Can Health Care Services Attract Retirees And Contribute to the Economic Sustainability of Rural Places?

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The search for engines to power rural economic growth has gone beyond the traditional boundaries of the food and fiber sector to industries such as tourism and to schemes such as attracting metropolitan workers to commuter communities with rural amenities. A group that has been somewhat overlooked is retirees, who may wish to trade in urban or suburban lifestyles for a more peaceful rural retirement. An industry that has been neglected is the health care industry, which is the most rapidly growing industry nationally and of particular interest to retirees and aging populations. This paper examines the importance of rural health care services in attracting migrants age 65+ to rural counties in Michigan. Results indicate that the number of health care workers has a positive effect on net in-migration, and that this effect is large and statistically significant for the 70+ age group. Implications for rural development strategies are discussed.

Key Words: elder migration, health care, rural development

In recent years the search for an economically sustainable basis for rural communities has moved away from reliance on traditional agriculture or resource extraction as the primary engine of economic growth, or even sustainability.[1] Robinson, Lyson, and Christy (2002) argue that globalization increases the difficulty of creating an economically viable rural community based on traditional agriculture and markets. Barkley and Wilson (1992) examine alternative agriculture (including value added) as an engine of rural economic growth, but find that the possibilities for income and employment generation are limited. Kim, Marcouiller, and Deller (2005) emphasize that many of the resources that provide the basis for extractive industries also serve as rural amenities—for example, forests. A literature is emerging on amenity-based rural sustainability (e.g., Che 2003, Bukenya, Gebremedhin, and Shaeffer 2003, Nzaku and Bukenya 2005). Complementary to this literature are investigations into how rural amenities can attract migrants to the area. For example, Renkow (2003) suggests that the emergence of a labor force choosing to live in rural areas to take advantage of rural amenities and commuting to metropolitan jobs can have positive effects on rural economies. Goetz and Rupasingha (2004) find relationships between health amenities, natural amenities, and migration.

As baby boomers retire, they may seek more bucolic lifestyles and move to areas with high levels of rural amenities (Domazlicky 2002). The majority of the 77.5 million baby boomers in the United States intend to buy a new home for retirement (Klebba 2005). The location choice for this retirement home is influenced by the availability of community amenities such as lifestyle or climate, and by personal amenities such as proximity to children or other family members (Klebba 2005). Health concerns may be an issue for some retirees, and come into play when making the migration and location decisions (Haas and Serow 1993). Shields, Deller, and Stallmann

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[1] Meaningful definitions of rural sustainability are diverse (Gold 1999). The U.S. Environmental Protection Agency (2007) defines sustainability as generating a high level of economic prosperity while protecting natural systems. A common thread among the definitions is that meaningful employment is a necessary condition for economic sustainability, and we focus on employment in our discussion.

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(2001) suggest that public investment in health services can provide an amenity that will induce retirees to migrate to rural areas.

Health care service for the elderly is one of the fastest-growing industries in the United States. For example, over the decade ending in March 2006, employment in community care services for the elderly increased nearly 47 percent. Over the same period, total health care services employment increased by 25 percent, total non-farm employment increased by 13 percent, employment in retail trades rose 11 percent (more than one-half of which was in health care retail), and manufacturing employment fell by 17 percent (between 1995 and 2005 the number of farms decreased 3.4 percent).[2] As the nation ages, the need for health care increases (Center for Health Workforce Studies 2006); increasing obesity in all age groups is also increasing the demand for health care (Flegal et al. 2002).

The health care industry has the potential to contribute to the economic sustainability of rural areas. For example, in Isabella County, Michigan, a mostly rural county with a population of 63,351 in 2000, the number of health care facilities increased by 14 percent between 2001 and 2003. Over the same period, the number of health care employees increased 13 percent, from 1,832 to 2,071; this represents an increase in health care's share of total employment from 6.7 percent in 2001 to 7.9 percent in 2003. Total wages paid to health care workers increased 31 percent, from $45,161,000 in 2001 to $59,363,000 in 2003. As a share of total wages paid in the county, health care wages increased from 6.4 percent in 2001 to 8.2 percent in 2003.[3] In the face of declining national and state employment from 2001 to 2003 and the worst three-year performance in national personal income growth since the Great Depression, the performance of the health care industry in Isabella County is phenomenal.

