Understanding employment growth in the recession: the geographic diversity of state rescaling

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We conduct an employment growth model of all US county areas for the mild recession after 9/11 and the Great Recession. We find employment growth is positively related to educational attainment and state centralisation of fiscal responsibility and negatively related to manufacturing employment. We use Geographically Weighted Regression to explore the spatial diversity of responses and find neither theories of the developmental state nor austerity urbanism adequately predict locality response to the recession. State rescaling has shifted redistributive expenditure responsibility down to the local level, crowding out developmental investments and undermining local resilience.

Keywords: state rescaling, employment growth, recession, austerity, local government, spatial diversity

JEL Classifications: H73, R11, R12, R58

Introduction

This paper explores the implications of fiscal devolution on the ability of localities to show resilience in times of recession. This paper answers the call of Lobao et al. (2009) for more empirical research on the nature of state rescaling. We develop models for the mild recession after 9/11 and the period since the Great Recession (2007–11) and find divergent results across space.

US local governments are some of the most fiscally independent of any in the OECD and are responsible for a broad range of services from physical infrastructure to social services and education. Jurisdictional fragmentation is common so we aggregate all local government units to the county area and include both urban and rural places in our analysis. The state rescaling process, which devolved responsibilities to the sub-national state and local level, has increased reliance on locally raised revenue to provide basic social, infrastructural and economic development services. This state rescaling process has caused a shift in our historical understanding of local government as the developmental state (Peterson, 1981), because devolution (and the mandates that accompany it) has forced local governments to assume more redistributive functions (Lobao and Adua, 2011).1 Facing the challenge of the current recession, US states themselves are under fiscal stress and have cut aid to localities and decentralised more fiscal responsibility to the local level (Mitchell, 2012). In times of crisis, local government obligations for redistributive expenditures grow.
We conduct geographically weighted regression (GWR) to illustrate differential spatial effects across county areas. GWR enables an exploratory analysis of the divergence in local response under conditions of austerity. We find differences in employment growth are related to educational attainment, manufacturing dependence and level of state centralisation of fiscal responsibility. This geographic variation challenges traditional notions of a standard global response and calls for urban scholars to employ models, which allow spatial disaggregation, and policy recommendations, which are more nuanced to spatial differences. Differential geographic effects show the critical role of both state and local government in a multi-level governance system and the importance of education investments in building local economies more resilient to recession.

Literature review

Recession, austerity and local government response

The Great Recession of 2007 has spawned an austerity crisis for state and local government as government tax receipts have dropped, service demands have risen, and business demands for bailouts have taken up any excess government capital. Geographers have noted that cities, especially, are victims of austerity (Christopherson et al., 2013), as are the poor, the young, the elderly and minority groups (Bardhan and Walker, 2011; Donald et al., 2013; Glasmeier and Lee-Chuvala, 2011). However, we expand this focus by looking at suburban and rural areas as well and are able to show the distribution of recessionary impacts across the full metropolitan scale.

To capture a more comprehensive picture of the shifting fiscal responsibilities between the local, state and federal levels in the process of state rescaling, we explore several key fiscal policy variables: local fiscal effort, state and federal aid to localities and state centralisation of fiscal responsibility. Local fiscal effort, measured as locally raised revenue relative to local capacity, varies widely as does the level of inter-governmental aid from the state and federal level. Embedded in the process of state rescaling is the level of centralisation of fiscal responsibility at the state level, which also shows wide variation across states. Prior research has found state centralisation to be more important than inter-governmental aid in reducing local government fiscal stress (Johnson et al., 1995; Warner, 2001; Warner and Pratt, 2005). This process of state rescaling and its impact on the resilience of localities to the recession is our primary focus.

Under state rescaling, both states and localities can follow divergent paths. Donald et al. (2014) argue that an austerity machine has replaced the traditional growth machine of local government originally described by Logan and Molotch (1987). This austerity machine results from the impacts of the financial crisis on state and local government revenue and reflects the ways in which austerity is being used to rewrite the social contract, reduce public services and enhance private control of governmental processes (Donald et al., 2014; Peck, 2014; Warner and Clifton, 2014). While some scholars celebrate the city as a growth engine and source of innovation (Glaeser, 2011; Katz and Bradley, 2013), others recognise the pressures of a multi-level governance system forcing cities to hollow out services but also enabling a varied response across cities (Warner and Clifton, 2014). Cities have always been entrepreneurial (Jessop, 2002), but with the recession, the use of business incentives among both cities and counties has increased dramatically (Warner and Zheng, 2013), while state funding for education and social services has declined (Leachman and Mai, 2013). But research also shows the critical importance of infrastructure investment, especially in education (Evans and Karecha, 2014; Reese, 2012). Thus, models of economic growth give special attention to the role of public investment and inter-governmental aid.

US localities are engaged in competitive economic development activities with real
winners and losers in a process some have termed ‘destructive competition’ or a ‘race to the bottom’ (Zheng and Warner, 2010). Efforts to reduce taxes and redistributive expenditures create special burdens on the poor, who are concentrated not just in inner cities, but also in adjacent inner ring suburbs and outlying rural areas—areas were costs of services are higher (Katz, 2001; Warner, 2001, 2006). This leads to lower quality public services in these communities, which further constrains development prospects—a vicious cycle, contrasted with the virtuous cycle of greater economic development investment in localities facing less need and less fiscal stress (Warner and Pratt, 2005). Spatial inequality in public investment and economic development is further exacerbated by decentralisation. While economic theory promised decentralisation would promote growth, empirical research across a range of OECD counties has found the opposite (Rodriguez-Pose and Bwire, 2004; Rodriguez-Pose et al., 2009).

