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Evelyn D. Ravuri
Saginaw Valley State University

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Saginaw Valley State University

Introduction

Within the collective conscious of the U.S. population, the Rocky Mountain region represents unspoiled natural beauty, recreational opportunities, solace, and an array of other pleasant factors, while the Great Plains is viewed by many as a landscape of limited physical, economic, and cultural interest. For most of the twentieth century, the Great Plains has been a region of net outmigration and population loss (Archer and Lonsdale, 2003[1]; Rathge, 2005[2]). During the early decades of the twentieth century, technological innovations in farm equipment reduced the need for an agricultural labor force and large numbers of individuals left the rural areas of the Great Plains. By the 1970s, economic restructuring and globalization further depleted the Great Plains of population as agribusinesses replaced the family farm as units of agricultural production (Hudson, 2003[3]). However, the Great Plains contains 876 counties spread over 13 states, and much variability in population change has occurred over the twentieth century with the western part of the Great Plains experiencing less of a decline in population than the central and eastern parts (White, 2004[4]). Population change in the Rocky Mountains over the twentieth century experienced a much more inconsistent pattern of growth and decline than that of the Great Plains due to the boom and bust periods associated with the mining and lumbering industries (Shumway and Davis, 1996[5]). However, since the 1970s, the Rocky Mountains has experienced rapid net inmigration and population growth (Shumway and Otterstrom, 2001[6]), largely a result of innovations in communication and transportation technology which led to less of a need for individuals to be rooted to a certain place, and allowed people to migrate to counties with environmental amenities.

Ullman (1954)[7] was one of the first researchers to point out that migration in the U.S. was not solely in response to employment opportunities, but also in response to amenities. Climate has long been an inducement for migration of the elderly, particularly from the Midwest and

Northeast to Florida. However, other locales such as the Upper Great Lake States, the Ozarks, and the Rocky Mountains have experienced increased inmigration of the elderly (Sutton and Day, 2004)[8].

What is more impressive is that within the last several decades, more of the working age population has been able to take advantage of both environmental amenities and employment opportunities in certain nonmetropolitan counties. These individuals are mostly professionals who have the economic resources to relocate to attractive locales. Growth in the professional labor force and retirement migration is accompanied by growth of employment opportunities in services which further drives migration to these counties or suppresses outmigration of individuals already residing in the county (Manson and Groop, 2000)[9].

During the 1990s, population growth rates of the fifty states ranged from highs of 66.3 percent in Nevada and 30.6 percent in Colorado to a low of 0.5 percent in North Dakota (U.S. Bureau of the Census, 2001)[10]. Two states which experienced healthy, but unimpressive growth during the 1990s included Montana and Wyoming with 12.9 and 8.9 percent, respectively. However, these two states lie astride the Great Plains and Rocky Mountain Region and a more accurate assessment of population change and migration can be undertaken by separating these two states into eastern (Great Plains) and western (Rocky Mountains) components.

The purpose of this paper is to examine population change and net migration between 1995 and 2000 for Montana and Wyoming by county. The first section of the paper examines nonmetropolitan population change in the U.S. as a whole beginning with the unprecedented growth of nonmetropolitan counties in the 1970s. Nonmetropolitan counties are defined as counties without a central city population of 50,000. This is the predominant type of county in Montana and Wyoming, which together have only six counties of metropolitan status out of a total of 79 counties. Secondly, the spatial distribution of population change by county and net migration between 1995 and 2000 is examined and a typology is created to examine four types of counties based on net migration and population change. Within this section, the relationship between net migration and population change is explored with emphasis on age patterns. In the third section regression analysis is used to determine which factors contributed to net migration exchanges between 1995 and 2000. The conclusion suggests avenues for further research.

