The Great Recession and the Public Sector in Rural America

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Abstract: Why did non-metro and rural areas in the United States recover from the Great Recession much more slowly than large metro areas? While public-sector employment is typically thought to be recession-proof, this paper shows that in many states, as with earlier severe recessions, due to declining tax revenues and intergovernmental aid from state governments, employment in the local government sector fell substantially after the Great Recession. Cuts to local public employment were especially large, long-lasting, and consequential in rural areas, which have become relatively dependent on public-sector employment and inter-governmental transfers. The public sector is relatively inconsequential in urban America, but in much of rural America, a decade after the Great Recession, the public sector was the slowest category of employment to recover, and emerged as the leading source of long-term job losses.

1. Introduction

From December 2007 to early 2010, 8.7 million jobs were lost in the United States. The Great Recession was remarkable not only because of its severity, but because the recovery was so slow relative to previous recessions. Employment did not reach pre-recession levels until April of 2014.[1] The motivation for this paper is a striking stylized fact: Metropolitan areas recovered from the Great Recession much more quickly than non-metropolitan and rural areas. Employment reached pre-recession 2007 levels in large metropolitan areas by 2012, but in non-metropolitan areas, this did not happen until 2015. A large number of rural counties still had not reached pre-recession employment levels when COVID arrived in 2020.

Why was the rural recovery in the United States so slow? Existing literature on the geography of the Great Recession focuses almost exclusively on its initial severity, and we know little about geographic heterogeneity in the speed of recovery after 2010. Existing work focuses on factors like the age and education of the workforce and pre-recession economic specialization. This largely descriptive and exploratory paper adds a new explanation: the relative dependence of rural places on public employment.

Around the world, public-sector jobs are often thought to be recession-proof. However, this paper explains how the structure of U.S. fiscal federalism made it difficult for the main public employers in the United States—local governments and school districts—to avoid large and long-lasting budget cuts that resulted in reduced public employment levels. Once temporary assistance associated with the Recovery and Reinvestment Act was terminated, a large and lasting reduction in public employment took place in a broad cross-section of states that were affected by the Great Recession. This was true of cities, suburbs, and rural areas alike.

However, this paper demonstrates that the public sector is far more important to local labor markets and local economies in rural areas than in urban areas in the United States. As a result, public sector job losses were more consequential in rural America than in urban America. In fact, in many states, the public sector has been the leading source of long-term rural job losses in the wake of the Great Recession.

This paper begins by establishing the stylized fact that motivates the paper: there was a striking divergence in the pace of recovery between urban and rural America starting in 2010. Next, it reviews the existing literature that might explain this divergence. The subsequent section explains the pro-cyclical structure of American local public finance, and the disappearance of public sector jobs after the Great Recession. Next, I document the rather different role played by the public sector in urban and rural America on the eve of the Great Recession, and then the differential geographic impact of public-sector job losses. The final section briefly considers implications for policy debates and political battles about public finance.

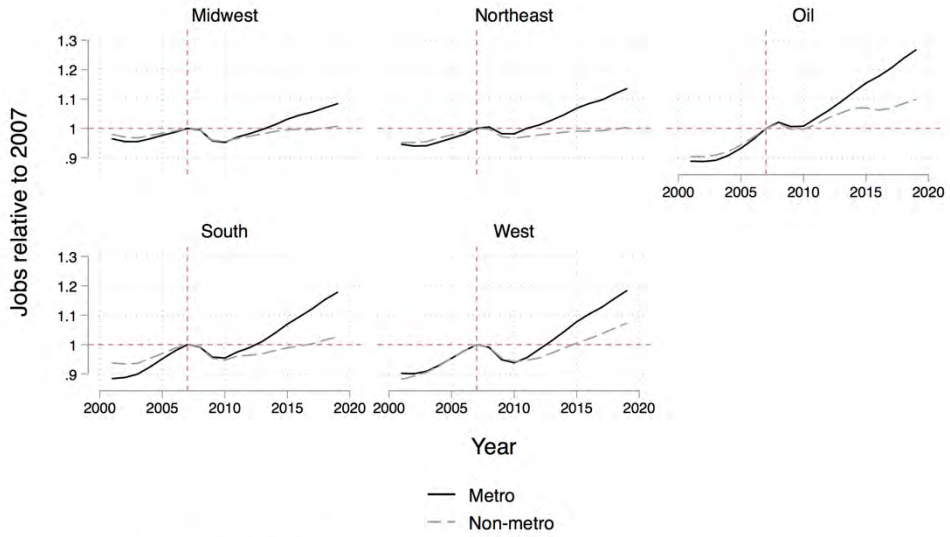
2. The Divergence of Urban and Rural America after the Great Recession

[1] https://fred.stlouisfed.org/series/PAYEMS

Relative to 2007 employment levels, the job losses experienced by metropolitan and non-metropolitan counties were very similar in all regions of the United States from 2008 to 2010. However, urban and rural America experienced a sharp divergence after 2010. By 2015, the metropolitan counties of every state but New Mexico had recovered to the employment level of 2007. Meanwhile, the non-metropolitan areas of 25 states had still not yet reached 2007 levels. In 2017, a full decade from the pre-recession peak, non-metro areas in 20 states still had not recovered to the pre-recession employment level, and in 11 states, this was still the case in 2019 on the eve of the COVID crisis.

Figure 1 depicts the speed of recovery in large metro counties versus non-metro counties by census region.[2] The top oil-producing states are extracted from their respective regions and examined separately. The vertical axis conveys the total number of jobs relative to 2007. In every region, after bottoming out in 2010, total employment increased much more rapidly in metro areas than in non-metro areas. The lagging non-metro recovery is especially notable in the non-oil-producing states of the Midwest, Northeast, and South, where in the aggregate, employment had still only barely surpassed pre-recession levels by 2019. In states with significant oil production, job losses were very mild and growth returned rapidly, albeit again, more quickly in metro areas than non-metro areas.

Figure 1: The Speed of Employment Recovery in Metropolitan and Non-Metropolitan Counties, by Census Region



Metro = County in metro area over 250K pop
Non-metro = All other counties

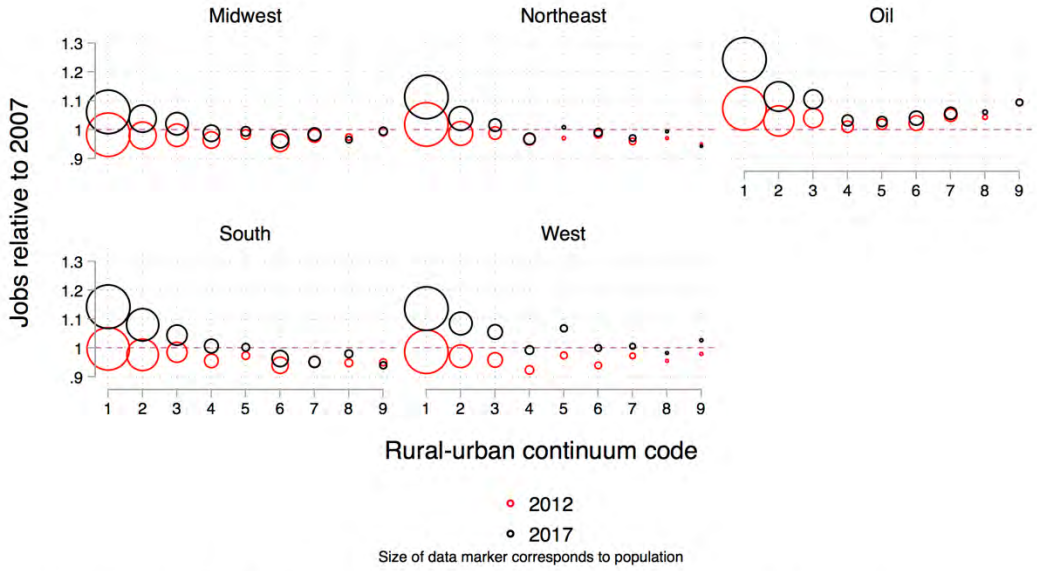
Oil states include Texas, Oklahoma, New Mexico, Colorado, Utah, Wyoming, North Dakota, Louisiana, and Alaska

[2] I use 2013 rural-urban continuum codes developed by the U.S. Department of Agriculture. Counties coded as 1 (metro area with population 1 million or more) and 2 (metro area with population between 250,000 and 1 million) are considered "metro," and the remaining counties are considered "non-metro."

This simple distinction between metro and non-metro counties masks the heterogeneity of non-metro areas. Figure 2 displays the employment level relative to 2007 for each type of county as designated by the U.S. Department of Agriculture's Rural-Urban Continuum Code, first for five years after the pre-recession peak (in red), and then for 10 years out (in black). It shows that the recovery was fastest in the largest metro areas, with slower recovery in smaller metros, and a very limited recovery in places with relatively little urban population.

This is not an artifact of the way the Rural-Urban Continuum Code is constructed. Appendix A1 uses quintiles of a continuous "index of rurality" developed by Waldorf and Kim (2018), demonstrating that the speed of recovery was clearly negatively associated with the "rurality" of the county.

Figure 2: Post-Recession Employment Recovery by 2013 Rural-Urban Continuum Code



1: metro > 1m; 2: metro, 250k-1m; 3: metro < 250k; 4: Urban pop > 200k, adjacent to metro; 5: Urban pop > 200k, not adjacent to metro
6: Urban pop 2500 - 20k, adjacent to metro; 7: Urban pop 2500 - 20k, not adjacent to metro;
8: Completely rural, adjacent to metro; 9: Completely rural, not adjacent to metro

Oil states include Texas, Oklahoma, New Mexico, Colorado, Utah, Wyoming, North Dakota, Louisiana, and Alaska

3. Existing Literature

Several authors have attempted to explain geographic heterogeneity in the severity of the initial job losses *during* the Great Recession. One fact is already suggested by Figure 1: communities with substantial employment in the extraction of oil and other natural resources experienced relatively limited job losses. The same was true for many agricultural communities in the Great Plains (Hertz et al 2014). The most severe losses were in areas hit hardest by the subprime crisis, and where household debt-to-income ratios were highest (Mian and Sufi 2014). Additionally, Shoag and Veuger (2016) claim that some of the cross-state heterogeneity in the severity of the Great Recession can be explained by variation in state-level policy uncertainty.

However, these explanations for the severity of initial job losses do not seem promising as explanations for within-state urban-rural divergence in the pace of recovery. Above all, Figure 1 shows that metro and non-metro areas experienced very similar relative job losses in the period from 2007 to 2010. Divergence did not appear until the recovery began.

If anything, some non-urban areas were especially well-positioned going into the recession. Employment in some of the economic sectors *least* effected by the recession—like agriculture and natural resources—is concentrated in rural areas. Subprime credit (George et al 2019) and foreclosures (Webb and Brown 2016) are more common in urban than rural areas, and urban borrowers owe more than rural borrowers.[3]

Urban-rural divergence in population growth, income, and prosperity is a slow-moving phenomenon that has been unfolding for decades. Rural areas are ageing and suffering from "brain drain" as young people leave in order to pursue higher education and better labor market opportunities in cities. Skill-biased technological change and agglomeration effects have facilitated the concentration of educated and well-compensated individuals in certain metro areas where technology jobs have clustered (Moretti 2013).

However, this is a story about gradual, long-term change. It is not clear why this process would have suddenly sped up and placed urban and rural areas on such different trajectories starting in 2010. In fact, Figure 1 shows that with the exception of the South, where job growth was more rapid in metro than non-metro areas in the run-up to the Great Recession, job growth was on relatively similar trajectories in the pre-recession period in both metro and non-metro areas in all other regions, and around the country, the initial shock to employment was similar in metro and non-metro areas.