A variety of processes characterise government action at the local scale. In some cities, we see a process of speculative urbanism (Davidson and Ward, 2014) investing in amenities that benefit the creative class (Florida, 2002), but ignoring the core infrastructural needs for economic development. Over reliance on short-term consumption at the expense of long-term investment can undermine development (Gardiner et al., 2013) and undermine resilience (Hall and Lamont, 2013). In other areas, we see the urbanisation of neoliberal austerity (Peck, 2014), as cities hollow out and privatise services. Cities and counties across the USA have cut services and laid off workers in an effort to address their fiscal constraints (Mitchell, 2012). The austerity-oriented shift of local government towards neoliberal governance usually embraces a policy package of limiting government services and promoting unsustainable development incentives (Harvey, 2005; Prasad, 2006). However, we also see evidence of Polanyi-style push backs as US cities and counties attempt to ride the wave of neoliberal market approaches and structure markets so public service needs may be met despite fiscal austerity (Warner and Clifton, 2014). Privatisation rates have not risen in US localities since the recession (Hefetz et al., 2012) and insourcing of previously contracted services equals new contracting out (Warner and Hefetz, 2012). A similar push back is also found in a re-municipalisation movement in some cities in western Europe (Hall et al., 2013).

The process of state rescaling under devolution is uneven. We see diverse responses across localities and states, and geographers need a broader frame than austerity urbanism to capture this diversity. For example, Lobao and Adua (2011) examine the geography of local austerity policies based on a survey in 2008 with cross-time policy comparisons with 2001 from over 1700 US counties. They find territorially varied local policy responses to current fiscal challenges under the devolutionary state rescaling process. The degree to which localities follow the conventional expected neoliberal policy paths are determined by specific institutional qualities of state and local government (Brenner, 2004; Lobao and Adua, 2011; Peck and Tickell, 2002). This tends to create variations in on-the-ground policy response within the nation, which requires a more geographically disaggregated modelling approach.

Our analysis is focused primarily on state rescaling under devolution and the importance of the local and sub-national state scale. We give special attention to local fiscal effort and state policy (state centralisation of fiscal responsibility and state aid to localities) on the employment response of county areas in two recessions, the weak recession after 9/11 and the Great Recession after 2007. States vary dramatically in their policies as regards local government powers (for example, tax and expenditure limitations), their level of state aid to localities and their level of centralisation of expenditure responsibility. For example, despite its high level of state aid to localities, New York is one
of the most decentralised states in the country, which causes local fiscal effort to be among the highest. Education and social service expenditures (borne most heavily by counties and school districts) are the largest components that differentiate centralisation across states (see online Supplementary Appendix Table 1 for State Centralization Scores). While our focus is primarily on state rescaling and its impacts, we control for the standard variables considered in most economic models of recession and employment growth.

Modelling economic growth

The early growth literature, grounded in economic base theory, explored regional growth measured by population and employment. Carlino and Mills (1987) studied the determinants of population and employment densities for all US counties through analysis of the effects of economic, demographic, climatic and policy-related variables on growth during the 1970s. They found local economic and demographic conditions matter for employment growth but local government education expenditure and tax policy were also found to play a role. With the shift of the national economy from goods to service producing, subsequent studies have broadened growth measurements by including income to capture capital effects on growth (Deller and Lledo, 2007).

Recent studies have found human capital, education, amenities, financial structure and public fiscal policies matter for economic growth (Reese, 2012). Shaffer (2002) included education to capture accumulated level of human capital, public fiscal policies to measure macroeconomic stability, firm size in different industries, climate, demographics, market size and agglomeration effects. In a study of non-metropolitan growth dynamics, Partridge et al. (2008) modelled distance to different tiers in the urban hierarchy and controlled for demographic attributes, such as race and age, economic characteristics, such as income, and amenities, such as climate and typography. Deller and Lledo (2007) and Deller (2010) included historical growth, market demand, market supply, credit markets, infrastructure, government, economic structure, agglomerations, geographic location and politics.

Urban geographers have given special attention to regional divergence in economic growth. Gardiner et al. (2013) identified a virtuous cycle of high growth, which promotes further spatial agglomeration and increased productivity in favoured areas in the UK. Meegan et al. (2014) found austerity exacerbates this spatial imbalance. Simmie and Martin (2010) explore the role of adaptability to economic shocks and find endogenous investments in education are more critical to economic resilience than industrial attraction strategies. Christopherson et al. (2010) find resilience in some old industrial regions in the USA, which missed the boom but have weathered the recession better than their Sunbelt counterparts, precisely because of their diversified economies and investments in health and education. Our study includes attention to demographic, economic and spatial effects to better understand the relationship between state rescaling and local resilience to recession.

Understanding spatial variation in growth and in policy response

Due to regional differences in economic structure and the nature of state rescaling, economic growth is spatially varied. While economic geographers often control for differences across sub-regions, the limits of conventional global regression approaches is revealed by variables which have positive and negative effects on growth in different regions. Partridge et al. (2008) found spatial heterogeneity in the growth effects of amenities and human capital, particularly college graduate shares. For example, education to increase human capital may result in a ‘brain drain’ for rural areas but growth in urban places. As educated households
and high skill firms prefer amenity-rich areas, the initial college-educated population share in the area with a weak industry mix or poor amenities would be inversely associated with subsequent local job growth.