Delimiting the Study Region

Geographers use physical, social, and economic characteristics of a locale to delimit regions. Given the names Great Plains and Rocky Mountains, it is obvious that topographic, vegetative, and climatic characteristics have been the primary determinants of this classification process. Social scientists find it more useful to use political boundaries to delimit regions, and thus rely on states and counties as units of analysis. Choosing boundaries for the study region is somewhat arbitrary given that between the 1920s and 1990s that approximately fifty maps of the Great Plains have been published, each based upon different physical and cultural characteristics

(Rossum and Lavin 2000)[11]. The Agricultural Bureau's map which uses the county as the unit of analysis was chosen for this study and the study area is also divided into two physical components which straddle the Great Plains/Rocky Mountains boundary with 49 counties being classified in the Great Plains category and 30 counties being assigned to the Rocky Mountains. As stated previously, Montana and Wyoming were chosen for their primary rural character. Although Colorado lies astride the same Rocky Mountains/Great Plains boundary it is more urbanized and thus was not considered for this analysis.

Demographic Trends

For much of the twentieth century, nonmetropolitan counties lost individuals to metropolitan counties as the U.S. went through the urbanization process. However, during the 1970s, American demography experienced a profound transformation. For the first time during the twentieth century, non-metropolitan counties grew faster than metropolitan counties (Beale, 1990)[12]. According to the U.S. Bureau of the Census (2003)[13], between 1975 and 1980 there was a net gain of approximately one million migrants from metropolitan to nonmetropolitan counties. Social Scientists referred to this unique phenomenon as the rural renaissance, counterurbanization, or nonmetropolitan turnaround and searched for explanations to explain this deviation from past trends. Frey (1990)[14] attributed this process to three possibilities. The economic restructuring explanation stated that changes from an industrial to a post-industrial society made manufacturing a less important component of employment than services and made both these sectors of the economy less tied to metropolitan locales. Secondly, period effects, defined as short-term economic and demographic phenomena which were uncharacteristic of typical U.S. patterns were important. These included the large number of baby-boomers who entered the college years and contributed to the population of nonmetropolitan college towns, as well as upsurges in mining due to the energy crisis of the 1970s. Thirdly, the deconcentration explanation stated that once a society becomes overly urbanized and densely populated that negative externalities associated with metropolitan areas such as congestion and pollution would lead some individuals to search for lower density locales. Improvements in communication technologies and the further development of highways aided in transferring individuals further from the central city. Much of the growth in nonmetropolitan counties during the 1970s, 1980s, and 1990s, accrued to nonmetropolitan counties that were adjacent to metropolitan areas and gives credence to this last explanation (Fuguitt and Beale, 1996)[15].

During the 1980s nonmetropolitan counties experienced slower growth than metropolitan counties largely as a result of economic recessions which affected nonmetropolitan counties to a greater extent than metropolitan counties (Johnson, 2003)[16]. Between 1985 and 1990, there was only a gain of 51,414 metropolitan migrants to nonmetropolitan counties (U.S. Bureau of the Census, 2003)[17]. For example, nonmetropolitan counties in the Rocky Mountains, Southwest, and Appalachia which experienced a tremendous growth in population related to resource extraction (coal, oil, etc.) during the 1970s, saw a precipitous decline in population growth during the 1980s as the extraction of these resources became less important (Falk and Labao,

2003[18]. Nonmetropolitan counties again experienced growth in the 1990s, but metropolitan counties had higher growth rates, growing at 13.9 percent versus 10.2 percent for nonmetropolitan counties (Perry, 2002)[19]. The nonmetropolitan flow from metropolitan counties again increased between 1995 and 2000 with a net gain of 510,488 migrants to nonmetropolitan counties (U.S. Bureau of the Census, 2003)[20]. Although the net gain during the 1990s was ten times that of the 1980s, it was only half that of the 1970s.

