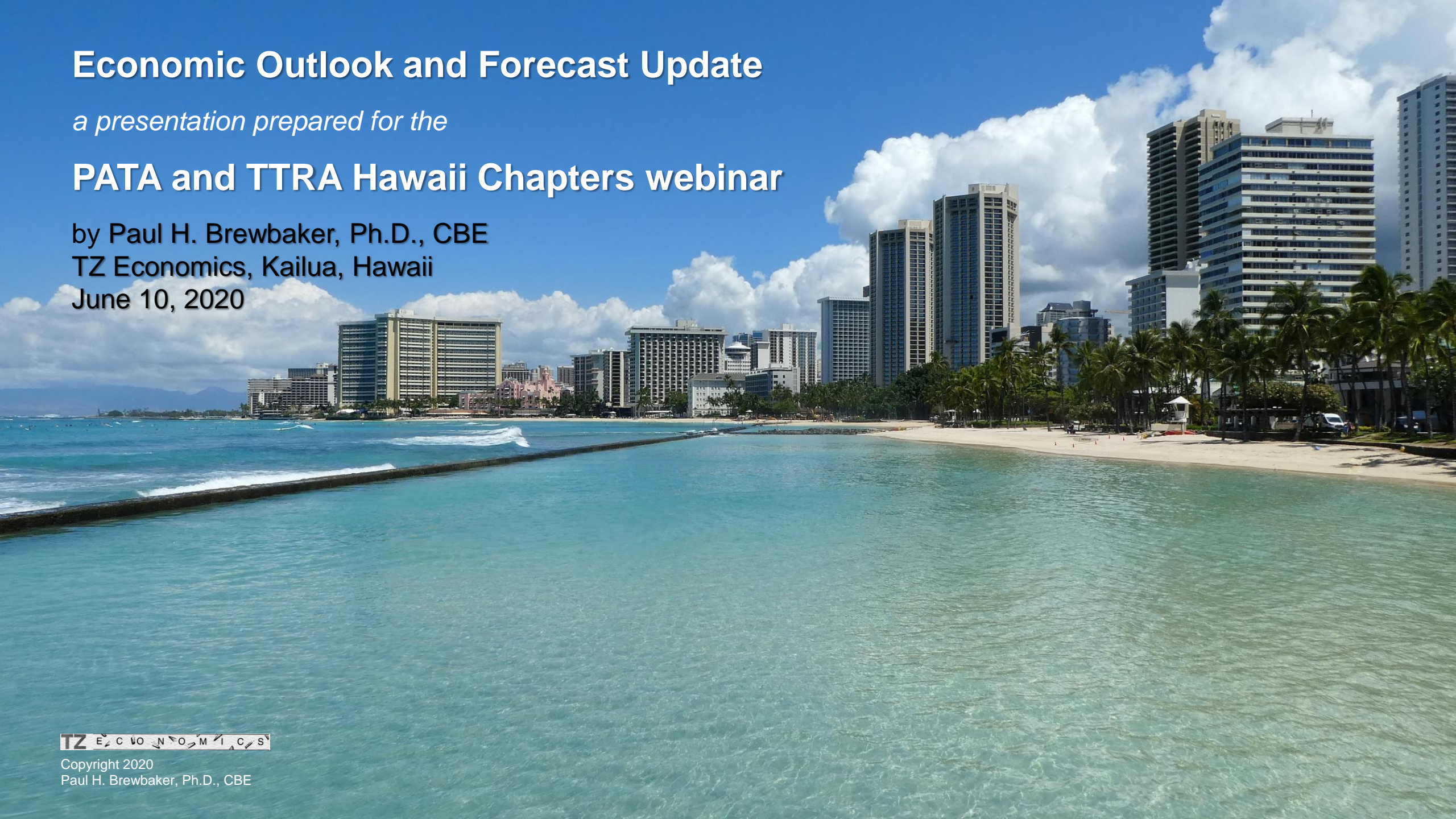


Economic Outlook and Forecast Update

a presentation prepared for the

PATA and TTRA Hawaii Chapters webinar

by Paul H. Brewbaker, Ph.D., CBE
TZ Economics, Kailua, Hawaii
June 10, 2020



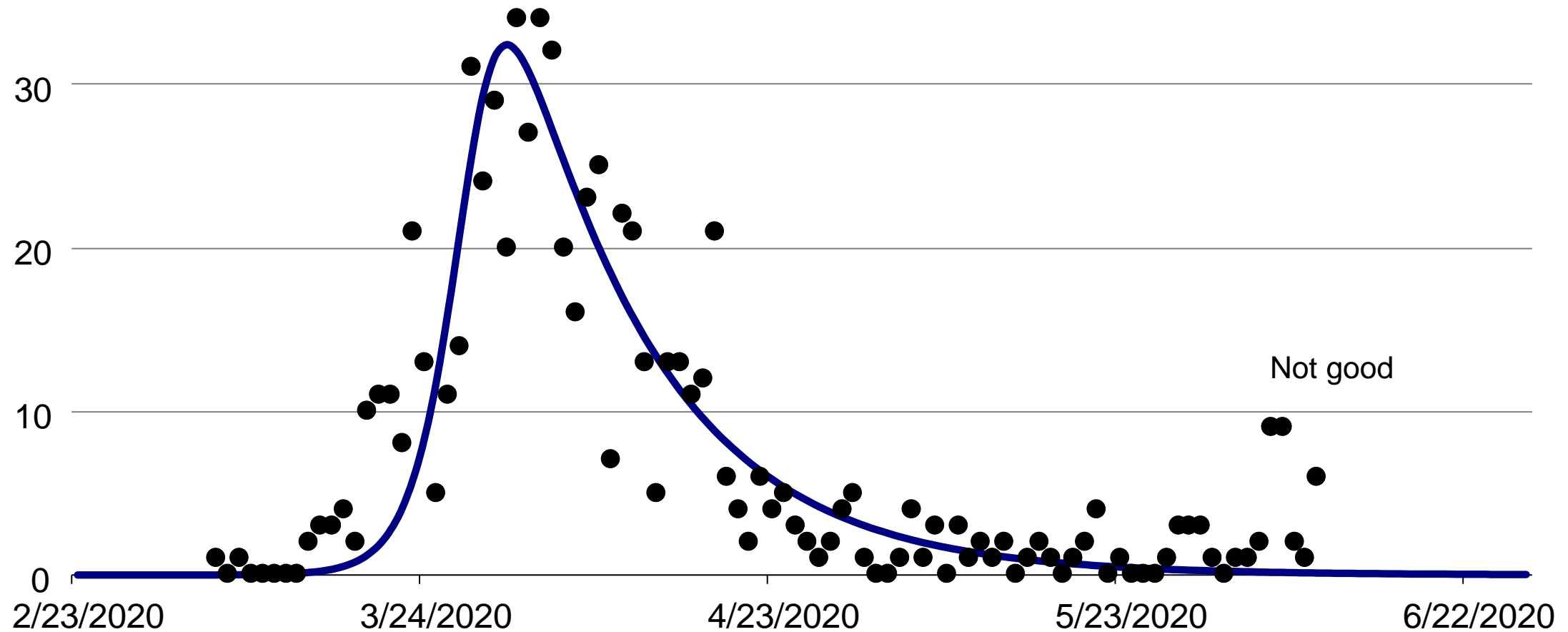


A novel coronavirus: SARS-CoV-2

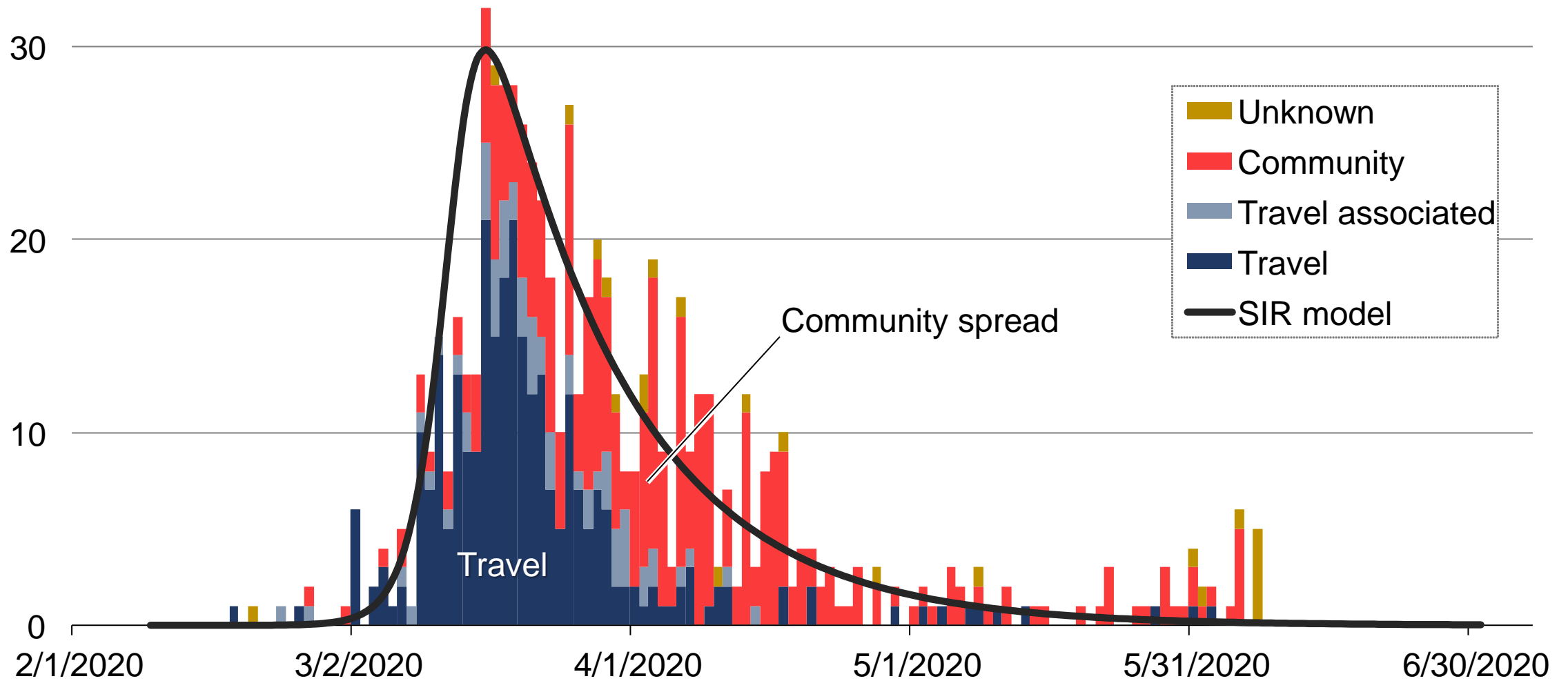
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Hawaii daily confirmed COVID-19 cases through June 9, 2020 and calibrated “Infectives” from simple SIR model: mitigation success?