Spatial heterogeneity has been found for state and local fiscal policies. Under decentralisation, unfunded mandates for programme delivery at the local level may result in enhanced resident well-being for localities with abundant resources while exacerbating the need-capacity gap for places with limited resources. Prior studies of US county areas have found rural or non-metropolitan non-adjacent counties to have higher fiscal burden, lower quality of services, weak human capital and unsustainable development (Dewees et al., 2003; Johnson et al., 1995; Lobao and Kraybill, 2005). In contrast, clusters of suburbs with the ability to benefit from tax exporting and service spillovers from neighbouring urban counties have lower fiscal burden (Warner, 2006). State centralisation of fiscal responsibility has been shown to be an important tool to promote development and address inequality under devolution (Warner, 2001). However, the effects of fiscal policy under state rescaling are not spatially uniform. Warner and Pratt (2005) used a neural network approach and found spatial variation in state centralisation of fiscal responsibility resulted in virtuous and vicious development cycles for different types of county areas.

The spatial variation of economic growth and of policy effects reveals the importance of spatial regression techniques to expose local variations masked by average global estimates. Brunsdon et al. (1996), and Fotheringham et al. (2002) introduced the non-parametric approach, geographically (or locally) weighted regression (GWR), which allows explanatory variables to have differential effects across geographic space. The GWR model has been widely used to efficiently test for spatial heterogeneity in parameter estimates. We use GWR to disaggregate the classic global statistical model and explore spatial heterogeneity in impacts of key variables on employment growth. Our analysis unfolds the geographically varied development patterns across US county areas during the mild recession after 2001 and the great recession since 2007. We employ GWR as an exploratory technique to unpack the different relationships we find between economic structure, educational attainment and state centralisation so we can better understand the impacts of state rescaling on local resilience to recession.

**Empirical model**

**Study unit**

We use county areas, a Census aggregation of all local governments within counties (cities, villages, towns and special districts) for the entire continental USA. This enables a more comprehensive study than one which just looks at cities (and thus misses the important impacts on neighbouring suburban and rural municipalities). County areas include special districts, such as schools, which are often the largest user of local property tax revenues, and thus capture a more complete picture of public expenditure and investment at the local government scale. In addition, counties themselves are an important part of the US local government system and the fastest growing general purpose governments in terms of both social service provision and economic development (Benton, 2002; Lobao and Hooks, 2003; Lobao and Kraybill, 2005). State rescaling scholars are finding complex spatial variation of local policy responses to decentralisation and austerity (Lobao and Adua, 2011; Warner and Pratt, 2005) and our comprehensive measures of state rescaling through state and local government finance variables allow us to capture this diversity.

**Data sources**

Data are divided into four parts: government finance measuring state rescaling, demographic/socioeconomic data, metropolitan status and economic structure. Our model combines
employment data by place of residence from the Census of Population and Housing for 1990 and 2000 and the American Community Survey rolling averages for 2005–09 and 2007–11. The American Community Survey replaced the Census for all income and employment data and most demographic data. Data are provided in 5-year rolling averages built up from annual surveys. We use the first available rolling average (2005–09) period to capture the mid-point, 2007, just before the Great Recession and the most recent rolling average, 2007–11 to capture the Great Recession. We build models for both the weak recessionary period after 2001 and the deep recessionary period of the Great Recession beginning in 2007. We complement the demographic and employment data with county area finance data from the US Census of Governments Finance Files, collected quinquennially for 2002 and 2007 to fit the two periods. Metro status is based on urban rural continuum codes (which measure metropolitan adjacency) from the USDA Economic Research Service for 2003 and 2013 and principal city data from the Office of Management and Budget 2000 standards (No. 08-01 Bulletin) and 2010 standards (No. 13-01 Bulletin) to differentiate core metropolitan counties from outlying suburban ones.

**Conceptual model**

The conceptual model is as follows:

\[
\text{Change in Employment Growth} = f \{\text{Government Fiscal Policy} + \text{Historical Growth} + \text{Demographic & Human Capital} + \text{Economic Well-being} + \text{Metropolitan Status} + \text{Industrial Structure}\}
\]

Our model specification follows the structures described in the literature above but we constrain our focus to employment growth as that has been especially problematic in the latest recession. The dependent variable is the county level percentage change in total employment for the period 2000 – 2005–09 and the period 2005–09 to 2007–11. Our major interest is in the impacts of government fiscal policy at different spatial scales and in different recessionary periods (weak and deep). In each model, we use fiscal data from the beginning of the period for each government level: federal, state and local. We expect spatial variation in local responses to recession and austerity. Federal fiscal policy is measured by federal aid per capita. State rescaling is represented by fiscal variables: state aid per capita and state centralisation of fiscal responsibility. State centralisation is the ratio of state expenditure to all state and local expenditure and captures the differential extent to which states decentralise expenditure responsibility to the local level across states. Local effort is measured as the ratio of locally raised revenue (including all forms of taxes, user fees and other local revenue) to capacity to pay (per capita income). Local fiscal effort captures the level of local revenue raising relative to local capacity and thus serves as a proxy for fiscal stress.

Employment growth is conditional upon historical information and initial conditions of a set of control variables (Carlino and Mills, 1987). We control for demographic characteristics, industrial structure and per capita income growth in the previous period. 1990–2000 is the prior period for our mild recession after 2001, and 2000 – 2005–09 is the prior period for the deep recession after 2007. To account for the effects of demographic and human capital, we include the initial year values for share of population aged 25 years and older with high school and bachelor degrees, percent foreign born, and percent White and the dependent population share defined as older than 65 years and younger than 18 years.