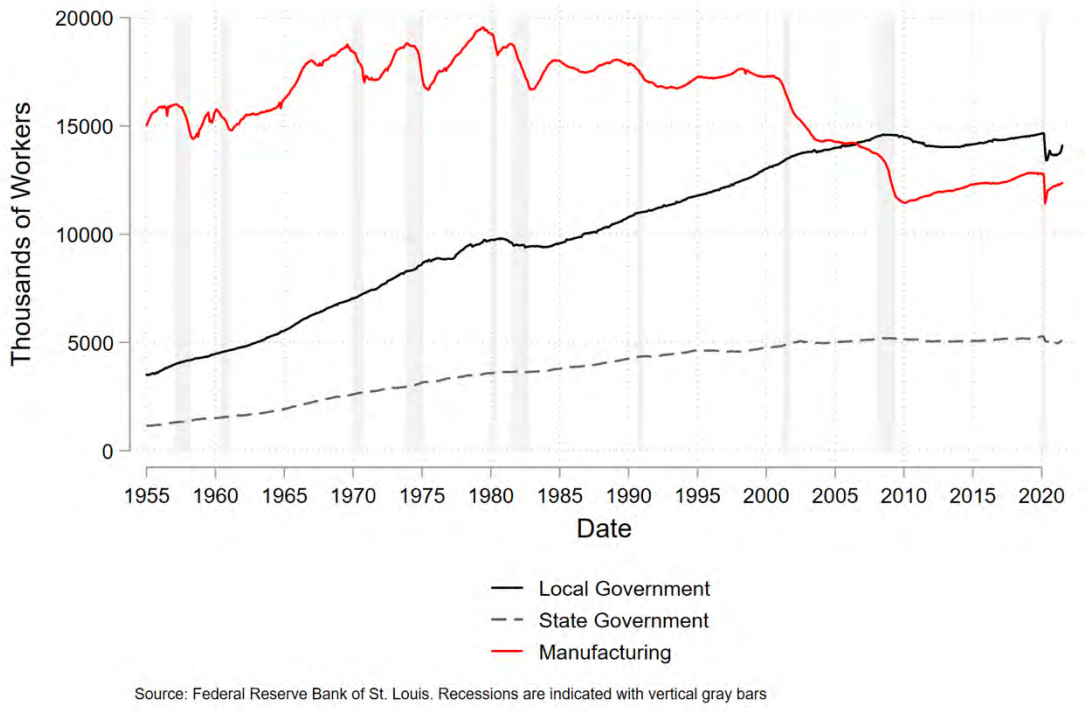
Perhaps the most obvious explanation offered in the existing literature is the relative importance of manufacturing in non-metro areas (Hertz et al 2014). Around the United States, manufacturing employment had already been declining steadily since before the Great Recession. In fact, 3.6 million manufacturing jobs were lost between 2000 and 2007 (see Figure 3 below). However, these job losses rapidly intensified during the Great Recession, with an additional 2.3 manufacturing job losses by 2010. The manufacturing recovery has been slow in some regions, and as explained in greater detail below, non-existent in others.

It stands to reason, then, that the lasting impact of the collapse of manufacturing is an important part of the story of slow recovery in manufacturing-oriented counties. In the early 20th century, manufacturing employment was concentrated in city centers. However, manufacturing has gradually moved from the urban core of large cities to peri-urban areas around those cities, as well as smaller cities and surrounding rural areas (Henderson 2002).

Indeed, manufacturing employment was somewhat more prominent in non-urban areas on the eve of the recession, but the analysis below suggests that urban-rural differences in the employment recovery are not very well explained by the manufacturing sector.

[3] https://www.lendingtree.com/debt-consolidation/country-vs-city-which-has-larger-balances-and-better-credit-scores/

Figure 3: Manufacturing and Public-Sector Jobs in the United States, 1955-2020



Source: Federal Reserve Bank of St. Louis. Recessions are indicated with vertical gray bars

This paper focuses on another segment of the labor market that is also of outsized importance in non-metro areas, but one that is not typically viewed as a leading source of job losses: state and local government. As demonstrated in Figure 3, on the eve of the Great Recession, local government jobs had become more numerous than manufacturing jobs. In fact, the combined state and local sector had surpassed the manufacturing sector already in 1999.

Figure 3 demonstrates that local governments started shedding jobs in 2009, and the recovery was extremely slow: the number of local government jobs did not reach pre-recession levels until 2019, after which the COVID outbreak ushered in a new round of cuts, bringing the raw number of jobs in the local public sector down to the level of two decades earlier. In fact, although the loss of manufacturing jobs was far more dramatic, the manufacturing recovery started more quickly and progressed more rapidly than the return of public sector jobs.

4. Recessions and the Public Sector in the United States

Around the world, public-sector jobs are often thought to be recession-proof. Kopelman and Rosen (2014), for instance, show that in the United States, controlling for a variety of individual-level characteristics and county fixed effects, public-sector workers are less likely to lose their jobs than are private-sector workers, and this is especially true during recessions, including the Great Recession. For example, private school teachers are more likely to be fired during recessions than public school teachers.

This does not imply, however, that a large public sector in a community provides a buffer against lasting effects from recessions. It is plausible that private-sector workers in fields like retail or construction are more easily fired during a recession, but also more easily rehired afterwards, compared with public-sector employees. Moreover, jobs are often shed in the public sector not necessarily by terminating existing employees, but by retirements, attrition, and freezes on new hiring. As suggested by Figure 3, public-sector job losses appear to occur with a significant lag after the onset of a serious recession. Relatively mild recessions, like those of the early 1990s and early 2000s, appear to only slow the pre-recession rate of job growth for a few years. However, overall local government employment was flat after the 1973-1975 recession, and as in the Great Recession, there was a substantial and lasting decline in local public-sector employment after the recessions of the early 1980s.

Local government employment in the United States moves with the business cycle because local revenue sources—including taxes, user fees, and transfers from higher-level governments—are sensitive to the business cycle. Member states of the European Union are able to borrow during recessions in order to smooth public-sector revenue over the business cycle. However, U.S. states are constrained by self-imposed borrowing prohibitions and balanced budget requirements, and are largely unable to borrow to sustain existing expenditures during recessions as tax revenues fall. Local governments are also not in a position to do so. Moreover, the United States does not have a system of automatic stabilizers built into its intergovernmental transfer system that would shift additional resources to states or localities as they experience reduced economic activity and tax collection.

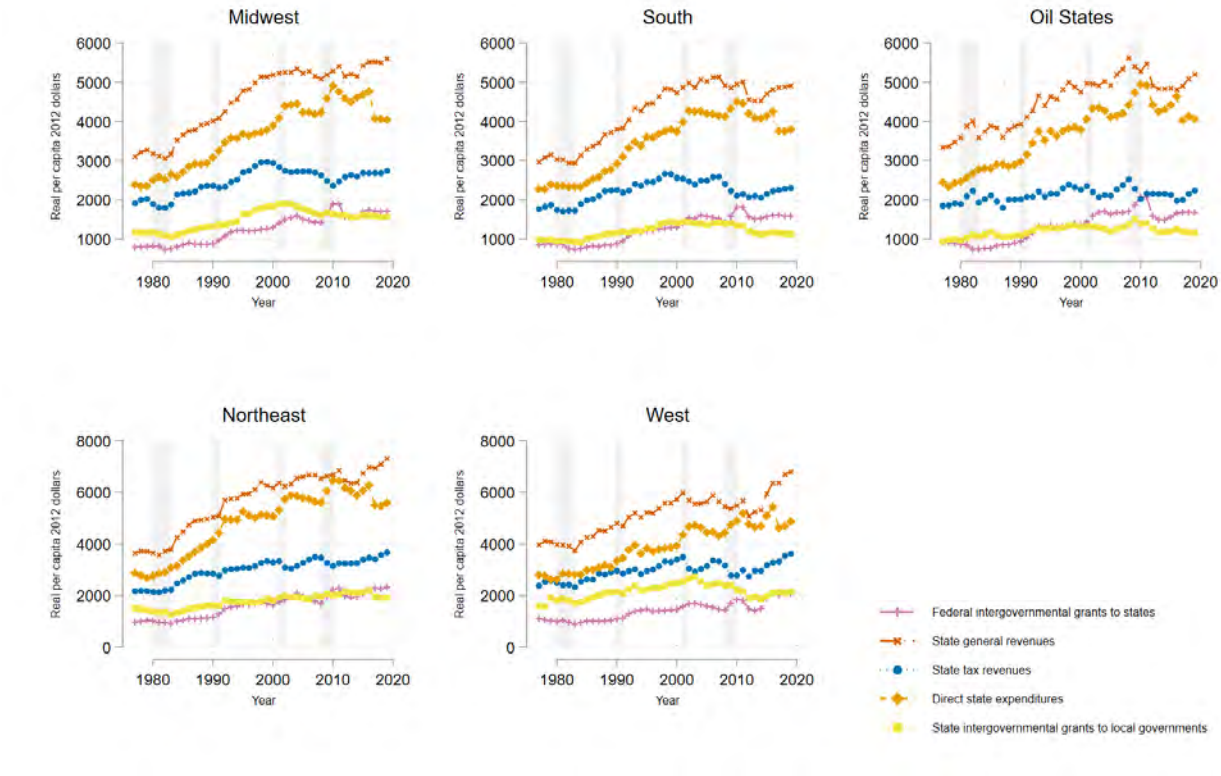
As a result, with the onset of each U.S. recession, a heated Congressional battle takes place about whether to provide emergency assistance to the states. In recent recessions, this has led to a rushed, ad hoc scramble to include some form of intergovernmental assistance as part of a larger package of "stimulus" measures. In the most recent recessions, this scramble resulted in a burst of additional federal transfers to state governments. These transfers have typically been distributed across states in ways that are not correlated with the decline in economic activity, and are typically a boon to the smallest states that are most over-represented in the U.S. Senate (cites).

Figure 4 explores the evolution of state government finance since 1977, aggregating over census regions. It displays real per capita general revenue (red), as well as its two most important components: taxes (blue) and federal grants (purple). On the expenditure side, it distinguishes between direct expenditures of state governments on their own employees and programs, including their implementation of federal programs (orange), and the fiscal transfers made by state to their local governments (yellow). Recession years are indicated with gray bars.

Unsurprisingly, in all regions, state tax revenues drop significantly during recessions. The great recession was especially severe. With the exception of the Northeast, in the immediate post-recession years, aggregate inflation-adjusted per capita tax revenues bottomed out at levels not seen since the 1990s or even earlier. However, note that transfers from the federal government to the states demonstrate a countervailing movement. During or immediately after recessions, federal transfers increase, and then plateau until the next recession, when they ratchet upwards again. The spike in federal transfers to states associated with the Great Recession is especially

noteworthy. It is similar in magnitude in each region, regardless of exposure to the Great Recession. This spike in transfers temporarily offset the reductions in tax revenues. Total general revenues were temporarily propped up by federal transfers, but fell precipitously again when the stimulus transfers ran out, not recovering again until late in the decade.

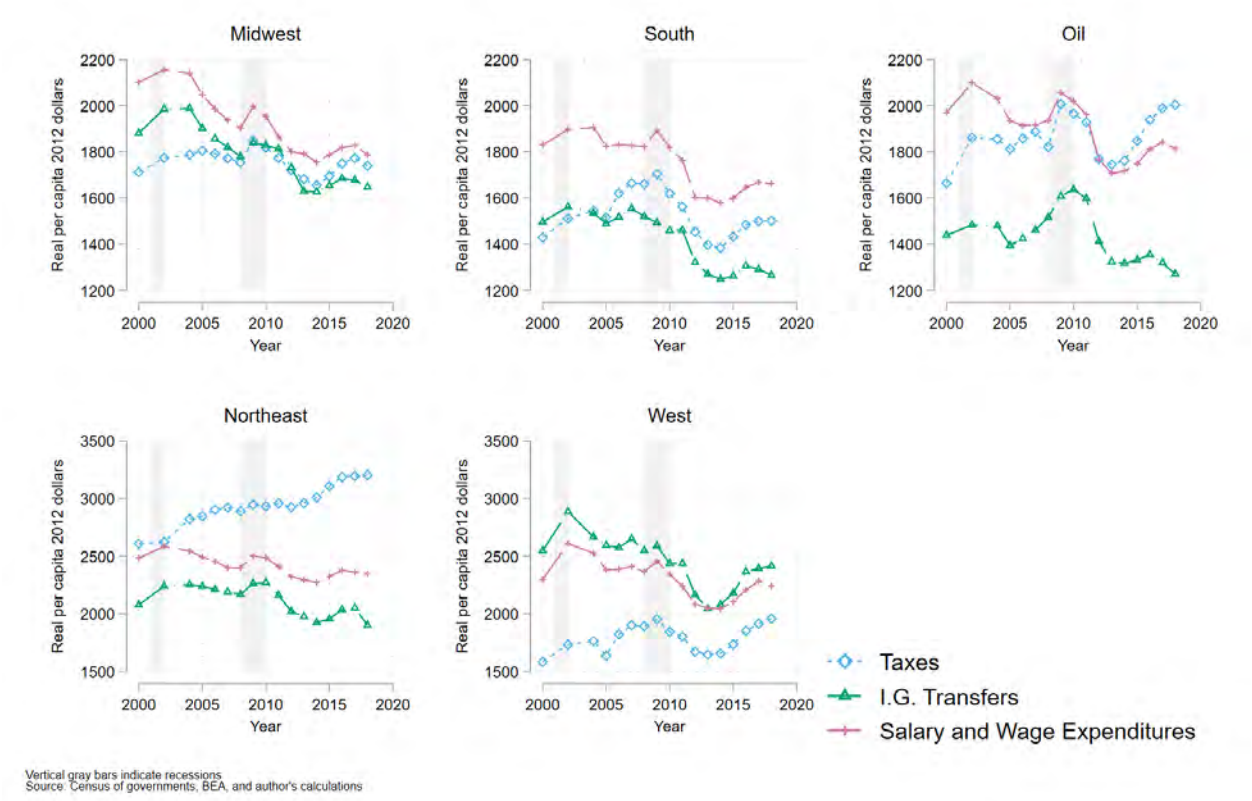
Figure 4: Real Per Capita Revenues and Expenditures of State Governments, 1977-2019



Bolstered by increased federal transfers, state *direct* expenditures increase substantially during and immediately after recessions, as state governments deal with increased enrollments in social service programs. Note that in Figure 3 above, unlike local governments, state governments do not shed large numbers of employees during or after recessions.

