The COVID-19 Pandemic in the Tampa Bay Area and Florida: A Preliminary Economic Impact Assessment, April 2020

About Tampa Bay Regional Planning Council (TBRPC)

TBRPC supports local government initiatives and projects with planning services and economic analysis throughout the West Central Florida counties of Citrus, Hernando, Hillsborough, Manatee, Pasco and Pinellas.

Economic analysis services are provided through TBRPC's Tampa Bay Economic Development District and the Regional Economic Analysis Program. TBRPC uses state-of-the-art computable general equilibrium and input-output models to assist its partner agencies in assessing the impacts of potential job creating projects and investment, as well as the economic analysis of environmental and public policy issues.

Summary

Coronavirus disease (COVID-19) is a novel infectious respiratory disease that has sickened over 1 million people worldwide and killed tens of thousands. While Florida's share of nationwide cases is relatively low, the state faces higher than average economic risks. Tampa Bay Regional Planning Council (TBRPC) has produced a preliminary analysis of the economic impacts of COVID-19 on the Tampa Bay Area and Florida economies.

TBRPC found that the combined economic losses from excess deaths, the national recession and statewide losses in consumer spending could cost the Tampa Bay Area and all of Florida more than 11 percent of Gross Regional Product and Gross State Product, respectively, and 230 thousand jobs in the Tampa Bay Area and about 1.4 million jobs throughout Florida in 2020.

Coronavirus disease (COVID-19) is a novel infectious disease with common symptoms of fever, dry coughing and shortness of breath that has spread from its origins in China to nearly every country in the first few months of 2020. Patients with compromised immunity or other health problems are highly susceptible to COVID-19, especially older individuals, who may face severe complications and death.

COVID-19 has infected more than 1.8 million people around the world and killed more than 100,000[1]. More than half a million people have been infected with more than 19,000 deaths in the United States. According to the Florida Department of Health, more than 19,000 people have been diagnosed with the disease in Florida, with more than 350 deaths as of April 13, 2020[2].

While the number of diagnosed patients is relatively small, there are clear economic effects of this pandemic, including significant costs to the health care system which could become worse if the volume of required hospitalizations overwhelms hospital capacity and staffing. Moreover, an extended economic shutdown that is required to prevent the further spread of the coronavirus has already inflicted severe consequences for the US economy.

[1] As of April 9, 2020. https://www.worldometers.info/coronavirus/#countries
[2] http://www.floridahealth.gov/diseases-and-conditions/COVID-19/

In light of Governor DeSantis' declaration of a state of emergency for Florida on March 11, the Tampa Bay Regional Planning Council (TBRPC) has prepared a preliminary analysis of COVID-19's impact on the state and Tampa Bay Area economy. As new data concerning the present crisis are developed, TBRPC will update the study accordingly.

Economic Impacts of Pandemics

On March 12, 2020, Wall Street saw the biggest drop on stock market indices since Black Monday in 1987 as the magnitude of the COVID-19 crisis became clear. In response, central banks around the world cut interest rates to keep the global economy afloat. News media reported on nationwide runs on toilet paper and other essential home supplies while most other consumer expenditures slowed to a stop. By March 25th, 3.3 million Americans had applied for unemployment benefits, a historical high[3]. Within three weeks, that number rose to more than 17 million unemployed, or about 15 percent of the labor force. In contrast, the Great Recession of 2007-9 took two years to eliminate 8.7 million jobs, contracting the economy by 4.2 percent[4].

All of these reactions indicate broad and long-lasting economic fallout from the pandemic, possibly outlasting the spread of the disease itself. While Florida's share of all US COVID-19 cases is low (92 cases per 100,000) compared to some states (it is ranked ninth[5]), Florida's dependence on travel and tourism leave the state among the three or four most highly exposed to the national impacts of COVID-19[6].

