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Abstract This study examines geographic and socio-demographic factors associated with private industry job change in North and South Dakota from 2002 to 2008. We conceptualize private industries as enterprises or businesses that are individually or corporately owned and operated outside the public sector. County-level occupational data were captured using the U.S. Census Bureau's Quarterly Workforce Indicators (QWI). Results indicate that percentage of workers commuting to another county for work, median household income, the percentage of residents identifying as American Indian and Alaska Native, and population change were significant predictors of county-level private industry job change.

INTRODUCTION

Private industries, enterprises or businesses that are individually or corporately owned and operated outside the public sector, play a significant role in creating vibrant economies for nonmetropolitan counties (Vias 2004). Much research has focused on various types of private industries, including educational and health services, manufacturing, and retail and wholesale trade, but only a handful of studies have examined aggregate private industry job change,

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especially in a narrowly defined geographic area such as North and South Dakota (Adamchak, Bloomquist, Bausman, and Qureshi 1999; Albrecht and Albrecht 2007).

United States Department of Labor and U.S. Census data demonstrate that North and South Dakota are similar in terms of minimum wage laws, population size, percentage of people in the workforce, per capita income, and median household and family income. Media reports also suggest that both North and South Dakota appear to be striving to engage in relatively large-scale cooperative development, such as the merger between Sanford Hospital in Sioux Falls and MeritCare in Fargo (Walker 2010). These similarities provide support for the purpose of this study: an examination of private industry job change in the Dakotas. Such a study also provides an opportunity to augment research on the factors that influence job change in the private sector.

LITERATURE REVIEW

A combination of factors impact economic restructuring. Of these, geographic, economic, and demographic factors are especially important. The interaction of these three factors can have both positive and negative effects on private industry job change. In turn, economic restructuring has an impact on a region's industrial landscape by dictating which industries will be the most successful (Albrecht and Albrecht 2007; McGranahan 1999; Shumway and Lethbridge 1998; Vias 2006).

The Importance and Impact of Economic Restructuring

One of the many consequences of economic restructuring includes the formation or creation of new sectors and industries and the modification, or even the elimination, of previously profitable ones (Shumway and Lethbridge 1998). The U.S. economy has experienced two major occurrences of economic restructuring (Albrecht and Albrecht 2007; Falk, Schulman, and Tickamyer 2003; Kenny, Lobao, Curry, and Goe 1989, Sassen 1990; Sassen-Koob 1986).

The first was characterized by technological advances in agriculture, which resulted in larger farms and increased productivity and efficiency, while also decreasing demand for farm labor (Rowley 1998). Simultaneously, manufacturing jobs, which were flourishing in urban areas, began to expand into nonmetropolitan areas where employers could take advantage of displaced farm labor, while minimizing union influence and labor costs (Albrecht and Albrecht 2007).

Another major shift occurred in the late 1970s, when manufacturing jobs began to decline. Once again, technology was the driving force behind this change, as improved transportation and information-technology made it possible for multinational corporations to relocate to foreign countries (Shumway and Lethbridge 1998). In addition, this period witnessed the emergence of the service sector as the dominant industry (Albrecht and Albrecht 2007; Sassen 1990). Unlike manufacturing jobs, which tended to create similar occupations in both metropolitan and nonmetropolitan counties, service sector jobs were more diverse. Metropolitan areas were able to offer higher wages, reestablishing their competitive advantage over rural areas (Albrecht and Albrecht 2007; Mannion and Zougris 2009; McLaughlin 2002; McLaughlin and Perman 1991).

Geographic Location

A county's geographic location in terms of proximity to natural amenities is central in affecting its level of economic growth and activity (Hunter, Boardman, and Saint Onge 2005; McGranahan 1999). Counties that are rich in natural amenities (such as scenic beauty, recreational sites, and tourism) are more likely to experience population growth, and, in turn, private industry job gain, than counties that lack such characteristics (Hunter et al. 2005; McGranahan 1999). In essence, jobs follow people to high amenity counties (McGranahan 1999). Although many of the jobs related to amenities are within the public sector, private

sector jobs in hotels, restaurants, and retail stores are also likely to flourish in high amenity locales (Deller, Tsai, Marcouiller, and English 2001; Green 2001; Marcouiller, Kim, and Deller 2004). Thus Hypothesis I states:

> H_1: There is a positive relationship between natural amenity scores and private industry job change.