Juxtaposing the success of the health care industry in places such as Isabella County with the potential migration of baby boomers as they retire raises the broad issue of understanding the relationships among provision of health care services, aging, choice of retirement residence location, and economic sustainability. This paper carves out one slice of the issue—whether elderly migrants are influenced by the availability of health care services—with the specific objective of quantifying the relationship between elder health care services and elder migration. It then places the results in the context of rural economic sustainability.

The paper focuses on how the availability of health care services influences the location decisions of elderly migrants (net migration) in 68 rural counties in Michigan. The lake counties of Michigan (most of which are rural) are notable for their attractiveness to the elderly and consequent positive elder in-migration rates (Bean et al. 1994). Although interstate migration from manufacturing states such as Michigan to warmer climes receives much publicity, nationally the ratio of intrastate movers to interstate movers is 10:3 (Hayes and Longino 2002). The Michigan lake counties exhibit a pattern of "reverse" migration that draws retirees from the Michigan auto industry and other Michigan industries, from Chicago, and from smaller Midwest cities such as Indianapolis and Columbus. In addition, the Michigan age demographic is slightly older than the national average, and the Michigan population is slightly more obese than the national average. For example, people age 75–84 constitute 4.58 percent of Michigan's population, compared to 4.40 percent for the nation; people age 85+ constitute 1.82 percent of Michigan's population, compared to 1.56 percent for the nation.[4] In terms of obesity, 26.2 percent of the Michigan population self-reported measurements that put them in the obese category based on body-mass index, compared to 24.4 percent for the nation.[5] Thus the Michigan data provide an advance peek at national trends and a rich source of information with which to measure the influence of health care services on net migration rates.

[2] Non-farm employment was calculated from the Bureau of Labor Statistics national employment data, available at www.bls.gov. March 2006 statistics are preliminary. Farm percentage change calculated from National Agricultural Statistics Service data, available at www.nass.usda.gov.

[3] Calculated from the Bureau of Labor Statistics Quarterly Census of Employment and Wages data, available at www.bls.gov. Health care is represented as NAICS 62 "Health care and social assistance" less NAICS 624 "social assistance."

[4] Michigan statistics are from the state government and are available at www.michigan.gov/hal/0,1607,7-160-17451_18668_41233-148584--,00.html. National statistics are from the U.S. Census Bureau and are available at www.census.gov/popest/datasets.html.

[5] Centers for Disease Control, data available at apps.nccd.cdc.gov/brfss/.

The paper proceeds with a review of the migration literature, with an emphasis on models of elder migration. The third section calculates net migration figures for two senior age groups (65–69 and 70+) for all Michigan counties, and provides an empirical analysis of factors causing this migration. Regression analysis quantifies the contribution of employment in the health care services as a migration draw. The final section provides interpretation and discussion of the regression results.

Modeling Elder Migration

The currently accepted demographic model of elder migration is a developmental or life-cycle model in which retirees may make all or none of three potential types of moves (Litwak and Longino 1987). The first type of move is an amenity migration, in which physically and financially healthy retirees migrate to locations providing the desired retirement amenities: temperate climate, recreational opportunities, etc. The second move, called assistance migration, is made primarily when the health of the retiree or spouse deteriorates and assistance is needed with activities of daily living and/or care for the spouse (Longino et al. 1991). This may mean a move to family, especially children, who can help with activities of daily living, and/or to a place with health care services needed by the elderly. A third potential move is into a long-term care facility. This model is widely accepted and used as the basis for empirical studies of elder migration (e.g., Haas and Serow 1993) and is consistent with other types of health-related migration (e.g., assistance migration of HIV+ individuals; see Berk et al. 2003). It is compatible with the push-pull model (Lee 1966), where there is an explicit recognition that the factors that push the elderly out of one place or pull them into another place will depend on the life-cycle stage of the individual (Walters 2002). It is also compatible with a Tiebout model, in which economic factors—predominantly state and local tax and fiscal policies and Medicare policy—are the primary determinants of migration and migration destinations (Conway and Houtenville 2003). We view the developmental model as a particular case of Sjaastad's (1962) economic benefit-cost framework for the analysis of migration, in which the developmental model has enhanced the general framework by specifying the benefits and costs most relevant to potential elderly migrants.