Even though nonmetropolitan counties as a group experienced growth over the past three decades of the twentieth-century, the spatial distribution of gain was not equal among all regions of the U.S. Sutton and Day (2004)[21] in their construction of a typology of rapidly growing counties between 1970 and 1990 identified two types of rapidly growing nonmetropolitan counties. Retirement counties were located in the Upper Great Lakes, the Ozarks, the Pacific Northwest, Northern California, the Texas Hill Country, as well as Florida, and Arizona. They not only attracted elderly migrants but created job opportunities in services which attracted or retained the working-age population. Isolated Growth/Recreation Counties were largely located in the Intermontane West and these counties were located in excess of 150 miles from a large urban area and had a high percentage of the labor force employed in recreation. These counties attracted not only the 'foot-loose' elderly, but also 'foot-loose' industries which relied on technology to attract highly-skilled individuals to locales with environmental amenities. The service and tourist industries also flourished in these counties and required further additions to the labor force. Vias (1999)[22] found in his study of population change in the Mountain West that rapid population growth in these recreational counties spawned growth in employment opportunities instead of growth in employment opportunities spawning population growth as it has in most other regions of the country.

In contrast to rapid population growth in high amenity nonmetropolitan counties, the Great Plains has lagged behind most other regions of the country except the Mississippi Delta Region and the Corn Belt (Johnson, 2003)[23]. Nonmetropolitan counties in the Great Plains experienced a slight increase in population during the 1970s, but this was more subdued than other parts of the nation, and then again experienced widespread loss during the 1980s (Albrecht, 1993)[24]. However, during the 1990s, counties in the Great Plains again experienced some growth (White, 2004)[25].

Net Migration and Population Change

Figure 1 displays the population change of counties in Montana and Wyoming between 1995 and 2000 while Figure 2 displays the net migration change between 1995 and 2000. Most of the population growth and positive net migration took place in Western Montana and Western Wyoming as well as along the transition zone between the Rocky Mountains and the Great Plains. Several of Montana and Wyoming's largest cities are located along this transition zone, and although these metropolitan counties did not necessarily experience the highest net migration or population growth, they provided a locale replete with urban amenities for settlers in the more

remote counties who could easily travel via one of the interstate highways to gain access to urban amenities.

Figure three displays a composite of net migration and population change. Four categories are possible and include positive net migration/positive population change; negative net migration/negative population change; negative net migration/positive population change; and positive net migration/negative population change. Although every county, except one (Albany, WY), that experienced positive net migration also experienced positive population growth, there is a group of counties which experienced negative net migration, but still experienced positive population growth. This means that natural increase, the difference between the number of births and deaths, was positive for these counties. Inmigrants and outmigrants to any particular county are likely to have different characteristics and it may be that inmigrants have higher birth rates and lower death rates than outmigrants resulting in net gain. Positive net migration by definition adds more individuals while negative net migration subtracts individuals. However, the process is more complicated in that selective migration is at work. Migration rates are the highest in the young adult ages and these migrants most likely transfer their child-bearing behavior to the place of destination, thus further depriving the origin from potential growth but adding more to the destination. Migration entails a cost-benefit analysis and it is young adults who will, under classic economic theory, be able to reap the benefits of a move over a longer period of time (Sjaastad,1972)[26]. Migration rates experience another peak between ages 55 and 70. Social security has allowed a foot-loose elderly population to seek out retirement locales that have little to do with economic incentives.

Johnson et. Al. (2005)[27] studied age-specific migration rates in the U.S. in recreational and agricultural counties between 1950 and 2000. Both recreational and agricultural counties had high outmigration rates of young adults (15-29) and low levels of inmigration of these individuals suggesting that neither types of these counties appealed to this age group. Both recreational and agricultural counties experienced their highest positive net migration rates of 30-40 year olds during the 1970s and 1990s, although the rates were substantially higher for recreational than agricultural counties. The rates of inmigration in the 30-40 range and the delay of child-bearing may account for some of this growth. Net migration rates for both agricultural and recreational counties rise around 55-69, but during the 1990s this age group experienced the highest net migration rates.

