 hours a day for the community. Superintendents thus have difficulties in filling principal vacancies (Pijanowski et al., 2009). As a result, some rural schools hire applicants with little or no administrative experience (Clarke & Stevens, 2009; Connelly & Tirozzi, 2008). To address these challenges, scholars suggest that developing sustainable leadership in rural areas needs to be a national educational priority (Hargreaves & Fink, 2006).

Although prior literature captures the challenges common to rural principals, scholars note that rural schools are far from similar in resources, size, and struggles (Fowles et al., 2014; Latterman & Steffes, 2017). These differences may have diverse policy implications for rural

schools—in particular, their distance from urban areas is closely related to access to academic programs for students and to professional development for teachers (Azano & Stewart, 2015; Baker et al., 2014; Lavalley, 2018). Nonetheless, the research tends to portray rural communities as homogeneous, an oversimplification that yields monolithic policies that are not attuned to rural communities (Johnson & Howley, 2015).

While the U.S. government employs multiple indices to define space and place (Cromartie & Bucholtz, 2008), the National Center for Education Statistics divides "rural" into three sub-categories based on how far the region is from an urban area (Geverdt, 2015): *rural fringe, rural distant,* and *rural remote. Rural fringe* districts are located less than or equal to 5 miles from an urbanized area. *Rural distant* districts are defined as being more than 5 miles but less than or equal to 25 miles from an urbanized area, while a *rural remote* region is more than 25 miles from an urbanized area. These contexts lead to different school systems, contexts, quality of teachers, and student learning needs (Johnson & Howley, 2015; Latterman & Steffes, 2017). While research has documented advantages and challenges unique to rural schools (Johnson & Howley, 2015; Petrin et al., 2014), no studies have explored how distance from an urban area operates in labor dynamics of principals in rural schools.

2. Application and Hiring Patterns

Scholars have not been able to account for application and hiring patterns when examining labor dynamics due to the lack of available job application data. As a result, little evidence exists on how district characteristics relate to the number of applications districts receive, while research documents that schools with large concentrations of low-achieving students, high-poverty students, or students of color experience high employee turnover (Rangel, 2018; Yan, 2020). If those factors account for the variation in the number of applications across schools, policymakers should provide more support and resources to those schools for the recruitment of applicants and retention of educators.

In addition, the investigation of application and hiring patterns allows us to better understand principal pipelines and suggest evidence-based policy decisions. While rural schools have a higher portion of male principals and a lower portion of principals of color than do urban schools (Beesley & Clark, 2015), we do not know whether application pools are less diverse or whether rural school districts tend to hire applicants with particular characteristics. Similarly, while rural community members prefer principals who understand their historical and social contexts (Browne-Ferrigno & Allen, 2006; Preston et al., 2013), we do not know whether applicants who have a close affiliation with the school community (e.g., working in the same district) are more likely to apply for the position, or whether the districts prefer to hire those candidates. Understanding these factors is crucial for developing sound recruitment policies because, if rural schools do not have diverse applicants, we will need to focus on supporting and encouraging women and applicants of color for principal positions. On the other hand, if the applicant pool is diverse, appropriate policy implications should focus on ways to improve hiring decisions.

III. Methodology

1. Data

Located in the northern Midwest, Wisconsin is the 25th largest state in land area, with a total population of about 6 million. By the Census definition, 97% of Wisconsin's land area is rural, but only 30% of the population lives in rural areas (Jones & Ewald, 2017). Based on our Wisconsin school and staffing records sorted by National Center for Education Statistics locale categories, as of 2016, 53% of school districts are classified as rural, 36% of schools are rural, 25% of teachers work in rural schools, and 23% of students attend rural schools. While these proportions are smaller than Wisconsin's share of rural land area, these figures suggest that rural schools play an important role in Wisconsin's public education. Also, Wisconsin is one of 12 states that provide less funding to rural districts, as compared to urban and suburban districts; many states give a disproportionately larger share of school funding due to the relatively higher costs of running rural schools (Showalter et al., 2019).

We use statewide vacancy and application data that cover most job market activities from demand (districts) and supply (principal candidates) sides for 2014 through 2016 in Wisconsin. This data, provided by the Wisconsin Education Career Access Network (WECAN), includes a wide range of information not only about the characteristics of vacancies (e.g., which districts post positions, what and when the positions are posted, how many applicants apply to each vacancy) but also about the applicants (e.g., years of educational experience, certifications, how many applications each applicant submitted). As of 2016, 83% of districts use the WECAN system to post job vacancies; consequently, most principal candidates search and apply for positions through the system. We merge the data with staffing records administered by the Wisconsin Department of Public Instruction to identify hiring results and work experiences (e.g., where the applicants worked before submitting applications, whether the applicants have principal experience within three years). In some analyses, we supplement application data with information on district-level characteristics from the Common Core Data and the Stanford Education Data Archive.

Table 1 presents summary statistics, where we disaggregate the data by rural and urban. The National Center for Education Statistics defines locales as city, suburban, town, or rural; however, instead of using the term "city", we use "urban" to accommodate previous studies. Additionally, we divide rural into three sub-categories—*rural fringe, rural distant,* and *rural remote*—based on the National Center for Education Statistics framework (Geverdt, 2015). Throughout our study, we set urban as a comparison group given that urban schools are well known to struggle with school staffing (Guin, 2004; Ingersoll, 2001).[1] This comparison between

[1] The National Center for Education Statistics classifies urban with three subtypes—urban large, urban midsize, and urban small—according to their population. As of 2016, There is one urban large district (Milwaukee Public Schools), two urban midsize districts (Madison Metropolitan School District and Green Bay Area Public School District), and 14 urban small school districts among the 424 school districts in Wisconsin. These 17 urban districts account for 24% of schools, 27% of teachers, and 29% of students, respectively. Milwaukee, the largest urban district, has 75,749 students, while the smallest urban district, Onalaska School District, has 3,155 students.

rural and urban helps us understand the ways in which the labor dynamics of school leadership is similar to and distinct from those documented in urban contexts.

