A Spatial Analysis of Income Inequality in Arkansas at the County Level: Evidence from Tax and Commuting Data

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In this paper, the authors examine income inequality at the county level in the state of Arkansas using data from individual tax returns. They find that the spatial pattern of inequality is positively correlated with economic growth. Therefore, the inverted-U hypothesis as it applies to regional income inequality is confirmed through cross-sectional analysis. This pattern can also be explained by many differences between metropolitan statistical areas (MSAs) and non-MSAs and cross-county commuting patterns. The important metropolitan area status–related variables include educational attainment, industrial composition, demographic distribution, and job-market condition. In an ordinary least-squares (OLS) model, these explanatory variables can explain most variations in the inequality. Commuting patterns also play an important role in explaining the inequality between job centers and fringe counties and between urban fringe and rural areas. The benefit of access to job centers is more significant in the MSAs than the micropolitan areas because of the quality and quantity of jobs available to commuters.

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Since the 1990s or earlier, the debate over the relationship between income inequality and economic growth has intensified among economists. Traditional research on the topic has delivered a consistent message that the existence of inequality is detrimental to long-run economic growth. For instance, Alesina and Rodrik (1994) explain that when there is sizable inequality in a geographic area, the median voters will be poor. As a result, the political pressure from voters can direct government spending toward income redistribution and thus hurt investment and long-run economic growth. More recently, however, some studies have challenged this conventional wisdom. For instance, Forbes (2000) suggests that, in the short and medium term, an increase in a country's level of income inequality has a significant positive relationship with subsequent economic growth. Regardless of these disagreements, income inequality does have a relationship with economic growth that is coincidental, if not causal. Thus, more attention should be paid to this issue in policy implementation at the regional level, where economic development appears to be the most dominant objective.

The study of regional income inequality in the United States has thus far remained at the state level. Data are limited when analysis expands to a more detailed level. Williamson (1965) shows that regional inequality at the state level also follows the inverted-U curve found in the international pattern, increasing in early stages of economic development and decreasing in later

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stages. Fan and Casetti (1994) further find that regional inequality has also been changing over time—the changes being associated with economic growth, sectoral shifts, and global spatial restructuring. The exceptions are four states in the South: South Carolina, Alabama, Mississippi, and Arkansas have remained, since the 1960s, in the high-inequality category, regardless of the emergence of the Manufacturing Belt in the 1960s, services sectors in the 1980s, and global competition in the late 1980s and 1990s.

This study examines the inequality patterns within the state of Arkansas, a state with one of the highest inequality rates since the 1960s. Most of the regional inequality literature thus far has focused on inequality across states, using U.S. census data on income at the county level. Inequality at the state level is usually measured by percentile ratio (e.g., Wheeler, 2004), Gini coefficient (e.g., Forbes, 2000), or Theil's T (e.g., Janikas and Rey, 2004). Amos (1988) has shown that the relationship between inequality and other factors (such as growth) at the state level is different from that at the county level. Moreover, a spatial analysis of income inequality within a state has far more interesting implications to the development of public policy and economic growth. Unfortunately, none of these inequality measures are readily available at the county level.

Using data from individual tax returns, the authors were able to construct an alternative measure of income inequality at the county level: the ratio of households in the top 25 percent of tax brackets to those in the bottom 25 percent of tax brackets. The analysis makes use of annual state tax filing data provided by the Arkansas Department of Finance and Administration. This data set was chosen for the current study and follow-up investigation because of its time-series availability and robust coverage of household information at the county level. Although decennial U.S. Census information is widely used in inequality studies, it was not used in this analysis. Instead, we have observed considerable fluctuation in the time-series information and change in income inequality. Our analysis here focuses on cross-sectional county patterns and factor relationships in the 2003 data. Table 1 includes the number of Arkansas tax returns (households) filed in each tax bracket (net taxable income). There are a total of 65 reported tax brackets, ranging from "under zero" to "$500,000 & over." The bottom 25 percent of tax brackets includes those households with net taxable income "under zero" through the "$15,000 to $15,999" bracket (or less than $16,000). The top 25 percent of brackets includes those households with net taxable income that is more than $49,000. To be sure, measurement errors are possible; current tax shelter programs could distort the relationship between a household's designated tax bracket and its actual income level. However, an assumption can be made behind the measurement: When filing a tax return, a rich household can downgrade itself by a few tax classes using some shelter provisions; however, it is unlikely to fall into the classification of a "poor household," because of alternative minimum tax (AMT) provisions and the limited nature of state tax exemptions. Therefore, the numbers of households in top 25 percent and bottom 25 percent of tax brackets provide relatively valid measures of the numbers of rich and poor households. A percentile analysis of the number of tax returns in each tax bracket is less effective than one based on income levels, such as that used in Wheeler (2004).

With more rich people and fewer poor people, the income gap narrows; with fewer rich people and more poor people, the income gap widens. Across counties, the higher ratio of rich people to poor indicates a higher income level and a higher level of inequality, and vice versa. Figure 1 plots the spatial distribution of income inequality of the 75 counties in Arkansas in 2003, which is the dependent variable we used in various models. There are six counties whose ratio is higher than 1.0: Benton in the northwest and Saline, Faulkner, Lonoke, Pulaski, and Grant in the central region. Other counties with relatively high inequality include Washington in the northwest, Ashley and Cleveland in the southeast, and Craighead in the northeast. Counties in the north and the west generally have low income inequality as well as a low income level.