Empirical analyses of the first Litwak-Longino move emphasize amenities such as recreational opportunities, state and local taxes, including income and inheritance taxes, and fiscal policy (Duncombe, Robbins, and Wolf 2003, Conway and Houtenville 1998, 2001, 2003). Perhaps because this move is made by physically healthy retirees, health variables are typically omitted from the analysis. However, Speare and Meyer (1988) conclude that some elderly move in anticipation of future care needs. Empirical evidence suggests that this move, if it occurs, usually occurs close to the age of retirement (e.g., 65 years old).

Empirical analyses of the second move include analysis of the health of the migrant and/or spouse. The decisions of whether and where to move are also influenced by both place ties and personal ties. Silverstein and Angelelli (1998) find that parents who rate their own health as poor are more likely to contemplate a return move to be near a child. In Stoller and Longino's (2001) study of migrants to Florida contemplating a return move, the number of children, siblings, and relatives living close to the original home increased the likelihood of return migration, and the number of children living near the Florida home decreased the likelihood of return migration. Clark and Wolf (1992), Walters (2002), and Rogerson, Weng, and Lin (1993) also examine the relationships among personal and/or place ties and assistance migration. The empirical literature suggests that this move usually takes place five or more years after retirement, sometimes following an initial or amenity migration at the time of retirement (see references cited above). Following the literature, we will assume that migration in the 65–69 age group represents amenity migration, and that migration in the 70+ age group represents assistance migration.

This literature places relatively little emphasis on health care facilities (or lack thereof) as a pull (or push) factor, in either the first or second potential move. Exceptions include Lee (1980), who found that counties with the largest proportionate increase in population age 65 and older also had the best health care delivery services, and interpreted this in terms of in-migration. She did not have actual migration numbers, nor did she answer the question of whether the health care services were a response to the increase in popula-

tion or a cause of it. Haas (1990) found that elder migration caused increases in the number of physicians and health care services. Haas and Serow (1993), who surveyed 814 migrants and potential migrants to western North Carolina, found that 45.8 percent of the respondents said medical care was an important factor in their location decision. Consistent with the Litwak-Longino model, Haas and Serow (1993) found that medical care was more important to retirees who were making a second move, presumably as their health deteriorated. Walters (2002) found that migrants with severe disabilities are likely to leave places in which the long- term care facilities are inadequate.

In a state-level analysis, Conway and Houtenville (2001) present the unintuitive result that per capita spending on hospitals in the destination area has a negative effect on both in-migration and out-migration for the 65+ age group and for all subcategories of that age group [although Conway and Houtenville (1998) seemingly accept negative but statistically insignificant coefficients as plausible, without explanation]. It is possible that their medical expenditures variable is a proxy for tax collections, even though they try to control for tax rates. Nonetheless, the negative and statistically significant coefficients are puzzling. We shall return to this in the discussion of the current results.

Empirical Analysis

This paper models net elder migration into a county as a function of the level of local health care services, proxied by the number of health care establishments, among other place, demographic, and economic variables that are described in detail later. The analysis follows lines laid out by Serow (2001) in the sense that regression analysis of county-level data provides an explanation of net migration rates in terms of geographic, economic, and demographic variables.

Net Migration Rates

In this paper, the net migration for a specific age group in a specific year is estimated to be the difference between the actual population and the expected population in the absence of migration. The general representation of this approach is

$$(1) \qquad NM_{k,t,n} = POP_{k,t+1,n} - \hat{POP}_{k,t+1,n},$$

where NM represents net migration of people into county k in year t in age group n. POP represents population and $\hat{POP}$ represents expected population in the absence of migration. This definition means that a positive net migration rate occurs when the county's actual population exceeds the expected population in the absence of migration. Thus a positive net migration rate is reflective of net migration into the county; a negative rate is reflective of net migration out of the county.

Implementing this approach requires appropriate specification of the expected population in the absence of migration. In the absence of migration, population will be determined by the existing population in an age group, the survival rate(s) of the population, and the aging process. These influences are formalized in equation (2), which defines the expected population in the absence of migration:

$$(2) \quad \hat{POP}_{k,t+1,n} = POP_{k,t,n} * SR_{n,t} * (1 - AUR_n) + POP_{k,t,n-1} * SR_{n-1,t} * AUR_{n-1}.$$