These recessionary expansions of direct expenditures are in contrast with the expenditures of state governments on intergovernmental transfers to local governments (in yellow). These tend to flatten out or fall during and immediately after recessions. Since 2000, assistance to local governments has trended downwards in real per capita terms, even as direct state expenditures have increased. As federal assistance to states has ratcheted up with each recession, state assistance to localities has ratcheted downwards. It appears that state governments have attempted to balance their budgets in the wake of recessions by cutting their assistance to local governments.

Figure 5: Real Per Capita Revenues, by Source, and Wage/Salary Expenditures of Local Governments, 2000-2018



Next, Figure 5 examines the evolution of revenues for *local* governments since 2000. Real per capita intergovernmental transfers have fallen far below pre-recession levels in every region, and as of 2018, they had not recovered. Inflation-adjusted tax collections per capita also fell in every region except the Northeast. Local tax receipts started to recover around the country in 2015, but in the Midwest and South, they had still not recovered to pre-recession levels by 2018, and the Western states had just barely recovered.

In sum, many local governments experienced significant and lasting revenue declines associated with the Great Recession, but these were driven disproportionately by declining state aid. Finally, the tight connection between the purple and green lines in Figure 5 demonstrates that there is a strong correlation between declining intergovernmental transfers to local governments and substantial reductions in expenditures on salaries and wages by local governments—cuts that forced the public-sector job losses documented above.

5. The Importance of the Public Sector in Rural America

Aggregate national job losses among local governments in the wake of the Great Recession were not very large relative to those in sectors like manufacturing or construction (see Figure 3 above). However, there is a great deal of heterogeneity across counties in the importance of the public sector to the local labor market and economy. Figure 6 plots state and local jobs as a share

of all jobs at the county level on the eve of the Great Recession, against the 2010 index of relative rurality. On the left side of each graph, we can see that the public sector workforce is relatively small in the urban, metropolitan counties around the United States—typically making up less than 10 percent of the workforce. However, rural counties are much more heterogeneous. Some rural counties with a thriving agricultural or natural resource sector or significant tourism are no different than metro counties on this dimension, but most rural counties are significantly more dependent on the public sector.

Figure 6: Index of County Relative Rurality and State/Local Government Jobs as Share of All Jobs, 2007, by Census Region

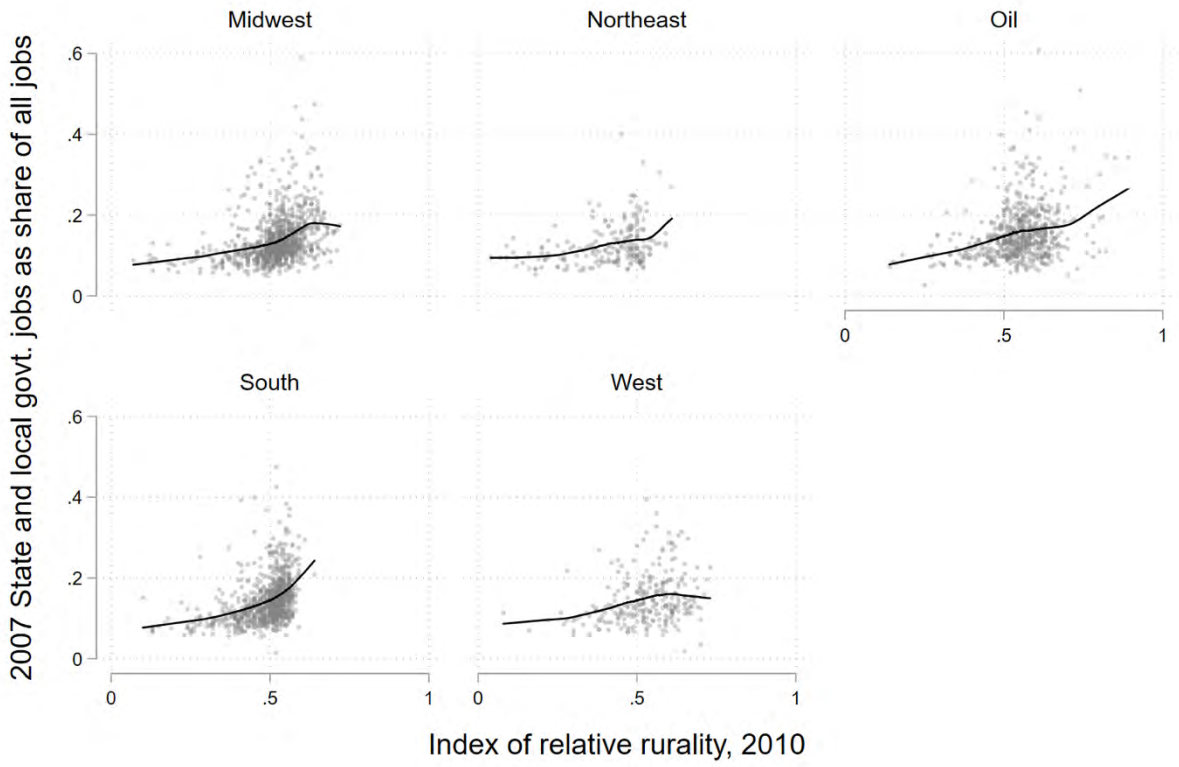
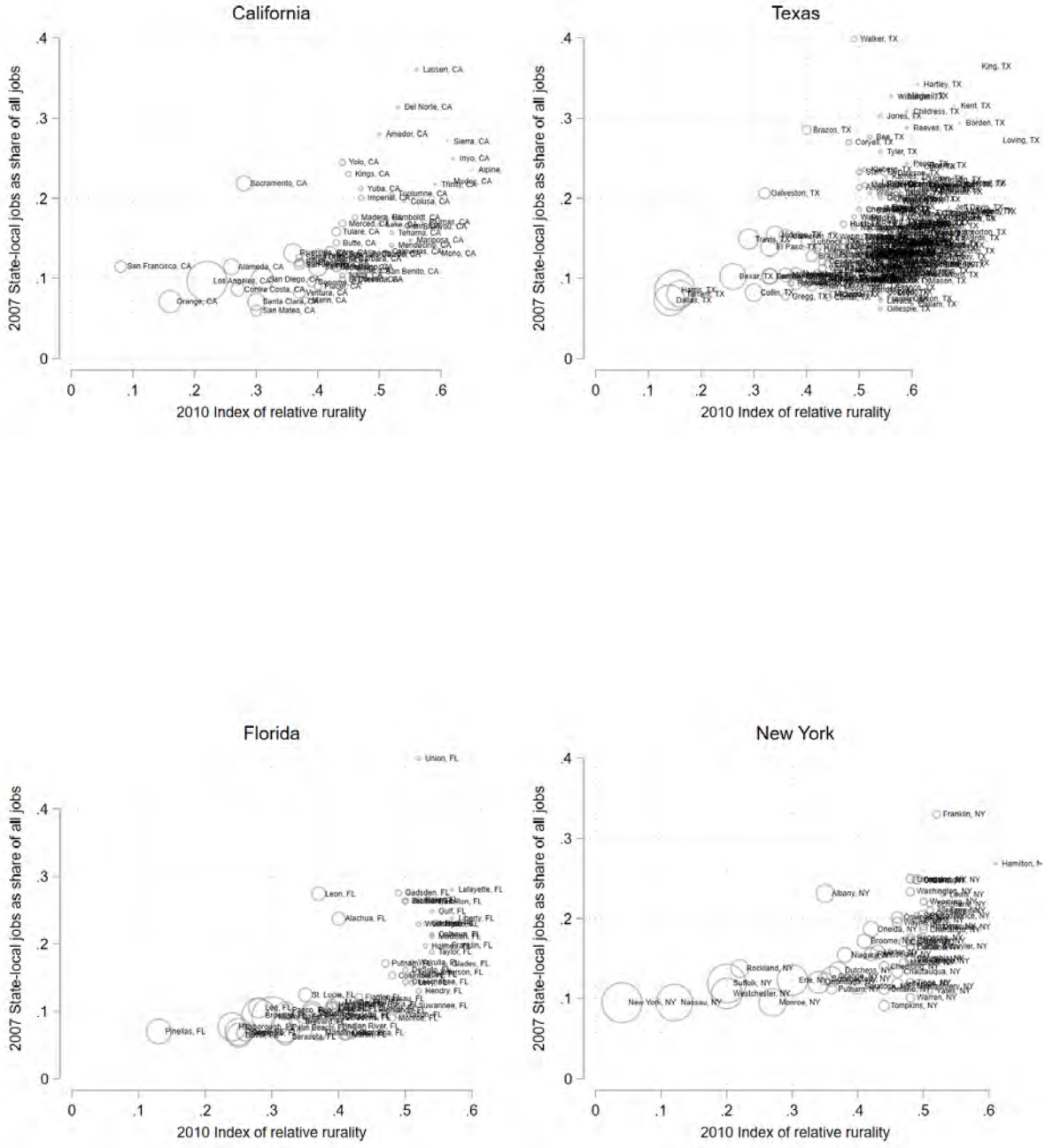
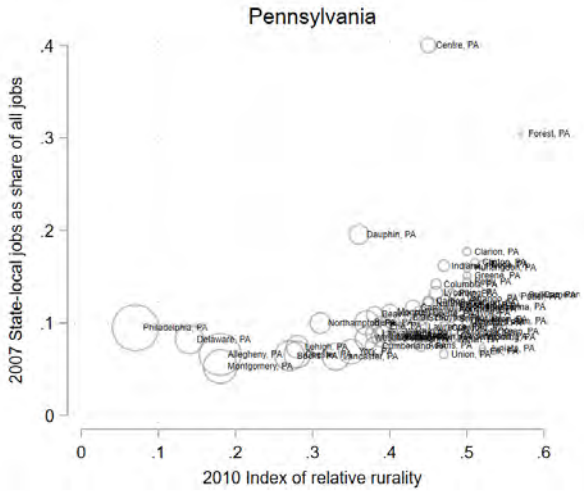
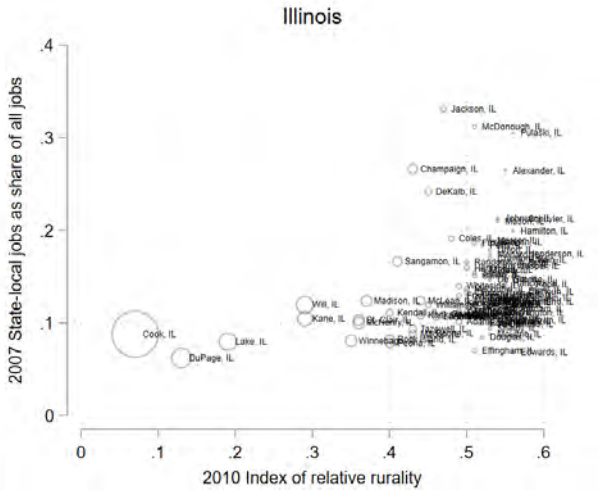
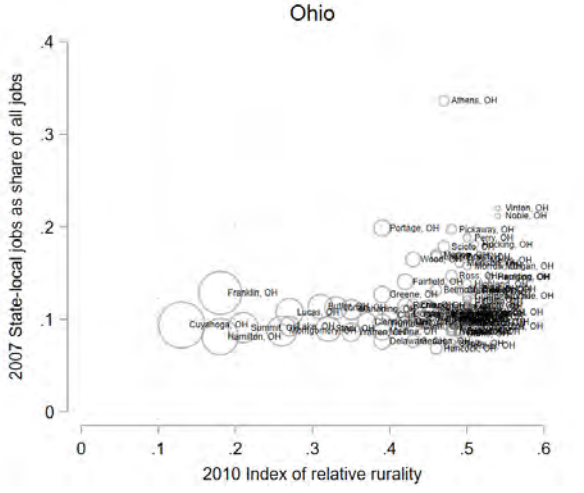