Broadly speaking, pandemics impact the economy through healthcare costs, shocks to consumer spending, and loss of business productivity in addition to excess deaths. While the COVID-19 pandemic is a developing phenomenon, it is likely that the healthcare costs associated with treating the sick and preventing the further spread of the disease will be a relatively small share of the pandemic's broad economic costs. Instead, most economic costs are associated with the effects of 'social distancing,' a mostly voluntary minimization of contact between members of the public in order to stem the infection rate of the disease. Social distance, whether it is voluntary or not, will drive impacts to consumer spending and business productivity as well as supply chain disruptions. For Florida's economy, social distancing will mean devastating impacts to an $86 billion hospitality industry.

Economic Impacts from Influenza Epidemics

In 2010, Sandia National Labs prepared scenario simulations for a situation similar to what the US is currently experiencing, with a focus on two different influenza pandemic scenarios[7]. Weighed against a slowing economy, Sandia modeled the economic impacts of an Avian Flu and a Swine Flu pandemic on the US, where each scenario considered different intervention and social isolation decisions. Table 1 reproduces the key findings from similar studies conducted by other interested parties and Sandia.

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[3] https://www.tampabay.com/news/business/2020/03/26/florida-unemployment-claims-explode-amid-coronavirus-layoffs/

[4] https://en.wikipedia.org/wiki/Great_Recession_in_the_United_States

[5] https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html#states

[6] Oxford Economics ranked Florida 4th in the most exposed of all of the states to the economic effects of COVID-19. https://fingfx.thomsonreuters.com/gfx/editorcharts/jbyprqraveo/index.html

[7] Economic and Policy Implications of Pandemic Influenza. Sandia Report SAND2010-1910. March 2010.

Table 1: Economic Modeling of Influenza Pandemics

Pandemic Economic Studies	*Geography*	*First Year Gross Domestic Product Impact*	
		Low Estimate	High Estimate
McKibbin (Brookings Inst.)	Pacific Rim countries	-0.6%	-5.5%
Congressional Budget Office	United States	-1.0%	-4.25%
*Sandia Nat'l Labs (Avian Flu)**	United States	-1.2%	-3.5%
Sandia Nat'l Labs (Swine Flu)	United States	-1.0%	-2.9%

Sources: CBO, 2006. A Potential Influenza Pandemic: Possible Macroeconomic Effects and Policy Issues. .McKibbin, W. 2006. Global Macroeconomic Consequences of Pandemic Influenza, Washington, D.C. Brookings Institution, Sandia National Labs, 2010. Economic and Policy Implications of Pandemic Influenza.

Of all of these studies, only McKibbin is close to the disruption that the United States is likely to experience but only focuses on a limited number of sectors in various Pacific Rim countries. Depending upon the impact of the recently passed "stimulus" bills, the economy may experience contractions of historic proportions significantly beyond those anticipated in those studies.

Simulating the Economic Impact of COVID-19 on the Florida and Tampa Bay Area Economies

TBRPC has modeled the economic impacts of COVID-19 on the Florida and Tampa Bay area economies by focusing on two dimensions of impact: **mortality effects** and the **consumer spending and supply chain effects** response to the pandemic. Because there is so much variation in estimates for both kinds of impacts they are discussed in separate sections.

