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Spatial Variability of Economic Impacts: Examining a Hypothetical Retiree In-migration Policy

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Abstract. This study estimates the economic impacts of a hypothetical retiree in-migration scenario involving elderly households and examines the effect of aggregation of study regions in an input-output framework on their regional purchase coefficients, and multipliers. Using migration estimates to three Arkansas counties based on income types, it was observed that the more affluent retirees tend to relocate to counties with more amenities and a higher standard of living. Findings suggest that the economically large counties with diversified industry have greater economic impacts not just as a result of higher retiree spending owing to in-migration of high-income retirees, but also due to more opportunities to purchase goods and services from local establishments, leading to higher output, employment and value-added multipliers. Further, it was observed that the aggregation of study regions in an input-output framework results in significant variation in economic impact results compared to the non-aggregated stand-alone models.

1. Introduction

The baby-boomers[1] number approximately seventy-six million and account for over 28 percent of the US population (Census Bureau, 2006). The next ten years are expected to witness an increase in the number of retirees as more of the baby-boomer generation transition to life after work. As a group, baby-boomers have enjoyed higher income during their working years than any preceding generation and have accumulated substantial savings, in part to provide for their retirement (CBO, 2004). The elderly[2] often relocate upon retirement to communities that offer more amenities conducive to their preferred lifestyle. Although they choose different lifestyles, natural amenities (lakes, rivers, mountains), less congestion, low crime, warm and sunny weather, low cost of living, and a welcoming community atmosphere are usually common and more sought after. During 1960 through 1980, nearly 60 percent of the inter-state migrating retirees settled in ten states However, this dropped to 56 and 54 percent in 1990 and 2000, respectively, with Florida the most popular destination for migrating retirees (Longino and Bradley, 2003)[3]. The declining trend to the top ten destinations combined with an increase in the number of migrating retirees prompted other non-traditional retiree destinations to adopt strategies to attract retiree in-migrants to relocate to communities in their states (Haas and Serow, 1993).

Literature on elderly movement reveals three types (Litwak and Longino, 1987). The first type, called amenity migration, involves physically and financially healthy retirees who migrate to locations providing the desired retirement amenities. 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. This may mean a move to

[1] People born between 1946 and 1964, who make up one of the largest and most prosperous generations in U.S. history.
[2] In the rest of the paper, elderly is used instead of retiree at certain places.
[3] The ten most popular states for in-migrating retirees in 1990 and 2000 in descending order were Florida, California, Arizona, Texas, North Carolina, Pennsylvania, New Jersey, Washington, Virginia and Georgia.

live with or near 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 (Haas and Serow, 1993). The focus of this study is on the first type.

The elderly have positive economic impacts on communities where they choose to relocate (Sastry, 1992; Miller, 2005; Miller and Rainey, 1997; Miller and Hy, 1998; Conway and Houtenville, 2003; Whitner and McGranahan, 2003; Hodge, 1991). The benefits include stimulated growth in the real estate (residential and commercial), finance (banks, insurance, stocks, financial planners, and accountants), healthcare (professionals and facilities), recreation and entertainment, hospitality (lodging & restaurants), retail (durables and non-durables), utilities, and tourism (visiting and permanent tourists) (Skelley, 2004; Haas and Serow, 1993). Concurrently, this leads to an increase in property and sales tax revenue that allows local governments to spend on improving infrastructure and services. Affluent retirees usually do not strain social services such as healthcare services, school systems, and the criminal justice system (Chestnutt et al, 1993). Overall, communities that have a sizable elderly population with assured incomes are more likely to have a stable economy and are relatively less affected during economic downswings when working people lose jobs and incomes decline (Chestnutt et al, 1993).

The existing body of literature cited above is mainly focused on economic and fiscal impacts of migrating retirees. None of the studies have delved into the spatial variability in economic impacts between areas within a state and examined the reasons behind such differences. This study seeks to fill the void and add to the literature by focusing on three Arkansas counties which are the most popular destinations in the state for retirees from within the state and from across the nation. The main objective is to estimate the economic impacts of a hypothetical retiree in-migration scenario involving 100 elderly households and also examine the effect of aggregation of study regions on their regional purchase coefficients (RPC) and multipliers. We hypothesize that the economically large counties with diversified industry sectors have greater economic impacts not just as a result of higher retiree spending, but also due to more opportunities to purchase goods and services from local establishments, leading to higher output, employment and value-added multipliers. Further, we hypothesize that aggregation of regions in an input-output framework results in significant variation in economic impact results compared to the disaggregated stand-alone models.

2. Theoretical framework

The input-output (I-O) framework was used to estimate the economic impact of adding 100 elderly households to the communities in the three chosen counties and tracing the flow of their expenditures across sectors (industries). The 100 retiree household in-migration scenario can best be described as changes in final demand that retirees present to the local economies. The analysis was conducted in two phases, descriptive and predictive. The descriptive model included information about local economic interactions known as regional economic accounts (REA) that describe the study area economy in terms of the flow of dollars from purchasers to producers within the region. Trade flows are also part of the descriptive model. They describe the movement of goods within the study region and the outside world. The REA were used to construct local multipliers and describe the response of the economy to a retiree spending stimulus and build the predictive model. The mathematical derivation of the multiplier is presented below. The simplified transactions of the study region's economy in matrix form is

$$X - A X = Y \quad (1)$$

where X and Y are vectors of output and final demand, respectively, and A is the matrix of coefficients a_{ij} which represent the amount of industry i's product needed to produce a dollar's worth of industry j's product. By algebraically manipulating equation 1 to add an identity matrix I to the equation, it can be written as:

$$X *(I - A) = Y \quad (2)$$

or

$$X = (I - A)^{-1} Y \quad (3)$$

where $(I - A)^{-1}$ is the Leontief inverse matrix. The elements of the matrix represent the purchases from one industry to others (direct and indirect) in order to produce another unit of output for the final demand. Since multiplying this matrix by a vector of final demand Y will produce the output X, this matrix also represents the multiplier effects. The summation of each column in the matrix is the multiplier for the matching industry of that column. The value of the multiplier in each sector is impacted by the amount of economic activity available in the local community.

