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# The Spatial Shift in the Growth of Poverty Among Families Headed by Employed Females, 1979–89\*

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*The number of working poor families in the United States increased substantially during the 1979–89 period. This increase was found to disproportionately consist of families headed by employed females. The growth in poverty among families headed by employed females during this period was found to be nonstructural in nature and inequitably distributed across labor markets in the U.S. It was found that at the onset of the 1980s, high rates of poverty among families headed by employed females were predominantly concentrated in labor market areas in the South. Over the 1980s, the highest increases in poverty rates among such families were found to be concentrated in labor market areas in the Midwest and Rocky Mountain regions, rather than the South. Further, declines in poverty rates among families headed by employed females were found to be concentrated in labor market areas located on the east and west coasts.*

Efforts to reform the welfare system in the United States during the 1990s have focused on moving the heads of impoverished families off of welfare and into the labor force where they hypothetically will be able to support their families through formal employment. While policies of this type have only recently been implemented at the state level at the behest of the Clinton Administration, support for the concept of *workfare* gained momentum

during the welfare reform debates of the 1980s. Ironically, while this idea was being championed by the Republican Administrations in office during the 1980s, the number of families living in poverty that were headed by an employed person increased substantially.

According to estimates drawn from the *U.S. Census of Population and Housing* (U.S. Bureau of the Census, 1983; 1993), the number of U.S. families that were headed by an employed person with an income below the poverty threshold (i.e., were working poor) increased by 21.8% from 2,860,666 families in 1980 to 3,472,305 in 1990. Further, the share of all U.S. families that were working poor increased from 4.8% in 1980 to 5.3% in 1990. Census estimates indicate that the growth of working poor families was not equitably distributed on the basis of family type. Families headed by employed females accounted for an estimated 63.9% of the increase in working poor families during this period (U.S. Bureau of the Census, 1983; 1993). By 1990, 20.4% of all families headed by employed females were working poor compared to 9.8% of all families headed by employed males and 4.1% of married couple families with one or more persons employed (U.S. Bureau of the Census, 1993). These estimates indicate that the growth of working poor families over the 1980s disproportionately consisted of female-headed families. In 1990, families headed by employed females were over twice as likely to be working poor compared to families headed by employed males, and over four times more likely to be working poor compared to married couple families with the head and/or spouse employed.

Within the context of a market economy, the labor market is a central institution influencing whether or not families of any type become working poor. Families become working poor when one or more members are able to sell their labor within a labor market, but due to specific conditions, are unable to secure wages above the poverty threshold in exchange, and cannot obtain sufficient income from other sources to raise their incomes above this level. The purpose of this research is to examine how the growth of poverty among families headed by employed females that occurred during the 1980s was geographically distributed across labor markets in the United States. The goals of the study are to describe where the growth of poverty among families headed

by employed females took place, evaluate the extent to which the growth of poverty among these families was inequitably distributed across labor markets, and assess the extent to which this growth was *structural* in nature.

Within the context of this paper, the term structural change is used in a statistical sense rather than an economic or sociological sense. It refers to the change in a variable between two points in time that can be predicted from initial scores on the variable at the first point in time (Kessler and Greenberg, 1981:50). A high level of structural change in poverty rates among families headed by employed females would indicate that the largest increases (or possibly decreases) in poverty rates over the 1980s tended to be concentrated in labor markets that already had high poverty rates at the beginning of the decade. In contrast, a low level of structural change would indicate that there is little systematic pattern to where the largest changes in poverty rates took place. In turn, this would be indicative of a spatial shift in poverty among families headed by employed females as some labor markets with lower poverty rates at the beginning of the decade experienced the largest increases as the U.S. economy underwent restructuring during the 1980s.