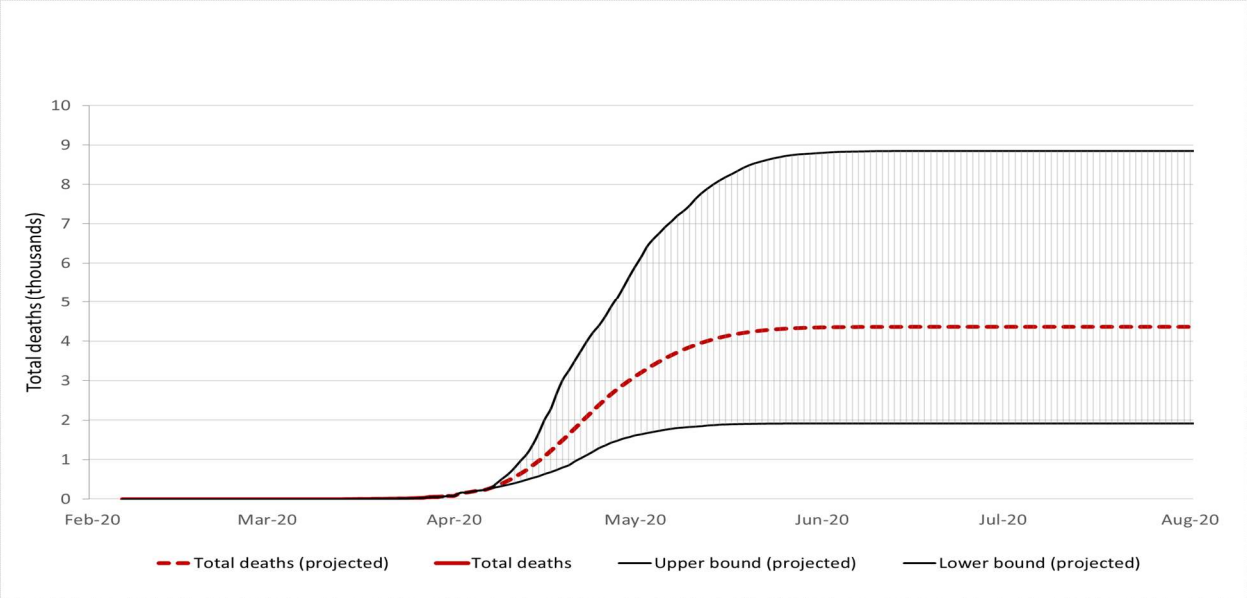
Mortality Effects: Three Mortality Scenarios for COVID-19

TBRPC has generated three scenarios to present a range of different potential morbidity and mortality outcomes, based on a recent (and frequently updated) forecast by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington for hospitalization and death impacts for each state and the nation. Figure 1 depicts the *low mortality*, *projected mortality* and *high mortality* estimates (scenarios) for Florida deaths stemming from COVID-19. Figure 1 is based on the estimate issued by IHME on April 8, 2020 with a forecast ranging from 1,670 to nearly 12 thousand deaths from COVID-19 with a projected mortality of 4,357[8].

Florida is likely to be able to manage demand for beds including in intensive care units, according to IHME's recent inventory of hospital capacity in the state. However, there is still a significant shortage of ventilator units. No information is available at this time on the Tampa Bay Area's hospital capacity.

[8] https://covid19.healthdata.org/united-states-of-america/florida.

Figure 1 COVID-19 Mortality Projections in Florida



Source: The Institute for Health Metrics and Evaluation (IHME), 2020. http://covid19.healthdata.org/projections

In line with the IHME mortality estimates, these three scenarios are called *low mortality*, *projected mortality* and *high mortality*.

COVID-19 Mortality Impacts on the Tampa Bay Area and Florida Economies

Increased deaths from the coronavirus directly impact the economy. Each individual who dies no longer spends money in the economy or generates demand for intermediate investment in production and supply chains that provide goods for future sales. Depending upon the age of the deceased, increased mortality could decrease consumer spending over a decade or more than would otherwise be expended had the deceased recovered from the disease.

Generally speaking, analysts use the case fatality rate (CFR) to describe the number of deaths that occur as the result of a pandemic. However, the CFR is likely to be unreliable until the pandemic is over and a more accurate accounting can take place. In the meantime, TBRPC is using available mortality estimates by age, as developed by the World Health Organization (WHO)[9].

Using WHO's death rates by age data, TBRPC modeled the loss of life from COVID-19 by simulating a change to population survival rates by age cohort in each of the Tampa Bay Area's counties and the rest of Florida in three "what-if" scenarios, using the deaths data identified in Table 2, below, in the REMI PI+ model.