A county's status as metropolitan or nonmetropolitan provides differing avenues for economic activities (McGranahan 1999). For example, metropolitan counties are more likely to have population bases necessary to sustain private industries. As metropolitan counties gain jobs at the expense of nonmetropolitan counties, counties in close proximity to a core city will remain stable or gain population. This can decrease commuting distances and result in private sector job gains (Adamchak et al. 1999, Albrecht and Albrecht 2007; Tickamyer and Duncan 1990; Vias 2006). Therefore, Hypothesis II states:

> H_2: There is a negative relationship between increased rurality and private industry job change.

Population change can also impact private industry job change (Albrecht and Albrecht 2007; Vias 2006). Private industries, such as retail, are likely to build, move, or remain in locations where population increases. High rates of in-migration signify stability and create additional consumer demands (Albrecht and Albrecht 2007; Vias 2006). Therefore, Hypothesis III states:

> H_3: There is a positive relationship between a county's rate of population change and private industry job change.

The percentage of workers commuting to another county for work may also impact private industry job change. Nonmetropolitan counties that are not adjacent to a metropolitan (core) county or are characterized as isolated are limited in economic growth opportunities (Adamchak et al. 1999). The combination of location and population loss makes these counties less attractive to potential businesses (Albrecht and Albrecht 2007; Bloomquist 1990; Turner,

Brooks, and Arwood 2010; Vias 2004, 2006). Conversely, nonmetropolitan counties that are adjacent to a metropolitan county are among the fastest growing counties in the Great Plains (United States Census Bureau 2000). Residents in these counties have the viable choice of working within their home county or commuting. Population increases combined with easy access may influence more rapid private industry development in nonmetropolitan counties in close proximity to metropolitan areas (MacDonald and Peters 1993; Turner et al. 2010). Therefore, Hypothesis IV states:

> H_4: There is a positive relationship between the percentage of residents commuting to another county to work and private industry job change.

The average travel time to work may also predict private industry job change (Adamchak et al. 1999; Bloomquist 1990; Nelson, Johnson, and Darling 2006). Bloomquist (1990:200) argues that certain locations represent "a central node in a network of exchanges of economic resources." Residents living in counties within close proximity to the central node are likely to have shorter commutes to work than residents living in more isolated counties (Bloomquist 1990). Longer average travel times to work may indicate isolation, which could potentially deter job growth (Bloomquist 1990; Nelson et al. 2006). Thus, Hypothesis V states:

> H_5: There is a negative relationship between average travel time to work and private industry job change.

Socioeconomic and Demographic Factors

Private industry change is also influenced by socioeconomic and demographic factors such as percentage of workers employed in extraction industries, median household income, unemployment rate, population change, net migration rate, and the prevalence of minority and aging populations (Albrecht, Albrecht, and Albrecht 2000; England and Brown 2003; Lichter and McLaughlin 1995).

The relationship between extractive industries and private industry change is complex. Communities dependent on extractive industries are often heavily reliant on a single raw material, making them more vulnerable to economic fluctuations and resource scarcity. An overreliance on resource extraction can coincide with a lack of economic diversity, possibly making these areas less attractive to potential businesses (England and Brown 2003; Frey and Speare 1992; Lichter and McLaughlin 1995; Slack and Jensen 2004). Therefore, Hypothesis VI states:

> H_6: There is a negative relationship between the percentage of employees in extractive industries and private industry job change.

An important agent of population change in nonmetropolitan counties is migration. From 1990 to 2000, 80 percent of the Dakota's nonmetropolitan counties experienced negative net-migration, which ran counter to the national trends during this time period (Johnson 1999; United States Census Bureau 2000). As McGranahan and Beale (2002:5) note, "it is the counties with the fewest people that have been most likely to lose population, putting further strain on services in counties least able to bear it." The combined effects of economic restructuring and the exodus of people from nonmetropolitan counties has resulted in the loss of potential labor pools and a weakened consumer base (McGranahan and Beale 2002; Vias 2006).