Hawaii daily COVID-19 cases

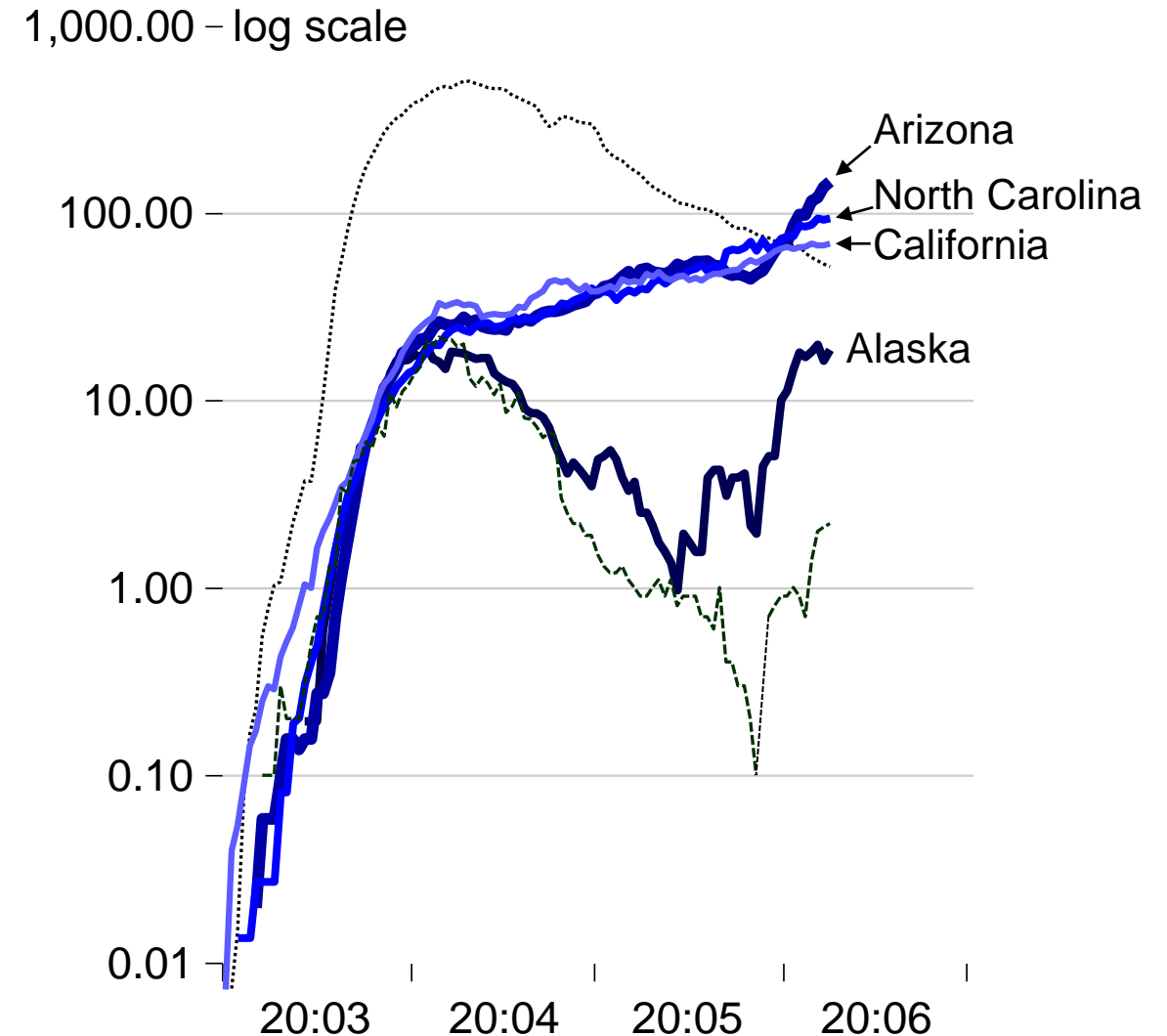
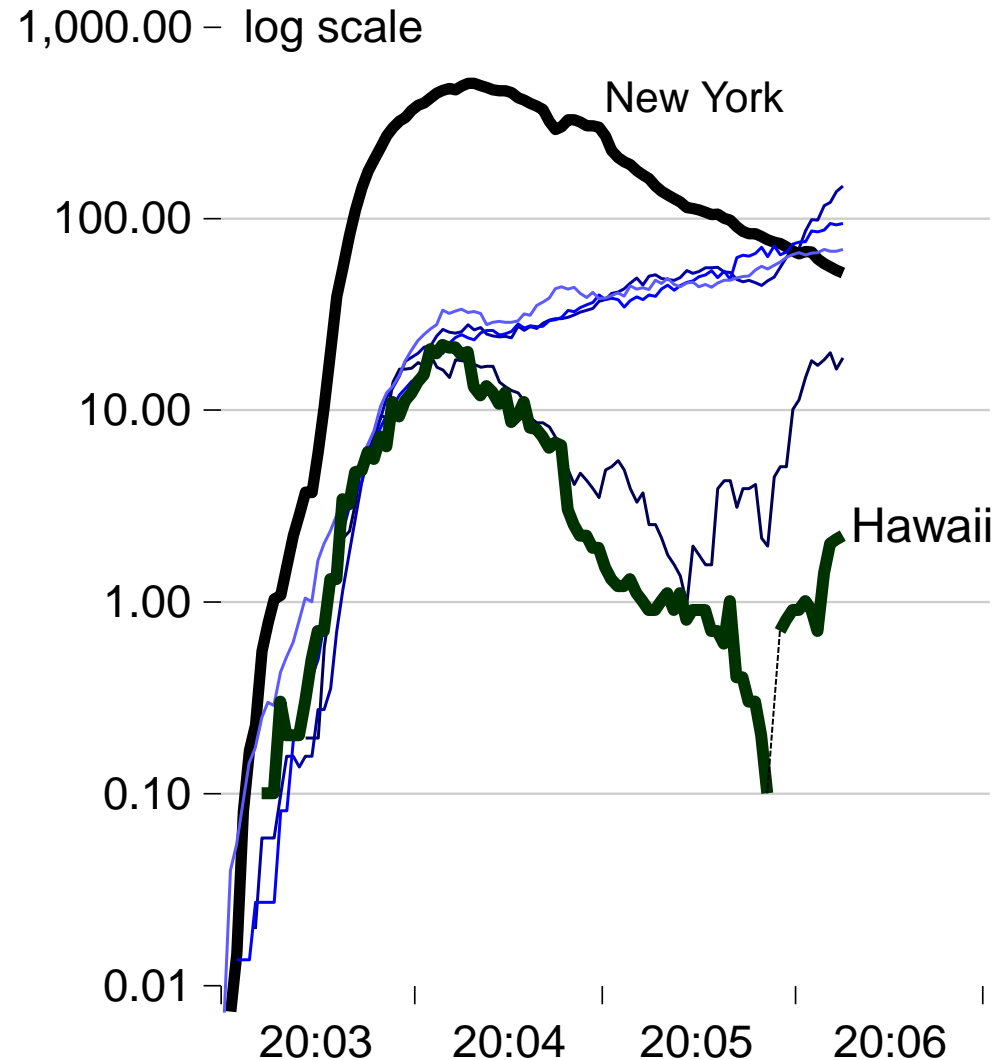


Hawaii Department of Health Epidemic Curve official data (based on date of disease onset or, if unknown, test date): with attribution



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New daily confirmed COVID-19 cases (7-day mov. avg.) normalized by population (per million) still rising in many states, even *accelerating*



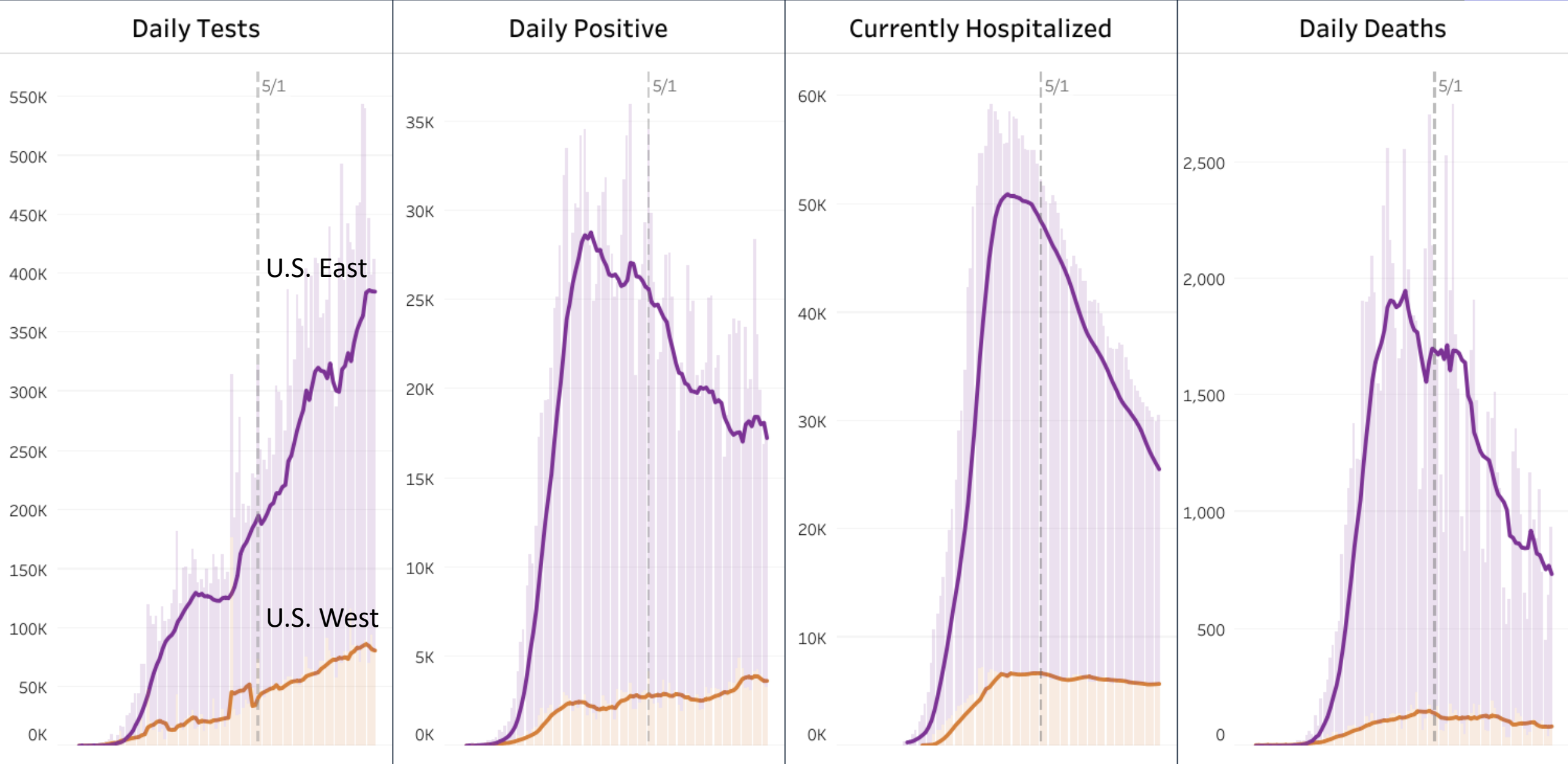
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COVID-19 Key Metrics Since Mar 1 by State Group

