

The Effects of COVID-19 on the Transportation Sector in Louisiana: Looking Back and Moving Forward

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Executive Summary

The global COVID-19 pandemic has shifted, and continues to shift, our behavior across all aspects of our lives in ways that would have been difficult to imagine in 2019. We've experienced stay-at-home orders, mask mandates, school closures, case surges, vaccines, virus variants, and the loss of more than 625,000 lives in the United States alone as of August 2021.² Examining the transportation sector can provide us with valuable insights into the economic and social disruption caused by the pandemic, how we've adjusted the way we live and work, and what changes may become permanent. In this white paper, I will explore how the movement of people and goods has evolved over the course of the pandemic with a focus on Louisiana.



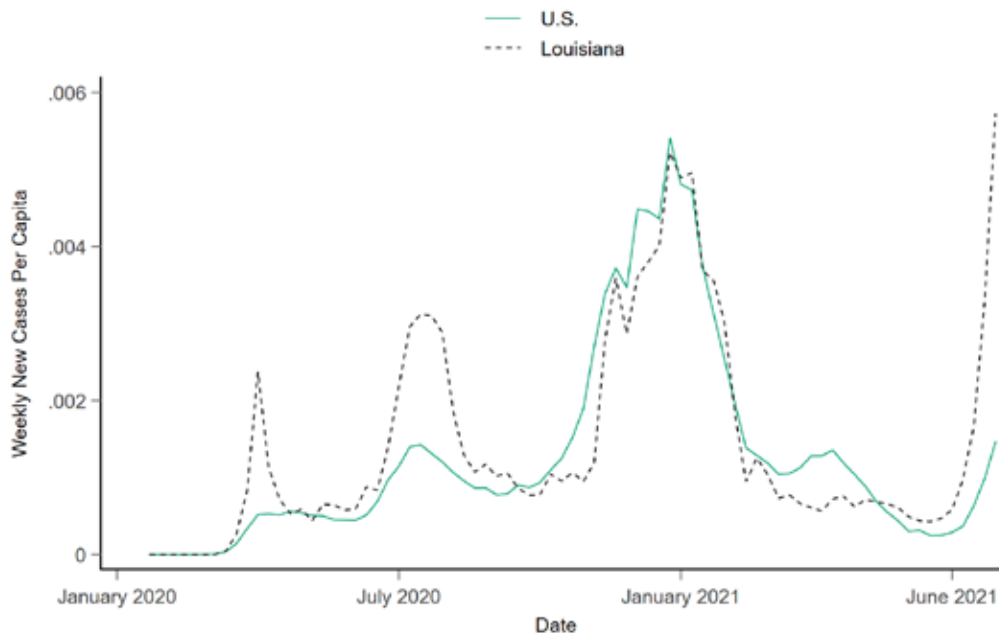
² See <https://covid.cdc.gov/covid-data-tracker/#datatracker-home> for up to date data on cases, deaths, and vaccination rates.

1 | Background

The discovery of a novel coronavirus causing a pneumonia-like illness in early 2020 marked the beginning of the COVID-19 pandemic (WHO 2021). The pandemic has caused massive upheaval in Louisiana and around the globe, affecting our health, economic well-being, environment, and even how we are able to safely socialize. Many aspects of our daily lives have changed since the start of the pandemic. These changes haven't always followed a linear process, as local and national regulations and guidance have fluctuated frequently as we learn more about the virus and infection rates rise and fall. Gauging the movement— or lack thereof—of people and goods over space throughout the pandemic can help us better understand the implications of COVID-19 and develop insights into what we can expect moving forward. The transportation sector, being both a driver and historic measure of economic activity, provides a natural backdrop to study some aspects of the pandemic.

To begin, it is important to outline the evolution of the COVID-19 pandemic to date. Figure 1 depicts the weekly new cases of COVID-19 per capita in the U.S. and Louisiana from January 2020 to early August of 2021. The four large increases in cases—with the fourth still increasing at the time of writing—have become known as COVID waves. These waves correspond to a worsening of the pandemic, and, with the exception of the third wave, Louisiana has thus far experienced far more cases per capita than the U.S. average in each wave. Indeed, Louisiana was an early hotbed for COVID-19 cases, potentially fueled by Mardi Gras 2020 coinciding with the beginning of the pandemic (Gee 2020).³

Figure 1: Weekly New Cases Per Capita



Notes: Figure depicts the weekly new cases per capita in the U.S. and Louisiana.

Source: Center for Disease Control and Prevention. <https://data.cdc.gov/Case-Surveillance/United-States-COVID-19-Cases-and-Deaths-by-State-o/9mfq-cb36/data>

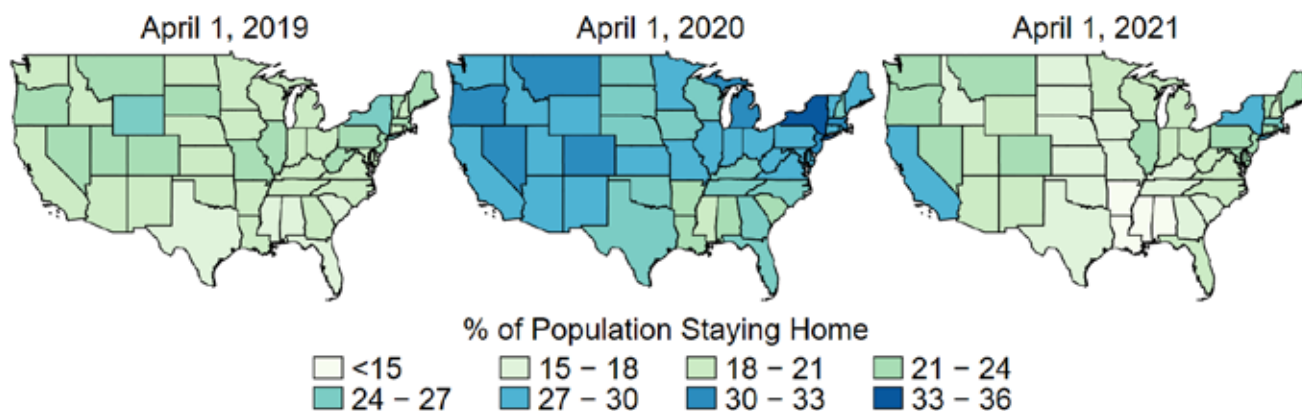
In response to increasing cases, many governors and mayors began to issue stay-at-home orders. In Louisiana, Governor John Bel Edwards issued an initial stay-at-home order from March 23, 2020, to

³ See also <https://www.nbcnews.com/news/us-news/new-orleans-epicenter-coronavirus-mardi-gras-could-be-b-and> and https://www.nola.com/news/coronavirus/article_e4095910-6af1-11eb-a3bc-336456794a5b.html

April 13, 2020, (though it would ultimately be extended) (State of Louisiana 2020). With restrictions on large gatherings already in place and many institutions (e.g., public schools) having been shut down just 10 days earlier in Louisiana, the movement of people rapidly declined, with similar measures and effects across the country.