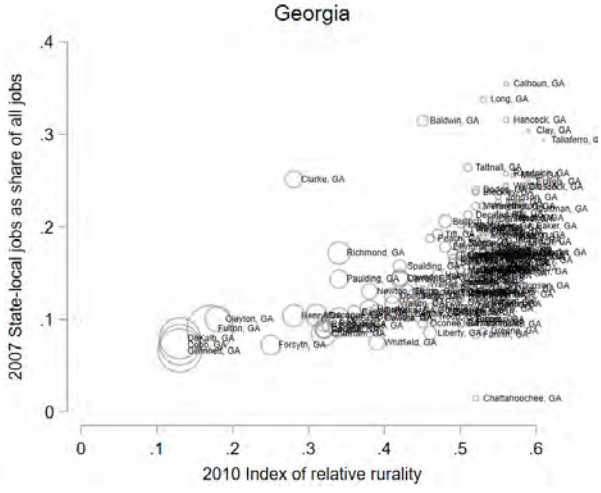
Figure 7: Index of County Relative Rurality and State/Local Government Jobs as Share of All Jobs, 2007, 10 Largest States




Pennsylvania
2007 State-local jobs as share of all jobs
2010 Index of relative rurality
0
.1
.2
.3
.4
.5
.6
Centre, PA
Forest, PA
Dauphin, PA
Clarion, PA
Philadelphia, PA
Delaware, PA
Allegheny, PA
Montgomery, PA
Union, PA


Illinois
2007 State-local jobs as share of all jobs
2010 Index of relative rurality
0
.1
.2
.3
.4
.5
.6
Jackson, IL
Champaign, IL
Alexander, IL
DeKalb, IL
Hamilton, IL
Sangamon, IL
Will, IL
Kane, IL
Madison, IL
Cook, IL
Lake, IL
DuPage, IL
Effingham, IL
Edwards, IL


Ohio
2007 State-local jobs as share of all jobs
2010 Index of relative rurality
0
.1
.2
.3
.4
.5
.6
Athens, OH
Vinton, OH
Noble, OH
Portage, OH
Pickaway, OH
Perry, OH
Franklin, OH
Cuyahoga, OH
Hamilton, OH


Georgia
2007 State-local jobs as share of all jobs
2010 Index of relative rurality
0
.1
.2
.3
.4
.5
.6
Calhoun, GA
Long, GA
Baldwin, GA
Hancock, GA
Clay, GA
Taliaferro, GA
Taliaferro, GA
Clarke, GA
Richmond, GA
Spalding, GA
Pauding, GA
Clayton, GA
Fulton, GA
Forsyth, GA
Whitfield, GA
Chattahoochee, GA

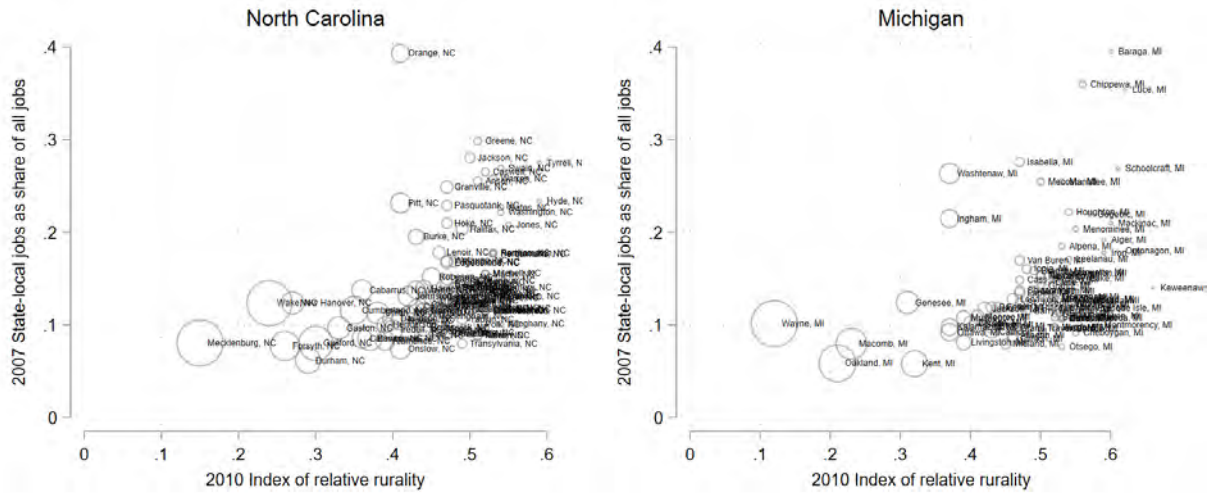


Figure 7 zooms in on the 10 largest U.S. states. (Perhaps choose a couple of examples and move the rest to appendix? I intend to clean these up so that labels are only there for some counties). The strong relationship between rurality and dependence on public-sector jobs shows up in each of these states.[4] In parts of rural America, the state and local public sector can account for more than 20 percent of all jobs. Some of the extreme cases above 30 percent are counties with prisons, like Lassen County, California or Walker County, Texas. Other notable outliers with high levels of public employment are counties with state capitals or public universities. Several of these have intermediate levels of rurality, like Leon County, Florida or Washtenaw County, Michigan, but some are relatively rural, like Athens, Ohio or Centre, Pennsylvania.

More generally, however, rural counties with relatively high levels of public-sector employment are much more diverse than prison and college towns. They are places where manufacturing and other private-sector economic activities of the past have faded, leaving behind a declining population that is relatively poor, less educated, and older. In these counties, public-sector wages are typically much higher than private-sector wages (include data in next draft). In many rural places, the few jobs that require a college degree are overwhelmingly in the public sector.

[4] There are several exceptions. The following states do not demonstrate statistically significant county-level relationships between rurality and public-sector dependence: Connecticut, Iowa, Idaho, Massachusetts, Maryland, Maine, North Dakota, New Hampshire, New Jersey, New Mexico, Nevada, Rhode Island, Vermont, and Wyoming. These states have either a large number of relatively affluent rural counties or limited cross-county variation in rurality.

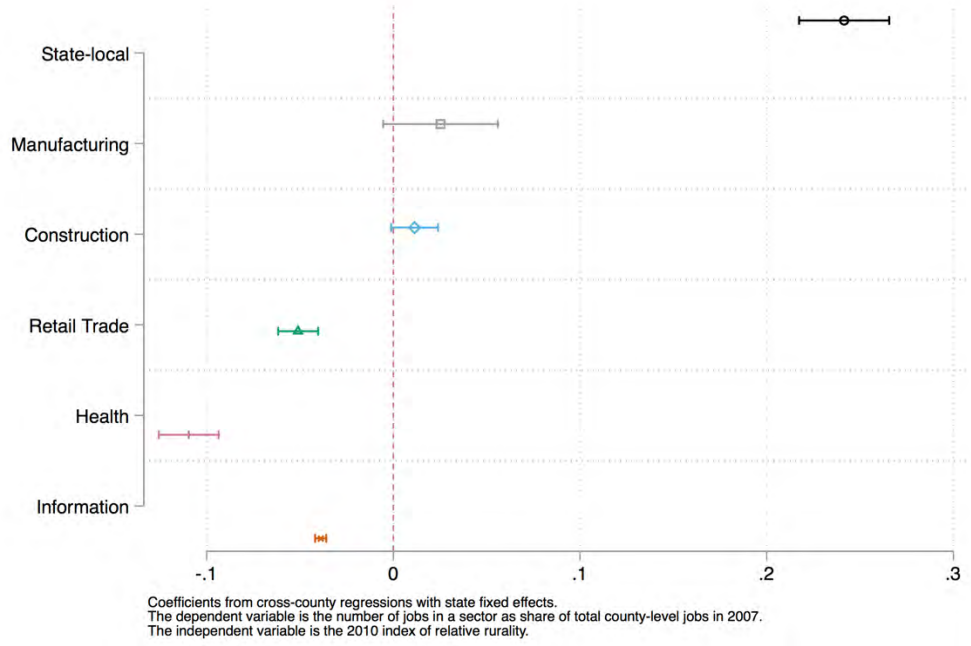
As a result, public sector employment shares do not fully capture the importance of the public sector to the local economy. For example, in the counties of Jackson, McDonough, and Pulaski, Illinois, the public sector accounts for around 30 percent of jobs, but well over 50 percent of all local salaries and wages. In Portage, Ohio, 20 percent of the jobs, but 30 percent of all compensation comes from the public sector. In the California counties of Sierra, Trinity, and Yuba, while the public sector accounts for less than 30 percent of jobs, it accounts for over 60 percent of employee compensation, and in Lassen County over 70 percent (Maybe include graphs in the appendix? Right now I only have compensation data for the entire public sector, including federal).

Often these public-sector jobs are heavily subsidized by inter-governmental transfers from the state government. Most states have some progressivity built into the scheme for distributing inter-governmental assistance, the lion's share of which is typically for education. As a result, low-income rural counties and school districts are often quite dependent on intergovernmental assistance, while metropolitan counties are more dependent on locally-raised property taxes. The baseline mix of local taxes and intergovernmental transfers varies from state to state depending on the school funding system, but a large difference in transfer-dependence between metro counties and relatively poor rural counties is quite common. For instance, in Florida, the school districts in more urban counties like Pinellas and Broward receive around 45 percent of their revenues from transfers, but those in rural counties like Gadsden or Lafayette receive around 80 percent from transfers. In Illinois, school districts in Cook County receive less than 40 percent of their revenues from the state, and those in Lake and DuPage counties in suburban Chicago receive only around 20 percent, but districts in poor, rural counties like Pulaski and Lawrence receive around 80 percent of their revenues from transfers (Maybe include something more systematic here? Not sure if it is necessary. This really varies from one state to another, but the general pattern is clear).

In most states, the size of real per capita cuts in state aid after the Great Recession were relatively similar in metro and non-metro areas, but these cuts are potentially more consequential in rural areas where they make up a much larger share of revenues. And in counties where the public sector makes up a sizable share of employment, long-term public-sector job losses associated with these cuts are more likely to have externalities for employment in other sectors like retail and various services.

In sum, a heavy reliance on public-sector employment was one of the distinctive features of rural labor markets on the eve of the Great Recession. To place this in perspective vis-à-vis other major types of employment, I have regressed the state/local share of county-level employment on the index of relative rurality in a model that includes state fixed effects. I do the same for several other large sectors: manufacturing, construction, retail trade, health, and information. The coefficients and 95 percent confidence intervals are displayed in Figure 8.

