Covid-19 and the North Carolina Economy

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Executive Summary

This report looks at the effects that the Covid-19 pandemic has had and is having on the North Carolina economy at both the state and county level. The report focuses on eight aspects of the pandemic that have been and are continuing to impact the state, county (local), and metropolitan statistical area (MSA) economies in North Carolina.

Overall, the North Carolina economy lost 571,500 jobs between March and April 2020. Like the U.S., the sector with the largest job loss was the hospitality and leisure industry down by 245,300 jobs between March and April 2020. North Carolina's unemployment rate in April 2020 ranked 25th, 1.8 percentage points below the U.S. rate indicating that the North Carolina economy was less severely impacted by the mandatory shutdowns that the average state. North Carolina's unemployment rate has been consistently below the U.S. unemployment rate throughout the Covid-19 recession. The U.S. unemployment rate peaked at 14.7 percent in April while the North Carolina rate peaked at 12.9 percent. By October 2020, the U.S. unemployment rate had fallen to 6.9 percent while the North Carolina unemployment rate had fallen to 6.3 percent.

At the county level the Covid-19 economic experience has been very divergent. Bertie, Chowan, and Duplin Counties all had a seasonally unadjusted April 2020 unemployment rates that were 8.1 percent. These rates were more than 50 percent lower than the State April 2020 seasonally unadjusted rate of 12.5 percent. In fact, 58 of the 100 North Carolina counties had April 2020 unemployment rates at or below the overall state rate of 12.5 percent. At the other extreme, Dare County lost almost 25 percent of the county's jobs in one month between March and April 2020. This accounted for 4,228 jobs of the 17,124 jobs in March 2020. Both Alexander and Watauga Counties lost approximately 20 percent of their jobs during the one-month decline.

Dare County had the largest percent decline in sale tax collections between April 2019 and April 2020, which is consistent with Dare County having the highest unemployment rate of all North Carolina counties in April and having the largest percentage job losses as well.

Statistical Analysis suggests that there has been a significant difference in the impact that counties have experienced based on their regional location. Counties in the Western Prosperity Zone experienced on average the greatest increase in their April 2020 unemployment rate

compare to their April 2019 unemployment rate. Western Prosperity Zone counties on average saw their April 2020 unemployment rate increase by almost 7.6 percentage points compared to April 2019. Counties in the North Central Prosperity Zone experienced on average experienced the greatest impact in their sales tax collections during the first nine months of 2020. However, while regional location has had significant impacts on increased unemployment rate and decreased sales tax collections, there appear to be no statistical correlation between the two impacts.

Covid-19 and the North Carolina Economy

This report looks at the effects that the Covid-19 pandemic has had and is having on the North Carolina economy at both the state and county level. The report focuses on eight aspects of the pandemic that have been and are continuing to impact the state, county (local), and metropolitan statistical area (MSA) economies in North Carolina. The first two sections document the spread of the disease from the initial stages in this country and its continuing impacts on state and local communities. The third and fourth sections provide a detailed examination of the North Carolina and county economies during the 21st century including GDP growth, employment growth, and industry sector growth and decline both at the state and local levels. The fifth section focuses on the direct economic impact that Covid-19 has had on the U.S. economy during 2020. This section identifies economic impacts on total employment, employment by industry, wages, unemployment, and the state's performance compared to other states,

The sixth and seventh sections drill down on the differential impacts that the state local economies have experienced during 2020 because of the Covid-19 induced recession. These sections provide detailed impacts of employment declines, wage declines, establishment declines, and unemployment increases for the state and all 100 North Carolina counties and several MSAs. The seventh section of the report also looks at the local fiscal impacts that have resulted from the Covid-19 induced recession. The eighth section provides a statistical analysis explaining the rise in unemployment rates and reduction sales tax revenue for the 100 counties during 2020. The final section presents a summary of the findings. All data used in this report is based on publically available data as of November 30, 2020.

Covid-19 in the United States

On January 9, 2020, the first death attributed to Covid-19 was reported in Wuhan, China. On January 20, 2020, the first reported cases of Covid-19 were reported in South Korea and the United States. By the end of January 2020, almost all countries had reported at least one case within their borders. The Pandemic had begun and for the most part was now present in most major northern hemisphere counties.

On February 2, 2020, the U.S. issued a travel ban on entry of foreign nationals who had visited China in the last 14 days. Americans and U.S. permanent residents returning from Hubei Province were still allowed to return, subject to a14-day quarantine. However, between the first official report of an outbreak in China and the announcement of U.S. travel restrictions, more than 40,000 travelers from China were estimated to have entered the United States. Scientists believe the virus likely emerged and began circulating a month or more before it was first recognized in China, which may have allowed it to spread beyond the countries before cases were initially recognized.

On February 6, 2020, the U.S. experienced its first Covid-19 death in Santa Clara County, California. By the end of February, an additional 37 countries reported their first case of Covid-19 bringing the total number of countries with reported cases to 64. On Wednesday March 14, The World Health Organization (WHO) declared the rapidly spreading coronavirus outbreak a pandemic with a total of 114 countries now reporting cases. By that date the U.S. had reported almost 1,000 cases with at least 29 deaths. Table 1 listed the cases by state through March 11, 2020.

Table 1

State	Cases[1]	Deaths[2]
Washington	267	24
New York	173	0
California	133	3
Massachusetts	92	0
Florida	23	2
Georgia	22	0
South Carolina	9	0
North Carolina	7	0
Total	927	31

By March 11, 2020, North Carolina had reported 7 cases. By the end of March, the North Carolina case count had reached 1,498.

Over the next eight months, the Covid-19 virus became a world-wide pandemic rarely seen in recent history. Table 2 documents world pandemics from viruses since 1889. As of late November 2020, 0.6 percent of the world's population had been infected and 1.2 million had

died. This is considerably lower than the 1918-1920 Spanish Flu pandemic that infected 33 percent of the world's population and resulted in more than 20 million deaths. Adjusted for population growth over the past century, the adjusted death figure for the Spanish Flu would approach 86 million on the lower bound.

Table 2

Name	Date	World pop.	People infected (est.)	Deaths worldwide	Case fatality rate
1889–90 flu pandemic	1889–90	1.53 billion	20–60%[3] (300–900 million)	1 million	0.10–0.28%[4]
Spanish flu	1918–20	1.80 billion	33%[5] (500 million)	20–100 million	2–3%[6]
Asian flu	1957–58	2.90 billion	8–33%[7] (0.25 – 1 billion)	1–4 million	<0.2%[8]
Hong Kong flu	1968–69	3.53 billion	7–28% (0.25 – 1 billion)[9]	1–4 million	<0.2%[10]
Russian flu	1977–78	4.28 billion	Unknown	Unknown	Unknown
2009 flu pandemic	2009–10	6.85 billion	11-21% (0.7–1.4 billion)[11]	151,700–575,400	0.03%[12]
Typical seasonal flu	Every year	7.75 billion	5–15% (340 million – 1 billion)[13]	290,000–650,000/year	<0.1%[14]
Coronavirus	2020	7.75 billion	0.6% (43-44 million)	1.2 million	2.7%

What is most remarkable about the Covid-19 virus is the unequal pattern of its impact. In the United States there are dramatic differences in both infection and death rates between states and MSAs. Table 3 ranks the states by infection rates as of November 30, 2020. The overall infection rate in the U.S. was 40.23 cases per 1,000 in population. North Dakota had a rate of infection more than double the U.S. rate at 102.27 cases per 1,000 in population. Twenty-seven states had infection rates above the U.S. infection rate. North Carolina ranked 36th, with an infection rate of 33.74 per 1,000 in population. Twenty-four states had infection rates at or below the U.S. rate. Five states had infection rates that were less than half the U.S. rate, while Vermont's infection rate was about one-seventh the U.S. rate.

Table 4 presents the data on state death rates from Covid-19 as of November 30, 2020. The U.S. death rate was 1.96 percent of cases. The state death rates ranged from a high of 5.14 percent of cases in New Jersey to a low of 0.38 percent of cases in Alaska. North Carolina's death rate was 31st, at 1.46 percent of cases.

Table 3

Rank	Area	Cases[15]	Deaths[16]	Population	Infection Rate/1000	Death Rate/1,000
	United States	13,089,125	256,550	325,386,357	40.23	0.79
1	North Dakota	77,935	915	762,062	102.27	1.20
2	South Dakota	73,817	942	884,659	83.44	1.06
3	Iowa	226,259	2,360	3,155,070	71.71	0.75
4	Wisconsin	380,870	3,285	5,822,434	65.41	0.56
5	Nebraska	124,066	984	1,934,408	64.14	0.51
6	Utah	192,087	863	3,205,958	59.92	0.27
7	Montana	60,845	669	1,068,778	56.93	0.63
8	Illinois	712,936	12,838	12,671,821	56.26	1.01
9	Wyoming	31,929	215	578,759	55.17	0.37
10	Idaho	98,500	909	1,787,147	55.12	0.51
11	Minnesota	304,023	3,521	5,639,632	53.91	0.62
12	Tennessee	363,466	4,541	6,833,174	53.19	0.66
13	Kansas	153,021	1,529	2,913,314	52.52	0.52
14	Arkansas	155,026	2,449	3,017,825	51.37	0.81
15	Rhode Island	53,954	1,346	1,059,361	50.93	1.27
16	Mississippi	149,940	3,779	2,976,149	50.38	1.27
17	Alabama	244,993	3,572	4,903,185	49.97	0.73
18	Louisiana	230,602	6,391	4,648,794	49.60	1.37
19	Oklahoma	193,824	1,717	3,956,971	48.98	0.43
20	Indiana	329,008	5,394	6,732,219	48.87	0.80
27	South Carolina	214,911	4,346	5,148,714	41.74	0.84
36	North Carolina	357,958	5,219	10,609,155	33.74	0.49
41	District of Columbia	21,308	678	705,749	30.19	0.96
42	California	1,183,320	19,089	39,512,223	29.95	0.48
43	Pennsylvania	351,667	10,275	12,801,989	27.47	0.80
44	Virginia	233,617	4,054	8,535,519	27.37	0.47
45	West Virginia	45,845	718	1,792,065	25.58	0.40
46	Washington	160,634	2,703	7,614,893	21.09	0.35
47	Oregon	70,832	885	4,217,737	16.79	0.21
48	New Hampshire	20,002	523	1,359,711	14.71	0.38
49	Hawaii	17,784	240	1,415,872	12.56	0.17
50	Maine	11,288	191	1,344,212	8.40	0.14
51	Vermont	3,827	64	623,989	6.13	0.10

Table 4

Rank	Area	Cases[17]	Deaths[18]	Population	Infection Rate/1000	Death Rate
	United States	13,089,125	256,550	325,386,357	40.23	1.96%
1	New Jersey	330,275	16,965	8,882,190	37.18	5.14%
2	Massachusetts	222,469	10,676	6,949,503	32.01	4.80%
3	Connecticut	112,581	4,961	3,565,287	31.58	4.41%
4	New York	634,438	26,632	19,453,561	32.61	4.20%
5	District of Columbia	21,308	678	705,749	30.19	3.18%
6	Pennsylvania	351,667	10,275	12,801,989	27.47	2.92%
7	Louisiana	230,602	6,391	4,648,794	49.60	2.77%
8	New Hampshire	20,002	523	1,359,711	14.71	2.61%
9	Mississippi	149,940	3,779	2,976,149	50.38	2.52%
10	Michigan	378,152	9,467	9,986,857	37.86	2.50%
11	Rhode Island	53,954	1,346	1,059,361	50.93	2.49%
12	Maryland	194,448	4,447	6,045,680	32.16	2.29%
13	Delaware	34,670	763	973,764	35.60	2.20%
14	Georgia	418,934	8,775	10,617,423	39.46	2.09%
15	Arizona	322,774	6,624	7,278,717	44.34	2.05%
16	South Carolina	214,911	4,346	5,148,714	41.74	2.02%
17	Florida	985,297	18,677	21,477,737	45.88	1.90%
18	Texas	1,151,069	21,309	28,995,881	39.70	1.85%
19	Illinois	712,936	12,838	12,671,821	56.26	1.80%
20	Virginia	233,617	4,054	8,535,519	27.37	1.74%
31	North Carolina	357,958	5,219	10,609,155	33.74	1.46%
41	Montana	60,845	669	1,068,778	56.93	1.10%
42	Kentucky	174,182	1,885	4,467,673	38.99	1.08%
43	Iowa	226,259	2,360	3,155,070	71.71	1.04%
44	Kansas	153,021	1,529	2,913,314	52.52	1.00%
45	Idaho	98,500	909	1,787,147	55.12	0.92%
46	Oklahoma	193,824	1,717	3,956,971	48.98	0.89%
47	Wisconsin	380,870	3,285	5,822,434	65.41	0.86%
48	Nebraska	124,066	984	1,934,408	64.14	0.79%
49	Wyoming	31,929	215	578,759	55.17	0.67%
50	Utah	192,087	863	3,205,958	59.92	0.45%
51	Alaska	31,444	121	731,545	42.98	0.38%

Covid-19 in North Carolina

In North Carolina the Covid-19 experience has also been quite uneven in its impact. Table 5 ranks the top 20 and bottom 20 North Carolina counties by infection rates as of November 30, 2020. The overall infection rate in the state was 33.74 cases per 1,000 in population. Sampson County's infection rate was the highest at 57.15 cases of Covid-19 per 1,000 persons. However, despite the high case rate the death rate per case in Sampson County was below the state average.

Mecklenburg County, the state's largest county by population, has the highest case count at 43,380. However, it had the 33rd overall case rate per 1,000 persons of 39.15. Wake County, the state's second largest county by population (1,089,579) had the 83rd overall case rate among the 100 North Carolina counties.

Table 6 presents the ranking of North Carolina counties by death rates from Covid-19 as of November 30, 2020. This table lists the top 20 and the bottom 20 counties by death rate. The North Carolina death rate was 1.46 percent of cases and the county death rates ranged from a high of 5.43 percent of cases in Jones County to a low of 0.26 percent in Alleghany County.

Table 5

Rank	County	Pop	Cases[19]	Deaths[20]	Cases/1,000	Death Rate
	North Carolina	10,609,155	357,958	5,219	33.74	1.46%
1	Sampson	64,284	3,674	43	57.15	1.17%
2	Greene	21,050	1,195	25	56.77	2.09%
3	Robeson	131,056	7,394	110	56.42	1.49%
4	Duplin	59,736	3,367	62	56.36	1.84%
5	Scotland	35,732	1,955	39	54.71	1.99%
6	Avery	18,022	955	8	52.99	0.84%
7	Montgomery	27,666	1,399	41	50.57	2.93%
8	Wilson	82,282	4,041	81	49.11	2.00%
9	Columbus	56,290	2,754	71	48.93	2.58%
10	Edgecombe	52,586	2,543	71	48.36	2.79%
11	Stanly	63,727	2,968	78	46.57	2.63%
12	Nash	95,647	4,434	108	46.36	2.44%
13	Wayne	125,825	5,779	112	45.93	1.94%
14	Bertie	19,636	899	24	45.78	2.67%
15	Gaston	222,744	10,186	183	45.73	1.80%
16	Chowan	14,114	632	18	44.78	2.85%
17	Pitt	179,731	7,897	48	43.94	0.61%
18	Burke	91,810	3,965	64	43.19	1.61%
19	Catawba	159,494	6,886	87	43.17	1.26%
20	Cleveland	99,776	4,286	109	42.96	2.54%
81	Onslow	201,548	5,364	41	26.61	0.76%
82	Orange	147,093	3,889	62	26.44	1.59%
83	Wake	1,089,579	28,745	289	26.38	1.01%
84	Washington	12,071	315	8	26.10	2.54%
85	Macon	36,498	938	9	25.70	0.96%
86	Perquimans	13,639	345	4	25.30	1.16%
87	Stokes	46,420	1,164	16	25.08	1.37%
88	Person	40,370	982	11	24.32	1.12%
89	Carteret	71,163	1,728	14	24.28	0.81%
90	Clay	11,860	280	5	23.61	1.79%
91	Madison	22,602	525	17	23.23	3.24%
92	Polk	21,696	475	13	21.89	2.74%
93	Buncombe	264,056	5,612	140	21.25	2.49%
94	Brunswick	142,088	2,998	59	21.10	1.97%
95	Haywood	63,328	1,186	40	18.73	3.37%
96	Gates	12,132	217	6	17.89	2.76%
97	Dare	37,290	641	4	17.19	0.62%
98	Camden	10,611	182	4	17.15	2.20%
99	Transylvania	35,484	556	9	15.67	1.62%
100	Currituck	27,526	328	5	11.92	1.52%