The first product on the right side represents the expected number of people in age group n at time t who remain in that age group at time $t + 1$. This equals the number of people in the age group at time t multiplied by the survival rate $SR_{n,t}$, multiplied by the proportion of people who do not age up into age group $n + 1$, $(1 - AUR_n)$, where AUR_n is the "aging-up ratio," or the proportion of age group n who ages up into age group $n + 1$ in any year (e.g., 69-year-olds who turn 70). County-specific survival rates are available from the Centers for Disease Control.[6] The aging-up ratio will be zero for age groups open at the top end, e.g., age group 75+. All other age groups contain a 5-year cohort of individuals, e.g., age group 60–64, and so the aging-up ratio for these groups is assumed to be 0.2 for each county and year. The second product on the right side represents the number of individuals from the younger age group, $n - 1$, that age up into age group n (e.g., 64-year-olds who turn 65). This number equals the population of age group $n - 1$ at time t multiplied by the survival rate for that age group at

[6] Centers for Disease Control, "Compressed Mortality" database, available at wonder.cdc.gov/cmf-ICD10.html.

time *t*, multiplied by the aging-up ratio for that age group. Once we have determined the expected population for each age-county category, we can determine net migration using equation (1). We determine net migration figures for the age group 65–69 years, and 70 years and over. Population data are taken from the Woods & Poole (2007) economic database.

The empirical exercise is to explain net migration in terms of the demographic and economic variables described in the literature. The empirical model is specified to be

$$(3) \quad NM_{k,t,n} = \beta_0 + X^D_{k,t,n}\beta_1 + X^E_{k,t,n}\beta_2 + \nu_{k,n} + \varepsilon,$$

where X^D and X^E are vectors of demographic and economic variables that influence the migration decision, the β are parameters, $\nu_{k,n}$ are the fixed effects, and ε is an error term.

Explanatory Variables

The choice of explanatory variables is based on the literature cited above. The explanatory variables include the demographic variables of population, population density, old-age dependency ratio (ratio of population 65+ to population 18–64), and the crime rate for major crimes. Elders seeking a more relaxed retirement lifestyle are likely to shy away from high population and high population density counties. The old-age dependency ratio may proxy for location amenities that have induced earlier retirees to migrate to the county (although a high ratio could also indicate aging in place or outflow of younger age groups). The crime rate is expected to have a negative influence on net in-migration rates.

The economic variables include per capita income, the number of jobs in the county, the number of health care establishments serving the elderly per 1,000 population, and the number of organizations in the education, entertainment, and recreational services industry. The influence of per capita income on elder migration is difficult to predict *a priori*. Elders who wish to work part-time during their retirement, or who wish to live near their employed son or daughter who in turn is seeking high wages, are more likely to move to a county with a high per capita income. However, the literature shows that high wages (as proxied by high incomes) attract working age migrants, and presumably the local governments provide amenities suitable to a working-age population, raising tax revenues to fund these amenities. Thus, retirees looking to escape the "rat race" and/or high taxes are likely to migrate out of high per capita income centers. Higher per capita income may also indicate higher costs of living, which elders on fixed incomes will try to avoid. The overall effect of per capita income is thus ambiguous *a priori*.[7] Similarly, the number of jobs in a county has an *a priori* ambiguous effect. A greater number of jobs is likely correlated with more services in the county, including those for elders. However, more jobs also attract working-age populations, which may have a negative effect for the same reasons that high incomes do. Inclusion of the number of health care establishments as a separate variable is expected to represent an amenity particularly for elderly contemplating an assistance move. Detailed establishment data for each county are taken from the U.S. Census Bureau. The number of health care establishments is the sum of the numbers of hospitals, home health care facilities, nursing homes, and service facilities for the elderly and disabled, so this measure focuses on health care services likely to be of particular interest to the elderly (the U.S. Census Bureau has data on broader categories of health care employment, which we did not use because of our focus on elder migration). The number of establishments in the education, entertainment, and recreational services industry serves as a proxy for cultural and recreational amenities that may entice the elderly to move to the area. These amenities include those provided by colleges and universities, fine arts schools, sports and recreation firms and organizations, and miscellaneous entertainment businesses.

Since most county-level geographic characteristics are time-invariant (e.g., miles of shoreline),

[7] At first glance, the possibility that per capita income could have a negative coefficient appears to be counterintuitive, but is in fact also consistent with the amenity migration and Tiebout models. Per capita income is highest in counties with high-paying jobs. As in the Tiebout model, this attracts a working age population. This working age population then demands amenities such as business tax breaks, schools, etc., that require local government expenditures but do not necessarily provide services desired by retirees. So retirees will move away from these locations to counties that have a greater level of elderly oriented amenities. Ideally this effect would be captured in a local tax rate variable, but local tax rates vary within a county, and therefore it is extremely difficult or impossible to construct an appropriate variable.

they are subsumed in the fixed effects and thus are not included in the regression model.

