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Economic Performance in Wisconsin since the Great Recession: A County-Level Analysis

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Abstract

This paper studies the performance of the Wisconsin economy at the county level in order to understand how different parts of the state fared during the Great Recession and the subsequent recovery. We find strong evidence of convergence in living standards. The counties that had the highest unemployment rates, highest poverty rates, and lowest incomes before the recession have seen the largest improvements in the following decade. We also find that the counties which suffered the most during the recession have had the largest gains during recovery. While we find convergence in living standards, we also find evidence of divergence in measures of overall size. Counties that had a high level of employment, larger labor force, or bigger population before the recession experienced faster average growth in those measures in the following decade. Similar trends occurred across all counties nationwide, but the magnitude of the convergence of living standards and divergence in size was stronger in Wisconsin.

Introduction

In December 2007, right before the onset of the Great Recession, the unemployment rate in Menominee County, Wisconsin stood at 9.6%, the highest of all 72 counties in the state and more than 5 percentage points above the statewide average of 4.5%.[1] The recession was especially severe in Menominee County, as unemployment climbed to 15.3% by December 2010 while the statewide (December) rate had peaked at 8.9% in 2009. During the recovery, unemployment fell consistently across the state, but it fell especially rapidly in Menominee, where by December 2017 unemployment was 4.3%, only 1.6 percentage points above the statewide level. During the recovery Menominee had more than made up the ground it lost during the recession, and had substantially narrowed the pre-recession gap to the rest of the state.

In this paper, we analyze the performance of the Wisconsin economy at the county level, to see how different parts of the state fared during the recession and the recovery. We show that the experience of Menominee County was extreme but not atypical, as there has been substantial convergence across counties in many measures of living standards.

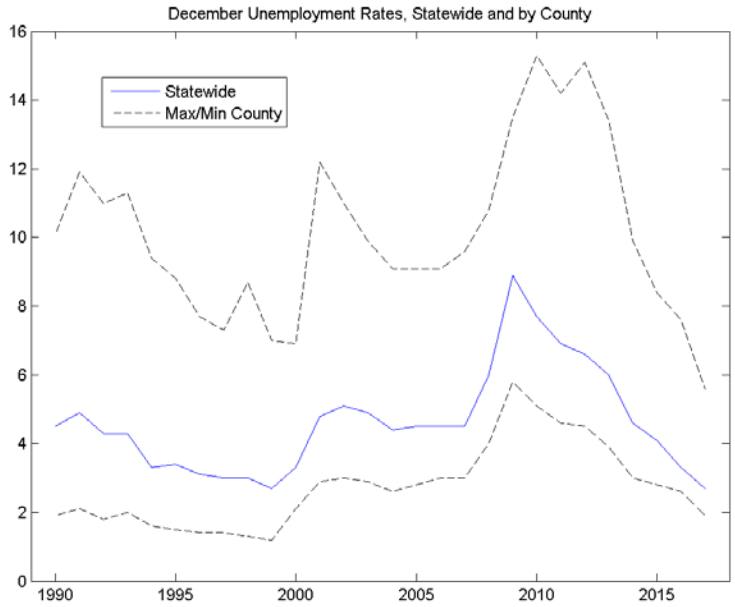

Figure 1: Unemployment rate statewide and in the highest and lowest counties in December of each year.

Like Menominee, counties in Wisconsin with higher unemployment rates in 2007 experienced larger average declines in unemployment the following ten years. The narrowing of the unemployment dispersion is illustrated in Figure 1, which plots the unemployment rate statewide along with the highest and lowest county rates in December of each year. While the overall patterns in all the lines are similar, there has been a clear narrowing of the differences across

1 All of these unemployment rates are seasonally unadjusted, which is all that is available at the county level. For that reason we only look at December of each year.

counties since 2010. In December 2017 the gap between the highest county rate (5.6% in Iron County) and lowest (1.9% in Dane County) reached an all-time low.

We show below that this same pattern of convergence holds true for several other measures of living standards. For example, over the last decade the poverty rate has declined the most among the initially poorest counties. Further, counties with a low level of income in 2007, whether measured by median household income or per capita personal income, experienced faster income growth on average over the following ten years.

