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# U.S. Regional Poverty Post-2000: The Lost Decade

by

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## *Abstract.*

The strong U.S. real income gains and reductions in poverty during the 1990s were largely erased in the following decade, which contained two economic recessions and tepid job growth otherwise. Areas most affected by weak U.S. economic performance could be expected to also have experienced the largest increases in poverty, particularly if interregional labor market adjustment is increasingly limited. We examine this issue, finding that not only was regional poverty affected by regional labor demand shocks, the effect was stronger post-2000, particularly in the long run. Consistent with the poverty results are findings of greater post-2000 regional labor demand effects on employment rates and reduced population adjustments to asymmetric labor demand shocks.

Keywords: US Poverty; Spatial Equilibrium; Great Recession

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## 1. Introduction

The strong U.S. economy during the 1990s led to significant declines in poverty rates, with (*ceteris paribus*) greater reductions in states with faster employment growth (Partridge and Rickman, 2006a, pp. 9 and 92-93). However, the Great Recession, along with tepid employment growth during the expansion leading up to it, largely erased the gains of the 1990s. After increasing nearly ten percent in the previous decade, real median household income declined by seven percent from 2000 to 2010 (DeNavas-Walt et al., 2011, Table A-2). The poverty rate climbed from 11.3 percent in 2000, to 15.1 percent in 2010, a rate last seen in 1993 (DeNavas-Walt, 2011, Table B-1). The reversal of progress in reducing poverty and the erasure of income gains have led to media references of a “lost decade” (Fremstad, 2011; Tavernise, 2011; Shierholz and Gould, 2012), with concerns that we may currently be in a second lost decade (Detrixhe and Keene, 2012).

Given the documented connection between local employment growth and poverty in the literature for prior decades (see Partridge et al., 2012b for a review), we should especially expect areas hard hit by globalization (Autor et al, forthcoming) and the Great Recession to have experienced the largest increases in poverty. Reduced labor mobility post-2000 (Partridge et al., 2012a) may have magnified regional disparities in poverty rates through larger local labor demand effects on regional unemployment and labor force participation. Yet, in a study of the largest 100 U.S. metropolitan areas, Fodor (2012) reports areas with faster population growth during 2000 to 2009 with higher poverty and lower per capita incomes, suggesting an absence of a connection between growth and poverty during the decade; this outcome though may arise from amenity migration and spatial equilibrium.

Therefore, using a disequilibrium approach we examine the relationship between poverty and employment growth during the period of 2000-2010 for U.S. counties. We use the industry mix employment growth component from the shift-share model to proxy labor demand shocks (Bartik, 1991; Bound and Holzer, 2000) rather than overall employment growth, which contains both labor demand and labor supply influences (Partridge and Rickman, 2006b). To be sure, it

may be the labor supply component of employment and population growth that underlie the result of Fodor (2012) above. In confirmatory analysis of the poverty analysis, the effects of industry mix employment growth on the employment rate and population growth also are examined. In addition, we compare the post-2000 results to those for the 1990s to assess whether the poverty-employment nexus changed post-2000. Finally, we separately examine the 2000-2007 and 2007-2010 periods to assess whether the recession and expansion periods exhibited differing regional poverty dynamics, or whether the post-2000 trends generally held across both sub-periods.

Our main contribution is that we provide a post-2000 view of the local poverty and employment rate impacts of spatially unequal demand-based employment growth. Along with the Great Recession, the post-2000 period has also been characterized by increasing income inequality and increased technological, institutional and international pressures on low-skilled American workers. While the national metrics may be well known, solutions to localized high unemployment and poverty will need to include a local or regional dimension, especially in the face of some evidence of reduced inter-regional mobility of labor. For both academic and policy reasons, a better understanding of the new regional dimensions of poverty and employment responses are of utmost importance, especially in light of the sluggish job growth and rising poverty rates since 2000. Thus, we consider both the 1990s and 2000s to assess whether the poverty responses shifted after 2000 and whether this implies different policy environments.

Among our primary findings, the short-run anti-poverty effects of demand-based employment growth strengthened post-2000, for metropolitan areas across all industries, and for manufacturing employment in nonmetropolitan areas. Employment growth affected population growth less and the employment rate more during 2000 to 2010 in both metropolitan and nonmetropolitan areas. Persistence of poverty also increased in both metropolitan and nonmetropolitan areas post-2000, suggesting more limited regional labor market adjustments to previous poverty rate differentials. The increased persistence translates the short-run poverty effects of labor demand into larger long-run effects. The results taken together suggest declining

mobility in response to labor market shocks.

Labor demand effects on poverty in nonmetropolitan areas dropped during the recession, while there was no (or negative) population response to industry mix employment growth in all areas. This is suggestive of increased prominence of other regional factors in influencing poverty during the recession such as increased labor market competition that especially hurt less skilled workers and the collapse of area housing markets. Overall, it appears that the recent decade was characterized by both weaker national employment growth and more limited interregional labor market adjustments to asymmetric labor demand shocks and previous poverty differentials. Regional economic development efforts that successfully spur local labor demand may be needed more than ever, though this begs the question of what serves best practice.