Table 6

Rank	County	Pop	Cases[21]	Deaths[22]	Cases/1,000	Death Rate
	North Carolina	10,609,155	357,958	5,219	33.74	1.46%
1	Jones	10,196	276	15	27.07	5.43%
2	Hertford	24,037	986	41	41.02	4.16%
3	Graham	8,687	273	11	31.43	4.03%
4	Rutherford	68,908	2,445	85	35.48	3.48%
5	Haywood	63,328	1,186	40	18.73	3.37%
6	Madison	22,602	525	17	23.23	3.24%
7	Pasquotank	39,731	1,099	35	27.66	3.18%
8	Beaufort	47,480	1,709	54	35.99	3.16%
9	Vance	45,969	1,756	55	38.20	3.13%
10	Northampton	20,527	824	25	40.14	3.03%
11	Montgomery	27,666	1,399	41	50.57	2.93%
12	Chowan	14,114	632	18	44.78	2.85%
13	Edgecombe	52,586	2,543	71	48.36	2.79%
14	Gates	12,132	217	6	17.89	2.76%
15	Chatham	75,994	2,364	65	31.11	2.75%
16	Polk	21,696	475	13	21.89	2.74%
17	Hyde	5,181	185	5	35.71	2.70%
18	Bertie	19,636	899	24	45.78	2.67%
19	Stanly	63,727	2,968	78	46.57	2.63%
20	Columbus	56,290	2,754	71	48.93	2.58%
81	Union	237,287	7,802	73	32.88	0.94%
82	Yadkin	38,196	1,534	14	40.16	0.91%
83	Iredell	181,380	5,557	50	30.64	0.90%
84	Pender	63,406	1,898	17	29.93	0.90%
85	Avery	18,022	955	8	52.99	0.84%
86	Carteret	71,163	1,728	14	24.28	0.81%
87	Onslow	201,548	5,364	41	26.61	0.76%
88	New Hanover	235,560	6,961	53	29.55	0.76%
89	Pamlico	13,266	402	3	30.30	0.75%
90	Caswell	23,664	843	6	35.62	0.71%
91	Rockingham	91,788	3,092	22	33.69	0.71%
92	Dare	37,290	641	4	17.19	0.62%
93	Pitt	179,731	7,897	48	43.94	0.61%
94	Caldwell	83,417	3,552	21	42.58	0.59%
95	Lincoln	86,453	3,430	20	39.67	0.58%
96	Jackson	44,335	1,399	8	31.56	0.57%
97	Watauga	57,899	1,878	8	32.44	0.43%
98	Ashe	27,861	784	3	28.14	0.38%
99	Yancey	18,623	557	2	29.91	0.36%
100	Alleghany	11,466	390	1	34.01	0.26%

The North Carolina Economy in the 21st Century

In this section, we benchmark the growth of the North Carolina economy during the first two decades of the 21st century. Table 7 documents the states with the largest population growth during the first two decades of the 21st century. The top five growth states by percentage were in the western United States. Between 2000 and 2019, the North Carolina population grew by 29.8 percent or over 2.4 million persons. The state's population growth was 8th in the nation during the 2000 through 2019 period. In the BEA's southern region, only Florida, at 33.8 percent, outpaced North Carolina population growth.

Table 7

Rank	State	2000 Population[23]	2019 Population[24]	% Change 2000-2019
1	Nevada	2,018,741	3,080,156	52.6%
2	Utah	2,244,502	3,205,958	42.8%
3	Arizona	5,160,586	7,278,717	41.0%
4	Texas	20,944,499	28,995,881	38.4%
5	Idaho	1,299,430	1,787,065	37.5%
6	Florida	16,047,515	21,477,737	33.8%
7	Colorado	4,326,921	5,758,736	33.1%
8	North Carolina	8,081,614	10,488,084	29.8%
9	Georgia	8,227,303	10,617,423	29.1%
10	Washington	5,910,512	7,614,893	28.8%
11	South Carolina	4,024,223	5,148,714	27.9%
12	Delaware	786,373	973,764	23.8%
13	District of Columbia	572,046	705,749	23.4%
14	Oregon	3,429,708	4,217,737	23.0%
15	Virginia	7,105,817	8,535,519	20.1%
16	Tennessee	5,703,719	6,829,174	19.7%
17	North Dakota	642,023	762,062	18.7%
18	Montana	903,773	1,068,778	18.3%
19	Wyoming	494,300	578,759	17.1%
20	South Dakota	755,844	884,659	17.0%
21	Hawaii	1,213,519	1,415,872	16.7%
22	Alaska	627,963	731,545	16.5%
	United States	282,162,411	328,239,523	16.3%

Table 8 presents the percentage growth in Real GDP by state during the first two decades of the 21st century. Again, western states were at the top of the list. North Carolina's Real GDP growth during the 2000-2019 period was 43.0 percent, slightly less than the 45.4 percent average

for the United States, and ranked 20th, just ahead of South Carolina. North Carolina's Real GDP growth was second among southern states, exceeded only by Florida (14th) at 50.2 percent.

Table 8

Rank	Area	RGDP 2000[25]	RGDP 2019[26]	% Increase 2000-2019
1	North Dakota	$24,653	$53,930	118.8%
2	Utah	$92,627	$168,793	82.2%
3	Texas	$998,149	$1,764,357	76.8%
4	Washington	$312,646	$548,687	75.5%
5	California	$1,709,491	$2,800,505	63.8%
6	Oregon	$137,820	$225,337	63.5%
7	South Dakota	$29,399	$47,560	61.8%
8	Oklahoma	$124,235	$197,900	59.3%
9	Idaho	$47,495	$74,937	57.8%
10	Arizona	$207,775	$323,598	55.7%
11	Nebraska	$76,663	$117,395	53.1%
12	Colorado	$232,832	$356,280	53.0%
13	Montana	$31,370	$47,916	52.8%
14	Florida	$641,249	$963,256	50.2%
15	Maryland	$250,851	$374,039	49.1%
16	Hawaii	$56,441	$82,471	46.1%
17	Nevada	$105,455	$153,729	45.8%
18	District of Columbia	$85,186	$123,929	45.5%
	United States	$13,130,987	$19,091,662	45.4%
19	Massachusetts	$359,286	$519,962	44.7%
20	North Carolina	$357,824	$511,540	43.0%
21	South Carolina	$150,403	$214,934	42.9%

Table 9 presents the Real GDP growth of the 12 BEA Southeast region states during the first two decades of the 21st century. Florida was the only southeast region state to grow at a faster pace than the overall United States rate of 45.4 percent. North Carolina was second and South Carolina was third. Overall, the southeast states fared poorly in Real GDP growth during the 21st century.

Table 10 puts population growth and Real GDP growth together and presents per capita Real GDP growth by state for the first two decades of the 21st century. Overall, per capita Real GDP grew by 25 percent in the United States between 2000 and 2019. Leading the way again were mainly western states, with North Dakota growing by 84.3 percent (fracking) and California growing by 40.9 percent (technology). In this measure, North Carolina performed very poorly

with per capita Real GDP growing by only 10.2 percent over the 19-year period, ranking 46th out of 50 states and the District of Columbia.

Table 9

Rank	Area	RGDP 2000[27]	RGDP 2019[28]	% Increase 2000-2019
1	Florida	$641,249	$963,256	50.22%
	United States	$13,130,987	$19,091,662	45.39%
2	North Carolina	$357,824	$511,540	42.96%
3	South Carolina	$150,403	$214,934	42.91%
4	Virginia	$346,997	$489,168	40.97%
5	Tennessee	$233,697	$328,406	40.53%
6	Georgia	$391,210	$547,423	39.93%
7	Arkansas	$90,224	$117,447	30.17%
8	Alabama	$157,697	$200,829	27.35%
9	Kentucky	$151,834	$190,812	25.67%
10	West Virginia	$62,001	$72,340	16.68%
11	Mississippi	$88,089	$102,656	16.54%
12	Louisiana	$206,462	$239,967	16.23%

Table 10

Rank	State	2000 Per Capita RGDP[29]	2019 Per Capita RGDP[30]	% Change 2000-2019
1	North Dakota	$38,399	$70,769	84.3%
2	California	$50,297	$70,877	40.9%
3	Oklahoma	$35,964	$50,013	39.1%
4	South Dakota	$38,896	$53,760	38.2%
5	Washington	$52,897	$72,054	36.2%
6	Nebraska	$44,732	$60,688	35.7%
7	New York	$57,092	$76,628	34.2%
8	Massachusetts	$56,482	$75,439	33.6%
9	Oregon	$40,184	$53,426	33.0%
10	Iowa	$41,775	$54,996	31.6%
11	Maryland	$47,232	$61,869	31.0%
12	Kansas	$42,298	$54,941	29.9%
13	Pennsylvania	$43,797	$56,723	29.5%
14	Montana	$34,710	$44,833	29.2%
15	Texas	$47,657	$60,849	27.7%
16	Utah	$41,268	$52,650	27.6%
17	Vermont	$37,766	$47,767	26.5%
18	Hawaii	$46,510	$58,248	25.2%
	United States	$46,537	$58,164	25.0%
42	South Carolina	$37,374	$41,745	11.7%
46	North Carolina	$44,276	$48,773	10.2%

Table 11 presents the same per capita Real GDP growth for the 12 BEA southeast states between 2000 and 2019. All the southeast states had per capita Real GDP growth rates below the overall United States rate of 25.0 percent. North Carolina performed poorly in this measure, ranking 11th out of the 12 southeast states. The North Carolina per capita Real GDP growth rate of 10.2 percent is less than half the United States growth rate during the same period; only Georgia performed worse.

Table 11

Rank	State	2000 Per Capita RGDP[31]	2019 Per Capita RGDP[32]	% Change 2000-2019
	United States	$46,537	$58,164	25.0%
1	West Virginia	$34,311	$40,365	17.6%
2	Tennessee	$40,973	$48,089	17.4%
3	Virginia	$48,833	$57,310	17.4%
4	Alabama	$35,420	$40,959	15.6%
5	Arkansas	$33,683	$38,918	15.5%
6	Kentucky	$37,499	$42,709	13.9%
7	Florida	$39,959	$44,849	12.2%
8	Louisiana	$46,169	$51,619	11.8%
9	South Carolina	$37,374	$41,745	11.7%
10	Mississippi	$30,926	$34,493	11.5%
11	North Carolina	$44,276	$48,773	10.2%
12	Georgia	$47,550	$51,559	8.4%

Table 12 presents state Real GDP per worker (productivity) ranked by the 2019 level. The District of Columbia had the highest Real GDP per worker at $134,267 (government), followed by Washington state at $118,067 (technology). North Carolina ranked 30th in Real GDP per worker at $82,658 in 2019.

Table 13 presents Real GDP per worker (productivity) ranked by the 2019 level in the BEA southeast region. Virginia ranks first with $93,674. North Carolina is 4th at $82,658. All the BEA southeast region states had Real GDP per worker output below the overall United States level of $93,674.

Table 12

Rank	State	2000 RGDP/Worker[33]	2019 RGDP/Worker[34]	% Change 2000-2019
1	District of Columbia	$115,852	$134,267	15.9%
2	Washington	$88,649	$118,067	33.2%
3	Alaska	$101,523	$115,826	14.1%
4	New York	$104,067	$115,794	11.3%
5	California	$88,902	$113,832	28.0%
6	Connecticut	$102,113	$107,787	5.6%
7	Delaware	$111,758	$106,016	-5.1%
8	Massachusetts	$88,270	$105,325	19.3%
9	New Jersey	$99,563	$98,782	-0.8%
10	Maryland	$81,126	$98,330	21.2%
11	Texas	$82,228	$97,887	19.0%
12	Illinois	$87,106	$97,092	11.5%
13	Wyoming	$85,250	$95,003	11.4%
14	United States	$79,403	$93,674	18.0%
30	North Carolina	$73,145	$82,658	13.0%
44	South Carolina	$65,972	$74,076	12.3%

Table 13

Rank	State	2000 RGDP/Worker[35]	2019 RGDP/Worker[36]	% Change 2000-2019
	United States	$79,403	$93,674	18.0%
1	Virginia	$78,878	$90,464	14.7%
2	Louisiana	$86,434	$87,414	1.1%
3	Georgia	$80,483	$85,285	6.0%
4	North Carolina	$73,145	$82,658	13.0%
5	West Virginia	$70,813	$80,810	14.1%
6	Tennessee	$67,556	$78,085	15.6%
7	Florida	$72,202	$74,920	3.8%
8	Kentucky	$65,829	$74,175	12.7%
9	South Carolina	$65,972	$74,076	12.3%
10	Alabama	$65,921	$73,410	11.4%
11	Arkansas	$60,862	$70,170	15.3%
12	Mississippi	$59,669	$63,469	6.4%

Table 14 presents the percentage change in state Real GDP per worker between 2000 and 2019. Overall, the United States Real GDP per worker increased by 18.0 percent. The states with the greatest increases in Real GDP per worker were dominated by energy producing states benefiting from the growth in fracking. North Carolina ranked 32nd in Real GDP growth per worker at 13.0 percent. This growth rate is only 72 .2 percent of the United States overall increase in real GDP

per worker. Again, North Carolina was 4th in Real GDP per worker growth in the BEA southeast region.

North Carolina did not do well in most economic measures during the first two decades of the 21st century. Only population growth exceeded the overall United States growth rate. In all other economic measures, North Carolina lagged the United States experience. In general, the BEA southeast region states did not do well in economic measurement during the last 19 years.

Table 14

Rank	State	2000 RGDP/Worker[37]	2019 RGDP/Worker[38]	% Change 2000-2019
1	North Dakota	$55,948	$91,889	64.2%
2	Oklahoma	$62,293	$84,689	36.0%
3	South Dakota	$57,378	$77,053	34.3%
4	Nebraska	$65,314	$87,447	33.9%
5	Washington	$88,649	$118,067	33.2%
6	Oregon	$65,875	$86,019	30.6%
7	Iowa	$63,887	$82,878	29.7%
8	California	$88,902	$113,832	28.0%
9	Kansas	$64,726	$82,259	27.1%
10	Montana	$56,758	$68,920	21.4%
11	Maryland	$81,126	$98,330	21.2%
12	Minnesota	$74,242	$89,290	20.3%
13	Wisconsin	$68,319	$82,070	20.1%
14	Massachusetts	$88,270	$105,325	19.3%
15	Texas	$82,228	$97,887	19.0%
16	Pennsylvania	$77,913	$92,226	18.4%
17	Utah	$67,095	$79,357	18.3%
	United States	$79,403	$93,674	18.0%
32	North Carolina	$73,145	$82,658	13.0%
34	South Carolina	$65,972	$74,076	12.3%

The North Carolina Regional Economy in the 21st Century

This section of the report details the regional economic experience of the 100 North Carolina counties during the first two decades of the 21st century. Table 15 presents the population growth by county for the 2000 to 2019 period. Overall, North Carolina's population grew by 29.8 percent or just over 2.4 million persons. Brunswick County experienced the largest population growth rate, with a 93.7 percent increase in 19 years. Two counties, Wake and Mecklenburg, accounted for 37 percent of the state's population growth between 2000 and 2019.

The top ten population growth counties (10 percent of counties) accounted for 54 percent of the state's population growth. Only 23 of the state's 100 counties experienced population growth rates above the overall state rate of 28.5 percent.

Table 16 presents the 18 North Carolina counties that lost population during the first two decades of the 21st century. Most of these counties are smaller rural counties, so while the percentage decline is moderate the actual level of population decline is small, usually numbering just a few thousand persons.

Table 15

Rank	County	2000 Population[39]	2019 Population[40]	% Change 2000-2019
1	Brunswick, NC	73,717	142,820	93.7%
2	Union, NC	125,573	239,859	91.0%
3	Wake, NC	633,267	1,111,761	75.6%
4	Johnston, NC	123,279	209,339	69.8%
5	Cabarrus, NC	132,231	216,453	63.7%
6	Hoke, NC	33,923	55,234	62.8%
7	Mecklenburg, NC	700,458	1,110,356	58.5%
8	Camden, NC	6,925	10,867	56.9%
9	Pender, NC	41,212	63,060	53.0%
10	Currituck, NC	18,294	27,763	51.8%
11	Chatham, NC	49,740	74,470	49.7%
12	Harnett, NC	91,393	135,976	48.8%
13	Iredell, NC	123,563	181,806	47.1%
14	Franklin, NC	47,611	69,685	46.4%
15	New Hanover, NC	160,887	234,473	45.7%
16	Durham, NC	224,476	321,488	43.2%
17	Pitt, NC	134,298	180,742	34.6%
18	Lincoln, NC	64,152	86,111	34.2%
19	Moore, NC	75,177	100,880	34.2%
20	Jackson, NC	33,303	43,938	31.9%
21	Onslow, NC	150,678	197,938	31.4%
22	Henderson, NC	89,662	117,417	31.0%
23	Watauga, NC	42,905	56,177	30.9%
24	North Carolina	8,081,614	10,488,084	29.8%

Table 16

Rank	County	2000 Population[41]	2019 Population[42]	% Change 2000-2019
1	Washington, NC	13,695	11,580	-15.4%
2	Hyde, NC	5,833	4,937	-15.4%
3	Halifax, NC	57,306	50,010	-12.7%
4	Martin, NC	25,506	22,440	-12.0%
5	Northampton, NC	22,041	19,483	-11.6%
6	Jones, NC	10,289	9,419	-8.5%
7	Edgecombe, NC	55,443	51,472	-7.2%
8	Lenoir, NC	59,556	55,949	-6.1%
9	Mitchell, NC	15,725	14,964	-4.8%
10	Bertie, NC	19,762	18,947	-4.1%
11	Caswell, NC	23,527	22,604	-3.9%
12	Richmond, NC	46,611	44,829	-3.8%
13	Chowan, NC	14,478	13,943	-3.7%
14	Anson, NC	25,342	24,446	-3.5%
15	Scotland, NC	35,944	34,823	-3.1%
16	Tyrrell, NC	4,126	4,016	-2.7%
17	Pamlico, NC	12,913	12,726	-1.4%
18	Rockingham, NC	92,090	91,010	-1.2%
19	Warren, NC	19,913	19,731	-0.9%

Table 17 presents the Real GDP growth by county from 2001 through 2019. Overall, North Carolina Real GDP grew by 41.8 percent between 2001 and 2019. Seventeen counties outperformed the overall state GDP growth. Wake County led with a 102.8 percent increase in just 18 years. Mecklenburg County had the greatest Real GDP level of any North Carolina county in 2019 at $98,965,774,000. This is almost 20 percent of the state's total Real GDP. Five counties (Mecklenburg, Wake, Durham, Guilford, and Forsyth) account for over 50 percent of the state's 2019 Real GDP.