Other data used in the study are obtained from the U.S. Census 2000. All the abbreviations

Table 1

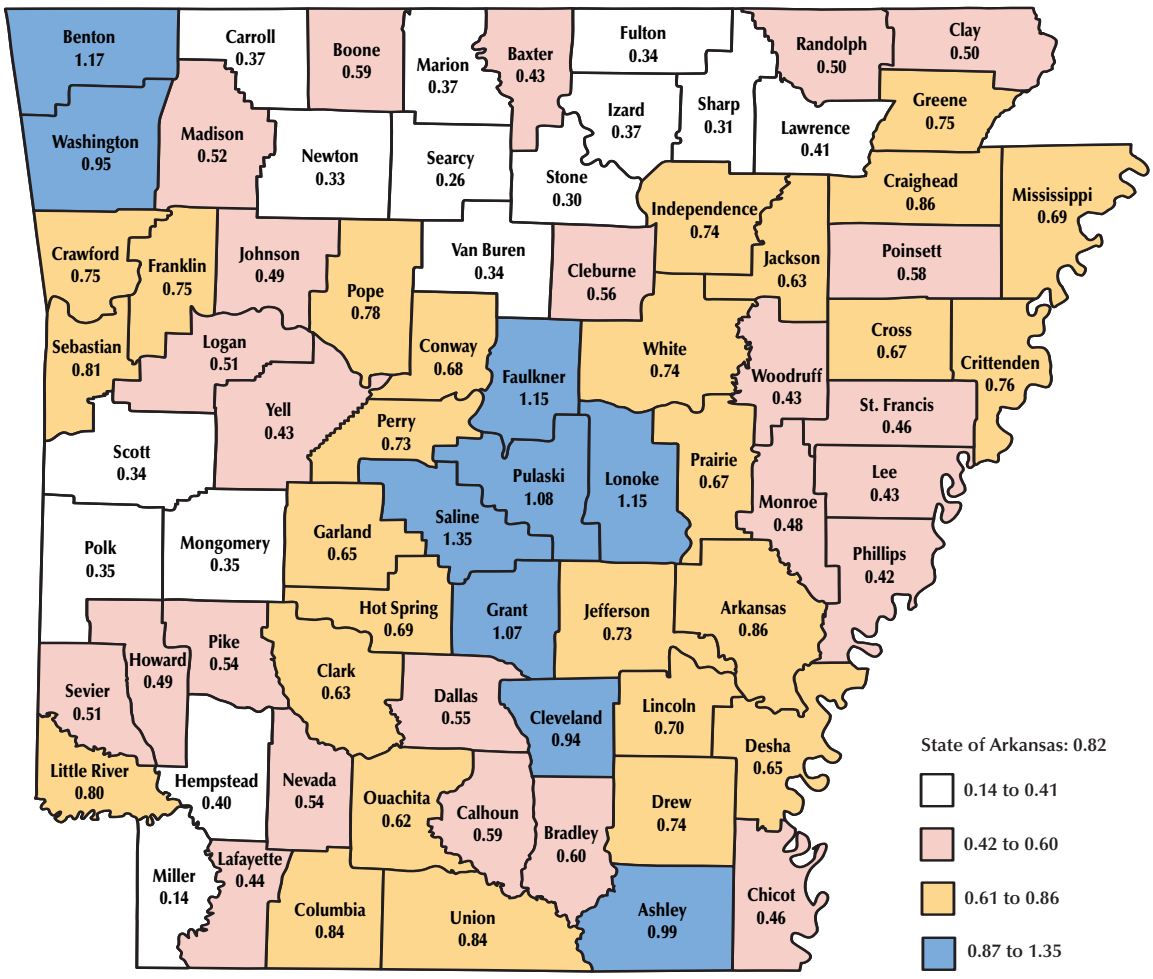
Arkansas Tax Data in 2003: State Total

Net taxable income ($)	Number of returns (household)
Bottom 25% of the tax brackets	
Under zero	1,678
0 TO 999	8,896
1,000 TO 1,999	5,202
2,000 TO 2,999	5,451
3,000 TO 3,999	5,905
4,000 TO 4,999	5,890
5,000 TO 5,999	6,084
6,000 TO 6,999	6,403
7,000 TO 7,999	9,039
8,000 TO 8,999	18,254
9,000 TO 9,999	21,979
10,000 TO 10,999	23,894
11,000 TO 11,999	18,320
12,000 TO 12,999	22,865
13,000 TO 13,999	24,072
14,000 TO 14,999	28,801
15,000 TO 15,999	31,222
16,000 TO 16,999	24,412
17,000 TO 17,999	21,126
18,000 TO 18,999	20,411
19,000 TO 19,999	19,755
20,000 TO 20,999	18,948
21,000 TO 21,999	17,962
22,000 TO 22,999	17,118
23,000 TO 23,999	16,476
24,000 TO 24,999	16,280
25,000 TO 25,999	15,206
26,000 TO 26,999	14,895
27,000 TO 27,999	14,049
28,000 TO 28,999	13,376
29,000 TO 29,999	12,862
30,000 TO 30,999	12,223
31,000 TO 31,999	11,722
32,000 TO 32,999	11,241
33,000 TO 33,999	10,502
34,000 TO 34,999	10,271
35,000 TO 35,999	10,108
36,000 TO 36,999	9,589
37,000 TO 37,999	9,260
38,000 TO 38,999	8,945
39,000 TO 39,999	8,498
40,000 TO 40,999	8,468
41,000 TO 41,999	7,967
42,000 TO 42,999	7,662
43,000 TO 43,999	7,658
44,000 TO 44,999	7,167
45,000 TO 45,999	7,078
46,000 TO 46,999	6,760
47,000 TO 47,999	6,693
48,000 TO 48,999	6,412
Top 25% of the tax brackets	
49,000 TO 49,999	6,420
50,000 TO 54,999	28,026
55,000 TO 59,999	24,262
60,000 TO 64,999	20,002
65,000 TO 69,999	16,364
70,000 TO 74,999	13,630
75,000 TO 79,999	11,132
80,000 TO 84,999	9,231
85,000 TO 89,999	7,473
90,000 TO 94,999	6,064
95,000 TO 99,999	5,078
100,000 TO 149,999	23,785
150,000 TO 199,999	7,890
200,000 TO 249,999	3,929
250,000 TO 499,999	6,475
500,000 & Over	4,640