All Others
West

Choose State Group
West

State
Hospital





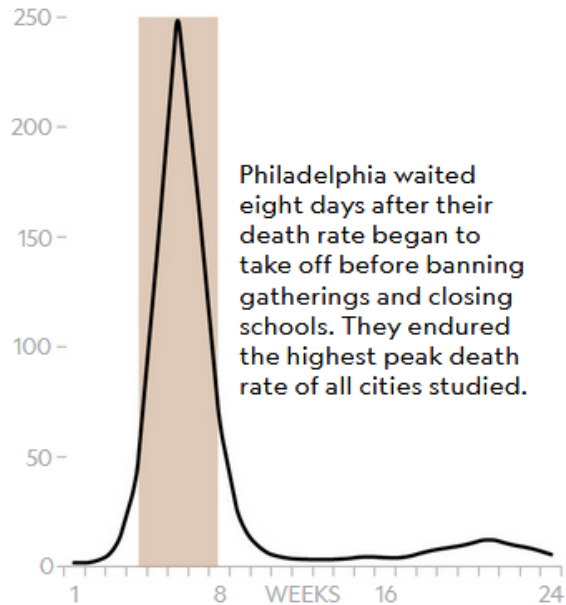
Aggregate Weekly Excess Deaths per million for 43 US Cities by Region from September 8, 1918 through February 22, 1919

Source: Howard Markel, MD, PhD; Harvey B. Lipman, PhD; J. Alexander Navarro, PhD; Alexandra Sloan, AB; Joseph R. Michaelson, BS; Alexandra Minna Stern, PhD; Martin S. Cetron, MD (August 8, 2007), "Nonpharmaceutical Interventions Implemented by US Cities During the 1918-1919 Influenza Pandemic," *Journal of the American Medical Association*, vol. **298**, No. 6, pp. 597-706 (<https://jamanetwork.com/journals/jama/fullarticle/208354>).

Weekly excess deaths per 100,000 persons, fall 1918 – winter 1919, deaths/100,000 after 24 pandemic weeks, social distancing measures

Philadelphia

748 Deaths per 100,000 after 24 weeks of pandemic

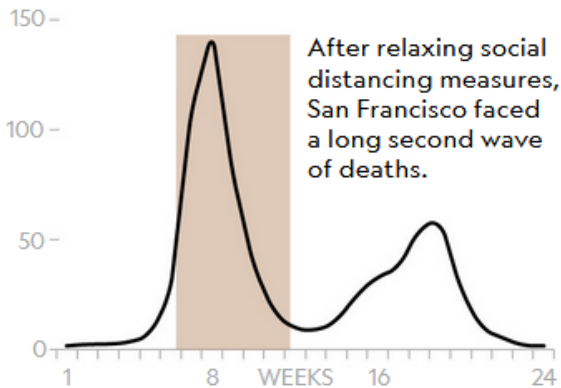


Weekly deaths per 100,000 from 1918 pandemic above the expected rate

Duration of social distancing measures

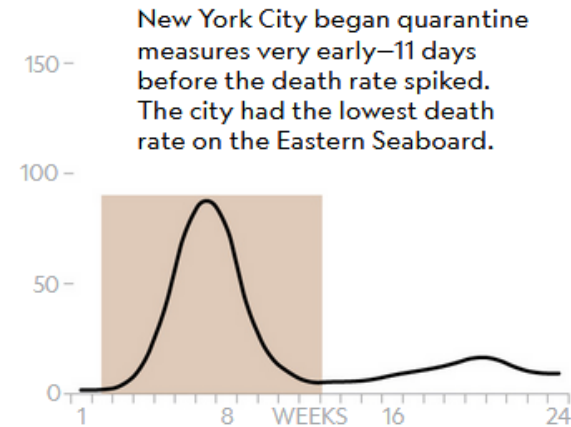
San Francisco

673 Deaths per 100,000



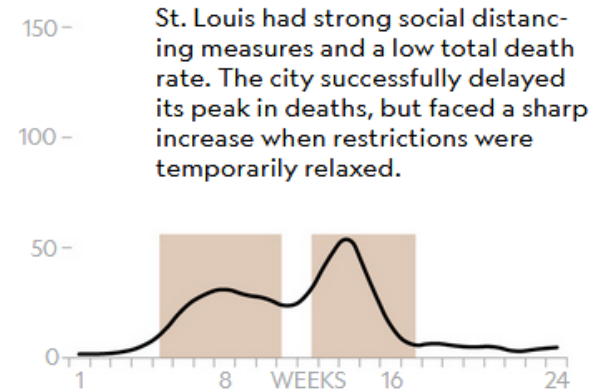
New York

452 Deaths per 100,000

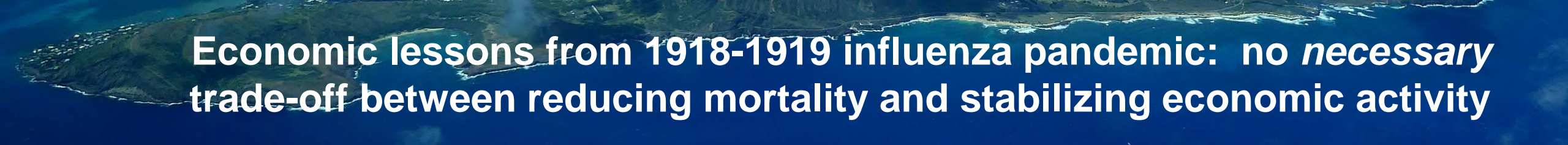


St. Louis

358 Deaths per 100,000



Sources: Nina Storchlic and Riley D. Champine (March 27, 2020), "How some cities 'flattened the curve' during the 1918 flu pandemic," *National Geographic* (<https://www.nationalgeographic.com/history/2020/03/how-cities-flattened-curve-1918-spanish-flu-pandemic-coronavirus/#close>), citing Howard Markel, MD, PhD; Harvey B. Lipman, PhD; J. Alexander Navarro, PhD; Alexandra Sloan, AB; Joseph R. Michaelson, BS; Alexandra Minna Stern, PhD; Martin S. Cetron, MD (August 8, 2007), "Nonpharmaceutical Interventions Implemented by US Cities During the 1918-1919 Influenza Pandemic," *Journal of the American Medical Association*, vol. **298**, No. 6, pp. 597-706 (<https://jamanetwork.com/journals/jama/fullarticle/208354>).



Economic lessons from 1918-1919 influenza pandemic: no *necessary* trade-off between reducing mortality and stabilizing economic activity

1. Jurisdictions more exposed to the pandemic saw sharp and persistent decline in economic activity—consumption cutbacks reduce economic activity *and* pandemic severity
2. Early and extensive non-pharmaceutical interventions (NPI) such as school, theater, church closings, partial business closings NPIs *mitigated* mortality, dampened adverse economic effects; *pandemics* depress economic activity, NPIs enable economic restoration
3. Cities with earlier and more aggressive NPIs performed better during *and after* the pandemic

“Pandemics Depress the Economy, Public Health Interventions Do Not”

*Reacting 10 days earlier to the arrival of the pandemic in a given city increases manufacturing employment by around 5% in the post period. Likewise, a one standard deviation increase in the intensity of NPIs increases manufacturing employment by 6.5% after the [1918-1919] pandemic. See Sergio Correia, Stephan Luck, and Emil Verner (April 10, 2020), “Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu” (https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=3561560)

Normalized COVID-19 morbidity and mortality statistics, June 9, 2020: how you do it matters—execution, scope, persistence ⇒ outcomes

	Taiwan	S Korea	Hawaii	Germany	Canada	U.S.	Sweden
COVID-19 cases	443	11,902	682	186,516	96,653	2,045,549	45,924
Deaths	7	276	17	8,831	7,897	114,148	4,717
Population (million)	23.78	51.64	1.42	83.02	37.59	328.20	10.23
Cases / 100,000	2	23	48	225	257	623	449
Deaths / 100,000	0.03	0.53	1.20	10.64	21.01	34.78	46.11
xTaiwan cases/000	1	12	26	121	138	335	241
xTaiwan deaths/000	1	18	41	361	714	1,182	1,566

*Oahu COVID-19 cases: 448 (about 45 cases per 100,000 with just under 1 million population, approximately 24 times Taiwan's prevalence)

Taiwan and Sweden are relatively culturally homogenous, but Taiwan adopted strict screening, testing, contact tracing and tracking protocols while Sweden's approach was more "laissez-faire." High Swedish social cohesion resulted in a *lower* contracted case rate than in the U.S. (lower prevalence) but Sweden has higher mortality—the U.S. is more culturally heterogeneous; both countries have more than 1,000 times Taiwan's death rate.