## **2. Relevant Literature**

Spatial equilibrium theory implies that labor mobility should alleviate the effects that spatially-asymmetric labor demand shocks have on regional poverty (Partridge and Rickman, 2006a, Ch. 3). Severe geographic concentrations of poverty would need to be explained by other factors such as the sorting of poor individuals into particular locations. However, in a review of prior U.S. empirical evidence, Partridge et al. (2012b) conclude that the spatial equilibrium view holds weakly in terms of adjustments for the unemployed and for those with lower incomes. The evidence suggests that spatially-asymmetric labor demand shocks likely have long-lasting effects on regional poverty, through both employment rates and wages. We review the most relevant evidence for this study below.

Over the period 1960-2003, Partridge and Rickman (2006a, p. 9) find changes in the U.S. unemployment and poverty rates to be strongly positively correlated. State (current and lagged) employment growth of one percentage point reduced the poverty rate by 0.5 percentage points from 1984-2000 (Partridge and Rickman, 2006a, pp. 92-93). The channels through which state employment growth reportedly affected poverty were increased employment rates and reduced teen birth rates. Gundersen and Ziliak (2004) similarly find that over the period of 1981-2000 stronger U.S. state economic performance reduced both the rate and severity of poverty.

In a review of the early literature on local area labor market effects of employment growth, Bartik (1991, Ch. 4) reports that estimated one-percentage point employment growth effects on regional unemployment rates over long periods of time range across studies from -0.04 percentage points to no effect, while for labor force participation, they range from no effect to 0.08 percentage points. He notes that studies generally failed to distinguish between whether employment growth represents labor demand or supply. Bartik's (1991) own analysis of US metropolitan areas, revealed a one-percentage point increase in employment growth reducing unemployment by 0.06-0.07 percentage points and increasing the labor force participation rate by 0.14 percentage points in the long run.

To address the issue of identifying labor demand, Partridge and Rickman (2003; 2006b) construct long-run restrictions structural vector autoregression (SVAR) models in assessing U.S. state labor market dynamics. In the SVAR, identifying restrictions are used to separate the influences of labor demand from labor supply shocks. Partridge and Rickman (2006b) find that about 20 percent of a state-level labor demand shock is reflected in the employment rate in the long run, which varies from 13 percent for Sunbelt states to 55 percent for Rustbelt states.

Bartik (2005) concludes that five years after a one percent increase in local employment real earnings per capita as a share of local area personal income increase 0.28 percent. One-half of this occurs because of area residents obtaining higher-paying occupations, while the remaining half results from increased employment rates. In a recent review of the literature, Bartik (2012) concludes that a one percent demand shock to local employment increases local employment rates by 0.2 percent and occupation wages by 0.2 percent, for a total effect on real earnings per capita of 0.4 percent.

Turning to more direct evidence on the employment growth effects on the distribution of income and poverty at the local level, Bartik (1994) finds that employment growth in U.S. metropolitan areas from 1979-1988 increased the long-run share of income received by those in the lowest income quintile. He interprets the finding as evidence that strong employment growth particularly benefits workers with the least skills; a strong labor market pushes employers to hire

labor force members with the least education and skills. In a further study of U.S. metropolitan areas, Bartik (1996) finds that a one-percentage point increase in employment growth reduces the probability of poverty for females by 0.33 percent and males by 0.20 percent. He also finds the same increase in MSA employment growth as increasing average real earnings by 0.5 or 0.6 percent, in which half is attributable to increased annual hours worked, and the other half to greater wages. Bartik (2001, p, 148) concludes that 10 to 20 percent of an increase in employment and earnings may persist in the long run, in which the most important channel is poor individuals moving into higher paying jobs. Bound and Holzer (2000) find that population responses partially offset U.S. metropolitan area effects of demand shifts, with the responses more limited among less-educated workers. This leads to estimates of a 10 percent decline in an area's labor demand reducing nominal earnings by 11 percent for high school educated workers but only 6 percent for workers with a college degree.

In a study of US metropolitan areas, Partridge and Rickman (2008b) generally find employment growth to reduce poverty, but the effect varies across metropolitan size and county type. A one-percentage point increase in employment growth reduces poverty by 0.4 percentage points in large metropolitan area (MA) central city counties, with no effect found for suburban counties. For medium- and small-sized MAs, a one percentage point metropolitan-wide increase in employment reduces poverty by 0.5 and 0.6 percentage points in the long run, respectively.

More relevant to this study are analyses of U.S. county poverty. Partridge and Rickman (2006a, p. 142) find a one percentage point increase in job growth to be associated with lower U.S. county poverty by 0.37 percentage points in 1989 and 0.23 percentage points in 1999. For high-poverty nonmetropolitan U.S. counties, Partridge and Rickman (2005) report that a one-percentage point increase in job growth reduces poverty by 0.11 percentage points in the long run; this is approximately double the magnitude of the estimate they found for the remaining nonmetropolitan counties. In a related study, Partridge et al. (2009) report that persistent poverty counties experienced the largest employment growth effect on unemployment and labor force participation among all USDA Economic Research Service county types.

In a follow-up study, Partridge and Rickman (2007) further examine the poverty generating process in persistently high-poverty nonmetropolitan counties using Geographically Weighted Regression. They find that employment growth has three-times the magnitude effect on poverty in persistently high-poverty counties relative to other nonmetropolitan counties, which is attributed to more limited migration and commuting adjustments to local labor demand shocks. However, the effect is not found to vary across differing persistent-poverty county clusters.