## DATA AND METHODS OF ANALYSIS

Considered from a geographic perspective, transactions between buyers and sellers of labor within a labor market are constrained by space. Not precluding migration in order to secure employment, there are practical limits to the distance that workers commute to their jobs. As a result, labor market transactions for any particular family tend to be limited to a circumscribed geographic space, or *labor market area* (Tolbert and Killian, 1987). Tolbert and Sizer (1996) delimited 394 labor market areas in the United States using data from the *Census of Population and Housing* that measures the location where residents of a county commute to work. A labor market area (LMA) consists of a set of counties that: (a) are interdependent as a result of having strong commuting ties; and (b) have a minimum population of 100,000 persons. The 394 LMAs were identified through the use of a cluster analysis algorithm which delineated groups of interdependent counties

based upon the strength of their commuting flows and the size of their combined population (see Tolbert and Sizer, 1996). As a spatial unit of analysis, labor market areas thus approximate the circumscribed geographic spaces in the United States in which the buying and selling of labor predominantly takes place. Poverty rates for families headed by employed females were calculated for each of the 394 labor market areas using data collected from the *Census of Population and Housing, Summary Tape File 4* for 1980 and 1990. Given that the end-point of the period of change being examined is 1990, it was decided that the 1990 Labor Market Area definitions would be used and reconstructed back in time for the variables measured in 1980. With this procedure, one or more counties in the set comprising a 1990 LMA may have been less interdependent with the other counties in the set in 1980 in terms of commuting ties and/or may have had different population levels. Thus, the analysis will examine change in the percentage of female-headed families that became working poor as such counties became more interdependent with the others in the set via commuting ties and/or experienced population change (i.e., as the new geography of Labor Market Areas coalesced over the decade).

In order to examine the extent to which the change in the poverty rate among families headed by employed females was inequitably distributed across labor market areas, the method for decomposing change scores proposed by Kessler and Greenberg (1981) was used. Following this method, a measure of the amount of change in the poverty rate among families headed by employed females between 1979–89 was calculated as follows:

$$Q^2 = \sum_{i=1}^N (X_{1989} - X_{1979})^2 / N$$

Where:

$Q^2$  = the amount change in the poverty rate among families headed by employed females;

$X_{1989}$  = the poverty rate for labor market area  $I$  in 1989;

$X_{1979}$  = the poverty rate for labor market area  $I$  in 1979;

$N$  = the number of labor market areas.

Following Kessler and Greenberg (1981:48–49), the measure of change was then decomposed in two components as follows:

$$Q^2 = \sum_{i=1}^N (X_{1989} - X_{1979})^2 / N = s_{\Delta x}^2 + (\Delta \bar{x})^2$$

Where:

$s_{\Delta x}^2$  = the variance of the change in the poverty rate;

$\Delta \bar{x}^2$  = the square of the mean change in the poverty rate.

With this decomposition, the  $(\Delta \bar{x})^2$  component reflects the extent to which the change in poverty rates during 1979–89 affected all labor market areas equally; that is, the extent to which all labor market areas experienced the average amount of change in the poverty rate. The  $s_{\Delta x}^2$  component reflects the extent to which the change in poverty rates during 1979–89 affected all labor market areas unequally; that is, the extent to which some labor market areas experienced greater change in their poverty rates compared to others, thereby changing the rank order of labor market areas in the distribution of poverty rates in 1989 compared to 1979 (Kessler and Greenberg, 1981:47–49). The relative magnitude of the two components  $s_{\Delta x}^2$  and  $(\Delta \bar{x})^2$  were compared to determine whether the change in poverty rates among families headed by employed females during 1979–89 to was predominantly equal or unequally distributed across the 394 labor market areas.<sup>1</sup>

In order to examine the extent to which change in poverty rates among female-headed families was structural in nature (see definition above), the method proposed by Kessler and Greenberg (1981:50–53) for decomposing change was also used. With this method, the variance in the poverty rate for 1989 was decomposed into four components as follows:

$$s_{x_{1989}}^2 = s_{x_{1979}}^2 + (b_{\Delta x, x_{1979}} s_{x_{1979}})^2 + 2b_{\Delta x, x_{1979}} s_{x_{1979}}^2 + s_e^2$$