Figure 8: Coefficients from County-Level Regressions of Employment Shares in Different Sectors on the Index of Relative Rurality

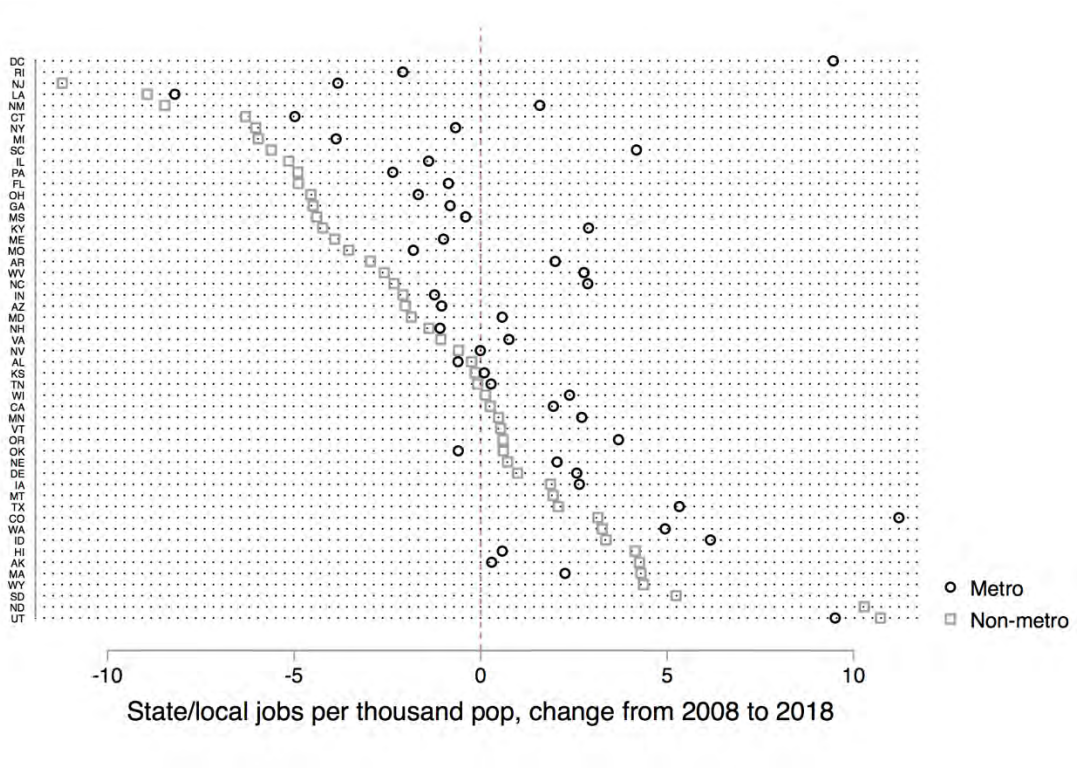


The state and local government coefficient suggests that going from a completely urban to a completely rural county is associated with a 25 percentage-point increase in the public employment share. The coefficients for manufacturing and construction are positive but much smaller, and not quite statistically significant. As counties become more rural, they become *less* reliant on jobs in retail trade, health, and information. As we will see below, along with the prevalence of public-sector jobs, the relative scarcity of health-care jobs in rural areas turns out to be an important part of the story of urban-rural divergence after the Great Recession.

6. The Public Sector and the Slow Rural Recovery

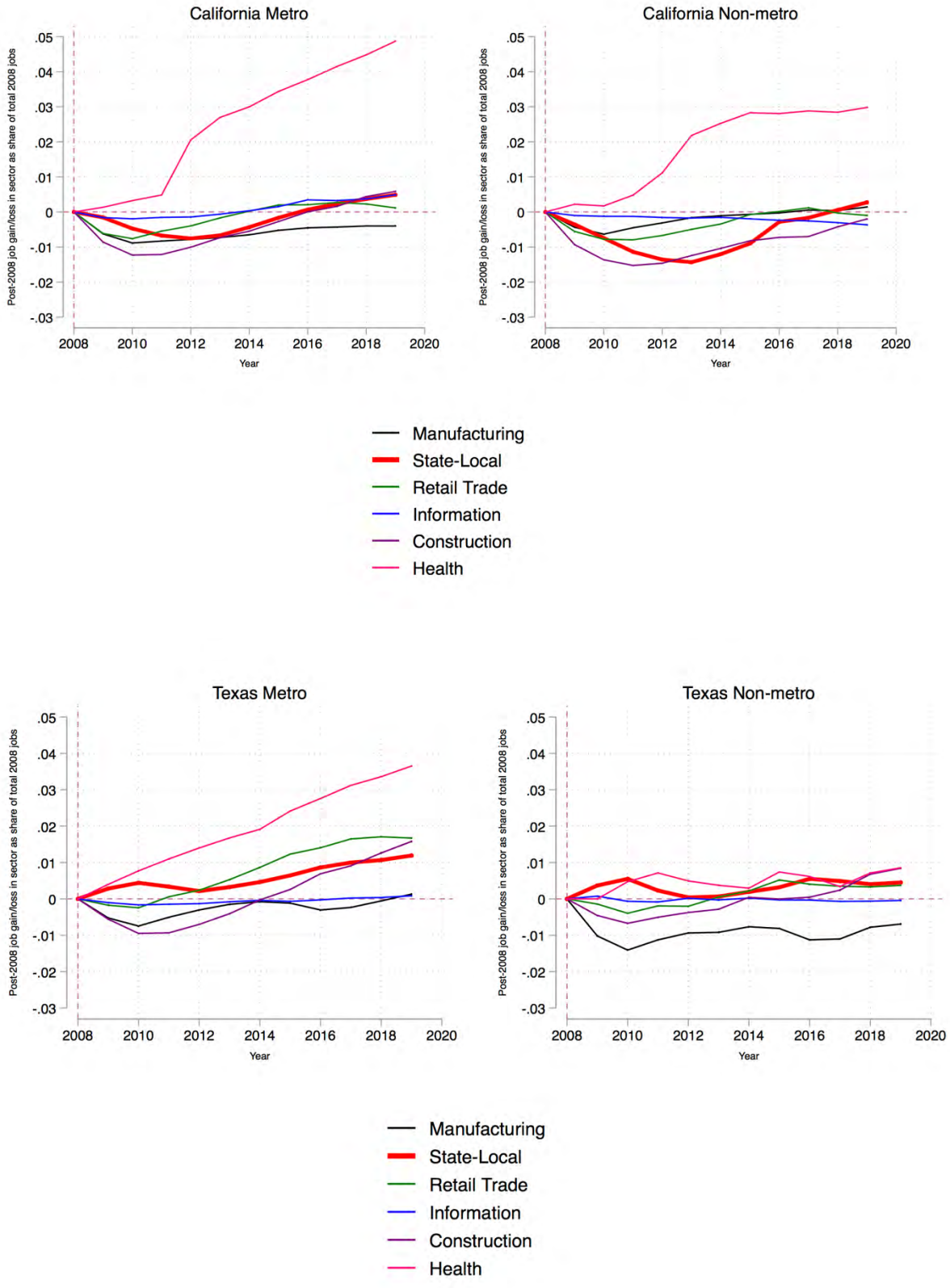
Not only were non-urban areas more dependent on the public sector on the eve of the Great Recession, but they also experienced greater public-sector job losses. Figure 9 plots the change in state-local jobs per 1000 people from 2008 to 2018—a full decade after the onset of the Great Recession—separately for metropolitan counties (with rural-urban continuum code of 1 or 2) and non-metro counties (codes 3 through 9). It shows that long-lasting public-sector job cuts were almost always more prevalent in non-metro counties than in metro counties in the same state. Leaving aside states where all counties were classified as metropolitan (DC and Rhode Island), or where all counties are classified as non-metro (the Dakotas, Wyoming, and Montana), there were 28 states in which the non-metro public sector had not returned to pre-recession public employment levels a decade later, and in all but one of these (Alabama), job losses were greater in non-metro than in metro counties. Of the 18 states where the non-metro public sector had surpassed 2008 employment levels a decade later, the gains were greater in metropolitan areas, with only five exceptions (Oklahoma, Hawaii, Alaska, Massachusetts, and Utah). The graph looks similar, and the lesson is the same, if instead of 2018, we examine any earlier year in the post-recession period.

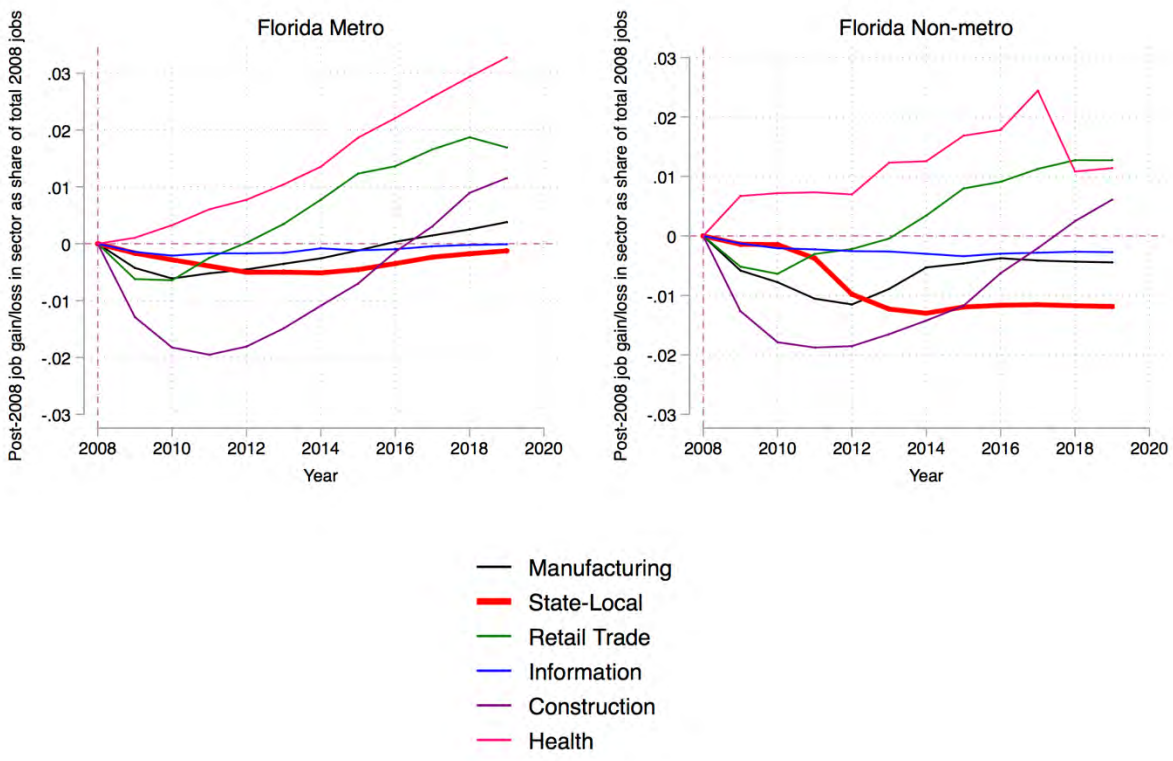
Figure 9: Change in State-Local Jobs Per 1000 Population from 2008 to 2018, Metro versus Non-Metro Counties, U.S. States