Figure 2 depicts state-level measures of the percent of the population staying home on April 1 of 2019, 2020, and 2021 to assess how response to the pandemic varied across the country and over time. April 1, 2019, serves as a baseline for comparison as some share of individuals will not leave the home on a given day for various reasons (e.g., retirement, unemployed, day off from work, illness, etc.). Across the country, the share of the population staying at home increased dramatically in 2020 and dropped back closer to the baseline in April 2021, when COVID cases were largely declining across the nation. The change in the population staying at home in 2020 appears to be lower than average in Louisiana, a statistic that may be influenced by employment in the state (e.g., a high share of individuals being essential workers), political preferences, or other factors.

Figure 2: Percent of Population Staying Home across U.S.



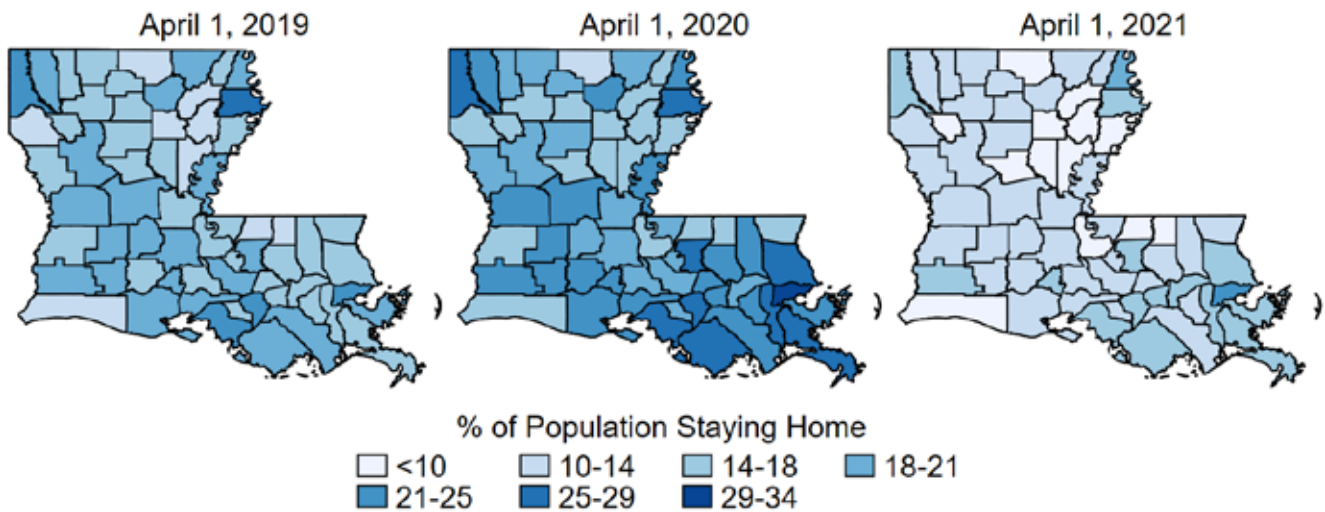
Notes: Figure depicts the percent of the population in each state staying home on the first day of April in 2019, 2020, and 2021.

Source: Bureau of Transportation Statistics. <https://data.bts.gov/Research-and-Statistics/Trips-by-Distance/w96p-f2qv>

Figure 3 delves deeper into how Louisianans responded to the pandemic by examining parish-level measures of the percent of the population staying at home on April 1 of 2019, 2020, and 2021. A pattern similar to that of Figure 2 arises here as well. A large increase in staying at home occurs between 2019 and 2020 with a drop in staying at home in 2021 (to levels largely below 2019). The largest increases in staying at home in Louisiana appear to be in more urban areas.

The stay-at-home orders and the pandemic more broadly have had significant economic consequences. With businesses temporarily—or permanently—closing their doors and employees losing work or becoming ill with COVID, national GDP plummeted. This can be seen easily in Figure 4 which plots U.S. seasonally adjusted annual rates of GDP in trillions of dollars. GDP, which had been steadily rising, fell significantly in early 2020 before quickly rebounding and continuing an upward trend. This “V”-shaped recession would suggest that the effects of the pandemic were short lived, but, as will be seen in the following sections, the pandemic has had significant and long-lasting effects on our behavior.

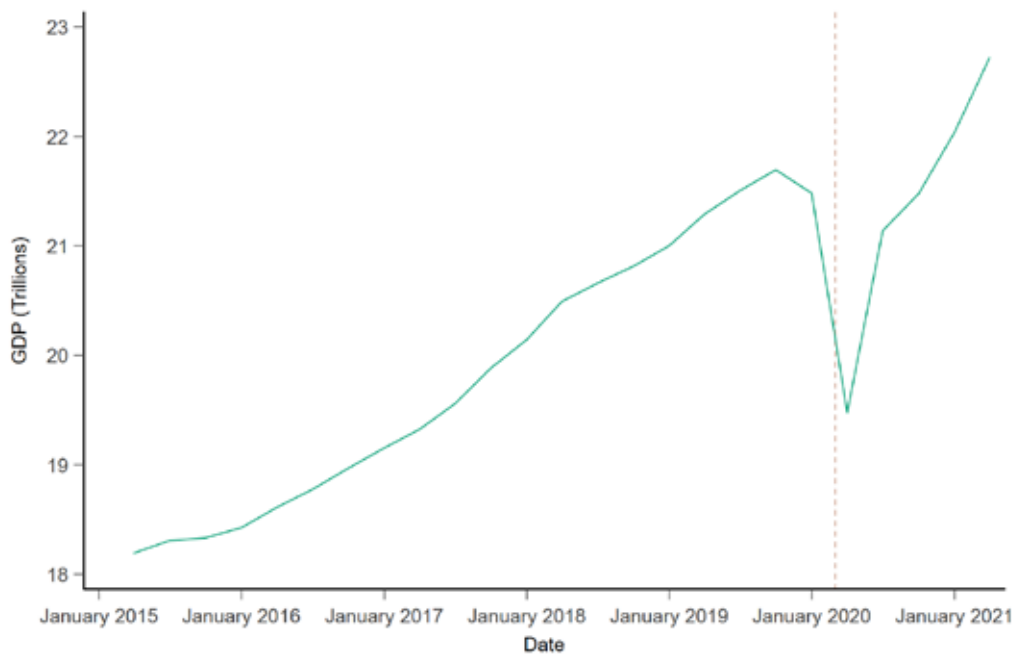
Figure 3: Percent of Population Staying Home across Louisiana



