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The effects of the pandemic on the economy of Hawaii

by

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Working Paper No. 2022-4

July 31, 2022

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Abstract

The economy of Hawaii was extremely vulnerable to the COVID-19 pandemic due to its heavy reliance on tourism. This article is a thorough survey of issues affecting a tourism-dependent open economy during the COVID-19 pandemic. We provide a comprehensive analysis of the pandemic's economic impact in Hawaii by comparing the actual outcomes during the affected period with the pre-pandemic forecast. We explain why Hawaii's experience differed from other states, suggest reasons for a slow recovery, and discuss the pandemic's lasting effects in the Islands. We also describe changes in the economic forecasting process necessitated by the increase in uncertainty.

1. Introduction

COVID-19 and the ensuing public-health counter-measures have triggered an unprecedented decline in economic activity. The recovery path has been uneven, particularly in Hawaii. Decision making in such a rapidly-changing environment required novel tools to monitor economic conditions in real time and an adjustment in forecasting workflows. Hawaii's experience was unique among US states due to its heavy reliance on tourism. It was an outlier in both the epidemiological and the economic dimension; it had the lowest case and death rate in the nation, while at the same time it suffered the highest job losses. Hawaii also seemed to be more responsive to local waves of the virus than other states (Fuleky and Szapudi, 2022).

The economy of Hawaii was extraordinarily vulnerable to the economic impacts of the COVID-19 pandemic due to its heavy reliance on tourism, dependence on air travel, and intensive service orientation. The dominance of the tourism industry in Hawaii meant that the economy was hurt badly by initial stay-at-home orders and travel restrictions. While pent-up demand led to a rapid recovery of US tourists in the summer of 2021, a year later Hawaii is yet to see a recovery of international tourists, and state real GDP remains below 2019 levels. Different industries were affected in different ways, with the impacts most apparent in the Accommodation and Food Services sector. Federal income support has been crucial to sustaining Hawaii incomes during the economic downturn. Long-term outcomes remain uncertain as the world is hit by yet another COVID-19 variant.

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Our paper contributes to a growing literature analyzing the impact of the COVID-19 pandemic on economic conditions. Early research in this area was surveyed by Brodeur et al. (2021), and research on labor market outcomes was surveyed by Handwerker et al. (2020). Altig et al. (2020) documented an unprecedented increase in economic uncertainty during the COVID-19 pandemic. Many scholars recognized that the new reality required more timely assessment and forecasting tools. Using daily statistics on consumption, employment, business revenue, job postings, and other variables Chetty et al. (2020) show that the slowdown in economic activity was partly driven by reductions in consumption. Several papers presented methods to incorporate real-time information into predictions. For example, Lewis et al. (2020) developed a weekly economic index using 10 different economic variables to track the economic impact of COVID-19 in the United States.

The impact on tourism dependent economies is especially noted. Oxford Economics (Dass, et. al., 2020) dramatically reduced their forecasts for global tourism as countries closed their borders early in the pandemic. Fotiadis, et. al. (2021) estimated that the drop in international tourist flows ranged from 30.8% to 76.3%, though of course this also varied significantly by destination. Behsudi (2020) and Milesi-Ferretti, (2021) noted that tourism dependent economies are among the most impacted by the pandemic. Plzáková and Smeral (2021) examine the impact of the pandemic on tourism in Europe. Gounder and Cox (2022) find the economic impact in small island developing countries to be greater if these economies were more dependent on tourism. Similarly, Licchetta et. al. (2022) showed how countries with greater contributions from travel and tourism suffered greater declines in GDP, but that since the US economy as a whole is less dependent on tourism, the industry's economic impact had been smaller than in more tourism dependent countries in Europe. Nonetheless, the within-country local impacts were sizeable in parts of the USA that are more tourism dependent. Fang et. al. (2020) show how economic policies had positive effects on the leisure and recreation industry, boosting the economic recoveries of tourism destinations. Qiu at. al. (2020) found that tourism generated significant social costs during the pandemic due to perceived risks of COVID-19 transmission. Usher (2022) documented the travel experiences of surfers, both traveling and hosting during six months of the pandemic, noting the need to diversify coastal economies.

Several studies examined the impacts on specific tourist economies. Agovina and Musella estimate a 79% loss of value added in the city of Sorrento. Lim and To (2022) document the unprecedented decline in gambling revenue in Macao as a result of the loss of tourist arrivals during the COVID-19 pandemic. Cardenete et. al. (2022) use simulations to estimate a fall in GDP of between 16.9m and 17.6m Euros in Andalusia. Kumar and Patel (2022) examine the impacts in the Pacific Island nations of Fiji, Tonga, and Vanuatu finding that negative tourism shocks were significant in explaining the decline in GDP in all three countries.

Assaf and Scuderi (2020) offer strategies for the government and the tourism industry to adjust to the pandemic and support its recovery. Similarly, the UN World Tourism Organization (2020) made a number of recommendations to use the decline in tourism as an opportunity to transform tourism in ways that reduce its cultural and environmental impact.

Narrowing the focus to Hawaii, Fuleky (2022) used 18 high frequency indicators to nowcast economic conditions during the COVID-19 pandemic. He noticed an extremely frail recovery and attributed it to the state's heavy reliance on tourism. Bond-Smith (2022) discusses forward looking strategies to diversify the economy of Hawaii and generate resilience to future shocks. The dichotomy between Hawaii's low case counts and high economic losses also prompted reviews of public health policies in the state: Chyba et al. (2022) and Lee et al. (2022) examine epidemiological modeling considerations to forecast public health outcomes, while Juarez et al. (2022) analyze the effects of COVID-19 vaccine mandates in the state.

What distinguishes our study from others is that we provide a thorough survey of issues affecting a specific tourism-dependent open economy during the COVID-19 pandemic. We carry out a detailed analysis of the pandemic's economic impact in Hawaii, explain why Hawaii's experience differed from other states, and describe changes in the forecasting process necessitated by the increase in uncertainty. Our findings carry through to other small, advanced, open economies with a similar structure.

2. How is Hawaii different?

There are several unique characteristics which made Hawaii especially vulnerable to the effects of the COVID-19 pandemic. Its industrial structure, concentrated on tourism services, relies on interaction between people. Its high cost-of-living implies a typically lower unemployment rate than the rest of the USA, with people leaving when there are better opportunities elsewhere. Yet its tourism industry is far more international than many other tourist destinations in the United States.

2.1 Hawaii's industrial structure

Hawaii's economy is heavily concentrated in tourism services, while agriculture, the state's former specialty, has disappeared almost entirely. The tourism industry, including all of the up and downstream activities, makes up approximately a quarter of the economy. In 2019, the state welcomed a record 10 million tourists, and on any given day, about 15% of the people in the state were tourists.

Small advanced economies are naturally more specialized in the specific industries where they hold an advantage. Specialization provides benefits due to both comparative advantage and local external and internal increasing returns to scale (Bond-Smith and McCann, 2020; Bond-Smith,

2021). But unlike so-called "small advanced economies" that refer to national economies, Hawaii is also as open as possible to its largest 'trading partner' by being a state of the USA. This openness implies even greater specialization (Bond-Smith and McCann, 2020). Yet Hawaii also differs from other states because it is farther from other states, relatively small, geographically closer to Asia, and holds close cultural ties to Asia. As a result, Hawaii's specialization in the tourism industry is far more international than other tourist areas in the United States, such as Las Vegas or Miami, that mostly serve domestic tourists. This unique combination of forces makes Hawaii an especially interesting place to examine the economic impacts of the pandemic.

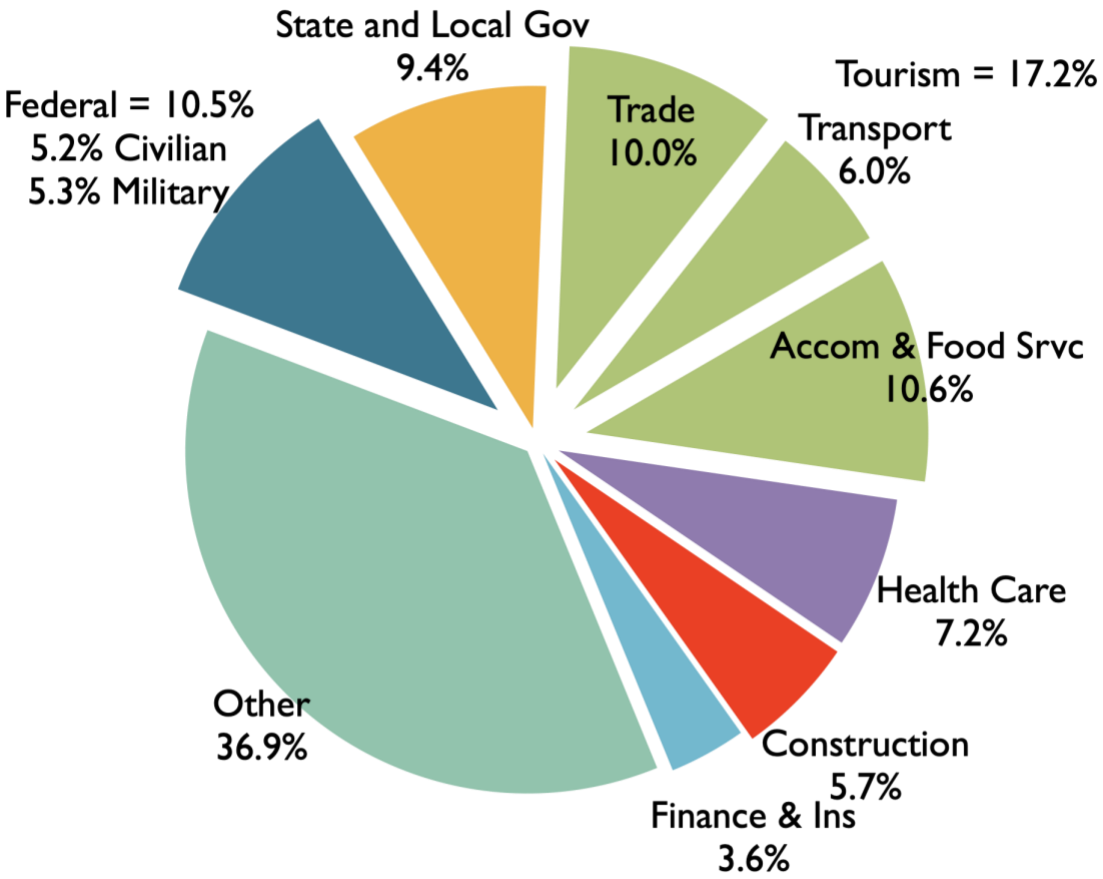


Figure 1: Contribution to Hawaii GDP by sector
Source: BEA, UHERO, DBEDT

Hawaii's economy is highly integrated with and open towards other US states, which reduces the barriers for Americans to visit the state in comparison with other tropical destinations. Furthermore, the US economy's openness to international trade and travel, also fosters trips from abroad to Hawaii. Over several decades, improvements in aviation technology have dramatically reduced the cost of flying to Hawaii. Hawaii's treasured climate, scenery, environment, and culture are key attractions for tourists, which—along with investment in resorts—have facilitated tourism demand.