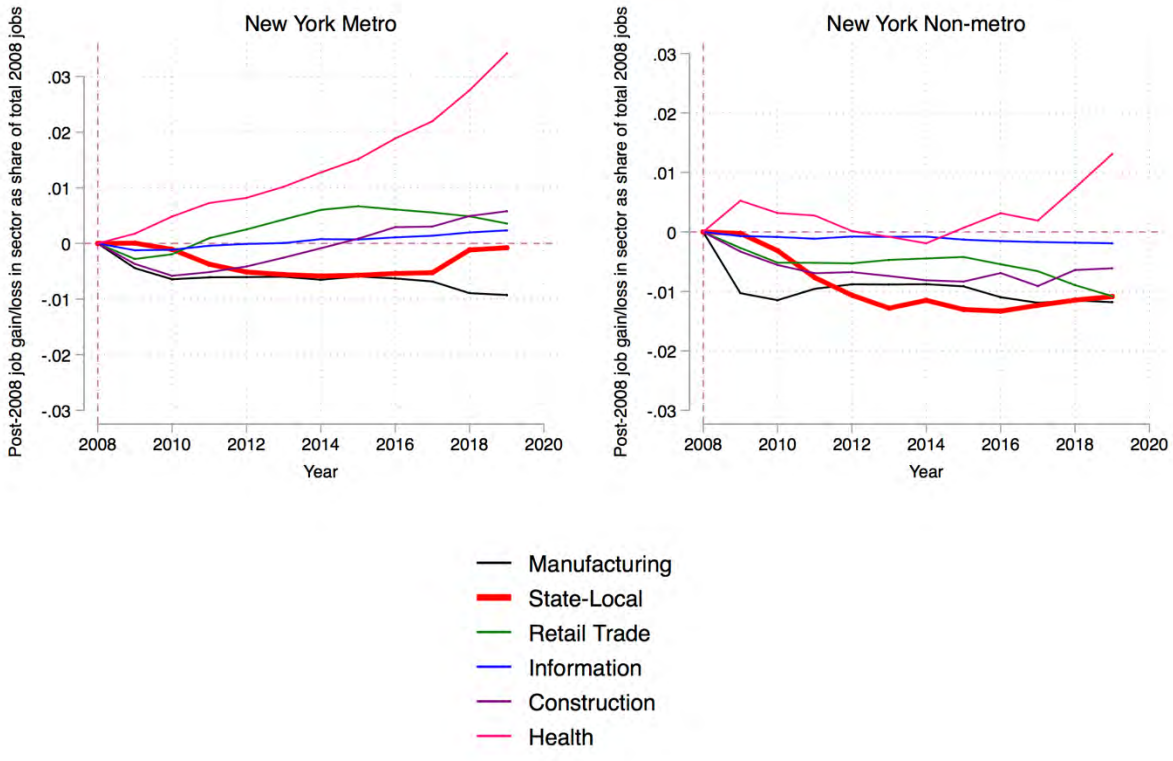


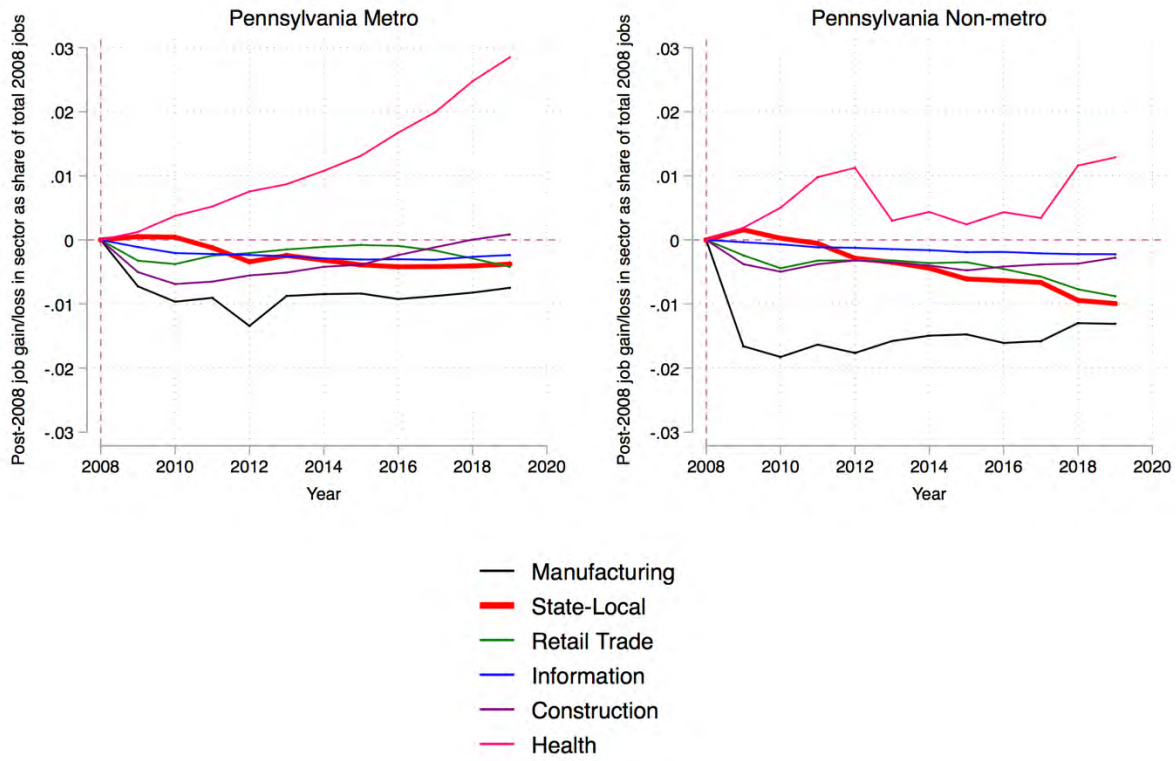
Next, let us combine information about the relative importance of public employment and other employment categories with information about the magnitude of job losses (or gains) since the Great Recession in order to measure the relative contribution of these categories to the initial job losses and then the recovery in the aftermath of the Great Recession. As a first cut, it is useful to examine once again the simple divide between metro and non-metro counties. In order to get a sense of the importance of each employment category in producing job losses and then subsequent gains, for each of the largest categories, for each year, I take the change in jobs in that category relative to the number of jobs in that category in 2008, and divide by the total number of jobs (in all employment categories) in 2008. In the left-hand panel of Figure 10, for each of the 10 largest states, I plot the data over time for metro areas (rural-urban continuum code of 1 or 2), and in the right-hand panel for non-metro areas (codes 3 through 9). The state and local sector is represented with bold red lines. [Clearly this needs to be streamlined. I am struggling to find the right way to display the data. Aggregates by census region are just too blunt. Again, maybe a few examples and everything else in the appendix?].

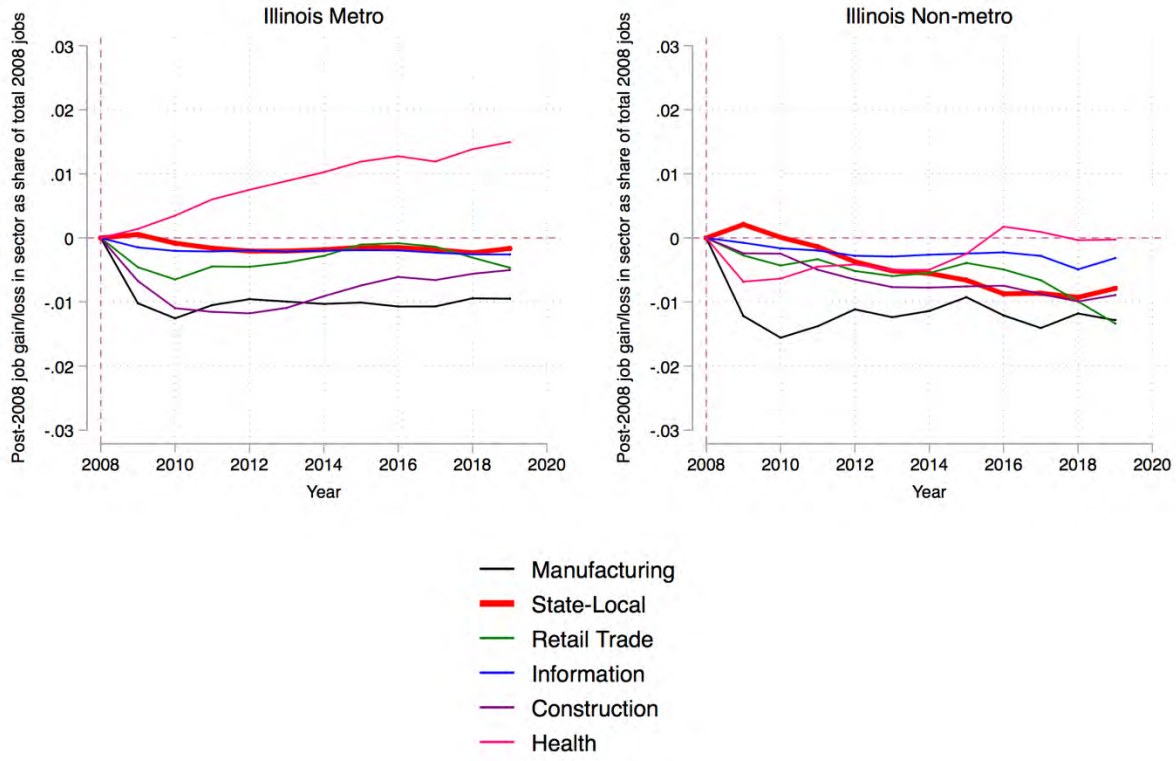
Figure 10: Impact of Various Employment Categories on Job Losses and Gains since 2008




Florida Metro
Florida Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.03
.02
.01
0
-.01
-.02
-.03
2008
2010
2012
2014
2016
2018
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


New York Metro
New York Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.03
.02
.01
0
-.01
-.02
-.03
2008
2010
2012
2014
2016
2018
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


Pennsylvania Metro
Pennsylvania Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.03
.02
.01
0
-.01
-.02
-.03
2008
2010
2012
2014
2016
2018
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


Illinois Metro
Illinois Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.03
.02
.01
0
-.01
-.02
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2008
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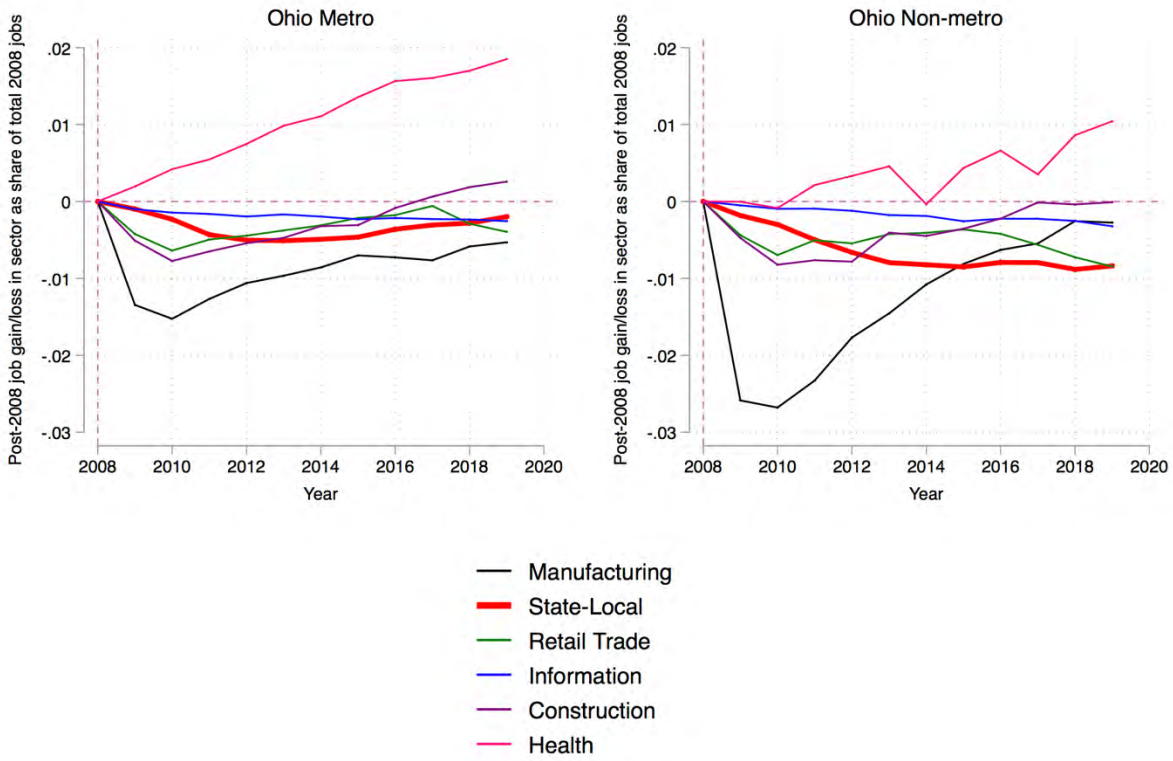
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


Ohio Metro
Ohio Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.02
.01
0
-.01
-.02
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2008
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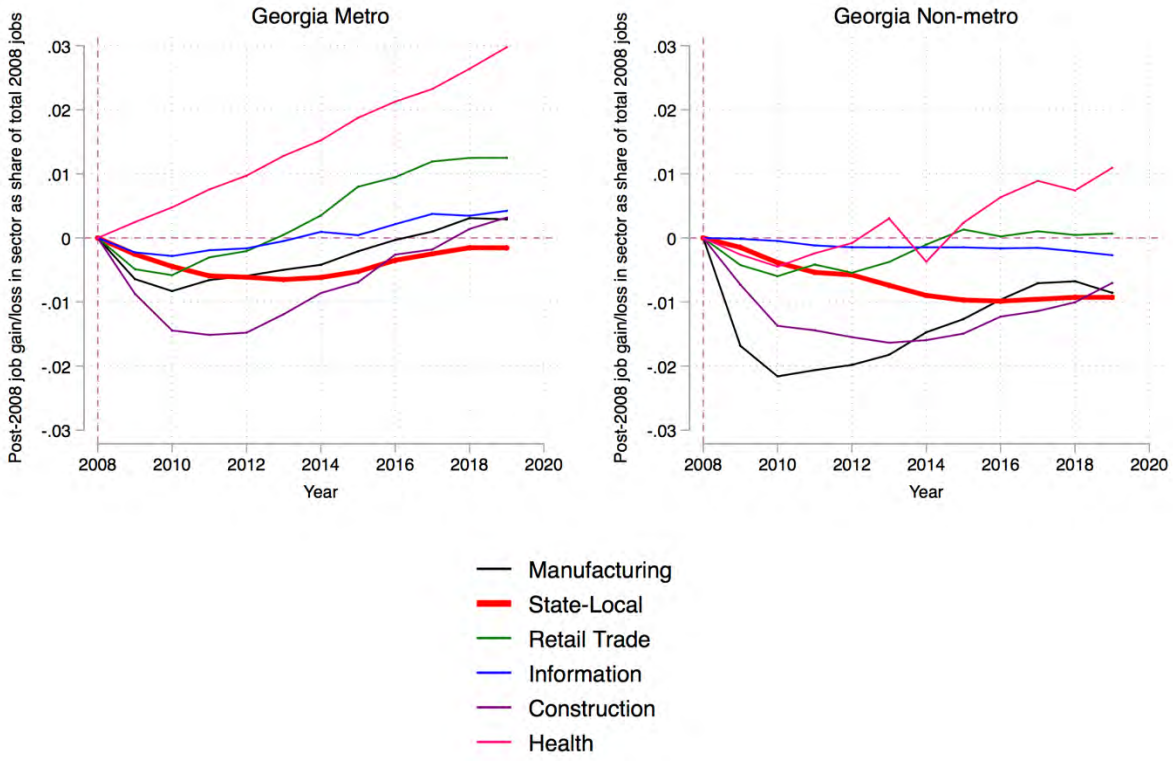
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