Table 18 shows the other side of the regional Real GDP disparity in North Carolina. The table lists the 15 counties whose Real GDP declined by at least 7 percent between 2001 and 2019. In all, 27 of North Carolina's 100 counties lost Real GDP between 2001 and 2019. What we see is a large disparity between a handful of counties that experienced solid Real GDP growth and one-third of the state's counties which declined during that period.

Table 17

Rank	County	RGDP 2001[43]	RGDP 2019[44]	% Change 2001-2019
1	Wake, NC	$37,490,048	$76,027,737	102.8%
2	Durham, NC	$16,764,221	$32,944,829	96.5%
3	Franklin, NC	$913,052	$1,745,090	91.1%
4	Johnston, NC	$3,811,383	$6,872,934	80.3%
5	Mecklenburg, NC	$55,965,774	$98,066,733	75.2%
6	Lincoln, NC	$1,557,075	$2,682,376	72.3%
7	Pender, NC	$754,257	$1,256,637	66.6%
8	Macon, NC	$866,332	$1,357,611	56.7%
9	Pitt, NC	$5,599,696	$8,645,832	54.4%
10	Iredell, NC	$5,136,404	$7,926,566	54.3%
11	Onslow, NC	$5,268,515	$8,030,430	52.4%
12	Currituck, NC	$422,824	$640,153	51.4%
13	New Hanover, NC	$7,950,555	$12,020,702	51.2%
14	Buncombe, NC	$8,507,285	$12,799,956	50.5%
15	Swain, NC	$392,966	$586,745	49.3%
16	Davie, NC	$848,027	$1,251,143	47.5%
17	Orange, NC	$5,680,197	$8,115,462	42.9%
	North Carolina	$360,773,118	$511,539,864	41.8%

Table 18

Rank	County	RGDP 2001[45]	RGDP 2019[46]	% Change 2001-2019
	North Carolina	$360,773,118	$511,539,864	41.8%
1	Bladen, NC	$2,035,686	$1,343,102	-34.0%
2	Bertie, NC	$922,411	$630,369	-31.7%
3	Martin, NC	$840,230	$640,195	-23.8%
4	Edgecombe, NC	$2,021,002	$1,633,606	-19.2%
5	Duplin, NC	$2,447,098	$1,990,950	-18.6%
6	Wilkes, NC	$2,736,445	$2,230,037	-18.5%
7	Vance, NC	$1,439,804	$1,174,030	-18.5%
8	Rockingham, NC	$3,159,718	$2,715,511	-14.1%
9	Stokes, NC	$1,138,690	$1,012,554	-11.1%
10	Hyde, NC	$176,623	$157,972	-10.6%
11	Chatham, NC	$1,671,543	$1,500,826	-10.2%
12	Jones, NC	$229,135	$208,304	-9.1%
13	Person, NC	$1,636,751	$1,498,681	-8.4%
14	Burke, NC	$2,741,828	$2,525,386	-7.9%
15	Scotland, NC	$1,205,611	$1,118,746	-7.2%

Table 19 provides a look at the level of Real GDP per worker for the top 20 counties in 2019. Durham County led with $118,532 in Real GDP per worker. That is almost double the level of Real GDP per worker in Nash County in 2001. Only 15 counties had Real GDP per worker in 2019 that was greater than the overall North Carolina level of $82,658.

Table 20 presents the Real GDP per worker of the 20 lowest counties in North Carolina in 2019. Madison County was the lowest with only $48,284 Real GDP per worker, which was about one-half the level of Real GDP per worker for the State in 2019.

Table 19

Rank	County	2001 RGDP/Worker[47]	2019 RGDP/Worker[48]
1	Durham, NC	$84,708	$118,532
2	Granville, NC	$92,710	$109,256
3	Person, NC	$105,305	$103,364
4	Mecklenburg, NC	$90,671	$102,524
5	Richmond, NC	$68,208	$102,235
6	Beaufort, NC	$75,695	$99,182
7	Wake, NC	$77,661	$94,885
8	Nash, NC	$79,589	$92,402
9	Forsyth, NC	$92,309	$91,348
10	Chowan, NC	$65,408	$87,473
11	Johnston, NC	$76,214	$85,146
12	Cleveland, NC	$64,387	$84,931
13	Wilson, NC	$93,584	$83,933
14	Pitt, NC	$69,843	$83,167
15	Guilford, NC	$83,767	$82,886
	North Carolina	$74,302	$82,658
16	Franklin, NC	$58,926	$81,175
17	McDowell, NC	$80,660	$80,269
18	Northampton, NC	$78,957	$79,442
19	Bertie, NC	$103,583	$79,083
20	Duplin, NC	$101,518	$78,975

Table 21 provides the percent change in Real GDP per worker between 2001 and 2019 by county. Richmond County leads the way with a 49.9 percent increase in Real GDP per worker over the 18-year period. The table lists the top 20 counties, all of which had a Real GDP per worker increase greater than the overall state increase of 11.2 percent.

Table 20

Rank	County	2001 RGDP/Worker[49]	2019 RGDP/Worker[50]
81	Pender, NC	$57,683	$57,507
82	Washington, NC	$51,050	$57,324
83	Watauga, NC	$52,746	$57,030
84	Avery, NC	$51,724	$56,353
85	Jackson, NC	$52,928	$56,250
86	Clay, NC	$53,826	$56,015
87	Alleghany, NC	$50,045	$55,645
88	Cherokee, NC	$52,425	$55,336
89	Warren, NC	$53,441	$55,159
90	Alexander, NC	$49,574	$54,795
91	Harnett, NC	$58,675	$54,784
92	Currituck, NC	$63,193	$54,607
93	Ashe, NC	$49,685	$54,341
94	Chatham, NC	$73,597	$52,374
95	Yancey, NC	$44,578	$52,266
96	Pamlico, NC	$53,439	$51,344
97	Camden, NC	$59,319	$50,422
98	Polk, NC	$56,595	$48,778
99	Hyde, NC	$56,501	$48,667
100	Madison, NC	$47,490	$48,284

Table 21

Rank	County	2001 RGDP/Worker[51]	2019 RGDP/Worker[52]	% Change in RGDP/Worker
1	Richmond, NC	$68,208	$102,235	49.9%
2	Durham, NC	$84,708	$118,532	39.9%
3	Macon, NC	$54,727	$76,266	39.4%
4	Franklin, NC	$58,926	$81,175	37.8%
5	Chowan, NC	$65,408	$87,473	33.7%
6	Cleveland, NC	$64,387	$84,931	31.9%
7	Beaufort, NC	$75,695	$99,182	31.0%
8	Graham, NC	$51,632	$64,716	25.3%
9	Montgomery, NC	$52,832	$66,158	25.2%
10	Scotland, NC	$57,435	$71,890	25.2%
11	Lincoln, NC	$59,624	$73,641	23.5%
12	Yadkin, NC	$47,700	$58,564	22.8%
13	Wake, NC	$77,661	$94,885	22.2%
14	Caldwell, NC	$56,329	$68,066	20.8%
15	Mitchell, NC	$59,454	$71,075	19.5%
16	Davie, NC	$53,673	$64,086	19.4%
17	Pitt, NC	$69,843	$83,167	19.1%
18	Swain, NC	$57,125	$67,605	18.3%
19	Onslow, NC	$59,471	$70,085	17.8%
20	Granville, NC	$92,710	$109,256	17.8%
	North Carolina	$74,302	$82,658	11.2%

Overall, 32 counties in North Carolina experienced a Real GDP per worker decline between 2001 and 2019. Table 22 presents the bottom 20 counties with declining Real GDP per worker over the 2001 to 2019 period.

Table 22

Rank	County	2001 RGDP/Worker[53]	2019 RGDP/Worker[54]	% Change in RGDP/Worker
81	Martin, NC	$69,891	$66,027	-5.5%
82	Harnett, NC	$58,675	$54,784	-6.6%
83	Jones, NC	$77,332	$71,239	-7.9%
84	Sampson, NC	$82,149	$74,255	-9.6%
85	Wilson, NC	$93,584	$83,933	-10.3%
86	Wilkes, NC	$81,174	$72,569	-10.6%
87	Currituck, NC	$63,193	$54,607	-13.6%
88	Polk, NC	$56,595	$48,778	-13.8%
89	Hyde, NC	$56,501	$48,667	-13.9%
90	Robeson, NC	$77,277	$66,072	-14.5%
91	Brunswick, NC	$87,262	$74,508	-14.6%
92	Camden, NC	$59,319	$50,422	-15.0%
93	Stokes, NC	$87,410	$73,817	-15.6%
94	Union, NC	$75,994	$63,605	-16.3%
95	Hoke, NC	$86,842	$68,877	-20.7%
96	Duplin, NC	$101,518	$78,975	-22.2%
97	Bertie, NC	$103,583	$79,083	-23.7%
98	Chatham, NC	$73,597	$52,374	-28.8%
99	Cabarrus, NC	$88,501	$62,911	-28.9%
100	Bladen, NC	$121,258	$76,995	-36.5%

At the county level there has been a disparity between counties during the first two decades of the 21st century. While some counties have done well and surpassed the overall United States and North Carolina benchmarks, many counties within the state have fallen behind. As described in the following sections that deal with the Covid-19 downturn, this economic disparity will be exacerbated during the pandemic.

The United States Covid-19 Economic Experience

In the second quarter of 2000, after 38 quarters of uninterrupted economic growth, U.S. Real GDP was $303.8 billion above Potential Real GDP, defined as the level of Real GDP possible if all resources are fully employed. The U.S. economy continued to expand for two more quarters before the recession of 2001 began. The economic expansion during the 1990s was, at that time,

the longest economic expansion of the 32 recessions recognized by the National Bureau of Economic Research (NBER) dating back to 1854. The unemployment rate in December of 2000 was 3.9 percent, just before the expansion ended and the 2001 recession began.

In December of 2019, the U.S. economy had been expanding for 42 quarters, and within two months of recording the longest economic expansion of all time. Real GDP was $224.4 billion above Potential Real GDP and the U.S. unemployment rate was 3.5 percent, the lowest it had been since May of 1969 (the height of the Vietnam War). The economic expansion that lasted 128 months had come after the worst economic recession since the Great Depression. The Great Recession was dated by the NBER as beginning in December of 2007 and ending in June of 2009. The recession lasted for 18 months, and was the longest recession since the Great Depression, which began in August of 1929 and lasted for 43 months.

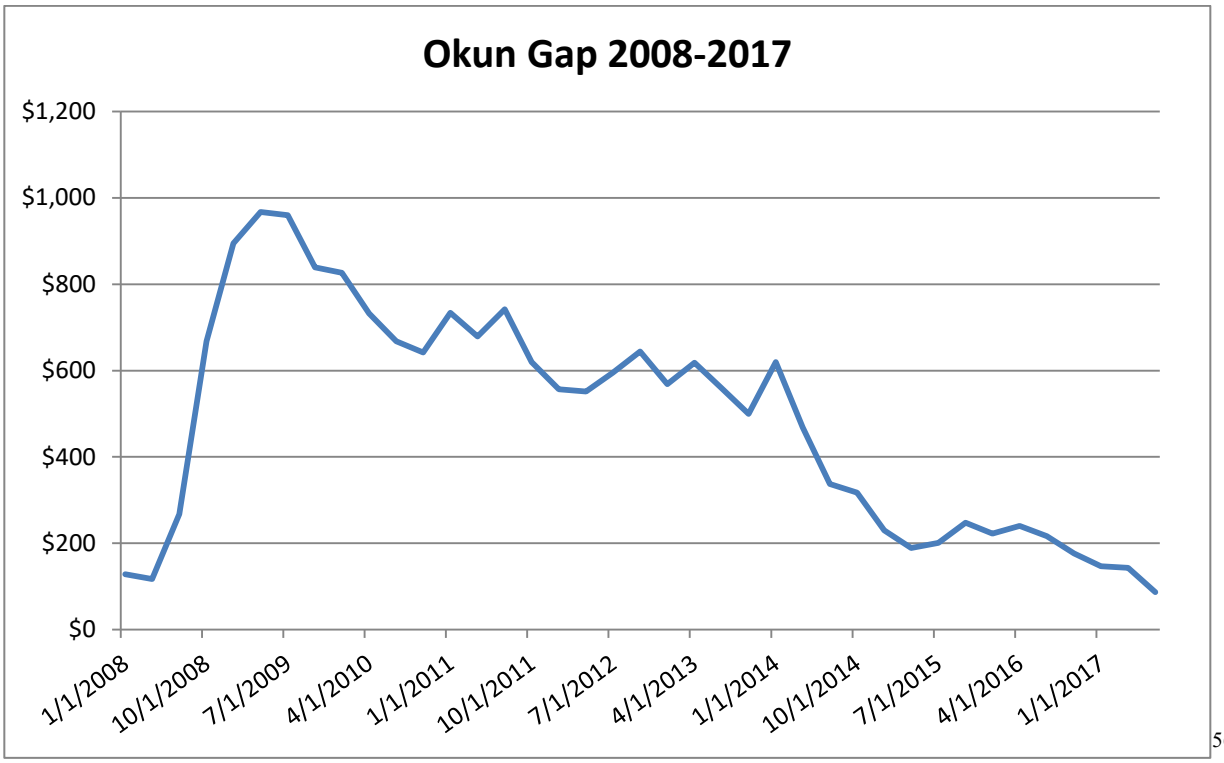
While the Great Recession was declared over in June of 2009, its effects lingered for several years. In fact, U.S. Real GDP remained below Potential Real GDP for 39 quarters, almost 10 years. When Real GDP is less than Potential Real GDP, that difference is referred to as an Okun Gap. After the Great Recession, the 39 quarter Okun Gap resulted in a cumulative loss of $4,730 billion in Real GDP. At the time, this was the equivalent of 25 percent of one year's Real GDP and this lost Real GDP is not recoverable.

Figure 1 traces the size of the Okun Gap during the 18-month recession and the subsequent 99 months (33 quarters) before the Okun Gap was closed.

The severity of the Great Recession was not the size but the length of the downturn. The peak unemployment rate of 10.0 percent was recorded in October of 2009; five months after the recession was officially over. This is not uncommon, as the unemployment rate is typically considered a lagging indicator of economic performance. Generally, the unemployment rate is considered to lag overall economic activity by about 6 months.