The declining cost of transport, easy access from the US mainland, a rich natural and cultural landscape, and an open US economy, all contributed to the concentration of Hawaii's economy in the tourism industry, which in turn made Hawaii especially vulnerable to the economic impacts of the COVID-19 pandemic. Tourism demand and Hawaii's short-run economic fortunes depend crucially on macroeconomic conditions on the US mainland and in the global economy. When the economy is performing well, people are confident in their employment and income prospects, and are more likely to take a vacation. When jobs or incomes are at risk, people might hold back. Similarly, businesses are more likely to host or pay for conference travel when things are going well. Specialization in the tourism industry exposes the Hawaii economy to external macroeconomic conditions that affect tourism numbers. Hawaii's economic recovery is therefore closely linked to the economic recovery of the state's tourism markets (tourist-origins).

2.2 Where we were before Covid

In 2019 Hawaii's economy had entered a soft patch. While tourist arrivals were at record numbers, driven by tourists from the mainland, the number of international tourists had declined. Per tourist per day, spending declined by four percent, payroll job growth had started to decline, and population actually declined in 2019. While the US economy enjoyed the longest period of growth on record, Hawaii's economy-wide indicators suggested that continued growth was increasingly tenuous in the islands. Real GDP per capita was flat and the University of Hawaii Economic Research Organization (UHERO) forecasted very low or modest growth for the next few years (Bonham et. al. (2019)[1] as shown in Figure 2. In December 2019, UHERO forecasted real GDP growth of 0.9% in 2020 and 1.1% in 2021 (or 2.6% and 2.9% nominal GDP growth).

[1] The 2019 Q4 forecast throughout this article refers to the forecast report from UHERO, Bonham et. al. (2019).

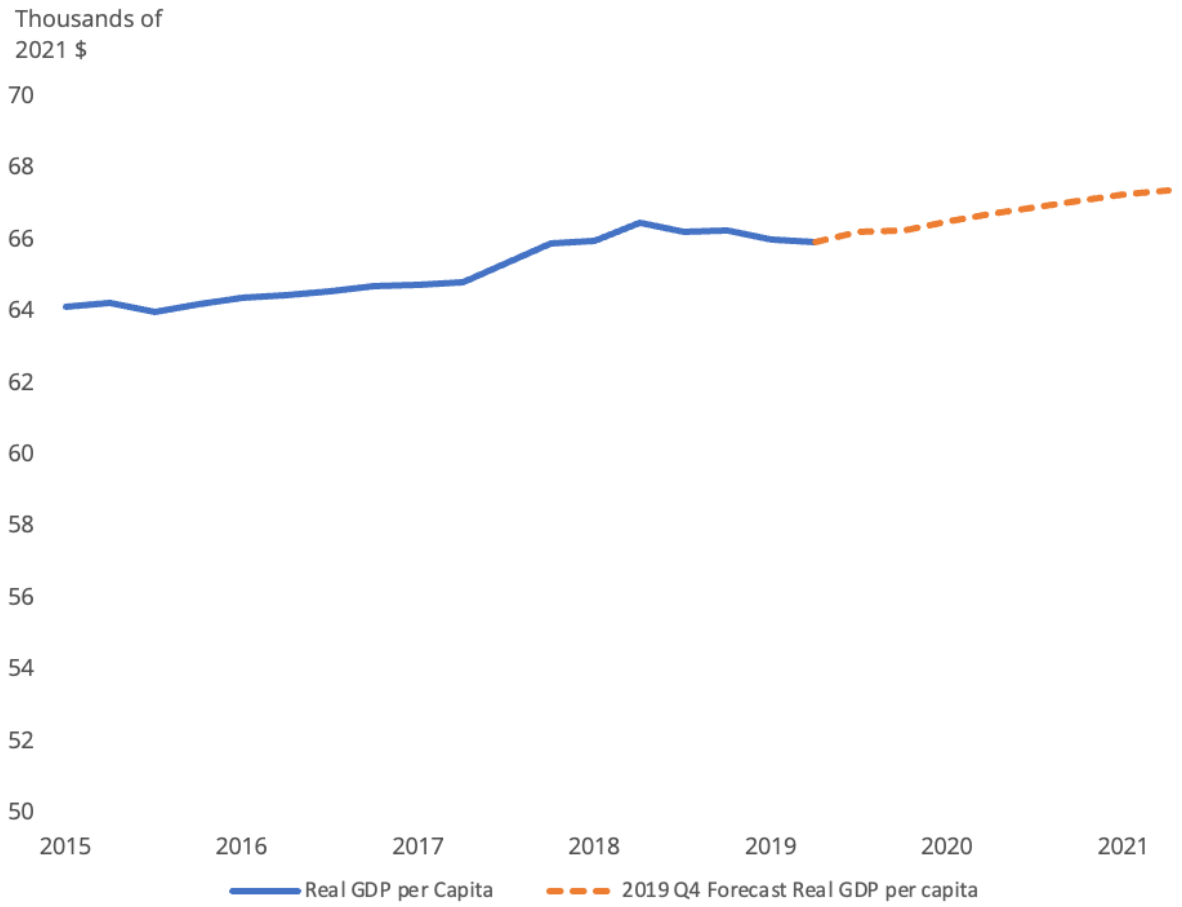


Figure 2: Real GDP per capita and UHERO Forecast in 2021 dollars. Vintage of data and forecast is 2019Q4.
Note: For the 2019 Q4 forecast vintage, GDP history was only available through 2019 Q2. The 2019 Q4 forecast is scaled by the subsequently (downward) revised 2019Q2 historical data.

For Hawaii, the soft patch was not really an unanticipated phenomenon. In many ways, Hawaii had already been falling behind for decades. Per tourist per day spending, shown in Figure 3, had followed a declining trend since its peak in 1992. Although tourist numbers continued to increase every year, seasonally adjusted total real tourism spending peaked in the first quarter of 1989. Since that time, total tourism spending has been relatively flat, punctured by the '90's recession, 9/11, the Great Recession, and most recently by the COVID-19 Pandemic.

Figure 3: Quarterly Total Real Tourism Spending in 2021 Dollars to Q1 2022, seasonally adjusted; and Tourist arrivals
Note: Nominal values deflated using the Honolulu Consumer Price Index

Since the tourism industry dominates Hawaii's economy, economic growth reflects a similar pattern. Following a long-lasting recession in the '90s, real GDP per capita in Hawaii peaked in 2005 and declined during the Great Recession. Real GDP per capita growth has been soft since then, not reaching this peak again until 2019, while the US economy as a whole grew 17% over the same period (See Figure 4).

The modest growth forecast in the fourth quarter of 2019 is a useful baseline for examining the impact of the COVID-19 pandemic. This broadly follows the method used in Bonham et. al. (2006) to assess the economic impact of 9/11 on Hawaii.

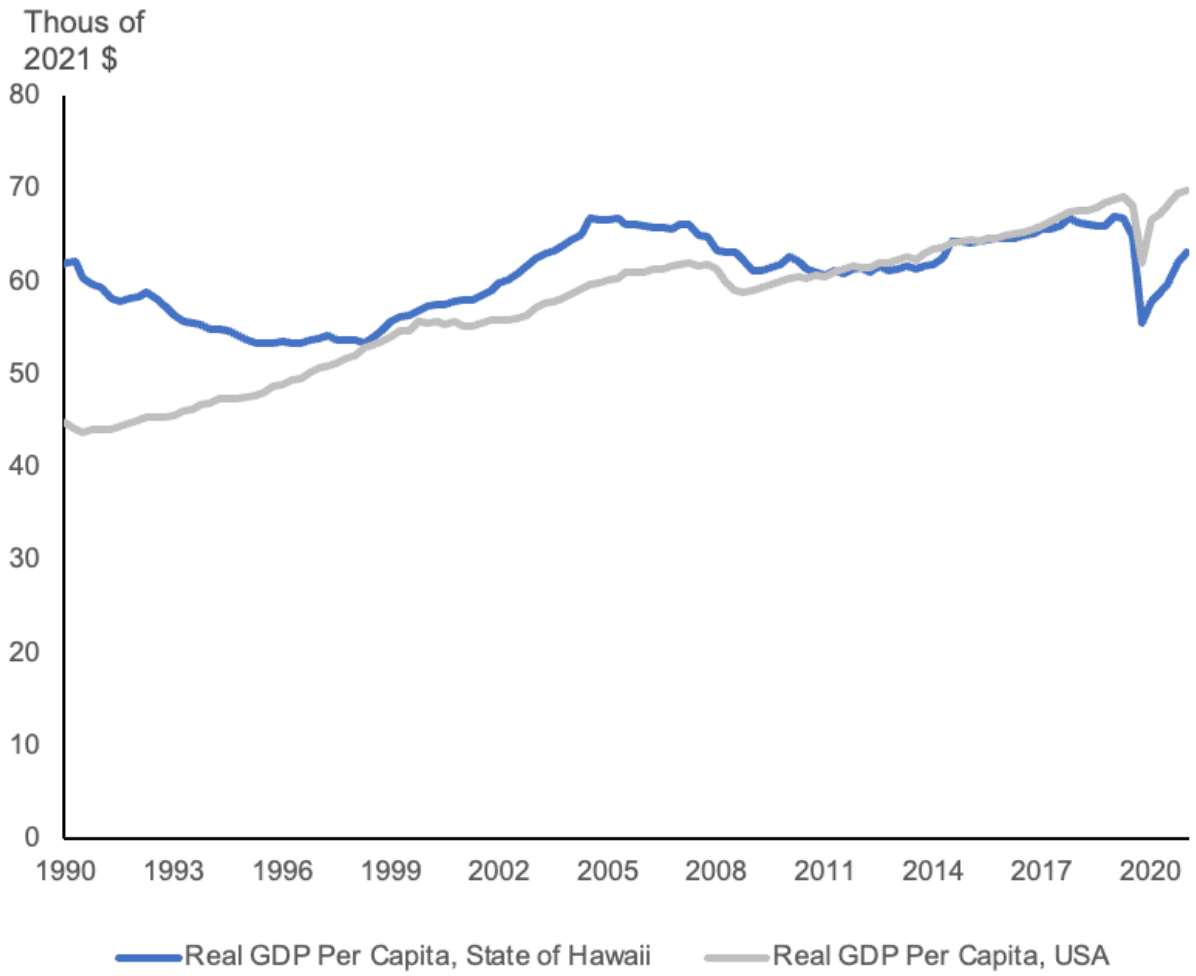


Figure 4: Real GDP per capita in 2021 dollars to Q3 2021 Hawaii and USA, quarterly, seasonally adjusted.
Notes: Nominal State GDP for Hawaii is deflated using the Honolulu Consumer Price Index; Nominal US GDP is deflated using the GDP deflator. 2021 Q1 and Q2 use UHERO population estimates. Annual population interpolated to quarterly frequency.

2.3 Covid in Hawaii

The economic impact of the COVID-19 pandemic on the economy of Hawaii is unique in the United States. While Hawaii was initially able to avoid a significant caseload by limiting the arrival of tourists and swiftly enacting stay-at-home orders, Hawaii also suffered the greatest employment impact of any US state. Later, as restrictions eased, Hawaii's economy continued to be buffeted by surges in case numbers during the Delta and Omicron waves of the pandemic.

