

The Geography of Recovery: An Analysis of the Mississippi Gulf Coast after Hurricane Katrina

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Abstract

Hurricane Katrina dramatically transformed the economic landscape of the Mississippi Gulf Coast. This paper traces the changes in the spatial pattern of economic recovery based upon employment data for the three southernmost counties in Mississippi: Hancock County, Harrison County, and Jackson County. We find that while employment losses are closely related to the impact of the storm, the pattern of recovery is more closely related to the economic structure of the county. Specifically, we show the employment levels in Hancock County, which was more directly hit by the storm, recovered faster than levels in Harrison County, which was more distant from the impact. This finding is verified using several measures of employment recovery. **Keywords:** Hurricane Katrina; Disaster recovery; Employment; Economic Losses

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1. Introduction

How do researchers, policymakers and residents know when an area has recovered from a disaster? What does 'recovery' mean in the context of a major natural disaster that fundamentally changes the economic and physical landscape of a community? Economic geography is concerned with why growth occurs, as well as why rates of economic growth vary across places (Farole 2010; Coe 2010). This paper explores the degree to which the Mississippi Gulf Coast recovered economically from Hurricane Katrina between the impact of the storm in 2005 and the beginning of the nation-wide recession that began in December 2007.

Hurricane Katrina, a Category 3 hurricane, introduced a storm surge over 30 feet high, winds over 100 miles per hour, and over a foot of rain to the Gulf Coast (Knabb *et al.* 2006). The economic impact of the storm came in the form of the destruction of both human and physical capital, causing \$81 billion in damage, dislocating over a million people, and destroying 225,000 homes on the coasts of Mississippi and Louisiana (Knabb *et al.* 2006). While the response to the storm by policymakers in Mississippi received favorable reviews (Noonan 2005), there is no evidence to suggest that these policies have led to a full recovery from the storm.

This research examines the economic recovery of the Mississippi Gulf Coast following the August 29, 2005, landfall of Katrina. The research offers two unique contributions to the literature in that it presents a long-term examination of economic recovery from a major disaster and, in doing so, uses multiple methods and techniques in its assessment of economic recovery. Specifically, this paper uses employment data to determine when and to what degree south Mississippi communities recovered from the

storm. Within this paper we ask the following questions: Did the communities along the Mississippi Gulf Coast recover economically from Hurricane Katrina? If communities did recover economically, which communities recovered in the shortest time? What factors were related the speed and degree of economic recovery?

While recovery can be framed as a political and social phenomenon (Glassman 2007), there are several reasons why focusing on the speed of economic recovery is important. First, although policy research often focuses on the immediate aftermath of a storm (within the first 3 months), it rarely evaluates the issue in terms of how policy affects long term recovery. Second, previous studies show that Gross Domestic Product (GDP) growth is stronger in areas that suffer from exposure to geologic or climatic natural disasters (Skidmore and Toya 2002; Toya and Skidmore 2007; Crespo-Cuaresma *et al.* 2008). However, this conclusion is based on a limited number of cases and macro-level data only. This paper analyzes the recovery of *micro*-economies within one small region. Thus, this paper allows the researchers to examine whether or not the macrolevel findings are verified at the micro-level. Third, understanding the timing of the recovery within the business cycle is critical in determining the rate of recovery and the appropriate policy response. This has, however, yet to be explored systematically by researchers. Since Katrina hit during the waning years of a housing-fed economic boom, it may offer keen insights into the relationship between the business cycle and local disaster recovery.

Few previous studies have examined the economic impact of Hurricane Katrina (see e.g. Groen and Polivka 2008a, 2008b; Baade *et al.* 2007). In a unique study, Parisi *et al.* (2007) examine administrative records from the Mississippi Department of

Employment Security (MDES) in an effort to measure the overall impact of Katrina on workers and firms. These administrative records include Unemployment Insurance (UI) claims data, data on employment and wages from employers, and a January 2006 survey of employers. According to these records, 28 percent of the businesses in the 11 hardest hit counties were negatively impacted by the storm (Parisi *et al.* 2007). Moreover, the authors estimate 56 percent of the workers dislocated from Hurricane Katrina had been rehired by the time of the January 2006 follow-up survey (Parisi *et al.* 2007).

Although there are numerous measures for assessing economic growth, unemployment rates are the most used among academics (Testa and Klier 1997). The current paper extends the previous research specific to Katrina, but also that in the area of social vulnerability (Cutter 1996, 2003; Mustafa 1998), to examine the recovery of coastal employment from the date of landfall in 2005 to 2007 and 2008 to conclude that communities closest to the landfall of the storm were not the slowest to recover. Instead, Harrison County, which is the most populous and contains the two largest cities on the Mississippi coast, recovered more slowly than Hancock County (to its West) and Jackson County (to its East). Furthermore, this was despite the fact that Hancock County received the most intense physical destruction, as the eye of the storm made landfall in this county. As of December 2007, before the national recession began, the level of employment in Harrison County had not returned to the pre-disaster level of employment. This is despite the massive inflow of aid, recovery dollars, and rebuilding efforts received by communities. At least three factors may have played a role in Harrison County's slow recovery: the slowing of growth of the central cities of medium-sized metropolitan

statistical areas (MSAs); the timing of the 2008-2009 recession; and the effect of the 2008-2009 recession in restricting the credit availability for rebuilding.

The remainder of the paper is organized as follows. Section 2 describes the relevant features of the Mississippi Gulf Coast. Section 3 introduces the data used in the study and Section 4 provides the results of the analysis. Finally, Section 5 offers the conclusions of this research.

2. The Mississippi Gulf Coast

The Gulf Coast of Mississippi is comprised of three counties that span the Gulf of Mexico for approximately 80 miles: Hancock, Harrison, and Jackson. Population along the Mississippi Gulf Coast, as has been the trend among United States' coasts in general (Crossett *et al.* 2004)², has grown in the last two decades. The combined population of the three coastal counties increased from 312,000 in 1990 to 364,000 in 2000. However, the 2010 Decennial Census shows that during the 2000s, this growth slowed, as the total population in the three counties was measured to be 371,000 in 2010.³

In Hancock County, the largest urban areas are Waveland and Bay St. Louis with 2005 populations of 7,203 and 8,276, respectively⁴. Notably, the population of this county is less tied to the region, in that the county is home to a number of retirees and individuals with second homes—many of whom are citizens of New Orleans, Louisiana—able to leave the city and be on the Mississippi coast within an hour. Of the

² Crossett *et al.* (2004) actually estimate a decline in coastal population as a percent of total population along the Gulf of Mexico coast from 1980 to 2003. However, their measure of the 'coast' includes some counties that are substantially inland.