The Regional Purchase Coefficient (RPC) is the proportion of the study region's demand for a good or service that is fulfilled by regional production, as

opposed to being fulfilled by imports from other regions. RPC is affected by changes in local industry production cost and output. For example, an increase in RPC can be caused by an increase in output (more choices better meet local demand) or a decrease in cost of production. The higher the percentage of money that remains in the local economy as reflected by higher RPCs, the greater the multiplier impact is. A mathematical justification of this relationship, provided by Mansury and Hara (2007), is illustrated below.

Let R_{ij} denote industry j's expenditure on imported commodity i in one of the study region. The regional purchase coefficient (RPC) for commodity i is defined as the proportion of local demand for that commodity, Z_{ij}, that is satisfied by local production:

$$RPC_i = \sum_j^N Z_{ij} / \sum_j^N (Z_{ij} + R_{ij}) \quad (4)$$

Let r_{ij} denote the proportion spent on imported input i per dollar's worth of output j, $r_{ij} = R_{ij}/Y_j$, and consider industry j's total expenditures on input I, $T_{ij} = Z_{ij} + R_{ij}$. By construction,

$$a_{ij} = t_{ij} - r_{ij} \quad (5)$$

where $t_{ij} = T_{ij} / Y_j$. Other things being equal, a lower proportion of imports in industry j's input mix implies stronger linkages to the local economy and therefore higher RPC since

$$RPC_i = \sum_j^N (t_{ij} - r_{ij}) Y_j / \sum_j^N t_{ij} Y_j \quad (6)$$

The next step demonstrates how high RPCs impact multipliers using the well-known result allowing the multiplier matrix $M = [I - A]^{-1}$ to be approximated as a power series:

$$[I - A]^{-1} \approx I + A + A^2 + A^3 + ... + A^{n-1} + A^n \quad (7)$$

where $n \to \infty$ is a large, positive integer. Now, consider the square matrix Δ having the same dimension as the matrix of coefficients A. Every element $\delta_{ij} \in \Delta$ satisfies two conditions: $0 \le \delta_{ij} \le 1$ and, furthermore,

$$\sum_i^N \delta_{ij} \le 1 - \sum_i^N a_{ij} \quad (8)$$

The second condition stipulates that the sum of every element belonging to the same column in the matrix Δ is bounded from above by the proportion of account j's expenditures spent on the exogenous accounts. Next consider the shifting of expenditures from imports to local production, resulting in a new coefficient matrix A^*:

$$A^* = A + \Delta, \quad (9)$$

where in this case the sum $\sum_i^N \delta_{ij}$ is bounded by the proportion spent on exogenous imports, $\sum_i^N \delta_{ij} \le l_{ij}^M \le 1 - \sum_i^N a_{ij}$. Now, compute the new multiplier $M^* = [I - A^*]^{-1}$, which can be approximated using a power series expansion:

$$M^* \approx I + A^* + A^{*2} + A^{*3} + \ldots + A^{*n-1} + A^{*n} \quad (10)$$

Since $0 \le a_{ij} \le a_{ij}^*$ for all $a_{ij} \in A$ and $a_{ij}^* \in A^*$, it follows that $m_{ij}^* \ge m_{ij}$ for every $m_{ij} \in M$ and $m_{ij}^* \in M^*$, with at least one strict inequality. Thus, in a SAM framework higher RPCs will always lead to greater multiplier impacts. In the later part of the article, this is verified empirically for the study region's economies.

While our interest is to compare and contrast the economic impacts in the two regions, disaggregating the economic impacts into direct, indirect and induced effects helps in understanding the ripple effect of the shock imposed on the model, i.e. is indicative of the magnitude of the multiplier. Direct effects result from the retirees spending dollars to purchase goods, services and real estate. Indirect effects arise when local businesses hire new employees and make additional purchases to cater to the new demand. The indirect effects are computed by applying the Type II multipliers generated by IMPLAN. Induced effects result from local purchases of goods and services made by new employees hired to meet the increased demand from retirees.

3. Study area

The study focuses on two regions, Baxter County in North central Arkansas and Garland and Saline counties (G-S) as one region in Central Arkansas which includes several retirement communities, the largest of which is Hot Springs village. Baxter, a rural county, had an annual income per household of $46,744 with 20,538 households in 2003. Much of Baxter County's economic growth and more than half its tax dollars can be traced to tourism and retirement (AAC, 2005).

Approximately 26 percent of the county's population is over the age of 65. Total and annual per capita retail sales, indicative of the residents' income levels, were $369 million and $9,522, respectively (Census Bureau, 2006). Garland County had an average annual income per household of $50,683 with 45,875 households in 2003. Recreation and tourism, along with livestock production and logging, were the backbone of the county's economy,. One of the largest quartz crystal mining operations in North America is located in Garland County. Three lakes in the county offer a full range of water sports and recreational facilities (AAC, 2005). Approximately 21 percent of the county's population was over 65 years of age. Total and annual per capita retail sales were $1,107 million and $12,301 respectively (Census Bureau, 2006). Saline County had an average annual income per household of $61,964 with 36,965 households in 2003. Approximately 13 percent of the county's population is over 65 years of age. Total and annual per capita retail sales were $973 million and $11,292, respectively (Census Bureau, 2006).

The choice of counties for this study was not just due to their popularity among retirees but also due to the contrast in economic status of the in-migrating retirees relocating to their communities and the differences in economic structure of the county economies. As is illustrated in Table 1, from 1995 till 2000 a total of about 9,300 elderly moved into Baxter County, of which 2,742, 1,138, and 869 were from Arkansas, Illinois and Missouri, respectively. A total of 38,725 elderly persons moved into G-S region between 1995 and 2000 of which 21,235 were from Arkansas.