Georgia Metro
Georgia Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.03
.02
.01
0
-.01
-.02
-.03
2008
2010
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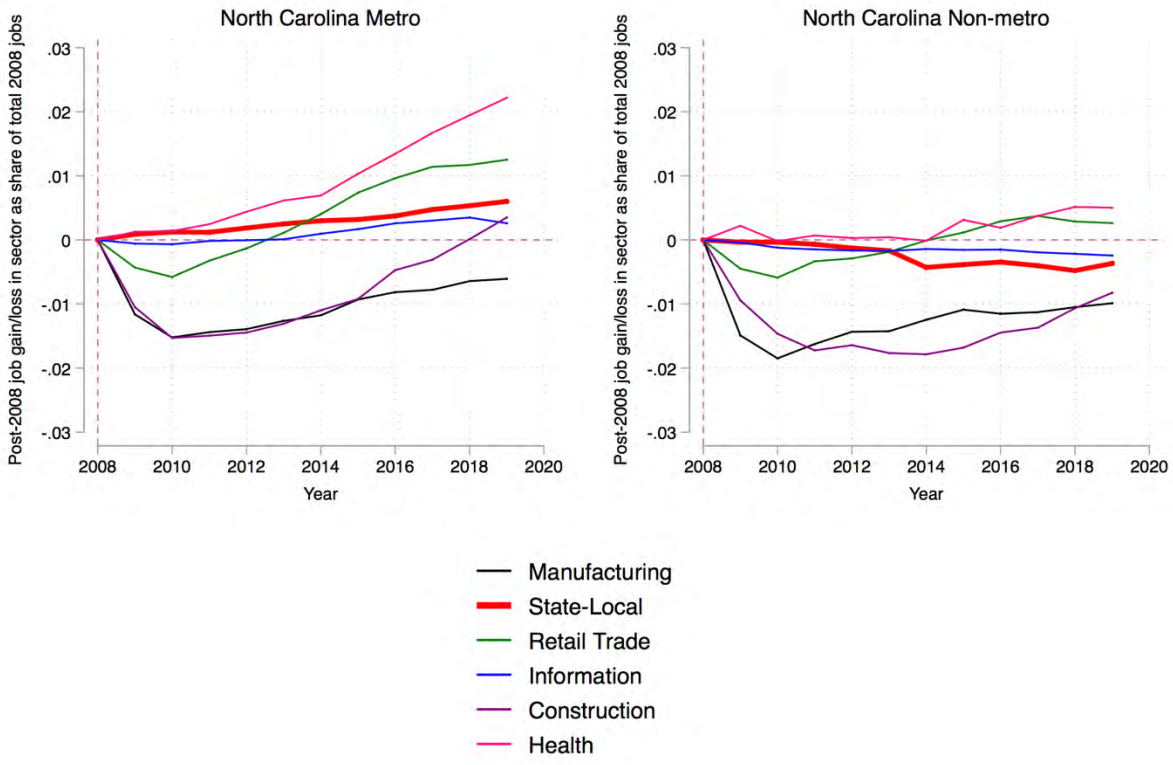
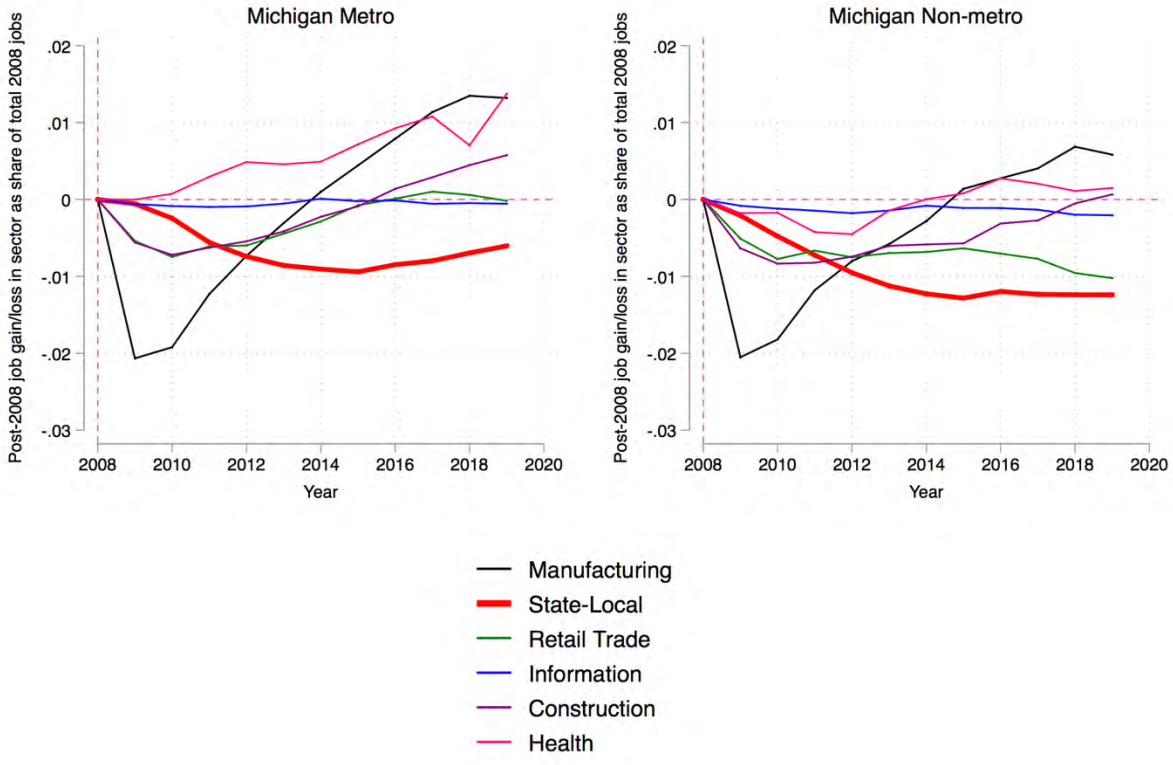
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


North Carolina Metro
North Carolina Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.03
.02
.01
0
-.01
-.02
-.03
2008
2010
2012
2014
2016
2018
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health


Michigan Metro
Michigan Non-metro
Post-2008 job gain/loss in sector as share of total 2008 jobs
.02
.01
0
-.01
-.02
-.03
2008
2010
2012
2014
2016
2018
2020
Year
Manufacturing
State-Local
Retail Trade
Information
Construction
Health

These graphs convey a number of interesting things about job losses and recovery after the Great recession. First, with the exception of Texas, which never experienced aggregate public-sector job losses in the wake of the Great Recession, the relative impact of state and local job losses was not trivial. While job losses in construction and manufacturing were sudden and dramatic, job losses in the state and local public sector accumulated more slowly—in many cases after other employment categories had already started to recover. This is consistent with a story in which state and local governments deal with declining revenues not by sudden dismissals, but by attrition.

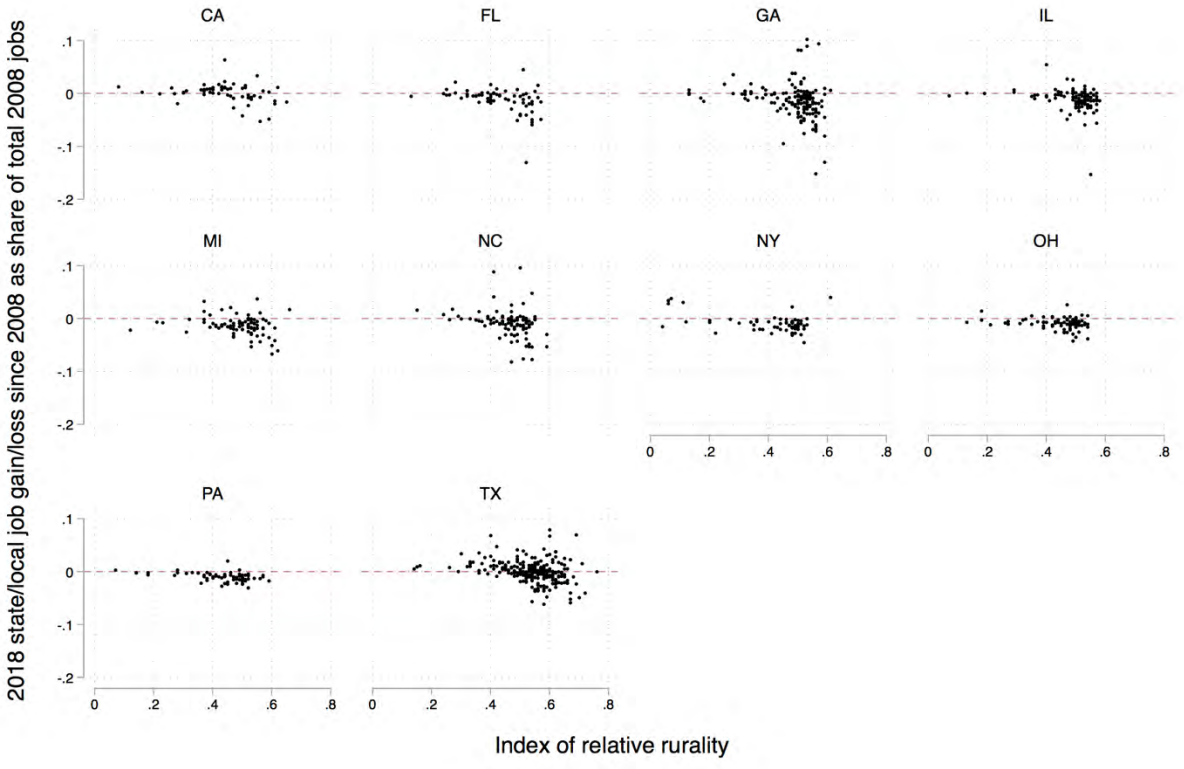
A very common pattern is that once other categories started to recover, the public sector remained stubbornly below pre-recession employment levels. This pattern is especially noteworthy in Ohio, Michigan, and Georgia, where beginning in 2010, a robust improvement in manufacturing employment took place, while public-sector employment continued to decline, and then leveled off well below its pre-recession level. In fact, in 7 of the 10 largest states, public-sector employment had still not reached pre-recession levels in either metro or non-metro areas by 2019.

Another clear pattern in these graphs is the difference between metro and non-metro areas. In every state, the impact of public-sector job losses was greater in non-metro areas. In fact, as time wore on, as other employment categories started to recover, the public sector became the leading source of long-term non-metro job losses in Florida, New York, Ohio, Georgia, Michigan, and prior to a public-sector recovery later in the decade, California. In the non-metro counties of several states, by late in the decade, persistent job losses in the public sector were sufficient to negate the gains in other employment categories that were on the path to recovery.

A final lesson from these graphs is difficult to ignore: the employment recovery in every state has been dominated by the rapid increase in jobs in the health sector. In some states, even by 2019, it was the only employment category to see significant increases over the pre-recession level. And the rapid increase in health jobs has been far more pronounced in metro than in non-metro areas.

The analysis in Figure 10 is rather blunt since it relies on a binary distinction between metro and non-metro areas. For instance, this approach classifies some small cities and other relatively urban areas as non-metro. It is also useful to calculate the relative impact of public sector job losses—again defined as the change in the number of public-sector jobs since 2008 in each post-2008 year divided by the total number of jobs in 2008—at the county level, and to examine correlations with the index of relative rurality. This is undertaken for the ten largest states in Figure 11 below, focusing once again on 2018—a decade after the financial crisis.