³ The census estimates in 2006, a year after Hurricane Katrina made landfall, were 342,873.

⁴ All of these population estimates are from US Census Bureau population estimates prior to Hurricane Katrina's landfall.

three coastal counties, Hancock County had the smallest population at 40,421 in 2005. Just to the east of Hancock County, Harrison County has the largest population in the tri-county area which stood at 171,875 as of 2005. The cities of Gulfport and Biloxi, which had respective populations of 72,304 and 49,904, provided the bulk of the population for Harrison County. Jackson County, the easternmost coastal county in Mississippi, is home to two major towns: Ocean Springs and Pascagoula, with respective populations of 17,726 and 25,101. Ocean Springs is an affluent bedroom community located across the bay (and county line) from the city of Biloxi. The city of Pascagoula, which is commonly identified by the city's ship-building industry, is in the eastern half of the county. In 2005, Jackson County had a total population of 130,577.

3. Methods and Data

Methods

This paper examines the recovery of the labor markets of south Mississippi after the impact of Hurricane Katrina. It is critical to understand the role of labor markets in disaster recovery, as a functioning labor market is recognized to be a fundamental element of community revitalization (Zissimopoulos and Karoly 2010).⁵ The destruction of physical capital (buildings, machines, and infrastructure) and human capital (human resources, job matches, and skilled workers) are the two greatest economic losses from a disaster (Kahn 2005; Baade *et al.* 2007), and either physical or human capital is a sufficiently significant topic to warrant a separate study. Labor market data can be drawn from numerous sources. For instance, to study the effects of Hurricane Katrina

⁵ One reason why the authors choose employment data rather than other measures is that 60% of the total economic activity of any given area is comprised of payments to workers. This allows employment to become a good representative of economic performance.

(especially the dislocation of workers to other states), studies have incorporated the Current Population Survey (CPS) from the Bureau of Labor Statistics and the Census Bureau (Groen and Polivka 2008a, 2008b; Zissismopoulos and Karoly 2010; and Vigdor 2007). However, CPS data only provides nationally representative data without county level geographic indicators, and cannot be used to study the impact on the south Mississippi labor market. Instead, this paper employs data from the Bureau of Labor Statistics' (BLS) Quarterly Census on Employment and Wages (QCEW). Through the use of these data, this study is one of the few to estimate the duration of the impact of a natural disaster.⁶

One challenge for understanding disaster recovery is how to evaluate the destruction and rebuilding of economic stocks, when most data sets measure changes in variables over a period of time (Leiter *et al.* 2008). The specific challenge is that the damage from a disaster is on the economic stocks—human and physical—of a community and economic data on stocks is not regularly collected. For instance, while the stock of housing may be decreased because of the disaster, the sales tax receipts and even GDP can increase due to the purchasing of new material to rebuild the damaged structures. Thus, although the region's quantity of productive resources may have decreased, the most common measure of economic activity, GDP, may reveal that the region's economic activity has grown.

Another example of the difference in measuring disaster impact in consideration of available data can be seen in the labor market. For instance, in the wake of Hurricane Katrina, the population of the city of New Orleans decreased by nearly one-third.

⁶ A similar study is that of Belasen and Polachek (2007), who also use the QCEW data to examine the impact of hurricanes in Florida on the local labor market.

However, the most widely publicized labor market statistic is the unemployment rate. The unemployment rate measures the number of workers who for *a given period of time* have wanted to work, but are unable to find a job, and thus is a measure that is a proportion of the overall labor force. The problem arises in that a decrease in the labor stock could keep the unemployment rate the same, increase the unemployment rate or decrease the unemployment rate. Therefore, when the labor force shrinks, it has an indeterminate effect on the unemployment rate. The information in Mississippi Governor Haley Barbour's progress report focuses on flows of economic activity, not the return of the stocks (*Mississippi Recovery 2008*). Specifically, the report focuses on the growth of retail sales tax and those values are expected to increase dramatically following a disaster as homeowners repair the property damage. This paper discusses both stocks and flows to provide a comprehensive analysis of the economics of recovery in south Mississippi.

Temporal issues of disaster recovery and measurement

This paper proposes three alternative quasi-experimental methods and measures of economic recovery. At its most basic level, recovery from a natural disaster is defined by Dacy and Kunreuther (1969) as "...the rebuilding process that brings the community back to its predisaster economic level" (70).⁷ The first approach is based upon this definition of disaster recovery. Specifically, using data from the QCEW, we estimate how long it takes each area to return to its pre-Katrina level of employment. In consideration of certain sectors (e.g. construction) seeing a spike in employment in the rebuilding process, it is necessary to choose only employment that can be reasonably expected to be sustained after rebuilding lost physical capital. Thus, in the analysis

⁷ These definitions of recovery generally refer to 'long term recovery.' Operationally, anything beyond one year is referred to as 'long term,' so one may get a sense of whether or not long run recovery had been approached or not using the data through December 2007.

below, we will focus only on service sector employment in our determining the rate and/or date of recovery.

A second method defines disaster recovery to have occurred when an area achieves a projected level of employment, rather than simply the pre-disaster level of employment. To calculate this measure, we use historical data to make a linear projection of employment based upon recent employment growth. This projection method will estimate a linear growth rate using ordinary least squares regression. Thus, if employment had been growing at 2 percent per year in a county, the county will be considered to have recovered only after it has caught up with the level that it is predicted to have achieved without the disaster.

The final method uses a counterfactual geographical area as the comparison case. This method compares the growth in employment in the study region to employment growth in a similar region that was not affected by the hurricane. Specifically, this method locates a region that has a similar employment structure to that of the Mississippi Gulf Coast and examines how employment changed in that community, comparing it to what was observed post-Katrina in Mississippi. As national trends concerning the housing boom, and then crisis, may have been obscured by the recovery effort, the counterfactual measure is intended to provide a researcher a better sense of what could have been expected to be 'normal' three years after Hurricane Katrina, had the storm not occurred.

4. Analysis

Unemployment and Employment Trends 2000-2008

The following section seeks to assess the temporal recovery of the three coastal counties of Mississippi between Hurricane Katrina and the 2008-2009 recession. The data for the following figures and tables are derived from two sources, which allow the researcher to understand the employment picture from two different lenses: the Local Area Unemployment (LAU) records from the Bureau of Labor Statistics (BLS) and the Quarterly Census of Employment and Wages (QCEW) from the BLS. While the LAU calculates unemployment figures based upon the household random sampling techniques that are used in the Current Population Survey, the QCEW is a survey of employers. As such, the QCEW has a more accurate count of total employment, but only captures those workers with jobs; it contains no information on the unemployed.