Table 1. Retirees relocating to the study region Arkansas Counties during1995 through 2000

	Baxter			Garland			Saline	
State	Retirees	Proportion	State	Retirees	Proportion	State	Retirees	Proportion
Arkansas	2,742	0.29	Arkansas	8,201	0.43	Arkansas	13,034	0.66
Illinois	1,138	0.12	Texas	2,079	0.11	Texas	1,227	0.06
Missouri	869	0.09	California	1,234	0.07	California	597	0.03
California	725	0.08	Illinois	998	0.05	Tennessee	523	0.03
Texas	394	0.04	Louisiana	712	0.04	Louisiana	466	0.02
Louisiana	353	0.04	Oklahoma	624	0.03	Illinois	430	0.02
Wisconsin	259	0.03	Tennessee	467	0.02	Oklahoma	430	0.02
Arizona	233	0.03	Missouri	434	0.02	Missouri	364	0.02
Colorado	231	0.02	Arizona	311	0.02	Florida	253	0.01
Indiana	196	0.02	Florida	294	0.02	Kansas	140	0.01
Others	2,157	0.23	Others	3,541	0.19	Others	2,366	0.12
Total	9,297	1.00	Total	18,895	1.00	Total	19,830	1.00

In addition, 3,306 and 1,831 elderly persons moved into the G-S region from Texas and California, respectively (Census Bureau, 2006). During 1995-2000, Saline had the highest total in-migration of elderly population, followed by Garland and Baxter. Although not presented in the table, beyond the year 2000 the growth of the elderly in Saline has been more pronounced, in Garland the growth has been slower, and in Baxter growth in this demographic has plateaued.

4. Data and methodology

Economic data for Baxter, Garland, and Saline Counties from the IMPLAN database (IMPLAN, 2003) were used to conduct the I-O analysis. Economic data used in the study included inter-industry transactions, value-added (comprised of payments to factors of production and indirect business taxes like excise, property and sales taxes), imports, exports, and final demands consisting of consumption by institutions and households, all expressed in million dollars. The data also included employment in each industry in the study regions. Type II Multipliers and RPC values estimated by IMPLAN were used to estimate the indirect and induced effects. Retiree household income data was obtained from the Census Bureau (2003). The number of elderly migrating to each of the three counties from within Arkansas and other states was sorted by the level of their income. In the next phase the average income of the elderly in each county was estimated as a weighted average. The Consumer Expenditure Survey from Bureau of Labor Statistics (BLS, 2003) was used to estimate the proportions of annual elderly household expenditures on food, housing, insurance,

healthcare, automobiles, etc. Garland and Saline, being adjacent counties, were combined to create one study area as the elderly moving into the region are spread over both of the counties (Table 1).

In the next step, the elderly income estimates and the spending proportions were used to calculate the annual dollar amount spent on various categories of the elderly household spending. Table 2 illustrates the additional dollars spent by 100 elderly households in both study regions. The table includes the proportion of total expenditure for each of the categories.

Table 2. Average retiree household expenditure and RPC's in the two study regions

Expenditure	Proportion (%)	Baxter ($)	Garland/Saline ($)	Saline RPC	Garland RPC	G-S RPC	Baxter RPC
Electricity	3.43	1,366	1,615	0.43	0.90	0.70	0.48
Natural gas	1.44	572	676	0.10	0.28	0.19	0.56
Water	1.20	479	567	1.00	0.92	1.00	0.65
Shelter Maintenenace	4.59	1,828	2,161	0.97	1.00	1.00	0.87
Vehicle Purchases	11.02	4,388	5,188	0.95	0.95	0.95	0.94
Food at Home	9.34	3,718	4,396	0.44	0.76	0.61	0.68
Apparel	3.29	1,311	1,550	0.28	0.71	0.51	0.51
Miscellaneous Retail	9.98	3,974	4,698	0.95	0.95	0.95	0.95
Drugs and Medical Supplies	3.81	1,518	1,794	0.95	0.95	0.95	0.52
Telephone	2.44	972	1,149	0.32	0.57	0.57	0.57
Health Insurance	7.26	2,891	3,418	0.30	0.42	0.42	0.33
Vehicle Insurance	2.32	924	1,093	0.42	0.42	0.42	0.42
Mortgage	3.09	1,229	1,453	0.53	0.57	0.57	0.57
Rented Dwellings	4.83	1,922	2,272	0.37	0.60	0.57	0.43
Medical supplies	2.50	993	1,175	0.44	0.95	0.95	0.95
Other Lodging	1.29	513	606	0.36	0.80	0.80	0.80
Food away from Home	4.79	1,907	2,255	0.88	0.90	0.90	0.82
Auto Maintenance Repair	1.69	674	797	0.90	0.90	0.90	0.90
Cash Contribution	7.14	2,843	3,362	0.59	0.06	0.45	0.43
Property Taxes	5.07	2,020	2,389	1.00	1.00	1.00	1.00
Home Furnishings	3.35	1,333	1,576	0.95	0.79	0.95	0.95
Movies	2.44	970	1,147	0.45	0.40	0.42	0.52
Electronics	1.77	705	833	0.39	0.46	0.43	0.45
Postage	0.49	196	232	0.56	0.65	0.65	0.65
Personal Insurance	1.41	560	662	0.30	0.42	0.42	0.33
Total	100	39,805	47,067	0.59	0.69	0.69	0.65

In the table, it is evident that vehicle purchases, miscellaneous retail, and food-at-home accounted for 30 percent of total elderly household expenditure. Health insurance and medical supplies accounted for additional 10 percent and cash contribution accounted for another 7 percent. The differences in the elderly household income between the two study regions can be attributed primarily to the economic profiles of the in-migrating elderly. It was observed that the relatively affluent elderly with higher income and educational levels preferred the Hot Springs area in G-S region. This area is adjacent[4] to the Little Rock Metropolitan area, Arkansas' largest urban conglomeration and the state capital. Blue collar retirees preferred to relocate to Baxter county, surrounded entirely by rural counties, primarily due to the relatively lower cost of living, i.e., about 6-10 percent lower (Sperling's Best Places, 2008).

After developing the descriptive model in IMPLAN, the sectoral expenditures were used as an additional stimulus to final demand. After running these through the predictive model, the post in-migration or policy estimates were compared with the respective baseline estimates that represent the status quo (pre-in-migration) for the base year. In estimating the indirect and induced impacts, regional purchase coefficients play a critical role. They represent the percentage of expenditure made locally, i.e., a higher RPC

[4] Saline county is actually part of the Little Rock MSA.

has a bigger multiplier effect on the local community (mathematical relationship explained in earlier section). IMPLAN generated the RPCs automatically with a set of econometrically-based equations. There was a different equation for each commodity with variables filled by study area data. For example, due to the presence of Baxter County Regional Hospital and Baxter Healthcare Corporation in Mountain Home, the RPC for medical services was 0.95 for Baxter County. Also, the RPC in the service and retail trade industries in G-S were high due to the large number of retail and service businesses that provided goods and services available to the tourists visiting Hot Springs. When the study region was aggregated to include Garland and Saline, the RPC in IMPLAN used the weighted average of the two regions' RPCs. The RPCs for all the scenarios used in the study are presented in Table 2.

