



B.I. Moody III College of Business Administration

Louisiana Economic Activity Forecast

2020:Q2 COVID-19 Economic Scenarios

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The views expressed in this report are those of the author and do not necessarily represent the views of the University of Louisiana at Lafayette or the University of Louisiana System. Any errors are my own.

Executive Summary

The COVID-19 pandemic has created tremendous global uncertainty and widespread economic disruptions. Actions taken to stop the spread of the virus have led to business closures in many industries and record numbers of individuals filing for unemployment. This research brief presents results from the Louisiana Forecast Model and Louisiana Regional Employment Model to assess the most likely impact on key economic indicators under several potential scenarios. The baseline projections, and even the most optimistic projections, are highly unfavorable at this time. Much like the national economy, Louisiana is projected to experience a recession more severe than the economic impacts of Hurricane Katrina and the Great Recession. Projections point towards a recovery that will be slower than the nation and may last until 2022. The Baton Rouge and New Orleans metro areas are expected to have the strongest recovery in the state, while the Lafayette and Houma-Thibodaux regions are projected to have the weakest recoveries.

Every forecasting model contains uncertainty. The results in this report are intended to provide broad guidance and should not be a direct cause for decision-making. This is particularly true now in light of the evolving global pandemic surrounding COVID-19.

2020 Report Release Schedule:

Second Quarter: May 20, 2020

Third Quarter: August 19, 2020

Fourth Quarter: November 20, 2020

18.4%

Projected Q2 peak of the state's unemployment rate.

-\$800 million

Estimated state tax collection shortfall over the next four quarters.

-339,000

Projected job losses statewide between the first and second quarters of 2020.



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Introduction

This research brief is the first in a new series of quarterly reports forecasting economic activity in Louisiana. Reports will present baseline, optimistic, and pessimistic scenarios for key Louisiana economic indicators. Scenarios and projections will be updated quarterly to reflect the most up-to-date economic outlook for the U.S. economy and other vital sectors that are influential in shaping Louisiana's economic activity. In addition to the standard scenarios, this report also provides a "Pre COVID-19" scenario for Louisiana's economy that projects the most likely path of economic activity if the pandemic had *not affected* the U.S. or Louisiana. This allows one to generate estimates of the potential economic impact of COVID-19 relative to a scenario where the pandemic was avoided.

Forecasting models make projections on the most likely path of future variables based on historical data, past trends, and the expected future path of other critical variables. Because these relationships change over time, no model is able to perfectly incorporate unexpected changes in economic conditions, policy decisions at the federal or state level, or shifts in consumer or firm behavior. This means that every model is embedded with uncertainty. For this reason, the projection scenarios provided in this report should be interpreted as providing broad guidance on the most probable path for economic activity in Louisiana **if** the underlying assumptions of the model evolve as anticipated. For example, all of the scenarios in this report depend strongly on how the growth in U.S. gross domestic product (GDP) evolves over the next 3 to 18 months. If U.S. growth turns out to be much stronger *or* much weaker than is currently envisioned, then the expected accuracy of the Louisiana projections decrease. To simplify the presentation of multiple scenarios, the figures in this report do not show the confidence intervals around the scenario point estimates. One should always bear in mind that a point estimate of (say) 1.1% for employment growth in the next quarter is the mid-point of a range of potential values.

The Louisiana Forecast Model (LFM) projects employment, unemployment rate, home prices, gross domestic product, and tax collections using a Vector Autoregression (VAR) framework (see the Technical Appendix for more details). The model also takes other variables into account and assumes that their future values are given with certainty. These external variables include real U.S. gross domestic product, oil prices, the state's real trade-weighted exchange rate, and the global prices of soybeans and rice.

Results from a regional employment model are also presented. The Louisiana Regional Employment Model (LREM) nests the Louisiana Forecast Model by adding statewide employment projections to the external variables in order to generate projections for each of the state's metropolitan statistical areas (MSAs). Employment in these nine metro areas account for approximately 90% of non-agricultural jobs in the state.

Alternative Economic Scenarios

Four alternative scenarios are considered in this report: Pre COVID-19, Baseline, Optimistic, and Pessimistic. The scenarios differ only in how they treat the future values of selected variables external to the Louisiana Forecast Model, namely U.S. gross domestic product and oil prices. Expected future values of these variables shifted sharply beginning in February 2020 as the COVID-19 situation began to escalate. Since the expected future values of exchange rates and the global prices of soybeans and rice have not experienced any significant disruptions between February 2020 and the publication of this report, the projected future values of these external variables are identical in all four scenarios.

Table 1 shows the future expected values for U.S. GDP and oil prices under each scenario. 2020:Q1 values for the Baseline, Optimistic, and Pessimistic scenarios are identical because this quarter has already occurred. The Pre COVID-19 values for 2020:Q1 are the previously forecasted values so that I can estimate the most likely path for the economy before the pandemic took hold. U.S. GDP projections for the Pre COVID-19 scenario are based on the median projections from the Survey of Professional Forecasters released on February 15, 2020. Pre COVID-19 oil price projections are from the U.S. Energy Information Administration's Short-Term Energy Outlook released on February 20, 2020. These projections were made prior to the onset of widespread concern over COVID-19, and pre-date the formal pandemic declaration as well as stay-at-home/social-distancing guidelines, so they should provide a useful counterfactual for how economic activity in Louisiana may have prevailed in the absence of the pandemic. Apart from the first quarter of 2020 where U.S. GDP was projected to grow at an annualized rate of 1.66%, the outlook through the fourth quarter of 2021 was for growth to be in the 2.0 - 2.2% range. Prior to the pandemic, the Energy Information Administration projected oil prices to gradually increase over the next 18 months and reach \$63 dollars per barrel by the end of 2021.