SOURCE: Arkansas Department of Finance and Administration, 2004.

Figure 1

Ratio of Households in the Top 25 Percent to the Bottom 25 Percent of Tax Brackets, 2003



SOURCE: Arkansas Department of Finance and Administration, 2004.

are explained in Table 2. In the remainder of this paper, the inequality differentials across counties are explained. The second section tests the hypothesis of regional convergence in Arkansas by analyzing the correlation between the inequality ratio and economic growth. The third section explains the income differential associated with the metropolitan statistical area (MSA) status. The explanatory power of MSA/non-MSA differences is also correlated with educational attainment, job-market condition, and industrial composition. The forth section explores the supplemental contribution of commuting patterns to the inequality distribution. The last section provides a conclusion and summary of the need for further research.

ECONOMIC GROWTH

Following Kuznet (1955), the literature implicitly assumes that income inequality is a consequence of economic growth, as implied by the inverted-U hypothesis. There is disagreement, though, about whether this relationship is positive

Table 2

Data Description

Variable	Description
Inequality	Ratio of households in the top 25% to the bottom 25% of the tax brackets, 2003
Growth	Annualized growth rate of total nonfarm personal income, 1993-2003
Income	Median household Income
Job	Job-market condition measured by employment/population
Education	Percentage of the population with a Bachelor's degree or higher
WorkingAge	Percentage of the population that is 25 to 44 years old
Industry	Share of finance, insurance, and real estate (FIRE) and other knowledge-based industries
MSA dummy	1 if MSA, 0 otherwise

SOURCE: The inequality measure is constructed from tax data provided by the Arkansas Department Finance and Administration; all the other variables are calculated from U.S. Census 2000.

or negative. If there is a negative relationship between the two, inequality could eventually be minimized by economic development efforts, as claimed by the conventional wisdom. If it is positive, the widening income gap might suggest the potential for subsequent economic growth, as implied by "Dr. Inequality" (Forbes, 2000).

Our model specification is consistent with the inequality literature. However, unlike the growth model in the literature, our model is designed to explain the spatial distribution of income inequality. Therefore, the dependent variable is inequality and growth becomes the regressor:

$$(1) \qquad Inequality_i = C + \beta_1 Growth_i + u_i,$$

where *i* represents each county, *Inequality* is measured by the ratio of households in the top 25 percent to the bottom 25 percent of tax brackets in 2003, *C* represents the constant term, *Growth* is the annualized growth rate of total nonfarm personal income from 1993 to 2003, and *u* is the error term. Because the inequality measure is constructed only for the year 2003, the analysis in this paper is cross-sectional. The OLS results are reported in Table 3, where both coefficients are statistically significant. Those results show that inequality has a positive relationship with economic growth. A 5.32 increase in the inequality ratio corresponds to a 100 percent increase in the economic growth rate. Therefore, counties with higher economic growth rates, such as those in central and northwest Arkansas, tend to have higher income inequality; whereas counties with lower growth rates, such as Baxter and Izard in the north and Dallas and Bradley in the south, tend to have lower income inequality.