To examine the effect of aggregation of the study regions on their multipliers and hence the economic ripple effects, an alternate scenario under which 50 elderly households relocated to Garland and Saline counties separately was developed. Under this scenario, the G-S regional model was split into two separate county models, and the same steps were repeated to estimate the economic impacts. Economic impacts of the two independent models were then combined and compared with the findings of the aggregated G-S regional model to determine the differences in estimates.

5. Empirical findings

The economic impacts (output; employment; value-added, comprised of labor income, proprietary income, and indirect business taxes; and tax impacts) are presented in Tables 3 through 6. For purpose of brevity in presenting findings, the 528 industries were aggregated into 20 broad sectors using the 2 digit NAICS classification. Overall, the in-migration had a bigger impact on the output of the retail trade and services industries. As illustrated in Table 3, the total output impact on Baxter County was $3.92 million, which translates to a 0.26 percent increase over the baseline output. The impacts on the retail and service[5] industries were $1.48 and $1.63 million, respectively. In the G-S model, the total impact on output was $5.73 million, a 0.09 percent increase over the baseline output. The impacts on the retail and service industries were $2.05 and $2.43 million, respectively. The 100 elderly households added 150 percent more in total output in G-S compared to Baxter County, mainly attributable to higher retiree spending and higher multiplier values.

As illustrated in Table 4, approximately 67 new jobs were created in Baxter County, while in the G-S region 89 additional jobs were created. Examining the impacts by sector reveals that the retail industry was the major beneficiary in both study regions with 34 and 46 additional jobs in Baxter and G-S counties respectively. In the accommodation and food services sector, Baxter and G-S created approximately 7 and 8 jobs, respectively. The G-S region created more jobs due to the greater availability of retail shopping in the area and the large number of visitors to Hot Springs who bought goods and services from local retailers. The Baxter and G-S regions added approximately 24 and 31 jobs in the service industry, respectively. The presence of two major hospitals in Mountain Home in Baxter County and the high tourism activity in Hot Springs in Garland County partially accounted for the high number of service jobs created. With the average size of an elderly household at 1.7 (BLS, 2003), the in-migration of 100 elderly households (equivalent to 170 individuals) translated into approximately 0.39 and 0.52 new jobs per in-migrating elderly in Baxter and G-S counties, respectively. These estimates were slightly higher compared to an earlier study that reported 0.34 jobs per in-migrating retiree in Wisconsin (Shields et al, 2001). The difference can be attributed to the time periods used in both studies, differences in income and economic structure, and the number of retiree households considered under the hypothetical scenarios (100 for this study versus 500 for the study by Shields et al).

Table 5 gives a comparison of the value-added[6] in both of the study regions. Baxter County value-added increased by $2.7 million, a 0.33 percent increase over the baseline of $812 million. The retail and services industries' value-added increased by $1.21 and $0.93 million, respectively. Similarly, in G-S region, the total value-added was $3.61 million, an increase of 0.11 percent over the baseline, with retail and services industries accounting for $1.5 and $1.3 million, respectively.

As shown in Table 6, Baxter County had a total tax impact of $0.66 million, i.e., $3,893 tax impact per capita for the 170 new elderly. State and local government tax receipts increased by $0.32 million, i.e., $1,884 per capita. A break up of the total taxes into sales, property, and income indicate tax dollars to the tune of $0.2, $0.05 and $0.02 million, respectively. Similarly, the G-S region had a total tax impact of $0.91 million, i.e., $5,408 per capita. State and local government taxes

[5] Information, finance & insurance, real estate & rental, professional-scientific and technology services, management of companies, administrative and waste services, educational services, health and social services, arts-entertainment, recreation, accommodation and food services.

[6] Valued added includes proprietary income, labor income, other property income and indirect business taxes.

increased by $0.4 million, i.e., $2,559 per capita. The share of sales, property, and income taxes as a portion of the state/local government taxes increased by $0.25, $0.074, and $0.04 million, respectively.

Table 3. Output impacts of retiree in-migration

	Baxter		Garland-Saline		Garland		Saline		Garland + Saline		
Industry	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Difference (million $)
Ag, Forestry, Fish & Hunting	15	0.008	53	0.008	35	0.003	17.962	0.004	53	0.007	0.001
Mining	12	0.000	26	0.002	25	0.002	0.596	0.000	26	0.002	0.000
Utilities	18	0.160	82	0.247	68	0.124	13.325	0.075	82	0.199	0.048
Construction	78	0.180	527	0.265	298	0.118	228.959	0.126	527	0.244	0.021
Manufacturing	459	0.043	1,293	0.100	761	0.044	531.569	0.030	1293	0.074	0.026
Wholesale Trade	15	0.017	176	0.070	110	0.033	65.793	0.025	176	0.058	0.012
Transportation & Warehousing	31	0.052	110	0.078	55	0.033	54.469	0.027	110	0.060	0.019
Retail Trade	109	1.485	618	2.054	277	0.908	341.069	0.900	618	1.807	0.247
Information	67	0.187	144	0.243	113	0.103	31.655	0.078	144	0.182	0.062
Finance & Insurance	71	0.334	277	0.515	197	0.224	79.957	0.185	277	0.410	0.105
Real Estate & Rental	46	0.178	206	0.284	153	0.145	53.030	0.087	206	0.231	0.053
Professional- Scientific & Tech Services	36	0.051	142	0.085	84	0.033	58.201	0.029	142	0.062	0.023
Management of Companies	6	0.016	40	0.052	36	0.024	4.004	0.005	40	0.029	0.023
Administrative & Waste Services	37	0.041	146	0.073	77	0.027	68.417	0.026	146	0.053	0.020
Educational Services	2	0.003	7	0.003	4	0.002	2.469	0.001	7	0.003	0.001
Health & Social Services	237	0.288	682	0.410	541	0.175	141.199	0.077	682	0.252	0.158
Arts-Entertainment & Recreation	7	0.010	85	0.032	73	0.015	11.499	0.005	85	0.020	0.011
Accomodation & Food Services	56	0.275	312	0.401	205	0.174	106.925	0.164	312	0.337	0.064
Other Services	65	0.246	263	0.335	167	0.085	95.470	0.174	263	0.259	0.076
Government & Non-NAICs	152	0.344	858	0.470	456	0.209	402.096	0.228	858	0.437	0.033
Total	1,520	3.918	6,045	5.727	3736	2.480	2308.663	2.245	6045	4.725	1.003