Notes: Figure depicts the percent of the population in each parish in Louisiana staying home on the first day of April in 2019, 2020, and 2021.

Source: Bureau of Transportation Statistics. <https://data.bts.gov/Research-and-Statistics/Trips-by-Distance/w96p-f2qv>

Figure 4: U.S. GDP



Notes: Figure depicts U.S. GDP in trillions of dollars. Values are seasonally adjusted annual rates. Vertical line denotes March 2020.

Source: Bureau of Economic Analysis. <https://www.bea.gov/data/gdp/gross-domestic-product>

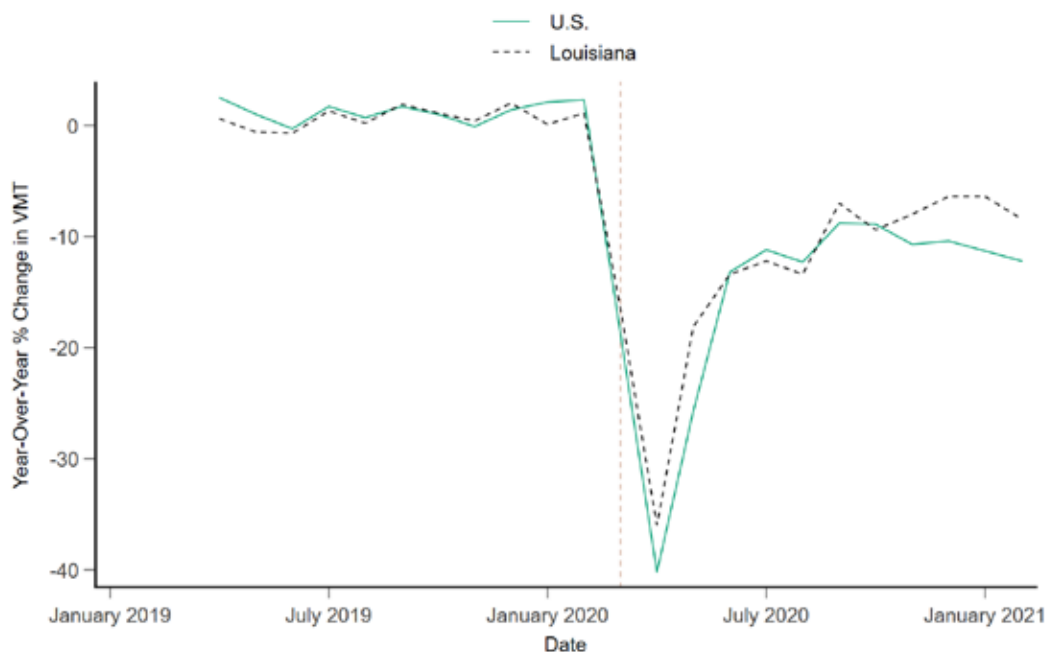
These figures of course only scratch the surface of the effects of the pandemic, but examining GDP and the share of the population staying at home provides a useful jumping off point to explore the ripple effects of the pandemic. I next explore some of the effects of the pandemic on local passenger vehicle travel before examining effects on air transportation and tourism—proxies for travel between regions—and finally freight transportation.

2 | Local Transport

Not surprisingly, the start of the pandemic coincided with a dramatic drop in vehicle miles traveled (VMT) in Louisiana and the U.S. more broadly. Figure 5 presents year-over-year changes in VMT—the change in VMT relative to 12 months prior (i.e. the percent change between January 2019 and January 2020). Monthly VMT fell almost 40% in April 2020. Roads were empty. Normally gridlocked streets flowed freely during rush hours, showing us how our lives could be without congestion.⁴ VMT has recovered, but continues to be significantly lower than pre-pandemic levels. VMT has remained about 10% lower in Louisiana and slightly lower still in the U.S. on average. Interestingly, VMT does not appear to have responded to subsequent COVID waves beyond the initial shock.

This drop in VMT and congestion may be sustainable going forward. As people began working from home and abiding by stay-at-home orders they took to the streets in new ways. Large modal shifts (particularly a decrease in public transit usage) were experienced, with many individuals opting to walk or bicycle, either for leisure or commuting trips (Zhang, Hayashi, and Frank 2021; Cusack 2021). The increase in active transportation and demand for outdoor dining was accompanied by temporary conversions of roadway and parking infrastructure, closing streets to car traffic and expanding pedestrian and bike infrastructure.⁵

Figure 5: Year-Over-Year % Changes in VMT



Notes: Figure depicts the year-over-year percentage change in vehicle miles traveled (i.e., the change relative to the same month-of-the-year in the prior year) in the U.S. and Louisiana. Vertical line denotes March 2020.