In a pair of related papers, using Geographic Information Systems data, Partridge and Rickman (2008a; 2008c) find that remoteness influences how job growth affects poverty. Local job growth reduces poverty only in nonmetropolitan counties at a sufficient distance from the nearest metropolitan area. In both studies they find lower migration responses to employment growth the farther a nonmetropolitan county is from a MA, which they interpret as underlying the greater anti-poverty effects of employment growth. Correspondingly, job growth in the nearest MA is found to reduce nonmetropolitan county poverty but the effect attenuates with distance. At a finer geographic level, Crandall and Weber (2004) show that job growth reduced poverty more in high-poverty U.S. Census tracts during the 1990s. A one percentage-point higher rate of employment growth rates reduced poverty by 0.011, 0.046 and 0.088 percentage points in low, medium and high poverty tracts, respectively.

### **3. Empirical Approach**

We assess whether the connection between regional employment growth and poverty typically found for the 1980s and 1990s has continued into the 2000s. Slower employment growth likely underlies the post-2000 rise in U.S. poverty, in which areas hardest hit by globalization and the Great Recession may have experienced the largest increases. We examine whether limited migration post-2000 exacerbated the effects of asymmetric labor demand shocks on regional poverty.

To allow for persistence in poverty rate differences, and to capture labor demand effects, we use the disequilibrium approach of Partridge and Rickman (2005; 2006a; 2007; 2008a; 2008b). In this approach, a spatial equilibrium of labor market outcomes is hypothesized to be



determined by numerous factors, including labor demand, local labor market policies, and area household amenities:  $Y_{it}^* = \beta X_{it}$ . Deviations of labor market outcomes from the equilibrium induce adjustments in the labor market with speed  $\alpha$ :  $Y_{it} - Y_{it-1} = \alpha(Y_{it}^* - Y_{it-1})$ . Substituting in the expression for the equilibrium labor market outcomes yields the econometrically-estimable equation:  $Y_{it} = (1 - \alpha)Y_{it-1} + \alpha\beta X_{it}$ .  $\alpha$  is the speed of adjustment, which implies that  $(1 - \alpha)$  is persistence of disequilibrium, and  $\alpha\beta$  is the short-run impact of  $X$  on  $Y$ .  $\beta$  is the long-run impact of  $X$  on  $Y$ , which is obtained as  $(\alpha\beta/\alpha)$ .

Our sample includes over 3,000 continental US counties including the District of Columbia.<sup>1</sup> Due to different expected rural and urban responses, we separate metropolitan area (MA) and nonmetropolitan area counties in the empirical analysis.<sup>2</sup> We focus on 2000-2010 but also consider 1990-2000 for comparison; the earlier period contained robust employment growth nationally and in most states, while the latter period can be characterized by general economic weakness with little net job creation. The latter period also exhibits a general decline in economic migration (Partridge et al., 2012a), which would reduce the spontaneous economic equilibrating effects in local labor markets. We also consider the 2000-2007 and 2007-2010 sub-periods to assess whether the Great Recession (which began in Dec. 2007) altered longer-term patterns.

The dependent variables consist of measures related to economic outcomes associated with policy or economic success. We first consider the employment/population ratio (EPR) over the respective periods. The EPR captures labor market tightness attributable to both unemployment and labor force participation, in which the latter includes factors such as older workers who lose their jobs and move onto disability assistance (Autor et al., forthcoming). Favorable demand shocks will increase the EPR, suggesting that original non-employed residents benefit. The EPR is approximated by dividing the number of employed residents, using US Bureau of Labor

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<sup>1</sup>Following the US Bureau of Economic Analysis, there are cases where independent cities are merged with the surrounding county to form a more functional region (mostly in Virginia). Due to the lack of economic data, we omit 43 mostly small rural counties.

<sup>2</sup>We use the 2003 metropolitan area definitions from the US Census Bureau.

Statistics Local Area Unemployment Statistics data, by county population from the US Census Bureau.

Our second dependent variable is the poverty rate. Consistent with findings for previous decades, we expect to find that positive economic shocks reduce the poverty rate. This stands in contrast to arguments that suggest that impoverished workers with less inclination to work sort themselves into poor places. The 1990 and 2000 poverty rates are from the 1990 and 2000 Census of Population, while we use US Census Bureau SAIPE estimates for other years.<sup>3</sup>

We also use population growth as a dependent variable. Changes in the EPR suggest smaller (larger) migration adjustments as the new jobs are filled by previously unemployed and non-labor force participants. Because population data come from another source, the population model serves as confirmatory analysis of our EPR and poverty results.

Our regression models closely follow Partridge et al. (2012a), though we consider the poverty rate as a dependent variable, and include lagged adjustment effects to assess persistence. Variable details and sources of the explanatory variables can be found in the earlier paper. For each sub-sample, our base specification for a given county  $i$  located in state  $s$  is:

$$\mathbf{OUTCOME}_{is(t)} = \alpha + \lambda \mathbf{OUTCOME}_{is0} + \theta \mathbf{ECON}_{is0} + \phi \mathbf{GEOG}_{is0} + \gamma \mathbf{AMENITY}_{is} + \delta \mathbf{DEMOG}_{is0} + \sigma_s + \varepsilon_{is(t-0)},$$

where the dependent variables are EPR and the poverty rate measured in period  $t$  (e.g., 2000, 2010), and the population growth rate measured over the entire decade (1990-2000, 2000-2010).