Table 4. Employment impacts of retiree in-migration

	Baxter		Garland-Saline		Garland		Saline		Garland + Saline		
Industry	Baseline Emp	Added Emp	Baseline Emp	Added Emp	Baseline Emp	Added Emp	Baseline Emp	Added Emp	Baseline Emp	Added Emp	Difference
Ag, Forestry, Fish & Hunting	350	0.3	923	0.2	679	0.1	244	0.1	923	0.2	0.0
Mining	114	0	173	0	169	0.0	4	0.0	173	0.0	0.0
Utilities	61	0.9	272	1.4	225	0.7	47	0.6	272	1.3	0.1
Construction	1,037	1.6	6,421	2.1	3,725	1.0	2,696	1.0	6,421	2.0	0.1
Manufacturing	2,796	0.3	5,399	0.6	3,405	0.3	1,994	0.2	5,399	0.5	0.1
Wholesale Trade	200	0.2	1,916	0.7	1,254	0.4	662	0.3	1,916	0.7	0.0
Transportation & Warehousing	364	0.8	1,255	0.9	657	0.4	598	0.3	1,255	0.7	0.2
Retail Trade	2,530	34	13,591	46.2	5,925	19.7	7,666	26.5	13,591	46.2	0.0
Information	304	1.1	661	1.2	531	0.6	130	0.4	661	1.0	0.2
Finance & Insurance	603	2.9	2,406	4	1,724	1.9	682	1.6	2,406	3.5	0.5
Real Estate & Rental	548	2	2,258	2.8	1,633	1.6	624	1.0	2,258	2.6	0.2
Professional- Scientific & Tech Services	488	0.7	1,833	1	1,188	0.5	645	0.3	1,833	0.8	0.2
Management of Companies	51	0.1	277	0.3	225	0.1	51	0.1	277	0.2	0.1
Administrative & Waste Services	753	1.2	4,147	2.1	1,941	0.8	2,205	0.9	4,147	1.7	0.4
Educational Services	46	0.1	209	0.1	127	0.0	82	0.0	209	0.0	0.1
Health & Social Services	3,247	3.7	9,851	4.7	7,419	2.3	2,432	1.2	9,851	3.5	1.2
Arts-Entertainment & Recreation	153	0.2	2,799	0.9	2,542	0.5	256	0.1	2,799	0.6	0.3
Accomodation & Food Services	1,430	7.2	7,142	8.4	4,564	3.9	2,578	4.0	7,142	7.9	0.5
Other Services	1,358	4.5	6,155	5.4	4,392	1.9	1,763	2.6	6,155	4.5	0.9
Government & Non-NAICs	1,484	5.7	8,748	5.9	4,968	2.8	3,780	3.2	8,748	6.0	-0.1
Total	17,919	67.5	76,436	88.7	47,294	39.4	29,142	44.2	76,436	83.6	5.1

Table 5. Value-Added impacts of retiree in-migration

	Baxter		Garland-Saline		Garland		Saline		Garland + Saline		
Industry	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Baseline Output (million $)	Added Output (million $)	Difference (million $)
Ag, Forestry, Fish & Hunting	5	0.0029	24	0.0038	17	0.0031	8	0.0014	24	0.0046	-0.0008
Mining	9	0.0003	17	0.0012	17	0.0022	0	0.0000	17	0.0022	-0.0010
Utilities	11	0.1087	59	0.1830	49	0.1827	10	0.0563	59	0.2390	-0.0561
Construction	25	0.0546	193	0.0874	105	0.0753	88	0.0431	193	0.1184	-0.0310
Manufacturing	184	0.0154	311	0.0264	179	0.0224	133	0.0085	311	0.0308	-0.0044
Wholesale Trade	11	0.0139	134	0.0530	84	0.0498	50	0.0189	134	0.0687	-0.0157
Transportation & Warehousing	17	0.0362	57	0.0477	33	0.0418	24	0.0147	57	0.0565	-0.0088
Retail Trade	83	1.2185	473	1.5036	212	1.3304	261	0.6608	473	1.9912	-0.4876
Information	34	0.0845	67	0.1027	51	0.0875	16	0.0315	67	0.1190	-0.0163
Finance & Insurance	40	0.2047	152	0.2695	106	0.2418	46	0.1013	152	0.3432	-0.0737
Real Estate & Rental	31	0.1340	140	0.1944	104	0.1982	36	0.0596	140	0.2578	-0.0634
Professional- Scientific & Tech Services	20	0.0311	81	0.0463	46	0.0354	35	0.0161	81	0.0515	-0.0052
Management of Companies	3	0.0100	23	0.0298	22	0.0286	1	0.0016	23	0.0302	-0.0004
Administrative & Waste Services	17	0.0239	75	0.0405	40	0.0309	35	0.0144	75	0.0453	-0.0048
Educational Services	0	0.0007	2	0.0009	1	0.0010	0	0.0002	2	0.0012	-0.0003
Health & Social Services	140	0.2164	407	0.2693	321	0.2290	87	0.0510	407	0.2800	-0.0107
Arts-Entertainment & Recreation	4	0.0061	58	0.0209	51	0.0198	7	0.0030	58	0.0229	-0.0020
Accomodation & Food Services	24	0.1374	149	0.1971	102	0.1727	48	0.0746	149	0.2474	-0.0503
Other Services	27	0.0834	123	0.1312	79	0.0732	44	0.0664	123	0.1397	-0.0085
Government & Non-NAICs	125	0.3190	714	0.4042	388	0.3650	326	0.1968	714	0.5618	-0.1576
Total	812	2.7017	3,259	3.6128	2,005	3.1910	1,254	1.4203	3,259	4.6113	-0.9985