Table 3

Income Inequality and Economic Growth

Dependent variable: *Inequality*

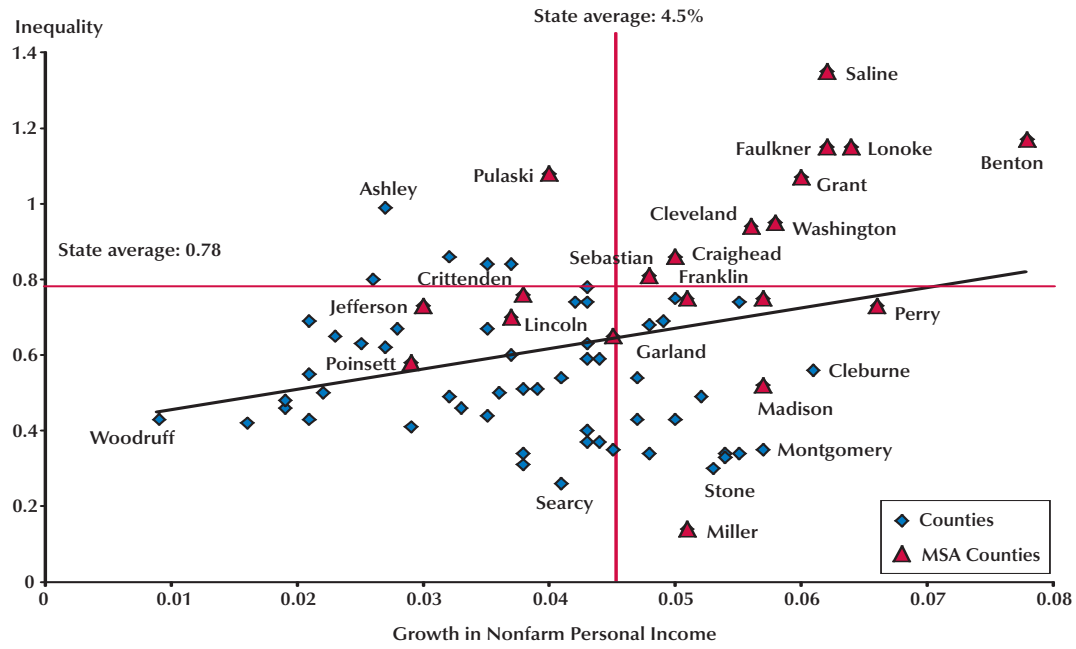
Variable	Coefficient	*t*-statistic
Constant	0.40	4.55
Growth	5.32	2.66
Adjusted R^2	0.08	

NOTE: All variables are statistically significant at the 5 percent level.

To further identify the performance of each county, Figure 2 plots the scatter diagram of the inequality ratios and economic growth rates of the 75 counties and the state averages. From 1993 to 2003, the state of Arkansas had an average growth rate for nonfarm income of 4.5 percent and an average inequality ratio of 0.78. Counties located in the northeast and southwest corners of the diagram display a positive relationship

Figure 2

Scatter Diagram of Inequality and Economic Growth



SOURCE: U.S. Bureau of the Census, U.S. Census 2000.

between inequality and growth (i.e., either high inequality and high growth or low inequality and low growth). There are nine counties that have both a higher inequality ratio and higher economic growth rate than the state averages: Benton, Saline, Lonoke, Faulkner, Grant, Cleveland, Washington, Sebastian, and Craighead. All of these are located in MSAs, where inequality generally accompanies rapid economic growth or significant gains from commuting. Among the counties located on the other end of the trend line, such as Woodruff and Searcy counties, low inequality is accompanied by lower economic growth.

Some counties also show a negative relationship between inequality and economic growth. (See the northwest and southeast corners of Figure 2.) Both Pulaski and Ashley counties have relatively high inequality (as shown in Figure 1), but they have a lower growth rate compared with other high-inequality counties. Pulaski County, where Little Rock is located, is the largest job center in the state. Ashley is home to many highly paid paper mill workers. Miller County, which is part of a border MSA (Texarkana) with Texas, has the lowest inequality ratio. Evidence of significant cross-border migration in Texarkana is associated with divergent tax treatment on income and usury lending effects on the Arkansas side of the border. Counties with higher inequality are most often located in MSAs, whereas those with relatively low inequality are most often located in non-MSAs. We therefore consider the MSA-related variables in the next section.

MSA OR NON-MSA?

Following the literature, an analysis of regional characteristics in the previous section has led us to describe inequality essentially as an outcome of growth processes. But inequality also has something to do with the strategic status of the region and its socioeconomic characteristics.

Fan and Casetti (1994) explain regional income inequality in the context of three phases of regional growth and industrial composition. Phase 1 involves initial advantages and agglomeration of activities associated with a "leading sector" and results in the formation of a core region of a state that is separate and distinct from peripheral areas. The formation of the state's core is accelerated by the movement of labor and capital from the periphery. A typical example in the United States was the emergence, consolidation, and widening of the Manufacturing Belt in the Northeastern and Midwestern states. Phase 2 is characterized by slower growth, stagnation, and the decline of areas within the main core and new growth in the former periphery. Phase 3 is driven by the spatial restructuring influenced by sectoral shifts and global competition.

Their theory was largely designed to assess inequality between states or nations, but a similar concept applies to inequality at the county level. Arkansas, as part of the national periphery, did not benefit to the same degree as other states did from the emergence of the Manufacturing Belt. Instead, Arkansas supplied labor to industrial states as part of its shift from an agriculture-based economy. However, as part of the polarization reversal in the 1960s and early 1970s, firms favored expansion into new locations in the periphery for their advantages such as a lower rate of unionization, lower labor and land costs, and an attractive climate. A good example of such growth and agglomeration is the emergence of the new MSA in northwest Arkansas, where Wal-Mart, Tyson Foods, and many trucking companies are based. Within the state, the difference between MSA and non-MSA, or urban and rural, is analogous to the core and periphery case, where MSAs attract most industries and jobs and thus have higher income inequality. Figure 3 maps the current metropolitan, micropolitan, and combined statistical areas in Arkansas. About 57 percent of the population resides in 20 counties of seven MSAs. For MSAs, the ratio of households in the top 25 percent to households in the bottom 25 percent of tax brackets is 0.93, whereas the ratio for non-MSAs and the state average are 0.58 and 0.78, respectively. The income inequality in MSAs is 60 percent higher than that in non-MSAs.