Out-migration also leads to an aging population, as elderly residents are less likely to leave. Nearly 43 percent of North and South Dakota counties had a median age of over 40 (United States Census Bureau 2000). Elders are less likely to be in the labor force, and counties with a large percentage of residents aged 65 and older may experience a loss of private industry jobs and an increased demand for services (Albrecht and Albrecht 2007). Some of these, such as veterans' health services, may be provided by the government, rather than private industry. Private industry loss might be less severe for nonmetropolitan counties with high natural amenity levels because they are better able to attract relatively affluent retirees

and other residents (Johnson and Cromartie 2006; Johnson, Voss, Hammer, Fuguitt, and McNiven 2005). Hypothesis VII states:

> H_7: There is a negative relationship between a county's percentage of residents 65 and older and private industry job change.

The prevalence of minority populations has been found to be associated with differing levels of economic development (Albrecht and Albrecht 2007, Frisbie and Neidert 1977). In 2000, there were 14 North and South Dakota counties in which 30 percent of more of the residents identified themselves as American Indian and Alaska Native (United States Census Bureau 2000). Nonmetropolitan counties with a high proportion of minority residents are more likely to be socioeconomically disadvantaged, making them less attractive to prospective businesses (Albrecht, Albrecht, and Murguia 2005; Gonzales 2003). In the case of North and South Dakota, many American Indian and Alaska Native residents have been forced to live in isolated and economically distressed reservations, which often lack the resources for economic development opportunities. Therefore, Hypothesis VIII states:

> H_8: There is a negative relationship between a county's percentage of American Indian and Alaska Native residents and private industry job change.

These hypotheses and the variables comprising them are intended to capture the possible relationships existing among geographic and socio-demographic variables and private industry change within the Dakotas.

METHOD

Data and Units of Analysis

Each of North and South Dakota's 119 counties were initially included in the analysis. Lichter and Johnson (2006) argue that counties are an appropriate unit of analysis because they have recognized boundaries in which decisions are made. Data sources included detailed demographic summary files from the U.S. Census Bureau, Quarterly Workforce Indicators from

the U.S. Census Bureau's Local Employment Dynamics system, and natural amenities scores and Rural-Urban Continuum Codes from the U.S. Department of Agriculture's Economic Research Service (United States Department of Agriculture 2003).

The U.S. Census Bureau began publishing QWI data for the purpose of providing local labor market estimates and trends (Abowd, Stephens, Vilhuber, Andersson, McKinney, Roemer, and Woodcock 2005). For most states, including North and South Dakota, quarterly and yearly data is available for the years 1998 through 2008. Many self-employed individuals are not included in the data because individuals must have earned at least one dollar from an employer during the designated quarter.

Analysts completed a series of steps to improve data accuracy prior to releasing it to the public. First, the Census's Longitudinal Employer-Household Dynamics (LEHD) collaborated with state agencies to obtain detailed employment and wage information (Abowd et. al 2005). Next, the individual's place of residence, sex, date and place of birth, race, ethnicity, and educational attainment were obtained from the employer along with their social security number, which was later replaced with a random Protected Identification Key (PIK). This information was used to create an Employment History File (EHF) (Abowd et. al 2005). Finally, employer information, which included the place of work, industry, size, location, and quarterly payroll, was used to create an Employer Characteristics File (ECF) (Abowd et. al 2005).

Abowd et al. (2005) describe the rigorous validity checks that were used to ensure coding accuracy. When coding errors were discovered, two main statistical imputation techniques, longitudinal edits and probabilistic methods, were used (see Abowd et. al 2005 for more detail regarding these procedures). The PIK and the ECF were combined to create the bulk of labor force data. It is important to note that private industry changes are derived from estimates rather than actual counts, meaning that there is at least some element of error.

Moreover, values used in the algorithm to derive statistics are subject to quarterly revision, which makes replication difficult (Abowd et al. 2005). Nonetheless, Abowd et al. (2005), document that although values may vary, this change is minor and typically does not affect labor market trends.