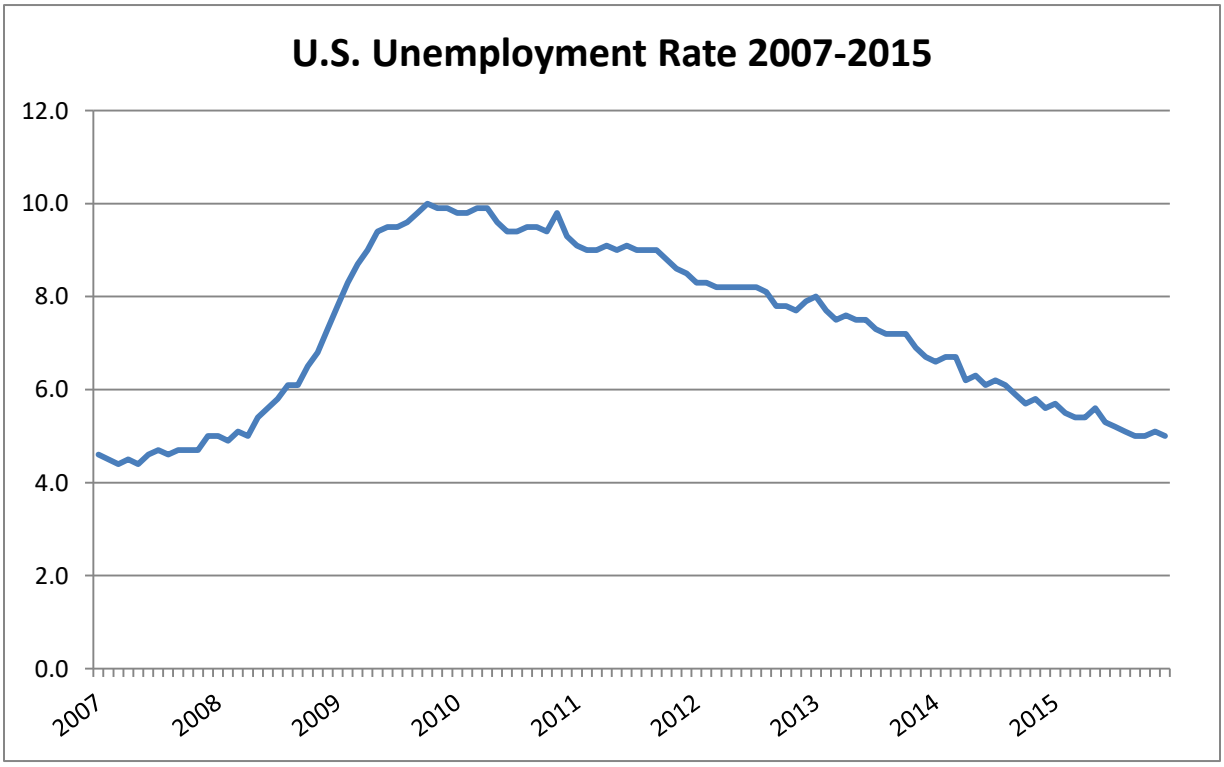
Figure 2 presents the U.S. unemployment rate trend over the 18 months of the recession and the subsequent 71 months until the U.S. unemployment rate returned to the 5.0 percent level when the recession began in December of 2007.

Figure 1[55]



[56]

Figure 2[57]



When Covid-19 hit in March of 2020, the U.S. government mandated shutdowns of large parts of the national economy. Additional shutdowns were implemented at both the state and local levels. Within one month, the U.S. economy went into a severe recession. First quarter Real GDP declined by an annualized rate of 5.0 percent. That decline was a result of three weeks of Covid-induced shutdown in March. During the second quarter, Real GDP recorded the largest quarterly decline on record; Real GDP fell by an annualized rate of 31.7 percent.

The way that the U.S. Bureau of Economic reports quarterly changes in GDP is different than most of the rest of the industrialized world. Quarterly GDP estimates are recorded in annualized levels, that is, the actual level of output for the quarter is multiplied by 4 with the interpretation that if that quarter's output were to continue for 4 quarters the annual change in the level of output would be the annualized level reported. To be consistent, the BEA also reports the percentage change in quarterly GDP as an annualized rate. This is essentially the quarterly growth rate raised to the 4th power. Table 23 presents an example of the differences in quarterly growth rate vs. annualized growth rates. The table also compares the U.S. Covid-induced recession experience to that of the Euro Zone. The U.S. quarterly Real GDP growth rates are presented in the second row of the table and are directly comparable to the Euro Zone quarterly Real GDP growth rates. In general, the U.S. decline in the second quarter of 2020 was not as severe as that experienced by the Euro Zone and its members.

Table 23[58]

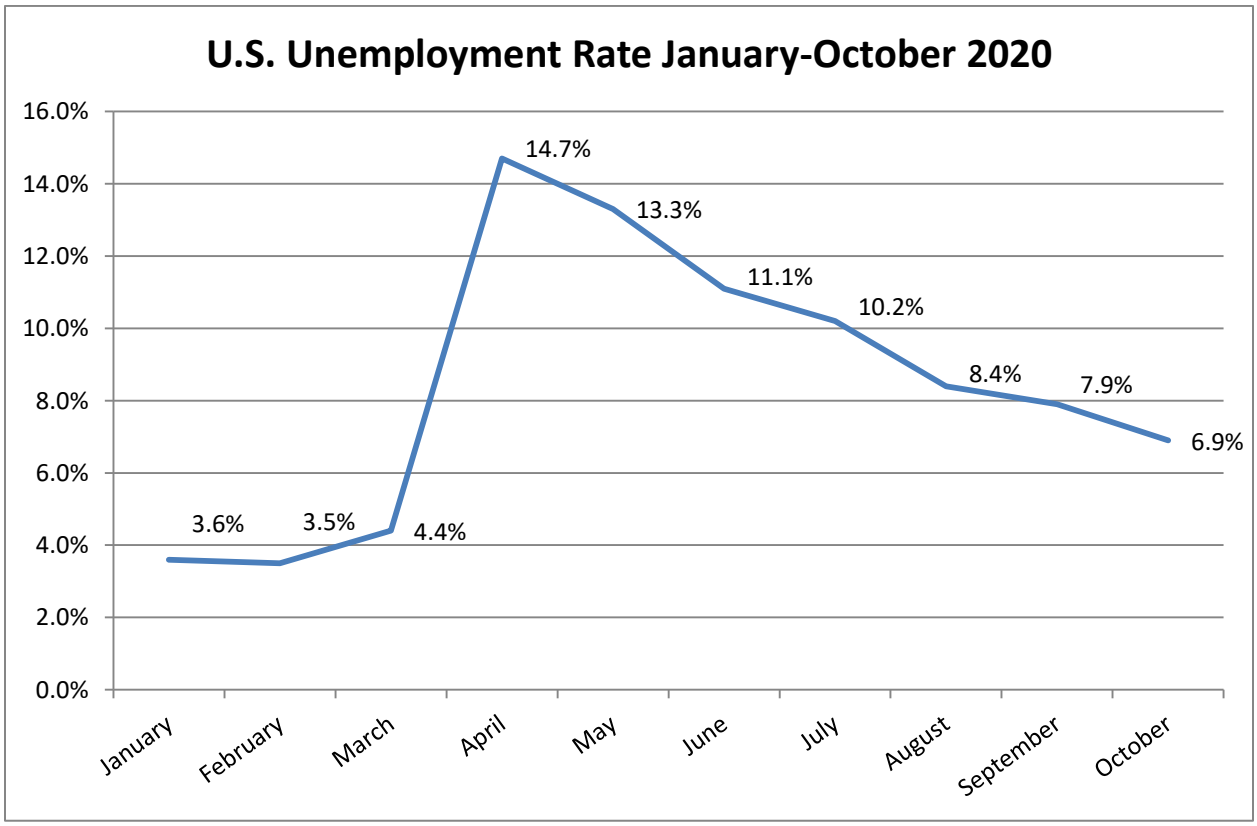
Area	2019 III	2019 IV	2020 I	2020 II	2020 III
U,S. Annualized	2.6%	2.4%	-5.0%	-31.7%	33.1%
U.S. Quarterly	0.6%	0.6%	-1.3%	-9.1%	7.4%
Euro Zone	0.3%	0.0%	-3.7%	-11.8%	12.7%
Germany	0.3%	0.0%	-1.9%	-9.8%	8.2%
Italy	0.0%	-0.2%	-5.5%	-13.0%	16.1%
France	0.2%	-0.2%	-5.9%	-13.7%	18.2%
UK	0.3%	0.1%	-2.5%	-19.8%	NA

The government mandated shutdown created a recession unlike any previous recession in U.S. history. Typically, a recession begins with a decline in Real GDP followed by a decline in non-agricultural employment and a rise in the unemployment rate. The unemployment rate continues

to rise after Real GDP hit its trough and began to recover (refer to Figure 2). During the 2007-2009 recession, Real GDP bottomed out in the second quarter of 2009 and began to recover in July of 2009. However, during that period, the U.S. unemployment rate continued to rise, peaking at 10.0 percent in October and remaining above 9.0 percent through September of 2011. The U.S. unemployment rate remained above 9.0 percent for a surprisingly long period of 29 months from April 2009 until October 2011.

The Covid-induced Recession has been completely different from the typical recession in that it was led by unemployment created by government-mandated business shutdowns. Figure 3 documents the trend in U.S. unemployment through November 2020. In February 2020, the U.S. unemployment rate was a 50-year record low of 3.5 percent. As the government-mandated shutdown began in March, the rate rose to 4.4 percent. We point out the survey that produces the U.S. unemployment rate is conducted during the week that contains the 12th day of the month. In March, the survey was conducted between March 9 and March 13, well before any significant shutdowns had begun.

Figure 3[59]



By April, the shutdowns were in full effect and the U.S. unemployment rate spiked to an unprecedented level of 14.7 percent. This is the highest monthly rate ever recorded going back to 1948 when the current survey began. U.S. unemployment rates in May and June 2020 were lower as shutdowns were eased geographically, however, both May and June 2020 rates were higher than any other month since 1948. This 3-month spike in U.S. unemployment rates to historic levels coincided with the second quarter of 2020. As a result of the government-mandated shutdowns, U.S. Real GDP declined at an annualized rate of 31.7 percent or a quarterly decline of 9.1 percent. The U.S. economy was operating at about 90 percent of Potential Real GDP during the second quarter of 2020.

In March of 2020, in anticipation of the economic damage that the government-mandated shutdowns would have on the U.S. economy, the U.S. congress passed four Covid-19 relief/stimulus packages. Bill Number 1 was the $8.3 billion Coronavirus Preparedness and Response Supplemental Appropriations Act, followed by Bill Number 2 the $183.8 billion Families First Coronavirus Response Act. Bill Number 3 was the $2 trillion Coronavirus Aid, Relief, and Economic Security (CARES) Act, followed by Bill Number 4 the $484 billion Paycheck Protection Program and Health Care Enhancement Act. The first three acts were in place by the end of March with the Paycheck Protection Act in place by the end of April. In total, almost $2.7 trillion in economic relief and stimulus was authorized to offset the first and second quarter declines in Real GDP. On a quarterly basis the U.S. economy lost $549 billion in output during the first two quarters of 2020 compared to the 2019 4th quarter level of Real GDP.

In addition to the fiscal policy stimulus passed by Congress, the Federal Reserve Bank also initiated a $700 billion round of quantitative easing aimed at assisting business to weather the government-mandated shutdowns. These quantitative easing programs were in place by the end of May 2020.

By June 2020, a gradual relaxing of government-mandated shutdowns began to occur on a piecemeal basis across the country. As a result of the return in business activity, by July 2020, the U.S. unemployment rate had dropped to 10.2 percent and continued to decline throughout the months of the 3rd quarter to 6.9 percent by October 2020.

The U.S. economy had lost over 20,000,000 jobs in April 2020 because of the government-mandated shutdowns. Payroll employment began to come back slowly in May 2020, and in June 2020 payroll employment increased by 4,781,000 jobs. In a five-month period between May 2020 and September 2020, the U.S. economy added 11,432,000 jobs or about half of the total jobs lost because of the government-mandated shutdowns. This increase in employment and the resulting decrease in unemployment generated a surprising 3rd quarter increase in U.S. Real GDP of 33.1 percent. This 3rd quarter Real GDP increase of 33.1 percent does not offset the 31.7 percent decline in 2nd quarter Real GDP. Table 24 presents an analysis of the economic impact of Covid-19 on the U.S. economy through the first three quarters of 2020. Despite the wild swings in annualized Real GDP in the 2nd and 3rd quarters, by the end of the 3rd quarter Real GDP was only down 3.5 percent from the 4th quarter 2019 level of Real GDP. The annualized cumulative loss through the 3rd quarter was $670.0 billion.

Table 24[60]

Measure	2019 IV	2020 I	2020 II	2020 III	Cumulative Loss
US RGDP ($B)	$19,254.0	$19,010.8	$17,302.5	$18,584.0	
Annualized % Change		-5.0%	-31.4%	33.1%	
Quarterly % Change		-1.3%	-9.0%	7.4%	
Change in Annualized RGDP ($B)		-$243.2	-$1,708.3	$1,281.5	-$670.0
Change in Quarterly RGDP ($B)		-$60.8	-$427.1	$320.4	-$167.5
Quarterly RGDP as a % of 2019 IV		98.7%	89.9%	96.5%	

The more interesting aspect of this purposefully created recession is how it compares with the Great Recession of 2007 to 2009. Figure 4 presents the trend in U.S. unemployment rates during the first 10 months of the Covid-induced Recession compared to the first two years of the Great Recession. Clearly during the Covid-induced Recession, the unemployment rate spiked during the first few months. However, 10 months into the recession the unemployment rate had dropped to 6.9 percent, which is just 0.4 percentage points higher than the Great Recession unemployment rate 10 months into the recession. The difference is that, during the first few months of 2021, the expectation is that the U.S. unemployment rate will continue to drop while at the 10 month point of the Great Recession the U.S. unemployment rate was going to continue to rise for another 12 months peaking at 10.0 percent in October of 2009.

Figure 5 presents the U.S. nonagricultural job losses by sector between March and April of 2020. What is striking is the disparate losses by sector. Of the 20,787,000 jobs lost, 7,750,000 were lost in the Leisure and Hospitality sector alone. Over one-third of the total jobs lost in April 2020 were in the Leisure and Hospitality sector. What is interesting is that the Leisure and Hospitality sector accounts for 11.0 percent of total U.S. nonagricultural jobs but only 2.8 percent of U.S. Real GDP.

Figure 6 presents the U.S. sector job losses in April 2020 as a percentage of total job losses in that month. Over one-third of the total jobs losses were in the Leisure and Hospitality sector. Three other sectors (Wholesale Trade, Retail Trade, and Education and Health) accounted for another one-third of the total job losses.

Figure 4[61]

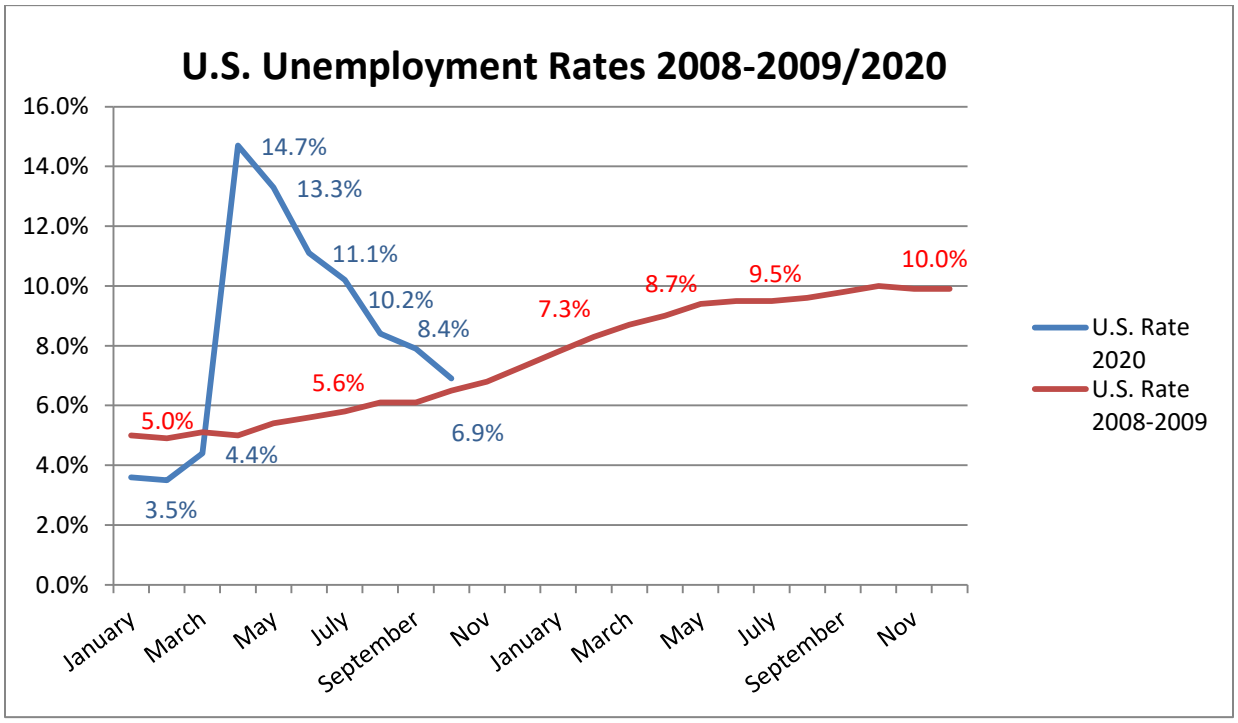


Figure 5[62]