Table 1: Assumed Future Values of External Variables

Quarter	U.S. GDP (% SAAR)				Oil Prices (\$ per barrel)			
	Pre COVID-19	Baseline	Optimistic	Pessimistic	Pre COVID-19	Baseline	Optimistic	Pessimistic
2020:Q1	1.66	-4.78	-4.78	-4.78	52.86	45.36	45.36	45.36
2020:Q2	2.10	-32.22	-21.48	-41.70	52.17	20.16	20.16	20.16
2020:Q3	2.02	10.63	13.33	6.78	58.17	23.44	35.56	23.44
2020:Q4	2.13	6.47	6.24	-8.89	59.50	29.00	45.56	26.55
2021:Q1	2.19	6.75	4.92	10.91	60.50	36.70	50.56	28.57
2021:Q2	2.22	4.09	4.86	5.75	61.50	40.84	53.56	33.56
2021:Q3	2.24	3.22	3.20	3.93	62.50	43.16	56.57	32.56
2021:Q4	2.18	2.87	2.78	2.59	63.50	43.50	60.16	31.55

The Baseline scenario in Table 1 shows the most likely path for oil prices and U.S. GDP based on the most current information. The figures that enter the model are derived from the Survey of Professional Forecaster's outlook for U.S. GDP released on May 15, 2020 and the Energy Information Administration's Short-Term Economic Outlook released on May 12, 2020. As is evident, there is a noticeable shift in the outlook for both variables. The onset of widespread stay-at-home orders, which led to reductions in business operations and a rash of new initial unemployment claims (more on this later), resulted in U.S. GDP growth contracting at an annualized rate of -4.8% in the first quarter of the year. This is the first decline in U.S. real GDP since 2009:Q2 and almost certainly signals the start of what is expected to be a very severe economic downturn. As the Baseline case shows, the median projection from the Survey of Professional Forecasters is for growth in U.S. GDP to contract at an annualized rate of -32.2% in the second quarter of 2020. If this projection turns out to be accurate, it will be three times as severe as any contraction in U.S. history for which we have data.

Oil prices also fell sharply in late February largely due to slowing global demand from reduced economic activity and price wars between Russia and Saudi Arabia. The Energy Information Administration's latest projections, which constitute the Baseline scenario, have oil prices averaging below \$30 per barrel for the remainder of 2020 and increasing only to the mid-\$40s by the end of 2021. Oil prices have not been below \$30 per barrel for any sustained period of time in more than 15 years. Combined with what is expected to be a severe national recession, it is difficult to conceive of a situation that is worse than what we may be facing at this moment.

The Baseline scenario assumes the U.S. economy will rebound and begin to grow starting in the third quarter of 2020. This scenario also assumes that growth will remain positive in the U.S. economy through the end of 2021. I would assign a 55% probability to the baseline forecast. In my opinion, the current downside risks far outweigh any upside risks to the economy and recovery.

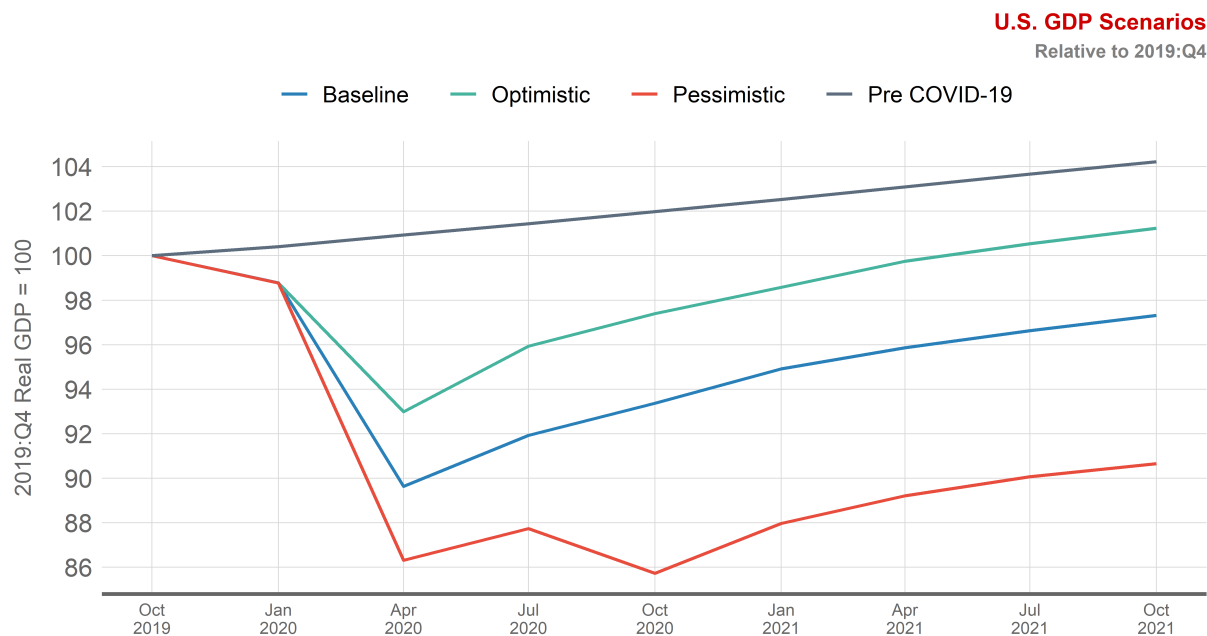
The Optimistic and Pessimistic scenarios, which I would assign a 15% and 30% probability respectively, vary the severity and recovery time for oil prices and U.S. GDP growth. The Optimistic projection assumes that Q2 growth in U.S. GDP will contract one-third less than is currently anticipated, and that oil prices will increase to \$45 by the end of the year. This scenario assumes that overall economic activity ramps up very quickly in the second half of 2020 and that we avoid any additional disruptions related to COVID-19. In contrast, the Pessimistic scenario assumes a more severe national recession than is currently expected in Q2 *and* an additional reduction in GDP growth in Q4. This scenario is consistent with the current stay-at-home orders remaining in place through June and the reintroduction of such restrictions in late 2020 because of a second surge in COVID-19 cases. In the Pessimistic scenario, oil prices remain below the mid \$30s per barrel due to the sustained reduction in global demand. Some of the future growth rates in U.S. GDP in the Optimistic and Pessimistic scenarios are higher or lower than the Baseline because the scenarios are assumed to be independent growth paths for the economy. Figure 1 plots the four scenarios to make this connection more concrete.