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Sources: Google, Hawaii Department of Health (<https://health.hawaii.gov/coronavirusdisease2019/what-you-should-know/current-situation-in-hawaii/>), Github (https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_confirmed_US.csv, https://raw.githubusercontent.com/CSSEGISandData/COVID-19/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_deaths_US.csv).

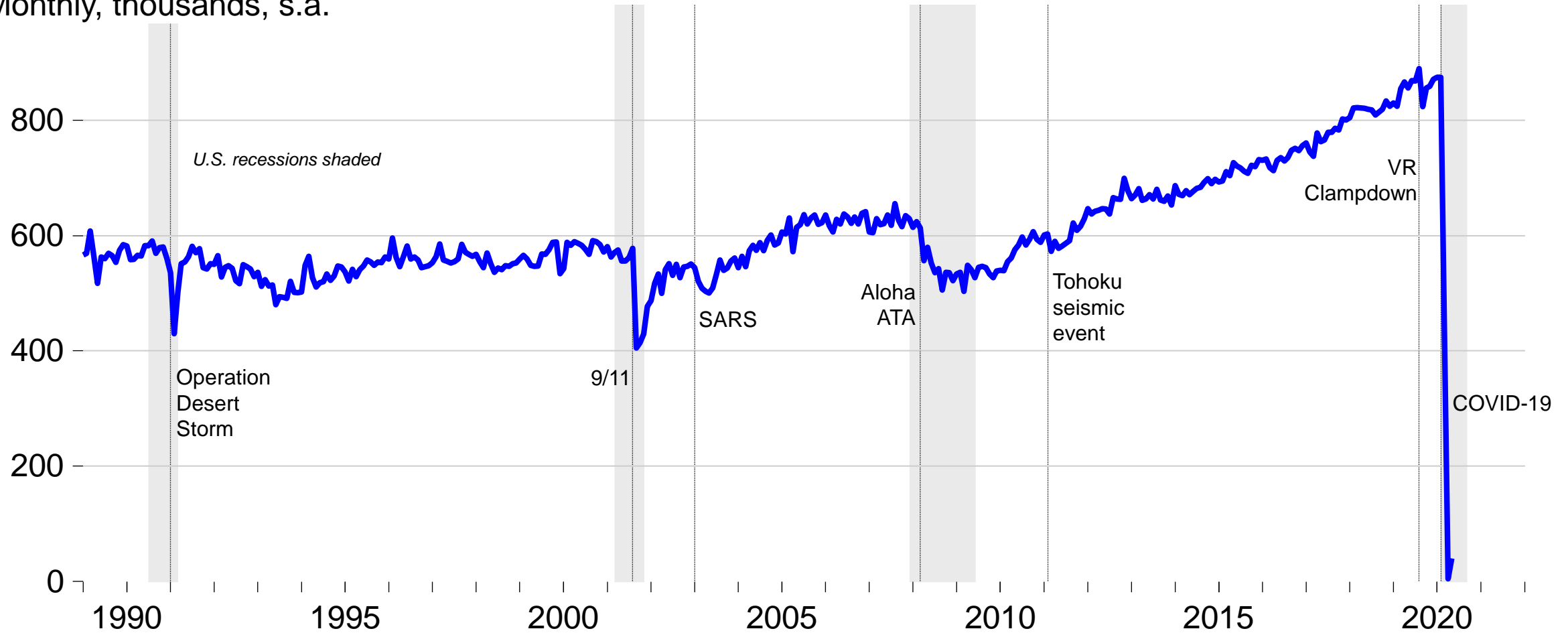


Hawaii tourism impacts of the novel coronavirus

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Hawaii's laboratory for transmission of leptokurtotic macroeconomic event risk: visitor arrivals—another “V-shaped-Nike Swoosh” shock

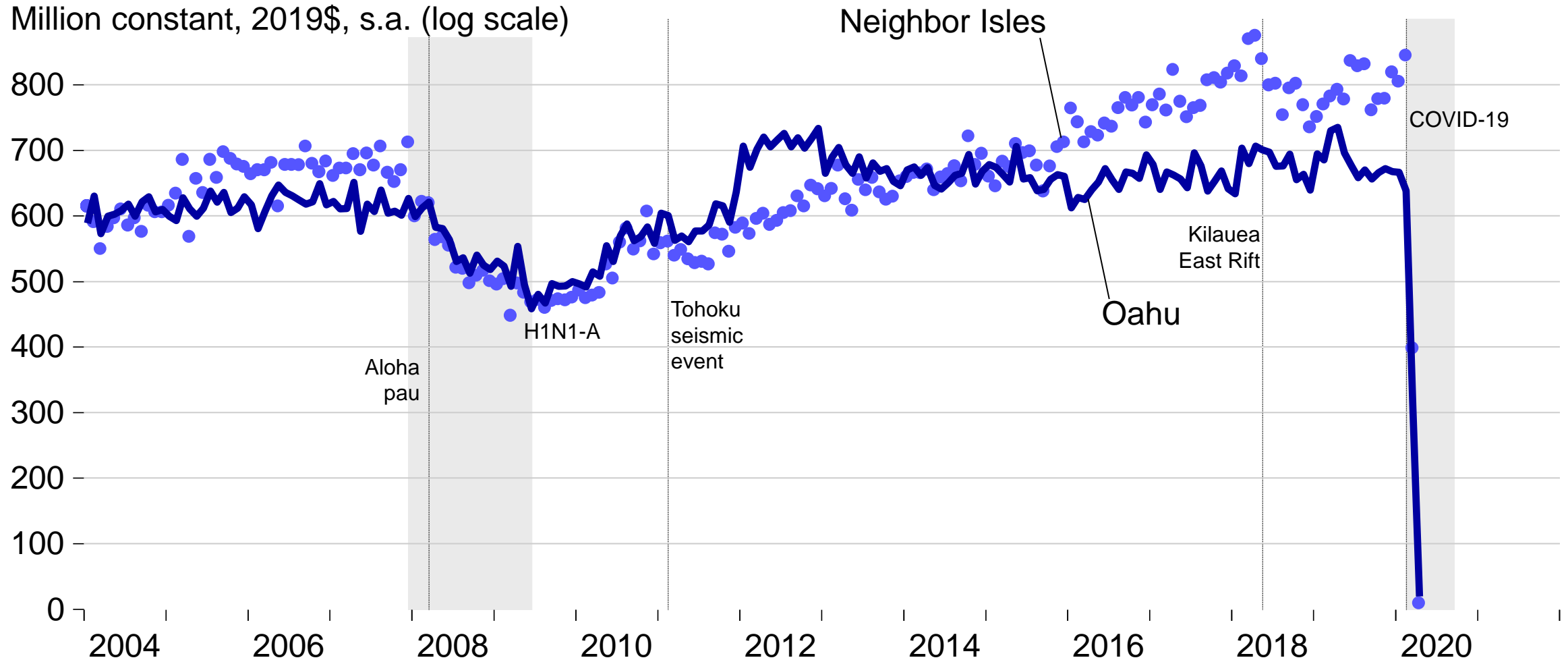
Monthly, thousands, s.a.



Slide copyright 2020 TZE

Sources: HTA (<https://www.hawaii tourism authority.org/research/monthly-visitor-statistics/>), Hawaii DBEDT (<http://dbedt.hawaii.gov/economic/mei/>), monthly data January 1966 – April 2020 with May and June 2020 estimates based on year-over-year percent changes in daily disembarking passenger counts through June 9, 2020; seasonal adjustment by TZE.

Constant-dollar tourism receipts were flat on Oahu through the 2010s, growing on Neighbor Isles until Kilauea's eruption, then Sudden Stop

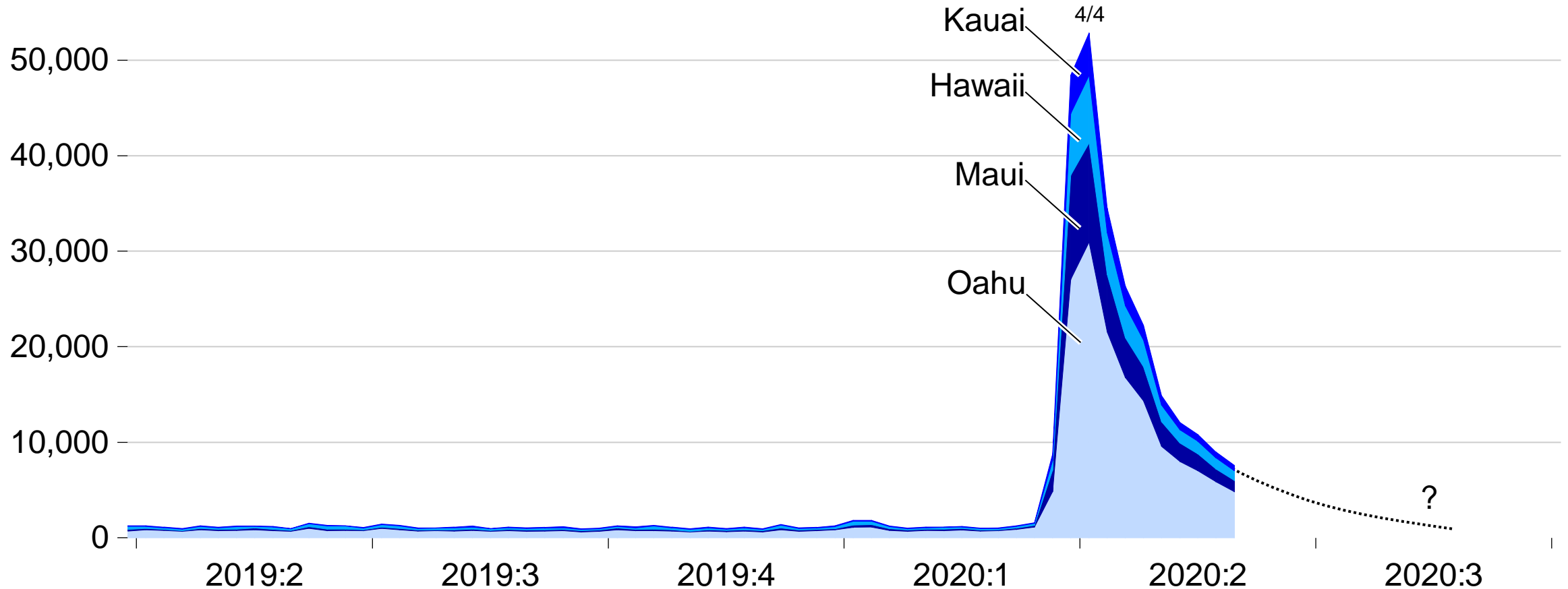


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Sources: Hawaii Tourism Authority (<https://www.hawaiitourismauthority.org/research/monthly-visitor-statistics/>), Hawaii DBEDT (<http://dbedt.hawaii.gov/economic/mei/>), U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis (<https://fred.stlouisfed.org/series/CPIAUCSL>); data through April 2020, seasonal adjustment using X-13 ARIMA filter, deflation using U.S. CPI-U by TZ Economics