Table 6. Tax impacts of retiree in-migration

Government	Type of Tax	Baxter ($)	Garland Saline ($)	Garland ($)	Saline ($)	Garland + Saline ($)
Federal	Corporate Profits Tax	27,897	45,163	19,859	20,441	40,300
Government	Indirect Bus Tax: Custom Duty	5,145	7,190	3,997	2,846	6,843
Non-Defense	Indirect Bus Tax: Excise Taxes	16,420	22,946	12,757	9,084	21,841
	Indirect Bus Tax: Fed NonTaxes	5,578	7,794	4,333	3,086	7,419
	Personal Tax: Income Tax	94,727	159,000	70,145	74,600	144,745
	Personal Tax: NonTaxes (Fines- Fees	0	0	0	0	0
	Social Ins Tax- Employee Contribution	99,730	127,473	62,310	54,798	117,108
	Social Ins Tax- Employer Contribution	92,122	114,718	59,381	45,760	105,141
	Sub-total	341,618	484,284	232,783	210,615	443,398
State Local	Corporate Profits Tax	4,147	6,713	2,952	3,038	5,990
Government	Dividends	11,761	19,040	8,372	8,618	16,990
Non-Education	Indirect Bus Tax: Motor Vehicle Licence	2,651	3,473	1,711	1,583	3,294
	Indirect Bus Tax: Other Taxes	6,509	8,526	4,201	3,886	8,087
	Indirect Bus Tax: Property Tax	56,813	74,419	36,664	33,917	70,581
	Indirect Bus Tax: S/L NonTaxes	9,845	12,896	6,353	5,877	12,230
	Indirect Bus Tax: Sales Tax	194,063	254,202	125,237	115,854	241,091
	Indirect Bus Tax: Severance Tax	861	1,128	556	514	1,070
	Personal Tax: Income Tax	26,778	43,647	19,236	20,470	39,706
	Personal Tax: Motor Vehicle License	1,778	2,582	1,194	1,157	2,351
	Personal Tax: NonTaxes (Fines- Fees	1,363	1,993	914	899	1,813
	Personal Tax: Other Tax (Fish/Hunt)	1,134	1,802	819	823	1,642
	Personal Tax: Property Taxes	468	622	293	275	568
	Social Ins Tax- Employee Contribution	495	961	400	514	914
	Social Ins Tax- Employer Contribution	1,606	3,117	1,296	1,669	2,965
	Sub-total	320,274	435,122	210,197	199,094	409,291
	Total	661,892	919,406	442,979	409,708	852,687

5.1 Aggregated versus disaggregated model

Under the second scenario for Garland and Saline there were two independent models with each examining the impacts of 50 retiree households in-migrating to their communities. As a result of the in-migration of 50 retiree households to Garland County, output was added to the tune of $2.5 million, with retail trade accounting for $0.9 million, and the service industry $0.9 million (Table 3). In Saline County, output increased by $2.2 million, and retail trade and services output increased by $0.9 and $0.6 million, respectively. It was observed that the output increased by an additional $1 million in the aggregated model, primarily due to the higher RPC and multiplier values in the G-S model. Under the disaggregated models, Garland and Saline added approximately 39 and 44 new jobs, respectively. The aggregated model created an additional 5 jobs compared to the two disaggregated models combined. Under the disaggregated models, Garland and Saline's value-added increased to the tune of $3.19 and $1.42 million, respectively (Table 5). Due to aggregation, value-added was lower by about $1 million. Under the disaggregated models, Garland and Saline generated federal and state/local taxes to the tune of $ 0.44 and $0.40 million, which combined was $66,719 less than in the aggregated model (Table 6).

5.2 Multiplier comparison

A comparison of the Type II output multiplier, presented in Table 7, sheds light on the differences in economic impacts between the two study regions

Table 7. Output multiplier comparison

Sector #	Industry	Baxter	G-S	Garland	Saline
30	Power Generation and Supply	1.21	1.27	1.28	1.21
31	Natural Gas Distribution	1.12	0.00	0.00	0.00
32	Water and Sewage	1.40	1.47	1.49	1.34
42	Maintenance/Repair of Farm and Nonfarm Residences	1.31	1.51	1.51	1.34
398	Postal Service	1.59	1.69	1.71	1.51
401	Motor Vehicle and Parts Dealers	1.43	1.51	1.54	1.34
402	Furniture and Home Furnishings Stores	1.41	1.49	1.52	1.32
403	Electronics and Appliance Stores	1.44	1.52	1.55	1.35
405	Food and Beverage Stores	1.44	1.53	1.57	1.35
406	Health, Personal Care Stores	1.43	1.51	1.55	1.34
408	Clothing/Accessories Stores	1.41	1.50	1.54	1.33
411	Miscellaneous Store Retailers	1.48	1.57	1.61	1.38
418	Motion Picture and Video Industries	1.64	1.61	1.61	1.52
422	Telecommunications	1.41	1.47	1.49	1.30
427	Insurance Carriers	1.53	1.59	1.61	1.46
428	Insurance Agencies, and Brokerages	1.31	1.34	1.35	1.24
430	Monetary Authorities	1.32	1.37	1.39	1.25
431	Real Estate	1.28	1.35	1.37	1.25
465	Physicians and Dentists	1.53	1.60	1.63	1.42
479	Hotels and Motels	1.41	1.51	1.53	1.33
481	Food Services and drinking places	1.37	1.48	1.50	1.35
483	Automotive Repair/Maintenance	1.45	1.58	1.68	1.35
492	Grantmaking/Giving and Social Advocacy Organizations	1.52	1.66	1.68	1.47
503	State & Local Education	1.56	1.63	1.66	1.43
	Average	1.42	1.45	1.47	1.30

under both the scenarios evaluated. The average Type II output multipliers for the 25 aggregated sectors are 1.42, 1.45, 1.47, and 1.30 in Baxter, G-S, Garland, and Saline counties, respectively. For example, in the vehicle purchase sector that had the highest proportion of elderly household expenditure, the multiplier values were 1.42, 1.50, 1.54, and 1.33 in Baxter, G-S, Garland, and Saline counties, respectively. The main reason behind the differences is that in Saline County a large number of vehicle purchases are made in Pulaski County, of which Little Rock is a part, which offers many more options for an automobile buyer. This is not the case with Garland County, where there is a large number of automobile dealerships and, therefore, most of the purchases are made locally. Further, in Baxter County the RPC is lower owing to its geographical location, it being nested within rural counties with a relatively lower number of auto dealerships. Similarly, for miscellaneous retail, which accounts for about 10 percent of expenditure, the multiplier values are 1.47, 1.57, 1.61, and 1.37 for Baxter, G-S, Garland and Saline counties, respectively. Including the two sectors discussed, in almost all of the high spending sectors multiplier values follow this trend. These differences in multipliers explain the variation in economic impacts between Baxter and G-S and between Garland, Saline, and G-S, not just due to the level of spending but also due to the magnitude of the multipliers impacting the indirect and induced effects. Although the magnitude of difference between the average multiplier values seems marginal, when the effects are measured in million of dollars, they represent significant differences.