It is worthwhile to note that the U.S. economy does not fully "recover" from the impending COVID-19 recession by the end of 2021 under the Baseline or

Pessimistic scenarios. Recovery in this context means that we return to the 2019:Q4 level of GDP. Figure 1 on the next page shows U.S. GDP under the four scenarios considered. The chart is indexed so that each scenario begins relative to 2019:Q4 that is assigned a base value of 100.

The Pre COVID-19 scenarios show the economy reaching 104.2 by the end of 2021, which is a 4.2% increase over 2019:Q4. By the end of 2021, the Baseline scenario leaves the economy at 97.3 or 2.7% below where we were in 2019:Q4. In this situation, the economy will have generated \$1.2 trillion less in goods and services relative a scenario where COVID-19 did not occur. The only scenario showing a full recovery in the next two years is the Optimistic scenario where GDP reaches it 2019:Q4 level in the third quarter of 2021.

Figure 1: U.S. Economic Recovery Scenarios

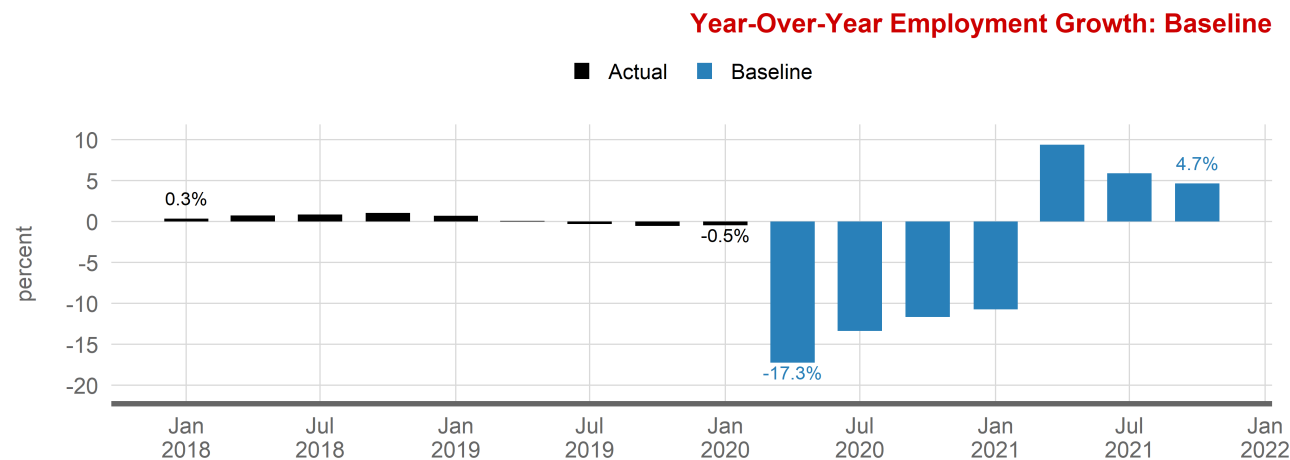
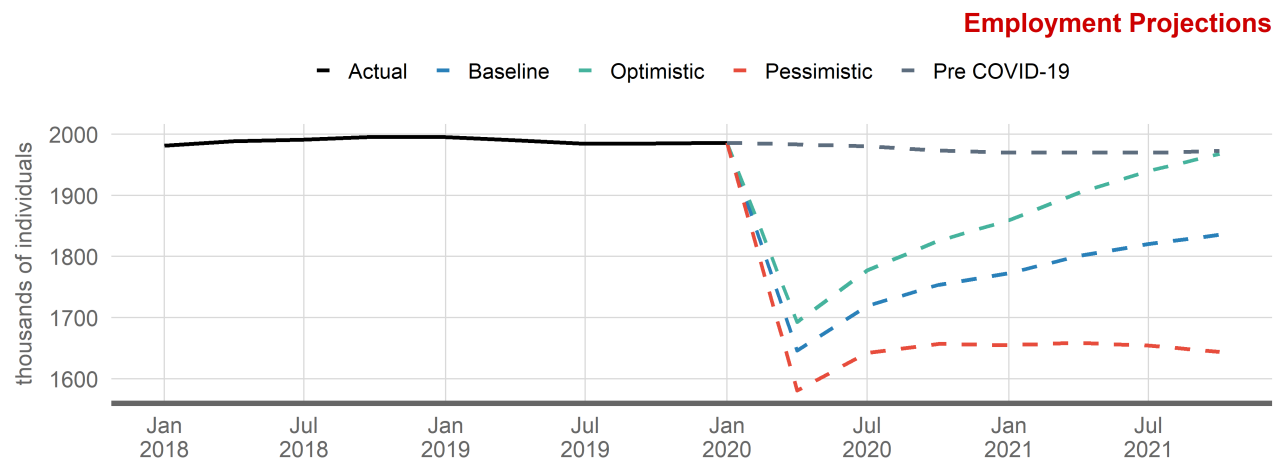


Louisiana Employment Projections

Figure 2: Louisiana Employment Projections

Employment growth in Louisiana was very weak prior to the onset of the COVID-19 pandemic. Year-over-year employment growth was negative for each of the past three quarters (2019:Q3, 2019:Q4, and 2020:Q1). 2018:Q4 was the last quarter the state experienced year-over-year employment growth above 1%.

Employment is projected to fall sharply in the second quarter. The Baseline projection is calling for a 17% reduction, which is twice as severe as the job losses the state experienced because of Hurricane Katrina and 5 times worse than the job losses in the Great Recession. The model projects Louisiana's recovery to be slower than the nation so employment growth is projected to remain below pre-pandemic levels through at least the end of 2021.