[9]Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf

Table 2: 2020 Mortality and its Economic Impacts on the Tampa Bay and Florida Economies

	Tampa Bay Area			Florida (All Counties)		
Scenario	Low Mortality	**Projected Mortality**	High Mortality	Low Mortality	**Projected Mortality**	High Mortality
*Hospitalizations^*	10,456	25,298	54,292	104,557	252,980	542,916
*Deaths^*	153	436	1,055	1,532	4,357	10,548
Employment	-4,483	-12,750	-30,868	-34,943	-99,378	-240,588
*Personal Income (Millions)**	-$13.1	-$37.2	-$90.1	-$98.1	-$279.0	-$675.5
*GRP/GSP (Millions)**	-$10.4	-$29.6	-$71.8	-$74.8	-$212.8	-$515.1

Source: The Institute for Health Metrics and Evaluation (IHME), 2020. http://covid19.healthdata.org/projections. TBRPC REMI PI+, 2020. ^TBRPC assumed that hospitalizations and death estimates for the Tampa Bay Area would be 10% of IHME's state estimate, consistent with area reported cases as a proportion of all state cases, as of April 1, 2020. *Currency Figures in current $, GRP is Gross Regional Product for the Tampa Bay Area and GSP is the state of Florida's Gross Domestic Product, both are the same concept as Gross Domestic Product but sized to geographic scale.

TBRPC used REMI PI+ to calculate the loss of spending activity and the indirect economic effects of that lost spending activity across the economy. For example, when hospitals experience an increase in patients there are direct costs of treating those patients: medications, medical expertise, beds, etc. There are also indirect costs associated with the hospital's supply chain: businesses that supply the linens, the surgical masks and respirators are affected by the change in demand for goods and services and thereby create or lose jobs depending on the demand for their services. PI+ forecasts both kinds of losses. Table 2 indicates the economic impacts on those three scenarios on the Tampa Bay and Florida economies in 2020. The **projected mortality** scenario is bolded because that scenario's impacts are considered together with the consumer spending and supply chain effects in the final section of this report. Each economic variable is explained in the Glossary.

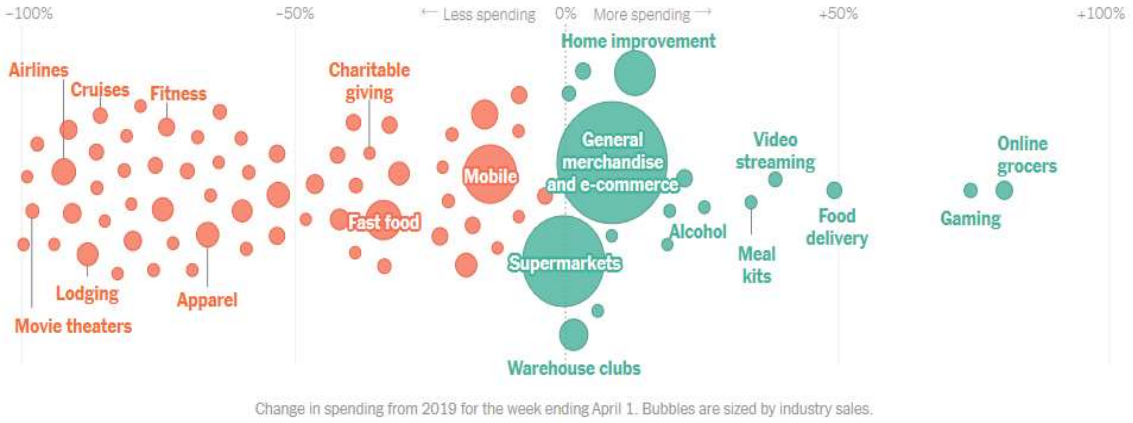
Consumer Spending Disruptions and Supply Chain Effects

COVID-19 arrived on American shores just as the economy was showing signs of a slowdown, with real GDP growth declining from the high of 2.9 percent in 2018 to 2.1 percent in the final quarter of 2019. Moreover, personal consumption growth in that same period was weak compared to the rest of 2019 and business fixed capital investment fell, even as increased government spending temporarily propped up real growth by 0.5 percent[10].