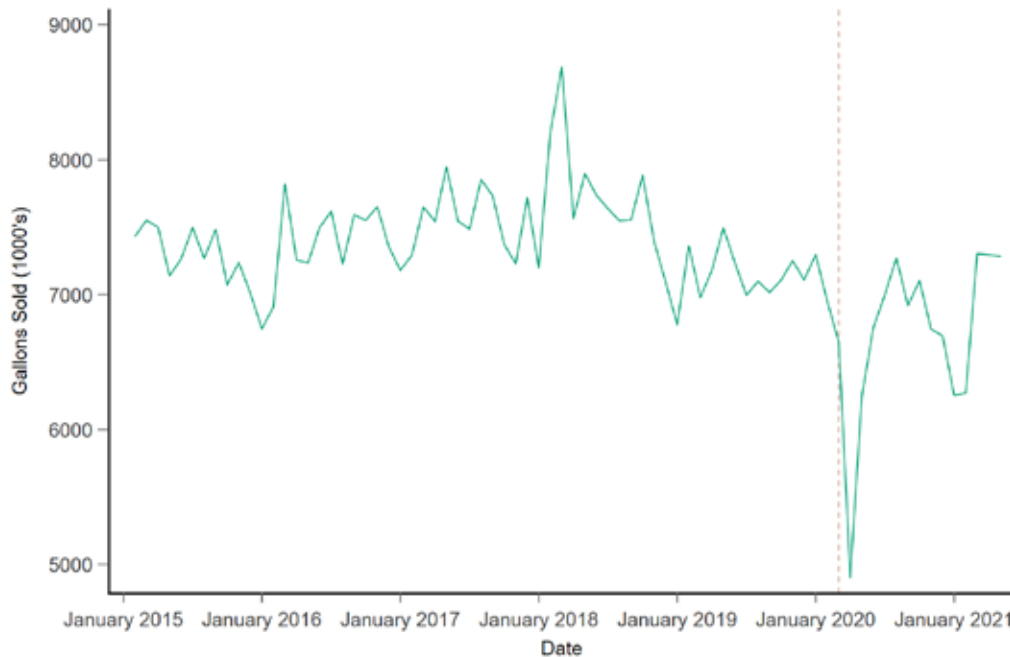
Source: Federal Highway Administration. https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm

⁴ See <https://www.usnews.com/news/best-states/articles/2020-04-15/low-us-traffic-levels-unprecedented-during-coronavirus-pandemic>.

⁵ See <https://e360.yale.edu/features/the-pandemic-has-taken-cars-off-urban-streets.-will-it-last>, https://www.washingtonpost.com/local/trafficandcommuting/some-cities-are-shut-down-streets-for-pedestrians-and-other-uses-during-the-pandemic-a-new-study-looks-2020/10/15/8bb0004c-0e27-11eb-8074-0e943a91bf08_story.html, and <https://www.nytimes.com/2020/04/11/us/coronavirus-street-closures.html>.

These changes in infrastructure availability along with the formation of new habits and changed perceptions of how transportation space and should be used may affect how individuals choose to get around in the future.

Figure 6: Daily Gasoline Sales



Notes: Figure depicts the daily average gasoline sales by prime suppliers measured in thousands of gallons in Louisiana. Vertical line denotes March 2020.
Source: Energy Information Administration. https://www.eia.gov/dnav/pet/pet_cons_prim_dcu_SLA_m.htm

As VMT changed throughout the pandemic, so has the demand for gasoline to fuel that mileage. Gasoline demand and oil prices play a large role in Louisiana’s economy, not only for the relationship with driving, but because the state is a prominent producer of these products. Figure 6 illustrates monthly averages of daily gasoline sales by prime suppliers in Louisiana. While a large drop in sales can be seen around the start of the pandemic, sales quickly rebounded to pre-pandemic levels with another drop in the winter of 2021 coinciding with the third wave of COVID. Figure 7 depicts the daily West Texas Intermediate (WTI) oil price over time. As can be seen, oil prices responded even more sharply to the pandemic than gasoline demand. Prices responded to the decrease in VMT and market uncertainty to such an extent that in April 2020 oil prices briefly became negative as demand fell and storage facilities filled. For a moment in time, you could be paid to take on oil contracts. Since those historic negative prices, the WTI price has increased fairly steadily though.

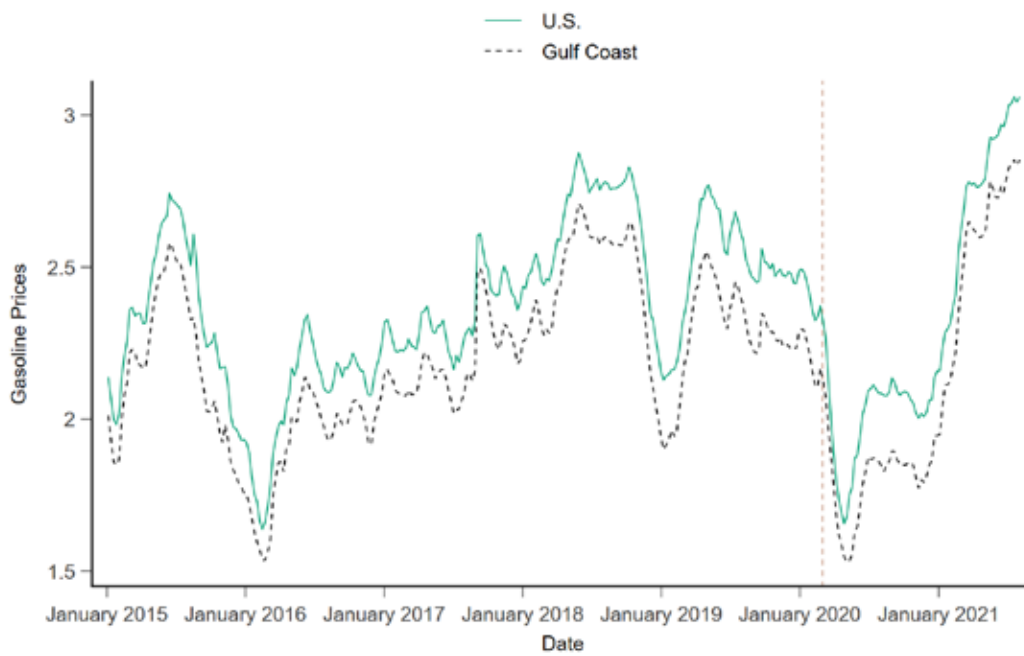
Unfortunately, for everyday consumers, the negative oil prices did not follow through to gasoline prices. The drop in demand did however lead to some of the lowest gasoline prices since 2016. Figure 8 shows average gasoline prices in the U.S. and in the Gulf Coast states. Both prices follow similar trends, and the Gulf Coast price falls to almost \$1.50 a gallon at the beginning of the pandemic and stays relatively low until the start of 2021. From there prices skyrocket to levels not seen in over half a decade. While gasoline and oil prices have been rising, these price increases have not been accompanied by similar sized changes in VMT or gasoline demand.