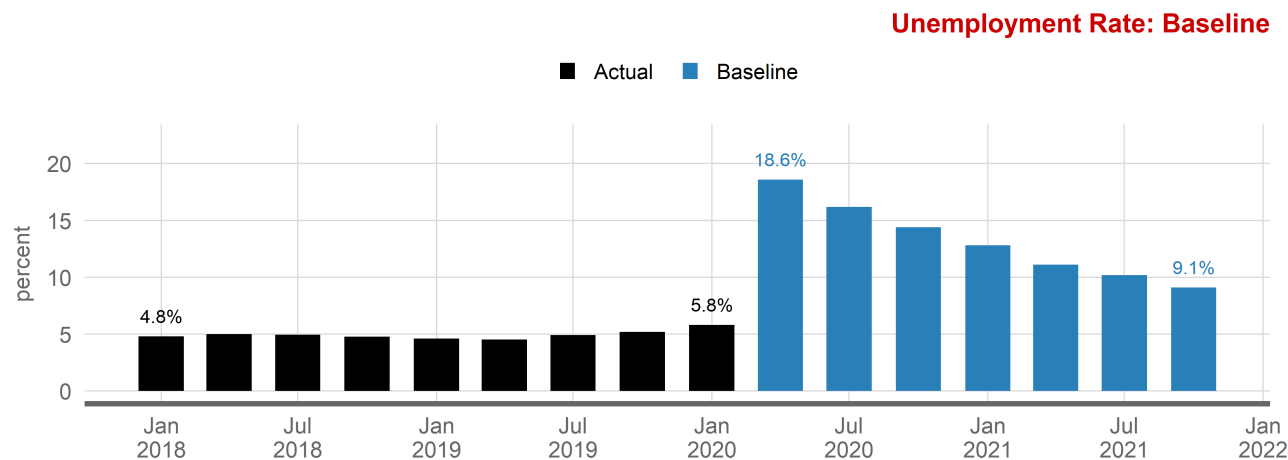
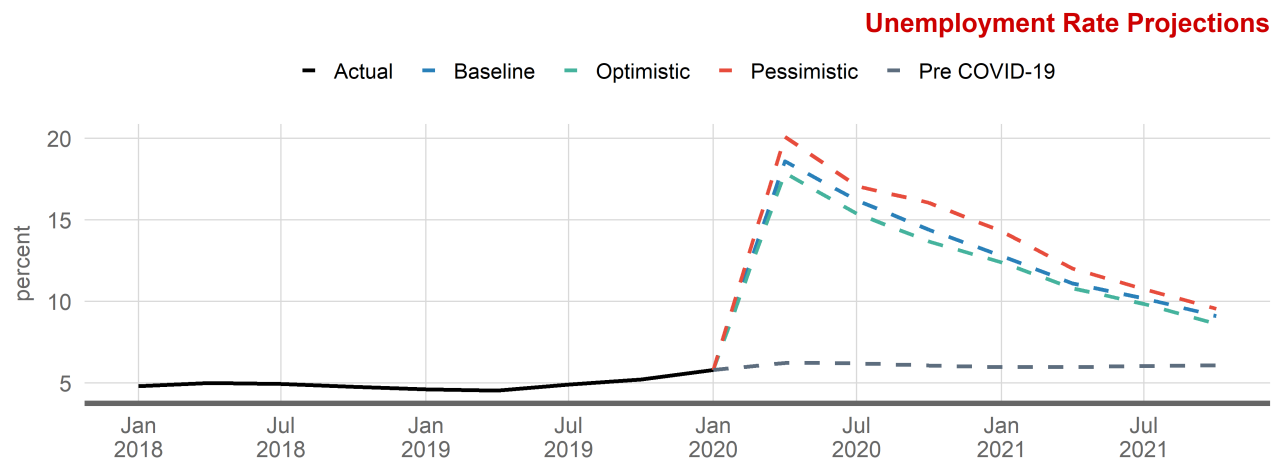


Louisiana Unemployment Rate Projections

Figure 3: Louisiana Unemployment Rate Projections

More than 600,000 Louisianians have filed for initial unemployment between March 21 and May 9, 2020. With a labor force of roughly 2.1 million workers, the unemployment rate in April may exceed 30%. The largest number of new claims occurred in the New Orleans metro area (215,37), followed by Baton Rouge (108,642) and Lafayette (57,381). The statewide unemployment rate for the second quarter of 2020, which averages April, May, and June is projected to exceed 18%. The previous high unemployment rate in the state was 13.1% in 1986.

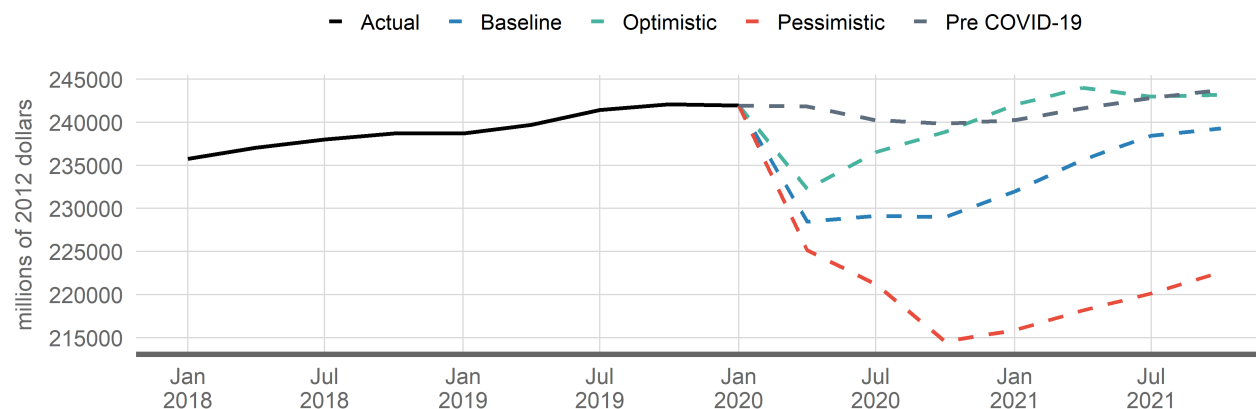
The Baseline, Optimistic, and Pessimistic projections are very close and point to the unemployment rate remaining above 10% until the end of 2021.