The economic impacts of the pandemic in most states typically reflected government interventions that limited activity in order to reduce interactions between people and the spread of COVID-19. While this is especially true for Hawaii, there are unique nuances. Hawaii's reliance on tourism, which completely shut down early in the pandemic, hit the economy

particularly hard. Unemployment surged from 2.2% in March 2020 to 22.4% in April. Similarly, when restrictions were eased to testing and vaccination requirements for domestic travel, the number of US tourists quickly bounced back, reaching a record number in the summer of 2021. Yet this recovery included very few international tourists, due to travel restrictions remaining in place in other countries. As a result, Hawaii's economic recovery still lagged behind the rest of the US, with unemployment persisting at a much higher rate (See Figure 5).

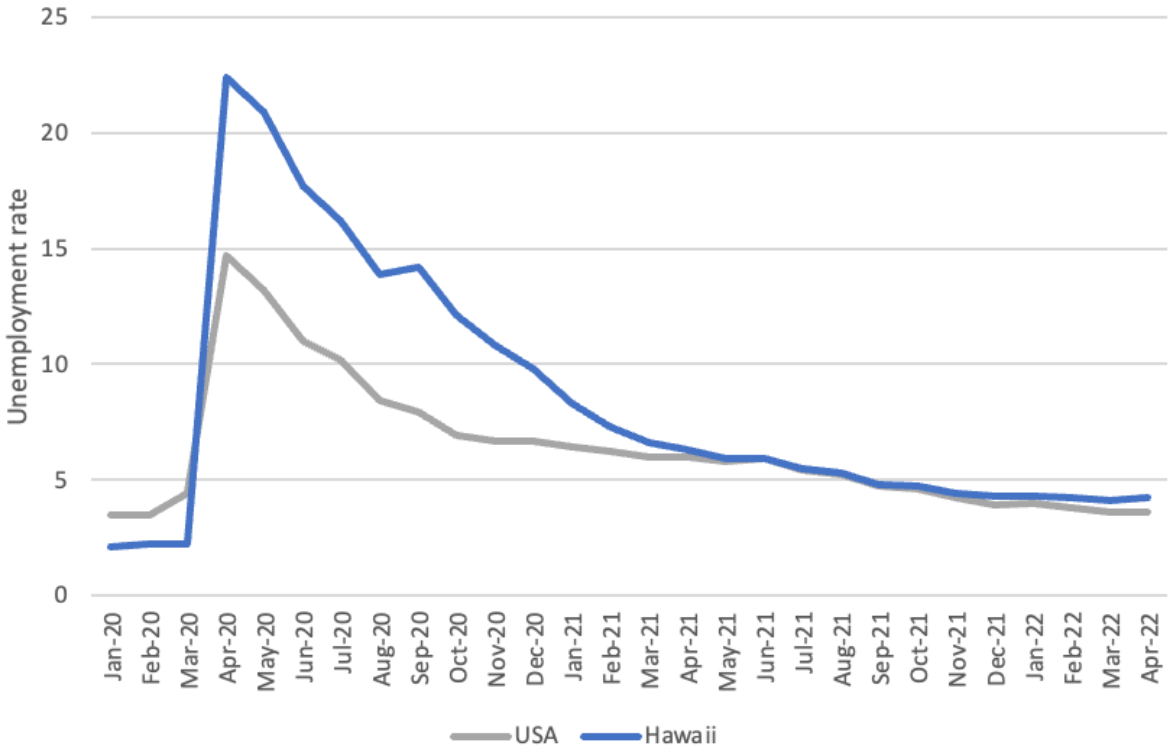


Figure 5: Unemployment rate USA and Hawaii, seasonally adjusted
Source: Bureau of Labor Statistics

Epidemiologically, Hawaii experienced very few cases of COVID-19 relative to the rest of the US until the Delta and Omicron waves of the pandemic in late summer 2021 and early 2022. With each of these waves, concerns about exposure to covid generated political debate and news stories about covid risk in Hawaii, leading to a substantial decline in tourist numbers. While infections varied considerably across the pandemic due to PCR testing capacity and utilization, hospitalizations provide a consistent measure of the severity of each wave. When hospitalizations ballooned, the Governor of Hawaii discouraged travel. The combined effect of politics, concerns about reinstating movement restrictions, and risks of contracting covid, reduced tourist numbers. While states in other parts of the US continued to see improving economic outcomes despite rising case numbers, Hawaii's economic growth stalled as the onset of each new wave of COVID-19 held back tourism (See Figure 6).

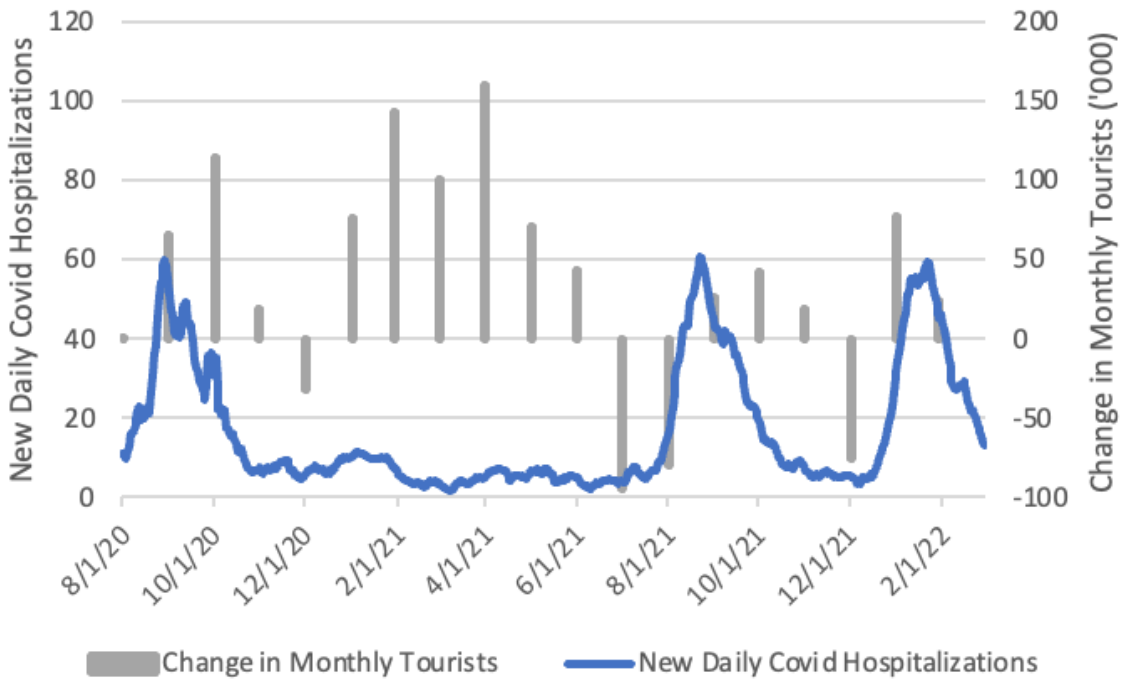


Figure 6: Covid Hospitalizations and change in monthly tourist numbers, seasonally adjusted
Source: Authors calculations using data from Hawaii Tourism Authority and Hawaii Department of Health

3. Economic forecasting in Hawaii

As noted above, the COVID-19 pandemic triggered an enormous economic shock, which called for new forecasting approaches and alternative data sources. UHERO (i.e. the research team that includes the authors) maintains a database of a wide array of economic and social indicators for the State of Hawaii and key external economies. The data is available via a "Data Portal" website, helping the public and stakeholders to navigate the economic landscape. UHERO also developed a model of the Hawaii economy consisting of over 200 behavioral equations and macroeconomic identities. The main purpose of the model is to forecast economic activity in the state. The time series entering the model are either observed at or aggregated to the quarterly frequency, enabling the generation of quarterly forecasts.

The model has four main components. 1) External drivers: since Hawaii is a small open economy, we start by generating forecasts for the external drivers of local economic conditions. The most important of these are the projected paths of the US and Japanese economies. 2) Tourism: Hawaii's main export, tourism is one of the key channels how external drivers affect the local economy. 3) Local macroeconomic conditions: the labor market, income, and construction activity are additional key components of the econometric model for the state. 4)

Industry level jobs and labor income for each county: forecasts for industry specific variables at the county level are obtained by disaggregating the state level forecasts.

Prior to the pandemic, UHERO released an updated forecast report once per quarter, but the high volatility and uncertainty of economic conditions during the pandemic necessitated adjustments in the methodology, such as a greater reliance on real-time data. We used daily or weekly data with very short release lags to inform our nowcasts and to anchor the starting point of forecasts. A subset of this high-frequency data was from traditional administrative sources, such as weekly unemployment insurance claims from the US Bureau of Labor Statistics, but in the wake of the COVID-19 outbreak, some companies also began sharing internal data that we used to track economic conditions with a very short lag. The weekly UHERO Economic Pulse index (Fuleky, 2022), discussed below in greater detail, synthesizes 18 timely indicators of tourism activity, labor market performance, mobility, and others to describe economic conditions in Hawaii.

To deal with the large uncertainty associated with potential outcomes during the pandemic, we also began releasing plausible forecast scenarios. Statistical estimates of uncertainty are typically based on past prediction errors, which were not applicable at a time of unprecedented volatility. Therefore, rather than solely relying on statistical estimates of uncertainty, the scenarios took into account a range of assumptions about virus spread, consumer behavior, willingness to travel, and public health policies. We described the assumptions in our forecast reports, which narrated both the baseline forecast, our projections for the most likely outcome, and the scenarios.

Incorporating high frequency information also helped to anchor industry specific forecasts. Figure 7 illustrates the evolution of short-term tourism forecasts with the passing of time. The red line shows the actual history available through May 2022, and the line segments in other colors show six-quarter ahead forecasts. The forecasts are typically finalized in the first or second month of the quarter, with nowcasts capturing the incomplete information about the given quarter. A key input into tourism nowcasts is the daily number of airline passengers, which encompass practically all travelers to the islands, both tourists and residents. As figure 7 demonstrates, our 20Q1 forecast made in February 2020 completely missed the imminent large decline in tourist arrivals, but our 20Q2 forecast finalized in April 2020 predicted the magnitude of the loss of tourists well. In fact, accurate nowcasts helped us bring the starting point of each forecast near the ultimate actual values for all subsequent vintages.