Figure 11: Impact of State-Local Job Losses and Gains, by Relative Rurality, 2008 to 2018



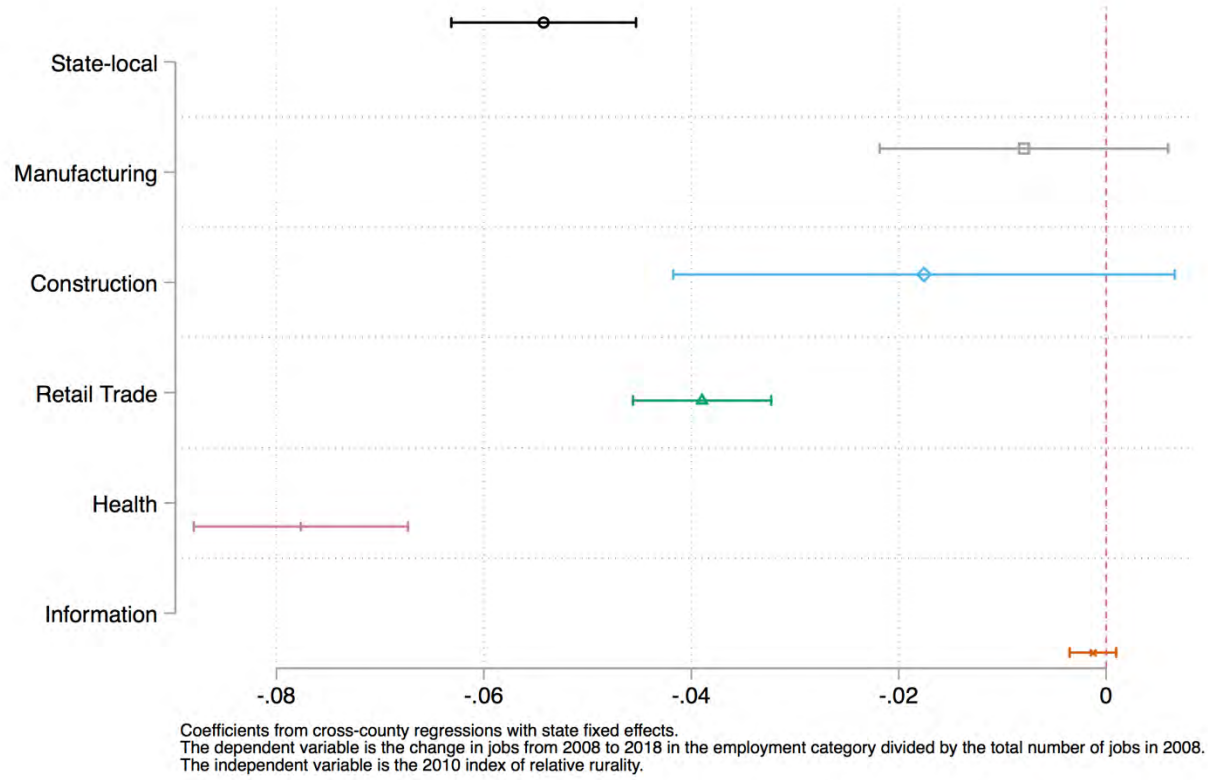
Because public employment is less important in urban places, and because urban areas were better positioned to avoid large and lasting job cuts, the long-term impact of public-sector job losses was minimal in urban America. However, a full decade after the financial crisis, public sector job losses were quite consequential in a number of rural counties. In many of the most rural places, the state and local sector was by far the leading category of long-term job losses by this metric. If we simply take the average value of this indicator for all counties in the United States with an index of relative rurality above the median, and do the same for the other major job categories, the state/local sector was far and away the leading category of job losses.

It is clear from Figure 11 that the impact of public-sector job losses is correlated with rurality. As a final exercise, it is useful to contrast the size of that correlation with job losses in other employment categories. As with state-local employment in the figures above, I calculate the long-term impact of job losses (or gains) in each category: jobs in category *i* in county *j* in 2018 minus jobs in category *i* in county *j* in 2008, divided by the total number of jobs (all categories) in county *j* in 2008. For each employment category, I separately regress this quantity on the 2010 index of relative rurality in a model with state fixed effects. The coefficients and 95 percent confidence intervals are presented in Figure 12.

The negative coefficient for state-local jobs is larger than that for any other job category but health. Retail trade is another category in which long-term job losses have been correlated with rurality. Clearly, in addition to state and local employment, the health care sector is a very important part of the explanation for urban-rural divergence in the recovery from the Great

Recession. However, recall from Figure 10 above that the health care sector *added* jobs after the Great Recession in the non-metro counties of each of the ten largest states, and the same is true in many other states. The large negative coefficient reported in Figure 12 is explained by the fact that by contrast, job growth in health care was explosive in metro counties.

Figure 12: Coefficients from County-Level Regressions of Job Losses in Different Sectors on the Index of Relative Rurality



7. Discussion and Conclusion

This paper has documented that lingering public-sector job losses are an important part of the reason why the employment recovery after the Great Recession has been slower in rural than urban places. Low-income rural places are relatively dependent on public employment, and also relatively dependent on transfers from more urban places to fund it. However, even though transfers from the federal government to the states often increase in the wake of recessions, the opposite has been true of transfers from states to local governments. As a result, many rural local governments were forced to make lasting cuts to public-sector employment after the Great Recession. A decade later, rural public employment has fallen far below pre-recession levels in many states, and has been a leading source of job losses in rural America—even surpassing manufacturing and construction.

With each recession, members of Congress scramble to assemble an ad hoc mix of subsidies to individuals, firms, and governments. The COVID crisis was no different. Given the increasingly polarized political environment, battles over the nature of these rescue packages have become

highly politicized. In the wake of COVID, some of the fiercest battles were about increased aid for state and local governments—often described by their Republican detractors as "blue state bailouts." However, this paper demonstrates that the communities most negatively impacted by the built-in pro-cyclicality of local revenues and public expenditures are overwhelmingly rural. By comparison, the public sector is relatively inconsequential in urban areas. Given the extremely high correlation between rurality and Republican voting (Rodden 2019), the communities with the most to lose from public sector job losses are the base of the Republican Party. This dynamic created a divide within the Republican Party. National party leaders argued against any additional assistance for lower-level governments, but fearing the consequences of large revenue and job losses, a number of Republican local officials lobbied in favor of such assistance.

More generally, this paper highlights some complexities in the way coalitions have formed in the two American political parties. Many public-sector workers, especially in education, identify with the Democratic Party and not surprisingly, embrace the party's support for more generous funding of the public sector. But even if individual unionized public-sector workers support the Democratic Party, private-sector workers in the geographic areas where the public sector makes up the largest employment shares overwhelmingly support the Republican Party, which over a period of decades, has developed a platform that seeks to limit the growth of the best-paying jobs in town.

An important question, then, both for rural economies and political battles, pertains to the potential for spillovers associated with public-sector jobs. It is likely that lasting cuts in public sector employment—especially in rural areas where public-sector jobs are among the highest-paying—lead to job losses in other categories of employment, including retail, services, and construction. This possibility was left unaddressed in this largely descriptive paper, but it is plausible that the lagging rural recovery in retail trade has something to do with externalities associated with public-sector cuts. Future work might attempt to causally identify such externalities using exogenous events like school district consolidations or prison closures.

One of the problems identified in this paper is that state governments appear to use emergency assistance to bolster their own direct expenditures, even while cutting their assistance to local governments. State governments may not be entirely trustworthy conduits for funds intended to prevent local public employment cuts. Perhaps this problem informed the design of the American Rescue Plan Act of 2021, which bypasses states in its funding for larger metro areas, and includes strict guidelines requiring states to distribute funds to less populous municipalities within 30 days of receipt, with monetary penalties for non-compliance.

Perhaps because of a perception that assistance to local governments associated with the American Recovery and Reinvestment Act of 2009 was too small and inflexible, the American Rescue Plan of 2021 included very large, essentially unconditional grants to local governments, many of whom subsequently ended up collecting more tax revenue than anticipated. Unlike previous stimulus packages, the American Rescue Plan of 2021 attempted to move away from the typical approach to geographic distribution, which in the past has relied on per-capita transfers to states with a generous floor for small states that are over-represented in the Senate. In the past, poorly-targeted aid meant that recessions led to windfalls for small states, many of

which were relatively rural. However, this paper demonstrated that this approach was not beneficial to rural areas in large, adversely affected states like Florida or Michigan. It is possible that the geographic winners from American Rescue Plan of 2021 will be different than those of the American Recovery and Reinvestment Act. An interesting question for the future is what type of impact these shifting windfalls will have on the local public sector. To the extent that they bolster public employment, and since they were distributed using formulae that include step-functions, these windfalls might offer opportunities for causal identification of externalities for other job categories.

Finally, this paper shed light on substantial unexplained cross-state and cross-county heterogeneity that is worthy of further analysis. As demonstrated in Figure 9, public-sector job losses after the Great Recession were not universal. Some states—many of them led by unified Republican government—presided over substantial increases in the number of state and local employees per 1000 residents. Some of these were states that were relatively untouched by the Great Recession, like the Dakotas, and many were small states that benefited from windfalls associated with the Recovery and Reinvestment Act. Another possibility has to do with cross-state variation in the power of public-sector unions. A possibility is that when revenues decline, labor unions have an impact on the trade-off between wage-setting and new hiring.

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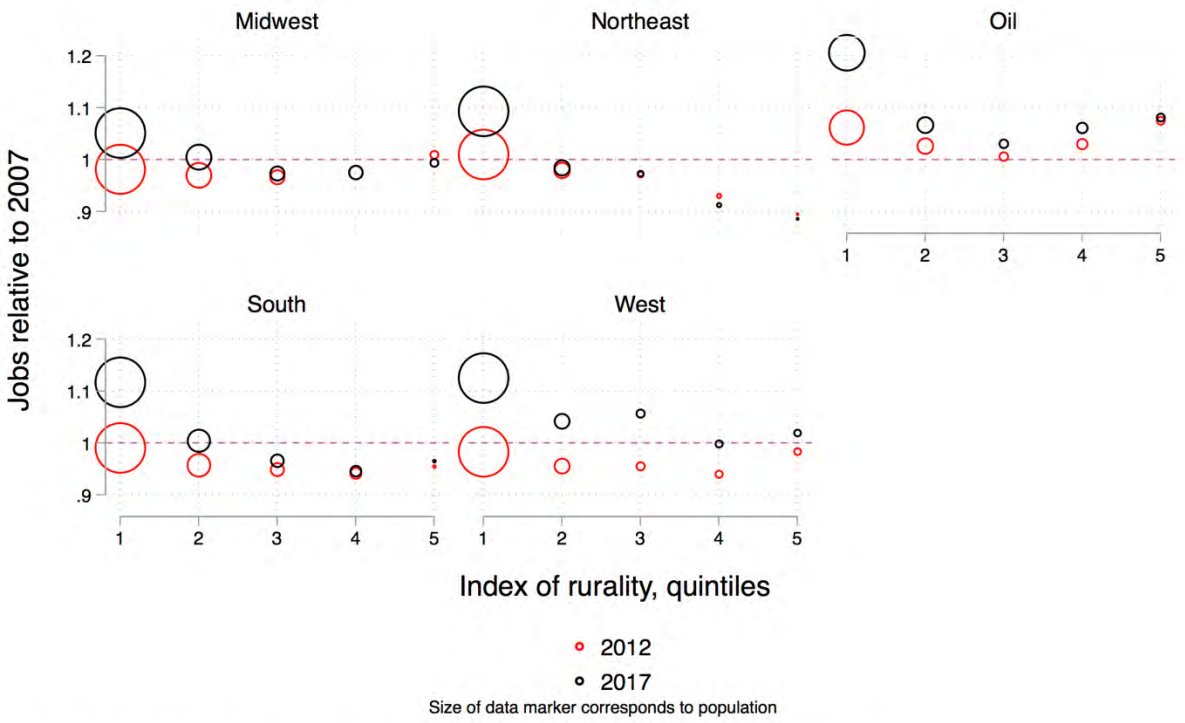
Appendix

Figure A1: Post-Recession Employment Recovery by Quintiles of the 2010 Index of Rurality



Oil states include Texas, Oklahoma, New Mexico, Colorado, Utah, Wyoming, North Dakota, Louisiana, and Alaska