Louisiana GDP Projections

Figure 4: Louisiana GDP Projections

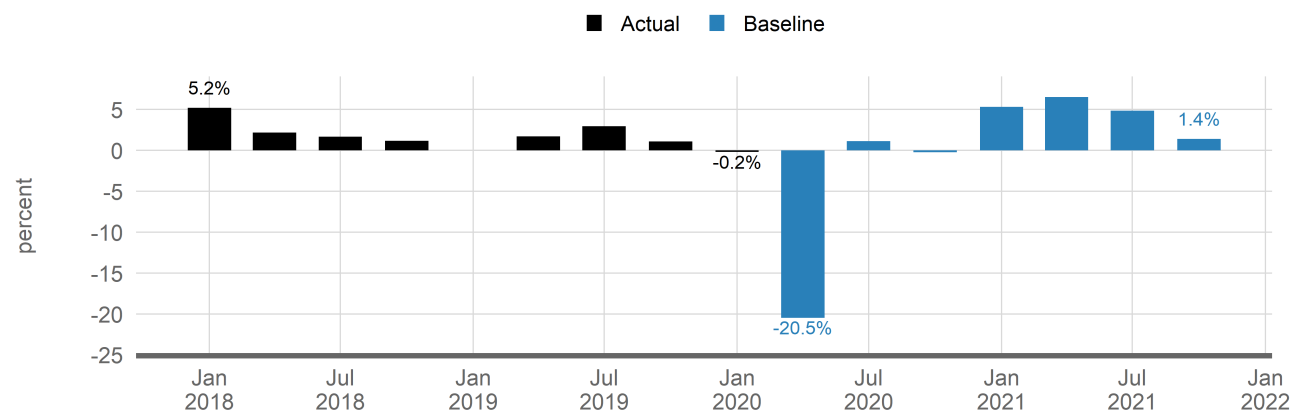
GDP Projections



The Baseline projection has the state's economy declining at an annualized rate of -20.4% in the second quarter. This is considerably better than the -32.2% projected for the United States. Under the Baseline scenario, Louisiana's GDP is projected to grow at a much slower pace than the nation, remaining below Pre COVID-19 levels until at least 2022.

The Pessimistic scenario, which includes a second-wave of shut downs and sustained oil prices below \$35 per barrel, shows Louisiana's GDP shrinking to Great Recession levels of 2008 and 2009.

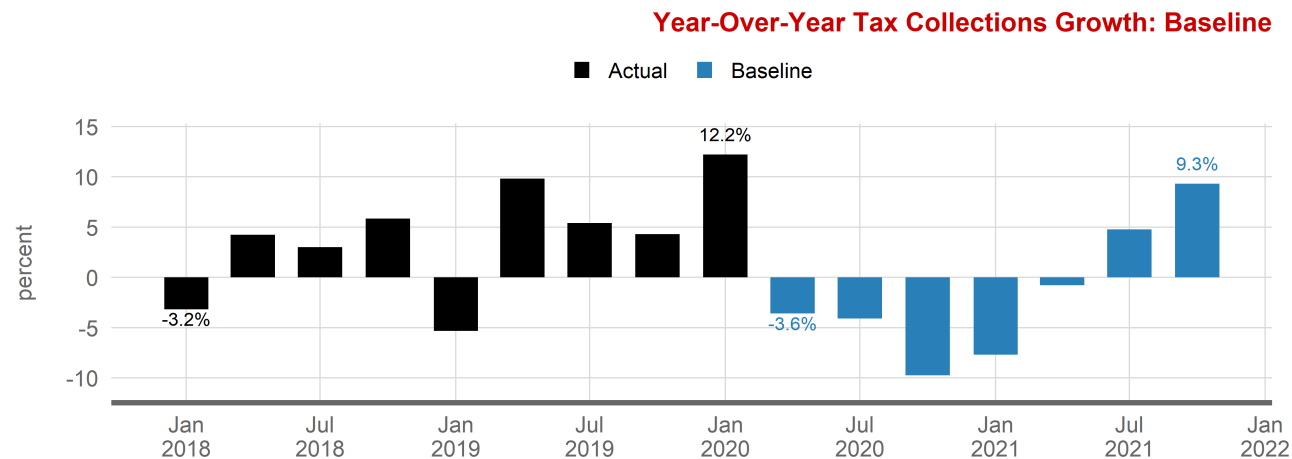
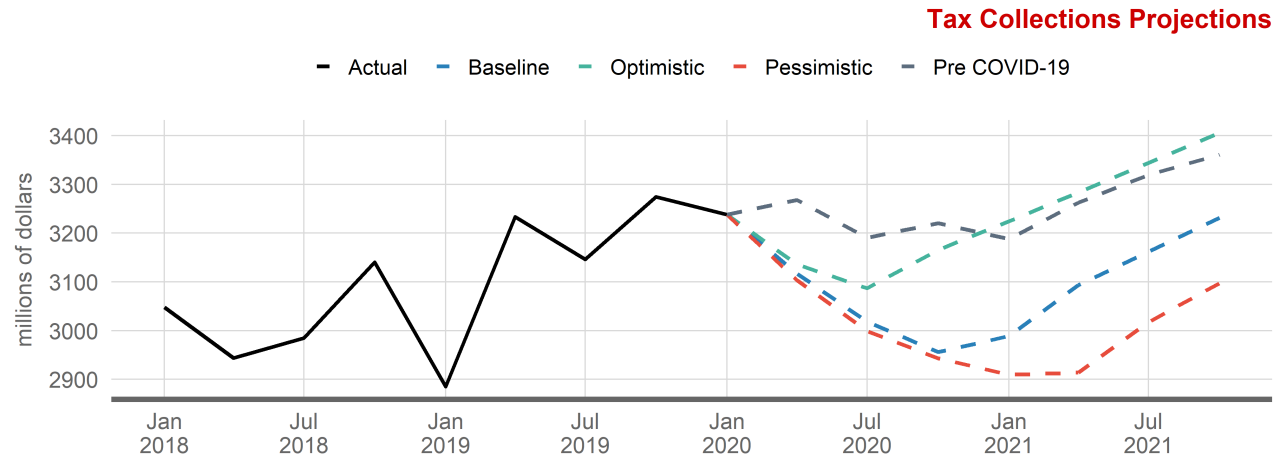
Annualized GDP Growth: Baseline