With this method,  $s_{x_{1989}}^2$  is the variance of the poverty rate for 1989. The term  $s_{x_{1979}}^2$  represents a component of the variance of

the poverty rate for 1989 that is attributable to a lack of change in the variable during 1979–89 (i.e., the poverty rate in 1989 was the same as in 1979). The term  $(b_{\Delta x, x 1979} s_{x 1979})^2$  represents a “structural” component indicating the amount of change in the poverty rate during 1979–89 that can be determined by initial values on the variable in 1979. The term  $2b_{\Delta x, x 1979} s_{x 1979}^2$  represents an overlapping component between the lack of change and structural components that is attributable to labor market areas with different poverty rates in 1979 experiencing different levels of change during 1979–89. Finally, the term  $s_e^2$  represents a “nonstructural” component indicating the change in the poverty rate during 1979–89 that cannot be determined by initial values on the variable in 1979.<sup>2</sup>

Out of these four components in the decomposition of the variance of the poverty rate in 1989, only the structural  $[(b_{\Delta x, x 1979} s_{x 1979})^2]$  and nonstructural components  $[s_e^2]$  are uniquely attributable to the change in the poverty rate between 1979–89 (Kessler and Greenberg, 1981:51). The relative magnitude of these two components was compared to determine the extent to which the change in poverty rates across labor market areas during the 1980s was structural versus nonstructural in nature; that is, the extent to which the greatest increases in poverty rates among families headed by employed females tended to be concentrated in labor market areas that had high initial rates in 1979. Finally, in order to illustrate the change in the geographic distribution of poverty rates among families headed by employed females, maps were created using GIS technology to describe the spatial distribution of poverty rates in 1979, 1989, and the change in poverty rates during 1979–89 using first difference change scores (i.e., 1989 rate minus the 1979 rate).

## FINDINGS

The data analysis indicates that across the 394 labor market areas, the mean poverty rate among families headed by employed females increased from 23.8% in 1979 to 27.4% in 1989 (see Table 1). Further, the standard deviation of the poverty rate increased from 6.172 in 1979 to 7.808 in 1989. Thus, there was greater dispersion across labor market areas in poverty rates among

families headed by employed females in 1989 compared to 1979. The decomposition of change scores indicates that the change in poverty rates over the 1979–89 period was predominantly unequal across the 394 labor market areas. Approximately 62.5% of the total change score  $Q^2$  was accounted for by the unequal change component  $s_{\Delta x}^2$  (see Table 1). Thus, the majority of labor market areas experienced changes in poverty rates that differed from the average change, and there were substantial changes in the rank order of the distribution of poverty rates in 1989 compared to 1979.

The decomposition of the variance in the poverty rate among families headed by employed females in 1989 revealed that the change in poverty rates during 1979–89 across the 394 labor market areas was nonstructural in nature. Out of the component of the variance in the 1989 poverty rate that could be uniquely attributable to change, 99.97% was attributable to the nonstructural change component  $s_{\epsilon}^2$  (see Table 2). This indicates that the highest increases in poverty rates between 1979–89 were not concentrated among labor market areas with high initial poverty rates in 1979. In turn, this is indicative of a spatial shift in the growth of poverty away from labor market areas with high concentrations of poverty among families headed by employed females in 1979.