The employment multiplier also revealed similar differences between the four regions that are presented in Table 8. The average employment multipliers for the twenty-five sectors were 1.51, 1.53, 1.54, and 1.38 in Baxter, G-S, Garland, and Saline, respectively. In four of the six sectors (property taxes, cash contributions, health insurance, food at home, miscellaneous retail, and vehicle purchases) that accounted for at least 5 percent of total retiree expenditure, Garland had the highest employment multiplier values. In the other two sectors, G-S had the highest value. For example, in the vehicle purchase sector that accounted for 11 percent of total expenditure, the employment multiplier was 1.65, compared to 1.37 in Baxter, i.e., 21 percent higher employment generation in Garland relative to Baxter due to indirect and induced effects.

Compared to output and employment multipliers, the difference between the average value-added multipliers in the 25 sectors in Baxter and G-S counties was marginal. As illustrated in Table 9, in the high spending sectors discussed in the earlier paragraph, G-S multiplier values were greater by 20-25 percent relative to Baxter. The difference between Garland and Saline were however much more stark. The average values in Garland and Saline were 1.68 and 1.34, i.e., Garland County's total value-added impact was approximately 25 percent higher than Saline. For example, in the motor vehicle and parts dealers sector, Garland had a multiplier value of 1.42, compared to 1.26 in Saline. This was mainly due to more residents of Saline County making purchases from either Pulaski or Garland, both neighboring counties with more retail auto dealerships and parts stores. Ironically, however, a comparison of economic indicators suggests that Saline is the most economically prosperous county among the three with a median household income of $46,500 in 2004, followed by Garland and Baxter with $32,687 and $31,300, respectively. The total accommodation and food service sales (a sector that has a high proportion of expenditure within the retiree group and indicative of the economic profiles of its residents) in Saline however was $54 million, compared to $158 million in Garland and $38 million in Baxter County in 2002. Total retail sales in Baxter, Garland, and Saline counties in 2002 were $369, $1,107, and $973 million, respectively. Per capita retail sales in 2002 were $9,522, $12,301, and $11,292 for the three counties in the same order. One plausible economic explanation for such a contrasting scenario stems from the geographical location of Saline County, which is located between Garland to the southwest and Pulaski to the northeast. It is a part of the Little Rock Metropolitan Statistical Area that comprises six counties (Pulaski, Saline, Faulkner, Lonoke, Perry, and Grant) and has a population of 0.66 million. The three major cities of the MSA are Little Rock, North Little Rock, and Conway. A sizable number of middle class families working in Little Rock prefer to live in Saline County due to low crime rates and better living conditions including less congestion, lower population density, and better school systems. However, Pulaski and Garland offer more variety in terms of entertainment and retail shopping experience. Saline operates as a bedroom county, resulting in leakages in retail and service sector expenditures. This is reflected in relatively low RPCs in Saline County, which translate into lower multiplier values as well. Thus, while Saline County has higher-income residents, the county does not benefit as much due to the spillover of its residents' expenditures to neighboring counties. Thus, the inflow of retirees does not translate into similar impacts in Garland and Saline counties.

Beginning in the 1970s, when the Supreme Court mandated the integration of schools, many students in the Little Rock MSA, as in other parts of the nation,

began travelling long distances by bus, which resulted in a number of middle income families eventually relocating to the school districts to reduce the burden of long travel for their children. A lot of families started living in neighboring counties and worked in Little Rock, and thus began the trend of commuting long distances to work and shop, and for entertainment and a host of other service activities. While the per capita incomes in Saline and other neighboring counties increased, that did not translate into significant employment benefits to the local county economy due to the leakages in spending mostly in the retail and service industries. Pulaski and Garland counties offered more options for residents of the MSA to spend on various activities and benefitted from leakages from other surrounding counties. A study undertaken to make an assessment of people travelling to Little Rock reveals that there were about 22,000 commuters between Little Rock and various towns and small cities in Saline county in 2000, up from about 16,000 in 1990 (Metrotrends, 2003). This means about 25 percent of the Saline county population commutes to Little Rock and is indicative of the type of retail- and service-related expenses that are lost as a result of leakage.

Table 8. Employment multiplier comparison

Sector #	Industry	Baxter	G-S	Garland	Saline
30	Power Generation and Supply	1.86	2.18	2.20	1.91
31	Natural Gas Distribution	1.83	0.00	0.00	0.00
32	Water and Sewage	1.35	1.43	1.44	1.34
42	Maintenance/Repair of Farm and Nonfarm Residences	1.53	1.88	1.84	1.64
398	Postal Service	1.63	1.79	1.80	1.59
401	Motor Vehicle and Parts Dealers	1.37	1.66	1.57	1.49
402	Furniture and Home Furnishings Stores	1.32	1.40	1.40	1.28
403	Electronics and Appliance Stores	1.26	1.31	1.33	1.21
405	Food and Beverage Stores	1.26	1.35	1.36	1.23
406	Health, Personal Care Stores	1.48	1.34	1.48	1.18
408	Clothing/Accessories Stores	1.23	1.24	1.26	1.16
411	Miscellaneous Store Retailers	1.19	1.16	1.23	1.09
418	Motion Picture and Video Industries	1.81	1.86	1.85	1.72
422	Telecommunications	2.38	2.53	2.44	2.44
427	Insurance Carriers	2.15	2.20	2.32	1.82
428	Insurance Agencies, and Brokerages	1.28	1.31	1.29	1.26
430	Monetary Authorities	1.70	1.84	1.94	1.52
431	Real Estate	1.36	1.44	1.47	1.31
465	Physicians and Dentists	1.79	1.79	1.84	1.48
479	Hotels and Motels	1.21	1.31	1.34	1.16
481	Food Services and drinking places	1.20	1.27	1.28	1.19
483	Automotive Repair/Maintenance	1.30	1.44	1.46	1.31
492	Grantmaking/Giving and Social Advocacy Organizations	1.55	1.80	1.62	1.63
503	State & Local Education	1.28	1.37	1.37	1.26
	Average	1.51	1.54	1.55	1.38