Each of these measures includes the period of recession and recovery, so looks at the change from one period of expansion to another. We also find evidence of "snapback growth," as those counties which suffered the most during the recession have had the largest improvements during the subsequent recovery. However the net gains over the recession and recovery have been positive. The counties which were initially worst off have more than made up for their losses during the recession and have closed the gap to those areas which were initially better off.

In contrast to our findings, some commentators have suggested that different regions of the state have recently experienced divergent economic fortunes.[2] This was also a common narrative nationwide during the 2016 election, with concerns that certain areas had been left behind economically. Our results suggest that this narrative does not describe the economic dynamics across counties in Wisconsin. Although there remains dispersion across counties, and the strength of the convergence has not been uniform, on average the counties that had lower living standards prior to the recession have seen the largest improvements in the following decade.

However when we turn to other indicators which measure the aggregate size of a county's economy, rather than the living standards of average residents, we find some evidence of divergence. Counties with a higher level of employment, larger labor force, or bigger population in 2007 experienced faster growth in those measures on average in the following decade. This evidence is consistent with a continuing process of agglomeration, the efficiencies through spillovers or scale economies that come with increased geographic concentration. Further, it suggests that some of the changes which occurred following the recession may be due to population dynamics, with slower growth or exodus from less populous areas toward more concentrated ones. This relative population reallocation may have contributed to the convergence in living standards if the poorer residents from the less concentrated areas moved to the cities. These results also suggest that difficulties associated with the slow growth of the labor force, which have gained increasing attention statewide, have become particularly acute in smaller counties.[3]

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[2] For example, "Economy a Challenge for Most of Wisconsin," by Sen. John Erpenbach, *Capital Times*, Jan. 26, 2018 and "The Two Wisconsins," by Marc Eisen, *Isthmus*, October 12, 2017 both argued that the recovery in the state was uneven, with rural areas lagging.

[3] For discussion of the labor force issues see, "Wisconsin, Facing a Worker Shortage, Pitches Its Benefits," by Shayndi Raice, *Wall Street Journal*, February 12, 2018.

Unemployment Dynamics

We now analyze the dynamics of different economic indicators more formally, beginning with the unemployment rate. For each variable we look at how the performance at the county level during the recession related to the performance during the recovery, which measures the "snap back" effect that we highlighted earlier. We also analyze the relationship between the initial level before the recession and the performance in the subsequent decade, to judge whether there has been convergence across counties over time.

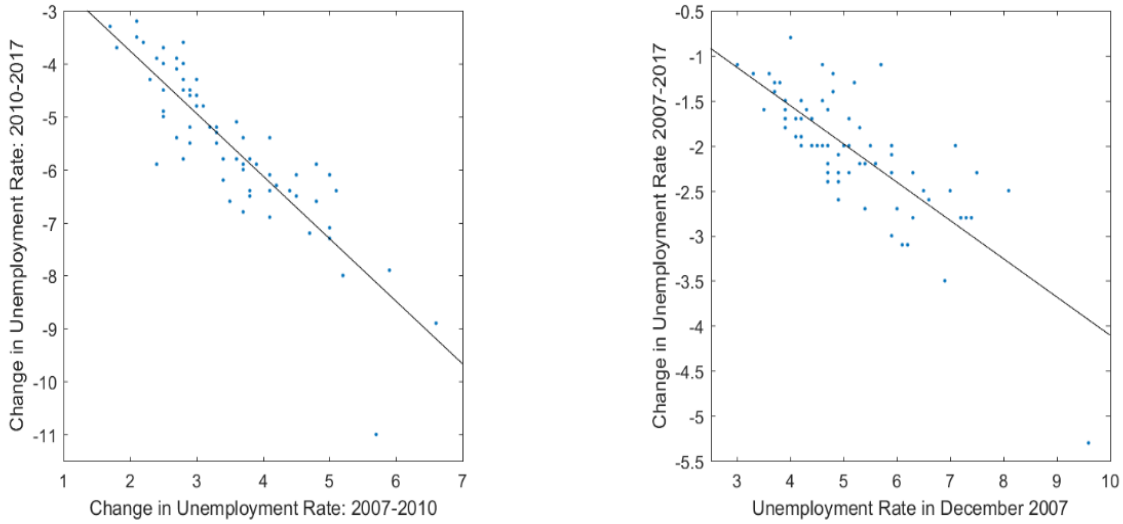

Figure 2: Convergence in the Unemployment Rate across Counties

The left panel of Figure 2 plots the change in the unemployment rate between December 2010 and December 2017 (the period of recovery) against the change between December 2007 and December 2010 (the period of recession) across the counties in Wisconsin. There we see clearly that counties that were hit hardest by the Great Recession are also the ones that experienced the largest recovery since 2010, consistent with the snapback growth discussed above. Counties which had a larger increase in unemployment had more idle labor capacity, and thus more potential to shed unemployment during the recovery. The slope of the fitted line is close to (negative) unity, implying a nearly uniform speed of recovery across counties.