The above result is consistent with relationships Wheeler (2004) observed for seven states in the Federal Reserve's Eighth District. The difference between MSAs and non-MSAs also includes a wage premium in urban areas in general and a wage premium for highly educated individuals. This characteristic is evidence of the skill-biased technological changes that have taken place nationally. As with the well-known "New England Turnaround," the MSAs in Arkansas attract most capital flows and jobs, mainly due to the following: well-established infrastructure; emergence of knowledge-intensive industries; and availability of education, training, major health care systems, and centralized services. As shown in Table 4, which reflects data from the U.S. Census 2000, MSAs generally contain a higher percentage of well-educated individuals in the 25-to-44 age range and provide more job opportunities (employment/population). In MSAs, economic growth is faster and absolute income is higher than in non-MSAs. MSAs are both job centers and population centers for their regions. Not only are most people employed by businesses in these areas, but also jobs are concentrated in the faster-growing industries such as finance, insurance, and real estate (FIRE) and other professional scientific and business services.

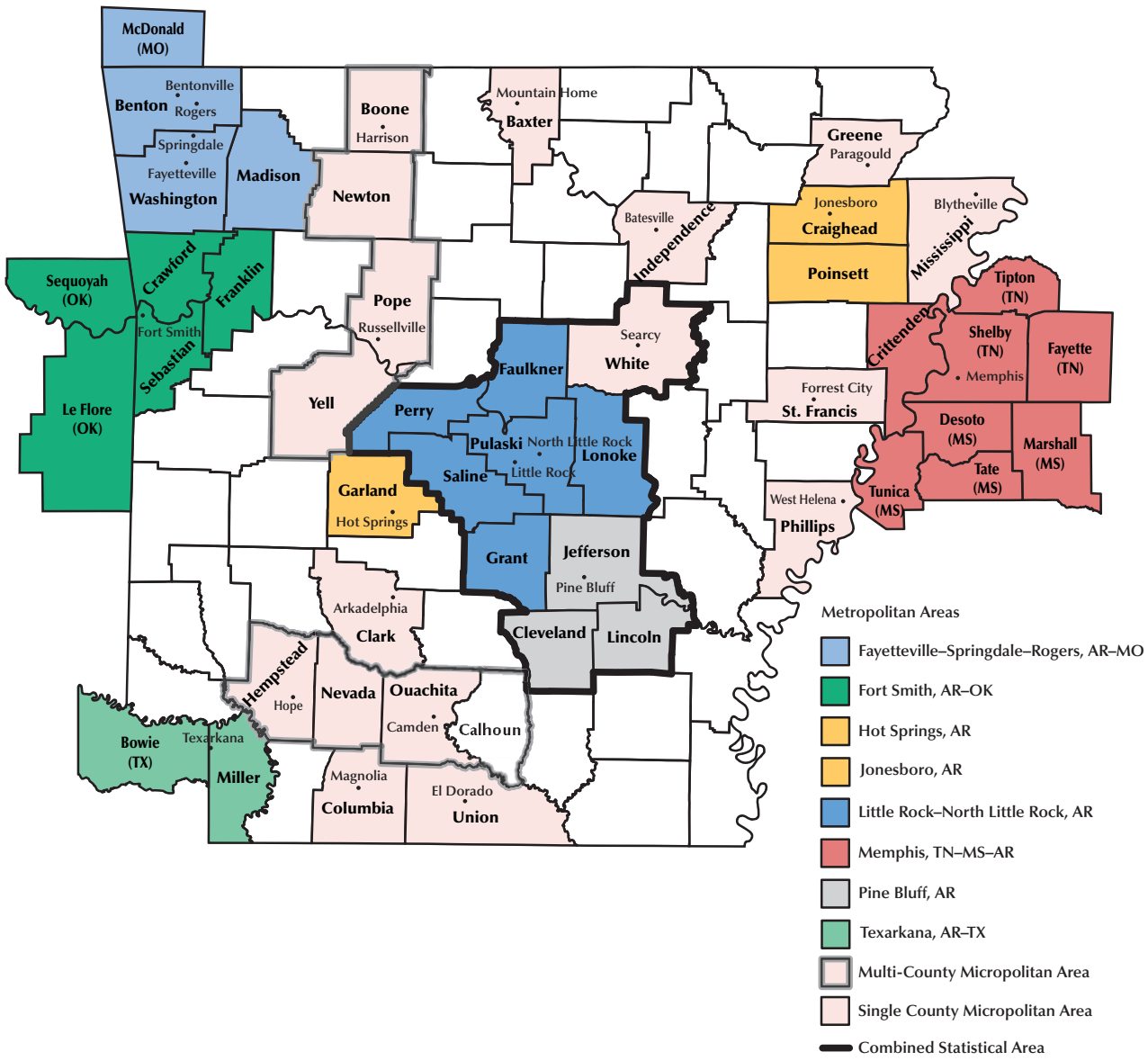
To quantify the contribution of these MSA-related variables, the following model was constructed:

(2)
$$Inequality_i = C + \beta_1 Job_i + \beta_2 Education_i + \beta_3 WorkingAge_i + \beta_4 Industry_i + u_i,$$

where i denotes county, C represents the constant, *Job* represents job-market condition measured by employment/population, *Education* is measured by percentage of Bachelor's degrees or higher, *WorkingAge* represents the share of persons aged 25 to 44 in the total population, and *Industry* is approximated by the share of FIRE and other knowledge-based industries. All of the above regressors are obtained from U.S. Census 2000 data, and the variables are explained in Table 2.