Table 1. Summary Statistics

	Rural	Rural fringe	Rural distant	Rural remote	Urban
Application-level					
Gender (Female)	0.407	0.421	0.408	0.380	0.524
	(0.491)	(0.494)	(0.491)	(0.486)	(0.499)
Applicant of Color	0.024	0.032	0.023	0.010	0.118
	(0.152)	(0.175)	(0.149)	(0.098)	(0.323)
Teaching Experience	12.613	12.498	12.743	12.370	12.132
	(6.474)	(6.472)	(6.496)	(6.390)	(6.241)
Worked as Principal within Three Years	0.145	0.161	0.143	0.114	0.125
	(0.352)	(0.367)	(0.350)	(0.318)	(0.331)
Worked in Same District within Three Years	0.024	0.022	0.024	0.025	0.140
	(0.152)	(0.146)	(0.153)	(0.155)	(0.347)
Number of Applications	5,106	1,607	2,771	728	5,999
Vacancy-level					
Student Achievement (standardized)	0.16	0.22	0.17	0.07	-0.11
	(0.31)	(0.35)	(0.32)	(0.18)	(0.34)
Percentage of Students on Free or Reduced-Price Lunch	39.13	33.28	38.41	49.20	53.76
	(16.39)	(18.72)	(15.23)	(11.37)	(14.33)
Percentage of Students of Color	12.44	11.44	13.08	12.06	42.98
	(16.04)	(6.73)	(20.97)	(7.59)	(20.41)
Percentage of English Language Learners	1.75	2.29	1.80	0.88	8.89
	(2.60)	(2.69)	(2.84)	(1.41)	(4.82)
Percentage of Students in Special Education	13.75	11.97	13.77	16.13	15.44
	(3.31)	(2.61)	(3.01)	(3.54)	(1.93)
Student Enrollment	1,012.2	1,651.4	800.8	713.4	19,982.5
	(822.1)	(1,283.4)	(346.7)	(389.5)	(21,103.0)
Per Pupil Expenditure	13,413.7	12,979.1	13,291.7	14,351.0	12,758.0
	(1,889.0)	(1,199.8)	(2,166.1)	(1,570.0)	(1,004.3)
Number of Vacancies Posted	108	29	58	21	141
Number of Districts	80	20	41	19	16

Notes. Sample means and standard deviations are for the years 2014–2016. Standard deviations are in parentheses. Urban: Territory inside an urbanized area and inside a principal city. Rural: Census-defined rural territory that is away from an urbanized area and an urban cluster. Rural fringe: Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster. Rural distant: Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster. Rural remote: Census-defined rural territory that is more than 25 miles from an urbanized area and more than 10 miles from an urban cluster.

As shown in Table 1, rural districts receive fewer applications from female candidates for rural leadership vacancies (41%) as compared to urban districts (52%).[2] The farther vacancies are from urban areas, the smaller the proportion of female candidates. For race/ethnicity, 2.4% of applications are from applicants of color for rural vacancies, the proportion in urban vacancies is nearly fivefold greater. As with female candidates, the proportion of candidates of color also decreases with greater distance from urban areas. We do not find clear differences in teaching experience between the location categories. For candidates who have previous experience as a principal within the prior three years, 14.5% of applications are for rural vacancies and 12.5% for urban vacancies. The proportion of experienced leadership applicants is highest in the rural-fringe (16.1%) and lowest in the rural-remote areas (11.4%). In contrast to the "grow your own" leadership pipelines that superintendents report to be commonplace in rural districts (Versland, 2013), only 2.4% of applications are from candidates who have worked in the same districts within the previous three years in rural vacancies in contrast to 14% from applicants to urban vacancies.

With respect to vacancy-level characteristics in Table 1, rural vacancies show higher student achievement scores than urban vacancies. We also find variation in student achievement among rural communities. Rural vacancies show smaller percentages of students eligible for free or reduced-price lunch, students of color, English language learners, and special education students compared to urban vacancies. Variations exist among rural communities, notably huge differences in student enrollment by locale. Lastly, per pupil expenditure, adjusted by the 2016 consumer price index for inflation, is a bit greater in rural vacancies compared to urban vacancies. Per pupil expenditure increases the farther vacancies are from urban areas.

2. Empirical Framework

To explore the first research question about what principal staffing looks like in rural schools, we examine the number of applications per vacancy by locale. We first provide a descriptive portrayal in rural, urban, suburban, and town districts, as categorized by the National Center for Education Statistics. To explore whether the application patterns differ by specific types of rural communities—*rural fringe, rural distant,* and *rural remote*, we also present a graph contrasting the number of applications by the sub-categories and urban areas. Because mean values are likely to be affected by outliers where a vacancy receives a massive number of applications, we use box plots which display median values as well as dispersion and skewness in the data.