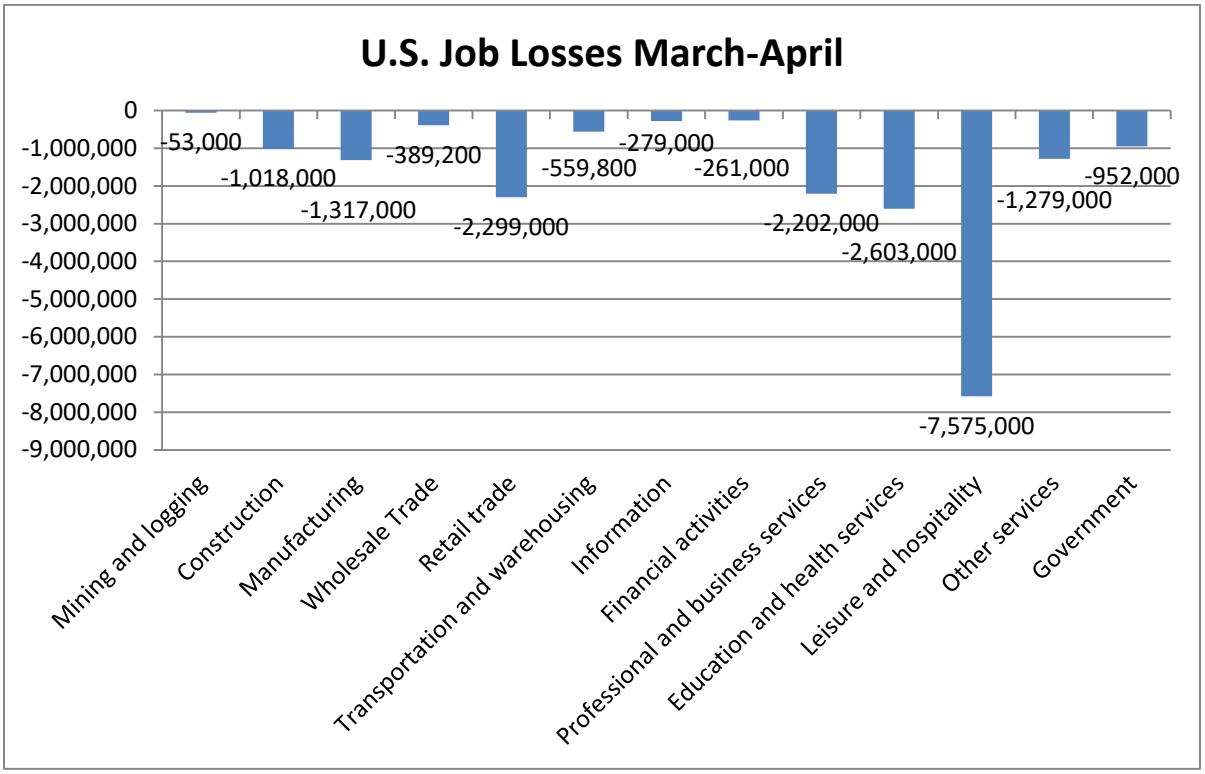

U.S. Job Losses March-April
0
-1,000,000
-2,000,000
-3,000,000
-4,000,000
-5,000,000
-6,000,000
-7,000,000
-8,000,000
-9,000,000
-53,000
-1,018,000
-1,317,000
-389,200
-2,299,000
-559,800
-279,000
-261,000
-2,202,000
-2,603,000
-7,575,000
-1,279,000
-952,000
Mining and logging
Construction
Manufacturing
Wholesale Trade
Retail trade
Transportation and warehousing
Information
Financial activities
Professional and business services
Education and health services
Leisure and hospitality
Other services
Government

Figure 6[63]

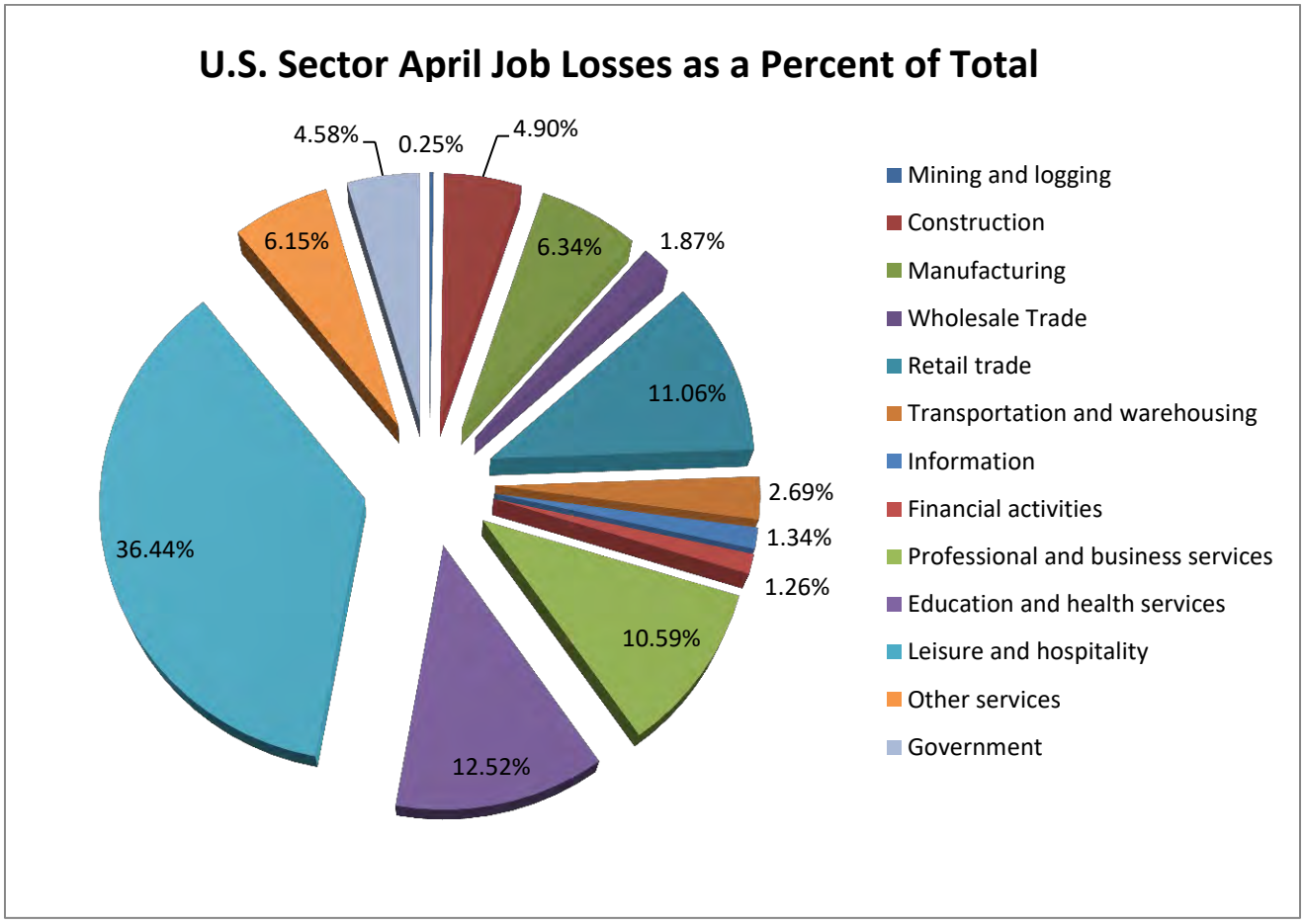
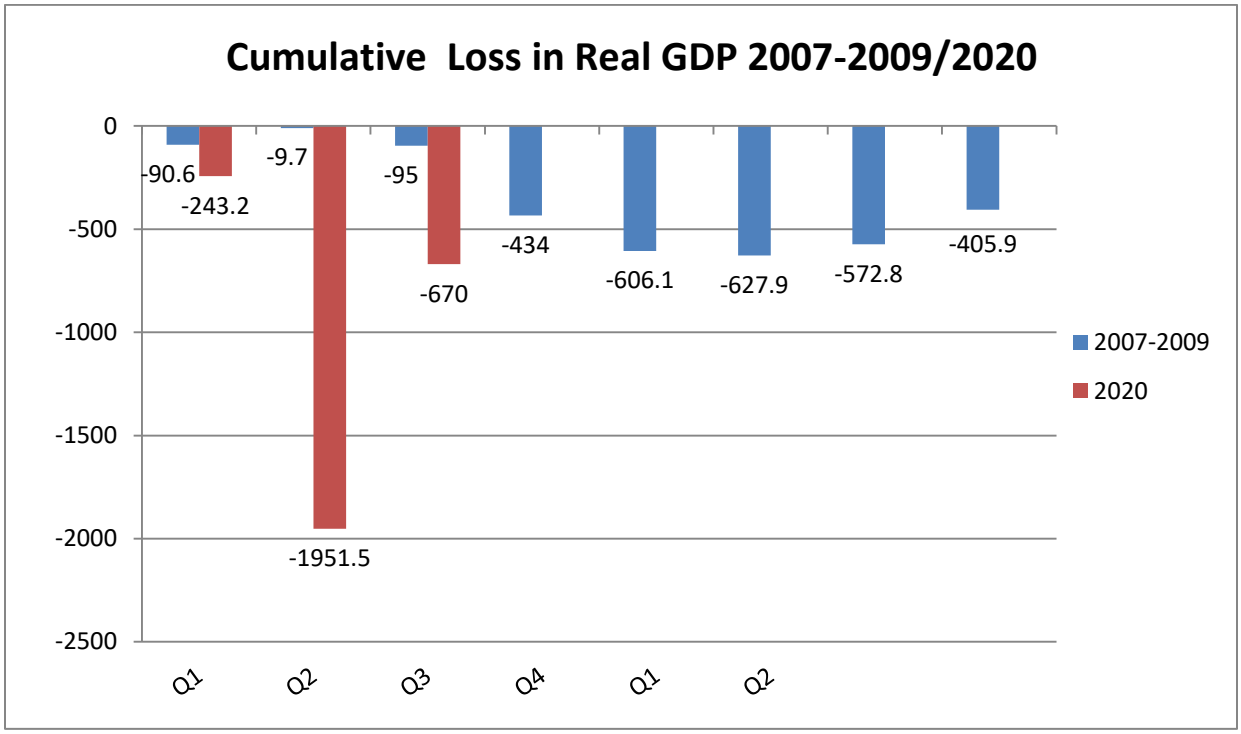


Figure 7 presents a comparison of the cumulative loss in Real GDP during the Covid-induced Recession and the Great Recession of 2007-2009. The cumulative Real GDP loss is calculated by the difference between a quarter's Real GDP level compared to the Real GDP level in the last quarter before the recession. For the Covid-induced Recession, the base quarter is the fourth quarter of 2019. For the Great Recession, the base quarter is the 3rd quarter of 2007. While the Covid-induced Recession quarterly losses are dramatic, the 2007-2009 quarterly losses continued for 8 quarters. So far, the sum of the losses in 2020 is $2,865 billion at an annualized rate or $716 billion in total. The 2007-2009 sum of the losses in Real GDP was $2,842 billion at an annualized rate or $711 billion in total. The two recessions have had, so far, virtually the same cumulative impact. The key going forward is the expected 4th quarter 2020 U.S. Real GDP growth rate and the growth rates during 2021.

Figure 7[64]



At this time, the expectation is that the U.S. economy will continue to see increases in Real GDP during the 4th quarter of 2020 and into the first half of 2021. How sizable the growth rates will be depends on the size of a second stimulus package and when that package might be passed. In any event, even the most conservative Real GDP forecasts have the U.S. economy back to its 4th quarter 2019 level by the second or third quarter of 2021 (6 to 9 months).

The North Carolina Covid-19 Economic Experience

Overall, what North Carolina experienced during the first three quarters of 2020 was not much different than that experienced by the U.S. economy. Figure 8 presents the U.S. and North Carolina unemployment rates for 2020. Both the U.S. and North Carolina started the year with unemployment rates at 3.6 percent. By April, after the mandatory shutdowns, the U.S. unemployment rate had risen to 14.7 percent while the North Carolina unemployment rate peaked at 12.9 percent. The North Carolina unemployment rate has remained below the U.S. rate for the past 6 months as both economies have been recovering from the shutdowns.

Figure 8[65]

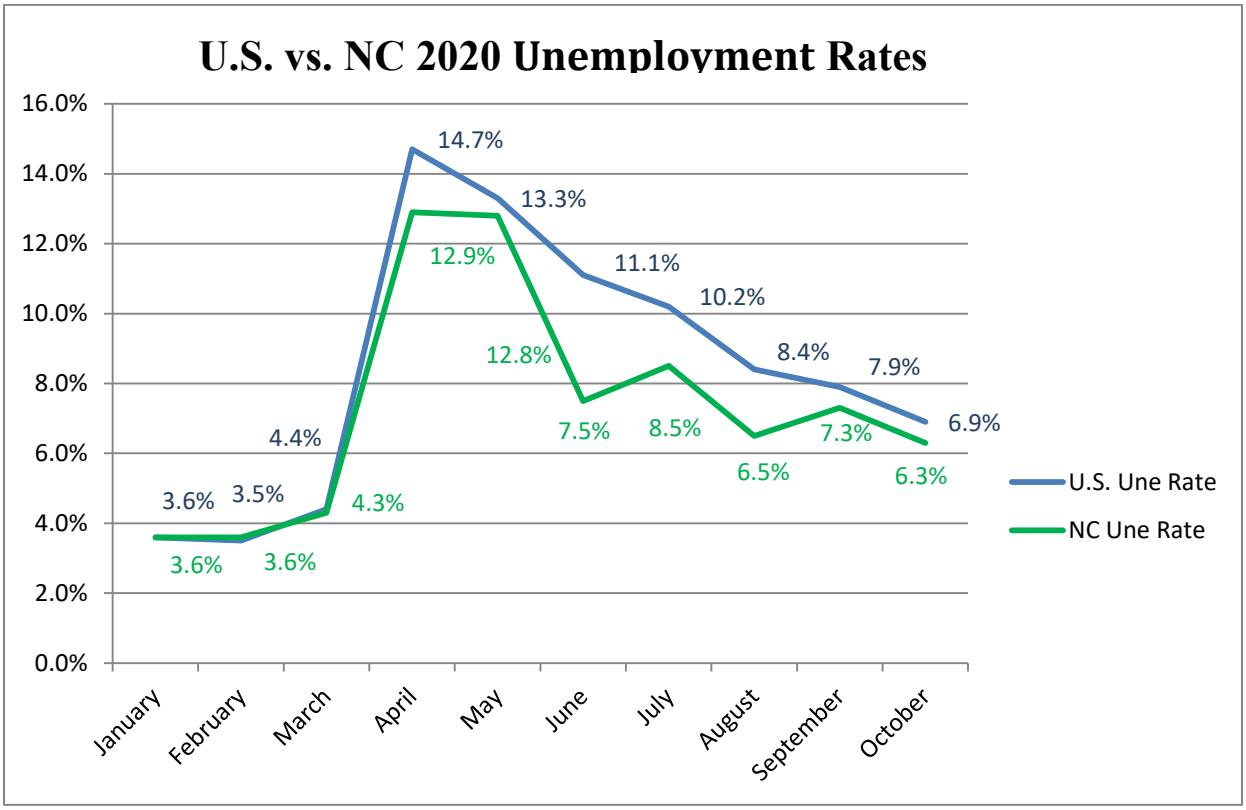


Table 25 provides state April 2020 unemployment rates ranked by those most severely affected by the government-mandated shutdowns. Nevada tops the list with an April unemployment rate of 28.2 percent, almost double the April U.S. unemployment rate. North Carolina's unemployment rate in April ranked 25th, 1.8 percentage points below the U.S. rate indicating that the North Carolina economy was less severely impacted by the mandatory shutdowns that the average state.

Table 26 presents the state unemployment rates in October 2020 ranked by the lowest unemployment rates. This provides a measure of how well states have been able to recover during the May to October 2020 period. Twelve states were able to recover well enough to have unemployment rates below 5.0 percent. By October 2020, North Carolina was ranked with the 29th lowest unemployment rate, indicating that while the downturn impacted the state's economy less than the average state; the recovery from the shutdowns has not been as strong as the average state.

Table 25[66]

Rank	State	February	April	October
1	Nevada	3.6%	28.2%	12.0%
2	Michigan	3.6%	22.7%	5.5%
3	Hawaii	2.7%	22.3%	14.3%
4	Rhode Island	3.4%	17.0%	7.0%
5	Indiana	3.1%	16.9%	5.0%
6	Ohio	4.1%	16.8%	5.6%
7	Illinois	3.4%	16.4%	6.8%
8	New Hampshire	2.6%	16.3%	4.2%
9	Vermont	2.4%	15.6%	3.2%
10	California	3.9%	15.5%	9.3%
11	Kentucky	4.2%	15.4%	7.4%
12	Mississippi	5.4%	15.4%	7.4%
13	Washington	3.8%	15.4%	6.0%
14	New Jersey	3.8%	15.3%	8.2%
15	West Virginia	4.9%	15.2%	6.4%
16	Massachusetts	2.8%	15.1%	7.4%
17	Pennsylvania	4.7%	15.1%	7.3%
18	Tennessee	3.4%	14.7%	7.4%
	United States	3.5%	14.7%	6.9%
19	Louisiana	5.2%	14.5%	9.4%
20	New York	3.7%	14.5%	9.6%
25	North Carolina	3.6%	12.9%	6.3%
31	South Carolina	2.5%	12.1%	4.2%

Table 26[67]

Rank	State	February	April	October
1	Nebraska	2.9%	8.3%	3.0%
2	Vermont	2.4%	15.6%	3.2%
3	Iowa	2.8%	10.2%	3.6%
4	South Dakota	3.3%	10.2%	3.6%
5	Utah	2.5%	9.7%	4.1%
6	New Hampshire	2.6%	16.3%	4.2%
7	South Carolina	2.5%	12.1%	4.2%
8	Georgia	3.1%	11.9%	4.5%
9	Minnesota	3.1%	8.1%	4.6%
10	Missouri	3.5%	9.7%	4.6%
11	North Dakota	2.2%	8.5%	4.8%
12	Montana	3.5%	11.3%	4.9%
13	Indiana	3.1%	16.9%	5.0%
14	Kansas	3.1%	11.2%	5.3%
15	Virginia	2.6%	10.6%	5.3%
16	Maine	3.2%	10.6%	5.4%
17	Idaho	2.7%	11.5%	5.5%
18	Michigan	3.6%	22.7%	5.5%
19	Wyoming	3.7%	9.2%	5.5%
20	Delaware	3.9%	14.3%	5.6%
29	North Carolina	3.6%	12.2%	6.3%
	United States	3.5%	14.7%	6.9%

Figure 9 presents the April 2020 one-month job losses for the North Carolina economy by sector. Overall, the North Carolina economy lost 571,500 jobs between March and April 2020. Like the U.S. the sector with the largest job loss was the hospitality and leisure industry down by 245,300 jobs between March and April 2020. Three other sectors had significant job losses led by educational and health services down by 66,400 jobs; business and professional services down by 53,400 jobs; and retail trade down by 52,300 jobs. Overall, these four sectors accounted for 73.1 percent of the total jobs lost by the North Carolina economy in April 2020.