Figure 3

Metropolitan, Micropolitan, and Combined Statistical Areas in Arkansas (effective June 9, 2003)



SOURCE: U.S. Census Bureau and the Arkansas State Data Center.

Table 4

Differences Between MSAs and Non-MSAs

	MSA	Non-MSA	State average
Ratio of households by income (75th/25th percentile)	0.93	0.58	0.78
Growth	5.1%	3.8%	4.5%
Income	$39,681	$33,248	$35,071
Employment/population	57%	52%	53%
Percent of the population with a Bachelor's degree or higher	10%	8%	8%
Percent of agriculture, forestry, fishing, hunting, and mining	4%	7%	6%
Percent of FIRE and other knowledge-based industries	10%	7%	8%
Percent of the population that is 25 to 44 years old	29%	26%	27%

SOURCE: U.S. Census 2000.

The OLS regression results are reported in Table 5. Because there is a significant relationship between the MSA dummy variable and MSA-related variables, the former is excluded from the model to avoid multicollinearity. The included four regressors plus the constant term are all statistically significant at the 5 percent level. Together they account for 60 percent of the variations in income inequality. Although the constant term does not, the four explanatory variables all have a positive effect on income inequality. Counties tend to have a higher degree of inequality when they have job opportunities. Jobs are more likely to be created by fast-growing industries such as FIRE and other knowledge-related and concentrated industries. As stated above, growing sectors are more likely to be located in MSAs because they require better education and up-to-date skills as well as sophisticated infrastructure systems. Because of these skill-based needs, market forces favor individuals in the 25 to 44 age range. The returns to skilled workers result in greater separation of income groups. Thus, the income gap widens.

Because Table 4 suggests that there is a significant gap between the growth rates of MSAs and non-MSAs (5.1 percent versus 3.8 percent, respectively), we also report the correlation coefficients of these MSA-related variables in Table 6. All variables are correlated to a certain degree with one another, but not significantly. Therefore, each variable explains part of the inequality pattern across counties. The diagnostics of the regression do not suggest any misspecification.

Table 5

Income Inequality and MSA-Related Variables

Dependent variable: *Inequality*

Variable	Coefficient	*t*-statistic
Constant	–1.22	–5.13
Job	0.96	2.39
Education	2.08	2.18
WorkingAge	3.60	3.73
Industry	2.44	1.97
Adjusted R^2	0.60	

NOTE: All variables are statistically significant at the 5 percent level.

IMPORTANCE OF COMMUTING PATTERNS

Apart from the factor as stated endowments in the MSAs, the working-age population living in other counties can still benefit by commuting to the job centers located in MSAs or micropolitan areas. Thus, commuting patterns and access to highway corridors are also important to income inequality. Figure 4 depicts the net gain or loss of

Table 6

Correlation Matrix of All MSA-Related Variables

	Inequality	*Growth*	Residuals from model (1)	*Job*	MSA dummy	*Working Age*	*Education*	*Industry*
Growth	0.30							
Residuals from model (1)	0.95							
Job	0.60	0.47	0.48					
MSA dummy	0.51	0.45	0.40	0.47				
WorkingAge	0.61	0.28	0.56	0.49	0.61			
Education	0.61	0.34	0.54	0.49	0.43	0.33		
Industry	0.63	0.38	0.55	0.45	0.57	0.44	0.72	

SOURCE: U.S. Census 2000.

workers commuting in or out of individual counties. By counting those counties with 7 percent or more of the workforce commuting-in, there are several major job centers in the state: Pulaski in the central region, Sebastian in the west, Boone in the north, Independence and Craighead in the northeast, Arkansas-Desha in the east, Union in the south, and Howard and Clark in the southwest. They can be divided into three types: in-state MSAs, cross-state MSAs, and stand-alone small job centers (or micropolitan areas).