The right panel plots the overall change in the unemployment rate between December 2007 and December 2017 against the unemployment rate in December 2007. On average, counties with a high initial unemployment rate experienced a larger decline in unemployment over the following ten years. This is consistent with the narrowing dispersion across counties which we highlighted in Figure 1 above. In particular, while the unemployment rate in December 2007 ranged between 3% and 9.6% across counties and had a standard deviation of 1.26, by December 2017 the range had narrowed to 1.9-5.6% with a standard deviation of 0.84. Thus there has been significant convergence in unemployment rates.

Income Dynamics

Next, we look at the evolution of income at the county level over the last ten years. We look separately at three different measures: the poverty rate, real median household income, and real per capita personal income. As we discuss, each of these captures a different aspect of income and is a key component to measuring changes in living standards.

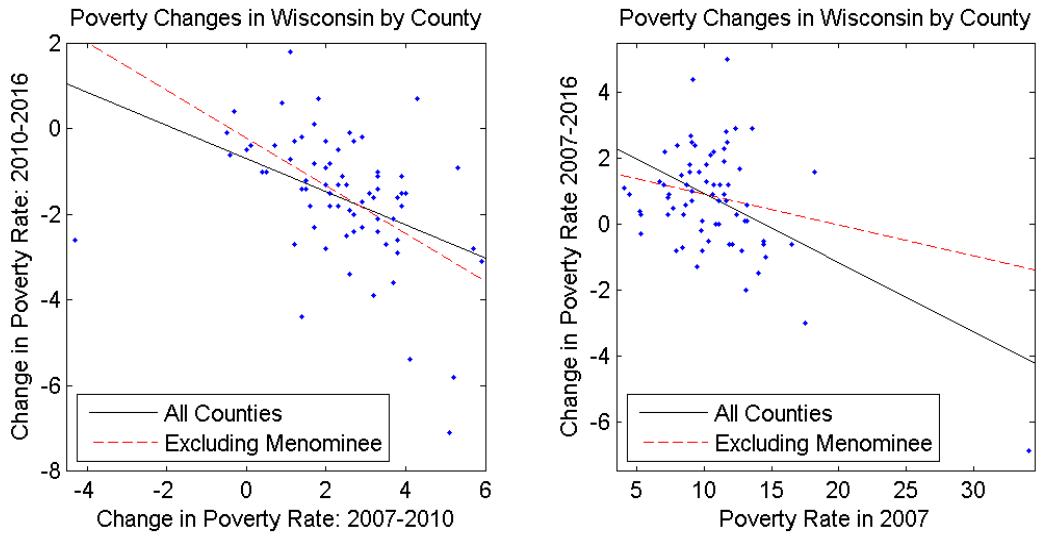

Figure 3: Convergence in the Poverty Rate across Counties

First we analyze the changes in the poverty rate by county. Statewide, the poverty rate increased from 10.8% in 2007 to 13.2% during the depths of the recession in 2010, before declining to 11.8% in 2016, the most recent data available. The left panel of Figure 3 shows that there was significant divergence in the experience of different counties, as some saw declines during the recession while others experienced increases of nearly six percentage points. However on average the counties that had the largest increases in poverty during the recession had the largest reductions during the recovery.

The right panel shows the total change in the poverty rate from 2007-2016 against the initial level in 2007. Again we see a negative relationship, with the initially poorest counties experiencing the largest reduction over the following decade. This is particularly stark in Menominee County, whose unemployment dynamics we highlighted above. In 2007 the poverty rate in Menominee County was 34.1%, by far the highest rate of any county. While Menominee remains the poorest county in the state, by 2016 its poverty rate had fallen to 27.2%, by far the largest reduction. Because Menominee is such an outlier, we include regressions both including and excluding it. Both clearly show the negative relationship characteristic of convergence, although the effect is less strong (but still statistically significant) when Menominee is excluded.