Measurement and Description of Variables

Dependent Variable. The dependent variable for this study was the rate of private industry job change[1] at the county-level. Two points in time were selected for observation, 2002 and 2008. The year 2002 was selected to maintain consistency with the North American Industry Classification System's (NAICS) 2001-2002 occupational classification scheme. From 2001 to 2002, changes were made that affected several counties having federally-recognized Indian tribes within their boundaries. Specifically, some tribal jobs, such as those found in the Arts, Entertainment, and Recreation industry were classified as being within the public sector in 2002 (Executive Office of the President 2001; 2007; Hine 2003). The 2002 baseline improves the accuracy of data interpretation.

Another important data transformation involved subtracting the number of extraction occupations from total private industry jobs. This step was taken in order to use extractive industries as an independent variable. Past literature has suggested that extractive industries negatively influence private industry job change and community well-being and are associated with higher underemployment levels (England and Brown 2003). While some extractive industries are classified as private industries, they employed less than 20 percent of the private

[1] Calculation for private industry job change:
((2008 private industry change-2002 private industry change)/2002 private industry change))
*100

industry workforce (United States Census Bureau 2000). Thus, we surmised that their effects would be more limited in our study area than they might be elsewhere.

Independent Variables. There were ten independent variables used in this study. Independent variables were classified as geographic, socioeconomic, or demographic.

Geographic Characteristics. The four geographic variables used in this study include: (1) natural amenity scores, (2) Rural-Urban Continuum Codes (3) the percentage of residents commuting to another county to work and (4) county location. County-level natural amenity scores, which were developed by McGranahan (1999), take into account a county's climate, topography, and water area. Natural amenity scores are reported as standard deviations from the United States' national mean and can have negative or positive values. Higher relative scores indicate the presence of greater natural amenity levels.

Rural-Urban Continuum Codes were used to help identify a county's degree of rurality based on population size and location relative to urban areas (United States Department of Agriculture 2004). Codes range from "1" to "9," with "9" indicating the greatest degree of rurality. Counties with Rural-Urban Continuum Codes ranging from "1" to "3" are classified as metropolitan, while those ranging from "4" to "9" are classified as nonmetropolitan. Four North Dakota and seven South Dakota counties fall under the classification of metropolitan (see Table 1). A total of 64 counties (29 in North Dakota and 35 in South Dakota) have Rural-Urban Continuum Codes of "9." This represents about 54 percent of the 119 counties within the Dakotas. Counties assigned a code of "9" are classified as being non-adjacent to metropolitan areas and either completely rural or home to an urban population of less than 2,500 residents (United States Department of Agriculture 2004). The rural-urban continuum variable was treated as an interval level of measurement for purposes of this analysis. Data pertaining to the percentage of workers commuting outside their home county for work were gathered from the

U.S. Census Bureau's detailed summary tables. Finally, a dummy variable (0=North Dakota; 1=South Dakota) was added to the regression model to test whether a county's location impacted private industry change.

Table 1 Rural-Urban Continuum Codes for North and South Dakota Counties (2003)

County Type	Continuum Code	Total Counties
Metro	3 (county in metro area with population less than 250,000)	11
Non-metro	5 (non-metro county with urban population of 20,000 or more , not adjacent to a metro area)	2
Non-metro	6 (non-metro county with urban population of 2,500 to 19,999, adjacent to a metro area)	8
Non-metro	7 (non-metro county with urban population of 2,500 to 19,999, adjacent to a metro area)	17
Non-metro	8 (non-metro county completely rural or less than 2,000 urban population, adjacent to a metro area)	16
Non-metro	9 (non-metro county completely rural or less than 2,500 urban population, not adjacent to a metro area)	64
Source: United States Department of Agriculture http://www.ers.usda.gov/briefing/rurality/ruralurbcon/		

Socioeconomic and Demographic. Two socioeconomic variables were included in this study: (1) median household income and (2) the percentage of workers employed in extraction industries. Data for these variables came from the U.S. Census Bureau's detailed summary tables.