Figure 7: WTI Oil Price



Notes: Figure depicts the daily WTI oil price in dollars/barrel. Vertical line denotes March 1, 2020.
Source: Energy Information Administration. <https://www.eia.gov/dnav/pet/hist/RWTCD.htm>

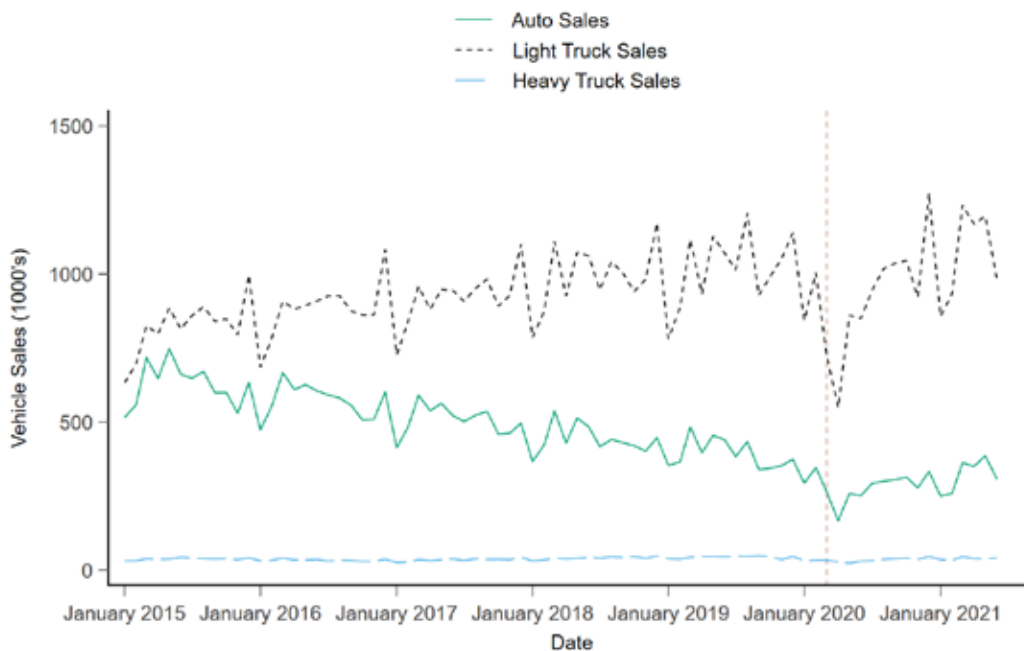
Figure 8: Gasoline Prices



Notes: Figure depicts the weekly average per-gallon gasoline price in the U.S. and Gulf Coast (Petroleum Administration for Defense District 3). Vertical line denotes March 2020.
Source: Energy Information Administration. <https://www.eia.gov/petroleum/gasdiesel/>

The changes in driving demand do not appear to have affected our demand for vehicles more broadly. Figure 9 depicts monthly vehicle sales for automobiles, light trucks, and heavy trucks in the U.S. An obvious fall in sales occurs at the start of the pandemic, but numbers rebound quickly. Light truck sales had been growing in the prior years and continue this upward trend. Automobile sales, which had been declining, appear to now be slightly increasing as well. The trend reversal may have societal benefits if it continues as automobiles are more fuel efficient, produce less pollution, and are less deadly in collisions than light trucks (White 2004; Anderson and Auffhammer 2014; Bureau of Transportation Statistics 2021a); however, it remains unclear if this shift towards autos is driven by income effects (autos are generally cheaper), new vehicle owners caused by mode switching from public transit, or changes in preferences. Heavy-duty truck sales have remained relatively constant throughout the period shown.

Figure 9: Vehicle Sales



Notes: Figure depicts monthly vehicle sales for automobiles, light trucks, and heavy trucks in the U.S. in thousands. Vertical line denotes March 2020.

Source: Bureau of Transportation Statistics. <https://data.bts.gov/Research-and-Statistics/Monthly-Transportation-Statistics/crem-w557>

3 | Tourism and Air Transport

While the previous section largely focused on local transportation during the pandemic—how we’ve changed our day-to-day travel—it is also important to consider how the pandemic has impacted travel between states and regions. Long-distance travel is particularly relevant within the context of Louisiana due to the economic importance of tourism in the region.

Tourism contributed \$18.9 billion to the state’s economy in 2019 and was the fourth largest employer in the state in 2020 (Louisiana Department of Culture, Recreation, and Tourism 2021a; Louisiana Department of Culture, Recreation, and Tourism 2021b). With 53.2 million visitors in 2019 raising \$1.17 billion in sales tax revenue, pandemic-fueled drops in tourism have weakened the state’s economy and fiscal base (Louisiana Department of Culture, Recreation, and Tourism 2021b). It is estimated that Louisiana’s tourism industry has declined by \$215 billion dollars due to the pandemic, while leisure and hospitality employment fell by 21.5% in the state between February and December of 2020 (Louisiana Department of Culture, Recreation, and Tourism 2021b; Hines and Phillips 2021).

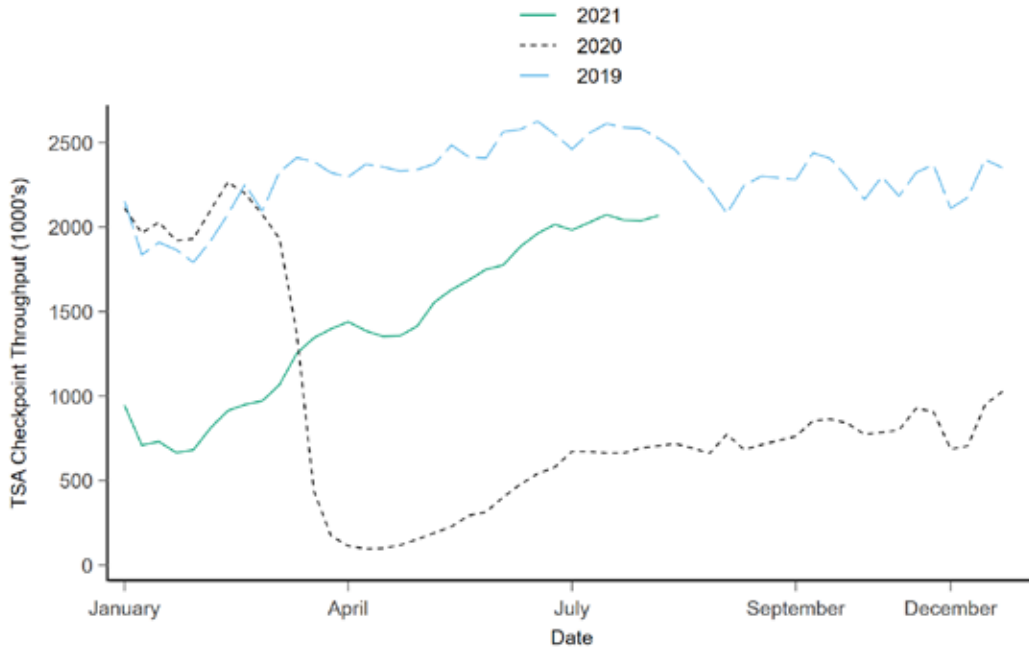
I will begin examining changes in inter-regional travel by looking at air transportation. Air travel has followed a different trajectory than passenger vehicle travel throughout the pandemic. Figure 10 illustrates how TSA passenger throughput has changed from 2019 to August 2021. Values are weekly averages of daily passenger throughput across the U.S.