Figure 10 presents the North Carolina April 2020 job loss picture by the percentage job loss. Again, hospitality and leisure services led the way with a 47.9 percent job loss in April 2020. Other services lost 21.5 percent job loss followed by durable goods down 11.7 percent.

Figure 9[68]

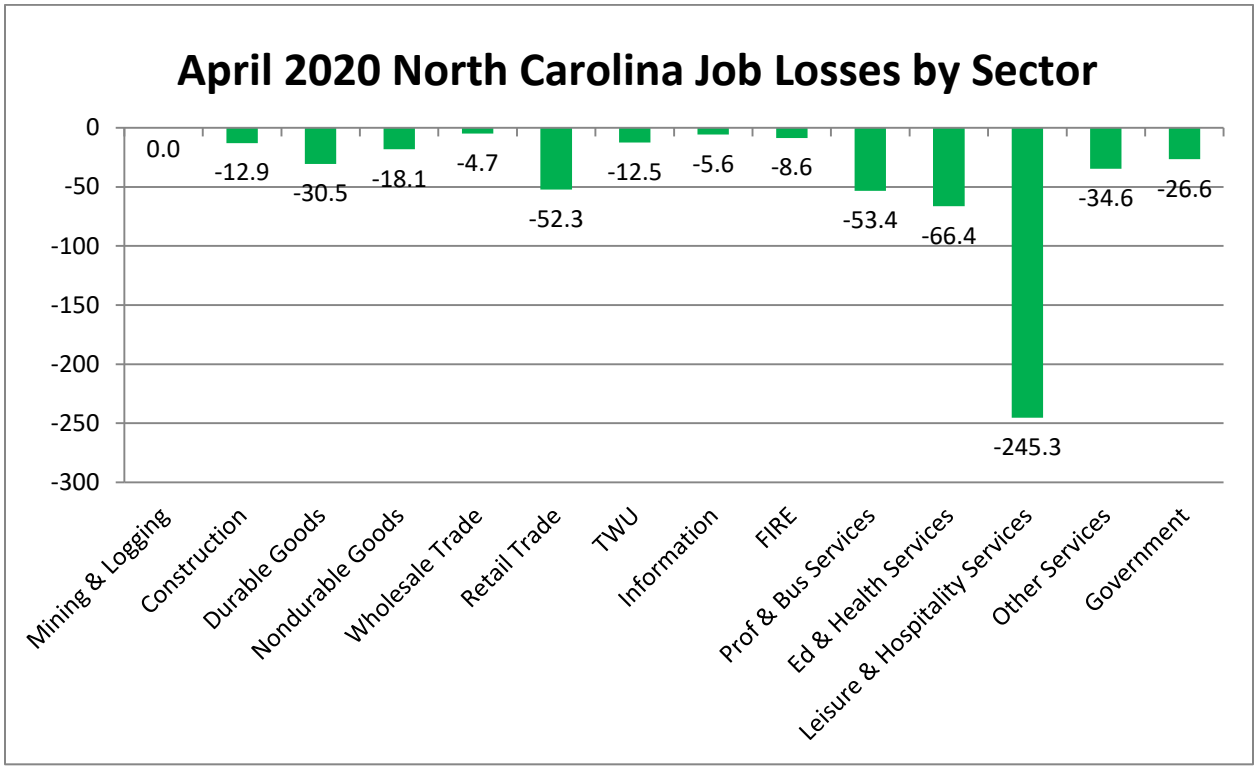
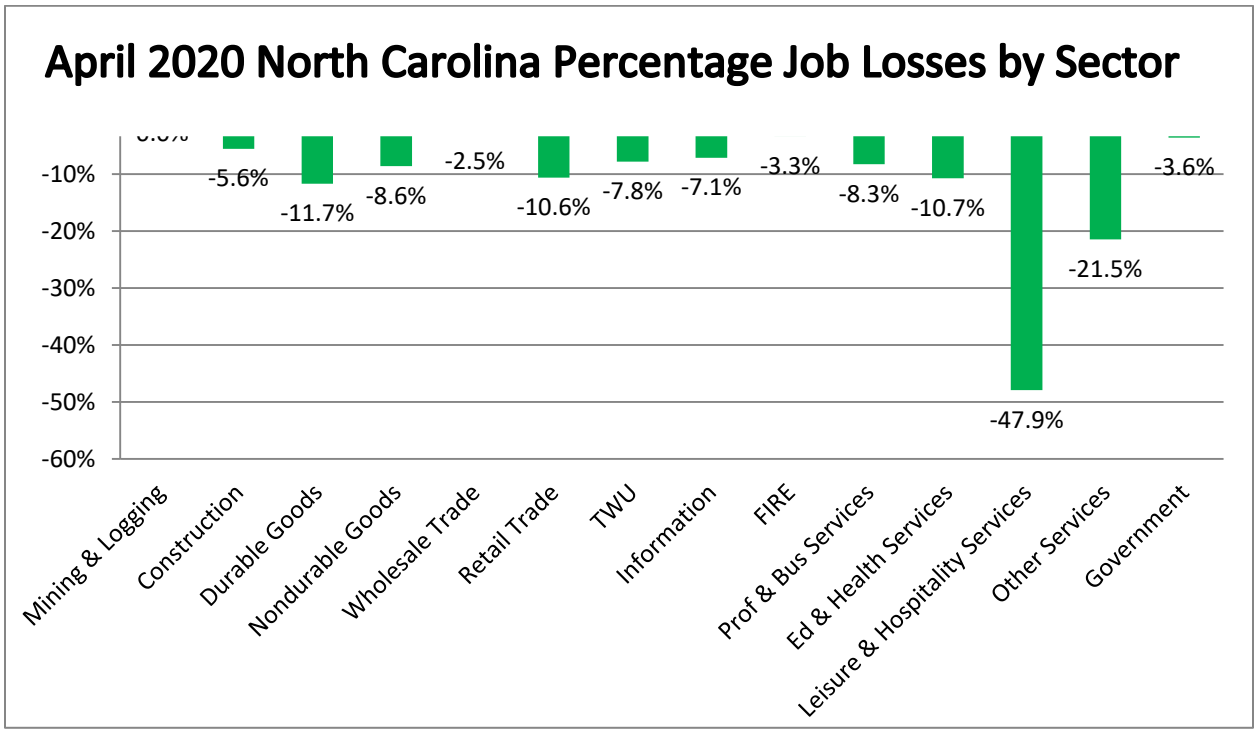


Figure 10[69]



The North Carolina Regional Covid-19 Economic Experience

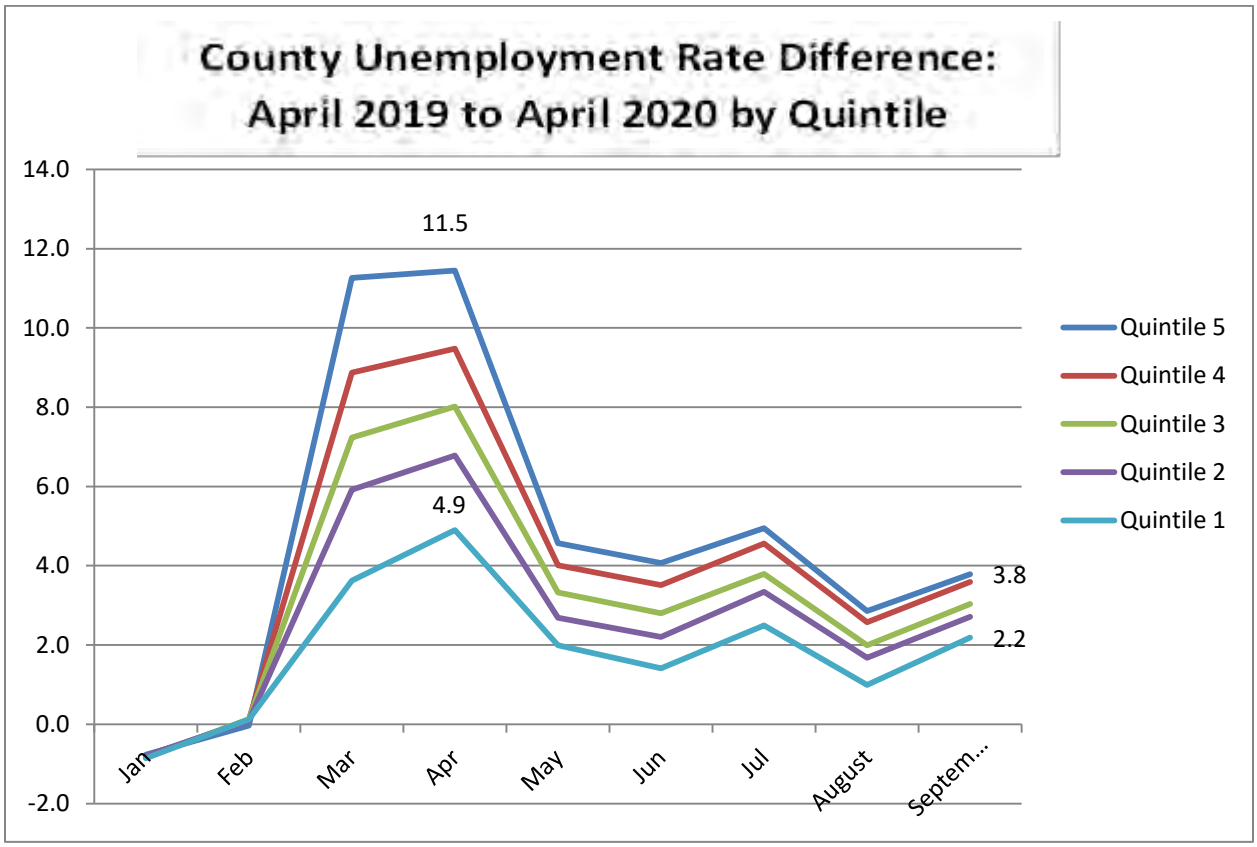
As different as the state experiences have been, the impact of the Covid-19 recession has been quite different across counties. North Carolina county unemployment rates are not seasonally adjusted, so it is difficult to judge the impact of month-to-month changes in seasonally unadjusted monthly unemployment rates. To get around this, Figure 11 presents the 12-month change in county unemployment rates. To simplify viewing the disparity in county impacts, the 100 North Carolina counties are grouped into five quintiles of 20 counties each. The selection criteria were the 12-month change in a county's April 2020 unemployment rate. The 20 counties with the largest change in their 12-month April 2020 unemployment rate are in placed Quintile 5 and the 20 counties with the smallest change in their 12-month April 2020 unemployment rate are placed in Quintile 1. The bottom 20 counties saw, on average, their 12-month April 2020 unemployment rate change by 11.5 percentage points. The top 20 counties saw the same 12-month April 2020 unemployment rate change by an average of just 4.9 percentage points. The bottom 20 counties saw their average April 12-month 2020 unemployment change by over twice the change of the top 20 counties.

By September 2020 much of the disparity had dissipated, however, the bottom 20 counties still had an average 12-month September 2020 change in unemployment that was 73 percent higher than the top 20 counties.

Figure 12 presents the absolute seasonally unadjusted April 2020 unemployment rates for the 10 worst counties and the 10 best counties. The range in April 2020 unemployment rates goes from 19.3 in Dare and Swain Counties to 8.1 percent in Bertie County. Again, the difference from top to bottom is more than double.

Table 27 presents the seasonally unadjusted unemployment rates for the 20 North Carolina counties with the highest unemployment rates in April 2020. The North Carolina state seasonally unadjusted unemployment rate for April 2020 was 12.5 percent. In all, 42 counties had unemployment rates in April 2020 above the state's 12.5 percent. Dare and Swain Counties fared the worst with April 2020 seasonally unadjusted unemployment rates of 19.3 percent. Dare County experienced an even

Figure 11[70]



higher unemployment rate in March of 24.1 percent. The last two columns of Table 27 present the 12-month change in each county's seasonally unadjusted unemployment rate, which helps to account for the seasonal variation. In this measure, Swain County had the largest 12-month increase in their unemployment rate of 15.3 percent points. In comparison, the North Carolina seasonally unadjusted rate in April of 2020 was 9.0 percentage points.

Table 27 also presents the 12-month October 2020 unemployment rate change. The 20 counties with the highest unemployment rate spike in April 2020 are still, for the most part, suffering as the recovery has begun. For most of the worst impacted counties, their October 2020 unemployment rate is still 3 to 4 percentage points higher than their October 2019 unemployment rate.

Figure 12[71]

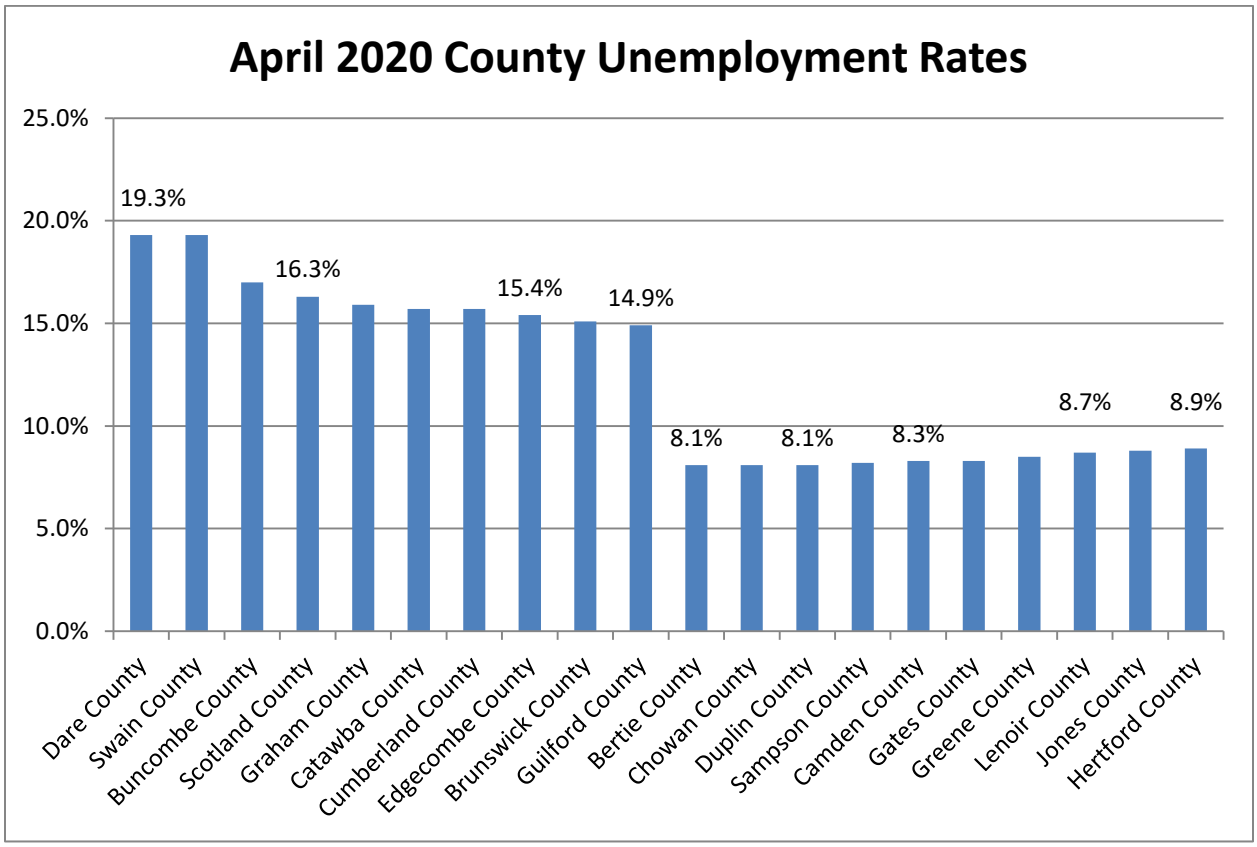


Table 28 presents the North Carolina counties whose seasonally unadjusted unemployment rates that were least affect by the Covid-19 downturn. Bertie, Chowan, and Duplin Counties all had a seasonally unadjusted April unemployment rates that were 8.1 percent. These rates were more than 50 percent lower than the North Carolina April 2020 seasonally unadjusted rate of 12.5 percent. In fact, 58 of the 100 North Carolina counties had April 2020 unemployment rates at or below the overall state rate of 12.5 percent. More importantly the 20 counties presented in Table 28 all had September 2020 unemployment rates that were either one or two percentage points above their September 2019 unemployment rate.