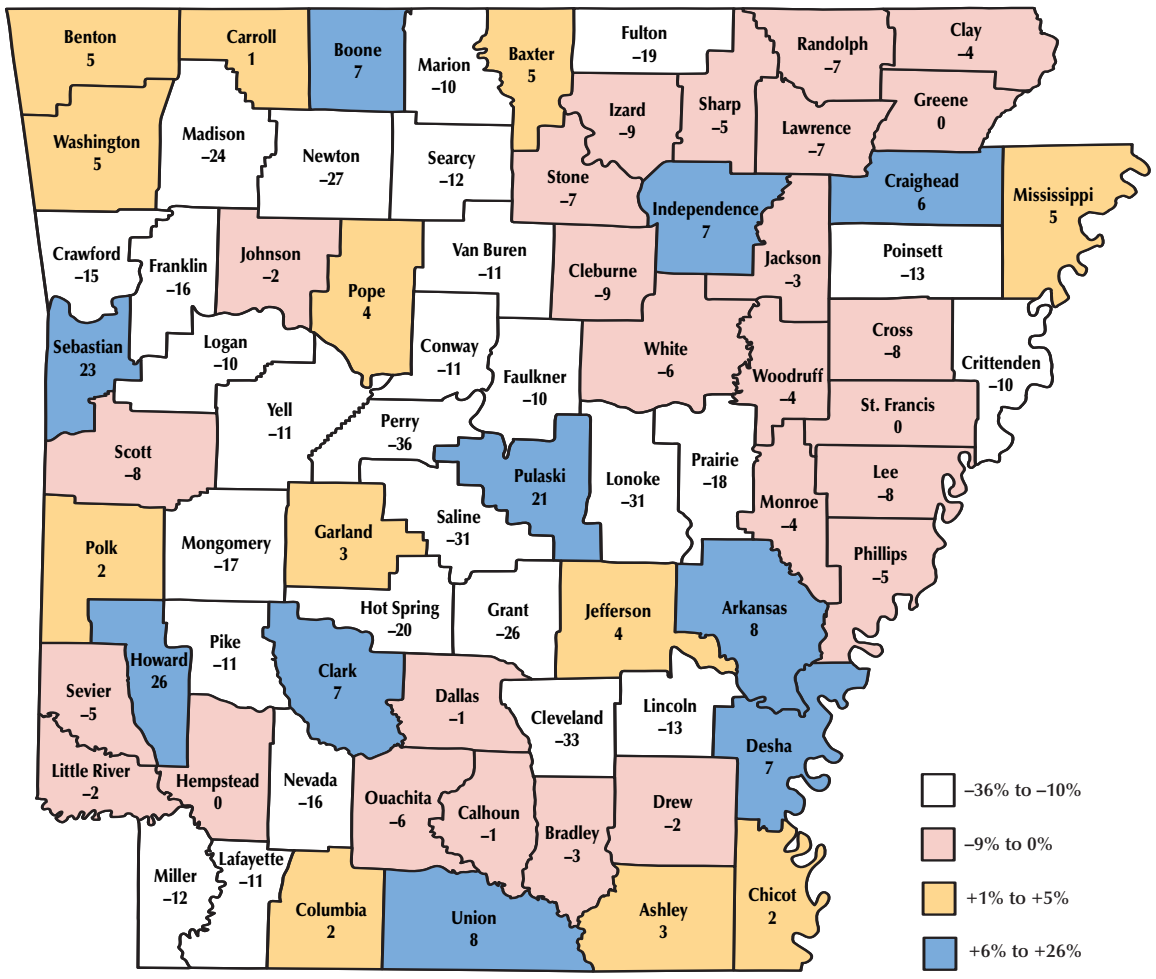
The largest in-state MSA is the Little Rock–North Little Rock area in central Arkansas, which includes Pulaski County in the urban center. As shown in Figure 4, the net gain/loss in commuter flow is 21 percent in Pulaski County and negative in all but one of the fringe counties. Individuals commute from the fringe counties to the Little Rock area to work. Consequently, all of these counties have high inequality because of better access to job markets, a large working-age population, and other advantages in the metropolitan area. In northwest Arkansas, Benton, Washington, and Carroll counties benefit from the presence of large corporations such as Wal-Mart, Tyson Foods, and J.B. Hunt Trucking. It is the most rapidly growing area in the state, and commuters from the fringe counties benefit from job creation and generally higher wages in these areas. Craighead County has become the urban center in northeast Arkansas because of Arkansas State University and other manufacturing firms located in Jonesboro. Jefferson County also attracts capital and workers because of the economic growth and development in Pine Bluff.

There are also three MSAs shared between Arkansas and other states. The MSA centered on Sebastian County is shared with Oklahoma and includes Fort Smith, the third largest city in the state. It thus attracts commuters and capital from the fringe counties in Arkansas and adjacent counties in Oklahoma. Crittenden County is located within an MSA shared with Memphis, Tennessee, and it benefits from the flow of commuters to the Tennessee side of the border. Miller County also benefits from the commuter flow to the Texas side of Texarkana.

There are several micropolitan areas within the state, which generally center on a single town as the economic driver in that area. For instance, Harrison (Boone County) attracts commuters because of the presence of a FedEx branch and several manufacturing firms in the furniture and wood products sectors. Batesville (Independence County) is home to several poultry processing and chemical industries. It also benefits from a fast-growing community college and a private four-year college. Hot Springs, a small MSA in Garland County, provides a major venue for tourism, convention and hospitality, and regional services.

Figure 4

Net Gain or Loss in Commuter Flow



SOURCE: U.S. Census 2000 and calculations by the authors.

Each of these micropolitan cases provides considerable services and retail capacity to surrounding rural counties. Notable examples of services include regional hospitals, small airports, and a variety of legal and financial services. Other job centers in non-MSA and non-micropolitan designations consist of major industrial facilities tied to forest resources; for example, large paper mill operations in rural counties provide high-wage jobs in sparsely populated areas—notably, in Ashley and Little River counties. Similar industrial location factors are noted in Union County.

Table 7 further organizes average income inequality levels by different statistical areas (MSAs and micropolitan areas) and commuting pattern. All 75 counties in the state of Arkansas are classified into one of five categories, with the number of counties of each category in parentheses:

- MSA urban center (7 counties): those with positive commuter flows in the MSA, including Pulaski, Washington, Benton, Sebastian, Jefferson, Craighead, and Garland;

Table 7

Inequality by Statistical Areas and Commuting Pattern

Statistical areas in Arkansas	Number of counties	Percentage of net commuter flow (percent)	Inequality
MSA	20	3	0.84
Urban job center	7	12	0.89
Urban fringe	13	–19	0.81
Micropolitan area	17	0.3	0.60
Micropolitan job center	7	6	0.69
Micropolitan fringe	10	–5	0.53
Rest of the state	38	–3	0.53
Entire state	75	0	0.78

SOURCE: U.S. Census 2000.