Summary statistics for the variables are presented in Table 1 by type (rural v. urban) county. Post (2004) classifies Michigan counties into two urban and three rural categories based on census data. In the regression analysis we restrict attention to the three rural categories: rural, urban-influenced; rural, primarily non-agricultural (in Michigan these counties are primarily forestry and mining areas); and rural, primarily agricultural. For purposes of comparison, summary statistics are included for all Michigan counties and for the subgroups of rural counties that are used in the regression analyses. The restriction of the estimation to rural counties naturally restricts attention to smaller, less densely populated counties with small numbers of migrants and fewer of each category of business establishment. As we move from urban to rural counties, average per capita income goes down, the average elder dependency ratio goes up, and the minimum elder dependency ratio goes up notably. Crime in rural counties is lower than the state average.

Regression Analysis

A fixed-effects panel model is estimated using feasible generalized least squares regression. The dependent variable is the net migration rate for rural counties in Michigan for the years 1995–2003; separate regressions are run for each of the two age groups 65–69 and 70+. We run regressions using all rural counties, then for rural counties not influenced by an urban area, and finally for rural, agricultural counties. We interpret this progression as showing a greater degree of "ruralness." The feasible generalized least squares procedure as implemented corrects for heteroskedasticity of the error term across panels (counties), and for autocorrelation of the error term within each county (autocorrelation coefficients are allowed to vary across counties).

Table 2 summarizes the regression results for the 65–69 age group. Migration in this age group is expected to be predominantly of the amenity migration type (Litwak and Longino 1987). The regressions use increasingly strict definitions of "rural," with the right-most column being the most restrictive (rural, agricultural counties).

The population variable has a negative and statistically significant coefficient at the 5 percent level in each of the three regressions. This is consistent with the idea that migrants to rural counties are looking for a less crowded lifestyle. Population density has statistically significant coefficients in the second and third regressions, but with opposite signs. This discrepancy suggests that there may be differences as to why people move into (or out of) agricultural counties versus forestry/mining counties. Similarly, the elder dependency ratio has positive and statistically significant coefficients in the first two regressions, but a negative and statistically significant coefficient in the third regression. Again, this suggests that agricultural counties are different in nature from rural, non-agricultural counties. For example, a high elder dependency ratio in a rural, non-agricultural county could be indicative of prior elder in-migration; in a rural, agricultural county, a high elder dependency ratio could be indicative of aging in place and/or out-migration of the young.

The total number of jobs has a positive coefficient in each regression, statistically significant in the first and third regressions. Per capita income is negative and statistically significant in each of the regressions. The negative and statistically significant coefficients on per capita income are consistent with the life cycle/amenity migration model since higher income proxies for a more hectic, working-age community, and amenity migrants are seeking to leave this type of location. Crime rates are negatively related to migration as expected but are not statistically significant. The number of education, entertainment, and recreation facilities has a positive and statistically significant coefficient in the first and second regression; the coefficient is negative but not statistically significant in the third regression. This suggests that retirees may often be seeking locations with entertainment amenities, but that this effect is not present in primarily agricultural rural areas.

The number of health facilities has negative and statistically significant coefficients in each of the regressions. This is consistent with the idea that migrants in this age group are relatively healthy, and thus that locating close to health facilities is not a concern. Moreover, health facilities are often located near population centers, so this variable could also be capturing some of the