Louisiana Tax Collections Projections

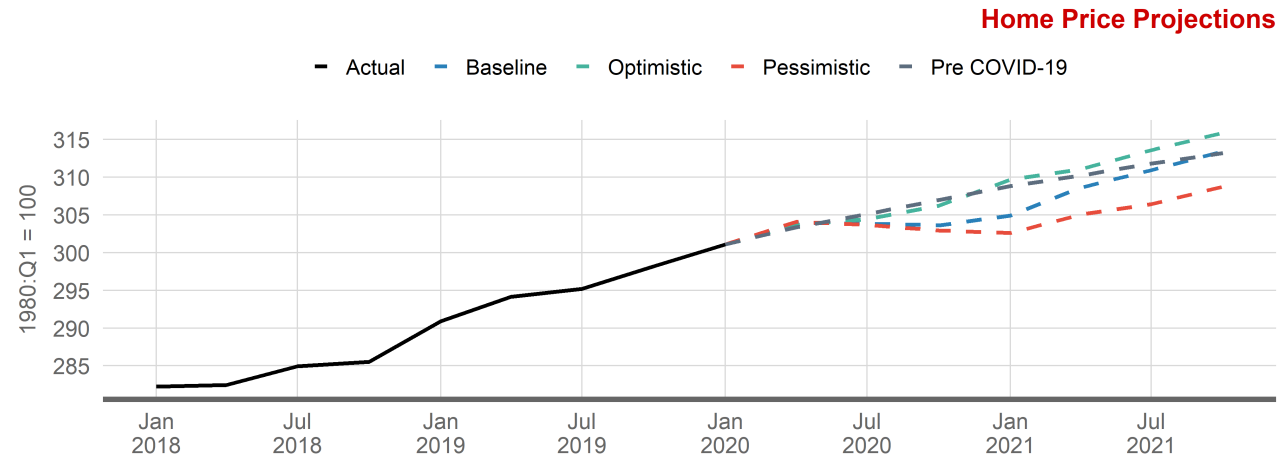
Figure 5: Louisiana Tax Collections Projections

The Baseline projection shows year-over-year quarterly tax collections declining for each of the next four quarters. Relative to the Pre COVID-19 scenario, the Baseline model implies a tax collection gap equal to roughly \$800 million over the next four quarters (2020:Q2 - 2021:Q1). Under the Pessimistic scenario, the gap between projected tax collections and the Pre COVID-19 scenario exceeds \$1 billion over the next four quarters.