$\mathbf{OUTCOME}_{is0}$  is the initial-period level of the dependent variable (except in the population model). A larger  $\lambda$  indicates greater persistence.  $\mathbf{ECON}$  includes economic characteristics of the county,  $\mathbf{GEOG}$  is a vector of variables that measure the location's access to the urban hierarchy,  $\mathbf{AMENITY}$  contains measures of natural amenities, and  $\mathbf{DEMOG}$  contains demographic/human capital attributes. The regression coefficients are  $\alpha$ ,  $\lambda$ ,  $\theta$ ,  $\phi$ ,  $\gamma$ , and  $\delta$ ;  $\sigma_s$  are state fixed effects that account for common features within a state; and  $\varepsilon$  is the error term, assumed to be spatially

<sup>3</sup>The 1990 and 2000 poverty rates are for the previous years, as the Census measures income in the prior year. The SAIPE estimates are poverty rates from a computer model. While the Census is more accurate, the correlation between the SAIPE and Census poverty estimates is approximately 0.95, suggesting that SAIPE data are reliable.

correlated.<sup>4</sup> The explanatory variables are lagged (initial-period) values to mitigate endogeneity concerns.

The primary **ECON** variable is the industry mix employment growth for each period. It is the ‘share’ variable from shift-share analysis (Bartik, 1991; Bound and Holzer, 2000) and is constructed by summing the products of the initial-period county industry shares and the national industry growth rates.<sup>5</sup> Industry mix employment growth represents the overall growth rate that would occur in a county if all of its industries grew at their respective national rates. Variation in county job growth is solely due to different initial industry composition. If an industry experiences a national or international demand shock, it influences the county’s industry mix growth rate through its intensity in the county. The industry mix variable’s key empirical benefit is that it represents exogenous demand shocks to the local labor market conditional on initial local industry composition. A key advantage of our industry mix variable compared to past research, including Partridge et al. (2012a), is our use four-digit industry data versus one- or two-digit data—which provides a more precise depiction of industry shocks.<sup>6</sup>

To the extent that migrants are attracted to a region with favorable (industry mix) labor demand shocks, the EPR and local poverty rate are affected to a lesser extent. The industry mix variable will be more strongly related to the EPR and the poverty rate, the more local labor supply, rather than migrants, satisfy local labor demand shocks. In contrast to using overall measures of employment or population growth (Fodor, 2012), use of the industry mix variables allows us to isolate labor demand effects on poverty.

**GEOG** contains measures of agglomeration economies including spatial distance measures that reflect proximity to urban areas differentiated by their tier in the hierarchy. First, is distance to

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<sup>4</sup>The residual is assumed to be spatially correlated with neighboring counties in their Bureau of Economic Analysis functional economic region but independent of county residuals outside the region.

<sup>5</sup>Industry mix employment growth for a county equals  $\sum_i (e_i/E) * gn_i$ , in which  $e_i$  is county employment in industry  $i$ ,  $E$  is total county employment, and  $gn_i$  is the national employment growth rate for industry  $i$ . Driven by national or international shocks, the industry mix growth rate is often used as an exogenous measure of total employment growth.

<sup>6</sup>The source of the four-digit industry level data is the EMSI consulting company. Typically, public data sources do not report detailed industry data at the county level in order to maintain confidentiality. EMSI produces accurate data for industries that are not publicly disclosed through an algorithm that uses many government data sources. For details of EMSI’s process, see Dorfman et al. (2011).

the nearest urban center of *any* size including micropolitan areas. For a county that is part of a MA, this distance is from the population-weighted center of the county to the population-weighted center of the MA. For a nonmetropolitan county, distance is measured from the county center to the center of the nearest urban area.<sup>7</sup>

Beyond the nearest urban center, we include the incremental distances to more populous higher-tiered urban centers: incremental distance in kilometers from the county to reach a MA of any size; and the incremental distances to reach MAs of at least 250,000, 500,000, and 1.5 million people.<sup>8</sup> The incremental distance terms reflect incremental distance costs to reach successively higher tiers of the urban hierarchy, akin to a Central Place Theory notion of the hierarchical relationships in an urban system. The largest population-size category generally reflects national and top-tier regional centers. Generally, more remote counties have less economic growth, lower wage and land prices and higher poverty (Partridge et al., 2008c). The **GEOG** vector also includes the county's population, as well as the population of the nearest/actual urban center to account for net urbanization economies. Finally, the vector includes the county land area in square miles.

We account for natural amenities (**AMENITIES**) with a 1 to 7 scale provided by the US Department of Agriculture using measures of climate, proximity to water, topography, etc. Three indicator variables are added for close proximity (within 50kms) to the Atlantic Ocean, Pacific Ocean, and the Great Lakes. State fixed effects control for policy differences such as tax or welfare policies, as well as other state-specific omitted influences. Thus, the other regression coefficients are interpreted as the average response for *within*-state changes in the explanatory variables.