Table 1. Summary Statistics, by Rural Classification

SUMMARY STATISTICS OF VARIABLES FOR ALL 83 MICHIGAN COUNTIES				
Observations = 664	Mean	Std. Dev.	Min.	Max.
Net migration of 65- to 69-year-olds (#)	-148.786	530.092	-5099	1015
Net migration of ages 70+ (#)	-18.3855	396.6047	-5185	1468
Population (#)	118.9642	276.0591	1.996	2113.482
Population density (pop/mile^2)	187.7254	435.0506	3.689464	3442.153
Elderly dependency ratio (ratio)	0.548467	0.06734	0.34073	0.770222
Major offences per 100,000 (#)	2759.624	1349.338	419.8851	8315.472
Per capita income (thousands of $)	22.06958	4.661746	13.421	47.426
Total number of jobs (#)	2826.586	6380.483	60	42013
Health care facilities (#)	41.53313	99.40483	0	886
Entertainment, education, and recreation facilities (#)	49.87651	95.2859	1	722
SUMMMARY STATISTICS FOR 68 RURAL MICHIGAN COUNTIES (INDEX 3, 4, OR 5)				
Observations = 544	Mean	Std. Dev.	Min	Max
Net migration of 65- to 69-year-olds (#)	-31.0735	72.64512	-396	145
Net migration of ages 70+ (#)	16.39154	49.83685	-106	299
Population (#)	41.38811	34.42877	1.996	169.038
Population density (pop/mile^2)	66.84785	57.73282	3.689464	297.6021
Elderly dependency ratio (ratio)	0.557967	0.066259	0.34073	0.770222
Major offences per 100,000 (#)	2361.912	955.6885	419.8851	7106.555
Per capita income (thousands of $)	21.04613	3.744859	13.421	35.804
Total number of jobs (#)	966.5993	754.3975	60	4014
Health care facilities (#)	15.31985	13.27235	0	86
Entertainment, education, and recreation facilities (#)	20.60662	15.2956	1	81
SUMMMARY STATISTICS FOR 52 RURAL MICHIGAN COUNTIES, NOT URBAN-INFLUENCED (INDEX 4 OR 5)				
Observations = 416	Mean	Std. Dev.	Min	Max
Net migration of 65- to 69-year-olds (#)	-9.59856	50.94415	-375	145
Net migration of ages 70+ (#)	12.38942	42.15099	-82	250
Population (#)	30.38488	25.25118	1.996	167.434
Population density (pop/mile^2)	49.33681	40.76761	3.689464	231.2624
Elderly dependency ratio (ratio)	0.569852	0.067662	0.34073	0.770222
Major offences per 100,000 (#)	2428.477	1001.38	419.8851	7106.555
Per capita income (thousands of $)	20.15947	3.095873	13.421	30.206
Total number of jobs (#)	794.4639	649.3353	60	3592
Health care facilities (#)	12.65385	11.73935	0	86
Entertainment, education, and recreation facilities (#)	17.52885	13.30075	1	81
SUMMMARY STATISTICS FOR 21 RURAL, AGRICULTURAL, MICHIGAN COUNTIES (INDEX 5)				
Observations = 168	Mean	Std. Dev.	Min	Max
Net migration of 65- to 69-year olds (#)	-17.8333	63.99744	-375	95
Net migration of ages 70+ (#)	7.952381	42.43555	-82	250
Population (#)	35.61971	32.57367	9	167.434
Population density (pop/mile^2)	59.79393	46.46597	15.9292	231.2624
Elderly dependency ratio (ratio)	0.573559	0.056264	0.454507	0.701092
Major offences per 100,000 (#)	2444.993	939.2068	770.819	6022.139
Per capita income (thousands of $)	19.76582	3.172977	13.421	30.206
Total number of jobs (#)	785.0179	689.8566	165	3584
Health care facilities (#)	13.47024	13.407	1	86
Entertainment, education, and recreation facilities (#)	17.86905	14.70002	3	81

Notes: Ruralness index 3 specifies counties defined as "rural, urban influenced." Ruralness index 4 specifies counties defined as "rural, primarily non-agricultural." Ruralness index 5 specifies counties as "rural, primarily agricultural."

Table 2. Fixed Effects Regression Results for Net Migration, Age 65–69, by Degree of Ruralness

Dependent Variable: Net In-Migration	Ruralness Index 3, 4 or 5 (p-value)	Ruralness Index 4 or 5 (p-value)	Ruralness Index 5 (p-value)
Constant	56.0734 0.005	43.3392 0.042	174.71 0.000
Population (thousands)	-2.1403 0.000	-2.1829 0.000	-3.1312 0.000
Population density	0.0665 0.471	0.2537 0.020	-0.3986 0.005
Elder dependency ratio	85.7912 0.001	72.8334 0.007	-152.905 0.011
Number of jobs (per 1,000 population)	0.2788 0.003	0.0122 0.222	0.1410 0.000
Per capita income (thousands of $)	-4.1567 0.000	-3.4366 0.000	-1.8873 0.017
Major crime rate (major offence per 100,000)	-0.0009 0.469	-0.0002 0.890	-0.0016 0.447
Entertainment, education and recreation facilities	1.3110 0.000	1.6076 0.000	-0.0854 0.872
Health facilities per 1,000 population	-0.8754 0.000	-0.5818 0.043	-2.7264 0.000
N	544	416	168
Counties	68	52	21
Years	8	8	8
χ^2	1280.19	252.92	504.15
p-value	0.000	0.000	0.000