Based on LAU data, Figure 1 shows yearly unemployment rates for 2000 to 2008 in the three southern Mississippi counties. Three trends are noticeable from this figure. First, from 2000 to 2004, all three counties experienced a decline in the unemployment rate, which was primarily a result of the economic recovery following the 2000-2001 recession. Second, from 2004 to 2005, unemployment rates spiked sharply for all counties. Most dramatically, Harrison County and Hancock County—the two most directly affected by Hurricane Katrina—saw their unemployment rates more than double from 5 percent to over 11 percent in this period. As these are yearly averages, the overall spike directly after Hurricane Katrina is significantly greater. Lastly, although unemployment rates remained high in 2006, they overwhelmingly returned to their pre-Katrina levels by 2007. Furthermore, it was only with the beginning of the recession in 2008 that unemployment began to rise again.

Figures 2 and 3 show the unemployment rate in all Mississippi counties in January 2005 (pre-Katrina) and October 2005 (post-Katrina). It is important to note that prior to Katrina, the coastal counties boasted some of the lowest unemployment rates in the state. Hancock had the lowest unemployment rate (6.0 percent) of the three coastal counties, which is similar to other bedroom communities, such as those found in Lamar, Rankin, Madison, Scott and De Soto Counties. Harrison and Jackson, however, had somewhat higher unemployment rates at 6.2 percent and 6.8 percent respectively, which are analogous to other larger urban areas in the state, such as Hinds, Warren, Forrest, and Lauderdale Counties. Thus, prior to the storm, the employment picture in the coastal counties was similar to comparable areas in the state.

Figure 3 shows unemployment in Mississippi by county in October 2005, less than two months after Katrina made landfall. Two differences are evident in this figure when compared to Figure 2. First, there was as a sharp spike in unemployment rates in many counties, but especially those along the coast and along the southern Mississippi-Louisiana border. Pearl River County, as well as Hancock, Harrison, and Jackson counties, saw double digit unemployment rates as a result of the disaster.

Figures 4 and 5 seek to provide a more regional perspective of Hurricane Katrina through the presentation of the unemployment rates in the southern coastal counties (and parishes) of Alabama, Mississippi, Florida, and Louisiana that are within 150 miles of Gulfport, Mississippi. Figure 4 provides the unemployment rate before the storm hit in January 2005 and Figure 5 provides the unemployment level in October 2005. In contrast to the effects in Mississippi, as seen in Figures 2 and 3, the regional perspective provided in Figures 4 and 5 shows that there is a wide swath that had a spike in

unemployment rates from the Alabama state line all along the coast and southeastern Louisiana. A little further east, however, in Alabama and Florida, there are several counties that experienced a sharp lowering of the unemployment rates after Katrina, especially in the Mobile, Alabama, metropolitan area. This finding is in concurrence with that of Belasan and Polachek's (2007) study of the impact of hurricanes in Florida: those counties not adversely affected by Florida's hurricanes, were likely to benefit from the storms.

Figure 6 shows monthly employment in all industries for the three Mississippi coastal counties for the period of January 2001 to December 2008, as provided by the QCEW data. As represented in this figure, Harrison County had the most employment of the counties along the Mississippi Gulf Coast, with an average of 90,000 jobs before Hurricane Katrina and approximately 70,000 jobs after landfall in September 2005. Jackson County is the second largest county in terms of employment, with 50,000 jobs before August 2005. Hancock County is much smaller in terms of employment than the other two counties, with only 10,000 jobs existing before Katrina.

Figures 7-10 indicate different groupings of sectors of employment for the three counties from 2001 through 2008. Figure 7 shows the scaled level of total employment during these years—the raw figures presented in Figure 6 have been scaled such that it is easier to view the proportional changes that might be obscured by the different sizes of the three counties. The scaling is done in such a way that the average for the period from January through August 2005 is set equal to 100. A value greater than 100 indicates the proportionate level above the 2005 pre-Katrina (January-August) employment level, while a value below 100 indicates the proportionate level below that level. Thus, a value

of 110 indicates that employment for that county-sector is 10 percent higher than the average from January-August 2005 while a value of 90 indicates that the level of employment is 10 percent less than that of pre-Katrina 2005. Figure 7 shows that total employment in Hancock County had the largest proportionate decrease in employment, as the number of jobs fell by nearly 30 percent after the storm in comparison to early 2005. Harrison County had the second most dramatic proportionate decrease, as in late 2005, total employment fell by 20 percent before it began to rise again. Jackson County, located farthest from landfall, experienced a 10 percent decrease in employment and employment began to recover within a few months.

Figures 8, 9 and 10 show scaled levels of sectoral employment in three different sectors respectively: goods-producing, construction and services. Note that because the goods-producing sector includes construction, the patterns of employment in these two sectors appear somewhat similar. Figure 8 shows that goods-producing employment increased in both Hancock County and Harrison County after August 2005. In Hancock County employment increased by 10 percent from August 2005 to November 2006, and in Harrison County employment increased by 30 percent before it began to subside in late 2006.

Figure 9 shows that Hancock and Harrison Counties experienced a similar increase in construction employment following Hurricane Katrina. Construction slowly increased in late 2005 and early 2006 until the total size of employment in this sector was 50 percent higher in 2007 than it was in August 2005. In late 2007, construction employment began to contract. By the end of 2008, three years after the storm, construction employment was still nearly 20 percent higher than 2005 levels. Jackson

County shows a peculiar dramatic decrease leading up to Katrina and then a similar boost after Katrina. The overall level of construction employment in Jackson County in 2006 was 100 percent higher than the pre-Katrina level, merely returning construction employment to its 2003 level.

As the Mississippi Gulf Coast is primarily a service sector economy, the trends in service sector employment are apt to follow broad economic trends in the region. Figure 10 shows scaled service sector employment for the three counties from January 2001 to December 2008. In Hancock County more than 40 percent of the service sector jobs were lost in the wake of the hurricane, while in Harrison County the figure is closer to a 30 percent loss. Jackson County, on the other hand, only suffered a 10 percent loss and quickly recovered. Although Hancock County suffered the steepest decline, it recovered to its previous level of service sector employment by the end of 2007. Harrison County, however, never returned to the pre-Katrina level of service sector employment before the end of the study period.