Local economic well-being is measured by the unemployment rate, average household wage, poverty rate and GINI coefficient of income inequality at the beginning of the period. We expect economic growth to be spatially varied due to differences in local fiscal policy, demographic need and economic structure. To control for effects of local economic
base, the initial occupation share is included for construction, manufacturing, retail, FIRE (finance, insurance and real estate), transport and public administration to capture the effects of industrial structure on growth.

We expect differences by metropolitan status and urban adjacency. We use percent urban population to capture more urbanised counties and non-metropolitan non-adjacent to differentiate outlying rural places. Both core urban and remote rural places have been found to face higher service delivery costs (Lobao and Kraybill, 2005; Warner, 2006). In contrast, metropolitan outlying counties are able to benefit from tax exporting and service spillovers from neighbouring urban counties. Thus, we include a control for outlying suburban counties in the model.

Table 1 presents the mean and standard deviation for all model variables for the two periods. It also presents paired T-tests that show when the change in means is significant over the two time periods captured in our two models. Table 1 clearly shows the deepening effects of recession over the two modelled time periods. We see our dependent variable, employment growth, is negative for both periods, but the decline in the deep recession period is more widespread.

Employment growth was positive (1%) in the 1990–2000 period but was unevenly distributed. The states with the highest numbers of counties experiencing negative employment growth in the pre-recessionary 1990–2000 period were North Carolina, South Carolina and Delaware in the east and the western resource-dependent areas of Texas, Kansas, South Dakota and North Dakota and the western states (California, Nevada, Washington and Montana) (see online Supplementary Appendix Figure 1). Employment growth dropped from 1% nationally in the pre-recessionary period (1990–2000) to −1.2% in the 2000 – 2005–07 period and to −1.29% in the 2005–11 period.

Maps of employment growth show negative growth for most counties in the weak recession, but positive growth is found in mining and natural resource-dependent areas in West Virginia, Louisiana, west Texas and across the Upper Mountain West (North and South Dakota, Montana, Wyoming, Utah and Nevada) (see online Supplementary Appendix Figure 2). This shows how much can change in a decade, with the resource boom leading to growth in these areas during the subsequent recessionary period. By the period of the Great Recession, we see negative employment growth across the entire country with only a few counties in Texas, North and South Dakota showing positive employment growth rates (see online Supplementary Appendix Figure 3).

Prior period population growth was 11% on average in the 1990–2000 period but dropped to 2.55% in the 2000 – 2005–09 period. Likewise per capita income growth dropped from 18% to just 1.6%. Paired T-tests of model variables also show rising poverty and unemployment in both periods despite rises in educational levels. While federal and state aid grew, state centralisation of fiscal responsibility dropped slightly and local fiscal effort increased dramatically. This illustrates the greater importance of state centralisation than state aid on local effort and its importance to the study of state rescaling under austerity. We see only slight shifts in industrial composition during the two recessions. Employment in manufacturing and retail dropped, as expected. Employment in construction and FIRE increased very slightly.

Model results
Results of the three general models are presented in Table 2. The first model is a standard Ordinary Least Squares (OLS). Although county areas are the study unit, the data are organised at more than one level to reflect the multi-level nature of government fiscal policy, specifically regarding state aid and state centralisation. Therefore, Model 2 uses multi-level fixed effects to control for state variance and correct state heterogeneity bias effects. Moran’s I indexes of employment
growth are statistically significant, thus our third model is a spatial error model, which corrects for spatial autocorrelation of county employment growth. While Table 2 shows standardised betas for ease of comparison across variables within each model, we also

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<tr>
<td>Employment growth, %</td>
<td>-1.20</td>
<td>2.95</td>
<td>-1.29</td>
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<tr>
<td>Historical growth</td>
<td></td>
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<tr>
<td>Prior population growth, %</td>
<td>11.13</td>
<td>16.06</td>
<td>2.55</td>
</tr>
<tr>
<td>Prior employment growth, %</td>
<td>0.97</td>
<td>2.29</td>
<td>-1.20</td>
</tr>
<tr>
<td>Prior per capita income growth, %</td>
<td>1784</td>
<td>9.90</td>
<td>1.63</td>
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<tr>
<td>Natural log of population</td>
<td>10.23</td>
<td>1.40</td>
<td>10.25</td>
</tr>
<tr>
<td>Percent dependent (&lt;18, &gt;65)</td>
<td>32.57</td>
<td>3.16</td>
<td>31.14</td>
</tr>
<tr>
<td>Percent high school graduates</td>
<td>34.72</td>
<td>6.54</td>
<td>35.98</td>
</tr>
<tr>
<td>Percent college graduates</td>
<td>16.49</td>
<td>7.77</td>
<td>18.65</td>
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<tr>
<td>Percent White</td>
<td>84.85</td>
<td>15.94</td>
<td>84.34</td>
</tr>
<tr>
<td>Percent foreign born</td>
<td>3.40</td>
<td>4.72</td>
<td>4.16</td>
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<tr>
<td>Economic well-being</td>
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<tr>
<td>GINI coefficient</td>
<td>0.434</td>
<td>0.039</td>
<td>0.431</td>
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<tr>
<td>Percent poverty</td>
<td>14.16</td>
<td>6.53</td>
<td>15.43</td>
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<tr>
<td>Natural log of average wage</td>
<td>9.42</td>
<td>0.27</td>
<td>9.40</td>
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<tr>
<td>Percent unemployment</td>
<td>5.71</td>
<td>2.69</td>
<td>6.87</td>
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<tr>
<td>Metropolitan status</td>
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<tr>
<td>Percent urban</td>
<td>40.06</td>
<td>30.86</td>
<td>40.06</td>
</tr>
<tr>
<td>Non-metropolitan non-adjacent</td>
<td>N = 965 (31.1%)</td>
<td>N = 965 (31.1%)</td>
<td></td>
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<tr>
<td>Metropolitan outlying (suburb)</td>
<td>N = 424 (13.7%)</td>
<td>N = 424 (13.7%)</td>
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<td>State rescaling</td>
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<tr>
<td>Federal aid per capita</td>
<td>93.78</td>
<td>139.41</td>
<td>114.05</td>
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<tr>
<td>State aid per capita</td>
<td>1188.49</td>
<td>485.80</td>
<td>122702</td>
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<td>State centralisation, %</td>
<td>46.33</td>
<td>6.63</td>
<td>46.24</td>
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<tr>
<td>Local effort (local revenue/per capita income)</td>
<td>9.03</td>
<td>5.31</td>
<td>10.39</td>
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<td>Occupational structure</td>
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<tr>
<td>Percent construction</td>
<td>7.72</td>
<td>2.38</td>
<td>8.27</td>
</tr>
<tr>
<td>Percent manufacturing</td>
<td>15.94</td>
<td>9.08</td>
<td>13.08</td>
</tr>
<tr>
<td>Percent retail</td>
<td>11.50</td>
<td>2.03</td>
<td>11.42</td>
</tr>
<tr>
<td>Percent FIRE</td>
<td>4.56</td>
<td>1.84</td>
<td>4.79</td>
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<tr>
<td>Percent transport</td>
<td>5.45</td>
<td>1.84</td>
<td>5.48</td>
</tr>
<tr>
<td>Percent public administration</td>
<td>5.35</td>
<td>3.01</td>
<td>5.40</td>
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A ‘repeated measures’ t-test was used to determine if two sets of data are significantly different from each other.
*T-tests compare model variables (change scores for growth variables) in the two models.
*Significance at 0.05 level; ***significance at 0.001 level.
Table 2. Regression results (standardised coefficients).