Table 27[72]

		Seasonally Unadjusted Unemployment Rate				12-Month Change in Unemployment	
Rank	**County**	**February**	**March**	**April**	**October**	**April**	**October**
1	Dare County	7.6	24.1	19.3	6.6	14.8	2.6
2	Swain County	5.0	14.6	19.3	5.8	15.3	1.8
3	Buncombe County	3.4	17.7	17.0	7.4	14.3	3.5
4	Scotland County	7.5	14.2	16.3	12.0	10.4	4.2
5	Graham County	6.3	13.9	15.9	7.5	11.0	2.5
6	Catawba County	4.0	18.7	15.7	7.2	12.5	2.9
7	Cumberland County	5.6	14.8	15.7	9.4	11.1	3.7
8	Edgecombe County	6.2	13.3	15.4	11.2	9.7	4.4
9	Brunswick County	5.8	17.3	15.1	7.8	10.4	2.3
10	Guilford County	4.5	14.7	14.9	8.3	11.2	3.6
11	Haywood County	3.9	14.7	14.8	6.8	11.7	2.8
12	Rutherford County	5.7	14.0	14.8	8.3	10.4	2.9
13	Rowan County	4.5	14.2	14.7	7.3	11.1	2.7
14	Jackson County	4.5	11.6	14.6	5.8	10.8	1.6
15	Caldwell County	4.2	16.0	14.4	7.5	10.7	2.9
16	Rockingham County	4.9	15.5	14.4	7.7	10.4	2.8
17	Vance County	6.1	12.3	14.4	10.1	9.2	3.7
18	Hyde County	12.5	14.4	14.2	7.7	6.1	-2.8
19	Cherokee County	4.9	11.7	14.1	6.8	10.1	1.9
20	Gaston County	4.4	13.7	14.1	7.7	10.6	3.3

In addition to significant differences in county unemployment rates, the Covid-19 downturn has also affected employment and wage levels in North Carolina counties. Table 28 presents monthly employment data from the Quarterly Census of Employment and Wages (QCEW), which is the most comprehensive county level employment series. The Table ranks the bottom 20 counties in North Carolina by job loss between March and April 2020. Dare County lost almost 25 percent of the county's jobs in one month between March and April 2020. This accounted for 4,228 jobs of the 17,124 jobs in March 2020. Both Alexander and Watauga Counties lost approximately 20 percent of their jobs during the one-month decline. Overall, North Carolina lost 11.38 percent of the state's jobs in one month, a total of 496,846. To put the job loss in perspective it took seven years, from March 2013 to March 2020 for the state's economy to generate almost 500,000 new jobs. In one month, the Covid-19 recession wiped out seven years of job growth.

Table 28[73]

		Seasonally Unadjusted Unemployment Rate				12- Month Change in Unemployment	
Rank	**County**	**February**	**March**	**April**	**September**	**April**	**September**
1	Bertie County	5.8	6.3	8.1	6.3	3.5	2.0
2	Chowan County	4.6	7.8	8.1	5.8	3.5	1.7
3	Duplin County	4.4	7.2	8.1	5.1	4.4	1.6
4	Sampson County	4.3	7.2	8.2	5.4	4.7	2.0
5	Camden County	4.2	8.7	8.3	4.8	4.8	1.6
6	Gates County	4.6	7.3	8.3	5.4	4.5	1.8
7	Greene County	4.0	7.7	8.5	5.8	5.0	2.5
8	Lenoir County	4.1	6.9	8.7	6.2	5.2	2.8
9	Jones County	4.1	8.6	8.8	5.5	5.2	2.2
10	Hertford County	5.7	6.9	8.9	6.8	4.2	2.2
11	Pamlico County	4.2	8.4	8.9	5.4	5.3	2.1
12	Orange County	3.5	8.2	9.0	5.0	6.1	2.2
13	Beaufort County	5.0	8.2	9.1	6.3	4.8	2.2
14	Chatham County	3.7	8.5	9.1	5.2	6.0	2.3
15	Northampton County	6.1	7.5	9.2	7.2	4.6	2.4
16	Avery County	4.4	10.3	9.5	5.1	5.8	2.1
17	Granville County	3.7	9.1	9.6	5.6	6.5	2.6
18	Perquimans County	5.5	10.0	9.7	6.0	5.0	1.6
19	Bladen County	5.4	8.9	9.8	6.7	5.4	2.4
20	Martin County	5.3	8.5	9.8	7.1	4.9	2.6

Table 29 presents the 20 North Carolina counties that lost the fewest jobs, by percentage, between March and April 2020. Employment in Hyde County was only down by 15 jobs, which resulted in a less than one percent drop in employment. All these counties are fairly small and don't have a large employment base in the industries most affected by the shutdown requirements.

Table 30 presents the top 5 total employment North Carolina counties. Three of the top five employment counties suffered larger percentage drops in their employment levels that the state overall. Guilford County experienced the largest percent drop of 12.65 percent. Mecklenburg County, the state's highest employment county, lost almost 82,000 jobs in one month. Only Durham County, of the state's five top employment counties, fared well. It lost 8.44 percent of its jobs in one month. Because a large percent of Durham's total employment is in the Research

Triangle Park, a greater percentage of Durham's workers were able to work remotely and therefor fewer lost their jobs.

Table 28[74]

Rank	County	March	April	Lost Jobs	March-April Decline
1	Dare	17,124	12,896	-4,228	-24.69%
2	Alexander	9,273	7,315	-1,958	-21.12%
3	Watauga	23,149	18,543	-4,606	-19.90%
4	Yadkin	9,875	8,007	-1,868	-18.92%
5	Buncombe	132,586	107,516	-25,070	-18.91%
6	Moore	36,572	30,804	-5,768	-15.77%
7	New Hanover	117,988	99,548	-18,440	-15.63%
8	Carteret	23,348	19,702	-3,646	-15.62%
9	Davie	12,974	10,997	-1,977	-15.24%
10	Catawba	87,943	74,954	-12,989	-14.77%
11	Randolph	45,023	38,471	-6,552	-14.55%
12	Burke	30,088	25,848	-4,240	-14.09%
13	Cabarrus	77,822	66,899	-10,923	-14.04%
14	Cherokee	8,149	7,021	-1,128	-13.84%
15	Currituck	6,471	5,579	-892	-13.78%
16	Haywood	17,458	15,061	-2,397	-13.73%
17	Brunswick	33,735	29,149	-4,586	-13.59%
18	Iredell	77,535	67,244	-10,291	-13.27%
19	Henderson	40,275	34,946	-5,329	-13.23%
20	Gaston	73,545	63,848	-9,697	-13.19%
	North Carolina	4,367,302	3,870,456	-496,846	-11.38%

In addition to localized difference in jobs losses, North Carolina's counties also suffered from disparate financial burdens. Table 31 presents the bottom 20 North Carolina counties that experienced the largest percentage decline in sales tax revenue for the first eight months of calendar year 2020 compared to the county's sales tax collections during the twelve months of 2019. Not surprisingly, Dare County had the largest percent decline, which is consistent with Dare County having the highest unemployment rate of all North Carolina counties in April 2020 as well as having the largest percentage job losses. The counties identified by an asterisk next to

Table 29[75]

Rank	County	March	April	Lost Jobs	March-April Decline
1	Hyde	1,533	1,518	-15	-0.98%
2	Bertie	5,552	5,426	-126	-2.27%
3	Gates	1,685	1,619	-66	-3.92%
4	Warren	3,023	2,896	-127	-4.20%
5	Sampson	18,071	17,258	-813	-4.50%
6	McDowell	15,927	15,150	-777	-4.88%
7	Richmond	13,538	12,854	-684	-5.05%
8	Hertford	9,195	8,717	-478	-5.20%
9	Lenoir	28,542	27,048	-1,494	-5.23%
10	Columbus	15,368	14,539	-829	-5.39%
11	Washington	3,195	3,021	-174	-5.45%
12	Granville	20,903	19,745	-1,158	-5.54%
13	Beaufort	15,575	14,686	-889	-5.71%
14	Greene	4,508	4,242	-266	-5.90%
15	Duplin	18,954	17,805	-1,149	-6.06%
16	Hoke	8,594	8,070	-524	-6.10%
17	Caswell	2,995	2,811	-184	-6.14%
18	Yancey	4,404	4,132	-272	-6.18%
19	Camden	1,221	1,142	-79	-6.47%
20	Chowan	4,646	4,338	-308	-6.63%
	North Carolina	4,367,302	3,870,456	-496,846	-11.38%

Table 30[76]

Rank	County	March	April	Lost Jobs	March-April Decline
21	Guilford	286,005	249,822	39,183	-12.65%
29	Forsyth	190,881	168,756	22,125	-11.59%
30	Wake	571,052	504,977	66,075	-11.57%
35	Mecklenburg	723,382	641,413	81,969	-11.33%
67	Durham	219,557	201,029	18,528	-8.44%

the county name all have leisure and hospitality employment percentages above 12.5 percent of total employment (state average). These counties suffered the most during the government-mandated shutdown. What is also interesting is that the state's five largest counties show up among the 20 counties with the largest percentage decline in sales tax revenue. These counties

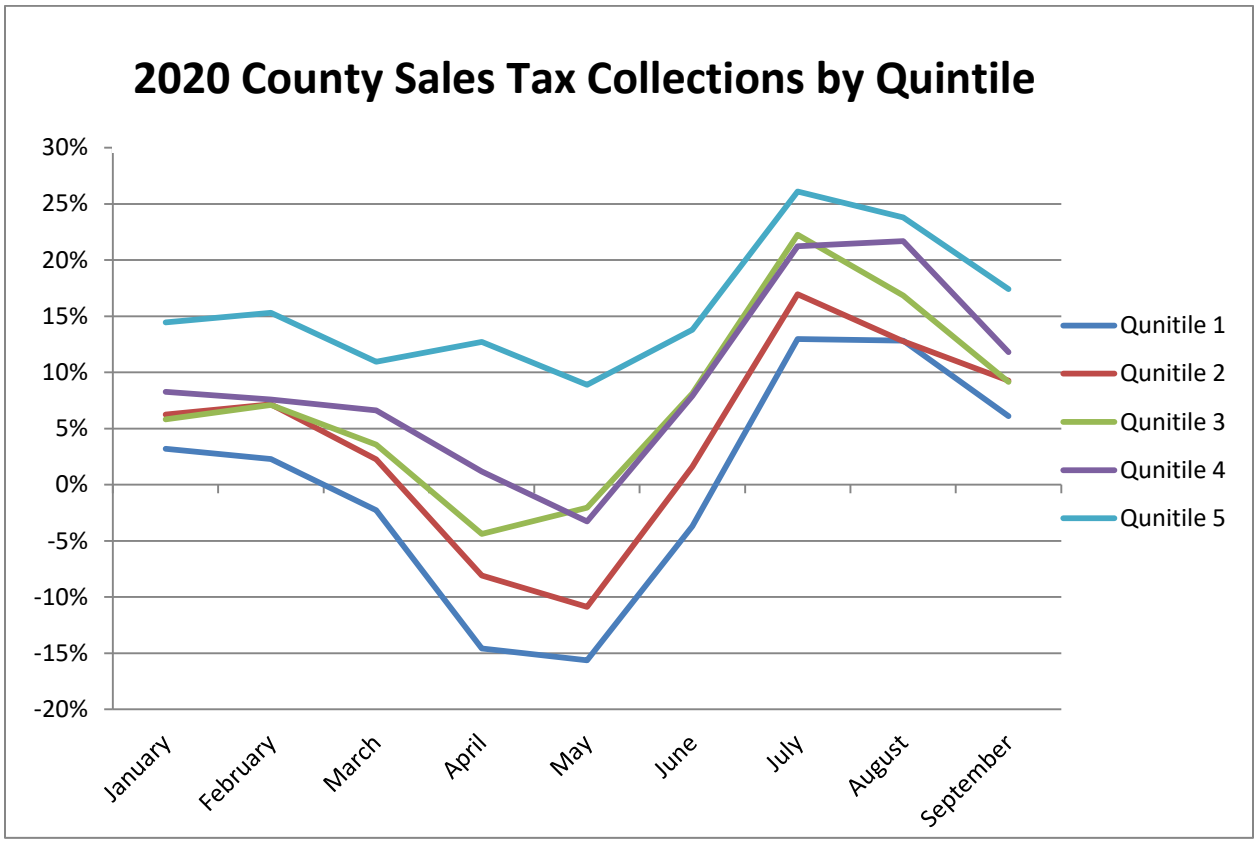
have large retail sectors and provide destination shopping for much of the state's population. As a result of the shutdown, brick and mortar retail was also adversely impacted.

Table 31[77]

Rank	County	April	May	August	September	2020 Shortfall	Percent Increase/Decrease
1	Dare*	(801595)	(2772708)	615,674	(10174255)	(12659822)	-16.14%
2	Buncombe*	(4551847)	(6285659)	(1088706)	(19713015)	(33907780)	-12.34%
3	Carteret*	(813766)	(1538510)	788,271	(6166693)	(8173941)	-12.27%
4	Guilford	(4927683)	(7650178)	(886324)	(31684568)	(46990160)	-12.08%
5	New Hanover*	(3734808)	(6115605)	303,001	(19052432)	(30235465)	-11.98%
6	Watauga*	(314869)	(1166646)	149,621	(4450644)	(4883668)	-10.48%
7	Durham	(2779130)	(7050139)	62,725	(29916797)	(39949873)	-10.40%
8	Wake	(7580739)	(14812248)	2,025,283	(80747689)	(86226765)	-8.85%
9	Mecklenburg	(13786659)	(21494777)	(2336228)	(75528054)	(100328431)	-8.64%
10	Halifax*	(130937)	(173632)	238,555	(953083)	(2164883)	-8.05%
11	Forsyth	(1825955)	(4884879)	3,559,317	(23556561)	(21742498)	-7.81%
12	Cabarrus	(2170299)	(3139011)	1,059,744	(12003962)	(13064009)	-7.35%
13	Washington	(18305)	(39197)	79,247	(380874)	(285234)	-6.86%
14	Macon*	(220140)	(501654)	249,366	(1975438)	(1805577)	-6.53%
15	Wayne	(576008)	(317763)	792,239	(5377181)	(3994204)	-6.25%
16	Onslow*	(1416387)	(599834)	1,434,673	(8641846)	(7152261)	-6.08%
17	Catawba	(1559789)	(1581307)	1,040,631	(6799141)	(6780103)	-5.62%
18	Rutherford	(240193)	(417980)	431,116	(2547448)	(1696153)	-5.29%
19	Robeson	(706557)	(184633)	775,605	(3430624)	(2720322)	-4.89%
20	Moore*	34,266	(1126045)	851,755	(5793925)	(3382301)	-4.80%

Figure 13 presents the 2020 monthly county sales tax collections 12-month percent change in five quintile groups. The groups are based on the 12-month percentage change between April 2019 and April 2020. The top 20 counties, while experiencing a decline in their 12-month revenue trend in April 2020, nevertheless, had, on average, a positive increase in their April sales tax revenue compared to the April 2019 level. The bottom 20 counties experienced a completely different sales tax revenue trend. On average, in April 2020 the bottom 20 counties saw a 12-month percentage decline of 14.6 percent in April 2020 and 15.6 percent in May 2020 compared to their collection levels in April and May 2019. In fact, on average, the bottom 20 counties experienced lower sales tax collection in April and May 2020 compared to the same months in 2019.