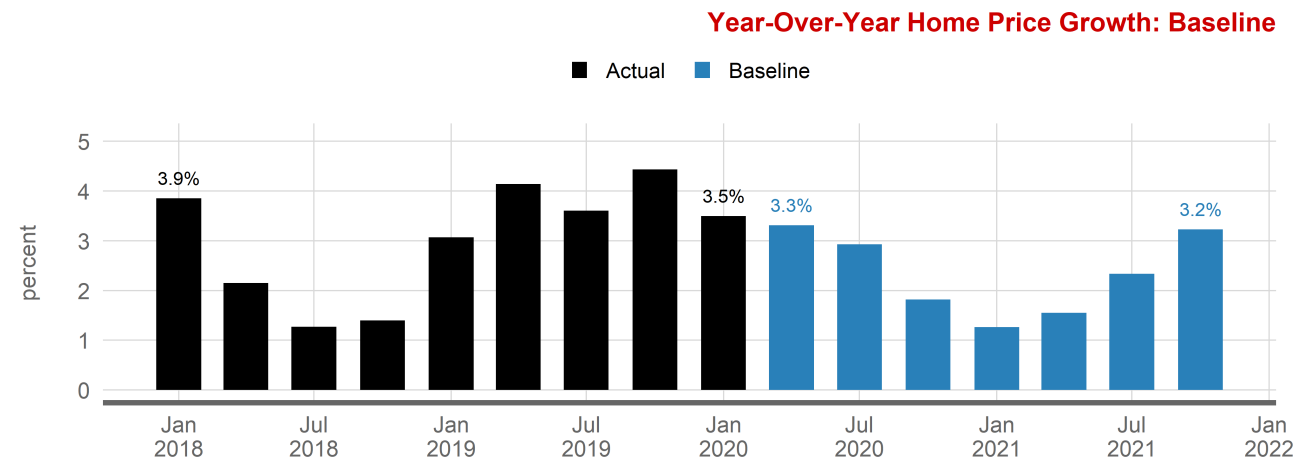


Louisiana Home Price Projections

Figure 6: Louisiana Home Price Projections

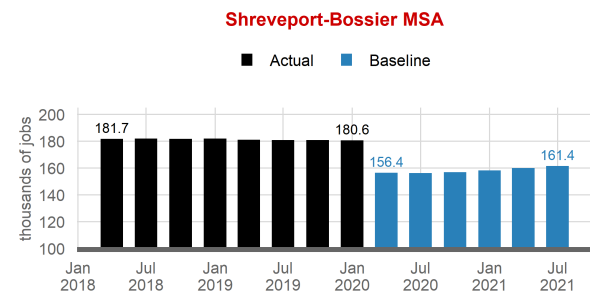
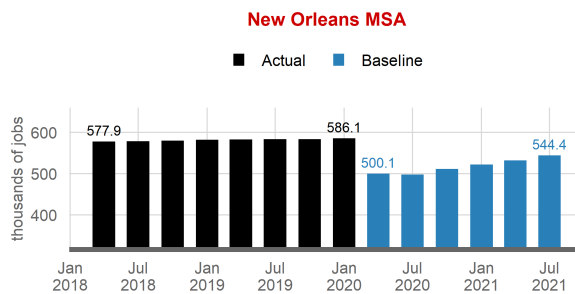
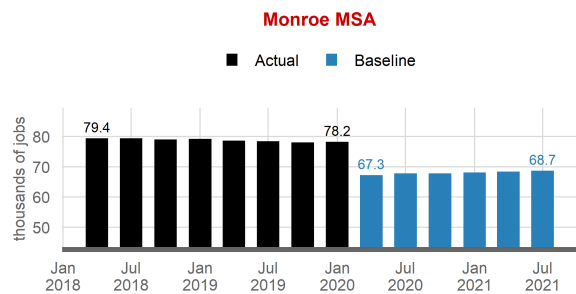
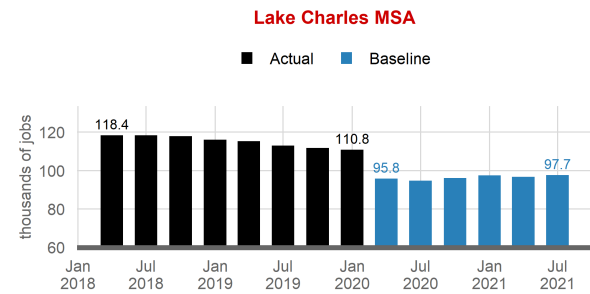
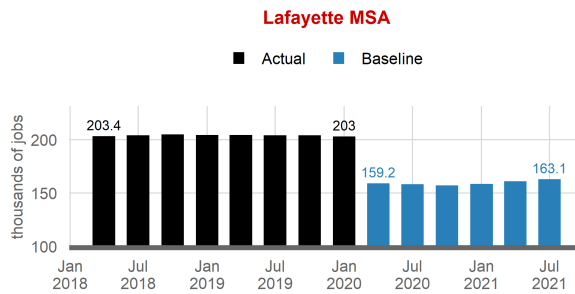
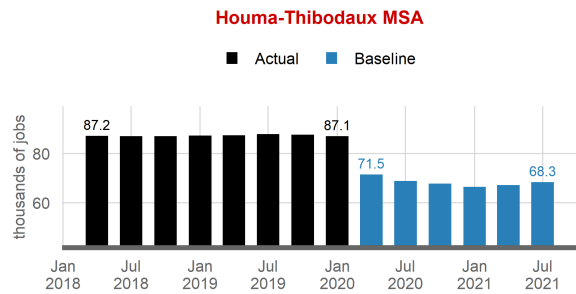
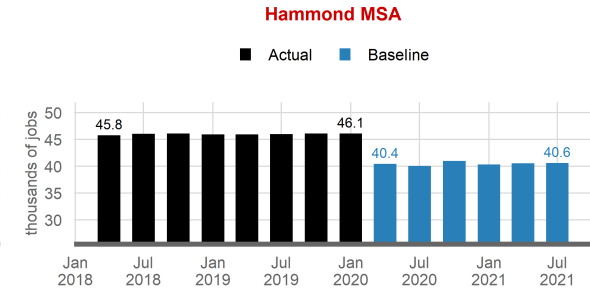
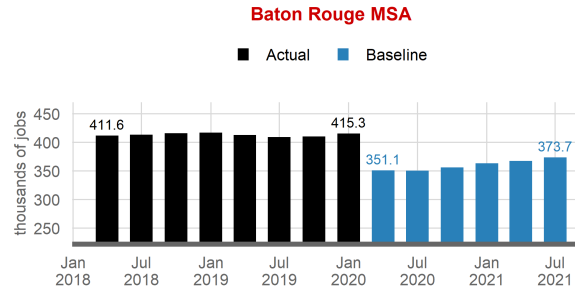
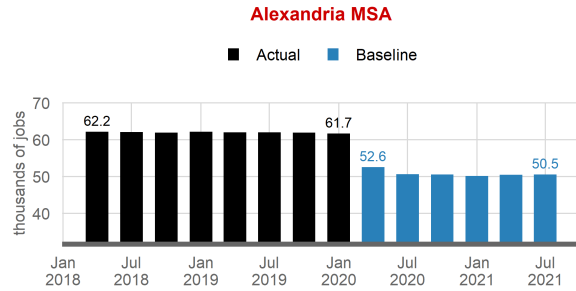


Unlike the Great Recession, where (nominal) home prices dropped nationally and in Louisiana, every scenario points to year-over-year home price growth remaining positive. The Baseline case has year-over-year price growth slowing to less than 3% in the second-half of 2020 and remaining soft throughout much of 2021.



Metro Area Employment Projections

Figure 7: Metro Employment Projections



Technical Appendix

The Louisiana Forecast Model (LFM) is based on a Vector Autoregression (VAR) system of equations. VAR models can be used to generate forecasts of the future values of multiple variables simultaneously (called endogenous variables) based on the past behavior of these variables and on the behavior of other variables whose values are taken as given (called exogenous variables). Endogenous variables (or the variables ones wishes to forecast) in the LFM include gross domestic product (or total production), non-farm payroll employment, unemployment rate, home prices, and state tax collections. Exogenous variables in the current version of the LFM include U.S. gross domestic product, oil prices, the state's real trade-weighted exchange rate, and the global prices of soybeans and rice. Hence, the forecast or projection of each endogenous variable is based on the historical relationship with its own past values, the past values of every other endogenous variable, and the values of every exogenous variable. The Louisiana Regional Employment Model (LREM) is a nested Vector Autoregression (VAR) of total payroll employment in the state's nine MSAs. In addition to the exogenous variables used in the LFM, the Louisiana Regional Employment Model incorporates statewide employment projections as an additional external variable.