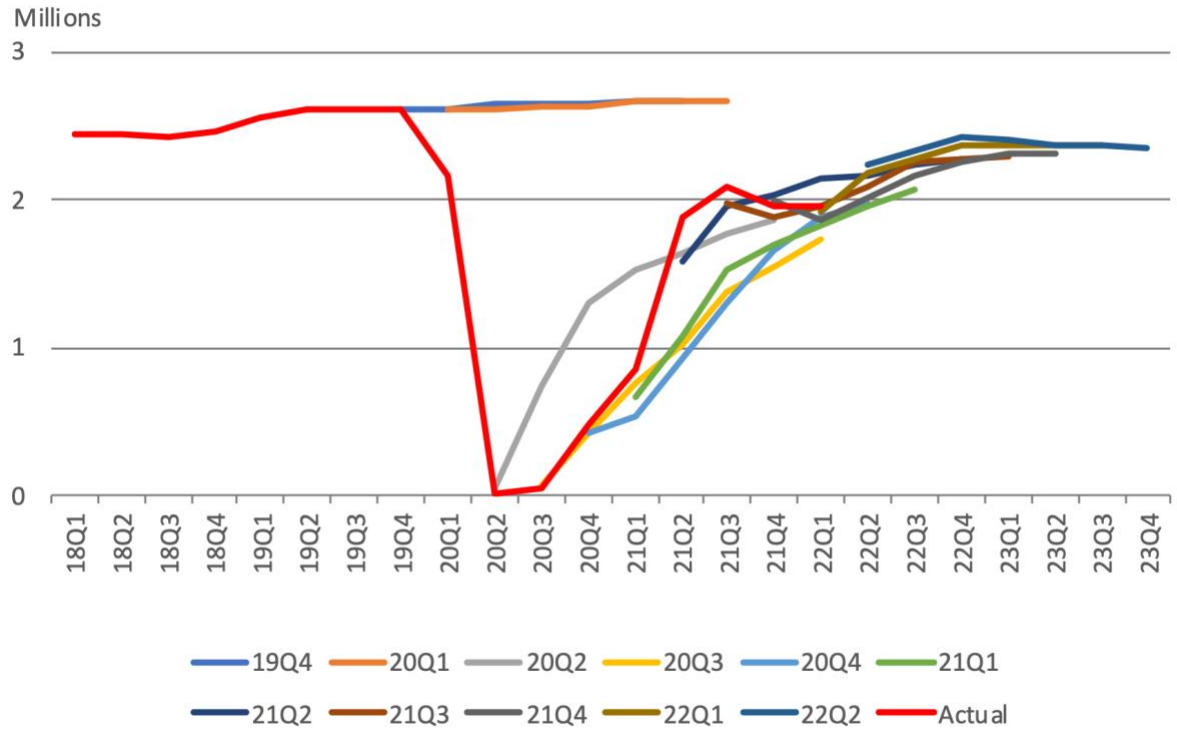


Figure 7: Forecast vintages of quarterly tourist arrivals.

4. Impact of the pandemic

The pandemic affected economic activity in Hawaii in a number of ways. When the threat of the pandemic emerged and when caseloads increased, people voluntarily reduced activity and contact with others. For long periods, the state government also implemented strict restrictions on movement, to limit contact and reduce the spread of the virus. The state government also placed restrictions on arrivals and travel between islands, such as a mandatory quarantine, and later vaccination or negative covid test requirements, reducing tourist numbers to Hawaii. This section discusses how the pandemic affected Hawaii.

4.1 Uncertainty

Unprecedented fluctuations called for novel tools to assess economic conditions. Researchers turned to non-traditional data sources to capture economic activity in real time. Fuleky (2022) developed the weekly UHERO Economic Pulse index to assess economic conditions in Hawaii. The index captured 79% of the overall variation in the underlying 18 high-frequency components and was robust to dropping any individual variable from the analysis. Since the index effectively consolidated the common signal about the business cycle, it was a useful summary measure of overall economic conditions. When normalized, by setting its peak in late February to 100% and the trough in mid-April to 0%, the values of the index represented the extent of recovery from the decline. Due to its timeliness, the index was used to nowcast the recovery from the COVID-

19 recession. Available four days after the reference week, the index predicted the evolution of job-gains—released 3-4 weeks after the reference month—very accurately. Needless to say, timely information of this kind was essential for anchoring initial conditions of forecasts, but also to support decisions by businesses and public leaders.

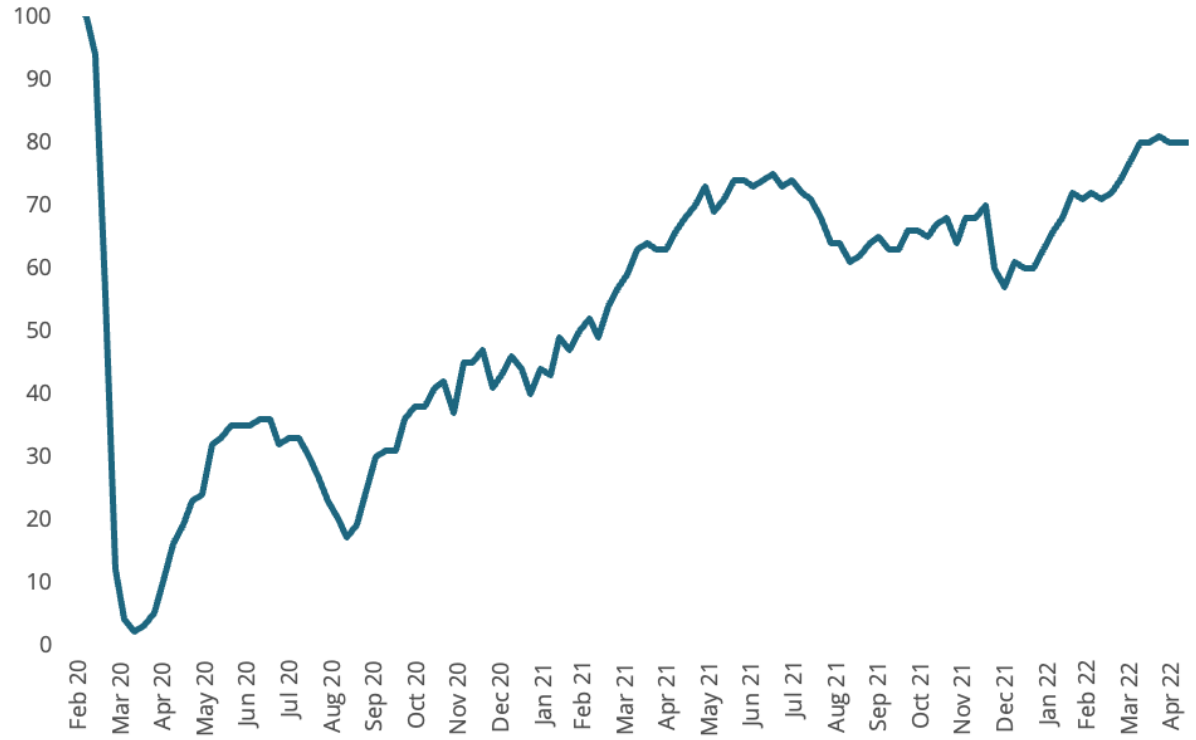


Figure 8: Weekly UHERO Economic Pulse Index

Notably, the periods when the UHERO Economic Pulse declined coincide with pandemic-related events. The initial lockdown had the greatest impact on activity. Later, subsequent waves of COVID-19 infections, in August and September 2020, and the Delta wave in August and September 2021, and the Omicron wave in late 2021, all led to declines in the UHERO Economic Pulse.

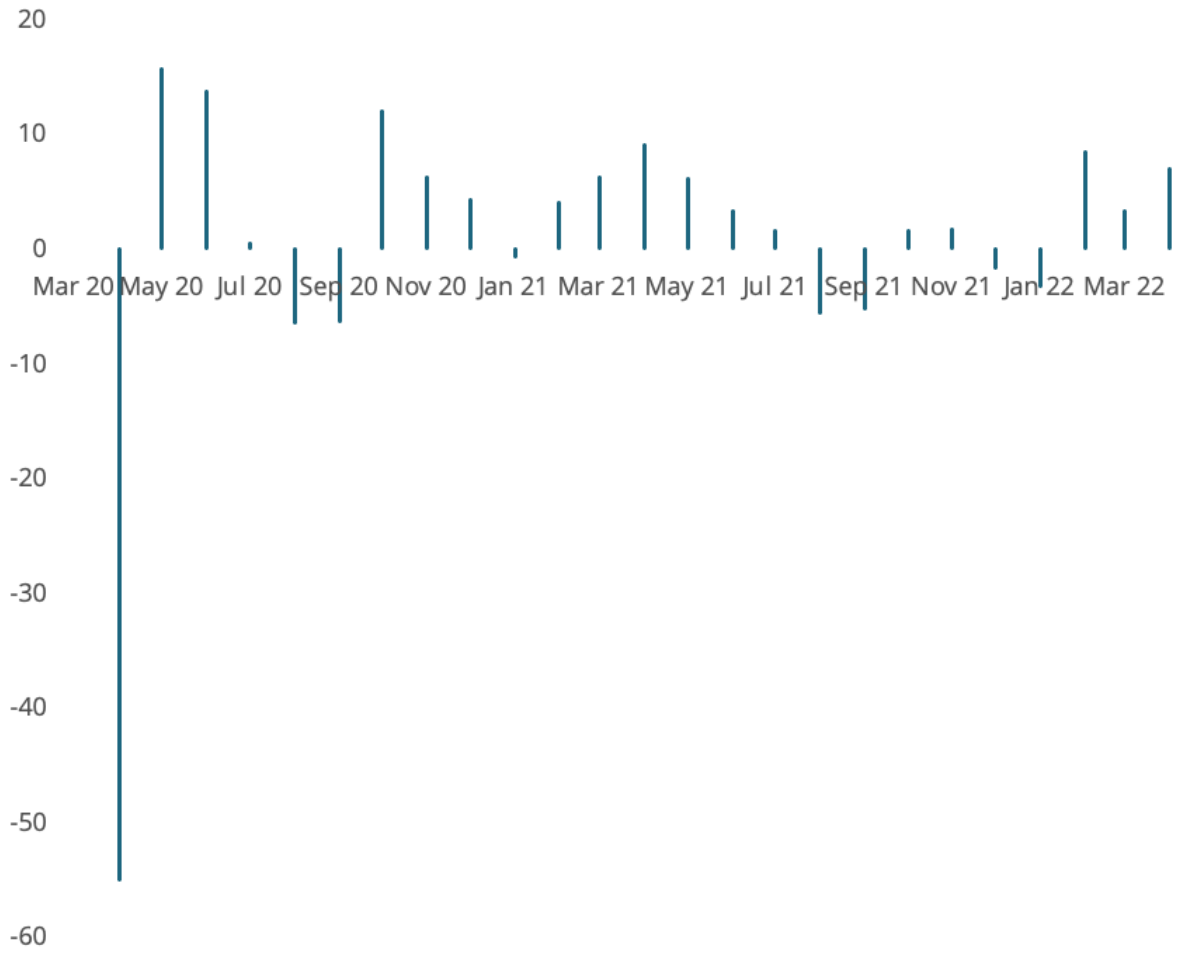


Figure 9: Monthly change in the UHERO Economic Pulse

The UHERO Economic Pulse shows that economic recovery was deeply affected by both government restrictions and the status of COVID-19. Hawaii consumers and businesses retrenched in response to waves of new infections. Even though fewer restrictions were imposed during the Delta wave, there was a significant fall-off in economic activity in the third quarter of 2021. Not surprisingly, changes in the number of jobs in Hawaii have closely matched the UHERO Economic Pulse.

Nonetheless, the impacts of additional waves appear to be diminishing as people become more used to living with COVID-19. As of early May 2022, the UHERO Economic Pulse had recovered to 80, well below the level of pre-pandemic activity, but a recent increase reflecting the economic recovery following the Delta and Omicron waves.