To explore differences in the application pool in rural communities, our second question, we use a logistic regression model in the application-level as follows:

[2] One applicant could apply for multiple vacancies, which may account for differences in summary statistics between applicant- and application-level. We show the summary results for the application-level because we focus on how application pools vary by locale (Research Question 2) and how the hiring probability differs conditional on candidate characteristics for a specific vacancy (Research Question 4). Additionally, we find that the summary statistics are similar to the results for the applicant-level. The results are available from authors upon request.

$$\text{Ln [P(Y)/(1-(P(Y))] } = \beta_0 + \beta_{1v}[Location] + \tau_t + \varepsilon \qquad (1)$$

where the outcome (Y) represents the logged odds of being individual characteristics (e.g., female, applicants of color) of an application i in vacancy v in year t; $Location$ is a binary (urban or rural) or categorical (urban, rural fringe, rural distant, or rural remote) variable classifying the location of vacancy v, respectively; τ_t indicates year fixed-effects; ε is the random error. Year fixed-effects account for time-specific correlates. Because one applicant applies to multiple vacancies, we cluster standard errors at the applicant level. If we do not account for the nested structure of the data, the standard errors would likely be underestimated, thereby inflating the statistical significance of the estimates. We convert the logged odds results into odds-ratios for ease of interpretation. We separate our approach into two analyses: one represents the difference in application pool between urban and rural while the other one is the differences in the application pool between urban versus rural communities (rural fringe, rural distant, rural remote).

The third research question explores organizational factors related to the number of leadership applications across locales. We estimate the following regression via ordinary least squares (OLS):[3]

$$Y_{vdt} = \beta_0 + \beta_k X_{dt} + \tau_t + \varepsilon_{vdt} \qquad (2)$$

where Y_{vdt} is the number of applications for vacancy v in district d, and year t; X_{dt} is a vector of district-level characteristics (student math achievement, percentage of students receiving free or reduced-price lunch, percentage of students of color, percentage of English language learners, percentage of special education students, student enrollment, per pupil expenditure); τ_t indicates year fixed-effects; ε_{vdt} is the random error. Standard errors are clustered at the district level to account for the nested structure. The coefficients of primary interest in Equation (2) are β_k, showing to what extent the district-level characteristics are associated with the number of applications. To clarify which characteristics have significance for both rural and urban areas and which are specific to rural districts, we estimate the models separately: once for rural vacancies and again for urban vacancies.

For the fourth research question, which individual factors are relevant for candidates to be hired, we run logistic regression models in the application-level of the following form:

$$\begin{aligned}\text{Ln [P(Y)/(1-(P(Y))] } = {} & \beta_0 + \beta_{1i}[Female] + \beta_{2i}[NonWhite] + \beta_{3i}[Exp] \\ & + \beta_{4i}[Prin] + \beta_{5i}[Dis] + \delta_v + \tau_t + \varepsilon_{ivt} \qquad (3)\end{aligned}$$

[3] Because the number of applications is a count variable, Poisson model is the appropriate approach to accommodate for the nature of the dependent variable. We find that the Poisson results are statistically consistent with the OLS results. We also find that the results are consistent with the OLS results when transforming the dependent variable into natural logarithmic form. We use the OLS results for ease of interpretation. Both Poisson and log-transformed results are available from the authors upon request.

where the outcome (Y) represents the logged odds of being hired for an applicant who submits an application i to vacancy v in year t; $Female$ is the indicator for whether the application is from a female candidate; $NonWhite$ is the indicator for whether the application is from an applicant of color; Exp is years of educational experience; $Prin$ is the indicator for whether the application is from an applicant who worked as a principal within three years in Wisconsin public schools; Dis is the indicator for whether the application is from an applicant who worked in the same district that posted the vacancy within three years; δ_v and τ_t indicate vacancy fixed-effects and year fixed-effects, respectively. ε_{ivt} is the random error. By constraining the variance to only that within vacancies, this modeling approach more closely reflects the underlying process where a principal candidate competes with other candidates who apply to the same vacancy and hiring decisions are made relative only to other candidates in the applicant pool. This strategy also mitigates the bias resulting from unobservable vacancy-level characteristics (e.g., when the vacancy is posted, how many applicants apply to the vacancy, whether the vacancy is planned ahead or unexpected) as well as district-level characteristics (e.g., district climate and size). We cluster standard errors at the vacancy level due to the nested nature of the data (multiple applications within a vacancy). Again, we convert the logged odds results into the odds-ratios for ease of interpretation. The odds of being hired are *estimated odds ratio* times as great as the reference category (e.g., male and White), holding all other covariates constant at their grand mean. To identify which factors are statistically significant for both rural and urban districts and whether the estimated magnitudes differ by locale, we divide the sample into two groups (rural and urban) and run the same logistic regression model. Additionally, we divide the rural group into specific rural communities (rural fringe, rural distant, rural remote) to clarify which factors are dominant across locales.