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<td></td>
<td>OLS, ML, SE</td>
<td>OLS, ML, SE</td>
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<tr>
<td>Historical growth</td>
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<tr>
<td>Prior period population growth</td>
<td>-0.140*** -0.127*** -0.122***</td>
<td>-0.056* -0.026 -0.050*</td>
<td>*** *** *</td>
</tr>
<tr>
<td>Prior period employment growth</td>
<td>-0.220*** -0.196*** -0.214***</td>
<td>-0.056* -0.049* -0.067**</td>
<td>*** *** ***</td>
</tr>
<tr>
<td>Prior period per capita income growth</td>
<td>0.068*** 0.080*** 0.066***</td>
<td>0.064** -0.003 0.020</td>
<td>*** *</td>
</tr>
<tr>
<td>Demographic and human capital</td>
<td></td>
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<tr>
<td>Natural log of population</td>
<td>-0.140*** -0.050† -0.105***</td>
<td>-0.133*** -0.023 -0.103**</td>
<td></td>
</tr>
<tr>
<td>Percent dependent (18, &gt;65)</td>
<td>-0.011 -0.051*** -0.023</td>
<td>0.077*** 0.010 0.076***</td>
<td>*** *</td>
</tr>
<tr>
<td>Percent high school</td>
<td>-0.024                   0.041</td>
<td>0.042 0.043 0.015</td>
<td></td>
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<tr>
<td>Percent bachelor+</td>
<td>0.075* 0.047 0.069†</td>
<td>0.144*** 0.124** 0.130**</td>
<td>*** *** ***</td>
</tr>
<tr>
<td>Percent White</td>
<td>0.214*** 0.298*** 0.281***</td>
<td>0.126*** 0.153*** 0.217***</td>
<td>*** *** ***</td>
</tr>
<tr>
<td>Percent foreign</td>
<td>0.105*** 0.122*** 0.120***</td>
<td>-0.019 0.020 0.031</td>
<td>*** *** ***</td>
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<tr>
<td>Economic well-being</td>
<td></td>
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<tr>
<td>GINI coefficient</td>
<td>0.012                   −0.007</td>
<td>-0.024 0.017 -0.019</td>
<td></td>
</tr>
<tr>
<td>Poverty</td>
<td>-0.300*** -0.336*** -0.259***</td>
<td>-0.011 -0.082* -0.044</td>
<td>*** *** ***</td>
</tr>
<tr>
<td>Natural log of average wage</td>
<td>-0.110** -0.066† -0.079*</td>
<td>0.030 0.050 0.068</td>
<td>** *</td>
</tr>
<tr>
<td>Metropolitan status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent urban</td>
<td>0.060*                  0.005</td>
<td>0.037 0.058* -0.004</td>
<td>0.009</td>
</tr>
<tr>
<td>Non-metropolitan</td>
<td>-0.075*                 0.003</td>
<td>-0.031 0.045 0.086*</td>
<td>0.090†</td>
</tr>
<tr>
<td>Metropolitan outlying</td>
<td>-0.010                  -0.041</td>
<td>-0.024 0.033 0.011</td>
<td>0.020</td>
</tr>
<tr>
<td>State rescaling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal aid per capita</td>
<td>-0.052*** -0.039** -0.036*</td>
<td>-0.028 -0.023 -0.020</td>
<td>*</td>
</tr>
<tr>
<td>State aid per capita</td>
<td>-0.033*                 0.009</td>
<td>0.001 -0.035† 0.042*</td>
<td>-0.028</td>
</tr>
<tr>
<td>State centralisation</td>
<td>0.094***                 0.109***</td>
<td>0.073*** 0.099*** 0.183***</td>
<td>0.147***</td>
</tr>
<tr>
<td>Local effort</td>
<td>0.056***                 0.048***</td>
<td>0.022 -0.010 -0.013</td>
<td>0.110*** ** **</td>
</tr>
<tr>
<td>Occupational structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent construction</td>
<td>0.001                   -0.041*</td>
<td>-0.007 -0.106*** -0.076***</td>
<td>-0.065** **</td>
</tr>
<tr>
<td>Percent manufacturing</td>
<td>-0.306*** -0.278*** -0.256***</td>
<td>-0.163*** -0.141*** -0.145***</td>
<td>*** *** ***</td>
</tr>
<tr>
<td>Percent retail</td>
<td>-0.028†                 -0.045**</td>
<td>-0.018 -0.074*** -0.063***</td>
<td>-0.057† **</td>
</tr>
<tr>
<td>Percent FIRE</td>
<td>-0.054**                 -0.048*</td>
<td>-0.032 -0.009 -0.023</td>
<td>0.015 **</td>
</tr>
<tr>
<td>Percent transport</td>
<td>0.039*                   0.0004</td>
<td>0.030† -0.024 -0.039*</td>
<td>-0.024 **</td>
</tr>
<tr>
<td>Percent public administration</td>
<td>-0.037*                 -0.046**</td>
<td>-0.041* 0.024 0.041†</td>
<td>** **</td>
</tr>
</tbody>
</table>