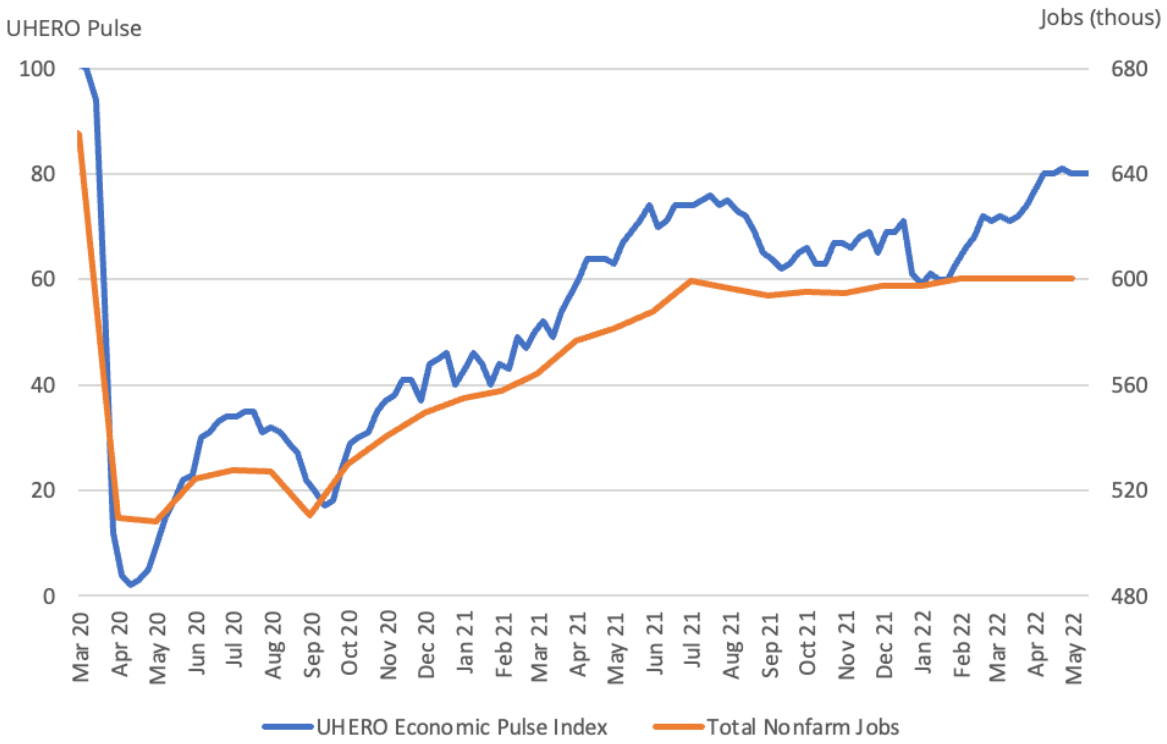


Figure 10: Weekly UHERO Economic Pulse and Monthly Total Nonfarm Jobs

4.3 Cases of COVID-19

Hawaii saw few cases of COVID-19 early in the pandemic when the US saw its first significant wave. Cases (as a percentage of the population) in the state also remained below the levels seen on the mainland during the August 2020 and 2021 waves. With each of these surges in case numbers, people voluntarily reduced activity and various restrictions were reimposed until case numbers declined. Cases peaked during the Delta wave at over 6200 per week at the end of August of 2021. Hawaii saw the highest number of cases during the more contagious Omicron wave that began in mid-December 2021, but hospitalizations did not exceed previous peaks. As of July 16, 2022, Hawaii has recorded 312,981 cases of COVID-19 with approximately half of those during the Omicron wave between December 2021 and mid-March 2022, and another quarter occurring during the Omicron BA sub-variants wave that began in late March 2022. By mid-January 2022, Hawaii has recorded 1,110 deaths from COVID-19.

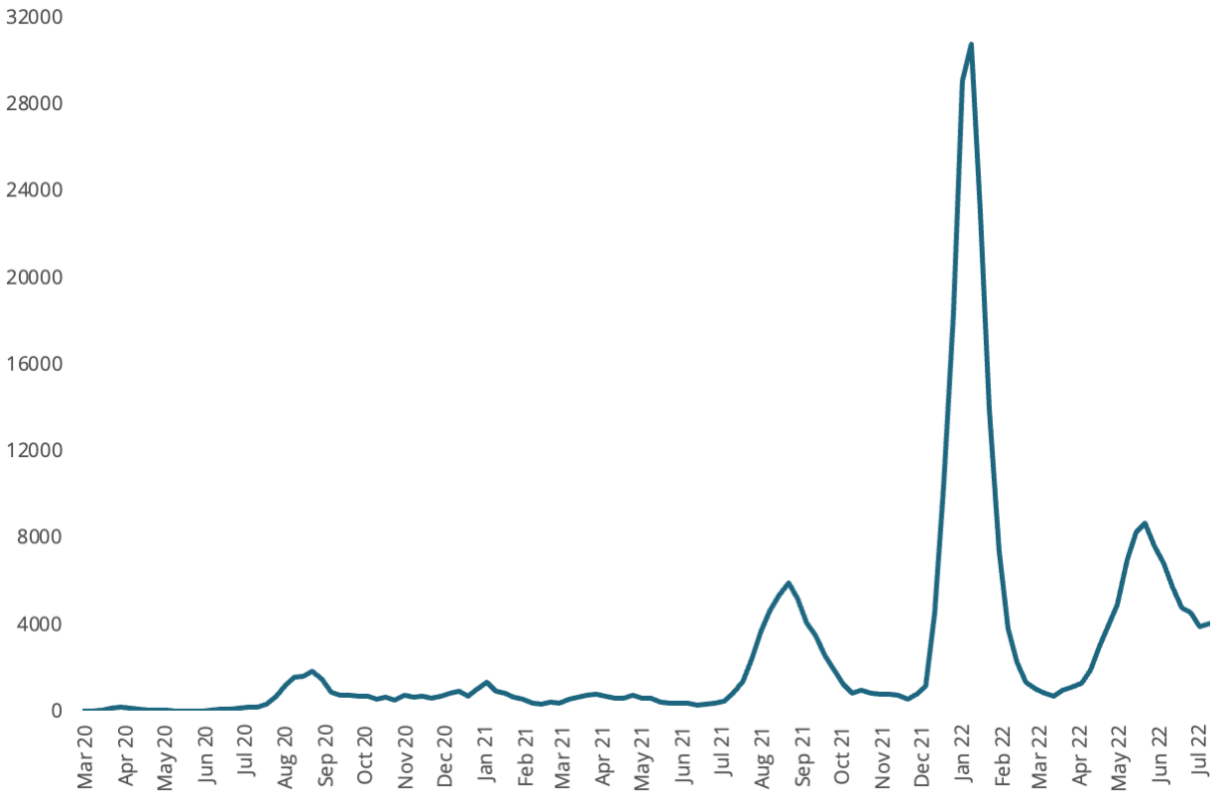


Figure 12: Weekly COVID-19 cases in Hawaii to July 2022.

4.2 Restrictions on activity

Hawaii has been proactive in reducing activity to limit the spread of COVID-19. The Oxford COVID-19 Government Response Tracker (OxCGRT) (Hallas et. al, 2021) collates an index of restrictions imposed in response to the pandemic (See Figure 11). Between April 2020 and April 2021, Hawaii had relatively high levels of restrictions that were gradually eased but implemented again with each wave of COVID-19.

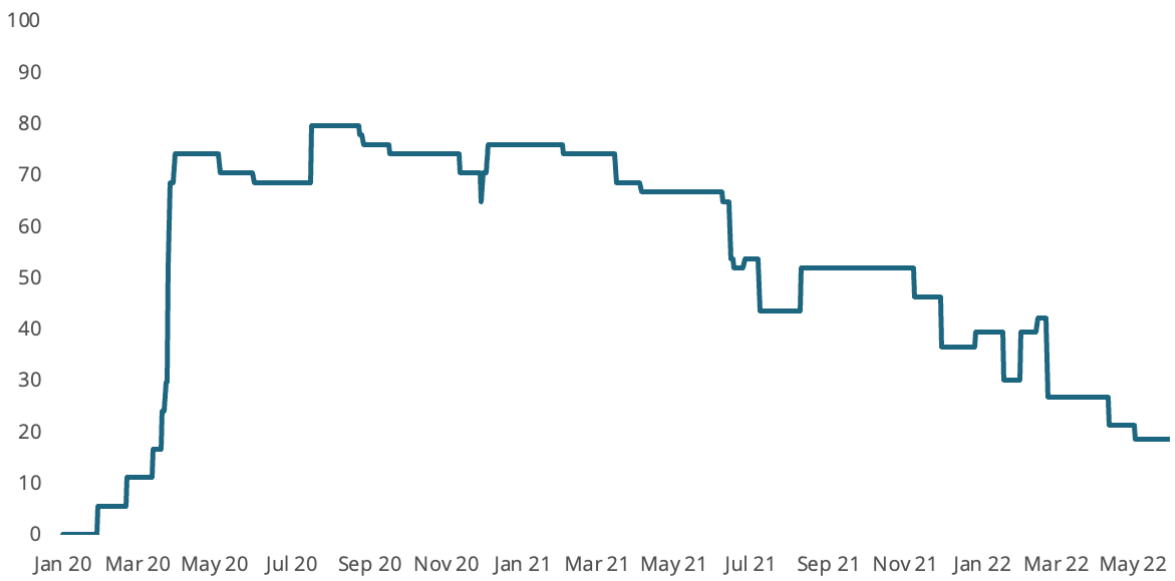


Figure 11: Oxford COVID-19 Government Response Tracker Stringency Index, Hawaii.
Note: State-based index was not published after April 26, 2021.

Early in the pandemic, Hawaii implemented a strict stay-at-home order to reduce the spread of the virus, like much of the United States. But unlike elsewhere in the US, Hawaii initially required tourists and inter-island travelers to quarantine for 14 days on arrival. Hawaii's isolation and these restrictions massively reduced tourist numbers to Hawaii but also helped to initially avoid many cases of COVID-19. Restrictions on the mainland also reduced tourist numbers to Hawaii.

As local mobility restrictions gradually eased over the summer of 2020, Hawaii saw its second COVID-19 wave and its first with more than 200 cases per week. Beginning in late July cases surged, reaching more than seventeen hundred per week by the end of August. The UHERO Economic Pulse fell eighteen points from its peak in mid-July.

After that wave subsided, restrictions were soon eased to allow tourists and inter-island travel without quarantine if travelers tested negative to COVID-19. The Safe Travels program allowed travelers with proof of a negative test result to avoid quarantine. This drove up the number of tourists very quickly, rising from 20 thousand tourists in September 2020 to 220 thousand in December. Later, the Safe Travels program was extended to allow fully-vaccinated arrivals from the United States to avoid quarantine, facilitating even greater tourist numbers in the Summer of 2021.