To demonstrate the precise timing of employment recovery, we now show tabular data that is similar to the above figures on service sector employment. Table 1 contains the average level of employment for the months of January through August for four years: 2005, 2006, 2007 and 2008. As previously noted, Harrison County is by far the largest of the three counties in terms of employment with 63,688 jobs in the service sector in the eight months leading up to Hurricane Katrina. The second largest is Jackson County, followed by Hancock County, with over 21,000 and 8,078 service sector jobs respectively. In 2006, Jackson County had already recovered to its pre-Hurricane Katrina level of service sector employment and Hancock County had nearly recovered by the first

part of 2007. By 2008, Hancock County's service sector employment exceeded the 2005 level—albeit by less than 1 percent. However, Harrison County still endured a lower level of service sector jobs, even into 2008.⁸ The January through August 2008 employment figure averaged 57,973, which is 9 percent less than the level of employment before Katrina. Based upon these figures, Jackson County took less than 1 year to recover, Hancock County took between 2 and 3 years to recover and Harrison County took more than 3 years to recover its service sector employment levels.

Growth Trends

Based on the data provided in Table 1, we conclude that Hancock County recovered at a faster rate than Harrison County in that it returned to pre-Katrina service sector employment by the end of 2007. However, an even a visual examination of the data leads to the conclusion that pre-Hurricane Katrina levels of employment may not, in fact, be the best baseline when considering how one might conceive of economic recovery. Specifically, Figure 10 shows that there were differences in growth rates of employment before August 2005. Thus, instead of considering whether or not these areas returned to the level of employment that they had just prior to the hurricane, a better approach may be to determine what employment would have been in 2007 if the storm had not hit and employment had maintained steady growth.

In order to conduct this analysis, we controlled for the trend in employment during this time. This approach is similar to Ewing and Kruse (2006) and Ewing, Kruse and Thompson (2007) who controlled for the trend in earnings in an effort to order to measure the effect of disasters. To estimate the trend, we first created a dataset that

⁸ The recent release of the 2010 Decennial Census has confirmed that Harrison County is the only south Mississippi County to have lost population from 2000 to 2010.

consisted solely of the employment in the three counties prior to Hurricane Katrina, using all the data currently available. Thus, we took employment data from January 2001 to August 2005 for these three counties and then ran an ordinary least squares regression model of a time trend of employment from January 2001 to August 2005. The resulting beta coefficient on the time trend from this regression produces the expected growth rate in employment over time centered on the time series average. Using this technique, the average growth rate per month for service sector employment is .20% for Hancock County, .13% for Harrison County and .20% for Jackson County. Using these estimates, we projected the employment level for September 2008 for each of the three counties and compared the obtained figures to the actual employment numbers, as provided in Table 2.

The results presented in Table 2 confirm the results from Table 1. Jackson County's employment recovered most quickly of the three coastal counties, while Hancock County recovered somewhat more quickly than Harrison County. Thus, the first two methods of measuring disaster recovery produce the same results concerning the ordinal ranking of the recovery rates, as both describe the most distant of the three counties recovering the most quickly. However, the two measures arrive at different results concerning the degree of recovery. While Hancock County recovered to pre-Katrina service sector employment levels by September 2008, this county's economic recovery was not complete when measured against its expected employment growth. However, it still remains true that Hancock County, which received the most direct impact from the storm, recovered more quickly than did Harrison County.⁹ Thus, though

⁹This result is similar to Tierney's (2007) claim that one of the factors that one would expect should affect speed of recovery, but does not, is the magnitude of the impact from the disaster.

the service sector in Hancock County got hit harder by the storm, it recovered more quickly than the service sector in Harrison County.

Counterfactual Growth Trends

A final measure of recovery from a disaster is to compare the employment figures in South Mississippi to those from a comparable region. While the first two measures have some advantages, they also have some shortcomings. Specifically, comparing employment post-Hurricane Katrina to employment pre-Hurricane Katrina does not take into account differential growth rates prior to the storm. Likewise, comparing employment to what it would have been assuming a constant growth rate does not take into account the possibility that macroeconomic changes could have either sped up or slowed down employment growth from its 2001-2005 path. Thus, a counterfactual case may be a better yardstick for understanding what one could have expected employment levels to be in the absence of the disaster. As our comparison case, we choose the three coastal counties in the Corpus Christi metropolitan area—Aransas, Nueces and San Patricio—which are also known as the Texas Coast Bend. These three counties have a total level of employment of approximately 140,000 in 2001 with 100,000 (71%) of these jobs in the service sector. This is, therefore, comparable to the three Mississippi coastal counties which had total employment of approximately 120,000 in 2001 with 87,000 (72%) of these jobs in the service sector.

To get a sense of the appropriateness of the counterfactual case study, consider unemployment rates for Aransas, Nueces and San Patricio Counties from 2000 to 2008. First, the decline in unemployment in the early 2000s is comparable to what happened in coastal Mississippi. Somewhat different than in Mississippi, the decline in unemployment

started later in Texas, implying that the recession of 2001 was still having some effect into 2003 and 2004. Second, unemployment begins to rise in 2008 after the steady decline through 2007, implying that the 2008-2009 recession affected the Corpus Christi area labor market in a similar manner that it affected Mississippi.

The three Texas counties had a total of 108,000 sector service sector jobs in August 2005. By August 2008, service sector employment had risen to 113,700 jobs, representing a 5 percent increase during these three years. Each of the three counties in Texas has a corresponding county in Mississippi that is most similar to its own employment structure. Nueces County contains the city of Corpus Christi and is the largest of the three counties and is thus the natural comparison to Harrison County. San Patricio County has primarily a service sector economy, but has marine related industry and military employment similar to that found in Jackson County. Finally, Aransas County has the smallest population of the three and the highest rate of service sector employment, which is similar to that found in Hancock County. Furthermore, the county with the central city, Nueces, experienced relatively slower service sector employment growth during this time, with 4.0 percent over 3 years. From 2005 to 2008, Aransas and San Patricio counties experienced growth rates of employment of 8.2 percent and 11.3 percent, respectively.

Using the average employment growth in the three Texas counties as the benchmark, none of the three Mississippi counties had recovered by August 2008 (see Tables 3 and 4). While Jackson County saw its service sector employment return to its pre-Hurricane Katrina level, it showed relatively anemic growth, at .2 percent from 2005 to 2008. This implies that Jackson County's employment growth remained nearly 5

percentage points lower than it might have been without the hurricane. Similarly, Harrison County's service sector employment was 15 percent lower than what would have otherwise been expected to occur.