The **DEMOG** vector includes several variables associated with human capital and mobility, all measured in the initial period. There are five variables measuring race or ethnicity; four variables measuring county educational attainment; percent of the population that is female; percent of the population that is married, and the percent with a work disability.<sup>9</sup>

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<sup>7</sup>For a one-county urban center, the distance term is zero. The MA population is based on initial-year population.

<sup>8</sup>For a county already located in a MA or micropolitan area, the incremental value to reach a micropolitan area or MA (of any size) is zero. See Partridge et al. (2008c) for more details of the incremental distances and maps that illustrate their construction.

<sup>9</sup>In models that use 1990 as the initial year, there are only four race and ethnicity measures due to data availability.

#### 4. Empirical Results

The descriptive statistics and the regression results for the key variables are presented in Tables 1-4, with the MA results in the upper panels and the nonmetropolitan results in the lower panels. In Table 2, columns 1-3 report the 1990-2000 results for the 2000 EPR, 2000 poverty rate, and 1990-2000 population growth; columns 4-6 report the corresponding results for the 2000-2010 period. In Table 3, columns 1-3 report the 2000-2007 results for the 2007 EPR, 2007 poverty rate, and 2000-2007 population growth; columns 4-6 report the corresponding results for the 2007-2010 period. Table 4 reports the results of adding the change in manufacturing employment share to the models featured in Table 2.

From Table 2, we can see that the coefficients on the lagged EPR range from, 0.66 to 0.79 in the 2000 model, and from 0.81 to 0.96 in the 2010 model (columns 1 and 4). Lagged variable coefficients also are larger in the latter period for the poverty rate (columns 2 and 5), increasing roughly from 0.6 to 0.9 in both metropolitan and nonmetropolitan areas. The large lagged coefficients suggest a high level of persistence in the disequilibrium adjustment process to spatially asymmetric shocks, which increased post-2000.

The coefficient on the 1990-2000 industry mix variable is not statistically different from zero for metropolitan areas and is small for nonmetropolitan areas in the 2000 EPR model, suggesting that almost all of the newly created jobs went to new residents. Yet, in both samples there were significant anti-poverty effects associated with the newly created jobs, possibly through wage effects, or through poor residents moving up the job ladder to better jobs (Bartik, 2005). A one percentage point increase in industry mix employment growth during the 1990s reduced poverty by approximately 0.045 percentage points in metropolitan areas and 0.067 percentage points in nonmetropolitan areas in the short run. The corresponding long-run impacts are calculated to equal 0.11 ( $0.045/(1-0.598)$ ) and 0.16 percentage points ( $0.067/(1-0.583)$ ), respectively. These fall within the range of those reported by the studies reviewed above for U.S. counties.

The industry mix coefficients for the 2010 employment rate are larger than for the 2000

employment rate, ranging from 0.13 to 0.32. The short-run anti-poverty effect of industry mix employment growth rises to 0.065 percentage points in metropolitan areas post-2000, while remaining approximately the same in nonmetropolitan areas at 0.063 percentage points. Nevertheless, because estimated poverty persistence increased dramatically post-2000, the long-run estimated anti-poverty effects of a one-percentage point rise in employment growth equals 0.64 percentage points in nonmetropolitan areas and 1.02 percentage points in nonmetropolitan areas, which represent substantial increases from the 1990s.

Columns 3 and 6 of Table 2 contain the corresponding results when using 1990-2000 and 2000-2010 percent population growth as the dependent variable. Population growth as the dependent variable precludes the use of lagged population as a measure of persistence. The population growth model results confirm the EPR and poverty results. There is almost a one-for-one MA migration response in the 1990s to industry mix employment growth and about a 0.75 response in nonmetropolitan areas. In contrast, the population growth responses range between 0.17 and 0.20 during 2000-2010, indicating smaller migration responses to economic shocks (Partridge et al., 2012a) and larger responses in the EPR and poverty rate.

The significant anti-poverty effects of faster industry mix employment growth during 2000-2010 contrast with the lack of relationship between growth and poverty reported by Fodor (2012). A key difference is that the use of industry mix employment growth isolates the influence of labor demand, whereas, overall population and employment growth reflect both demand and supply influences, and increases in labor supply would have less of a poverty reducing role. Therefore, in results not shown, to confirm this conjecture we replace industry mix employment growth as an independent variable in the 2010 regressions with overall employment growth.

The anti-poverty effect of overall employment growth is less than one-half that for industry mix employment growth in nonmetropolitan areas and less than one-third as large in metropolitan areas. This is likely because overall employment growth also reflects labor supply influences. Consistent with the lower poverty responses, there also are noticeably lower

employment rate effects and greater population growth responses to overall employment growth in both metropolitan and nonmetropolitan areas.

We now further explore whether the Great Recession altered adjustment patterns by splitting the sample for the latter period into 2000-2007 and 2007-2010 sub-samples. We then re-estimate the model using 2007 and 2010 employment and poverty rates as dependent variables and the employment industry mix variables measured over 2000-2007 and 2007-2010 (shown in Table 3).<sup>10</sup> Correspondingly, the response of population growth to industry mix employment growth is examined during the sub-periods.