The GIS maps illustrate the spatial shift in poverty rates that was inequitably distributed across labor market areas. Figure 1 maps the percentage of families headed by employed females with incomes below the poverty threshold in 1979 across the 394 labor market areas in the United States. In 1979, the poverty rate representing the 95th percentile in the distribution was 35.6% (note: this is designated as the cutting point for the largest ranked category in Figure 1). Figure 1 indicates that labor market areas with the highest percentages of working poor, female-headed families were concentrated predominantly in the South as well as the Texas border region. Within 5 of the labor market areas at or beyond the 95th percentile, over 40% of families headed by employed females were working poor in 1979. All of these labor market areas were in the South and encompassed the following cities or towns in rank order: West



Table 1  
*Decomposition of Change Scores ( $Q^2$ ) in the Poverty Rate Among Families Headed by Employed Females, 1979-89*

	Poverty Rate 1979	Poverty Rate 1989	Change in the Poverty Rate, 1979-89 %
mean	23.82	27.43	21.837
standard deviation	6.17	7.81	13.075
variance	38.09	60.96	34.912
			$s_{\Delta x}^2$
			$(\Delta \bar{x})^2$
			$Q^2$
			62.5
			37.5
			100.0

Memphis, AR (47.4%); Greenville, MS (45.9%); Greenwood-Clarksdale, MS (44.8%); Laredo, TX (42.2%); and McComb-Brookhaven, MS (40.1%).

In 1979, the poverty rate representing the 5th percentile was 15.5%. Figure 1 indicates that labor market areas with the lowest percentages of families headed by employed females that were working poor in 1979 were concentrated predominantly in the upper Midwest, Pacific, and mid-Atlantic regions (see Figure 1). Of those labor market areas at or below the 5th percentile, only 4 had rates less than 14%. The labor market area encompassing Sheboygan, WI had the lowest rate with a figure of 13%. This was followed by labor market areas encompassing the following cities: Wabash, IN (13.2%); Reno, NV (13.6%); and San Jose, CA (13.6%).

Figure 2 maps the change in percentage of families headed by employed females with incomes below the poverty threshold over the 1979–89 period using the first order difference as a measure of change (i.e. percent 1989 minus percent 1979). Overall, 301 of the 394 labor market areas experienced gains in the percentage of families headed by employed females that were working poor. As illustrated by Figure 2, these gains were concentrated predominantly in labor market areas located in the Midwest and Rocky Mountain regions. The labor market area encompassing the cities of Sioux Center, IA and Worthington, MN experienced the largest increase with a gain of 17.2%. Additionally, six other labor market areas experienced gains greater than 13%. In rank order, these labor market areas encompassed the following cities or towns: Casper, WY (14.8%); Corinth, MS (13.7%); Spencer, IA - Fairmont, MN (13.6%); Ottumwa, IA (13.3%); Big Rapids - Ludington, MI (13.3%); Pulaski County [Fort Leonard Wood], MO (13.1%). Thus, the largest gains in the poverty rate among families headed by employed females occurred in nonmetropolitan labor market areas

Overall, 93 of the 394 labor market areas experienced declines in the percentage of families headed by employed females with incomes below the poverty threshold. As illustrated by Figure 2, these declines tended to be concentrated in east coast labor market areas in the Mid Atlantic and New England regions, as well as Florida, and the west coast in California. The labor mar-