Notes: Weak Recession model: N = 3046, (OLS) adjusted R² = 0.4547; (ML) log likelihood = –3196.35; (SE) R² = 0.5192, log likelihood = –3328.85. Deep Recession model: N = 3068, (OLS) adjusted R² = 0.1067; (ML) log likelihood = –3873.30; (SE) R² = 0.2046, log likelihood = –4091.17. 

1z = (B1 – B2)/√(seB1^2 + seB2^2). B1 and B2 are unstandardised regression coefficients for each model and time period and seB1 and seB2 are the SEs.  

*Significance at 0.05 level; **significance at 0.01 level; ***significance at 0.001 level; †significant at 0.10 level.
include tests of significant difference in the raw coefficients so we can make inferences regarding change in the strength of a variable’s impact across models.

While one would expect population and income growth to be positively correlated with employment growth, we see that prior population and income growth are negatively related to current employment growth during the recession. This is because current employment growth is negative in both recession models. But the size of the standardised beta is much smaller in the deep recession model suggesting the effect of historical trends is less strong because recessionary effects became more generalised in the deep recession period. Counties with income growth show positive employment growth in the weak recession models, but we only find this effect in the OLS model for the deep recession as income and employment growth diverged in the Great Recession.

Our demographic variables show that larger counties had lower employment growth in both recessions but places with more dependent population had more employment growth in the deep recession. This may be due to greater service demands of an aging society and older adults returning to the labour force (even at reduced wages and skill levels) in the deep recession. Regarding education, high school attainment was not significant, but bachelor’s degree attainment was positive and more so in the deep recession model—reflecting the higher skill requirements of the new economy. In both recessionary periods, counties with more White population showed more growth, suggesting the recessionary effects were felt more strongly in minority communities. While foreign born was associated with more employment growth in the weak recession, there was no effect in the deep recession. Income inequality did not significantly affect employment growth in either period. By contrast, places with higher poverty showed lower growth in the weak recession, but this result was only significant in the multi-level model in the deep recession because recessionary effects were more generalised. These results confirm other studies that show the recession had stronger impacts on the poor, the young, the elderly and racialised communities (Bardhan and Walker, 2011; Donald et al., 2013; Glasmeier and Lee-Chuvala, 2011; Kitson et al., 2011). Places with higher unemployment showed higher rates of employment growth—especially in the weak recession as this signalled employee availability to markets. But in the deep recession, the impact of unemployment was half that of the weak recession, possibly a response to the weaker demand for workers in general in the deep recession.

Regarding state rescaling, while federal aid was higher in counties with lower employment growth in the weak recession, this redistributive role of federal aid disappeared in the deep recession. Federal aid to place is quite small—about a tenth of the level of state aid. However, even though state aid is much larger, it shows no consistent effect on employment growth. We find limited support for a redistributive role in the OLS models but no effect in the other models except for the multi-level model in the deep recession, which shows a positive, pro-development effect. States, as a mid-level actor in the multi-scalar governance system, are pressured to play both redistributive and developmental roles, thus we do not find a strong or consistent effect of state aid in our overall models.

State centralisation, by contrast, is the state rescaling variable with the strongest and most consistent positive impact across all models. When states centralise more fiscal responsibility to the state level, this relieves the redistributive expenditure burden on localities and frees local government to pursue more developmental activity, which can lead to local employment growth. State centralisation of fiscal responsibility can make localities more resilient to recession. Prior research also found state centralisation to be more important than state aid in helping local governments address fiscal stress (Warner, 2001; Warner and Pratt, 2005). Local effort has a positive impact on employment growth in the
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weak recession but no impact in the deep recession except in the spatial error model. This limited impact of local effort may be because state mandates requiring redistributive spending by counties crowd out economic development investments, a finding also suggested by earlier work by Lobao and Adua (2011).