In early 2020, traffic levels were slightly above those in 2019. Passenger levels then fell to near zero in March and April of 2020 before slowly rebounding to around 500,000 passengers a day on average in July of 2020. The number of passengers then slowly increased throughout the rest of 2020 to around 1,000,000 daily passengers at the start of 2021. Levels have increased quickly during 2021 to almost pre-pandemic levels in the summer before flattening off, potentially due to the fourth wave of COVID and the prevalence of the highly contagious Delta variant of the virus.

Turning to more local affairs, it is possible to examine some metrics of Louisiana’s tourism industry. Figure 11 illustrates monthly average hotel occupancy percentages and daily room rates within the state. The two variables follow relatively similar trends and appear to have fairly stable annual trends until the beginning of the pandemic. At the beginning of the pandemic, hotel occupancy and daily room rates plummeted. Occupancy was at 64% and rooms averaged \$123/night in February of 2020, but these figures dropped to just 26.6% occupancy and \$67/night in April. Since these lows, occupancy and rates have risen and fallen, but appear to be on the rise again according to the most recent available data (June 2021). This recent increase aligns with the trends seen in air travel above.

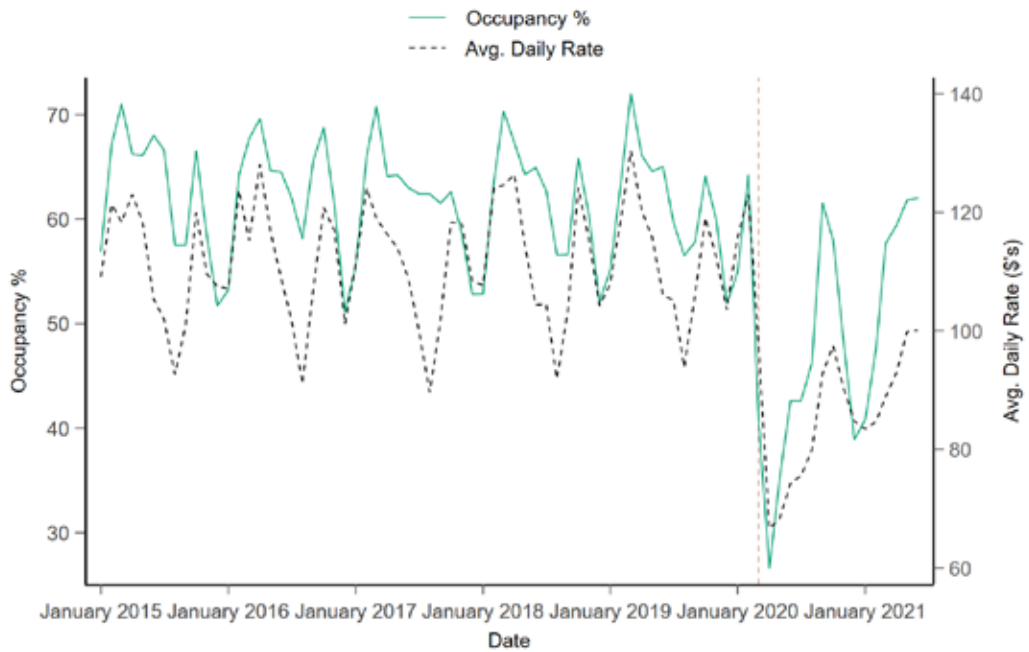
Further evidence of a rebound in travel and tourism can be seen in Figure 12 which illustrates website sessions for LouisianaTravel.com—the official travel authority for the state of Louisiana. The website guides visitors to the state, providing information on things to do, events, and places to stay. Like air travel and lodging numbers, visitors to the website fell during the pandemic. What is most notable about this data, however, is the increase in traffic in recent months. Website sessions have nearly tripled pre-pandemic levels. Again, this increase has already been accompanied by actual visitors to the state, but it may be a precursor to even larger increases in travel in the months to come.