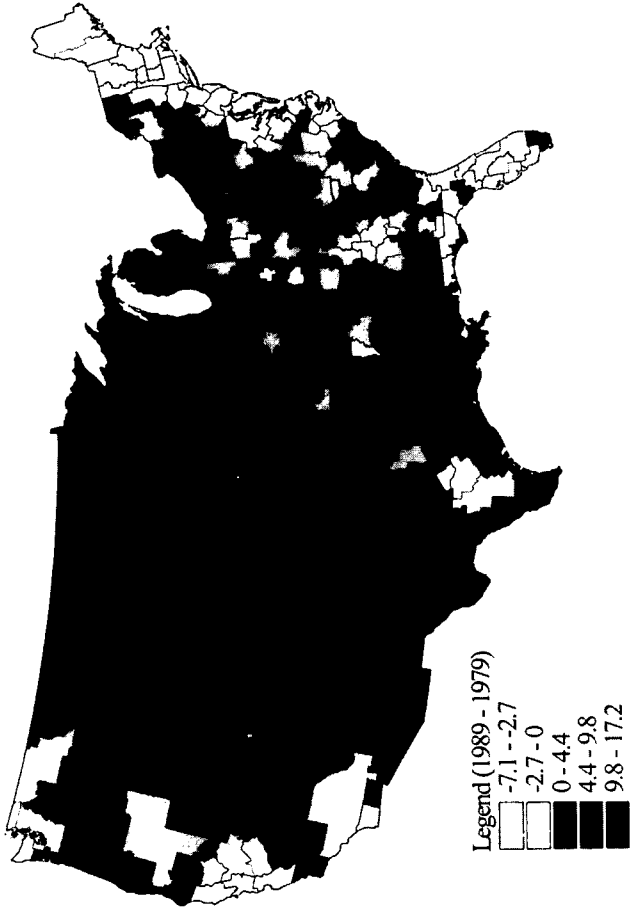
Table 2  
*Decomposition of Variance in the Poverty Rate Among Families Headed By Employed Females, 1989*

Components of Change	All components		Components Uniquely Attributable to Change	
	Value	%	Value	%
Lack of Change [ $S_{x,1979}^2$ ]	38.0899	62.48		
Structural Change [ $(b_{\Delta x, x, 1979} s_{x, 1979})^2$ ]	0.0070	0.01	0.0070	0.03
Overlap [ $2b_{\Delta x, x, 1979} s_{x, 1979}^2$ ]	1.0367	1.70		
Nonstructural Change [ $s_e^2$ ]	21.8297	35.81	21.8297	99.97
Total Variance [ $S_{x, 1989}^2$ ]	60.9633	100.00	21.8367	100.00

Figure 1  
*Poverty Rate Among Families Headed by Employed Females for U.S. Labor Market Areas, 1979*



Figure 2  
Change in the Poverty Rate Among Families Headed by Employed Females for U.S. Labor Market Areas, 1979-89  
(1989 rate-1979 rate)



ket area encompassing Wilmington, DE experienced the largest decline with a decrease of 7.1%. Additionally, four other labor market areas experienced declines above 6%. In rank order, these labor market areas encompassed the following cities or towns: Monmouth, NJ (-6.4%); Berlin, NH (-6.3%); Daytona Beach, FL (-6.1%); Honolulu, HI (-6.1%).

Figure 3 maps the percentage of families headed by employed females with incomes below the poverty threshold in 1989 across the 394 labor market areas. Note that in this map, the poverty rate representing the 95th percentile in 1979 was used as a cutting point for the largest ranked category and the rate representing the 5th percentile in 1979 was used as a cutting point for the smallest ranked category. As illustrated by Figure 3, poverty rates equivalent to the most severe levels in 1979 had spread to additional labor market areas in the South, the Midwest, and Rocky Mountain regions as well as several labor market areas in Appalachia. By 1989, 21 labor market areas had poverty rates among families headed by employed females above 40%. Of these, 16 were located in the South with the top 5 being located in the state of Mississippi: Greenville, MS (53.3%); Clarksdale, MS (49.8%); Vicksburg, MS (49.1%); McComb, MS (48.7%); and Hattiesburg, MS (47.1%). Further, 14 of these labor market areas were located in nonmetropolitan areas.

Figure 3 also illustrates the outcome of the decline of poverty among families headed by employed females that was concentrated predominantly in the east and west coast areas. A larger number of labor market areas in the mid Atlantic and New England regions, as well the California coast, had poverty rates in 1989 that were equivalent to the lowest levels in 1979. By 1989, 15 labor market areas had rates below 14%. Of these, 9 were labor market areas encompassing major metropolitan areas on the east and west coasts (Newark, NJ [9.8%]; Oakland, CA [10.4]; Hartford, CT [10.5]; Washington, D.C. [10.6]; Boston, MA [10.8]; San Jose, CA [11.0]; New York, NY [11.9]; Philadelphia, PA [13.0]; Los Angeles, CA [13.6]), while the remainder encompassed smaller metropolitan areas within these regions.