It is also possible that nonmigrants are fueling the growth of these counties. Several counties in Montana have a high percentage of Native American individuals and these individuals tend to have higher fertility levels than their non-Hispanic white counterparts. Another factor not accounted for in this study is that of immigration. Immigrants who settled in a U.S. county and then subsequently moved to another county between 1995 and 2000 would be recorded in the county to county migrant flows whereas those immigrants who moved directly to a county from a foreign country would not be recorded. Given that Montana and Wyoming are not major gateways for immigrants this effect should be negligible, but social scientists have noted that

during the 1990s that immigrants have dispersed themselves to previously underrepresented states (Bump, Lowell, and Petterson, 2005)[28]. Given that immigrants tend to be younger than the U.S. population as a whole, and tend to have higher fertility levels, population growth is likely to follow.

The mean net migration rate and growth rate for counties which experienced positive net migration/positive growth was +4.3 percent and +6.2 percent respectively. Negative/negative counties experienced a decline of -8.6 percent net migration and -4.7 percent population decline while negative/positive counties had an average of -4.9 percent net migration and an increase of +3.4 percent in total population.

Albany County, Wyoming is interesting given that it is the lone county which experienced positive net migration, but negative population growth. This could be explained by a large number of students who came to this university county. Low birth rates and a high percentage of students and professionals (who tend to have lower birth rates) may explain this unexpected relationship.

Regression Analysis

This paper will take a macro approach to examining the relationship between net migration and aggregate variables associated with the counties. It is important that the reader understands that the model does not predict what an individual migrant will respond to. In order to draw those conclusions actual survey data on migrant behavior is needed. Von Reichert (2001)[29] did this with migrants to Montana and this study will be briefly discussed in the conclusion.

Implicit within this discussion is Lee's (1966)[30] theory of migration in which origins and destinations are associated with both positive and negative factors. Pull factors are associated with the destination and attract migrants to a destination. These factors include economic and educational opportunities as well as climatic reasons. Push factors are associated with the origin and act to expel individuals and may include high unemployment rates and low per capita incomes. The migrant undergoes a cost-benefit analysis and then decides on whether to relocate or to remain. Due to the numerous combination of counties that contribute to the inmigrant flow to each of the counties in the study, it not feasible to examine characteristics of the origin counties. Therefore, only characteristics related to the 79 destination counties are examined.

Regression analysis is undertaken to determine the variables which likely explain net migration to the counties of Montana and Wyoming between 1995 and 2000. All migration data were taken from the county to county migration flows published by the U.S. Bureau of the Census and the independent variables were taken from the Summary Tape Files 1 and 3 published by the U.S. Bureau of the Census. Net migration is the difference between the number of inmigrants and outmigrants to each of the 56 counties of Montana and 23 counties of Wyoming. Net migration is divided by the total county population to render a percentage net migration for the study period. This will be the dependent variable or the variable in which an explanation will be

sought. Independent variables include the percentage of labor force engaged in agriculture, per capita income, unemployment rate, total county population, median age, and two dummy variables rural-urban and New West. The regression equation takes the form:

$$\textbf{Nmig= A+I+U+P+R+W+e}$$

Following is further explanation of these variables and a rationale for the inclusion of these variables in the regression equation.

Percentage Labor Force in Agriculture: It is well known that agriculture has ceased to be an important segment of the American labor force for most of the twentieth century. However, given the reliance on this sector of the economy for many counties in the Great Plains and Rocky Mountains, it is included in the model. It is predicted that an inverse relationship will exist between the percentage of labor force employed in agriculture and net migration signifying that counties with a high percentage of agricultural labor force would be likely to lose more migrants than they would gain.

Total Population: Although net migration has been largely controlled by dividing by total population it is still predicted that larger counties will draw more individuals. Total county population is largely an effect of city size and not the result of densely populated rural areas. Potential migrants are more likely to know about those counties with larger urban areas and should be attracted to counties which provide a diversified economic base. These counties should also more effectively be able to retain potential outmigrants.

Per Capita Income: Drawing from economic theories of migration, it is predicted that net migration will be positively associated with higher per capita incomes, which usually indicates a more developed labor sector and not only attracts migrants, but most likely retains potential outmigrants.