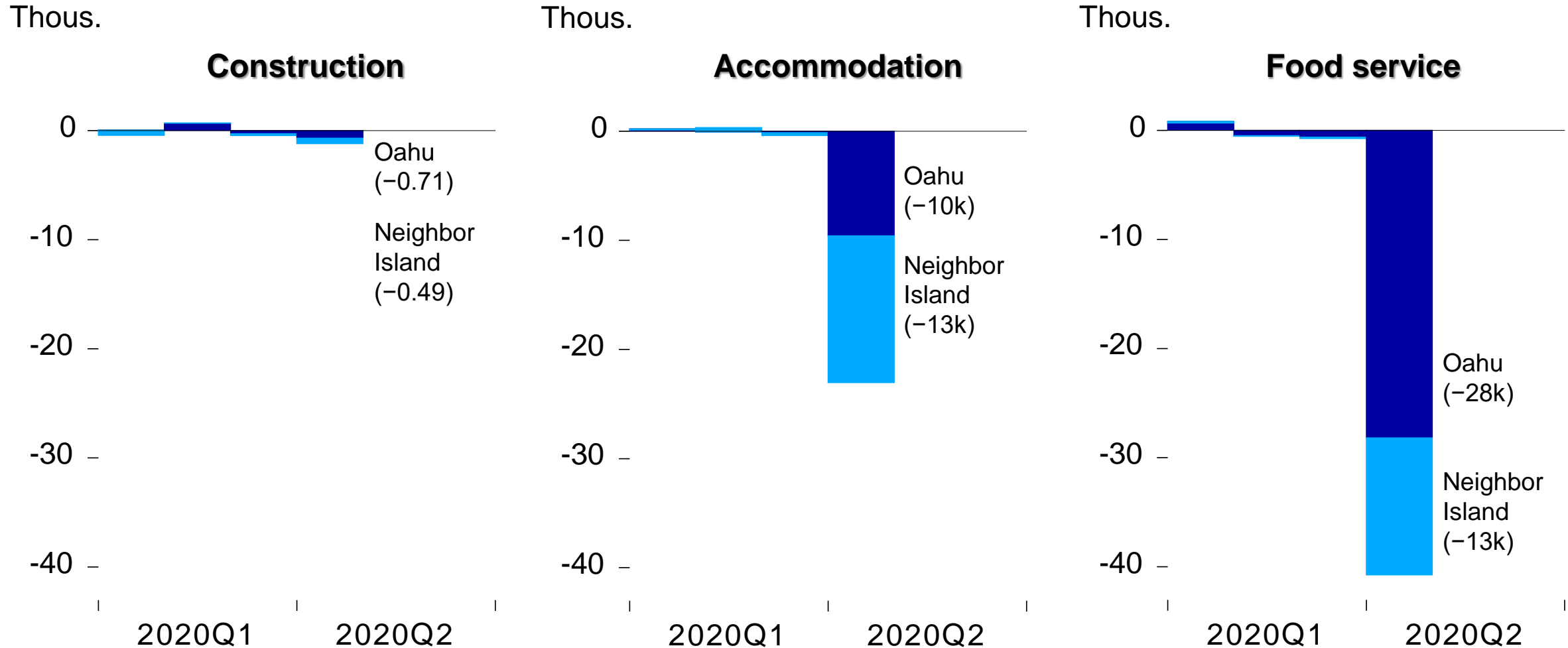
Impact of economic sudden stop: catastrophic employment impulse response—“pandemics depress economy (not public health policy)”

Initial weekly claims for unemployment insurance



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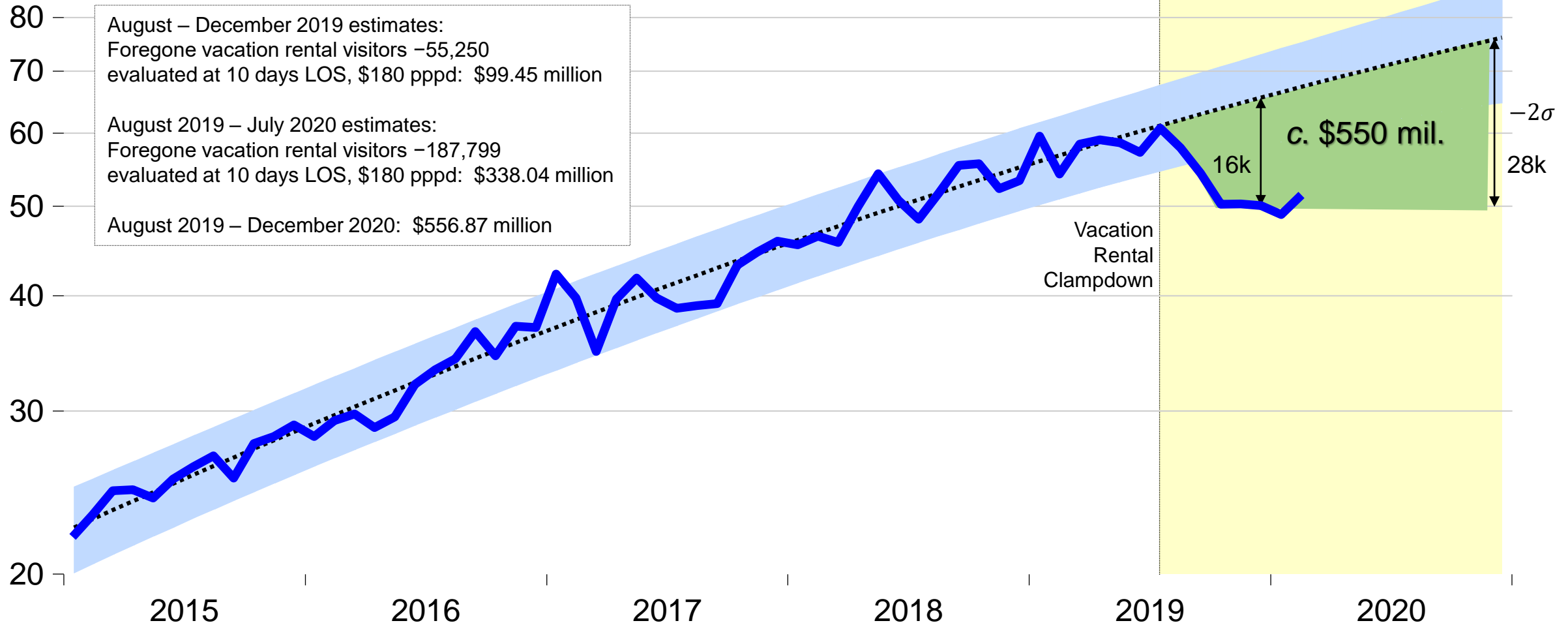
Monthly (s.a.) job changes in three Hawaii industries, Jan-Apr 2020: tourism hammered, construction resilient—a new word, “hysteresis”



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Pre-COVID-19: Oahu VR visitor arrivals enable projection of foregone tourism receipts July 2020—what the *City* was willing to forego

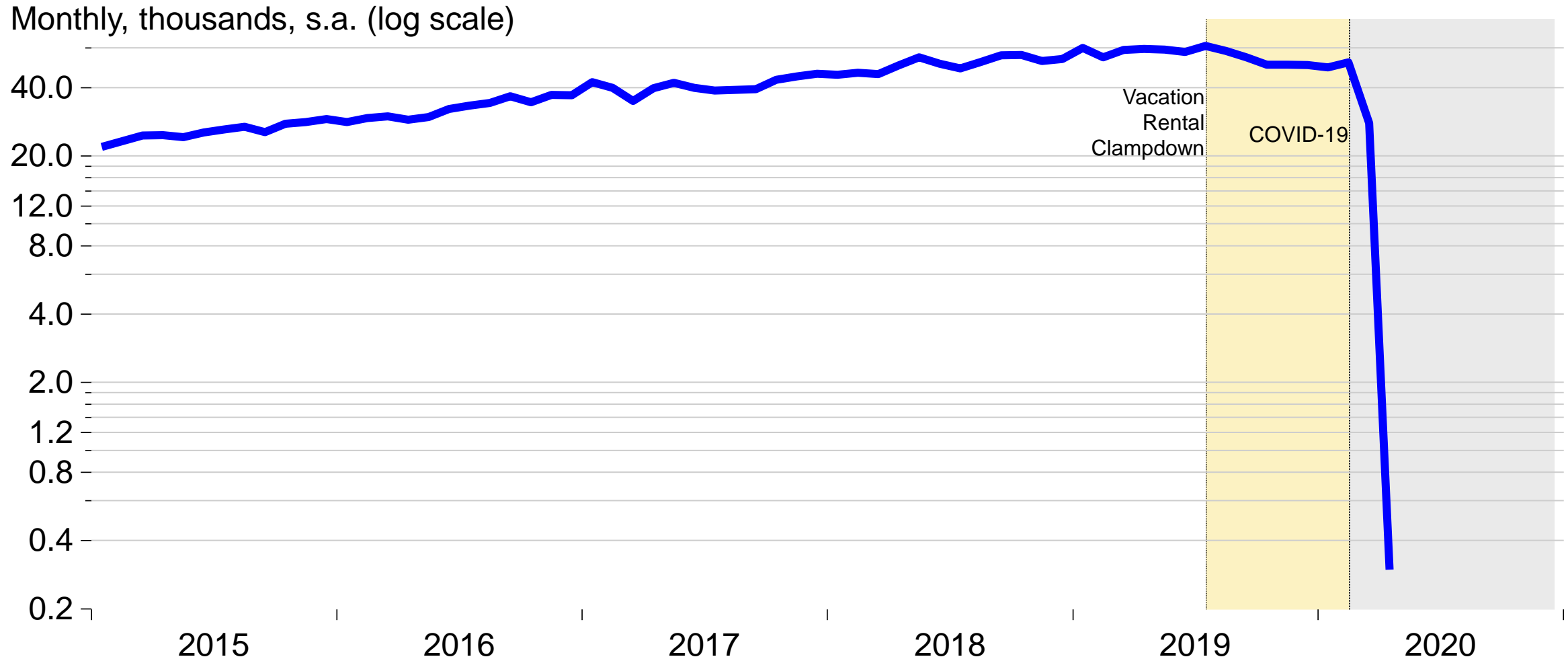
Monthly, thousands, s.a. (log scale)