As Americans isolated themselves consumer spending patterns began to shift between sectors of the economy, as shown in Figure 2. As consumers spent more money on e-commerce sites, brick-and-mortar retailers and hospitality employers began large scale layoffs, even as elevated levels of some purchases ensured shortages of some common household goods and food. While many e-commerce firms have increased their workforce to meet the increased demand, hiring order fulfillment and delivery positions has not and is likely to not offset soaring brick-and-mortar job losses in many parts of the country, including Florida.

[10] https://lsa.umich.edu/content/dam/econ-assets/Econdocs/RSQE%20PDFs/Exec_Sum_February_2020.pdf

Figure 2: Change in US spending 2019-2020 for the week ending April 1



Source: Earnest Research, 2020 credit card expenditures, survey sample data. New York Times, April 11 2020. https://www.nytimes.com/interactive/2020/04/11/business/economy/coronavirus-us-economy-spending.html

In late March, several prominent forecasts of unemployment forecasted peak quarter Gross Domestic Product contractions of 10% in 2020 and unemployment of 8.5% (JP Morgan[11]), a 6.2% GDP contraction and 9% unemployment by Goldman Sachs [12], while Bank of America has forecasted a 10.4% GDP contraction and 15.6% unemployment[13].

Since Goldman Sachs made their forecast of peak quarterly national consumption impacts available, TBRPC used those estimates to first model the response of the US economy to demand shocks (change in consumer spending) from COVID-19, adjusted to JP Morgan's and Bank of America's estimates of 10% loss in Gross Domestic Product. Supply shocks are estimated changes to labor productivity due to factors such as school closures, increased absenteeism from warehouses and delivery jobs, transit and medical worker sick leave and the inefficiencies of remote work. As such, TBRPC modeled a **net decrease in US Gross Domestic Product of 10% ($2.17 trillion loss) in 2020**, initiating a deep recession[14].

If the Great Recession of 2007-2009 is an indicator, Florida's economy will do worse than the US economy and its recovery will lag that of the rest of the nation. As such, TBRPC's model of a national recession is useful for putting national economic impacts to Florida's economy in context. That context, or baseline, helps analysts think about how Florida might be different from the economic outcomes of the rest of the United States and to ensure that those differences are incorporated into the analysis.

As noted previously, Florida's economy is especially vulnerable to both changes in consumer spending by residents and by impacts driven by the hospitality industry[15]. As the state's budget is

[11] https://www.jpmorgan.com/global/research/fallout-from-covid19
[12] https://www.goldmansachs.com/insights/talks-at-gs/04-01-20-cares-act-impact-on-us-economic-outlook-f/report.pdf
[13] https://www.afr.com/markets/equity-markets/wall-street-slides-as-jobs-data-foreshadows-covid-19-economic-cost-20200404-p54h0h
[14] A 10 percent loss or greater may in fact be considered a depression.
[15] Oxford Economics ranked Florida 4th in the most exposed of all of the states to the economic effects of COVID-19. https://fingfx.thomsonreuters.com/gfx/editorcharts/jbyprqraveo/index.html

largely funded by sales tax, losses in the hospitality sector will also have devastating fiscal consequences in the short and long term in addition to job losses. Moreover, since most Florida businesses are small businesses, owners generally do not have extensive cash reserves. Even if the state returns to normal by the end of the year, many small businesses will simply not reopen even with major federal stimulus funds due to enduring balance-sheet damage.

Accordingly, TBRPC then nested reasonable assumptions about the additional impacts to Florida's hospitality sector within an economic model simulation that captured both national impacts and statewide COVID-19 impacts on the Tampa Bay Area and the state. Table 3 summarizes the national impacts to consumer spending, adapted from the Goldman Sachs estimates.