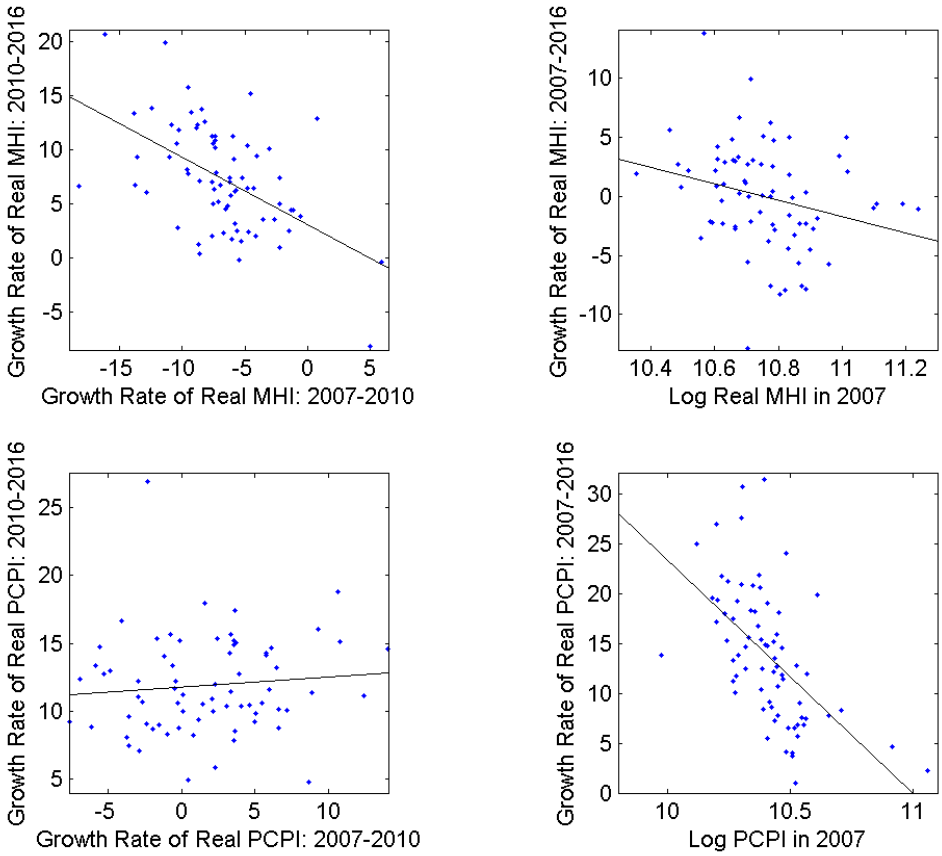

Figure 4: Changes in Real Median Household Income (MHI) and Per Capita Personal Income (PCPI) across Counties.

Next we turn to measures of income. Figure 4 plots two different income measures, real median household income (MHI, top row) and real per capita personal income (PCPI, bottom row). Again, we show changes during and after the recession on the left, and changes over a decade versus the (log) level in 2007 on the right. Household income is a survey measure, capturing all sources of pre-tax income received by a typical household in each county. Personal income is similar to measures in the national income and product accounts, capturing labor and capital income payments within the county, which is divided by the county population to convert to per capita. Thus aside from different data sources, one is a median while the other is an average.

The two income measures differ in whether there was snapback growth, as shown in the left column of Figure 4. Median household income is consistent with snapback, as the counties whose median household suffered the largest income decline during the recession also tended to have the largest income gains during the recovery. However for per capita personal income there is no relationship between growth during and after the recession. (The upward sloping regression line shown is not statistically significant.) Average PCPI growth rates were roughly uniform across counties during the recovery, regardless of how the county fared during the recession.

However both income measures suggest convergence in incomes across counties, as shown in the right column of Figure 4. The convergence effects are weaker for median household income, where there has been more dispersion over the 2007-2016 period for counties which had initially similar incomes in 2007. Nonetheless, the effect is still noticeable and statistically significant. Convergence is much stronger for personal income than household income, as there is less dispersion and the regression line has a much steeper slope. Further, some of the highest county growth rates occurred in the poorest counties, while the lowest growth rates were among the richest counties. For example, Iron County, which had a per capita personal income $7,700 below the statewide average in 2007 grew by 30.7% from 2007-2016, more than triple the statewide rate of 9.1%. By contrast, the richest county in the state, Ozaukee County with a per capita personal income of over $28,000 above the statewide average in 2007, grew by only 2.2%.