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Source: Hawaii Tourism Authority (<https://www.hawaiitourismauthority.org/research/monthly-visitor-statistics/>); monthly data through April 2020, seasonal adjustment using, nonlinear trend regression through July 2019 by TZE [$\ln(\text{VREVOVR3_D11}) = -34.2837734267 + 0.0508333271106 \cdot t - 1.20633926677e-14 \cdot t^2$]; trend growth rate through July 2019 was 20.2 percent p.a. (2.2 percent p.a. for hotel-condo-timeshare visitors)

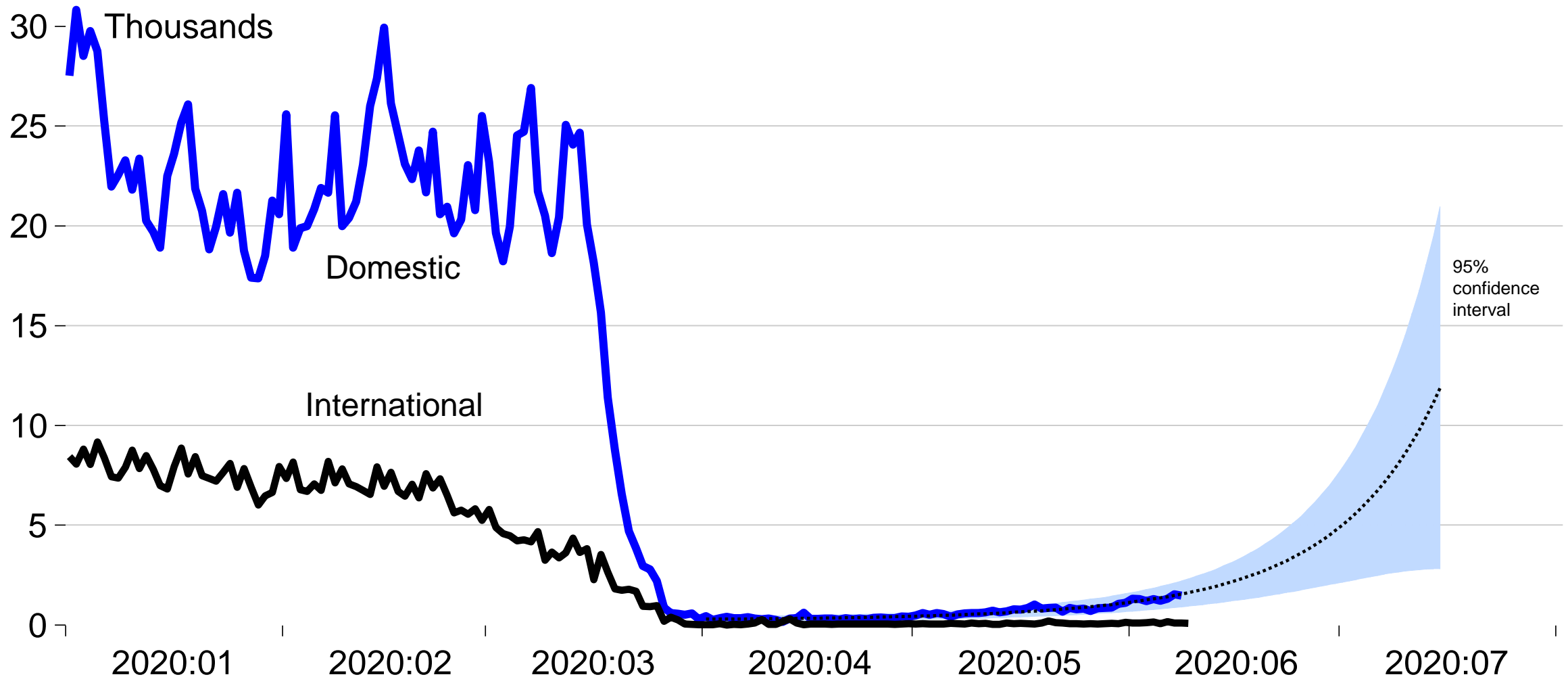
After February 2020: monthly Oahu visitor arrivals (staying in a rental house, private room, or shared room in a private house) Sudden Stop



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Hard to imagine, but remember exponentiating COVID-19 case counts?

Current trend in daily Hawaii domestic passenger arrivals may surprise



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Source: Hawaii DBEDT (<http://dbedt.hawaii.gov/visitor/daily-passenger-counts/>); trend regression is $\ln(\text{domestic passengers}) = 15919.21 - 4.30975t + 0.000292t^2$, where t is defined in days; all parameter estimates have P-values of 0.0001, an F-statistic of 0.00000 and an adjusted R-squared value of 0.8633, the estimating period is April 1 – June 9, 2020, and projection shown with 2 standard-error bandwidth.