Table 9. Value-added multiplier comparison

Sector #	Industry	Baxter	G-S	Garland	Saline
30	Power Generation and Supply	1.18	1.21	1.22	1.16
31	Natural Gas Distribution	1.31	0.00	0.00	0.00
32	Water and Sewage	1.30	1.35	1.37	1.25
42	Maintenance/Repair of Farm and Nonfarm Residences	1.64	1.86	1.91	1.57
398	Postal Service	1.50	1.57	1.59	1.42
401	Motor Vehicle and Parts Dealers	1.33	1.39	1.42	1.26
402	Stores	1.32	1.39	1.42	1.26
403	Electronics and Appliance Stores	1.33	1.39	1.42	1.26
405	Food and Beverage Stores	1.39	1.47	1.51	1.31
406	Health, Personal Care Stores	1.35	1.43	1.47	1.28
408	Clothing/Accessories Stores	1.35	1.43	1.47	1.28
411	Miscellaneous Store Retailers	1.41	1.49	1.53	1.32
418	Industries	2.32	2.25	2.36	1.90
422	Telecommunications	1.42	1.49	1.51	1.31
427	Insurance Carriers	2.32	2.54	2.47	2.58
428	Brokerages	1.20	1.22	1.24	1.16
430	Monetary Authorities	1.27	1.31	1.33	1.21
431	Real Estate	1.23	1.30	1.32	1.21
465	Physicians and Dentists	1.41	1.47	1.50	1.34
479	Hotels and Motels	1.33	1.41	1.44	1.27
481	Food Services and drinking places	1.53	1.61	1.64	1.45
483	Automotive Repair/Maintenance	1.54	1.65	1.74	1.41
492	Advocacy Organizations	2.59	2.28	6.15	1.87
503	State & Local Education	1.34	1.39	1.41	1.27
	Average	1.50	1.50	1.68	1.35

A comparison of the RPC of Baxter and G-S in Table 2 reveals that the average RPC for the 25 sectors in both the regions are 0.65 and 0.68, respectively. This indicates that, relative to Baxter County, more of the products and services are produced and supplied using local inputs in the G-S region rather than being imported. Part of the reason for the higher RPCs in the G-S region is their proximity to the largest urban and industrial conglomeration in the state, resulting in many services and products being offered locally. However, for reasons described earlier, overall Saline County loses some of its retail and service expenditures to Pulaski due to the mobility of large number of its residents, including a lot of elderly for leisure and shopping on a frequent basis. As a result, the RPC of G-S is lower compared to Garland. In the case of Baxter County, due its geographic location in the midst of rural counties, the RPCs are lower and, hence, the multiplier values are lower as well. For example, food at home purchases have a RPC of 0.76 in Garland and 0.67 in Baxter, but only 0.43 in Saline, and thus the multipliers in those sectors follow a similar pattern as well. Aggregating Garland and Saline into one region reduced the RPC values consistently across all sectors. But due to the aggregated RPC being a weighted average, the G-S value does not decline significantly from that of Garland County's average RPC.

6. Discussion and conclusion

The findings suggest that 100 elderly households will have a greater impact on output, employment, value-added, and tax impacts in G-S than in Baxter County, which is in sync with the hypotheses of the study. Further, aggregating study regions impacts RPCs and hence multipliers, which leads to differences in results relative to standalone independent models for individual regions. While the higher household incomes in G-S, about 20 percent higher than Baxter (Census Bureau, 2007) are a major factor for the

differences in economic impacts, the RPCs and multiplier values are also relatively higher in most sectors in G-S owing to the more diversified economic structure in the region. The average output, employment, and value-added multiplier values in all major sectors are about 25 percent higher in the G-S region (IMPLAN, 2003) which translates into a 25 percent greater impact on output, income and employment in G-S compared to Baxter. Although individuals in Saline, including retirees, are the most economically prosperous among the three chosen counties, this does not translate into greater local impacts, primarily due to the expenditure leakages into neighboring Pulaski and Garland counties.

It was observed that multipliers vary not just across regions, but also between different industry sectors. For example, multipliers (output and employment) for service sectors are usually higher than for manufacturing sectors. This is caused by the fact that service sectors are more labor intensive than manufacturing sectors. More workers are required to deliver a fixed amount of sales in service sectors compared to manufacturing sectors, where a majority of the direct cost goes to purchases of raw materials and equipment. As a result, more income will result from sales in service sectors. The higher worker income is in a region, the more purchases employees will make in the local region. And these local purchases will result in more money being re-circulated in the region, higher induced effects, and higher multipliers. Further, population and population density explain more than 75 percent of the variation in multipliers for sales, income, and value-added. Multipliers tend to increase with population (except for job multipliers, which are negatively correlated with population) in a nonlinear relation (Chang, 2001).

It has been observed that retirees tend to relocate to places they have previously visited (Haas and Serow, 1993). Therefore, counties willing to adopt a retiree development strategy need to initiate efforts by promoting tourism. The investments made toward tourism development can be sustainable in the long-run if elderly tourists decide to retire in those areas. Investments made on building and developing new and existing tourism infrastructure and nurturing retirees can have long-term economic benefits. Further, retiree spending is shown to be less affected by economic downturns than other spending groups. It was observed that aggregation contributes to variation in economic impacts depending on the economic structure of the regions being aggregated. It is helpful to look at smaller regions rather than aggregate a large number of areas into one big region i.e. the strength and weaknesses of the individual smaller economic units can be better analyzed and understood. Finally, higher per capita income in a region does not always translate into greater economic activity if the region has fewer opportunities for residents to purchase goods and services in the local economy. Local economies affected by such a problem therefore need to assess the amount of leakage from their areas and consider long-term planning to minimize it.

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