The results for EPR are similar across post-2000 periods, with little difference in the estimates of persistence and industry mix effects. For the poverty rate, estimated persistence is noticeably higher for the 2000 to 2007 period for both metropolitan and nonmetropolitan areas, with values at or near unity. The industry mix employment effect on the poverty rate drops off by more than half during 2007-2010 in nonmetropolitan areas, and becomes statistically insignificant. Consistent with reports in the literature of declining U.S. internal migration during the Great Recession (Saks and Wozniak, 2011; Rickman and Guettabi, 2013), population became unresponsive to industry mix employment growth in nonmetropolitan areas and is negative and significant in metropolitan areas.

The reduced responsiveness of poverty to industry mix employment growth in the face of declining migration in nonmetropolitan areas suggests that other factors drove changes in regional poverty differentials during the recession. For one, such a finding is consistent with an abundance of labor for employers to hire, which means they may not hire as many disadvantaged workers out of the poverty pool. Another possible factor could be the fallout from the housing market, such as reduced local consumption through household debt deleveraging induced by declining housing prices (Mian and Sufi, 2009; 2011; Rickman and Guettabi, 2013). In fact, overall employment growth, subjected to the adverse effects of regional housing markets,

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<sup>10</sup>With the exception of the industry mix variables that which correspond to the respective sample periods, we use the same explanatory variables in both the 2000-07 and 2007-10 models. We experimented with models that omit the demographic variables but the results were robust to those changes.

significantly reduced poverty during the recession (results not shown). In general, employment growth also continued to be associated with population growth during the recession. The reduced persistence of poverty in the latter period points to other forces altering the previous regional poverty differentials.

Finally, Table 4 shows the results from adding the change in the manufacturing share of employment for 1990-2000 and 2000-2010. This assesses whether manufacturing had differing employment growth effects from the average across industries. We examine manufacturing separately because of its prominence in the discussion of adverse globalization effects on U.S. employment (Autor et al., forthcoming) and its general exogeneity to local demand conditions. Descriptive statistics for the sector employment shares are included in Table 1.

The change in the manufacturing share shows some significantly different effects in both decades (Table 4). In the 1990s, the greater the change in the manufacturing share, the larger was the employment rate response in both metropolitan and nonmetropolitan areas. The change in the manufacturing share also was associated with a lower population response in metropolitan areas during the decade. Manufacturing employment did not have a differential effect on poverty rates in any areas.

Post-2000, the manufacturing share continued to have a differentially significant positive effect on the employment rate, particularly in nonmetropolitan areas. Manufacturing employment also continued to be associated with a lower population response in metropolitan areas. In nonmetropolitan areas, the change in manufacturing share differentially affected the poverty rate; e.g., a hypothetical drop in the manufacturing share would raise the poverty rate more than an average employment decline in other industries. Thus, while manufacturing is a much smaller share of the US economy, its influence in lifting lesser skilled Americans into the middle class remains important.

## **5. Summary and Conclusions**

In this paper, we examined the reversal of 1990s U.S. regional poverty gains during the first decade of the 21<sup>st</sup> century. Using a disequilibrium adjustment approach, we find lower



population responses and increased employment rate responses to spatially asymmetric labor demand shocks post-2000. For metropolitan areas, a unit labor demand shock increased short-run poverty more in the recent decade, on average. Only for manufacturing did a labor demand shock have a larger short-run poverty effect post-2000 in nonmetropolitan areas. Regional poverty also became more persistent post-2000 in both metropolitan and nonmetropolitan areas, possibly because of reduced interregional labor market adjustments. The increased persistence of poverty led to substantially larger long-run area poverty effects of regional labor demand shocks after year 2000.

In separate analyses of the 2000-2007 and 2007-2010 periods, persistence of employment rates was found to not vary across the decade but poverty rate persistence decreased during the latter (recession) period in both metropolitan and nonmetropolitan areas. We also found greatly reduced responsiveness of poverty to industry mix employment growth during the recession in nonmetropolitan areas, becoming statistically insignificant, and an absence of a (or negative) population response to industry mix employment growth. Industry mix was negatively related to population growth in metropolitan areas during the recession, and had slightly larger poverty effects. The pattern of responses in nonmetropolitan areas suggests factors other than industry composition drove changes in regional poverty differentials during the recession. One possible explanation is that the abundance of available labor supply decreased demand for less skilled workers who were at greater risk for becoming impoverished. Another possible reason relates to the economic fallout from regional housing markets collapsing (Rickman, and Guettabi, 2013).

Overall, local employment growth continues to be an important influence on area poverty. To be sure, its importance increased post-2000 in metropolitan areas across industries generally and for manufacturing employment specifically in nonmetropolitan areas, particularly in the long run. Economic development efforts devoted to spurring local labor demand remain an important anti-poverty tool, though the relative effectiveness of various approaches to stimulating local demand remains an open question (Partridge and Rickman, 2006a, Ch. 9; Glaeser and Gottlieb, 2008; Bartik, 2012).