Overall, our results provide evidence of convergence in income across counties over the last ten years: counties with a high poverty rate in 2007 on average experienced a larger decline in the poverty rate since then, and counties with a low level of income in 2007 on average experienced a faster income growth.

Employment, Labor Force, and Population Dynamics

While so far we have considered measures of living standards, we now turn to measures of overall size. While the previous indicators were different measures of the conditions for a typical county resident, these measure the scale of economic activity and population within a county.

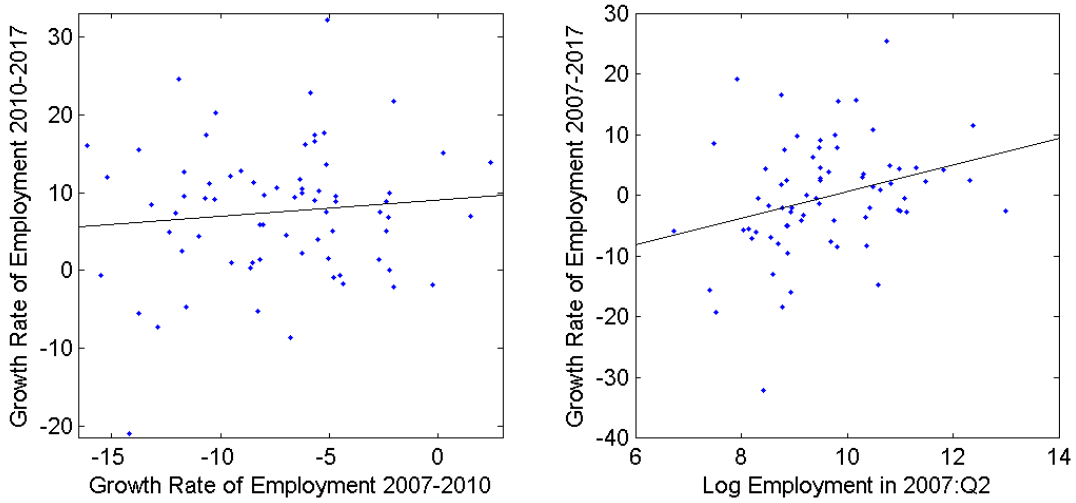

Figure 5: Changes in Employment across Counties

In particular we first consider total employment, which is shown in Figure 5. Unlike our previous measures of living standards, we now see some evidence of divergence across counties. As with personal income, the left panel of the figure shows that there was no evidence of snapback employment growth. Employment growth during the recovery has no systematic relation with employment losses during the recession. (Again the line with the slight upward slope is not

significant.) However the right panel now shows evidence of divergence: the counties which had the highest initial level of employment in 2007 experienced larger average growth in the following decade. There certainly is dispersion in outcomes, as the R-squared for the regression is only 0.086, but the regression coefficient is significant (p-value < 0.015). Thus although counties had a wide range of outcomes, the larger ones did tend to grow faster on average. Perhaps even more striking, many of the counties with initially smaller employment levels experienced substantial employment declines of 20% or more over the decade from 2007-2017.