Demographic variables included: (1) the rate of population change from 2002 to 2008, (2) a county's percentage of American Indian and Alaska Native residents, (3) and the percentage of residents aged 65 and older. Population change and net-migration rates were highly correlated with one another, causing multicollinearity concerns (r = .810; VIF was greater than 10). The decision was made to use population change rather than net-migration to be consistent with past literature (see Albrecht et al. 2000).

Slope County, ND as an Outlier

In observing the descriptive statistics, it became apparent that there was great variability with regard to the county's private industry job change. This variability was due to a sharp increase in Slope County's job levels between 2002 and 2008, which had been historically low prior to that. Positive net-job change in a county with low job levels can result in an inflated rate of job change. A histogram clearly showed that Slope County experienced a private industry job change rate of 261.8 percent, making it an extreme outlier. In 2007 and 2008, several oil companies temporarily employed several Slope County residents, helping to explain the extreme private industry job change rate for the county (North Dakota Oil and Gas Division 2011).

Modeling Strategy

An ordinary least square regression model was utilized to examine the influence of geographic, socioeconomic, and demographic characteristics on private industry change. Two models were used to test the hypotheses. Model 1 shows the results with Slope County, North

Dakota while Model 2 presents the results without Slope County. One conservative approach for handling outliers is to compare results with and without the extreme case (Bowerman, O'Connell, and Koehler 2005). Thus, the decision was made to conduct separate analyses, one with and one without Slope County.

RESULTS

Table 2 shows the combined descriptive statistics for population and private industry change for counties in North and South Dakota. Overall population growth in the Dakotas was recorded at 3.62 percent from 2002 to 2008. However, this gain was limited to metropolitan

Table 2 Changes in the Dakotas' Population and Private Industry Job Change

	All counties	Metro counties	Non-metro adjacent to metro area	Non-metro and non-adjacent to metro	Completely rural non-metro counties
Population					
2002 Population	1,395,230.00	609,840.00	180,543.00	345,784.00	259,063.00
2008 Population	1,445,675.00	677,839.00	176,969.00	344,121.00	246,746.00
02-08 Pop Change (%)	3.62	11.15	-1.98	-0.48	-4.75
Private Industry					
2002 Private Industry	540,134.00	304,731.00	49,950.00	133,193.00	52,260.00
2008 Private Industry	591,842.00	342,971.00	52,310.00	142,094.00	54,467.00
02-08 Private Industry Change (%)	9.57	12.55	4.72	6.68	4.22

counties. The counties that were completely rural (those with Rural-Urban Continuum Codes of '9') experienced the highest rates of population loss.

Private industry employment in the Dakotas grew by 9.57 percent. There were substantially greater gains in metropolitan counties when compared to nonmetropolitan counties. From 2002 to 2008, private industry employment in metropolitan counties grew by 12.55 percent. Overall, nonmetropolitan counties experienced private industry job growth, although the extent of this growth was far less when compared to metropolitan counties. Not surprisingly, metropolitan counties experienced positive population and private industry job change.

Table 3 Descriptive Statistics with Slope County

Variable	Mean	Standard Deviation	Range (Min./Max.)
Dependent Variable			
02-08 Private Industry Change	9.18	29.35	-55.1/261.8
Independent Variables			
Geographic			
Rural Urban Continuum Codes	7.75	1.84	3/9
Amenity Score	-2.00	1.38	-5.2/1.9
Percentage Commuting	20.27	13.22	3.5/71.4
Average Travel Time to Work	17.11	2.95	11.1/25.0
Socioeconomic/demographic			
Median Household Income	$30,943	$5,509	12,692/48,338
Percentage Employed in Extraction Industries	18.02	9.87	1.5/56.4
Percentage Living in Poverty	13.41	6.98	4.1/42.0
02-08 Net Migration rate	-4.99	6.35	-19.2/32.5
Percentage of Population Aged 65 and Older	18.41	5.75	4.8/34.2
Percentage of Population Who Identify as American Indian or Alaska Native	9.76	21.02	.1/93.1
02-08 Population Change	-3.87	8.22	-20.7/43.23

Table 3 presents the means, standard deviations, and minimum and maximum values for the dependent and independent variables with Slope County included in the analysis, while Table 4 presents the same descriptive results without Slope County in the analysis. The exclusion of Slope County reduced the mean private industry job change rate from 9.18 percent to 7.04 percent.