The VAR methodology is a widely-accepted approach for generating economic and business forecasts. Academic studies have repeatedly shown that small-scale VAR models perform well in terms of prediction errors relative to alternative forecasting models. VAR systems also model the underlying dynamics of economic relationships in the system without imposing behavioral assumptions about the relationships between the variables or how they evolve over time.

The model is estimated using quarterly data beginning in 1994:Q1. Quarterly average values are used for data series that are available at a weekly or monthly frequency. All variables enter the model in log difference form. Real quarterly Louisiana gross domestic product, which the Bureau of Economic Analysis did not begin reporting until 2005, is backcasted using the estimated relationship between the observable data on state GDP and real U.S. quarterly gross domestic product and real quarterly state personal income.

Future values of the exogenous variables are required to make projections for the endogenous variables. The future growth rate in real U.S. GDP is the median projection from the Survey of Professional Forecasters. Future projections for oil prices are from the U.S. Energy Information Administration. Future trade-weighted exchange rates and the prices of soybeans and rice were estimated using an Akaike Information Criterion (AIC) weighted average of univariate autoregressive moving-average (ARMA) models that range from (0,0) to (4,4). The data appendices provide complete documentation for all underlying source data used in the model.

Data Appendix: Endogenous Variables

- **Employment (statewide)**

Total seasonally adjusted non-farm payroll employment. Source: Bureau of Labor Statistics via the Federal Reserve Bank of St. Louis FRED database (mnemonic = LANA). Units: thousands of individuals.

- **Unemployment rate**

Seasonally adjusted unemployment rate. Source: Bureau of Labor Statistics via the Federal Reserve Bank of St. Louis FRED database (mnemonic = LAUR). Units: percent.

- **Home prices**

All-transactions home price index. Source: U.S. Federal Housing Finance Agency via the Federal Reserve Bank of St. Louis FRED database (mnemonic = LASTHPI). Units: 1980:Q1 = 100. Seasonally adjusted prior to estimation.

- **GDP**

Total Real Gross Domestic Product for Louisiana (seasonally adjusted annual rate). Source: U.S. Bureau of Economic Analysis via the Federal Reserve Bank of St. Louis FRED database (mnemonic = LARQGSP). Units: Millions of chained 2012 dollars. Pre-2005 figures were backcasted following the approach described in the Technical Appendix.

- **Tax collections**

Total state tax collections for Louisiana. Source: U.S. Census Bureau via the Federal Reserve Bank of St. Louis FRED database (mnemonic = QTAXTOTALQTAXCAT3LANO). Units: Millions of dollars. Seasonally adjusted prior to estimation.

- **Employment (metro area)**

Total seasonally adjusted non-farm payroll employment. Source: Bureau of Labor Statistics via the Federal Reserve Bank of St. Louis FRED database. Units: thousands of individuals. Alexandria (ALEX722NA), Baton Rouge (BATO922NA), Hammond (SMU2225220000000001SA), Houma (HOUM322NA), Lafayette (LAF122NA), Lake Charles (LAKE322NA), Monroe (MONR722NA), New Orleans (NEWO322NA), and Shreveport (SHRE322NA).

Data Appendix: Exogenous Variables

- **U.S. GDP**

Total Real Gross Domestic Product for the U.S. (seasonally adjusted annual rate). Source: U.S. Bureau of Economic Analysis via the Federal Reserve Bank of St. Louis FRED database (mnemonic = GDPC1). Units: Millions of chained 2012 dollars. Future values are from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters.

- **Oil prices**

West Texas intermediate crude oil price. Source: U.S. Energy Information Administration via the Federal Reserve Bank of St. Louis FRED database (mnemonic = DCOILWTICO). Units: dollars per barrel. Future values are from the U.S. Energy Information Administration Short-Term Energy Outlook. Seasonally adjusted prior to estimation.

- **Trade-weighted exchange rate**

Real trade-weighted exchange rate for Louisiana's major trading partners relative to the U.S. dollar. Source: Federal Reserve Bank of Dallas. Units: January 1988 = 100.

- **Price of rice**

Global price of rice. Source: International Monetary Fund via the Federal Reserve Bank of St. Louis FRED database (mnemonic = PRICENPQUSDM). Units: U.S. dollars per metric ton. Seasonally adjusted prior to estimation.

- **Price of soybeans**

Global price of soybeans. Source: International Monetary Fund via the Federal Reserve Bank of St. Louis FRED database (mnemonic = PSOYBUSDM). Units: U.S. dollars per metric ton. Seasonally adjusted prior to estimation.

About the Author

Dr. Gary A. Wagner currently holds the Acadiana Business Economist Endowed Chair at the University of Louisiana at Lafayette. In this role, he monitors the region's economic environment, conducts research and analysis, and engages with external stakeholders on behalf of the Moody College of Business and University.

His research interests range from regional economics to state and local public finance issues, with a particular focus on tax structures and economic development, borrowing costs, and pension systems. He has authored or coauthored more than 60 professional articles and reports, and has delivered more than 300 presentations to public audiences on national and regional economic conditions. Dr. Wagner served on the Governor's Council of Economic Advisors in Arkansas from 2008-2011, and he is a quarterly participant in the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters projecting national economic conditions.

Dr. Wagner holds a Ph.D. in Economics from West Virginia University. His professional research has appeared in many leading economics journals including *The Journal of Law and Economics*, *National Tax Journal*, *Economics and Politics*, *Regional Science and Urban Economics*, *Papers in Regional Science*, *Public Choice*, and *Public Finance Review*. Prior to joining the University of Louisiana at Lafayette, he was Vice-President & Senior Regional Officer for the Federal Reserve Bank of Cleveland.

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