Age: As discussed by Johnson et. Al. (2005)[31], individuals over age 30 had the highest net migration rates to nonmetropolitan counties over the past three decades. It is uncertain if this variable will be positively or negatively associated with net migration given that aging in place has occurred in many counties while rapid immigration of retired elderly has occurred in some counties.

Rural-Urban Continuum: This variable makes use of Economic Research Service (2004)[32] rural-urban continuum codes for counties in the U.S. which provides nine categories for U.S. counties by metropolitan and nonmetropolitan status. It would not be appropriate to use percentage of a county that was rural as a determinant of migration attractiveness, given that it is often the location of a county with respect to other counties which determine migration behavior. Many of the largest metropolitan counties experienced negative net migration as early as the 1950s with the expansion of suburbs while metropolitan counties with smaller central cities experienced increased inmigration. It was also noted that nonmetropolitan counties adjacent to a metropolitan

county grew faster than nonmetropolitan counties in remote areas. Therefore a dummy variable is used instead of a percentage variable. It is predicted that counties adjacent to a metropolitan county would experience a positive relationship with net migration regardless of whether they are rural or urban. Counties classified under the ERS categorization as adjacent, nonmetropolitan 20,000-49,999 (4); adjacent, nonmetropolitan 2,500-19,999 (6); and adjacent rural (8) were coded as 1. Metropolitan counties (3) and non-adjacent nonmetropolitan (5 and 7) and rural nonadjacent counties were categorized as 0. Types 1 and 2, large metropolitan areas of a central city of 1,000,000 or 500,000, respectively under the ERS classification do not exist in Montana or Wyoming.

New West: Shumway and Otterstrom (2001)[33] categorized counties in the Western U.S. according to the type of economic structure. New West counties have a large-service component in contrast to the Old West counties which rely heavily on extractive industries (agriculture, forestry, and mining). There were eight counties in Montana and six counties in Wyoming categorized as New West and these counties assumed the dummy variable 1 while all other counties were recorded as 0. It is predicted that net migration will be positively related with this variable given the preference for environmental amenities in migration.

Unemployment: It is predicted that net migration will be negatively associated with unemployment. Counties with high unemployment should prove unattractive to potential inmigrants and should provide incentive for outmigration from the county.

Step-wise regression was implemented. In this type of regression the variable with the most explanatory power is entered first, and subsequently other variables are entered until no more explanatory power can be provided. Given that several of the independent variables are correlated among themselves, step-wise regression allows variables to be removed if other variables provide better explanatory power. Variables will be considered highly significant at the 0.01 level, significant at the 0.05 level and marginally significant at the 0.1 level.

Several of the independent variables underwent log and square root transformations in order to allow a normal distribution of the variables. Agriculture and unemployment underwent square root transformations while total population underwent a log transformation. See Table 1 for regression results.

Income is significant at the 0.01 level and it appears that the most important determinant of net migration in the study region is the traditional economic motive. This variable alone accounts for 21.3 percent of the variance in net migration rates between 1995 and 2000. It is also important to note that counties with high net inmigration rates between 1995 and 2000 probably have had high rates for several decades. Scholars have begun to note that net migration shifts often are accompanied by shifts in income allowing a select group of counties to become wealthier over time whereas less attractive counties lose in the income transfer (Manson and Groop, 1996)[34]. Counties benefiting from this transference include recreational/retirement counties which attract

wealthy retirees as well as professionals who can afford to live in counties with environmental amenities. These individuals also require a cadre of service personnel which further bolsters the local economy. Although service occupations may not pay much, they often pay better than employment in the primary sector of the economy, which in the Great Plains/Rocky Mountain States focuses on agriculture and mining.

Surprisingly, unemployment is positively associated with net migration suggesting that migrants between 1995 and 2000 were more attracted to counties with higher unemployment. Although this seems counterintuitive to rationale decision making, this often occurs in developing countries where unemployment in rural areas is not well documented (Todaro, 1969)[35]. Of course, developed countries such as the U.S., have adequate statistics concerning unemployment, but it is likely that the least attractive counties (agricultural) had already shed much of their labor force and thus unemployment levels were already low.