Figure 10: TSA Passenger Throughput



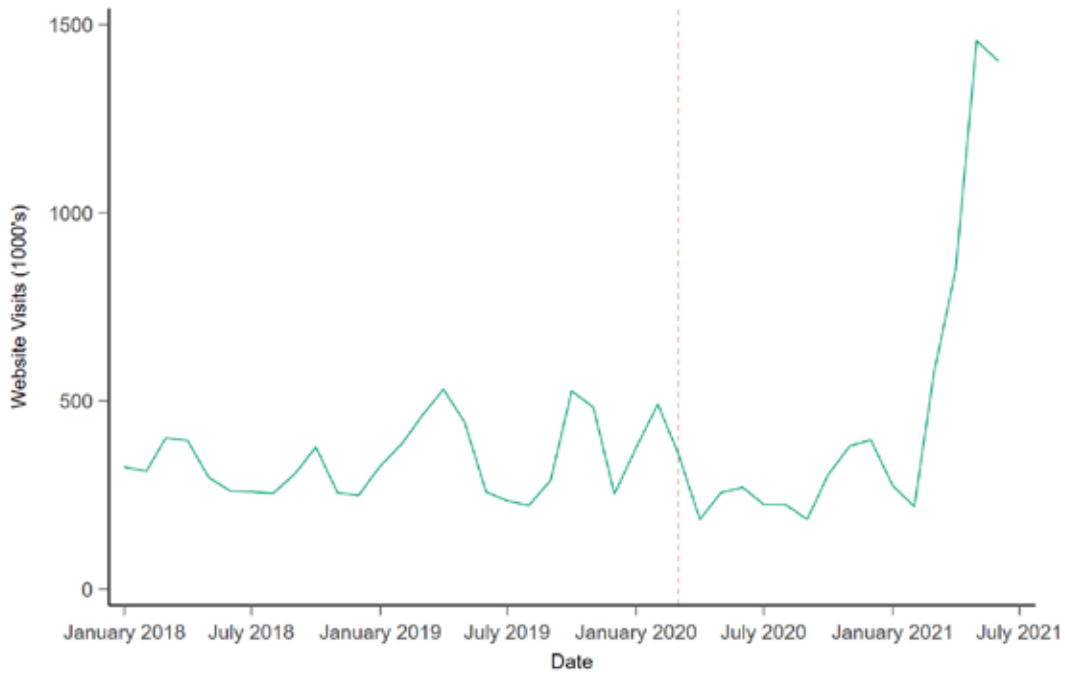
Notes: Figure depicts the average daily number of passengers processed by the TSA each week for 2019, 2020, and 2021 (through August 11).
 Source: Transportation Security Administration. <https://www.tsa.gov/coronavirus/passenger-throughput>

Figure 11: Hotel Occupancy and Average Daily Rates



Notes: Figure depicts the monthly average occupancy percentage and daily room rate of hotels across the state of Louisiana. Vertical line denotes March 2020.
 Source: Louisiana Department of Culture, Recreation, and Tourism.

Figure 12: LouisianaTravel.com Website Sessions



Notes: Figure depicts the monthly website sessions on LouisianaTravel.com. Vertical line denotes March 2020.

Source: Louisiana Department of Culture, Recreation, and Tourism. <https://www.crt.state.la.us/tourism/louisiana-research/tourism-indicators/index>

These numbers suggest that travel around the country and to Louisiana are slowly returning to pre-pandemic levels. It is difficult to forecast how these numbers will continue to evolve, though, as the virus mutates and new mandates are issued. For example, New Orleans began requiring individuals to provide proof of COVID vaccination or a recent negative test when accessing indoor dining, fitness, and entertainment or large outdoor events on August 16, 2021 (City of New Orleans 2021).⁶

⁶ See also https://www.nola.com/news/coronavirus/article_20a8445c-fb7b-11eb-bbf1-1fa3b35d5990.html.

4 | Freight

The final aspect of transportation considered is the movement of goods across the country and state. Again, this aspect of the transportation sector is particularly important for Louisiana as the state has 5 of the top 20 largest ports in the country by tonnage (Bureau of Transportation Statistics 2021b).

To begin, Figure 13 presents freight and passenger values of the Transportation Services Index developed by the Bureau of Transportation Statistics. This index acts as a benchmark measure of transportation services across the country. Though they were at a similar level and follow relatively similar trends before the pandemic, the freight and passenger indexes diverge sharply at the beginning of the pandemic. Passenger services fall to almost zero while the freight index takes a comparatively small dip. Both indexes rebound quickly, but while the freight index returns to pre-pandemic levels, the passenger index has remained far below those levels.

The previous two sections illustrated that air and passenger vehicle travel sharply declined during the pandemic. This figure points out that, broadly speaking, freight transportation did not feel the effects of the pandemic anywhere near the extent to which some other aspects of transportation have. This can likely be explained by the relatively short-lived fall in GDP and a change in how consumers purchased goods during the pandemic. While e-commerce was already on the rise, this trend was accelerated by the pandemic, as shoppers ceased traveling to stores and diverted funds from in-person leisure activities (e.g., movie theaters and sporting events) to purchasing goods.⁷

The pandemic's relatively small impact on freight levels appears to hold when examining individual freight modes. As an example, Figure 14 illustrates the level of all commodities shipped on internal waterways in the U.S. over time. Monthly tonnage is fairly volatile, with several large decreases since 2017, but the decrease from the pandemic is not as dramatic as changes seen for VMT or air passenger numbers. Here the drop in tonnage takes several months to materialize, and then tonnage rises and falls several more times until the most recent observation (July 2021). The monthly volatility during the pandemic is similar to that before the pandemic, and it is worth noting that for every decrease, there is a similarly sized increase in the following months. Cumulatively, this suggests that the pandemic has not had particularly large or permanent effects on freight levels on U.S. internal waterways.

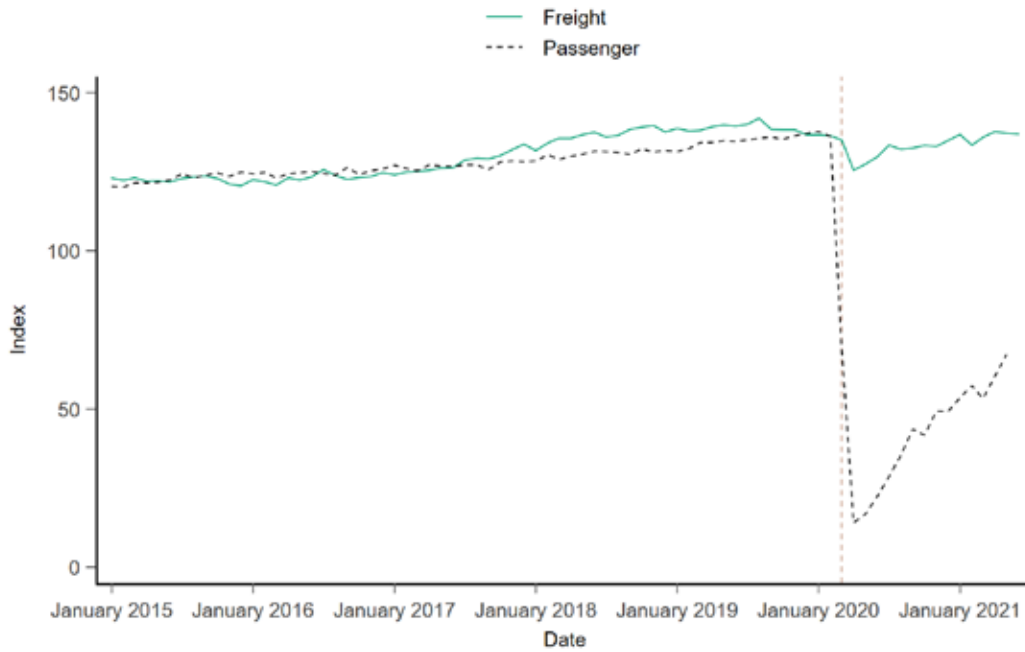
The small transitory decreases in freight levels may at first glance suggest that the industry has been largely unaffected, but this ignores employment effects. As discussed above, the pandemic has had a large persistent effect on employment, and it has been reported that employment issues have impacted the industry.⁸ It is possible that the pandemic, combined with increased demand in some areas, may have led to higher shipping prices.