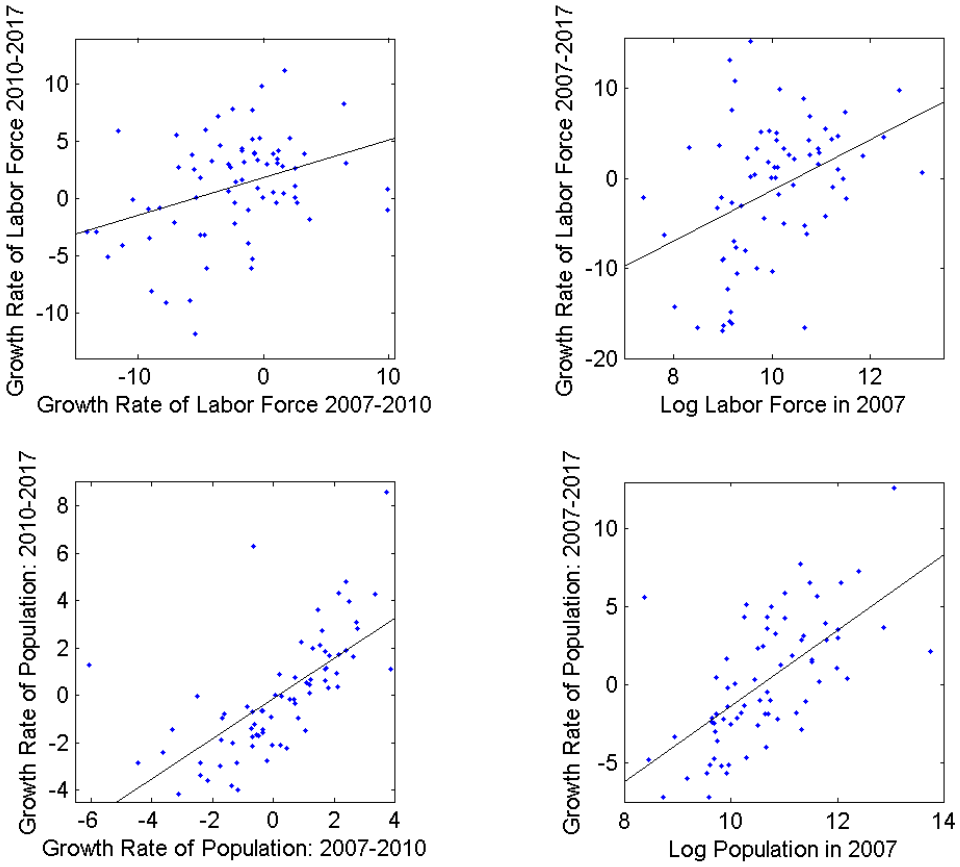

Figure 6: Changes in Labor Force and Population across Counties

Stronger evidence of divergence comes when examining the size of the labor force and population across counties, which is shown in Figure 6. Both the labor force (top row) and especially the population (bottom row) show persistence in growth rates and divergence. The left column shows that counties whose population or labor force grew faster during the recession also grew faster during the recovery. The right column shows that counties that initially had a larger labor force or population in 2007 experienced a faster average growth rate in these measures over the following decade. Initially large counties grew relatively even larger.

Although the patterns are similar, the effects are stronger and more uniform for population. Out of the smallest 13 counties in the state only one, Menominee County, experienced an increase in

population from 2007-2017. All of the others experienced declines, by an average of 4%, although some saw losses of more than 7%. By contrast the 16 largest counties in the state all had population increases, by an average of 4%, with the state's second largest county (Dane) growing by 12.6%.

Thus the last decade has seen a significant reallocation of the population within the state, with growth in the more concentrated and urban areas and loss in the less populous rural area. We show below that similar results have been seen nationwide, with continued urban population growth and flat or declining populations in rural areas. As discussed above, this evidence is consistent with agglomeration, the efficiencies through spillovers or scale economies that come with increased geographic concentration. These results also suggest that the population and labor force shortages, which have gained increasing attention statewide, have become particularly acute in smaller counties.

Are the Trends in Wisconsin Different from the Rest of the Country?