The other means and standard deviations shown in Tables 3 and 4 are similar. The majority of counties in the Dakotas (64 of 119, or 53.8 percent) were assigned a Rural-Urban Continuum Code of "9," indicating they are completely rural. The mean natural amenity score was -2, which indicates below average amenity levels. The average percentage of workers

Table 4 Descriptive Statistics without Slope County

Variable	Mean	Standard Deviation	Range (Min./Max.)
Dependent Variable			
02-08 Private Industry Change	7.04	17.86	-55.1/117.5
Independent Variables			
Geographic			
Rural Urban Continuum Codes	7.74	1.84	3/9
Amenity Score	-2.00	1.39	-5.2/1.9
Percentage Commuting	20.22	13.26	3.5/71.4
Average Travel Time to Work	17.11	2.97	11.1/25.0
Socioeconomic/demographic			
Median Household Income	$30,997	$5,501	12,692/48,338
Percentage Employed in Extraction Industries	17.69	9.25	1.5/54.3
Percentage Living in Poverty	13.41	7.01	4.1/42.0
02-08 Net Migration rate	-4.96	6.36	-19.2/32.5
Percentage of Population Aged 65 and Older	18.42	5.78	4.8/34.2
Percentage of Population Who Identify as American Indian or Alaskan Native	9.85	21.09	.1/93.1
02-08 Population Change	-3.84	8.25	-20.7/43.2

commuting to another county for work was nearly 20 percent, while the average travel time to work was approximately 17 minutes.

Multivariate Results

Table 5 presents the results of the multiple regression models. Model 1 presents the results with Slope County. In this model, one geographic location variable, the percentage of workers commuting to another county for work was found to be significant and positively associated with private industry job change ($\beta = 0.309$; $p \leq 0.001$).

In terms of the socioeconomic and demographic variables used in Model 1, results revealed that the percentage of residents employed in extractive industries ($\beta = 0.552$; $p \leq 0.001$), percentage commuting to another county for work ($\beta = 0.309$; $p \leq 0.01$), and population change ($\beta = 0.557$; $p \leq 0.001$), were positively associated with private industry job change. Conversely, median household income ($\beta = -0.324$; $p \leq 0.05$) and the county's percentage of American Indian residents ($\beta = -0.443$; $p \leq 0.05$) were negatively associated with private industry job change.

Model 2 presents the results without Slope County in the analysis. Similar to Model 1, the percentage of workers commuting to another county for work was positively associated with private industry job change ($\beta = 0.322$; $p \leq 0.01$), while natural amenity scores were negatively associated with private industry job change ($\beta = -0.180$; $p \leq 0.05$), suggesting that counties with higher amenity scores lost private industry jobs.

Concerning the socioeconomic and demographic variables, population change was positively and significantly associated with private industry job change ($\beta = 0.581$; $p \leq 0.001$). In contrast, median household income ($\beta = -0.330$; $p \leq 0.05$), and the percentage of American Indian residents ($\beta = -0.346$; $p \leq 0.05$) were all negatively correlated with private industry job change.

Table 5 OLS Regression Analysis of Private Industry Change for North and South Dakota Counties, 1990-2000 (N= 119).

	Model 1		Model 2	
Variable	Unstandardized Coefficients (SE)	Standardized Coefficients	Unstandardized Coefficients (SE)	Standardized Coefficients
Geographic				
Rural Urban Continuum Codes	-1.65 (1.96)	-.103	.840 (1.18)	.087
Natural Amenity Score	-2 (1.91)	-.094	-2.32 (1.14)	-.180*
Percentage Commuting	.687 (.263)	.309**	.448 (.159)	.322**
Average Travel Time to Work	-2.93 (1.15)	-.295**	-.600 (.692)	-.10
Socioeconomic/ demographic				
Median Household Income	.002 (.001)	-.324*	.001 (.001)	-.330*
Percentage Employed in Extraction Industries	1.64 (.378)	.552***	.156 (.248)	.081
Percentage of Population Aged 65 and Older	-1.46 (.783)	-.286†	-.723 (.472)	-.234
Percentage American Indian	-.618 (.293)	-.443*	-.293 (.148)	-.346*
Population Change (02-08)	1.99 (.466)	.557***	1.26 (.148)	.581***
Great Plains State[1]	1.99 (5.20)	-.143	-2.08 (3.08)	-.058
Constant	124.49			
Explained Variance	30.00			
Mean Square Error (MSE)	602.69			