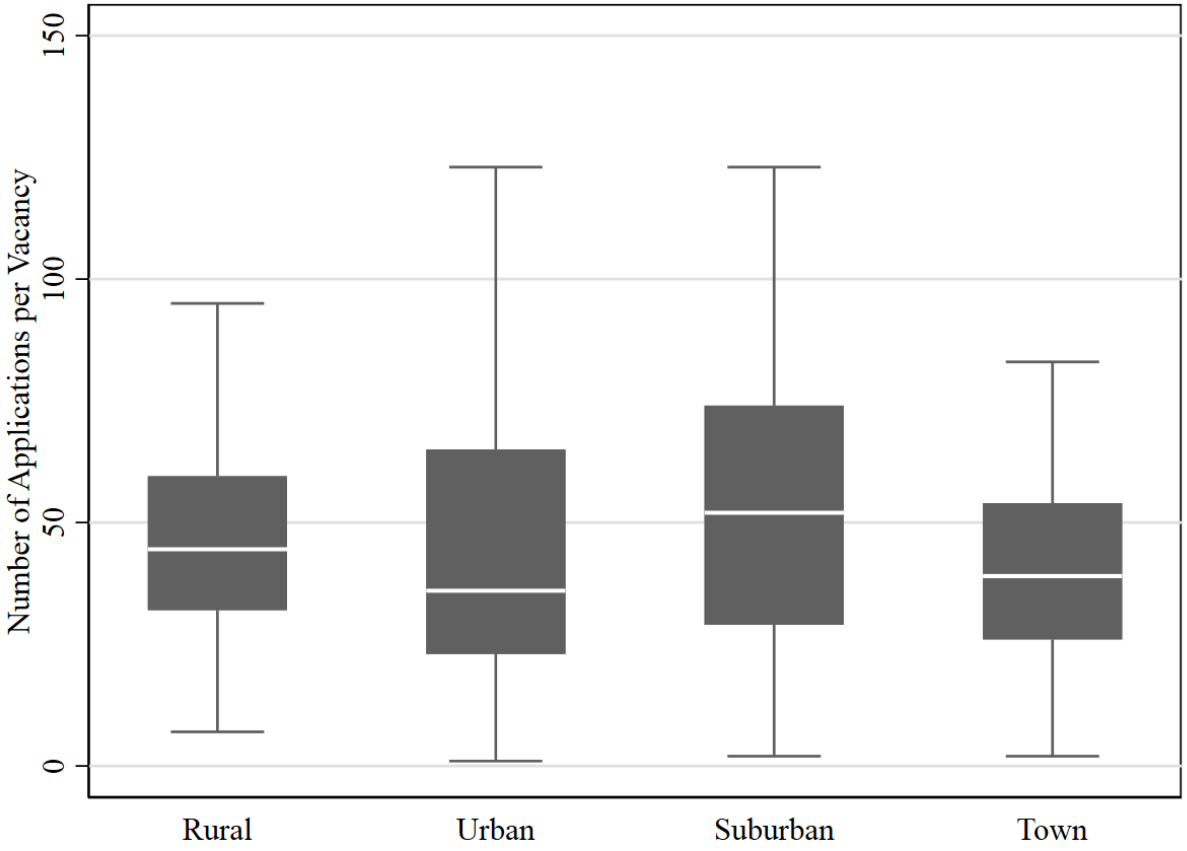
IV. Findings

1. Recruiting Principal Candidates: Number of Applications

We find that rural districts receive the same or more applications as compared to school districts in the urban areas. As illustrated in Figure 1, the median number of applications that a principal vacancy in rural districts receives is 44.5, whereas urban districts receive around 36 applications. We also find that suburban districts receive 52 applications and town districts receive 39 applications, respectively.[4]

[4] We find consistent tendencies when breaking down the applications by year (2014 to 2016) and using mean values, respectively. These results are available from authors upon request.