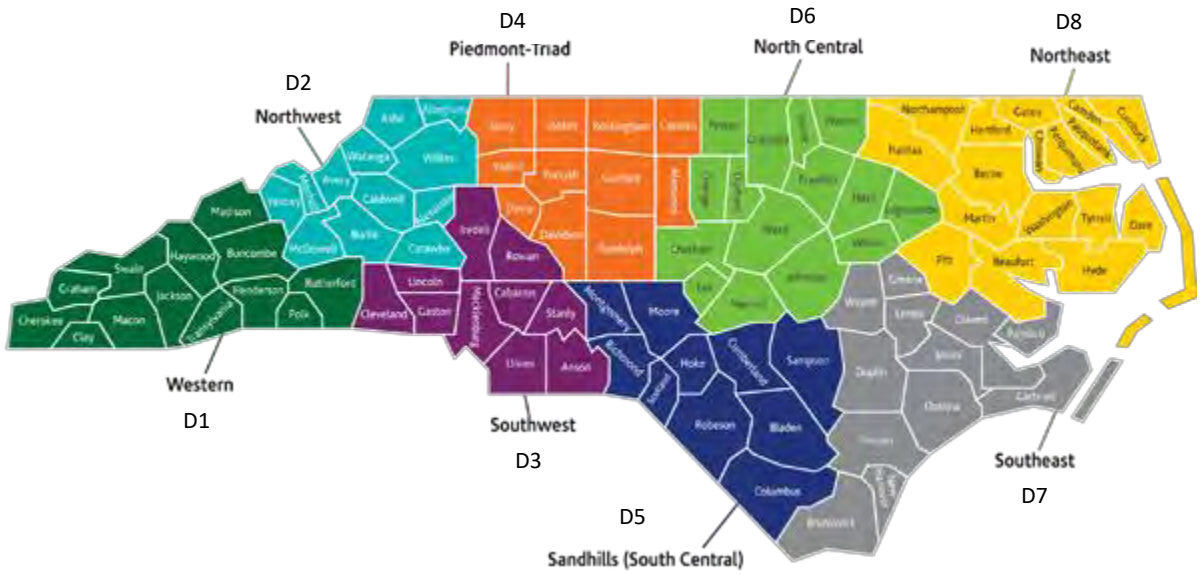
Figure 13[78]



Statistical Analysis

Figure 14 presents the eight North Carolina Prosperity Zones. These zones were established to provide each area with a "one-stop" physical location for economic development, transportation, and state interaction purposes. In addition to providing the name for each zone, the map also identifies the regional fixed effects variable identifier for the regression results presented later in this section.

Figure 14



Unemployment Regression

The following regression was run to determine the statistical relationship between the rise in county unemployment between April of 2019 and April of 2020.

$$MUNE_i = B_1LH_i + B_2\,RT_i + C_3DEN_i + B_4D1_i + B_5D2_i + B_6D3_i + B_7D4_i + B_8D5_i + B_9D6_i + B_{10}D7_i + B_{11}D8_i + \varepsilon_i$$

where, for county i:

MUNE = is the difference in a county's unemployment rate between April 2019 and April 2020;

LH = is the percent of total employment in the leisure and hospitality industry in February 2020;

RT = is the percent of total employment in the retail trade industry in February 2020;

DEN = is the county's population per square mile in 2019;

D1 = A regional dummy with a value of 1 if the county is in the Western Prosperity Zone and 0 otherwise;

D2 = A regional dummy with a value of 1 if the county is in the Northwestern Prosperity Zone and 0 otherwise;

D3 = A regional dummy with a value of 1 if the county is in the Southwestern Prosperity Zone and 0 otherwise;

D4 = A regional dummy with a value of 1 if the county is in the Piedmont Triad Prosperity Zone and 0 otherwise;

D5 = A regional dummy with a value of 1 if the county is in the Sandhills Prosperity Zone and 0 otherwise;

D6 = A regional dummy with a value of 1 if the county is in the North Central Prosperity Zone and 0 otherwise;

D7 = A regional dummy with a value of 1 if the county is in the Southeast Prosperity Zone and 0 otherwise;

D8 = A regional dummy with a value of 1 if the county is in the Northeast Prosperity Zone and 0 otherwise.

Table 32 presents the cross-section regression results for the 100 North Carolina counties. The regression has an R^2 value of 0.42 and an *F*-statistic that tests significant at the 0.01 level. The coefficient on the percent of total employment in the leisure and hospitality industry tests significant at the 0.05 level and has a positive sign indicating that counties with a greater percentage of their work force in the leisure and hospitality industries experienced in increase in their relative level of unemployment between April of 2019 and April of 2020. The percent of a county's workforce in retail trade does not test significant. The county's population per square mile variable tests significant at the 0.05 level and indicates that as a county's density increases the county experienced an increase in its relative level of unemployment between April of 2019 and April of 2020.

The Prosperity Zone dummy variables all test significant at the 0.01 level and provide an interesting regional take on county unemployment rate changes during the Covid-19 lockdown. D8 is the dummy for counties in the Northeast Prosperity Zone which on average had the smallest increase in their unemployment rates between April of 2019 and April of 2020. A coefficient of 4.1720 indicates that on average the counties in the Northeast Prosperity Zone experienced a 4.17 percentage point increase in their April 2020 unemployment rate compared to April 2019. Counties in the Western Prosperity Zone on average experienced the greatest increase in their April 2020 unemployment rate compared to their April 2019 unemployment

rate. Western Prosperity Zone counties on average saw their April 2020 unemployment rate increase by almost 7.6 percentage points compared to April 2019. The range between the least impacted counties (Northeast Prosperity Zone) and the most impacted counties (Western Prosperity Zone) was over 3.4 percentage points.

Table 32

LS // Dependent Variable is MUNE
Included observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LH	0.1957	0.080576	2.428606	0.0172
RT	0.0003	0.075407	0.004463	0.9964
DEN	0.0016	0.000733	2.180910	0.0318
D1	7.5763	1.017206	7.448177	0.0000
D2	6.5913	0.936489	7.038335	0.0000
D3	6.3758	1.026703	6.209968	0.0000
D4	7.2210	0.960951	7.514388	0.0000
D5	6.0290	0.925399	6.515055	0.0000
D6	5.8774	0.917152	6.408345	0.0000
D7	4.3641	1.019257	4.281650	0.0000
D8	4.1720	0.887026	4.703318	0.0000
R-squared	0.4227	Mean dependent var		8.1240
Adjusted R-squared	0.3578	S.D. dependent var		2.3921
S.E. of regression	1.9170	F-statistic		6.5158
Sum squared resid	327.0591	Prob(F-statistic)		0.0000
Durbin-Watson stat	2.2218			

Sales Tax Regression

The following regression was run to determine the statistical relationship to explain the reduction in county sales tax collections for the first nine months of 2020 compared to the first nine months of 2019. The explanatory variables are the same used in the county unemployment regression.

$$ST_i = B_1LH_i + B_2 RT_i + C_3DEN_i + B_4D1_i + B_5D2_i + B_6D3_i + B_7D4_i + B_8D5_i + B_9D6_i + B_{10}D7_i + B_{11}D8_i + e_i$$

where, for county i:

ST = is the percentage change in a county's sales tax collections for the first nine months of 2010 compared to the first nine months of 2019 April 2019;

LH = is the percent of total employment in the leisure and hospitality industry in February 2020;

RT = is the percent of total employment in the retail trade industry in February 2020;

DEN = is the county's population per square mile in 2019;

D1 = A regional dummy with a value of 1 if the county is in the Western Prosperity Zone and 0 otherwise;

D2 = A regional dummy with a value of 1 if the county is in the Northwestern Prosperity Zone and 0 otherwise;

D3 = A regional dummy with a value of 1 if the county is in the Southwestern Prosperity Zone and 0 otherwise;

D4 = A regional dummy with a value of 1 if the county is in the Piedmont Triad Prosperity Zone and 0 otherwise;

D5 = A regional dummy with a value of 1 if the county is in the Sandhills Prosperity Zone and 0 otherwise;

D6 = A regional dummy with a value of 1 if the county is in the North Central Prosperity Zone and 0 otherwise;

D7 = A regional dummy with a value of 1 if the county is in the Southeast Prosperity Zone and 0 otherwise;

D8 = A regional dummy with a value of 1 if the county is in the Northeast Prosperity Zone and 0 otherwise.

Table 33 presents the cross-section regression results for the 100 North Carolina counties. The regression has an R^2 value of 0.28 and an *F*-statistic that tests significant at the 0.01 level. Unlike the unemployment regression the coefficient on the percent of total employment in the leisure and hospitality industry tests insignificant at the 0.05 level but has a negative sign indicating that counties with a greater percentage of their work force in the leisure and hospitality industries experienced a decrease in their relative sales tax collection during the first nine months of 2010 compared to the first nine months of 2019. Similar to the unemployment regression the percent of a county's workforce in retail trade does not test significant. The county's population per square mile variable test significant at the 0.05 level and indicates that as a county's density increases the county experienced a negative impact on its sales tax collections during the first nine months of 2020 compared to the first nine months of 2019.

The Prosperity Zone dummy variables all test significant at the 0.01 level and provide and like the unemployment regression provide an interesting regional take on changes in sales tax collections during the first nine months of 2020. D7 is the dummy for counties in the Southeast Prosperity Zone which on average had the smallest impact on the sales tax collections during the first nine months of 2020 compared to the first nine months of 2019. Counties in the North Central Prosperity Zone experienced on average the greatest impact in their sales tax collections during the first nine months of 2020. What is significant is that like the unemployment regression, the sales tax regression suggests that there has been a significant difference in the regional impacts of the Covid-19 recession.

Table 33

LS // Dependent Variable is ST
Included observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LH	-0.5194	0.534744	-0.971275	0.3340
RT	-0.3188	0.500439	-0.637088	0.5257
DEN	-0.0206	0.004863	-4.235693	0.0001
D1	29.1365	6.750719	4.316055	0.0000
D2	28.3153	6.215037	4.555938	0.0000
D3	31.3038	6.813744	4.594208	0.0000
D4	26.9836	6.377379	4.231144	0.0001
D5	26.5159	6.141439	4.317544	0.0000
D6	32.6568	6.086707	5.365262	0.0000
D7	18.1713	6.764327	2.686339	0.0086
D8	26.1087	5.886773	4.435148	0.0000

R-squared	0.2822	Mean dependent var	14.1940
Adjusted R-squared	0.2015	S.D. dependent var	14.2375
S.E. of regression	12.7221	F-statistic	3.4990
Sum squared resid	14,404.8300	Prob(F-statistic)	0.0006
Durbin-Watson stat	2.3001		

Rank Order Correlation

A Spearman Rank Order Correlation test was conducted to determine if there was a correlation between increased unemployment rates (April 20219 vs. April 2020) and loss of local sales tax revenue. The formula used to conduct the Spearman test is:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Where:

$\rho =$ The Spearman Correlation coefficient between 0 and 1

d_i = The difference between a county's sales tax ranking and unemployment ranking for county i

n = The number of counties (100)

The calculated value for the Spearman Rank Order Correlation was 0.0913. This indicates that there is virtually no correlation in county ranks of loss in sales tax revenue and increased unemployment rates. The lack of correlation is likely due to two factors. First, North Carolina allocates 1 percentage point of local sales tax revenue based on population and not point of sales. Second, the unemployment rate is based on place of residence not place of work.

Table 34

County	Sales Tax Rank	Unemployment Rank	County	Sales Tax Rank	Unemployment Rank
Alamance	17	32	Johnston	38	56
Alexander	96	12	Jones	1	86
Alleghany	76	78	Lee	66	39
Anson	49	73	Lenoir	31	87
Ashe	78	72	Lincoln	69	34
Avery	77	83	Macon	23	65
Beaufort	33	93	Madison	91	30
Bertie	85	99	Martin	45	91
Bladen	59	84	McDowell	70	44
Brunswick	36	19	Mecklenburg	9	22
Buncombe	2	3	Mitchell	35	55
Burke	41	20	Montgomery	39	74
Cabarrus	15	33	Moore	42	36
Caldwell	54	13	Nash	18	41
Camden	97	92	New Hanover	3	15
Carteret	8	79	Northampton	62	95
Caswell	68	38	Onslow	27	61
Catawba	16	4	Orange	13	81
Chatham	88	82	Pamlico	19	85
Cherokee	75	23	Pasquotank	60	62
Chowan	50	100	Pender	56	52
Clay	95	59	Perquimans	100	90
Cleveland	29	37	Person	34	31
Columbus	44	68	Pitt	32	71
Craven	11	64	Polk	61	67
Cumberland	25	7	Randolph	43	29
Currituck	74	43	Richmond	46	46
Dare	10	2	Robeson	22	69
Davidson	58	40	Rockingham	47	16

Davie	65	24	Rowan	40	8
Duplin	20	97	Rutherford	37	17
Durham	7	50	Sampson	67	94
Edgecombe	94	26	Scotland	63	18
Forsyth	21	27	Stanly	86	70
Franklin	92	54	Stokes	84	47
Gaston	52	14	Surry	48	53
Gates	99	96	Swain	80	1
Graham	64	9	Transylvania	55	75
Granville	73	76	Tyrrell	28	57
Greene	90	89	Union	79	66
Guilford	5	6	Vance	93	35
Halifax	6	58	Wake	14	45
Harnett	89	51	Warren	87	42
Haywood	51	5	Washington	24	88
Henderson	26	25	Watauga	12	48
Hertford	53	98	Wayne	30	77
Hoke	98	28	Wilkes	83	63
Hyde	4	80	Wilson	71	60
Iredell	57	21	Yadkin	81	11
Jackson	82	10	Yancey	72	49

Findings

In some respects, North Carolina's Covid-19 experience has been less burdensome than that of many states and in some measures more burdensome. Likewise, the regional (county) impacts have been quite different amongst counties depending mostly on their industry structure, size, and location.

Major North Carolina Findings

- North Carolina's unemployment rate has been consistently below the U.S. unemployment rate throughout the Covid-19 recession. The U.S. unemployment rate peaked at 14.7 percent in April while the North Carolina rate peaked at 12.9 percent.

- By October 2020, the U.S. unemployment rate had fallen to 6.9 percent while the North Carolina unemployment rate had fallen to 6.3 percent.

- North Carolina's unemployment rate in April 2020 ranked 25th, 1.8 percentage points below the U.S. rate indicating that the North Carolina economy was less severely impacted by the mandatory shutdowns that the average state.

- By October, North Carolina was ranked with the 29th lowest unemployment rate, indicating that while the downturn impacted the state's economy less than the average state; the recovery from the shutdowns has not been as strong as the average state.

- Overall, the North Carolina economy lost 571,500 jobs between March and April 2020. Like the U.S. the sector with the largest job loss was the hospitality and leisure industry down by 245,300 jobs between March and April 2020.

- Three other sectors had significant job losses led by educational and health services down by 66,400 jobs; business and professional services down by 53,400 jobs; and retail trade down by 52,300 jobs. Overall, these four sectors accounted for 73.1 percent of the total jobs lost by the North Carolina economy in the month of April 2020.

- The North Carolina state seasonally unadjusted unemployment rate for April 2020 was 12.5 percent. In all, 42 counties had unemployment rates in April 2020 above the state's 12.5 percent. Dare and Swain Counties fared the worst with April 2020 seasonally unadjusted unemployment rates of 19.3 percent.

- North Carolina lost 11.38 percent of the state's jobs in one month, a total of 496,846. To put the job loss in perspective it took seven years, from March 2013 to March 2020 for the state's economy to generate almost 500,000 new jobs. In one month, the Covid-10 recession wiped out seven years of job growth.

Major North Carolina County Findings

- Bertie, Chowan, and Duplin Counties all had a seasonally unadjusted April 2020 unemployment rates that were 8.1 percent. These rates were more than 50 percent lower than the State April 2020 seasonally unadjusted rate of 12.5 percent. In fact, 58 of the 100 North Carolina counties had April 2020 unemployment rates at or below the overall state rate of 12.5 percent.

- Dare County lost almost 25 percent of the county's jobs in one month between March and April 2020. This accounted for 4,228 jobs of the 17,124 jobs in March 2020. Both Alexander and Watauga Counties lost approximately 20 percent of their jobs during the one-month decline.

- Three of the top five employment counties suffered larger percentage drops in their employment levels that the state overall. Guilford County experienced the largest percent drop of 12.65 percent. Mecklenburg County, the state's highest employment county, lost almost 82,000 jobs in one month. Only Durham County, of the state's five top employment counties, fared well. It lost 8.44 percent of its jobs in one month.

- Dare County had the largest percent decline in sale tax collections between April 2019 and April 2020, which is consistent with Dare County having the highest unemployment rate of all North Carolina counties in April and having the largest percentage job losses as well.

- The state's five largest counties show up among the 20 counties having the largest percentage decline in sales tax revenue. These counties have large retail sectors and

provide destination shopping for much of the state's population. As a result of the shutdown, brick and mortar retail was also adversely impacted.

- Statistical Analysis suggests that there has been a significant difference in the impact that counties have experienced based on their regional location

- Counties in the Western Prosperity Zone experienced on average experienced the greatest increase in their April 2020 unemployment rate compare to their April 2019 unemployment rate. Western Prosperity Zone counties on average saw their April 2020 unemployment rate increase by almost 7.6 percentage points compared to April 2019.

- Counties in the North Central Prosperity Zone experienced on average experienced the greatest impact in their sales tax collections during the first nine months of 2020.

- While regional location has had significant impacts on increased unemployment rate and decreased sales tax collections, there appear to be no statistical correlation between the two impacts.

End Notes

[1] https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_the_United_States

[2] https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_the_United_States

[3] Valleron AJ, Cori A, Valtat S, Meurisse S, Carrat F, Boëlle PY (May 2010). "Transmissibility and geographic spread of the 1889 influenza pandemic". Proceedings of the National Academy of Sciences of the United States of America. **107** (19): 8778–81

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