Table 3: Assumed National and Florida Consumer Spending Sector Impacts from COVID-19

National Impacts + Florida adjustments	Peak Impact	National Impacts + Florida adjustments	Peak Impact
Hospitals/Outpatient Care	+15%	Accommodation and Food Service	-75%
Casinos/Gambling	-90%	Air Travel	-96%*
Sports & Entertainment	-90%	Prepared foods & Groceries	+5%
Expenditures in the US by foreigners	-20%	Personal Care	-65%
Public transportation	-75%	Education Services	-15%
Household maintenance	-65%	Non-profit services	-15%

Source: Adapted from Goldman Sachs, 2020[16]. TBRPC, 2020. *https://thehill.com/policy/transportation/492082-airline-travel-has-dropped-96-percent-amid-coronavirus

Economic Impacts of Consumer Spending Losses and Supply Shocks

Building on two assumptions—that 2020 US Gross Regional Product losses are about 10.0% and that while peak impacts occur through the end of the second quarter of 2020, the federal stimulus bills will moderate the severity of the recession, beginning with the third quarter of 2020, leading into 2021. TBRPC modeled the economic impacts of consumer spending shocks related to social distancing for both 2020 and for impacts from 2020 through 2030. Table 4 summarizes the economic impacts for the six county Tampa Bay Area and for all of Florida. It is important to note that employment impacts are different from unemployment claims. In addition to underreporting due to difficulties with the state unemployment website and eligibility, TBRPC models net annual change in jobs—estimating the loss of jobs that are both eligible and ineligible for unemployment benefits but also jobs that would have otherwise been created in a stronger economy but now are not going to be created.

Table 4: Consumer Spending Total Impacts

	Tampa Bay Area	Florida
2020 Total Employment Impacts	-218,000	-1,360,000
*2020 Personal Income (Millions)**	-$19,940	-$123,200
*2020 Gross Regional Product (Millions)**	-$20,930	-$126,200
2020 Gross Regional Product Change (%)	-11.3%	-11.4%

Source: TBRPC REMI PI+ (2020) *Currency Figures in current $

In this preliminary analysis, TBRPC shows that the Tampa Bay Area suffers relatively less than Florida as a whole. While it is tempting to analyze why the region's strengths may limit some of

[16] Goldman Sachs provides peak quarterly impact assessments of consumer spending impacts. TBRPC used those estimates to create an annualized estimate for each spending category.

the damage experienced by the rest of the state, there may not yet be enough information to confirm this finding. Instead, as new data become available TBRPC will update its findings and draw the appropriate conclusions about the regional economy once the state Department of Revenue releases more recent data regarding retail sales by county.

Summary Impacts and Conclusions

Table 5 summarizes the combined projected mortality economic impacts for Florida and TBRPC's calculation of regional deaths and the economic impacts of the national recession and statewide economic losses.

Table 5: Projected Mortality and Consumer Spending Total Impacts

	Tampa Bay Area	Florida
2020 Total Employment Impacts	-230,750	-1,390,870
*2020 Personal Income (Millions)**	-19,980	-123,290
*2020 Gross Regional Product (Millions)**	-20,960	-126,270
2020 Gross Regional Product Change (%)	-11.4%	-11.4%

Source: TBRPC REMI PI+ (2020) *Currency Figures in current $

As shown in this analysis, a contraction of the US economy of 10% and the increased mortality rate will lead to an 11.4% loss in the state Gross Domestic Product and in the Tampa Bay Area. However, the COVID-19 Pandemic and its economic consequences are difficult to forecast from a relatively early stage in its spread across Florida. As such, it is far too early to assume that the death toll will follow IHME's projected mortality forecast and may veer sharply toward the high or the low estimate, depending on how successful Florida's efforts to contain the pandemic will be. The economic impacts of COVID-19 are also likely to be higher than this analysis anticipates. TBRPC will update this report in the summer of 2020 to account for the latest estimates.