Figure 1. Number of Applications per Vacancy

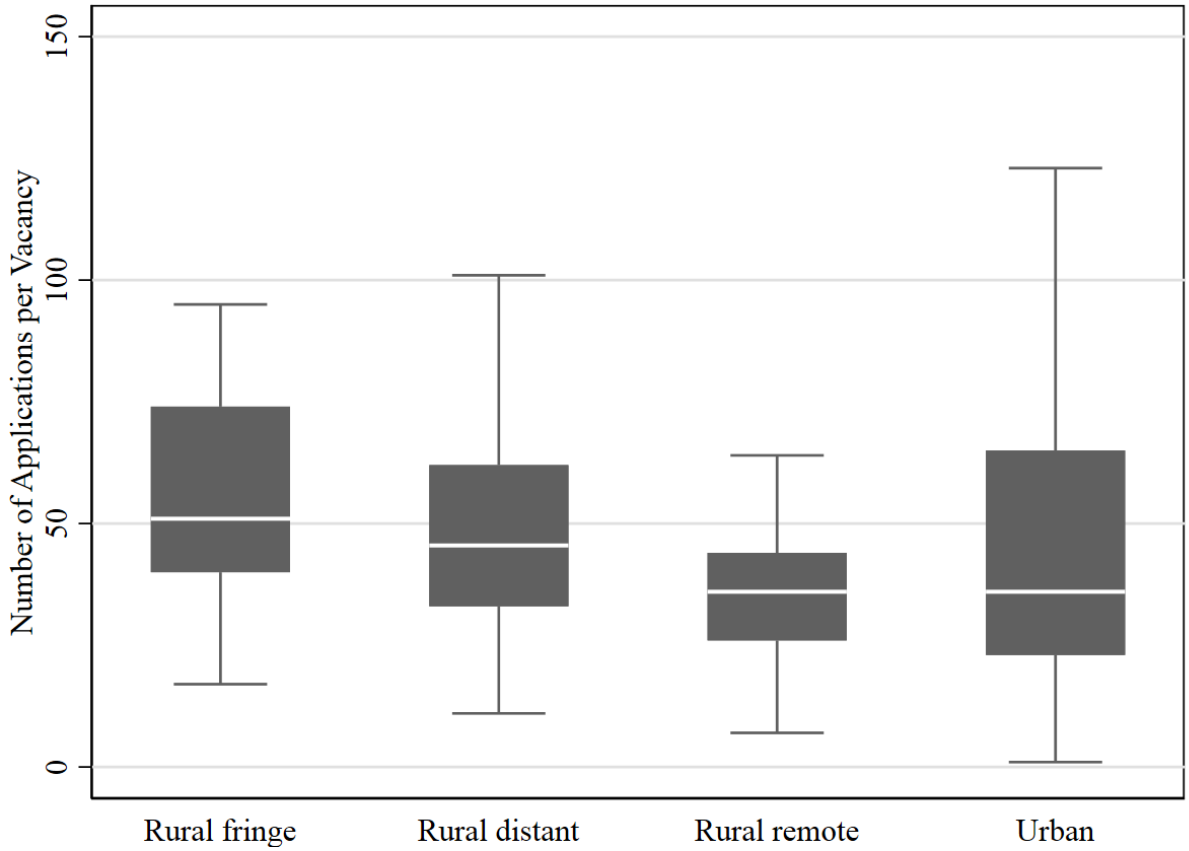


We further explore whether patterns in the size of the application pool differs by rural classification: rural fringe, rural distant, and rural remote. We find marked differences in the number of applications across the rural types, as shown in Figure 2. The farther a principal vacancy is from urban areas, the more the number of applications decreases. A principal vacancy in rural fringe, which is less than or equal to 5 miles from urban areas, receives a greater number of applications (51) compared to other rural communities as well as urban districts (36). Rural distant receives 45.5 applications per school principal vacancy. Lastly, among the rural sub-types, rural remote receives the fewest applications (36), which is similar to those in urban districts. Overall, Figure 2 depicts that the farther a district is from an urbanized area, the number of applicants tends to be substantially reduced. Though rural remote receives the fewest applicants, nonetheless, they still receive above 30 applications per vacancy on median value.

One concern may be that principal applicants show different application patterns between rural and urban. For example, applicants who apply to rural vacancies might submit more applications than those who apply to urban vacancies because job openings may not come around often in rural areas. We find, from 2014 to 2016, nearly 28% of urban schools post principal positions at least once, with 14% for rural schools. However, candidates in urban areas submitted applications on average of 2.85 times, while those in rural areas submitted on average of 2.40 times, refuting the possibility that candidates vying for rural positions may apply to every available position due to limited job availability. We also find that the number of applications per

candidate is similar across specific types of rural communities—rural fringe, rural distant, and rural remote.

Figure 2. Number of Applications per Vacancy by Rural Subtypes



2. Differences in the Application Pool

To address our second research question—whether the characteristics of principal applicants differ by school district locale—we run two logistic regression models, focusing on two locale types (rural and urban) and then four types (rural-fringe, rural-distant, rural-remote, and urban), respectively. The reference group is urban vacancies in both models.

Table 2 shows a clear tendency for rural vacancies to receive fewer of applications from female candidates. The odds that an application is from a female candidate in rural are 0.624 times smaller than those in urban vacancies. Additionally, we find that regardless the distance to urban areas, rural communities tend to receive fewer applications from female candidates, as compared to urban vacancies ($p < 0.001$). Similar to gender, rural districts receive fewer applications from candidates of color than urban vacancies do. We find that the odds of an urban district receiving an application from a candidate of color is over five times greater than that of rural vacancies ($p < 0.001$). This trend is consistent when comparing other rural communities with the urban districts (odds-ratios range from 0.073 in rural remote to 0.236 in rural fringe). The third outcome pertains to teaching experience, which is a continuous variable. Thus, we use

an OLS model to account for the nature of the dependent variable. We find that candidates in rural vacancies have more years of experience than candidates in urban vacancies, although the magnitude of the difference (0.51 years) is small. The fourth outcome identifies whether an applicant worked as a principal within three years in Wisconsin public schools. We find that the odds of applicants who have experience as a principal in rural are 1.165 times greater than those in an urban area ($p < 0.1$). This tendency is consistent when comparing the rural fringe to the urban vacancies (odds-ratio: 1.321). The fifth outcome is whether an applicant applies to a vacancy in the district where he or she has worked within three years. Here we find that rural vacancies receive fewer applications from candidates who have worked in the same districts within three years compared to urban vacancies. The odds of the district experience in a rural area are 0.148 times smaller than those in urban locales. These differences are consistent when comparing the application pool in the urban vacancies to all the other rural communities.

Table 2. Application Pool Differences in Rural and Urban Vacancies (Odds Ratios)

	(a) Female	(b) Applicants of Color	(c) Teaching Exp. (Con.)[a]	(d) Worked as Principal within Three Years	(e) Worked at Same District within Three Years
Urban vs. Rural					
Rural	0.624***	0.181***	0.512*	1.165†	0.148***
	(0.046)	(0.028)	(0.247)	(0.104)	(0.017)
Wald chi^2 / R^2	45.06	130.35	0.006	7.65	280.94
Urban vs. Rural Details					
Rural-Fringe	0.644***	0.236***	0.444	1.321**	0.132***
	(0.047)	(0.040)	(0.242)	(0.122)	(0.027)
Rural-Distant	0.630***	0.176***	0.621*	1.151	0.156***
	(0.050)	(0.036)	(0.263)	(0.119)	(0.023)
Rural-Remote	0.562***	0.073***	0.250	0.888	0.158***
	(0.071)	(0.038)	(0.413)	(0.150)	(0.041)
Wald chi^2 / R^2	46.90	126.87	0.008	17.90	281.27
Obs.	11,105	11,105	11,105	11,105	11,105