Regarding occupational structure, we see that counties with more dependence on construction showed lower employment growth rates in the weak recession and this effect increased in magnitude in the deep recession model as construction dried up. Counties with greater dependence on manufacturing suffered especially dramatic declines in employment growth—in both recessions. Interestingly, counties with greater dependence on FIRE only showed a significant negative effect on employment growth in the weak recession. This could be because the FIRE sector got the majority of federal stimulus dollars in the Great Recession. Counties with more reliance on retail employment showed negative effects on employment growth in both recessions, and counties with greater employment shares in public administration showed negative effects on employment growth in the weak recession, but not in the deep recession. This may be because the large layoffs in the public sector during the Great Recession had a lag effect (Mitchell, 2012) that may not have been captured in the ACS 2007–11 rolling average.

Regarding metropolitan location, more urban places show more growth in both recessions, but this effect is only significant in the OLS models. We see that non-metropolitan, non-adjacent places have higher employment growth in the deep recession but this could be related to the natural resources boom of the late 2000s. These results suggest further probing of spatial differences is in order.

**Understanding diversity in geographic responses**

We expect a diversity of local responses across space, so global policy estimates could be misleading. We use GWR to allow our explanatory variables on state rescaling to have differential effects on employment growth across space. GWR first calculates the optimal number of counties and the optimal bandwidth for local neighbour regressions for each county. The GWR determined the optimal number of neighbouring counties to include in each local estimation, 511 local neighbours in the weak recession model and 769 local neighbours in the deep recession model, but the shape of the neighbouring counties included in each model varies for each county. The general $R^2$ (based on the local R square distribution) shows improved model performance (Weak Recession: adj. $R^2 = 0.60$ compared to adj. $R^2 = 0.45$ in OLS model; Deep Recession: adj. $R^2 = 0.29$ compared to adj. $R^2 = 0.11$ in OLS model). We present the results of the GWR models with maps of the coefficients of educational attainment, state centralisation and local effort on employment growth. These variables are chosen because of the larger magnitude of general effects and the importance of these variables for our study of state rescaling.

Because government should be countercyclical in a recession, we expect a positive coefficient response of employment growth to state policy and indeed a positive response to state fiscal centralisation was the result found in all our regression models for both time periods. But GWR allows us to see how that relationship varies across space. In the early recessionary period, we find positive responses among counties in the Midwest, southwest and west, but negative responses in Louisiana, Florida, the mid-south and New England (see Figure 1). In the deep recession (Figure 2), we see this negative response shifts north and grows to include all the Northeast and extends into Indiana, Ohio and Illinois. The negative responses to state centralisation in Florida, Georgia, South Carolina and Louisiana switch to positive and the negative response shifts northward into Arkansas and Oklahoma.
Figure 1. Impacts of state centralization on employment growth in Weak Recession, 2000 – 2005–09, GWR model results.

Figure 2. Impacts of state centralization on employment growth in Deep Recession, 2005–09 – 2007–11, GWR model results.
What explains these changes? How is state policy in the northeast and Midwest having a negative impact on local employment growth? What about state policy in the Southeast is causing the opposite effect? Future research should look into the components of state and local spending to see which functions are being centralised and which decentralised. While the overall level of state centralisation did not change much from 2002 to 2007, the employment response did.

States, under fiscal crisis, have cut aid to localities and devised mandates that constrain local government activity. In addition, states have been giving increased attention to tax breaks for businesses. Counties in states with lower centralisation of welfare expenditures may be under more pressure to engage in redistributive expenditures at the expense of development investments. For example, New York, Pennsylvania and Indiana all shift from mostly positive impacts of state centralisation on employment in 2002 to mostly negative impacts in 2007. More research will need to untangle these effects.

A look at the GWR results for local effort may provide some clues (see Figures 3 and 4). Recall that local effort had a positive impact on employment growth in the weak recession (OLS and multi-level models). This is expected from theory, which argues local government will behave as a developmental state. However, in the deep recession model, local effort was only significant (and positive) in the spatial error model. Maps of the local effort coefficient for 2002 and 2007 are almost mirror images of each other. The Northwest, Texas, Missouri, Arkansas and Florida switch from negative to positive impacts, while the east coast and Midwest switch from positive to negative impacts. The Northeast and Midwest generally have higher social welfare supports than the Southern and Western states, but states often finance this through state mandates to counties. This could be evidence of redistributive expenditure crowding out economic development expenditure at the local level through a process of state rescaling similar to what Lobao and Adua (2011) found in their smaller study. By contrast, western states have higher state centralisation of redistributive functions (education and welfare) and this may free localities to pursue more development activity. Understanding the shifts between redistributive and developmental expenditures at the state and local level will be important to understanding how fiscal policy affects employment growth in the recession.

Counties with higher dependence on manufacturing showed much lower employment growth in both recessionary periods, but the GWR results show variations in that central story across space (see online Supplementary Appendix Figures 4 and 5). While almost all counties had a negative relationship between manufacturing share and employment growth, the impact was positive for the Northeast (from Pennsylvania to Maine) during the weak recession. By contrast, in the deep recession, the positive impacts shifted to the intermountain west, northern Minnesota and Maine. This likely relates to the energy boom of the later 2000s in the intermountain west and Minnesota and forestry-related manufacturing in Maine.

Education has become more important in the great recession. GWR maps show a strong and consistent positive response along the West Coast and East Coast, the Mid West and the Mid-south (Arkansas, Missouri). The positive effects of education become more generalised in the deep recession and the intermountain west, which had shown a negative education response in the weak recession, switches to positive in the deep recession. This education premium may be associated with the mining boom in the intermountain west. Where the negative response to education deepens is in south Texas and the Deep South (Alabama, Georgia, Tennessee and Florida). This region traditionally has pursued low skill manufacturing and invested less in education (see Figures 5 and 6).