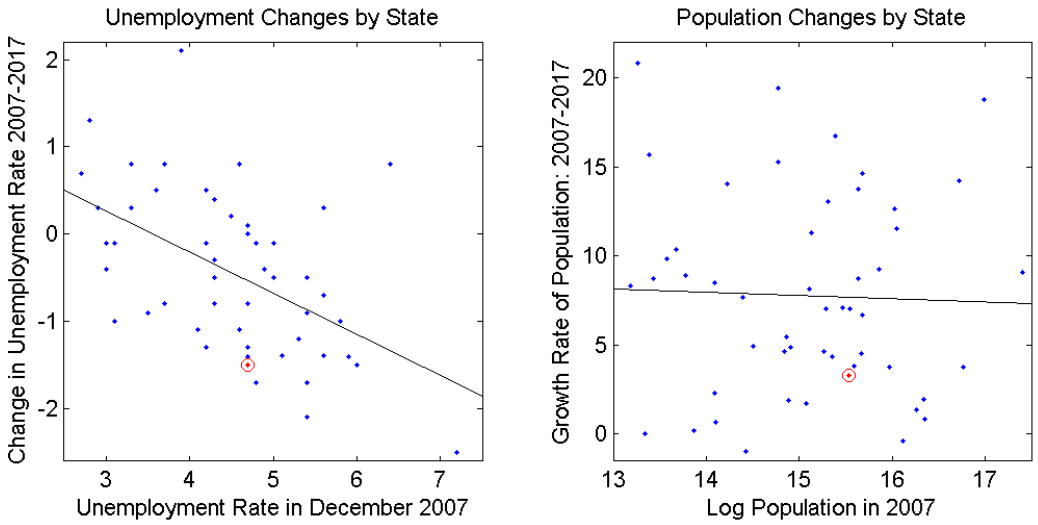

Figure 7: Changes in Unemployment and Population across States

We now investigate whether the trends in Wisconsin and its counties are distinct from what has happened in the rest of the country. We focus first on unemployment, which showed the clearest signs of convergence in Wisconsin, and population, which showed the clearest signs of divergence.

In Figure 7 we plot state-level unemployment (left panel) and population (right panel), showing the initial level in 2007 versus the change from 2007-2017. The data points for Wisconsin are shown in the red circled dots. The left panel shows that the convergence in unemployment rates that we observed within Wisconsin also happened across states. The states which had the highest unemployment rates in December 2007 on average had the largest reductions in unemployment from 2007-2017. We also see that the reduction in unemployment in Wisconsin was more than average, as it lies well below the regression line. Statewide unemployment in Wisconsin fell

from 4.7% in 2007 to 3.2% in 2017, while on average a state with 4.7% unemployment would only be expected to see unemployment fall by to 4.2%.

The right panel shows that the population divergence that we observed at the county level in Wisconsin is not evident nationwide at the state level. There is no systematic relation between initial state population size and subsequent growth. (The slightly negatively sloped regression line is not statistically significant.) This suggests that the agglomeration factors leading to population divergence are more localized, affecting the population dynamics within rather than across states. We also see that overall population growth in Wisconsin was on the low end of the distribution, with the cumulative growth rate of 3.3% over the decade, ranking as the 12th lowest among the 50 states plus Washington, DC.

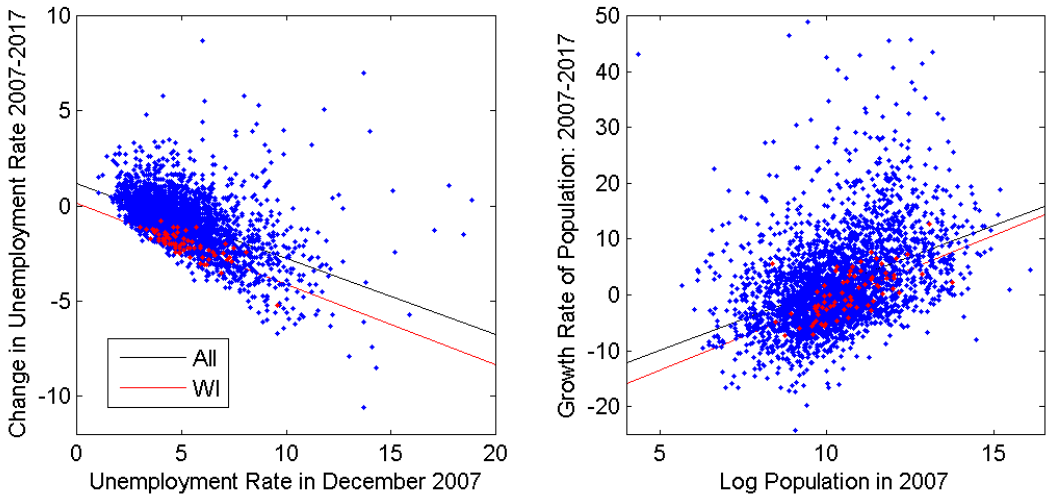

Figure 8: Changes in Unemployment and Population in All Counties in the US

In Figure 8 we show the same results, but now for all counties in the United States. We highlight the Wisconsin counties in red, while all other counties are shown in blue. Both figures also include two regression lines, one including all of the counties (black line) and one just focusing on Wisconsin (red line) as in our previous figures. The figure shows that roughly the same pattern of convergence in county unemployment rates and divergence in county population was seen in counties throughout the US. In both panels the slopes of the two regression lines are very similar but the Wisconsin regression lines are shifted down. Further, there was more dispersion in both unemployment and population outcomes nationwide than in Wisconsin. The figures are even trimmed to exclude a few of the largest outliers, which are still included in the regression.