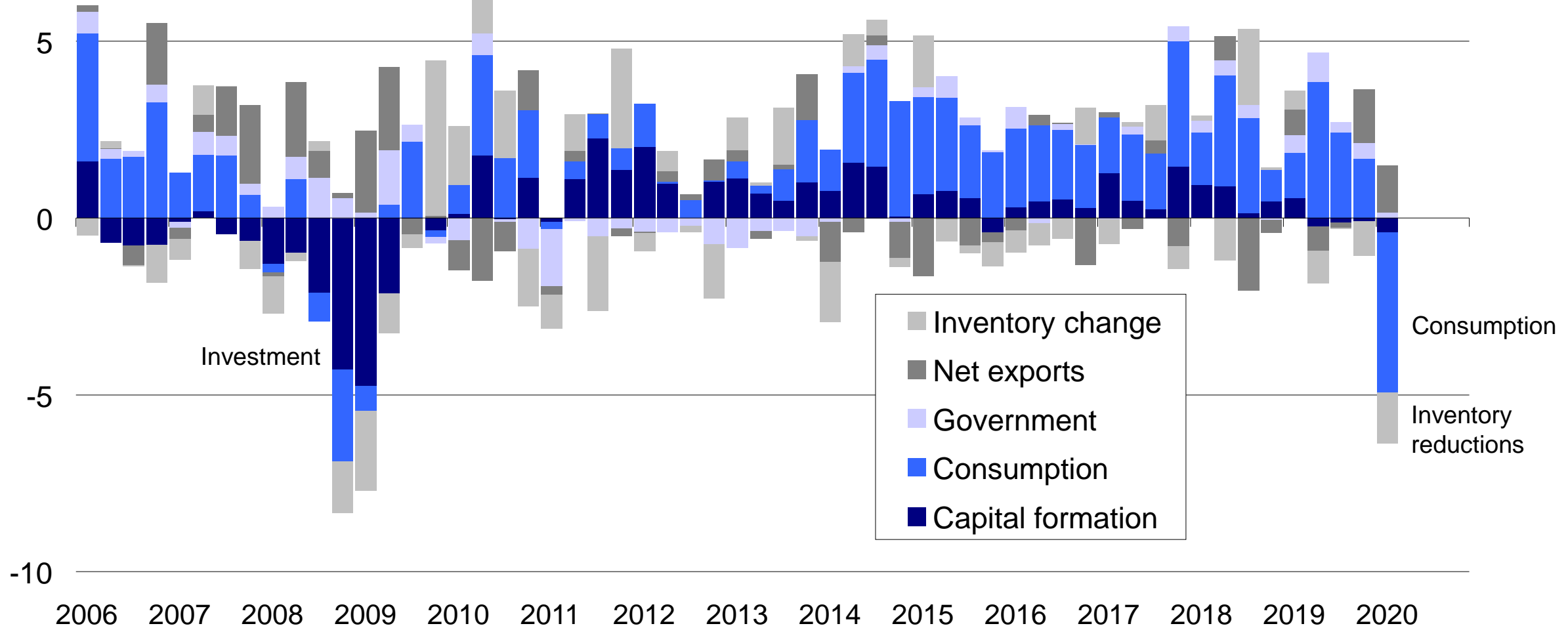


Final thoughts on the economic outlook

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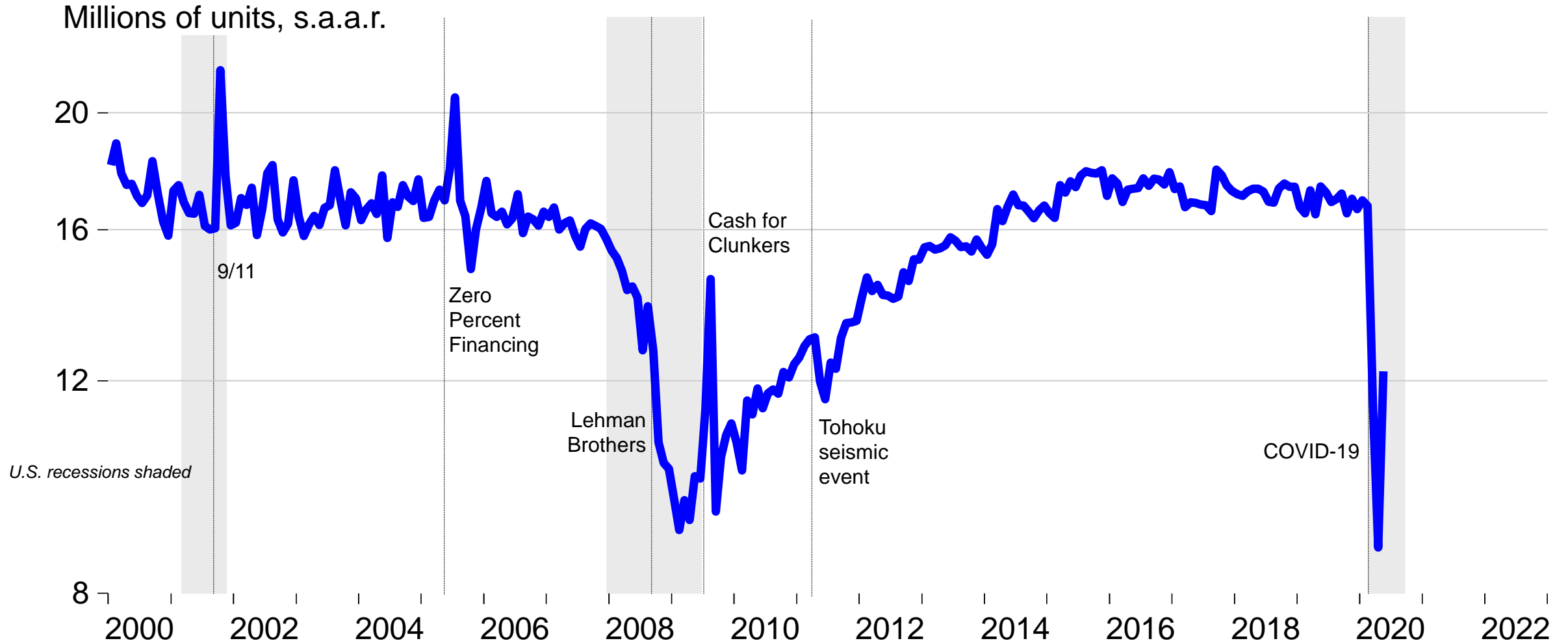
What the *composition* of real output growth reveals: COVID-19 caused a *consumption*-led downturn; more often recessions are investment-led

Quarterly annualized percent change contributions



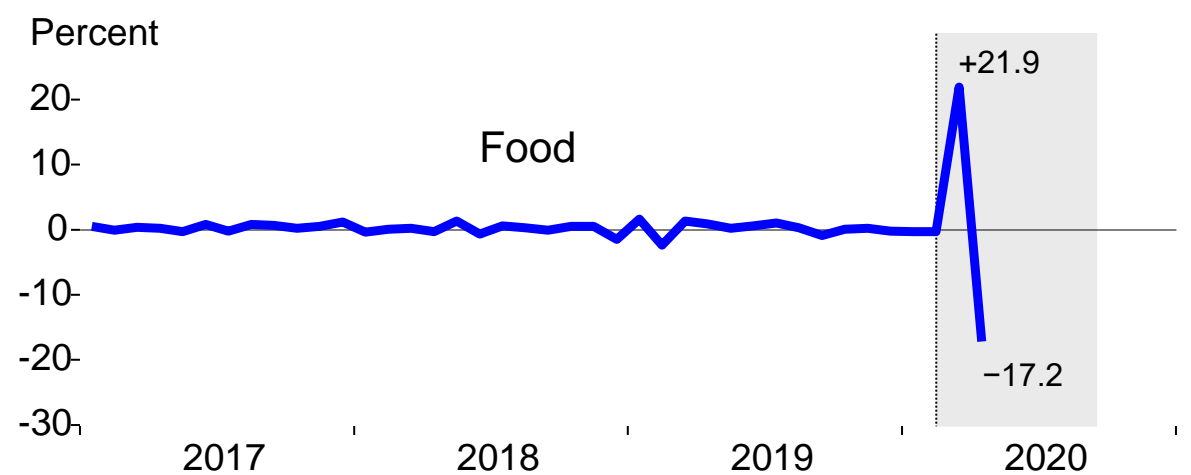
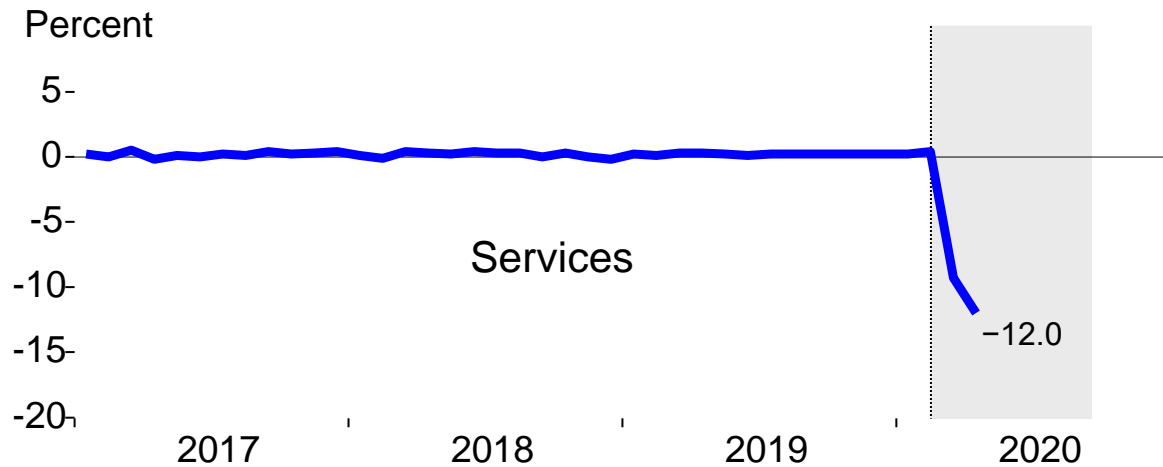
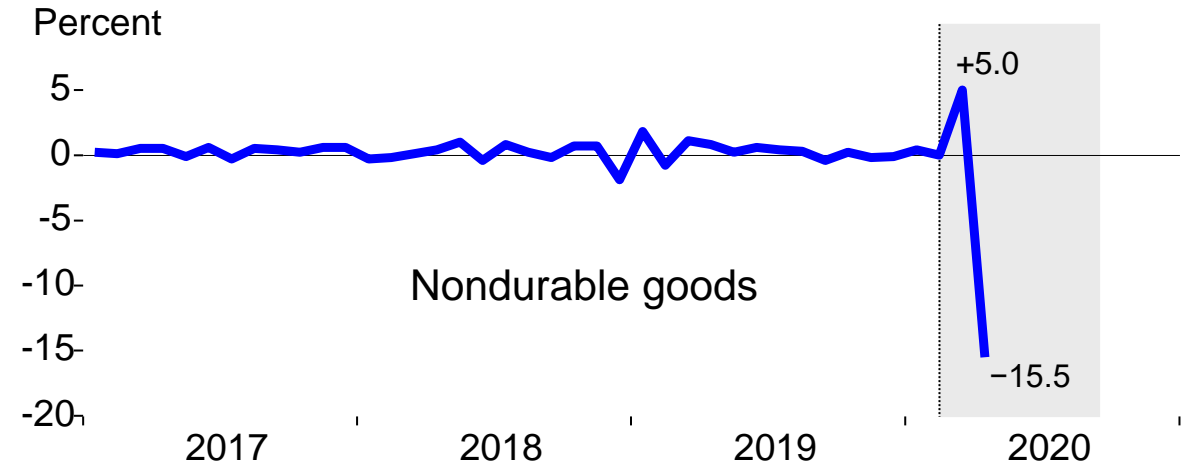
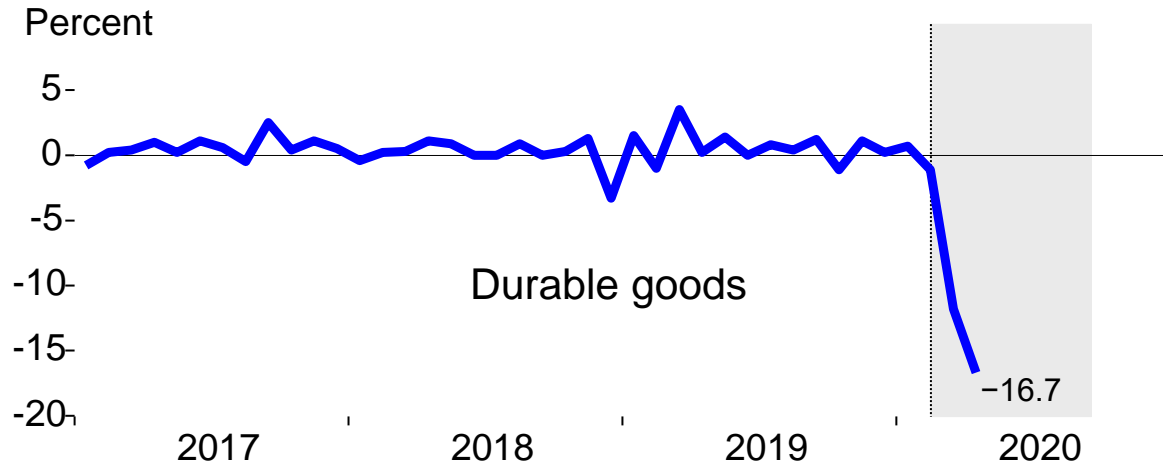
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U.S. auto/light truck sales provide glimpse of the bounce in durable goods consumption from SARS-CoV-2 pandemic, through May 2020