Notes: Ruralness index 3 specifies counties defined as "rural, urban influenced." Ruralness index 4 specifies counties defined as "rural, primarily non-agricultural." Ruralness index 5 specifies counties as "rural, primarily agricultural."

"congested lifestyle" effect that retirees are seeking to leave, leading to the negative coefficients.

Table 3 shows analogous regression results for the 70+ age group; migration in this group is expected to be driven predominantly by health concerns (Litwak and Longino 1987). As in Table 2, columns farther to the right use an increasingly strict definition of "rural."

None of the population variables are significant at the 5 percent level. For the first two regressions this is due to collinearity among the three population variables, as joint tests show significance (for model 1, $\chi^2 = 29.80$, $p = 0.000$; for model 2, $\chi^2 = 16.78$, $p = 0.001$; for model 3, $\chi^2 = 2.60$, $p = 0.458$). The total number of jobs in the county is positive and statistically significant at the 1 percent level in the first two regressions. Per capita income has positive coefficients that are statistically significant at the 1 percent level in all three regressions. The major crime rate has a negative and statistically significant coefficient in the first regression, but as the definition of rural becomes stricter, this coefficient is no longer significant. This is perhaps because crime is less of a problem in the most rural counties. The number of entertainment, education, and recreation facilities enters negatively in each regression, and is statistically significant at the 5 percent level in each regression. The number of health facilities has a positive coefficient in each regression. The size of the coefficient increases sixfold as we move from the broadest to the strictest definition of rural, and it becomes statistically significant at the 5 percent level. In the third regression the coefficient on the health care facility is 16 times the coefficient on the number of jobs. This is very

Table 3. Fixed Effects Regression Results for Net Migration, Ages 70+, by Degree of Ruralness

Dependent Variable: Net In-Migration	Ruralness Index 3, 4 or 5 (p-value)	Ruralness Index 4 or 5 (p-value)	Ruralness Index 5 (p-value)
Constant	-43.31.9 (0.005)	-34.0056 (0.027)	-50.5945 (0.209)
Population (thousands)	-2.068 (0.307)	-.3722 (0.134)	-0.2754 (0.590)
Population density	-0.1897 (0.066)	-.2087 (0.071)	-.2330 (0.303)
Elder dependency ratio	-13.7664 (0.497)	-16.1585 (0.405)	-46.0545 (0.353)
Number of jobs (per 1,000 population)	0.0541 (0.000)	.0586 (0.000)	0.0520 (0.066)
Per capita income (thousands of $)	2.5650 (0.000)	2.1904 (0.000)	3.3516 (0.000)
Major crime rate (major offence per 100,000)	-0.0033 (0.015)	-0.0027 (0.060)	0.0035 (0.187)
Entertainment, education and recreation facilities	-.6648 (0.023)	-0.8693 (0.007)	-1.1083 (0.040)
Health facilities per 1,000 population	0.1586 (0.470)	0.5120 (0.069)	0.9442 (0.024)
N	544	416	168
Counties	68	52	21
Years	8	8	8
χ^2	232.09	175.28	94.03
p-value	0.000	0.000	0.000

Notes: Ruralness index 3 specifies counties defined as "rural, urban influenced." Ruralness index 4 specifies counties defined as "rural, primarily non-agricultural." Ruralness index 5 specifies counties as "rural, primarily agricultural."

reasonable, suggesting that the addition of a new health care facility in a rural, agricultural county has the same effect on elder migration as the addition of 16 new jobs (but no new health care facility) (to the extent that the new health care facility also adds jobs, its effect would be larger). The magnitude of the effect is similar to the effect of entertainment facilities (but of opposite sign).