More recently, high vaccination rates in Hawaii have reduced the need for strict social-distancing measures. While Hawaii saw a significant wave of cases with the Delta variant in August and September of 2021, the relatively high vaccination rate meant that stay-at-home orders were not

reimposed. However, there were some limitations on gatherings, an indoor mask mandate, and the Governor requested tourists to delay non-essential travel. Despite even higher caseloads (but similar hospitalizations), the Omicron wave did not trigger additional restrictions in early 2022. Since the summer of 2021, voluntary reductions in activity in response to the high case numbers, restrictions on gatherings and events, and cautious messaging all contributed to reduced economic activity, with a fourteen point decline in the UHERO Economic Pulse over a six-month period, before it resumed its upward trend in February 2022.

5 Economic Impacts

Reduced activity has an economic cost relative to expected economic outcomes before the pandemic. This section considers the impact of the pandemic on traditional measures of economic activity in Hawaii.

5.1 State Gross Product

The overall impact of the pandemic on the economy of Hawaii can be quantified by comparing actual outcomes and current forecasts (Bonham et. al., 2022)[2] with UHERO's pre-pandemic forecasts (Bonham et. al., 2019) made in the fourth quarter of 2019. Hawaii's quarterly *annualized* gross product initially plunged to $77 billion in the second quarter of 2020, 17.6% below the *annualized* pre-pandemic forecast of almost $94 billion. While the economy partially recovered when restrictions were eased, a loss of output persisted in subsequent quarters. Over the 10 quarter period between early 2020 and mid-2022, when gross product is expected to remain below the pre-pandemic forecast level, the total output gap is estimated at $18.7 billion of lost production (See Figure 13).

[2] The 2022 Q2 forecast throughout this article refers to the forecast report Bonham et. al. (2022).

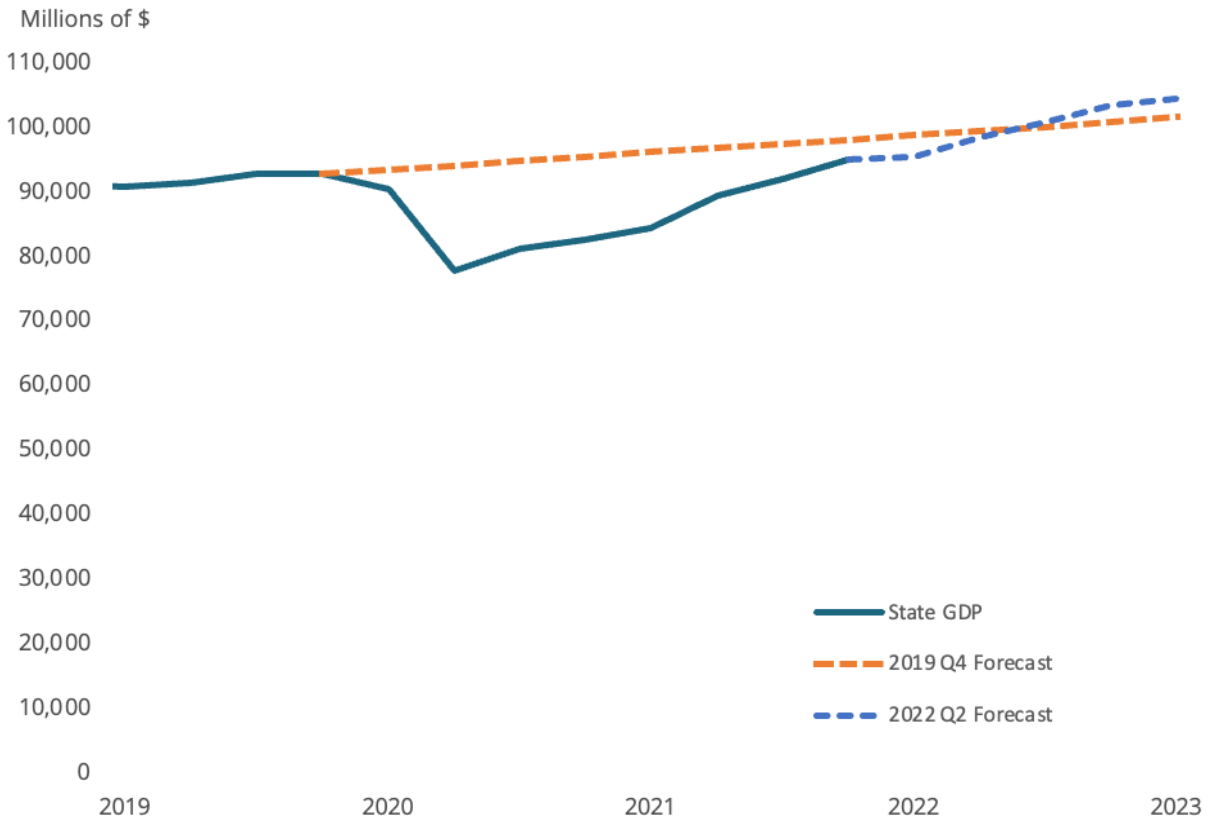


Figure 13: Quarterly annualized State Gross Product and 2022 Q2 Forecast compared to 2019 Q4 Forecast
Note: The 2019 Q4 forecast is scaled by the (downward) revised 2019Q2 historical data.

However, nominal gross product masks a persistent real output gap. Since mid-2021, inflation has been significantly elevated. Once adjusting for inflation, output continues to remain below the 2019 forecast beyond 2023. The *annualized* real output gap in mid-2021 was more than $7 billion or almost 7.5% of pre-pandemic GDP. The elevated rate of inflation is also arguably a result of the pandemic and government responses to the pandemic affecting supply chains and demand (See Figure 14).

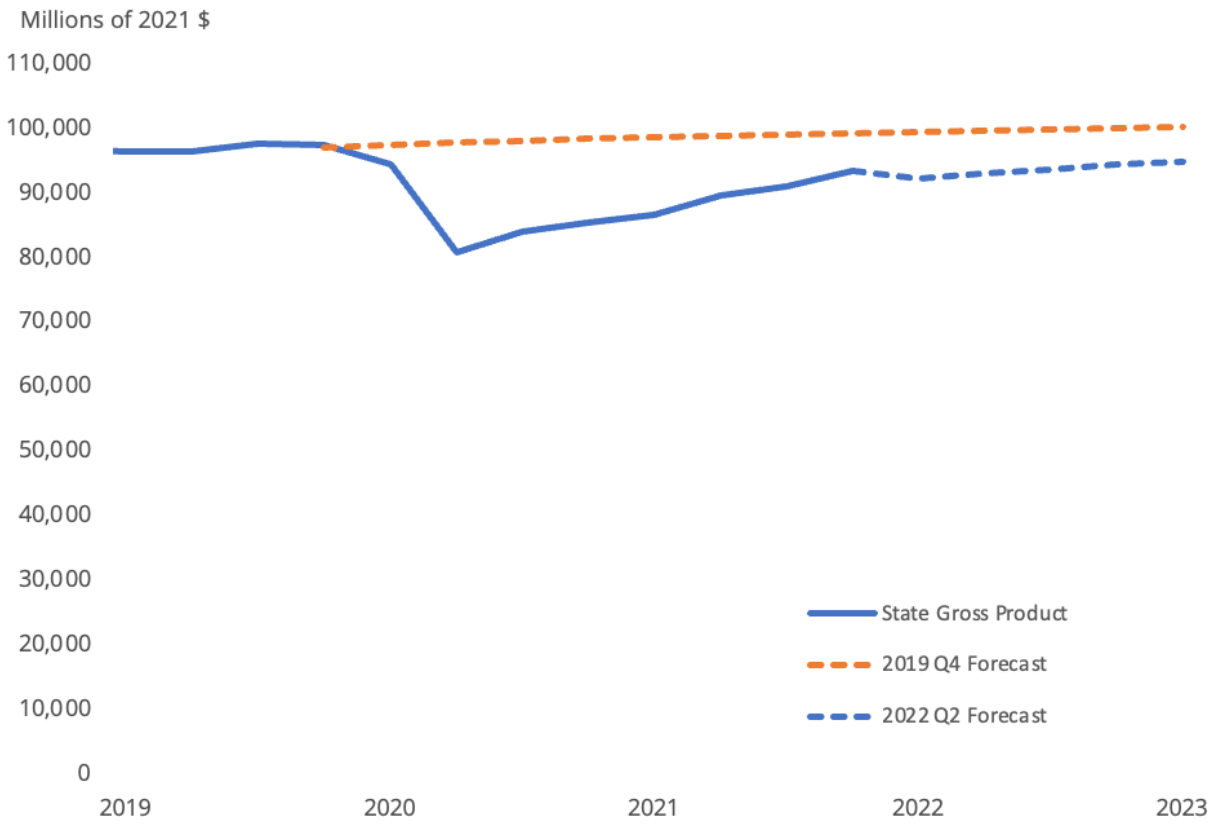


Figure 14: Quarterly real annualized State Gross Product and 2022 Q2 Forecast compared to 2019 Q4 Forecast

Note: The 2019 Q4 forecast is scaled by the (downward) revised 2019Q2 historical data. 2019 Q4 forecast is deflated by 2019 forecast Honolulu CPI, GDP is deflated using actual Honolulu CPI and 2022 Q2 Forecast is deflated using forecast Honolulu CPI.

5.2 Impact on sector earnings

The impact of the pandemic was not equal across sectors. Much of the impact on the overall economy was in the Accommodation and Food Services sector, as lockdowns and restrictions dramatically reduced the number of tourists coming to Hawaii and prevented many businesses from operating. In this sector, annualized earnings fell from 6.5 billion dollars (in 2021 dollars) to just over 2.3 billion dollars in the second quarter of 2020; 64% below the pre-pandemic forecast. The total lost earnings in the Accommodation and Food Services sector during the 2020-21 biennium amounts to $6.2 billion (in 2021 dollars). This is equivalent to almost one year's earnings. The Accommodation and Food Services sector is the main driver of lost output in Hawaii, with the same pattern for earnings losses as for lost State GDP. By the end of 2021 earnings had recovered somewhat but were still projected to remain around 12% below the pre-pandemic forecast for the foreseeable future. While earnings appear to have recovered in the summer of 2021/22, much of this is likely a pent-up demand surge, rather than a sustained return of visitors. Total lost earnings in the sector between the beginning of 2020 and the end of 2023

will be around $7 billion dollars with an ongoing, but slowly diminishing, annual output gap of around $800 million.

The Trade sector saw an initial decline of almost 12% from annualized earnings of $5.1 billion to $4.5 billion (in 2021 dollars) but recovered in the fourth quarter of 2021 back to pre-pandemic levels. Total lost earnings in the eight quarters between the beginning of 2020 and the end of 2021 add up to over $500 million or 10% of pre-pandemic annual earnings.

With fewer people visiting Hawaii, annualized earnings in the Transport and Utilities sector also declined from $3.5 billion to under $2.8 billion (in 2021 dollars) in the second quarter of 2020 and remain 5% below pre-pandemic earnings. Earnings are expected to remain 3-5% below the pre-pandemic forecast, even until late-2023. Total lost earnings over this period will amount to $1.1 billion or 33% of pre-pandemic annual earnings, with an ongoing annual earnings gap in mid-2023 of approx. $150 million.