The primary counties in the Mississippi and Texas coastal areas are Harrison County and Nueces County, respectively. A more precise comparison is employment growth in Harrison County to that in Nueces County, rather than comparing Harrison County's employment growth to all three Texas counties' employment growth. Note that national trends come to play in this comparison. For example, the 2005-2008 construction and real estate fueled economic growth throughout the United States saw central cities grow less than suburbs during this boom time. Therefore, when compared with Nueces County, the losses in Harrison county show a decrease of 14 percent with the counter factual rather than the 15 percent found when comparing to the entire Coastal Bend region. Conducting this exercise with Jackson County and Hancock County, however, shows greater losses than the previous calculation. The result of Hurricane Katrina is that the areas lost the growth opportunities offered by the housing boom. From 2005 to 2008 employment growth was 8.2 percent in Aransas County and 11.3 percent in San Patricio County. Hurricane Katrina effectively cost these counties part of the upward swing in the business cycle that the recovery aid dollars could not match or replace, especially given the reaction by the insurance industry after the storm. As insurance companies pulled out of the state, some residential developments that were planned became infeasible for a number of years until most of the insurance disputes were settled. For example, a large number of mid-2005 planned condo developments were thwarted by Hurricane Katrina and by the time the region was able to get back to some semblance of

normalcy, hence appearing attractive as a target for investment growth, the housing boom was over and the opportunity was lost.

5. Conclusion

This paper has offered a unique long-term examination of economic recovery following a major disaster by using three methods to measure economic recovery from Hurricane Katrina in Mississippi. We have used publicly available BLS data to determine the impact on employment from September 2005 until the end of 2008. The employment data provides several interesting patterns relating to the impact of the storm. First, while the storm had a large negative impact on employment in the Mississippi Gulf Coast, by the end of 2006 employment had returned to its pre-Katrina level for some areas.

Second, while Hancock County received the brunt of the storm, employment in this county returned to pre-Hurricane Katrina levels before employment in Harrison County, which was further from the eye of the storm. Third, some counties in Mississippi saw sharp decreases in unemployment after the storm. Fourth, when correcting for either the pre-Katrina growth trend or the counterfactual 2005-2008 growth trend, employment in South Mississippi did not return to its expected level prior to the recession that killed employment growth throughout the state, including in South Mississippi. Finally, public officials often point to flow variables, such as retail sales or incomes, to show that an area has “recovered” from a storm. These variables, however, are inflated after a storm, as businesses and households increase purchases in the short run in order to replace the lost capital stock. Measures such as employment, when corrected for pre-storm trends, are a more useful guide to the true state of recovery from a natural disaster.

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Table 1. Service Sector Employment 2005-2008, Mississippi Coastal Counties

	Jan-Aug 2005	Jan-Aug 2006	Jan-Aug 2007	Jan-Aug 2008
Hancock	8,078	5,676	7,927	8,098
Harrison	63,688	49,047	56,875	57,973
Jackson	21,150	21,224	21,647	21,633

Table 2. Projected Service Sector Employment and Employment Losses from Hurricane Katrina

County	Actual Sept 2008 Employment	Projected Sept 2008 Employment ^a	Projected Employment Losses from Hurricane Katrina
Hancock	8,005	8,603	-7.0%
Harrison	57,441	63,729	-9.9%
Jackson	21,214	22,207	-4.5%

Source: Authors' tabulations based upon Bureau of Labor Statistics Quarterly Census of Employment and Wages. ^aThese projections are based upon average growth rates in service sector employment from 2001 to 2005 by county.

Table 3. Difference between Coastal Mississippi and Texas Employment Changes

County	August 2005 Employment	August 2008 Employment	Percent Change	Percent change in Coastal Texas employment	Projected losses due to Hurricane Katrina
Hancock	8411	8061	-4.2	5.0	9.2
Harrison	64584	57867	-10.4	5.0	15.4
Jackson	21575	21627	0.2	5.0	4.8

Table 4. Difference between Coastal Mississippi and Texas Employment Changes (by county)

County	August 2005 Employment	August 2008 Employment	Percent Change	Percent change in Coastal Texas employment (by county)	Projected losses due to Hurricane Katrina
Hancock	8411	8061	-4.2	(Aransas) 8.2	12.4
Harrison	64584	57867	-10.4	(Nueces) 4.0	14.4
Jackson	21575	21627	0.2	(San Patricio) 11.3	11.1