Finally, we turn to real per capita personal income. We saw above that there had been no snapback growth effect since the recession, but there had been overall convergence in this income measure within Wisconsin since 2007. In Figure 9 we plot this same real per capita income measure across the country at the state level (left panel) and for all counties (right panel). Again we show Wisconsin as a red circled dot on the left panel and show Wisconsin counties in red in the right panel, along with both the national and Wisconsin regression lines.

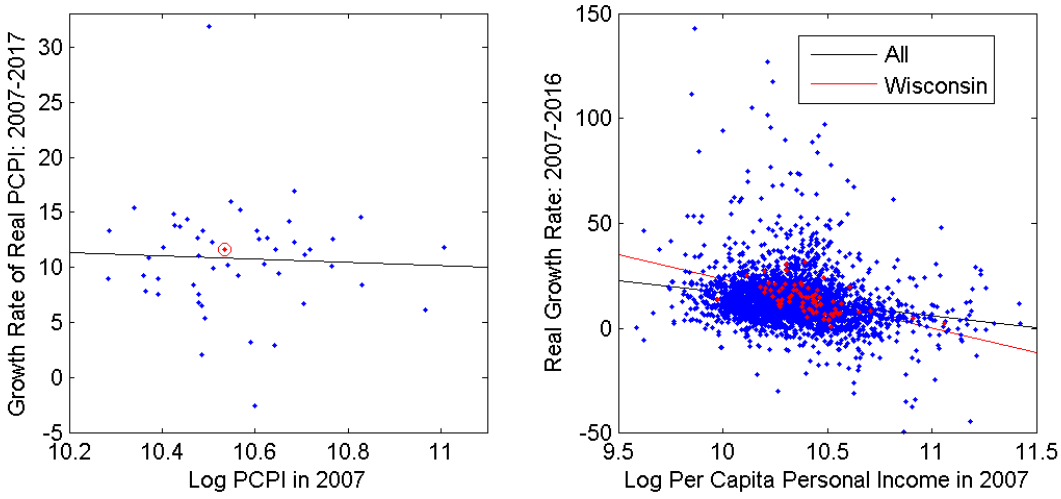

Figure 9: Changes in Real Per Capita Personal Income across States (left panel) and in All Counties in the US (right panel).

As with population, the left panel shows that there has been no significant trend toward convergence or divergence in incomes across states. (The slightly negatively sloped regression line is not statistically significant.) Across all US counties shown in the right panel, there has been some convergence in incomes since 2007, as the regression is negatively sloped and statistically significant. However there is a huge range of variation, with very different growth rates for counties of the same initial size. (The figure is even cropped to exclude some of the largest outliers.) For example, in 2007 per capita personal income in Issaquena County, Mississippi was $28,644 while in Keya Paha County, Nebraska it was $27,281. By 2016, Issaquena's income had fallen nearly 30% in real terms while Keya Paha's increased by 127%. Thus while on average there was convergence, initial income played a relatively small role in later growth, as indicated by the fact that the R-squared of regression is only 3.6%.

In Wisconsin the convergence in incomes has been much stronger, as is evident by the steeper sloped regression line and the fact there is much less variation around the line. In particular, the slope of the Wisconsin line is more than double (-23.4 vs -11.2) and the R-squared is 32%. Thus Wisconsin has seen initially poorer counties grow faster and narrow the gap to richer counties much more rapidly than in the nation as a whole.

Conclusion

Overall we find strong evidence of convergence in living standards across counties in Wisconsin, but divergence in size. This suggests that while there has been a leveling of economic conditions, the economic weight and concentration of larger communities has grown. The general pattern of convergence in living standards and divergence in population was similar in Wisconsin and the rest of the country, but that the effects were stronger and there was more uniformity across the regions within Wisconsin. Wisconsin had a larger reduction in unemployment, a smaller growth in population, and a more significant narrowing of income gaps than the rest of the country.