Earnings were relatively constant in the construction sector and fluctuated between 2.3% below and 3.8% above pre-pandemic forecasts. Earnings in this sector are expected to remain relatively constant at around or slightly above pre-pandemic forecast levels through mid-2023.

Agriculture earnings increased during the pandemic from a low base peaking 39% above pre-pandemic levels. Despite this increase, earnings remain below 2017 levels as Agriculture has been in a long-term decline in Hawaii. In mid-2023 Agriculture sector earnings are expected to continue around $50m per year above the pre-pandemic forecast.

Real estate, Insurance, and Finance earnings also increased during the pandemic to 6.3% above the pre-pandemic forecast. Earnings were flat initially, while investors may have been uncertain about the future, but rose significantly above the pre-pandemic forecast in mid-2020. Earnings in Healthcare and Social Assistance also increased unevenly, both as a result of lockdowns shifting demand and perhaps the cost of treating COVID-19 patients.

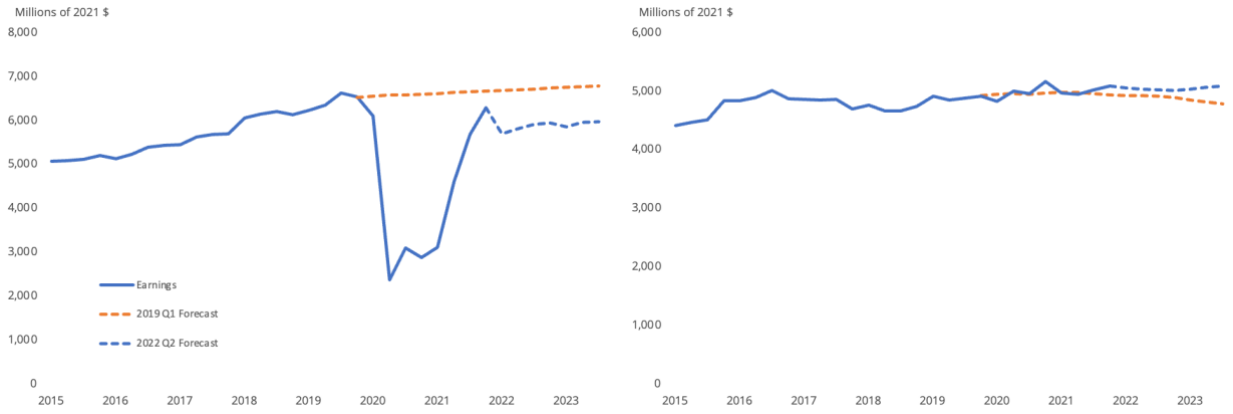


Figure 15a: Quarterly Real Annualized Earnings Accommodation and Food Services compared to 2019 Q4 forecast.

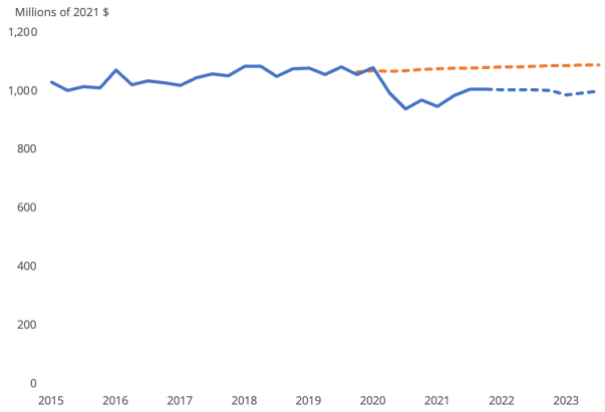


Figure15b: Quarterly Real Annualized Earnings Construction and Mining compared to 2019 Q4 forecast.

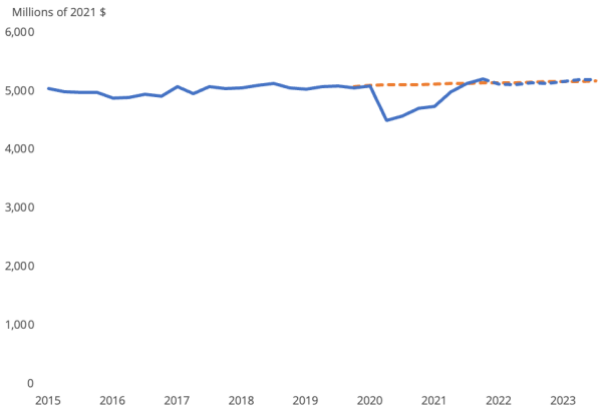


Figure15c: Quarterly Real Annualized Earnings Manufacturing compared to 2019 Q4 forecast.

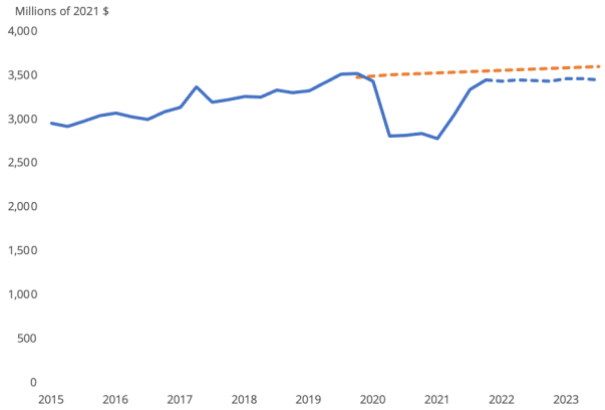


Figure 15d: Quarterly Real Annualized Earnings Trade compared to 2019 Q4 forecast.

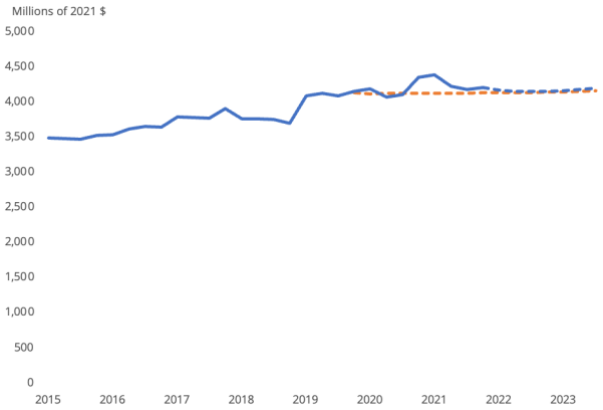
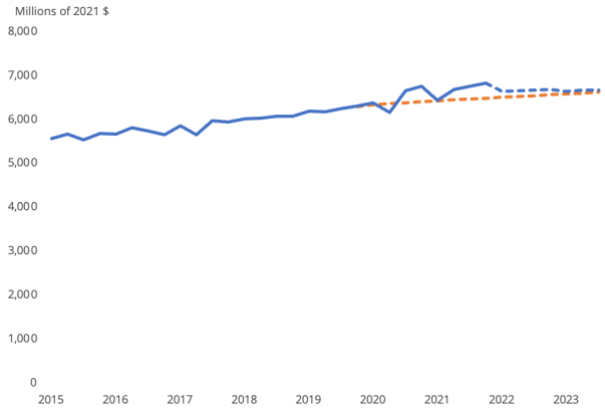


Figure 15e: Quarterly Real Annualized Earnings Transport and Utilities compared to 2019 Q4 forecast.

Figure 15f: Quarterly Real Annualized Earnings Finance, Insurance, and Real Estate compared to 2019 Q4 forecast.



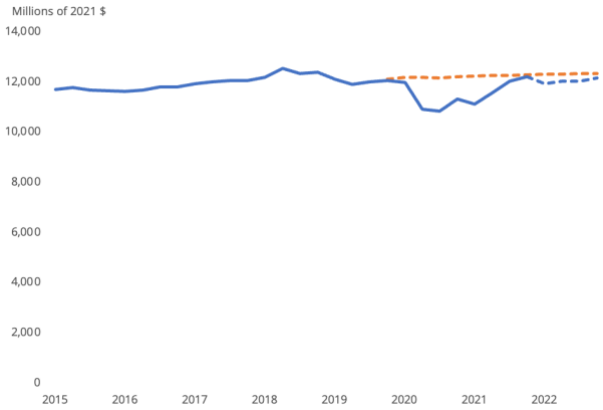


Figure 15g: Quarterly Real Annualized Earnings Healthcare and Social Assistance compared to 2019 Q4 forecast.

Figure 15h: Quarterly Real Annualized Earnings Other Sectors excluding Agriculture (Incl. If,Ps,Ae,Ma,Ad,Ed,Or) compared to 2019 Q4 forecast.

Figure 15: Quarterly real annualized earnings by sector compared to 2019 Q4 forecast.
Note: The 2019 Q4 forecast is scaled by the new (downward) revised 2019Q2 historical data as a ratio to the forecast of 2019 Q2 real GDP.

5.3 Labor force

The loss of jobs led to an increase in the unemployment rate; a decrease in the labor force participation rate; and contributed to a projected population decline.

Quarterly unemployment peaked in the second quarter of 2021 at almost 20%. The quarterly unemployment rate is projected to fall to the pre-pandemic forecast level in the second quarter of 2023.

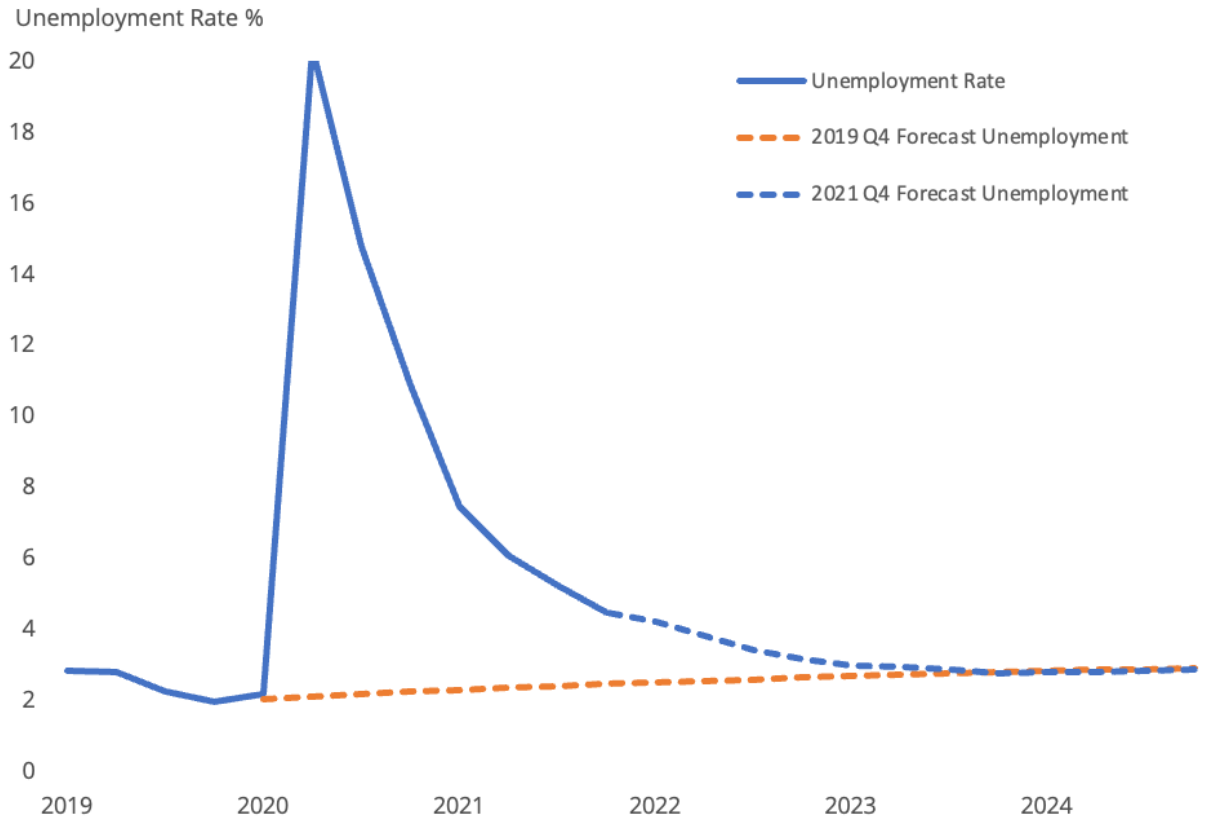


Figure 16: Quarterly unemployment rate and 2021Q4 and 2019Q4 forecasts
Note: The 2019 Q4 forecast is scaled by the revised 2019Q2 historical data.