Notes. All specifications include year fixed-effects. Urban is the reference group. Standard errors clustered at the applicant-level are in parenthesis. The locale definitions are identical to those in Table 1. [a] We used OLS because the teaching experience is a continuous variable.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

3. District Characteristics Attracting Principal Applicants

Moving to the third research question, we examine which organizational factors are relevant for the number of applications for the school principal position in rural districts. For comparison, we also run the same regression model using the sample of urban districts. Table 3 shows that, among the district characteristics, only the proportion of free or reduced-price lunch students in

the district is associated with the number of applications in rural districts. Specifically, one percentage point increase of the lunch status is related to 0.56 decrease in the number of applications applying to the vacancy in the district, holding other covariates constant. Other variables such as student achievement, student enrollment, percentage of students of color, or per pupil expenditure show no discernible differences in the number of applicants to rural districts.

Table 3. Relationships between Number of Applications and District-level Characteristics

	(a) Only Rural	(b) Only Urban
Student Achievement	7.487	-1.715
	(9.206)	(23.317)
Percentage of Students Eligible for Free or Reduced-Price Lunch	-0.564**	0.269
	(0.188)	(0.536)
Percentage of Students of Color	0.103	0.937
	(0.205)	(0.622)
Percentage of English Language Learners	1.038†	-2.887***
	(0.553)	(0.476)
Percentage of Students in Special Education	0.332	2.493
	(0.753)	(2.741)
Student Enrollment	-0.000	-0.001**
	(0.003)	(0.000)
Per Pupil Expenditure	-0.001	-0.016**
	(0.002)	(0.005)
Obs.	108	141
R^2	0.277	0.220

Notes: All specifications include year fixed-effects. Standard errors clustered at the district-level are in parenthesis. The locale definitions are identical to those in Table 1.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

In urban contexts, the proportion of students receiving free or reduced-price lunch is not associated with the number of applications received. Instead, we find that the percentage of English language learners, student enrollment, and per pupil expenditure in the district are associated with the number of applications to urban vacancies. To illustrate, one percentage point increase of a district's share of English language learners relates to 2.9 decease in the number of applications for the vacancy. 100 increase of students in the urban district is associated with 0.1 decrease in the number of applications to a vacant position. One dollar increase in per pupil expenditure is associated with 0.016 decrease in the number of applications. One possible interpretation for this result is that the greater per pupil expenditure indicates a higher poverty level in school districts. Because high poverty districts are more likely to receive a large amount of state and federal funding such as Title 1 funds, higher per pupil expenditure indicates particular districts (e.g., high-poverty school) where principal applicants may not prefer to work (Rangel, 2018; Yan, 2020). Although revealing the exact mechanism is beyond the scope of this study, the high correlation (0.80) between the per pupil expenditure and the percentage of students receiving free or reduced-price lunch in urban districts may support this scenario.

Overall findings suggest that district factors associated with the number of applications differ by where the vacancy is located. Variables such as student achievement, the percentage of students of color, and the percentage of special education students are not associated with the variation in the number of applications in either rural or urban vacancies.

4. Individual Characteristics Leading Candidates to being Hired

We explore what types of individual characteristics are relevant for principal candidates to be hired in rural districts, shown in Table 4.[5] Importantly, these results are conditional on an individual applying for a position. Here we find that gender is unrelated to being hired in rural locales overall. Interestingly, we see that female applicants are more likely to be hired in the rural remote vacancies (odds ratio: 5.132). While the magnitude is large, the findings need to be interpreted with caution as it may be largely attributable to the modest sample size (505 observations) and the small portion of female candidates (38%), as compared to other locales.

Table 4. Applicant Characteristics Related to Being Hired (Odds Ratios)

	(a) Rural	(b) Rural-Fringe	(c) Rural-Distant	(d) Rural-Remote	(e) Urban
Female	1.186	1.069	0.970	5.132*	1.072
	(0.259)	(0.431)	(0.296)	(3.975)	(0.233)
Applicants of Color	0.550	0.000***	0.833	0.000***	1.991**
	(0.594)	(0.000)	(0.925)	(0.000)	(0.522)
Teaching Experience (Continuous)	0.987	0.943*	1.001	1.008	0.997
	(0.015)	(0.022)	(0.022)	(0.042)	(0.014)
Worked as Principal within Three Years	1.801*	3.072*	1.425	1.732	5.461***
	(0.488)	(1.500)	(0.524)	(1.346)	(1.099)
Worked at Same District within Three Years	8.951***	16.854***	4.575**	46.161***	9.602***
	(3.001)	(10.130)	(2.547)	(40.307)	(2.242)
Obs.	4,170	1,228	2,437	505	4,140
Wald chi^2	44.35	1460.78	8.53	638.51	165.69

Notes: All specifications include vacancy and year fixed-effects. Standard errors clustered at the vacancy-level are in parenthesis. The locale definitions are identical to those in Table 1.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

For the candidates' race/ethnicity, we see opposite relationships between rural and urban vacancies. Although there seems to be no difference in rural vacancies overall, applicants of color who apply to a vacancy in rural fringe and rural remote areas are less likely to be hired