- MSA urban fringe (13 counties): those with negative commuter flows in the MSA;
- Micropolitan center (7 counties): those with positive commuter flows in the micropolitan areas, including Boone, Baxter, Pope, Independence, Clark, Columbia, and Union;
- Micropolitan fringe (10 counties): those with negative commuter flows in the micropolitan areas;
- Rest of the state (38 counties).

On average, 12 percent of the urban centers' working population commute in from fringe counties to work. About 20 percent of the working population in fringe counties commutes into job centers in an MSA. Overall, about 3 percent of the working population in MSA counties commutes from outside of the MSA, which implies that MSAs as a whole provide job opportunities to the rest of the state. Commuter flow is significantly lower in micropolitan areas. Only about 6 percent of the working population in job centers commutes in from fringe counties, and about 5 percent of those in fringe counties commutes out. Micropolitan areas, overall, have a net flow of commutes of 0.3 percent. The rest of the state has a net pattern of commuter out flow. About 3 percent of the state's population commutes to either MSAs or micropolitan areas to work. Overall, the labor market in Arkansas is self sustained, with 0 percent net commuter flow.

As shown in Table 7, the commuting pattern has a strong linkage with the inequality distribution and, in turn, economic growth. Households in urban centers usually have the highest income inequality, followed by urban fringe counties, micropolitan job centers, micropolitan fringe counties, and, finally, the rest of the state. In addition to the significant inequality gap between MSA and non-MSA counties, another gap exists between commute-in (job center) and commute-out (fringe) counties. The latter gap is wider in micropolitan areas than in MSAs. However, the average inequality ratio of micropolitan areas (0.60) is lower than the state average (0.78) and marginally exceeds the rest of the state (0.53). The inequality ratios are similar for micropolitan fringe counties and the rest of the state, although the former have a higher percentage of commuting-out. Therefore, commuting promotes income inequality and economic growth in urban areas more so than in rural areas. Larger-scale and higher-paying jobs are concentrated in urban centers, which allows more people to commute in and thereby benefits the MSA by, among other things, promoting relatively higher wages. These concentration and scale differences partly explain the high inequality in urban fringe relative to rural areas. On the other side, jobs in micropolitan areas are not compensated as well as those in urban areas and their scale is also not that large. Thus,

access to jobs in these areas does not help change the income level, economic growth, or inequality of the micropolitan fringes relative to the rest of the state (0.53 vs. 0.53). There is another possible explanation for the similarity in the inequality level of micropolitan fringes and that of rest of the state: measurement error. Access to job centers or the possibility of commuting promotes economic growth and income improvement and eventually affects inequality. However, tax data may not reflect the difference because of the distortion caused by tax shelter programs.

CONCLUSIONS

Using the data from individual Arkansas tax returns, this study develops an indicative measure of income inequality at the county level. In the state of Arkansas, income is most unequally distributed in the northwest and central portions of the state and selected counties in the southern part of the state. This spatial pattern is positively correlated with economic growth. Counties differ in their inequality over the course of their economic development and inequality may decrease as the economy develops. The inequality pattern can also be explained by many factor differences between MSAs and non-MSAs, such as educational attainment, sector composition, demographic distribution, and job-market conditions. This paper also uses the data on commuting patterns to show that a fringe county can still benefit when its population commutes to a nearby job center. However, access to urban centers is more beneficial than access to micropolitan areas because the job quality in the latter is much lower.

This study provides an Occam's razor for policymakers by separating the intertwined issues of income inequality and growth at the regional level. Although more research is needed, the preliminary findings point to area growth and urban concentration as principal drivers for income inequality over time and in spatial distributions. The study also implies that concern about income inequality, or more likely the rate of change in inequality, would be better directed at addressing root factors rather than social engineering or punitive tax policy. Factor analysis provided in this study points to the need for more effective educational systems and occupational training as constructive ways to respond to the effects of regional growth on incomes and the spreading effects on household income distributions that stem from rising opportunity in a given job center.

In addition to improving the specificity and clarity of inputs to regional growth, the study identifies the need for greater coordination in transportation-system planning overall and economic development of rural or micropolitan areas. The same growth and inequality relationships observed in large urban centers are observed down to the micropolitan and county levels. This study's policy implications are not unlike those of other studies that promote public and private investment in programs and infrastructure for rural development. The difference here is that the prospect of rising income inequality should not be a deterrent to growth and development efforts.

Further research is needed to measure and test the role and significance of commuting on income inequality. Part of this examination will need to account for several data issues and data methodological issues. The current research has shown a statistically significant relationship between metropolitan and nonmetropolitan areas of the state. Lack of statistical significance among counties with an elevated commuting rate has not been fully examined. Issues of county-level data quality and definitional shifts of MSAs need to be accounted for, given the accretionary changes in MSA designation over time and the definitional role of commuting ties to the urban core and income dependency ratios. Explanatory models of income inequality may be inefficient when combining MSA variables with non-MSA variables for commuting-dependent counties.

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