†=p≤.10; *=p≤.05; **=p≤.01; ***p≤.001

[1]Refers to whether county was located in North or South Dakota. The former was coded "1" and the latter "2"

The regression results revealed specific differences between Models 1 and 2. The average travel time to work and the percentage of workers employed in extractive industries were significant predictors of private industry job change in Model 1 but not Model 2. Conversely, natural amenity scores were only a significant predictor of private industry job change in Model 2. The percentage of workers commuting to another county for work and 2002-2008 population change were significant positive predictors of private industry job change, while, median household income and percent American Indian and Alaskan Native were significant negative predictors of private industry job change. When Slope County was included, we found it skewed our private industry data and slightly reduced the mean private industry change. The differences in the findings reinforces the rationale behind omitting an extreme outlier and running two distinct analyses as certain relationships showed significance in one scenario but not the other.

DISCUSSION AND CONCLUSION

The purpose of this study was to examine how geographic, socioeconomic, and demographic factors influence private industry job change. Descriptive statistics show that the eleven metropolitan counties in North and South Dakota were much more likely to experience population and private sector job gains. These results are consistent with the research of Adamchak and colleagues (1999) and Albrecht and Albrecht (2007), which confirmed that job growth occurred most rapidly in metropolitan counties. The substantial increase in population and private industry employment in metropolitan counties compared with nonmetropolitan counties highlights the importance of location and proximity of a county to a core city.

In examining the hypotheses, Hypothesis I, which predicted that natural amenity scores would positively impact private industry job change, was rejected. Model 2, which excluded Slope County, North Dakota from the analysis, produced significant results. However, the

relationship was opposite the direction hypothesized. It appears that as natural amenity scores increase, levels of private industry job change actually decrease. Slope County's natural amenity score was -0.78, meaning there were fewer natural amenities comparatively. At first, one might expect the removal of Slope County to shift statistical support in the favor of our hypothesis. However, this was not the case. It is, however, important to note that the natural amenity scores are relatively homogenous in the Dakotas. Furthermore, while the results were statistically significant, the relationship was rather weak. One major change, such as the closing of the Homestake Mine in the Black Hills in 2002, may negatively impact the results, especially considering that the Black Hills are characterized by high amenity scores.

Hypothesis II, which predicted that a county's degree of rurality would be negatively related to private job industry, was not supported. Although results are contrary to past research (Albrecht and Albrecht 2007; Vias 2004), the preponderance of rural nonmetropolitan counties, or extreme lack of metropolitan counties, likely skewed the data in a manner less likely to occur in regions having more variation in county-level rural-urban classification of location in explaining private industry change in the Dakotas.

Hypothesis III, which predicted that a county's rate of population change would be positively related to their level of private industry change, was supported. This is, consistent with the literature (Albrecht and Albrecht 2007). Although it is true that people follow jobs, the results also lend support to the notion that jobs follow people. Counties that experience population loss may also have a difficult time sustaining employment levels in the private industry sector due to the lack of an available local labor pool.

Hypotheses IV, which predicted that the percentage of residents commuting to another county for work would positively impact private industry job change was supported. In this study, the percent commuting was an indirect measure of a county's proximity. Results suggest

that counties with high levels of residents commuting to another county for work had positive private industry job gains. Increasing the number of residents commuting to another county for work may generate multiplier effects within the county due to their close proximity to the central node.