Figure 1: Unemployment Rate for Three Coastal Mississippi Counties: 2000-2008

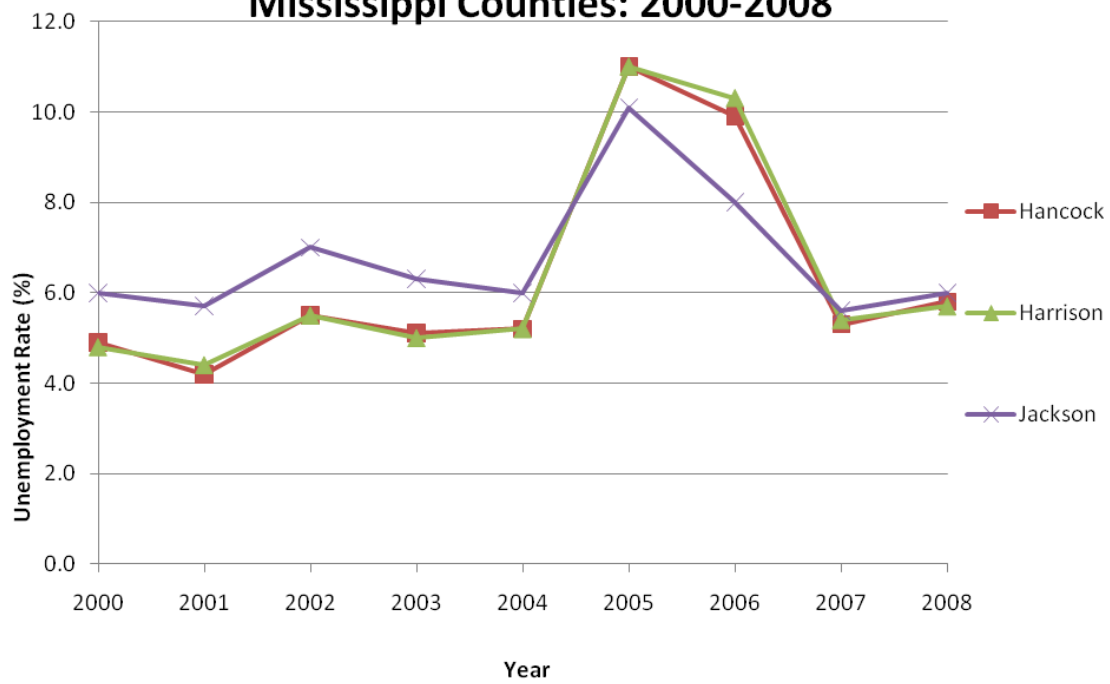


Figure 3. Unemployment Rates in Mississippi Counties, October 2005

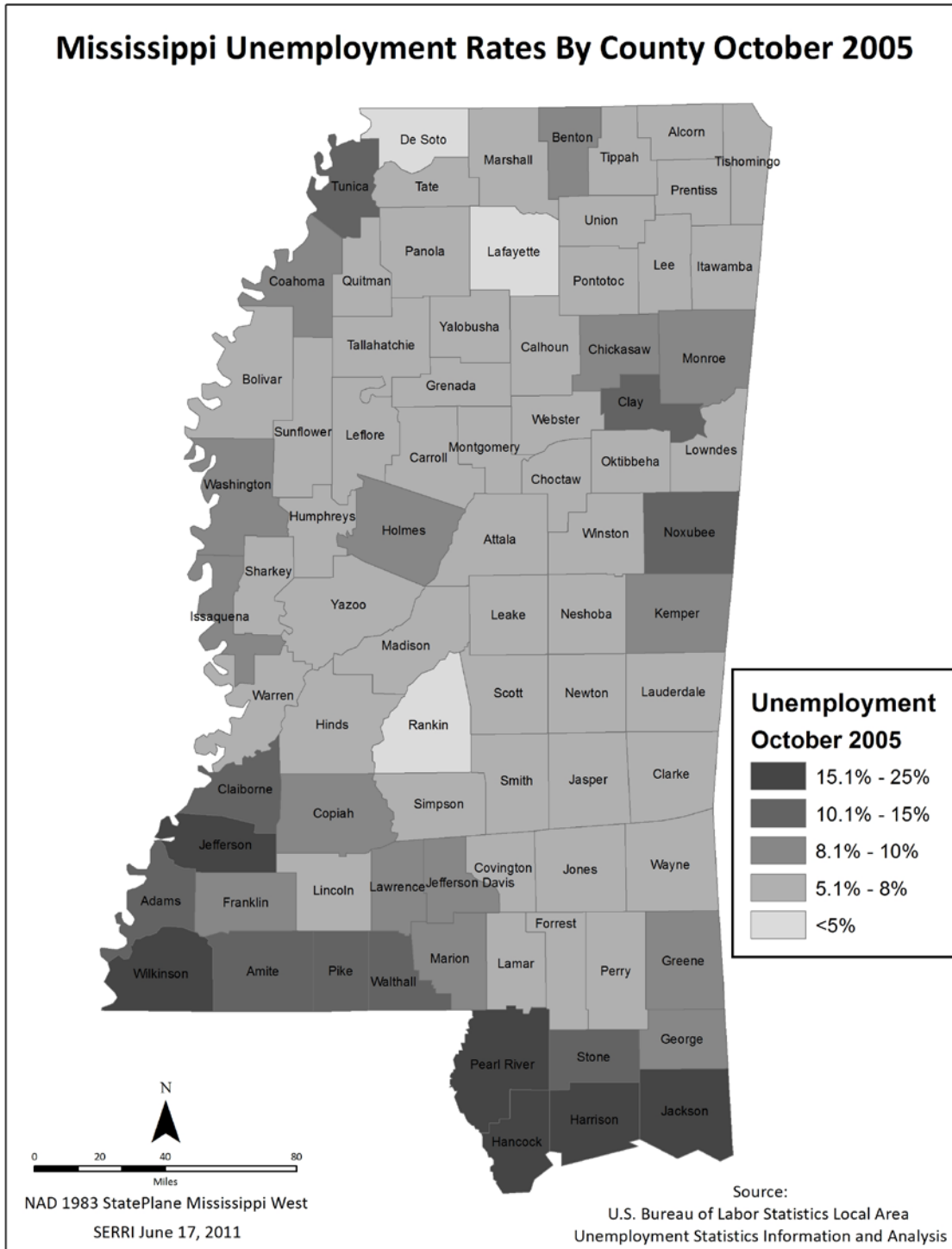


Figure 4. Unemployment Rates in Counties and Parishes near Katrina landfall, January 2005

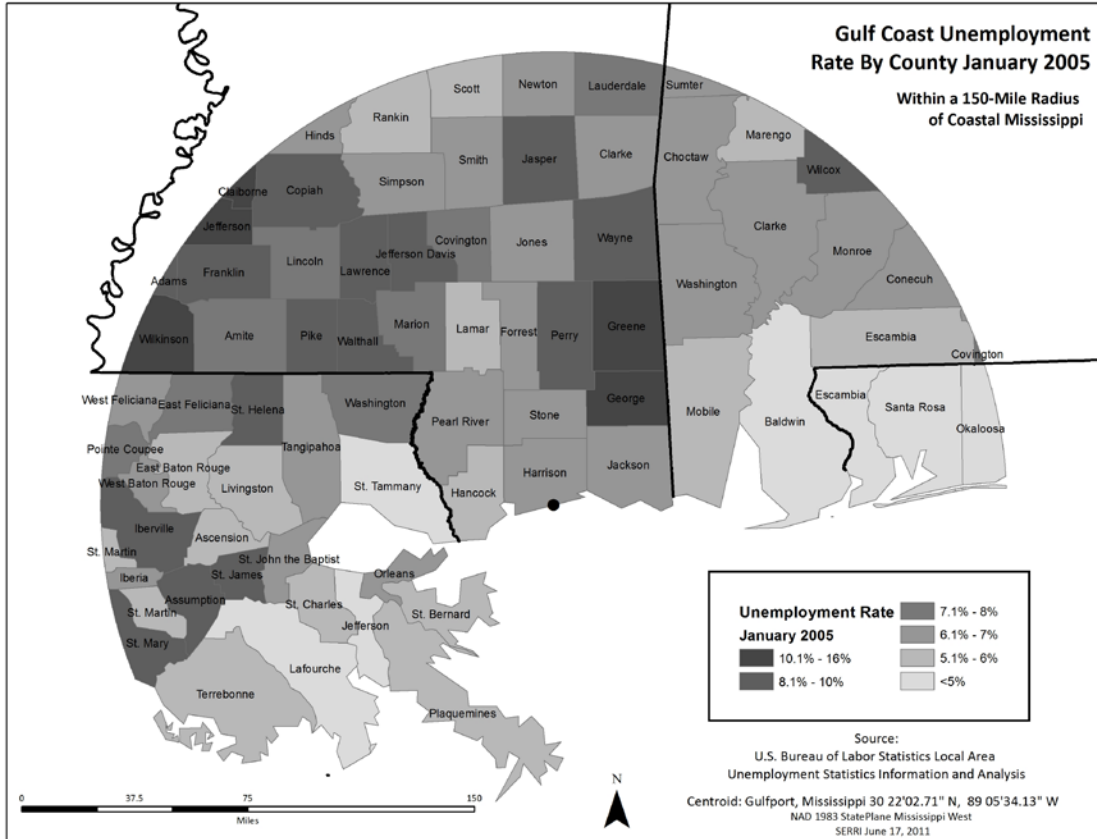


Figure 5. Unemployment Rates in Counties and Parishes near Katrina landfall, October 2005