To cumulatively examine these employment and price effects on the industry it is possible to examine freight trucking revenues over time. Figure 15 illustrates quarterly revenue for general long distance freight trucking establishments that are subject to federal income tax in the U.S. As can be seen freight revenues fell in the first and second quarters of 2020 before rebounding to near pre-pandemic levels. A full recovery had not yet been made at the time of the most recent data release though.

⁷ See <https://news.un.org/en/story/2021/05/1091182>.

⁸ See <https://www.npr.org/2021/08/18/1028108776/tight-supply-of-truckers-leaves-a-few-gas-stations-dry>

Figure 13: Transportation Services Index



Notes: Figure depicts the monthly transportation services index for freight and passengers, which measures the movements of freight and passengers. Vertical line denotes March 2020.

Source: Bureau of Transportation Statistics. <https://www.transtats.bts.gov/OSEA/TSI/>

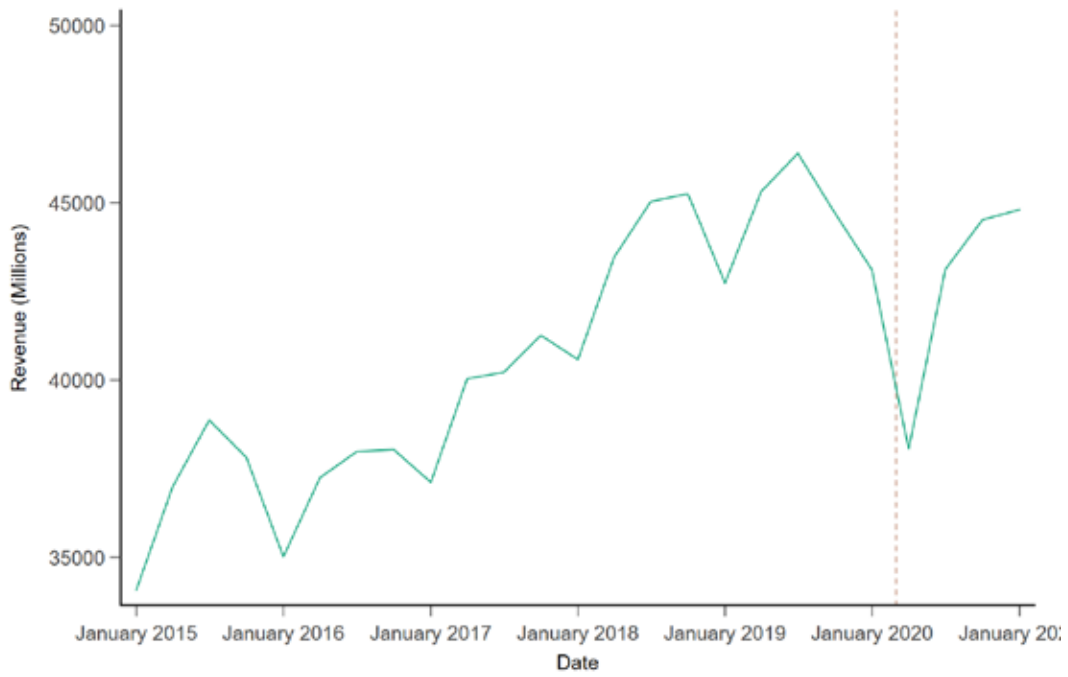
Figure 14: All Commodities Shipped on Internal U.S. Waterways



Notes: Figure depicts the monthly shipping indicator for all commodities on internal U.S. waterways. Vertical line denotes March 2020.

Source: U.S. Army Corps of Engineers. <https://publibrary.planusace.us/#/document/37160b73-1002-414a-caeb-ba8746202f03>

Figure 15: Freight Trucking Revenue



Notes: Figure depicts quarterly total revenue for general long distance freight trucking from establishments subject to federal income tax in the U.S. Vertical line denotes March 2020.

Source: St. Louis Federal Reserve Bank. <https://fred.stlouisfed.org/series/REV48412TAXABL144QNSA>

5 | Conclusion

This white paper has provided a simplified overview of the dramatic effects the pandemic has had on how, when, and where we travel. Vehicle miles traveled, which fell almost 40% in April 2020 relative to April 2019, has largely recovered. Mileage remains lower than pre-pandemic levels and though still increasing, may not reach those levels in the near future. While mileage is down from long-run trends, its relatively high level compared to recent months has increased fuel demand and prices. These high prices will likely carry forward as refineries and markets adjust. Interestingly, the pandemic may have had a long-run effect on fuel consumption as Americans shifted automobile purchases from light trucks to more fuel efficient automobiles.

Like vehicle travel, air transportation and tourism numbers have been increasing, but remain persistently lower than prior to the pandemic. The rapid increase in air passengers over the summer of 2021 has posed challenges for the industry, as flight delays and cancellations propagated throughout the system due in part to employee shortages and work hour restrictions.⁹ Finally, freight services appear to have weathered the pandemic with relatively minor disruption relative to other areas of the transportation sector.

Of course, as the pandemic has made abundantly clear, the future can be hard to predict. With the Delta variant increasing infection rates, particularly in Louisiana, where a mask mandate was recently reinstated, the recent increases in travel may once again fall. Louisiana, which has one of the lowest vaccination rates in the country, may become a cautionary example of the dangers of viral mutations in unvaccinated populations.

⁹ See <https://apnews.com/article/lifestyle-health-business-pandemics-coronavirus-pandemic-658f555ab74b>

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