However, due to a decrease in the labor force as a result of the pandemic, the declining unemployment rate does not imply recovery to the same pre-pandemic forecast level of employment. The labor force participation rate is expected to remain a full percentage point below the pre-pandemic forecast. Outward migration from Hawaii also masks the permanent reduction in jobs following the pandemic.

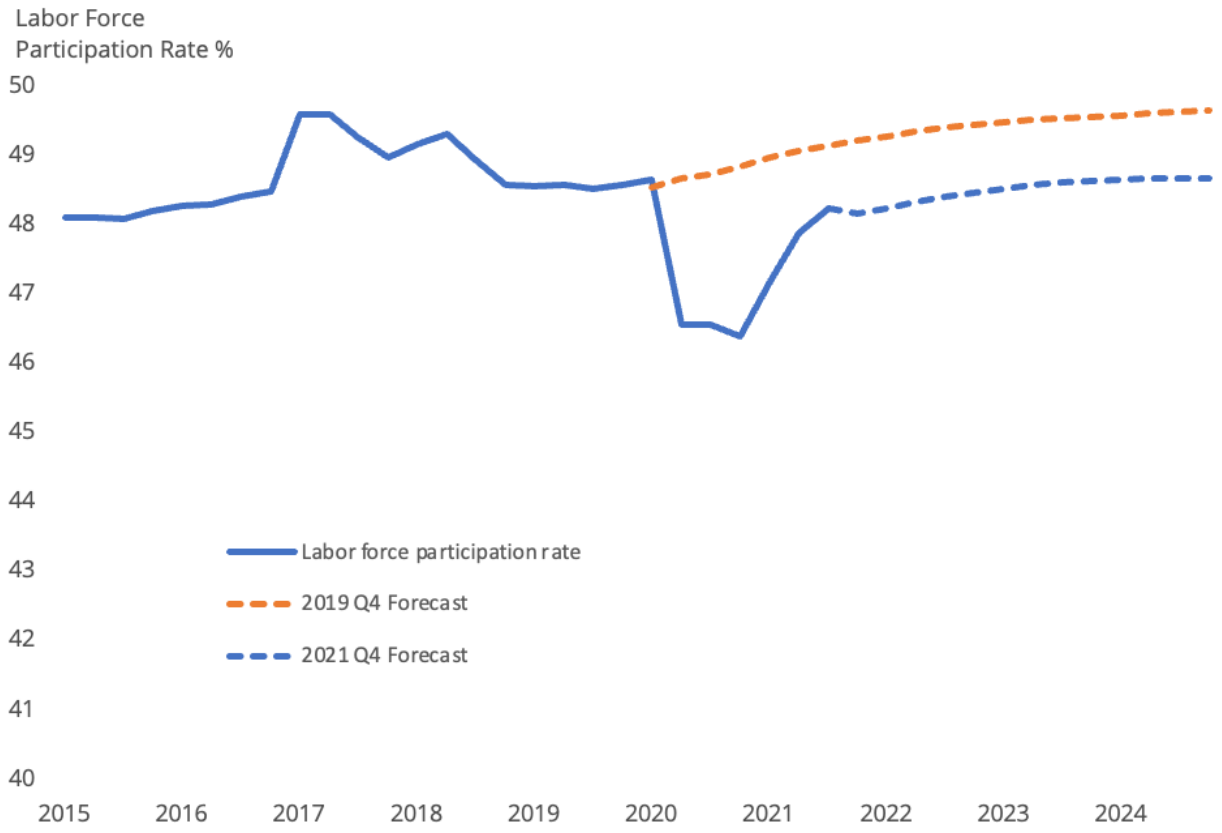


Figure 17: Quarterly labor force participation rate and 2021Q4 and 2019Q4 forecasts
Note: The 2019 Q4 forecast is scaled by the new revised 2019Q2 historical data.

5.4 Income

Income growth and decline usually match closely the fluctuations in State Gross Domestic Product. However, federal support bolstered incomes for households to get through the worst of the pandemic, enabling reductions in activity in order to reduce infections. The figure below shows how income decoupled from GDP during the pandemic as Federal income support arrived. While federal programs have ended, much of the spending is via state and county governments, generating ongoing support for incomes.

Clearly, the extent to which governments were willing to continue fiscal support has been important throughout the pandemic in supporting household and business finances and the general economy. Much of that support has now been phased out in the US and many other countries. At their peak, outlays in the US were raised by about $2 trillion dollars in both 2020 and 2021, more than 10% of GDP. Now that most programs have ended, outlays are falling rapidly, reducing a huge source of income and spending stimulus. While the economic recovery has restored much of the lost incomes in Hawaii, income levels remain below UHERO's 2019 Q4 forecast.

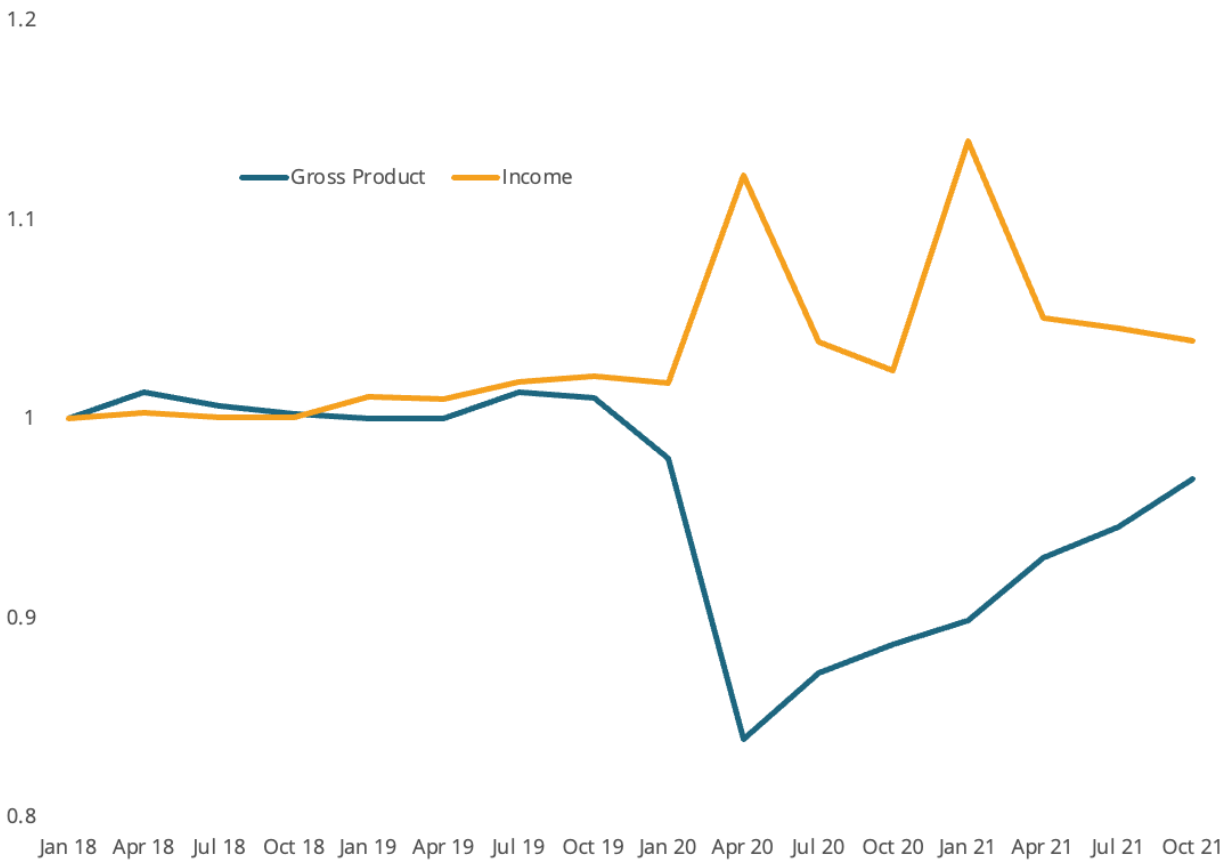


Figure 18: Gross Product and Income, indexed to Jan 2018.

6. Concluding Remarks

The extent of the COVID-19 recession's more persistent effects is currently unknown. There are a number of channels through which recessions, which by their nature are temporary, could also have longer-lasting adverse effects, termed economic "scarring" (Huckfeldt, 2022; Fuentes and Moder, 2020). These include firm bankruptcies, damage to household balance sheets, costs of persistent unemployment on human capital and labor force participation, and even loss of human capital in the next generation due to closed elementary, secondary, and post-secondary schools. So far, the direct financial effects do not appear to be large. Many of those initially out of work during the COVID-19 shutdown in 2020 have returned to employment. But as of April 2022, non-farm employment in Hawaii is still almost 60 thousand jobs, or nearly 10%, below pre-pandemic levels. Unemployment statistics are masking workers dropping out of the labor force or leaving Hawaii. Some of this loss of jobs and output will be permanent if the people do not return to the workforce, or to Hawaii, or if population decline continues. And the longer-term loss of human capital from long bouts of unemployment and education losses will also only show itself in coming decades. But the ability for Hawaii to return to its former tourism capacity

may also be restricted. Supply constraints are already apparent globally in the cost of flights and recent flight cancellations.

The pandemic is also not over. The recent waves of cases due to several versions of the highly-transmissible Omicron variant will have economic impacts if people again reduce activity, tourists avoid travel, or if worker absences limit output. Importantly for Hawaii, ongoing waves of infection continue to generate concerns and travel restrictions in international markets. While the various Omicron variants have been milder, with a lower rate of hospitalization and death relative to case numbers than earlier in the pandemic, future variants may not be as mild. Yet much of the initial economic impacts come from the novelty of the original virus, causing widespread anxiety and a strong public health response. New variants are no longer novel viruses now that there are high levels of vaccination and natural immunity, limiting further economic fallout.

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