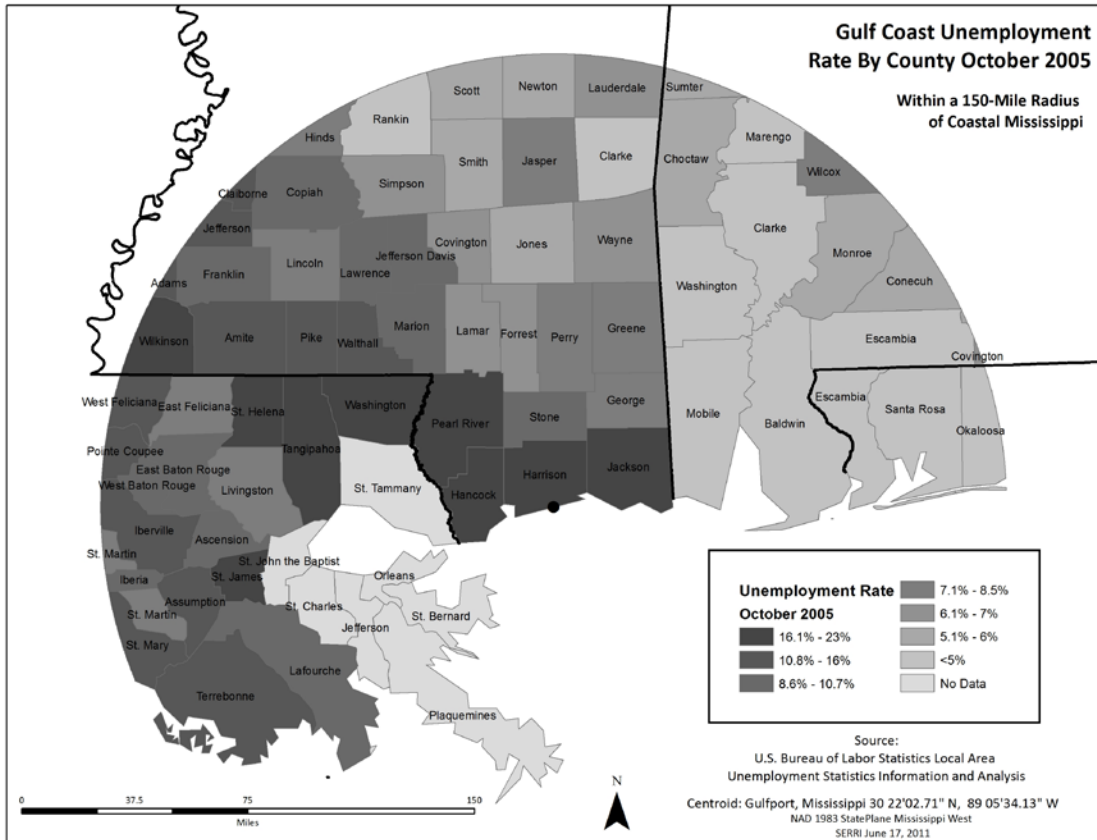


Figure 6. Total Employment for Mississippi Coastal Counties: 2001-2008



Figure 7: Scaled Total Employment for Coastal Mississippi Counties: 2001-2008

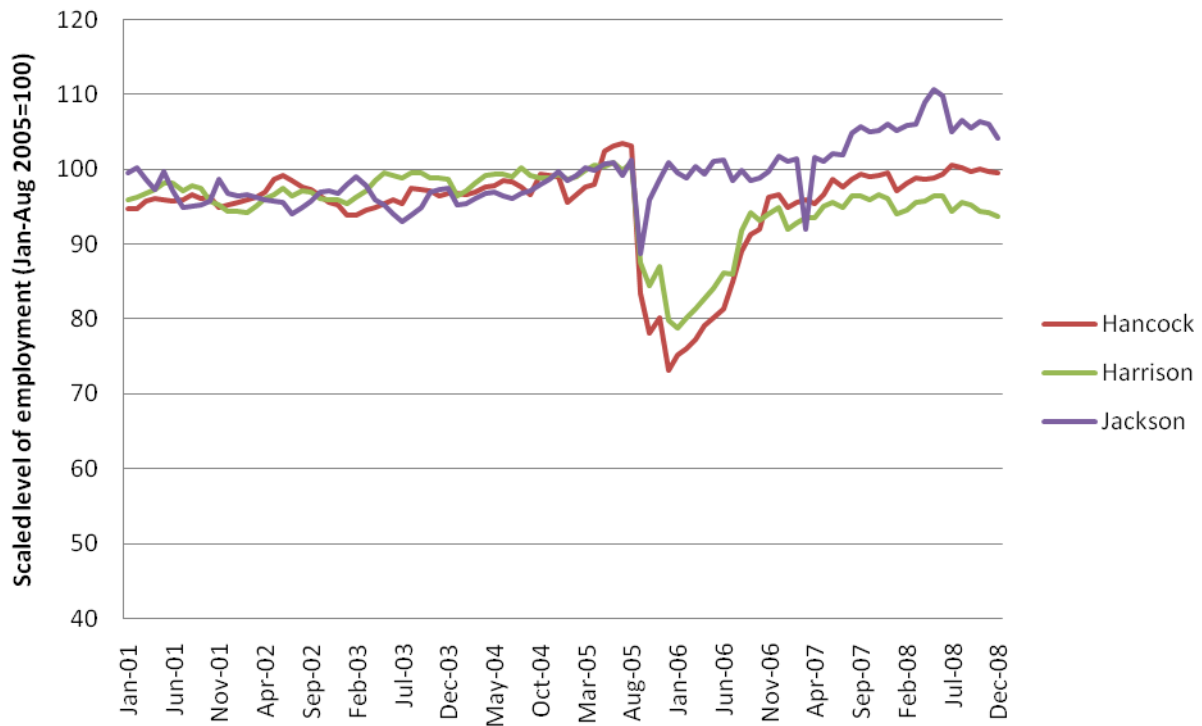


Figure 8: Scaled Goods-producing Employment for Coastal Mississippi Counties: 2001-2008