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Table 1: Descriptive Statistics

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
<b>Metropolitan Areas</b>					
Industry mix emp. growth 1990-2000	1053	0.168	0.054	-0.209	0.355
Industry mix emp. growth 2000-2007	1053	0.073	0.037	-0.123	0.2
Industry mix emp. growth 2007-2010	1053	-0.04	0.019	-0.144	0.047
Industry mix emp. growth 2000-2010	1053	0.031	0.05	-0.226	0.258
Employment population ratio 1990	1053	0.468	0.059	0.122	0.76
Employment population ratio 2000	1053	0.485	0.056	0.154	0.676
Employment population ratio 2007	1053	0.477	0.056	0.129	0.678
Employment population ratio 2010	1053	0.448	0.053	0.149	0.61
Poverty rate 1990 <sup>a</sup>	1053	13.268	6.261	2.18	56.84
Poverty rate 2000 <sup>a</sup>	1053	11.554	5.193	2.117	35.871
Poverty rate 2000 <sup>b</sup>	1053	10.882	4.436	1.7	31.7
Poverty rate 2007 <sup>b</sup>	1053	12.708	4.943	2.4	34.5
Poverty rate 2010 <sup>b</sup>	1053	14.712	5.194	3.5	35.8
Population growth rate 1990-2000	1053	0.181	0.18	-0.123	1.921
Population growth rate 2000-2007	1053	0.09	0.116	-0.649	0.825
Population growth rate 2007-2010	1053	0.026	0.037	-0.094	0.559
Population growth rate 2000-2010	1053	0.121	0.149	-0.453	1.12
Mft. Employment Share Chg. 1990-2000	1053	-0.022	0.038	-0.198	0.221
Mft. Employment Share Chg. 2000-2010	1053	-0.040	0.037	-0.251	0.062
<b>Non-Metropolitan Areas</b>					
Industry mix emp. growth 1990-2000	1971	0.13	0.047	-0.085	0.351
Industry mix emp. growth 2000-2007	1971	0.05	0.043	-0.16	0.269
Industry mix emp. growth 2007-2010	1971	-0.036	0.024	-0.146	0.093
Industry mix emp. growth 2000-2010	1971	0.015	0.058	-0.243	0.336
Employment population ratio 1990	1971	0.432	0.058	0.195	0.844
Employment population ratio 2000	1971	0.455	0.063	0.19	0.808
Employment population ratio 2007	1971	0.46	0.074	0.191	0.836
Employment population ratio 2010	1971	0.443	0.079	0.183	0.837
Poverty rate 1990 <sup>a</sup>	1971	18.531	7.998	2.402	63.118
Poverty rate 2000 <sup>a</sup>	1971	15.5	6.616	2.925	52.319
Poverty rate 2000 <sup>b</sup>	1971	14.608	5.643	2.7	42.2
Poverty rate 2007 <sup>b</sup>	1971	16.402	6.345	3.1	49.3
Poverty rate 2010 <sup>b</sup>	1971	17.917	6.358	3.2	49.1
Population growth rate 1990-2000	1971	0.074	0.134	-0.272	0.882
Population growth rate 2000-2007	1971	0.01	0.08	-0.313	0.79
Population growth rate 2007-2010	1971	0.006	0.028	-0.175	0.264
Population growth rate 2000-2010	1971	0.017	0.1	-0.38	0.898
Mft. Employment Share Chg. 1990-2000	1971	-0.019	0.05	-0.387	0.29
Mft. Employment Share Chg. 2000-2010	1971	-0.040	0.049	-0.386	0.195

Notes: <sup>a</sup>Poverty rate data from the Census of population; <sup>b</sup>Poverty rate data from US Census Bureau SAIPE.

Table 2: Empirical Results: 1990-2000 and 2000-2010

	1990-2000			2000-2010		
	2000 Emp. Ratio	2000 Poverty Rt.	1990-2000 Pop. Chg.	2010 Emp. Ratio	2010 Poverty Rt.	2000-2010 Pop. Chg.
<b>Metropolitan Areas</b>						
Lagged Employment Ratio	0.79*** (20.24)			0.811*** (22.75)		
Lagged Poverty Rate		0.598*** (15.65)			0.9*** (23.85)	
INDMIX Employment Growth	0.025 (0.99)	-4.582*** (-3.26)	1.026*** (8.1)	0.131*** (5.94)	-6.428*** (-3.9)	0.197* (1.85)
N	1053	1053	1053	1053	1053	1053
R <sup>2</sup>	0.907	0.92	0.577	0.878	0.909	0.45
<b>Non-Metropolitan Areas</b>						
Lagged Employment Ratio	0.657*** (19.47)			0.958*** (25.71)		
Lagged Poverty Rate		0.583*** (25.55)			0.936*** (40.9)	
INDMIX Employment Growth	0.039** (2.45)	-6.748*** (-4.81)	0.746*** (8.63)	0.317*** (13.25)	-6.559*** (-5.48)	0.166*** (3.01)
N	1971	1971	1971	1971	1971	1971
R <sup>2</sup>	0.865	0.896	0.544	0.778	0.908	0.459

Notes: For the 1990-2000 period, poverty data are from the decennial census; for 2000-2010, they are from SAIPE. Robust t-statistics from STATA cluster command are in parentheses. \*, \*\*, and \*\*\* indicates significance at 10%, 5%, and 1% level, respectively. In all models, control variables include: distance to nearest or actual Urban Center; incremental distance to a MA; incremental distances to MA > 250,000, > 500,000, and > 1,500,000 population; county population 1990/2000; population of nearest or actual MA 1990/2000; county area (sq. miles); amenity dummy variable represented by a 1 to 7 scale (USDA); proximity (within 50kms) to the Atlantic Ocean, Pacific Ocean, and the Great Lakes; state fixed effects; demographic variables including five ethnicity shares (four for 1990); four education shares; %females; % married; and % with a work disability.