[5] Because we employ a logistic regression model with vacancy fixed-effects, vacancies are dropped if their hiring results are not identified (e.g., the hiring result of all applicants is coded as zero in a vacancy). This case may happen if a district decides not to recruit a candidate from the application pool or for other reasons. Thus, the number of samples decreases compared to other analyses in this study. We run linear probability models with vacancy fixed-effects to verify whether the sample exclusion makes differences in our findings, shown in Tables A1 and A2 in the appendix. Table A1 does not exclude those vacancies with unidentified hiring results while Table A2 uses the same observations as in Table 4 (dropping those unidentified vacancies). We confirm that our main results are robust to both alternative results.

while those who apply to an urban vacancy are more likely to be hired. The extremely low odds ratios (0.000) in the two areas are likely attributable to very few applicants of color applying to those vacancies coupled with low rates of subsequent employment, which is a product of not being offered a position *or* electing not to accept a position offer. Descriptively, 3% and 1% of applications are from applicants of color in the rural fringe and rural remote, respectively, and nobody is identified as a hired case in the staffing record. On the other hand, within urban applicant pools, applicants of color are twice as likely to be hired than are White applicants.

We do not find teaching experience to be notably associated with the probability of being hired as a principal in rural or urban districts. Focusing on vacancies and corresponding applications in rural fringe districts, we find that the more years of teaching experience are related to decrease in the probability of being hired. In particular, the odds of being hired are 0.943 times as great as a one-year increase in teaching experience, holding all other covariates constant at their mean.

We see that principal candidates who have worked as a principal within three years are more likely to be hired at a principal position again in both rural and urban districts. In rural districts, the odds of being hired for applicants with principal experience are 1.801 times as large as those with no principal experience. In urban districts, the odds ratio is larger than the rural districts: The odds of those with the experience being hired are 5.461 times as great as those with no experience. Narrowing down to specific rural communities, we find a similar tendency in rural fringe districts: the odds of being hired for applicants with principal experience are 3.072 times greater than those with no experience.

Lastly, we learn that principal candidates who have worked at the same district where they apply is the most powerful factor for the prediction of being hired. In rural districts, the odds of being hired for those who have worked at the same district where they apply are 9 times greater than those who have not. In urban districts, the odds of those candidates being hired are 10 times greater than the odds for those who have not being hired. Focusing on the specific rural communities, we find the magnitudes of the estimates vary while the odds ratios are all positively associated with the probability of being hired. In rural distant districts, the odds of being hired are 4.6 times as great as those who have not worked in the same district. In rural remote districts, similarly, the odds of being hired for those who have worked at the same district are 46 times greater than those who have not. Still, this result should be interpreted with caution because the magnitude would be largely attributable to the small sample size.

V. Implications

Our work here has shown that labor dynamics of school principals in rural contexts are, in many ways, quite similar to those in urban locales. Specifically, we have shown that the number of applicants for rural and urban leadership vacancies is comparable and, even in the case of remote rural districts, often exceeds 30 applicants per vacancy. Districts are also similar with respect to the experiential profiles of their candidates, which have comparable years of teaching experience and are equally likely to have leadership experience. With respect to the candidates

who are hired, female candidates are hired in proportion to their representation in all applicant pools and teaching experience appears to be a null factor in hiring decisions for either locale. Prior leadership experience and experience within the district to which the candidate is applying are the largest determinants of being hired, regardless of locale.

That said, significant and meaningful differences exist between urban and rural districts hiring school principals and among rural fringe, distant, and remote districts. While rural fringe districts receive 15 more applications than do urban districts, for instance, the number of applications declines farther away rural districts are from an urban area, with rural distant receiving more than remote districts. Female candidates and candidates of color are significantly less likely to apply to leadership vacancies in any rural locale. For candidates of color this pattern is manifest as districts are located farther and farther from urban centers, to the point where urban districts see over 12 times as many applicants of color than do remote rural districts. Urban districts also have a much larger proportion of internal applicants. The characteristics that correlate to number of applicants for a position also differ; in rural locales applicants appear averse to student poverty, whereas applicants for urban vacancies appear to avoid higher proportions of English language learners. Urban districts are more likely to hire applicants of color. Lastly, although leadership experience is a key predictor of subsequent hiring in all locales, it doubles an applicant's likelihood in rural districts as compared to over a fivefold increase in urban districts.

The nature of these labor dynamics observed here brings to light specific implications for practice, policy, and subsequent research. The discrepancies involving genders, racial groups, and their application rates are problematic. From the standpoint of racial diversity, we need to know more about how to attract a more diverse applicant pool to leadership positions in rural districts. This inquiry is timely given the growing populations of students of color in rural areas. While we have an initial understanding of why tokenism, racial/linguistic isolation, or racism may make educators of color reluctant to apply to rural vacancies (Hollingworth & Dude, 2009), our understanding of how some rural districts have successfully diversified their applicant pools (labor demand) and what motivates candidates of color to apply to rural vacancies (labor supply) remains largely unknown. Using a database such as WECAN to construct a sampling frame of districts that have diversified their recruitment efforts and/or identifying candidates of color who have shown interest in rural contexts could be a fruitful direction for subsequent research. Similarly, it would be useful to ascertain why female candidates are less likely to apply for rural leadership vacancies and to identify and mitigate the professional (e.g., lack of mentorship), economic (e.g., as the primary/secondary familial income earner), and social (e.g., expectations of "traditional" gender roles) barriers that inhibit their candidacy for school leadership positions (Fuller et al., 2018; Hoobler et al., 2009).