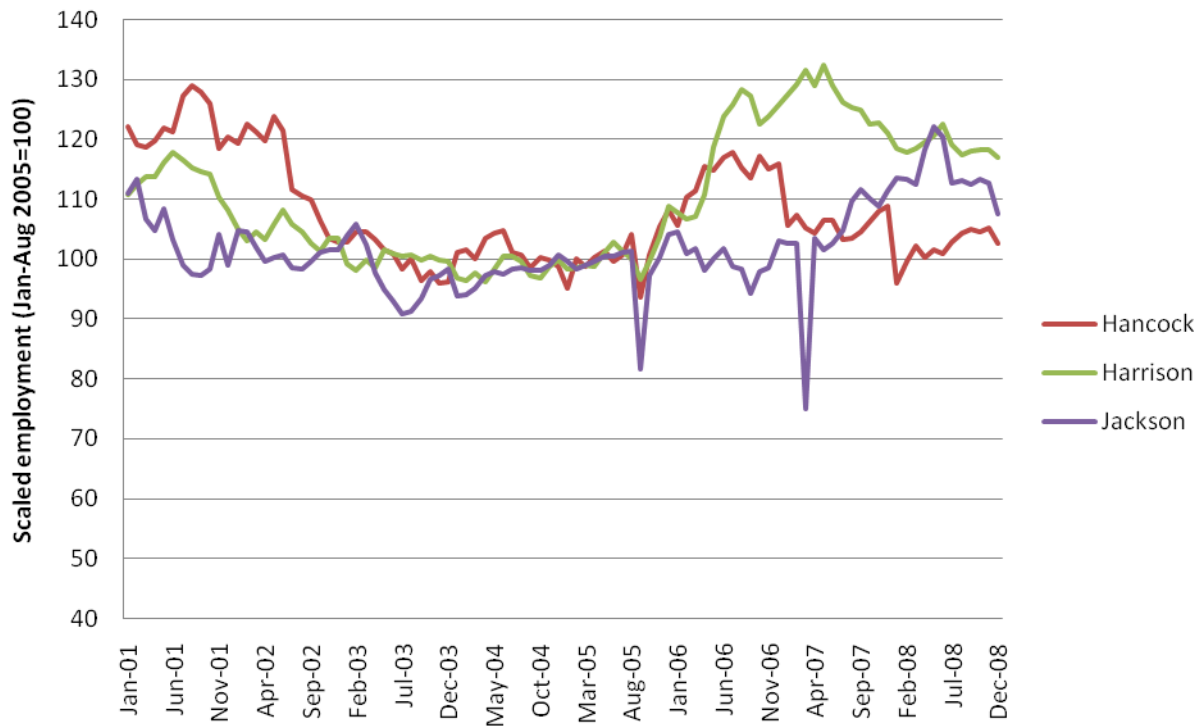


Figure 9: Scaled Construction Employment for Mississippi Coastal Counties: 2001-2008

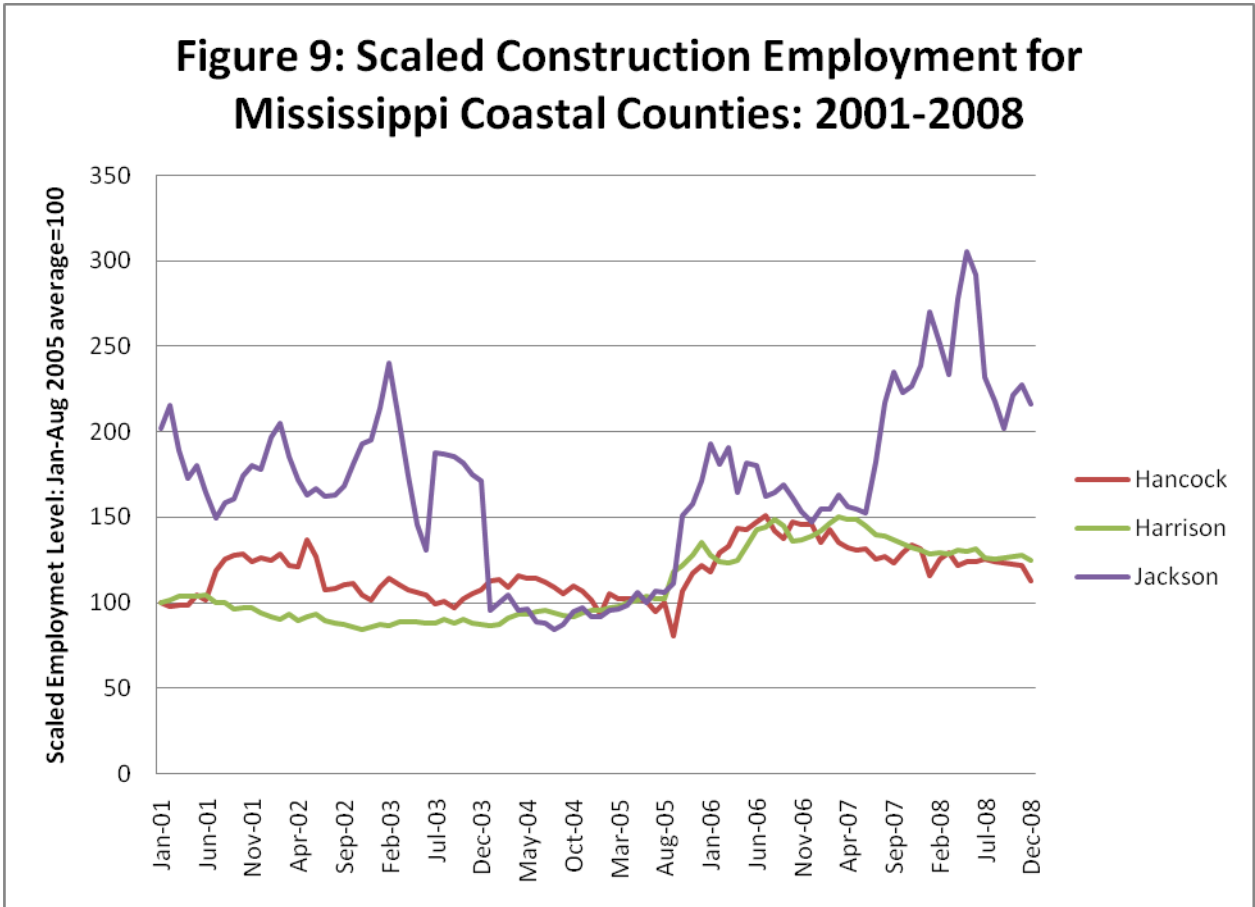


Figure 10: Scaled Service Sector Employment for Coastal Mississippi Counties: 2001-2008