Figure 3  
*Poverty Rate Among Families Headed by Employed Females for U.S. Labor Market Areas, 1989*



## DISCUSSION

The findings indicate that the growth of poverty among families headed by employed females during 1979–89 was nonstructural in nature, and inequitably distributed across labor markets. In 1979, the highest poverty rates were predominantly concentrated in labor markets in the South, particularly the state of Mississippi. However, over the ensuing decade, these southern labor markets tended to experience smaller increases in poverty rates compared to those in other regions of the nation. Moreover, in some southern labor markets, particularly in Florida and parts of Georgia (see Figure 2), the poverty rate actually declined.

Instead of taking place in southern labor markets, the largest increases in the poverty rate were predominantly concentrated in labor markets located in nonmetropolitan areas of the upper Midwest and Rocky Mountain regions. The findings from this research suggest that labor market conditions in these regions of the country were particularly ill-suited to promoting the economic well-being of female-headed families through formal work as greater numbers of such families were established during the 1980s. While the highest poverty rates still remained concentrated among labor market areas in the South in 1989, at this point in time, labor markets in nonmetropolitan areas of the Midwest, Rocky Mountain, and Appalachian regions were on a developmental trajectory approaching that of the impoverished labor markets in the South.

The research findings indicate that the decline of poverty rates among families headed by employed females during the 1980s was predominantly a bicoastal phenomenon. This is likely a reflection of the uneven nature of economic growth in the U.S. during the 1980s. During this period, the sixteen states on the East and West coasts had three times as much real economic growth, experienced 90% more job growth per capita, and captured the lion's share of real growth in wages compared to the rest of nation (Zukin, 1991; Joint Economic Committee, U.S. Congress, 1986). Thus, the emergence of the "bicoastal economy" coincides with the decline of poverty rates among families headed by employed females in these areas.



The decline of poverty rates among such families in the 1980s may signal that a greater number of employed females that head families were accorded real gains in wages, rather than being paid poverty level wages. Alternatively, the decline in poverty rates may simply reflect regional income differences in relation to the poverty thresholds set by the Federal Government, and may not reflect any real decline in poverty. The ability to statistically control for cost-of-living differences in modeling changes in the spatial distribution of poverty rates would require the availability of such data (e.g. the consumer price index) at the level of the labor market area. Presently, such data are not available.

In conclusion, it remains to be seen whether the trends identified in this research have continued during the decade of the 1990s. Further growth of working poor, female-headed families in the United States would appear to be detrimental to the success of state workfare policies, particularly if the goal is to move families out of poverty. Further research is needed to gain a deeper understanding of the labor market conditions that have contributed to the growth and spatial shifts in poverty among families headed by employed females.

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## NOTES

1.  $s_{\Delta x}^2$  is calculated by computing the variance of the 1989 poverty rate minus the 1979 poverty rate. The term  $(\Delta \bar{x})^2$  is calculated by squaring the mean of the 1989 poverty rate minus the 1979 poverty rate.
2. The term  $s_{x1979}^2$  is calculated by computing the variance of the poverty rate for 1979. The term  $(b_{\Delta x, x1979} s_{x1979})^2$  is calculated by: (a) regressing the 1989 poverty rate on the 1979 poverty rate and calculating  $b_{\Delta x, x1979}$  from  $(1 - b_{y, x1979})$ ; (b) multiplying this coefficient times the standard deviation of the poverty rate for 1979; and (c) squaring the result. The term  $2b_{\Delta x, x1979} s_{x1979}^2$  is calculated by taking the product of  $b_{\Delta x, x1979}$  times the variance in the poverty rate for 1979 and then multiplying the result by two. Finally, the term  $s_e^2$  is calculated by computing the mean squared error from the regression noted above.