Our findings have revealed that urban districts are more likely than rural to attract a disproportionate number of applicants from within their own organization. This is not surprising given that urban districts are much larger and thus have far more vacancies and potential internal applicants. However, a propensity to hire from within is a common practice of districts across all

urban and rural locales. Although it is beyond the scope of our paper to make inferences on the efficacy of such behaviors, we can speculate that such a heavy focus on internal recruitment—while bringing advantages such as organizational knowledge and an established understanding of the applicants' strengths and weakness—also carries its own risks. Internal promotion is a common practice to fill vacancies higher in the organizational structure (DeVaro et al., 2019); however, an excessive focus on internal hiring may inhibit organizational change (Song, Almeida, & Wu, 2003) and hinder development of professional networks (Whittington et al., 2009). Rural districts that already struggle with professional isolation may benefit from more purposeful recruitment and hiring of external candidates. Therefore, how internal hiring/promotion affects rural schools (e.g., school climate, teacher retention, student performance) is worthy of further exploration.

As illustrated, many of our findings show that the labor dynamics of rural and urban contexts appear quite similar. This result is not terribly surprising given that rural and urban schools often grapple with many of the same challenges, such as student poverty and access to adequate resources. As a result, we observe similar struggles with educator recruitment, hiring, and retention. And yet we urge our readership not to take our results as confirmation that findings from urban leadership studies can be unilaterally applied to rural contexts because, while the challenges may be similar, the mechanisms—and therefore the appropriate remedies—are distinct to the locale. Poverty, for example, tends to be highly concentrated in urban districts and more diffuse in rural districts. Homelessness plagues both locales, yet the antecedents and available supports differ substantially (Edwards et al., 2009). Access to the internet, which is nearly ubiquitous in urban schools, can be unreliable or unavailable in many rural districts (LaRose et al., 2007).

The challenges to principal recruitment and hiring in a rural context involve aspects of social and cultural dissonance, even when race is not an issue (Hurley, 1992; Morford, 2002); a misalignment between the types of amenities offered and the amenities desired across locales (Monk, 2007); limitations in leadership preparation (Drummond & Halsey, 2014); and scale-related constraints that require principals to engage a broader swath of responsibilities with fewer organizational supports (Tholkes & Sederberg, 1990). And while some solutions, such as increased compensation (Cowan & Goldhaber, 2018), may apply across locales, other solutions are apt to be more effective when tailored to locale-specific challenges.

Two notable limitations accompany our findings. First, although we observe who applied to a given vacancy and who was ultimately hired, we have no insight into the hiring process. We lack any data on which candidates were offered interviews, who were interviewed, who received offers, and rejected offers. As such, we cannot determine if the individual who was ultimately hired was that districts first (or last) choice and if that district was that candidate's first (or last) choice. The second limitation pertains to generalizability; specifically, the population of Wisconsin, particularly in rural locales, is overwhelmingly white. Our findings—specifically those pertaining to race—unlikely generalize to a context such as rural Alabama or Mississippi where considerations of racial isolation may be less of an issue. These limitations aside, the data

and findings presented here provide an unprecedented view into the dynamics of the rural leadership labor market.

Appendix

Table A1. Applicant Characteristics Related to Being Hired (Linear Probability Model with All of Sample)

	(a) Rural	(b) Rural-Fringe	(c) Rural-Distant	(d) Rural-Remote	(e) Urban
Female	0.003	-0.000	-0.000	0.026*	0.002
	(0.004)	(0.006)	(0.006)	(0.010)	(0.004)
Applicants of Color	-0.006	-0.008*	-0.002	-0.016	0.013†
	(0.009)	(0.004)	(0.017)	(0.010)	(0.007)
Teaching Experience	-0.000	-0.001*	-0.000	0.000	0.000
(Continuous)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Worked as Principal	0.013†	0.019†	0.009	0.014	0.061***
within Three Years	(0.007)	(0.011)	(0.009)	(0.017)	(0.009)
Worked at Same District	0.132***	0.157*	0.079†	0.281**	0.083***
within Three Years	(0.034)	(0.064)	(0.040)	(0.108)	(0.010)
Obs.	5,106	1,607	2,771	728	5,999
R^2	0.032	0.047	0.017	0.112	0.169

Notes: All specifications include vacancy and year fixed-effects. Standard errors clustered at the vacancy-level are in parenthesis. The locale definitions are identical to those in Table 1.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

Table A2. Applicant Characteristics Related to Being Hired (Linear Probability Model with Limited Sample)

	(a) Rural	(b) Rural-Fringe	(c) Rural-Distant	(d) Rural-Remote	(e) Urban
Female	0.004	-0.000	-0.000	0.036*	0.003
	(0.005)	(0.008)	(0.006)	(0.015)	(0.006)
Applicants of color	-0.008	-0.014*	-0.003	-0.016	0.023*
	(0.013)	(0.006)	(0.022)	(0.012)	(0.010)
Teaching Experience	-0.000	-0.001*	0.000	0.000	0.000
(Continuous)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Worked as Principal	0.015†	0.026†	0.010	0.015	0.079***
within Three Years	(0.008)	(0.014)	(0.010)	(0.025)	(0.012)
Worked at same district	0.149***	0.192*	0.087†	0.308**	0.120***
within Three Years	(0.038)	(0.076)	(0.044)	(0.117)	(0.015)
Obs.	4,170	1,228	2,437	505	4,140
R^2	0.031	0.051	0.015	0.115	0.176

Notes: All specifications include vacancy and year fixed-effects. Standard errors clustered at the vacancy-level are in parenthesis. The locale definitions are identical to those in Table 1.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

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