The differences between migration in the 65–69 age group (Table 2) and the 70+ age group (Table 3) are generally consistent with the Litwak-Longino (1987) migration model. The 65–69 age group is affected negatively by population, consistent with the idea that they are seeking to leave areas catering to the needs of a working age population in favor of a more relaxed retirement lifestyle. The 70+ age group is also negatively affected by population, but not in a statistically significant manner. Per capita income is negatively and statistically significantly related to migration in the 65–69 age group as they leave the high-wage areas that working age populations seek. Migration in the 70+ age group has the opposite relationship with per capita income, a positive and statistically significant relationship, which is consistent with the explanation that migrants in this age group are moving for health reasons and often seek to be near their (working age) children, who are more likely to seek out areas with high-paying jobs and thus are more likely to live in high-income counties. The presence of education, entertainment, and recreation facilities is positively and statistically significantly related to migration in the first two regressions for the 65–69 age group (and insignificant in the third), as is consistent with a group seeking a healthy and active retirement lifestyle. The presence of these facilities is negatively and sta-

tistically significantly correlated with migration in the 70+ age group, corroborating the idea that these migrants have health issues that prevent them from enjoying an active retirement lifestyle.

Health facilities are negatively and statistically significantly correlated with migration in the 65–69 age group. This is consistent with the idea that these migrants are relatively healthy and seeking other types of amenities, and that the presence of health facilities implies added tax or other costs. Health facilities are positively correlated with migration in the 70+ age group, and statistically significant in the third regression, corroborating the hypothesis that migration in this age group is driven in large part by health considerations.

Conclusions

The first notable finding is that the effects of demographic and economic forces on elder migrants in the 65–69 age group are different from the effects on migrants in the 70+ age group, in predictable ways that corroborate the Litwak-Longino developmental or life-cycle model. New or recent retirees (ages 65–69) move to take advantage of location amenities, and older migrants (ages 70+) move for health-related reasons, in a manner that is consistent with a desire to be near offspring. The empirical evidence presented above shows that new or recent retirees are moving away from locations with high incomes to take advantage of education, entertainment, and recreation amenities. Migrants age 70+ are moving back to high-income locations (presumably because that is where their employed offspring are) and are concerned with the location of health care facilities.

A second interesting finding is that the determinants of migration differ between rural, agricultural counties and other types of rural counties. These differences are seen in the effects of the elder dependency ratio and the number of education, entertainment, and recreation establishments for the 65–69 age group, and to a lesser extent in the size of the health care effects for both groups. This paper has not been able fully to explore these differences; a more detailed exploration is left for future analysis.

The third notable finding, and the primary emphasis of this paper, is that the provision of health care services as represented by the number of health care facilities has a positive effect on net migration. This effect is statistically significant in the 70+ age group. These findings contrast with earlier findings in the literature that health care had a negative effect on migration decisions (at the state level). The effect is similar in magnitude to effects of other economic variables such as education, entertainment, and recreation institutions or number of jobs, but not large enough to justify investing in additional health care simply in hopes that older retirees migrate to the area. However, the magnitude is large enough that, coupled with evidence showing the important contribution of health care to the economic viability of cases such as Isabella County (see introduction), it is reasonable to conclude that the health care industry has potentially important contributions to make to rural economic sustainability.

Before embarking on a wholesale investment in rural health care industries, some additional issues need to be addressed. An issue with the regression model is that of the direction of causality between health care employees and migration. In reality, and in an ideal of a sustainable economy, the existence of health care draws migrants, who in turn cause an increase in the demand for health care services and thus attract new health care establishments, which draws new migrants, etc. Econometrically we partially control for this by including the retirement age dependency ratio as a proxy for earlier migration. However, additional work is called for in order to understand more fully the dynamics of this positive reinforcement between health care facilities and rural retirement. Second, the ability of the health care industry to attract retirees is not sufficient to make the industry financially viable: additional demand for health care services must exist and be sufficient to generate profits or justify non-profit health care organizations. Third, the economic effect of attracting retirees age 70+ needs to be carefully examined; for example, Stallmann, Decker, and Shields (1999) show that the contribution of households to government revenue decreases with age (but even at old ages remains on net positive) (see also Serow 2003). Fourth, the effect of investment in the health care sector on the aggregate rural economy, not just on retirees, is important. Finally, even with the aging of the baby boomers and the large relative demand for health services by individuals age 65+, this demand is probably sufficient to drive a significant health care indus-

try only in an important but limited number of rural places.

In conclusion, the findings and caveats suggest a further research agenda that delves more deeply into how rural places can best use health care to strengthen their economies, and which places are best suited to take advantage of this opportunity.

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