Rural-urban continuum was also significant at the 0.05 level and shows that counties regardless of their urban structure attract migrants close to metropolitan areas. These counties provide the best of both worlds. Cultural amenities related to metropolitan areas are within easy driving distance while environmental amenities can also be enjoyed.

New West was significant at the 0.05 level and shows that these counties continued to attract migrants during the 1995 to 2000 period. However, these counties can not be divorced from the economic surroundings. Booth (1999)[36] noted that in the Mountain West it is not only environmental amenities that attract migrants but also proximity to a metropolitan area. However, Carruthers and Vias (2005)[37] found that much of the growth in counties between 1982 and 1997 took place in true rural areas and showed that distance from the metropolitan county is not the only factor responsible for the growth of nonmetropolitan counties.

Age was significant at the 0.05 level signifying that counties that experienced higher positive net migration rates had higher median ages. Given that retirement migration, as well as the migration of workers at the peak of their careers, has been an important component of population growth in the Rocky Mountain States, these results are not surprising.

The relationship between the percentage of the labor force engaged in agriculture and net migration was negative, but insignificant. This is not surprising in that much of the excess rural population would have been expelled from rural counties well before the 1990s. Total population was positively related to net migration exchanges but also insignificant most likely a result of the desire for migrants to reside in low density, amenity rich counties.

Conclusion

Much of the variance in net migration rates has been left unexplained by the predictor variables in the regression equation suggesting that additional variables could have been added to the model. Von Reichert (2001)[38] in her study of return and first-time migrants to Montana found

that the most important reason for return migrants to Montana was family whereas first-time migrants were more attracted to employment opportunities. Although family attachments may account for some of the variation in net migration rates in the study area, much of the migration exchanges in this study did not occur across interstate lines but across county lines and may not be an effective way to gauge net migration. Another problem is that categorical variables such as New West and Rural-urban may not capture as much variance in the dependent variable as continuous variables such as distance from closest metropolitan area or percentage of labor force employed in recreational opportunities.

Decades of outmigration of young adults from the Great Plains counties has left a residual of individuals in the elderly ages. However, during the 1980s and 1990s, this deficit of working-age individuals led to an inmigration of younger working-age adults to nonmetropolitan counties in Kansas, Nebraska, and Iowa. Many of these individuals were Asian and Latin American immigrants who located to counties with meat-processing industries (Martin, Taylor, and Fix, 1996)[39] or other manufacturing opportunities.

Johnson (2006)[40] examined the 2000-2004 net migration data for counties and found that a decline in net migration transfer to nonmetropolitan counties had once again occurred. Whether this decline will continue over the next several decades is questionable. The baby boom population has just begun to enter the retirement years and if they follow the trajectories of previous retirees, nonmetropolitan areas could again experience rapid growth. In contrast, the aging in place of elderly in some counties along with the decades long expulsive of young adults, and consequent low birth rates in these counties may spawn increased flow into previously unattractive counties making predictions concerning migration behavior difficult. Whereas economic differentials between two locales can narrow with migration and thus stall the migration process (Borts and Stein, 1964)[41], this is not the case with environmental amenities which can continue to attract migrants. However, if individuals are in search of pristine areas, further inmigration often destroys the ambience and may lead to outmigration as a result of congestion and pollution.

End Notes: Evelyn D. Ravuri, "Straddling the Great Divide: Migration and Population Change in the Great Plains and Rocky Mountains," *Online Journal of Rural Research & Policy* (2008.3).

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Author Information

Evelyn D. Ravuri (back to top)

Assistant Professor
Dept. of Geography
Saginaw Valley State University
Tele: (989) 964-4501
Send E-mail

Evelyn Ravuri received her Ph.D. in Geography from the University of Cincinnati in 2001. She is Assistant Professor of Geography at Saginaw Valley State University in Michigan where she teaches World Regional Geography, North American Regional Geography, and Physical Geography. Her research interests include migration and race/ethnicity in the United States.