Key Takeaways

- While Florida has fewer per capita coronavirus cases than many states, it is one of the most vulnerable states to its economic impacts due to the state's age profile and dependence on tourism

- Even though the Tampa Bay Area has relatively few of the state's coronavirus cases (about 10 percent or less), its economy is likely to be influenced by a national and statewide downturn even more than actual infections or stress on area hospitals

- A 10 percent decline in Gross National Product will lead to greater losses in Florida and the Tampa Bay Area, about 11 percent each

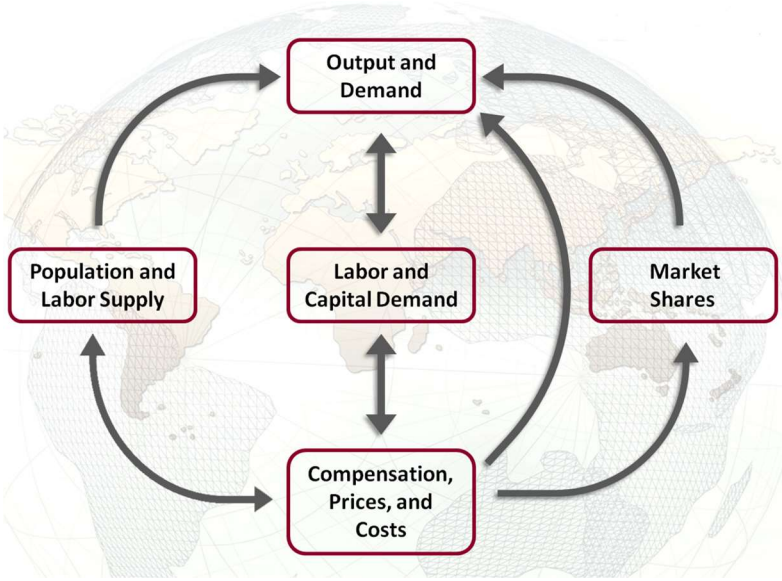
Appendix: About REMI PI+

REMI PI+ is an economic modeling tool that supports economic and demographic analysis of many different policy issues. In this case, TBRPC used REMI PI+ to analyze how COVID-19 impacts the Tampa Bay Area and Florida economies. The REMI model builds upon decades of research and various data sources, econometric models and an input-output model that tracks the flow of spending through the economy from consumer or producer spending to all other sectors of the economy.

REMI PI+ Model Structure

Figure 1 depicts the interactions within the REMI model among five economic "blocks."

Figure 1 The REMI Model



Imagine a factory (the Output block) that sells to all the sectors of final demand as well as to other industries. The Labor and Capital Demand block shows how labor and capital requirements depend both on output and their relative costs. Population and Labor Supply are shown as contributing to demand and to wage determination in the product and labor market. The feedback from this market shows that economic migrants respond to labor market conditions. Demand and supply interact in the Wage, Price and Profit block. Once prices and profits are established, they determine market shares, which along with components of demand, determine output.

The REMI model brings together all of the above elements to determine the value of each of the variables in the model for each year in the baseline forecasts. The model includes all the inter-industry relationships that are in an input-output model in the Output block, but goes well beyond the input-output model by including the relationships in all of the other blocks shown in figure 5.4.

In order to broaden the model beyond the standard Input-Output methodology, it was necessary to estimate key relationships. This was accomplished by using extensive data sets covering all areas in the country. These large data sets and decades of research effort have enabled REMI to

simultaneously maintain a theoretically sound model structure and build a model based on all the relevant data available.

The model has strong dynamic properties, which means that it forecasts not only what will happen but when it will happen. This results in long-term predictions that have general equilibrium properties. This means that the long-term properties of general equilibrium models are preserved without sacrificing the accuracy of event timing predictions and without simply taking elasticity estimates from secondary sources.

Glossary

Employment. Jobs, part-time, full-time or a mix thereof.
Personal Income. Personal Income represents wages and income for all jobs.
Gross Regional Product. Market value of goods and services produced by the six Tampa Bay Area counties (Gross Regional Product, or GRP) or the entire state of Florida (Gross State Product, GSP), depending upon context. Similar to Gross Domestic Product, but at the sub-national level.

Prepared by Randy Deshazo, Director of Planning and Research, on 4/9/20 using REMI PI+, V2.3
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