Education is primarily funded by state and local governments in the USA. The counties that showed positive responses to manufacturing
Figure 3. Impacts of local effort on employment growth in Weak Recession, 2000 – 2005–09, GWR model results.

Figure 4. Impacts of local effort on employment growth in Deep Recession, 2005–09 – 2007–11, GWR model results.
Figure 5. Impacts of education on employment growth in Weak Recession, 2000 – 2005–09, GWR model results.

Figure 6. Impacts of education on employment growth in Deep Recession, 2005–09 – 2007–11, GWR model results.
(primarily found in the Northeast and Midwest) were the ones that also showed positive responses to education. These are the resilient regions. In the Southeast, by contrast, we see negative employment responses to manufacturing and to education. It may be that Southern states, which invested so much in tax breaks to attract manufacturing in the 1990s and early 2000s, were not able to keep those jobs in the recession because they invest too little in education. Indeed educational attainment is lowest in these southern states (see online Supplementary Appendix Figure 6).

GWR is an exploratory tool for data analysis to uncover where the local response of key model variables differs by geography. Heeding Freedman’s (1991) classic admonition not to substitute statistical models for grounded analysis, we argue future analysis should unpack the nature of economic development policy and state rescaling especially as regards educational expenditure and the composition of state centralisation of fiscal responsibility.

Conclusion

This paper has shown the importance of including fiscal policy variables in studies of employment growth and in using a local unit that aggregates all local government expenditures, so the full complement of local government activity across both urban and rural areas can be studied. State rescaling is not an even process, and the links to employment resilience during recessionary periods reflect this diversity. The results pose new challenges for geographers seeking to understand state rescaling and its impact on economic growth. Traditional theories of local government as the developmental state no longer hold. Neither do the more recent theories regarding austerity urbanism. What we now see is a more varied response, which combines both developmental and redistributive responsibilities and shows dramatic differences across states and over time. Our models point to the need to look closely at state rescaling, especially the impacts of state centralisation and local government fiscal effort. We find dramatic differences in recessionary impacts after the weak recession in 2001 and during the Great Recession of the late 2000s, especially as regards state fiscal centralisation, local fiscal effort, educational attainment and manufacturing employment shares. Public investments related to longer term benefits such as educational attainment contribute to the diversity of the economic base and local economic resilience.

Theories of the developmental state argue that state and local expenditure should be development promoting. While the majority of counties across the USA show a positive employment response to state and local government expenditure, negative responses are found in the Northeast, to both state centralisation and local fiscal effort—and this represents a major change from the recession in the early 2000s when employment responses were positive. What changed? Are these states shifting away from long-term development expenditures such as education, to short-term tax breaks for footloose firms? Are these states shifting more redistributive expenditure responsibilities to the local level and thus undermining economic development investments at the local government scale? For example, New York has introduced an aggressive programme of tax cuts and abatements (Start up New York which gives 10-year state income and local property tax breaks to relocating firms), while reducing state funding for education to just a 17% share of the total—the lowest state share of any of the 50 states (see online Supplementary Appendix Table 1).

The Southeast and Texas show positive employment responses to state and local investments in the current recession, but they show negative employment responses to education and manufacturing. This suggests that tax breaks may be effective in the short term but do not contribute to long-term economic
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resilience. In contrast, the Northeast and Midwest show positive responses to education and manufacturing, suggesting a long-term positive relationship. Resilience may come from investments in education that promote a diverse employment base. Tax breaks, which have been a hallmark of Southern US investment strategy and are now extending to the rest of the country, may have short-lived effects and long-term negative implications for economic resilience if they come at the expense of core investments in education.

Economic forces primarily drive economic outcomes, but state rescaling matters. To understand the full diversity of state rescaling and its impacts on resilience, more grounded analysis of the actual content of state economic development and educational investment policy is needed. Resilience in recessionary times appears to be critically tied to educational attainment, but the role of state centralisation on employment growth shifts with the depth of the recession and the content of state centralisation policy. More attention needs to be given to the differing content and level of state rescaling so scholars can better understand the role of public investment on local economic resilience. Neither developmental state nor austerity urbanism adequately capture the full diversity of local responses to recession that we find in a rescaling state and local government system.

Supplementary material
Supplementary material is available at Cambridge Journal of Regions, Economy and Society Journal online.

Endnotes
1 While some scholars (for example, Jessop) use the term state rescaling to explore emergence of new regional levels of the state, we, like Lobao, use the term to describe the devolution process that shifts responsibility for services down to state and local levels.
2 County areas aggregate expenditure and revenue for all local jurisdictions in a county. This includes cities, villages, towns, counties and special districts (school districts, water districts, etc). County areas represent a complete picture of all local government activity in the county.
3 State centralisation is measured as the level of state expenditure relative to all state and local expenditure. It measures the differential level of decentralisation of fiscal responsibility across states under state rescaling.
4 We are interested in the impact of recessions where people live and, thus, use residence-based measures of employment from Census and ACS. Establishment-based measures of employment such as Economic Census would over-count for some counties and under-count for others depending on commuting patterns. Bureau of Labor Statistics (BLS) only measures for metropolitan areas, and the Economic Census is only conducted in 5-year intervals. Thus ACS provides data based on residence and annual surveys drawn into 5-year rolling averages, so that rural as well as urban counties can be studied.
5 While there was a boom prior to 2007, the ACS rolling averages do not capture that and so, empirically, we find negative employment growth in both periods. Hence, we use weak recession to describe the first period and deep recession to describe the second.

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References


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