Table 3: Empirical Results: 2000-2007 and 2007-2010

	2000-2007			2007-2010		
	2007 Emp. Ratio	2007 Poverty Rt.	2000-2007 Pop. Chg.	2010 Emp. Ratio	2010 Poverty Rt.	2007-2010 Pop. Chg.
<b>Metropolitan Areas</b>						
Lagged Employment Ratio	0.898*** (31.21)			0.867*** (34.58)		
Lagged Poverty Rate		0.922*** (24.9)			0.755*** (26.58)	
INDMIX Employment Growth	0.108*** (3.93)	-4.988*** (-2.59)	0.638*** (5.8)	0.088** (1.98)	-5.812** (-2.01)	-0.236*** (-3.14)
N	1053	1053	1053	1053	1053	1053
R <sup>2</sup>	0.894	0.923	0.468	0.947	0.921	0.355
<b>Non-Metropolitan Areas</b>						
Lagged Employment Ratio	1.005*** (29.24)			0.933*** (43.28)		
Lagged Poverty Rate		1.004*** (32.99)			0.695*** (28.58)	
INDMIX Employment Growth	0.306*** (9.25)	-5.912*** (-4.87)	0.334*** (5.79)	0.385*** (10.22)	-2.172 (-0.82)	-0.007 (-0.2)
N	1971	1971	1971	1971	1971	1971
R <sup>2</sup>	0.801	0.925	0.483	0.927	0.899	0.344

Notes: The poverty data are from SAIPE. Robust t-statistics from STATA cluster command are in parentheses. \*, \*\*, and \*\*\* indicates significance at 10%, 5%, and 1% level, respectively. In all models, control variables include: distance to nearest or actual Urban Center; incremental distance to a MA; incremental distances to MA > 250,000, > 500,000, and > 1,500,000 population; county population 1990/2000; population of nearest or actual MA 1990/2000; county area (sq. miles); amenity dummy variable represented by a 1 to 7 scale (USDA); proximity (within 50kms) to the Atlantic Ocean, Pacific Ocean, and the Great Lakes; state fixed effects; demographic variables including five ethnicity shares (four for 1990); four education shares; %females; % married; and % with a work disability.

Table 4: Manufacturing Employment Share Results: 1990-2000 and 2000-2010

	1990-2000			2000-2010		
	2000 Emp. Ratio	2000 Poverty Rt.	1990-2000 Pop. Chg.	2010 Emp. Ratio	2010 Poverty Rt.	2000-2010 Pop. Chg.
<b>Metropolitan Areas</b>						
Lagged Employment Ratio	0.795*** (20.58)			0.812*** (23.19)		
Lagged Poverty Rate		0.599*** (15.38)			0.901*** (23.66)	
INDMIX Employment Growth	0.004 (0.18)	-4.153*** (-2.74)	1.101*** (8.36)	0.095*** (4.01)	-5.675*** (-2.97)	0.414*** (3.61)
Manufacturing Employment Share	0.077*** (3.20)	-1.738 (-0.96)	-0.305*** (-2.59)	0.079*** (3.45)	-1.701 (-0.86)	-0.478*** (4.03)
N	1053	1053	1053	1053	1053	1053
R <sup>2</sup>	0.908	0.92	0.58	0.88	0.909	0.458
<b>Non-Metropolitan Areas</b>						
Lagged Employment Ratio	0.661*** (19.12)			0.959*** (25.96)		
Lagged Poverty Rate		0.584*** (25.42)			0.943*** (40.27)	
INDMIX Employment Growth	0.025 (1.45)	-6.318*** (-4.47)	0.752*** (8.32)	0.168*** (5.41)	-3.604*** (-3.14)	0.177*** (2.73)
Manufacturing Employment Share	0.044*** (3.1)	-1.401 (-1.09)	-0.019 (-0.4)	0.32*** (11.65)	-6.50*** (-4.83)	-0.024 (-0.47)
N	1971	1971	1971	1971	1971	1971
R <sup>2</sup>	0.865	0.896	0.544	0.798	0.909	0.459

Notes: For the 1990-2000 period, poverty data are from the decennial census; for 2000-2010, they are from SAIPE. Robust t-statistics from STATA cluster command are in parentheses. \*, \*\*, and \*\*\* indicates significance at 10%, 5%, and 1% level, respectively. In all models, control variables include: distance to nearest or actual Urban Center; incremental distance to a MA; incremental distances to MA > 250,000, > 500,000, and > 1,500,000 population; county population 1990/2000; population of nearest or actual MA 1990/2000; county area (sq. miles); amenity dummy variable represented by a 1 to 7 scale (USDA); proximity (within 50kms) to the Atlantic Ocean, Pacific Ocean, and the Great Lakes; state fixed effects; demographic variables including five ethnicity shares (four for 1990); four education shares; %females; % married; and % with a work disability.