Hypothesis V, which predicted a negative relationship between average travel time to work and private industry job change, was supported in Model 1, but not Model 2. It is possible that the presence of private industries increases economic opportunities within a county, reducing the need to travel long distances to work**.**

Hypothesis VI, which predicted that the presence of extractive industries would negatively impact private industry job change, was not supported. Past research indicates that counties with a high percentage of extractive industries tend to lack economic diversity (Rowley 1998). Model 1, which included Slope County, North Dakota, produced significant results. However, the relationship was opposite than hypothesized. Model 2, which excluded Slope County produced no significant results. Slope County's private industry gains were such that it made the county an outlier. Slope County also has a relatively high percentage of extractive industries, which possibly affected the multivariate results.

Hypothesis VII, which predicted that the percentage of population aged 65 and older would be negatively related to private industry change was not supported. This may be due to the fact that because aging populations are so prevalent in the Dakotas their effect on private industry job change is difficult to determine.

Hypothesis VIII, which predicted that a county's percentage of American Indian or Alaska Native residents was negatively associated with private industry job change, was supported. American Indians and Alaska Natives are the most prevalent minority population in the Dakotas, which is why only this group was examined as opposed to all minorities. Past

research has argued that minority populations are generally characterized as lacking access to scarce resources (Albrecht et al. 2005). Private industry growth appears to be one of these resources.

In summary, the utility of two models allowed us to observe the effect an outlier county had on the results. Four variables, the percentage of workers commuting to another county for work, median household income, percent American Indian and Alaskan Native, and population change from 2002 to 2008 predicted private industry job change regardless of whether or not Slope County was in the analysis.

Limitations

As with all studies, there are limitations that lead to less than perfect results. Perhaps the most important concern deals with the Quarterly Workforce Indicator (QWI) data. Quarterly revisions make replicating the study very difficult. General trends and patterns can be observed over longer periods of time, but QWI logarithms have a tendency to cause slight change to past estimates. Also, detailed analyses of QWI data are not possible for most of the largely rural locales.

Another concern deals with the study's narrow geographic focus. Future research might benefit by expanding the geographic scope to examine private industry trends in more than two states. This would help to more fully explain what factors are most influential in predicting macro-level private industry job change, while also allowing for comparisons between different regions and states.

Future research focusing on smaller regions, such as the Dakotas, could also benefit from a revised amenity score index. The current natural amenity scale has been applied to the entire United States and is useful for large-scale comparisons. Yet, the similar climate, topography, and water levels in counties within North and South Dakota likely lead to

homogeneous natural amenity scores. Creating a revised amenity scale could prove beneficial by making scores more relevant for research in the Dakotas and similar Great Plains states. For example, amenity scores could expand beyond traditional natural amenities to include services and other amenities, such as parks and hospitals, which help attract prospective residents.

Despite these limitations, this study makes important contributions to the rural sociological and economic restructuring literature. First, it demonstrates that geographic location plays a key role in influencing private industry job change. Second, it suggests that commuting patterns are a significant predictor of private industry job change. Moreover, some location's commuting patterns signify isolation, which detrimentally impacts private industry change. Many of the Dakotas' most rural counties continue to be disconnected from economic activity. Thus, they often struggle to attract new businesses or sustain existing ones.

Practical Applications

This study has important implications for policymakers and residents of North and South Dakota. Today, many states are concerned with structural budget deficits. Changes in private industry employment clearly have ramifications on state budgets, as they affect how much money flows into state coffers. Moreover, states periodically offer reduced taxes and other incentives to lure private industry to their area. Thus, studies like ours can help stakeholders make informed decisions regarding areas that may sustain private industry growth.

Another possible implication suggests that it is important to encourage and support smaller and local businesses in this area in order for nonmetropolitan counties to remain economically viable. Such practices might help nonmetropolitan counties alleviate some of the effects of economic restructuring and increasing globalization. In addition, it helps smaller communities maintain a clear identity, which is important as globalization and economic

restructuring continue to alter cultural values (Lyson and Tolbert 2003). Local businesses offer diversity and enable local residents to gain greater control over their future, or at least preserve some autonomy. Additionally, communities with vibrant small businesses may have less inequality compared with communities dominated by a few large businesses (Lyson and Tolbert 2003; Mills and Ulmer 1946).

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