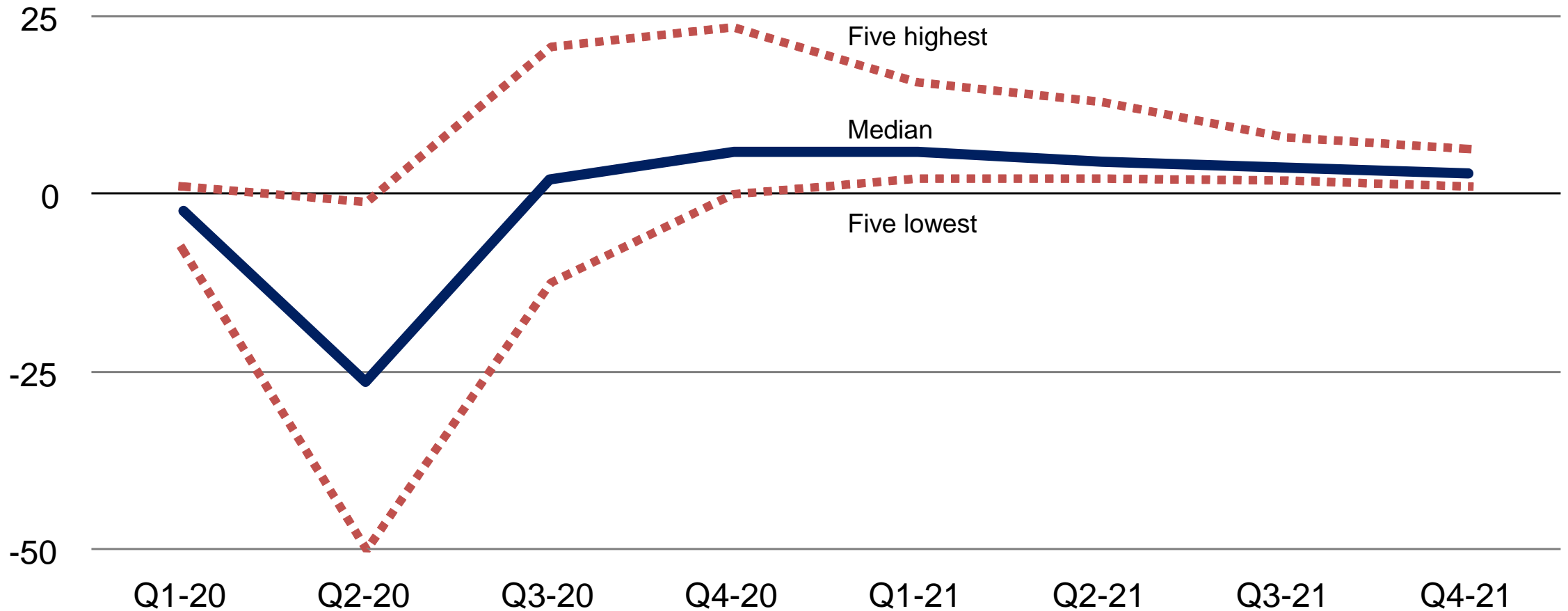
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Monthly real U.S. personal consumption expenditure growth through April 2020 and the COVID-19 Sudden Stop: stocking up, dropping out



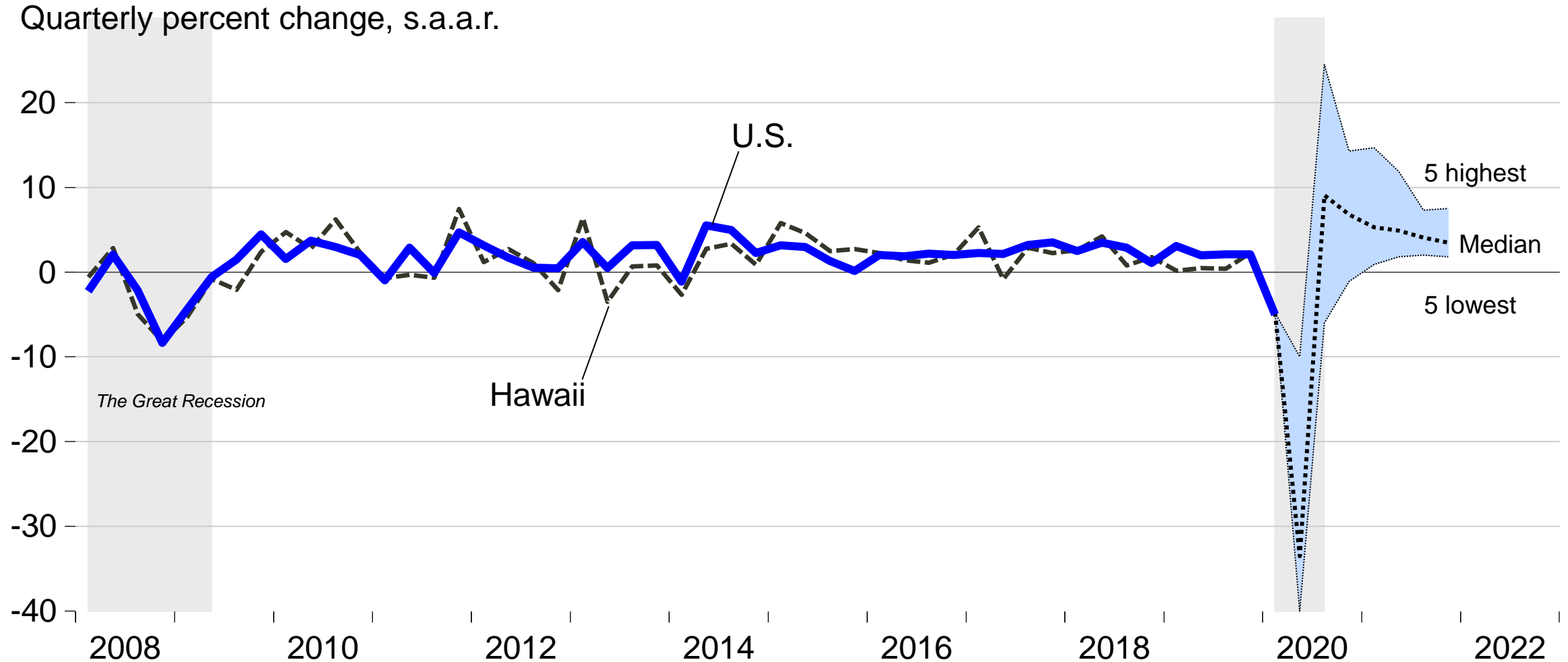
NABE outlook flash survey April 2020: V-, L-, U-shaped, Hockey Stick or Nike Swoosh? CBO forecast for 2020Q2 is -40% (annualized)

Forecast real U.S. GDP growth (percent, annualized)



Sources: National Association for Business Economics (<https://files.constantcontact.com/668faa28001/765a4afd-4ed3-4ea0-b98b-ae631771042b.pdf>); Philip Schwagel (April 2020) CBO's Current Economic Projections and a Preliminary Look at Federal Deficits and Debt for 2020 and 2021, (<https://www.cbo.gov/system/files/2020-04/56344-CBO-presentation.pdf>), Congressional Budget Office, "CBO's Current Projections of Output, Employment, and Interest Rates and a Preliminary Look at Federal Deficits for 2020 and 2021," CBO Blog (April 24, 2020), (www.cbo.gov/publication/56335) CBO projections at the time of passage of the CARES Act: -0.9 (2020Q1), -11.8% (2020Q2), +5.4% (2020Q3), +2.5% (2020Q4) (<https://www.cbo.gov/publication/56335>).

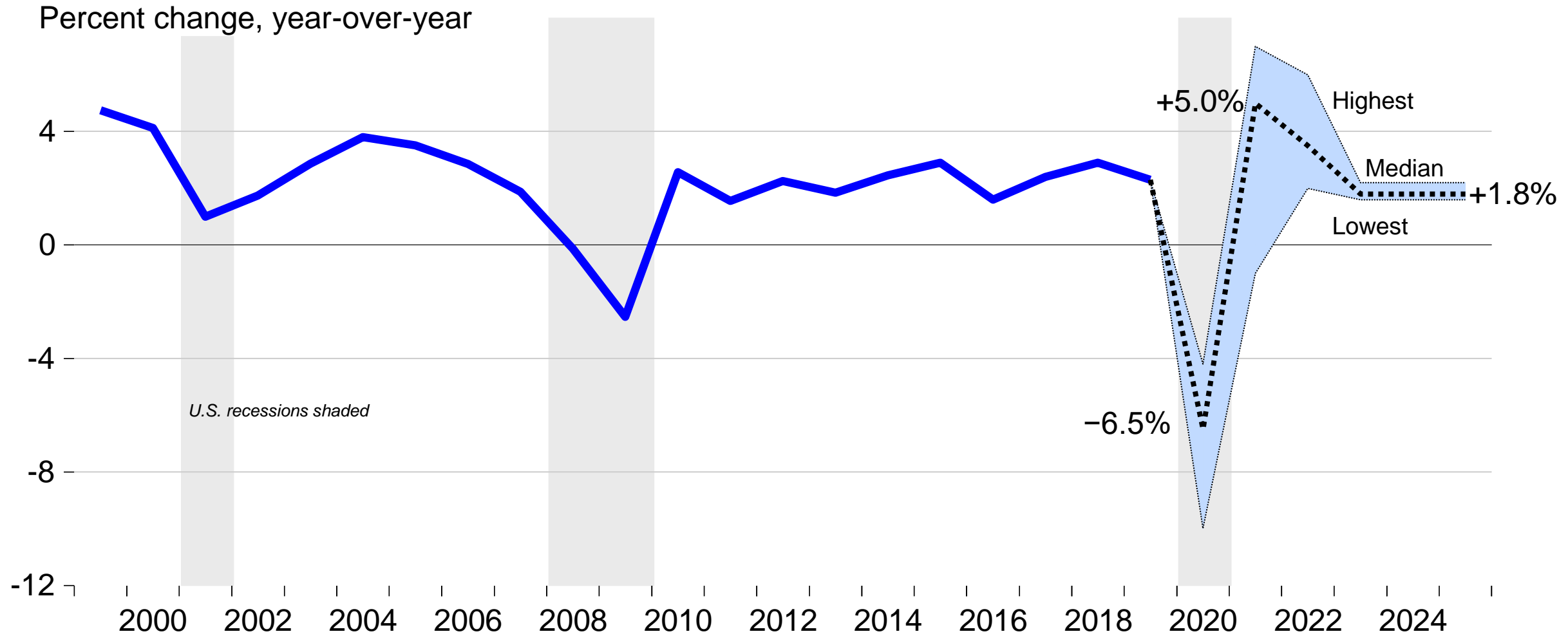
Putting U.S., Hawaii 2010s real GDP growth of 2.2% and 1.8%, in context: June 2020 median NABE forecasts: -33.5% (2020Q2), +9.1% (2020Q3)



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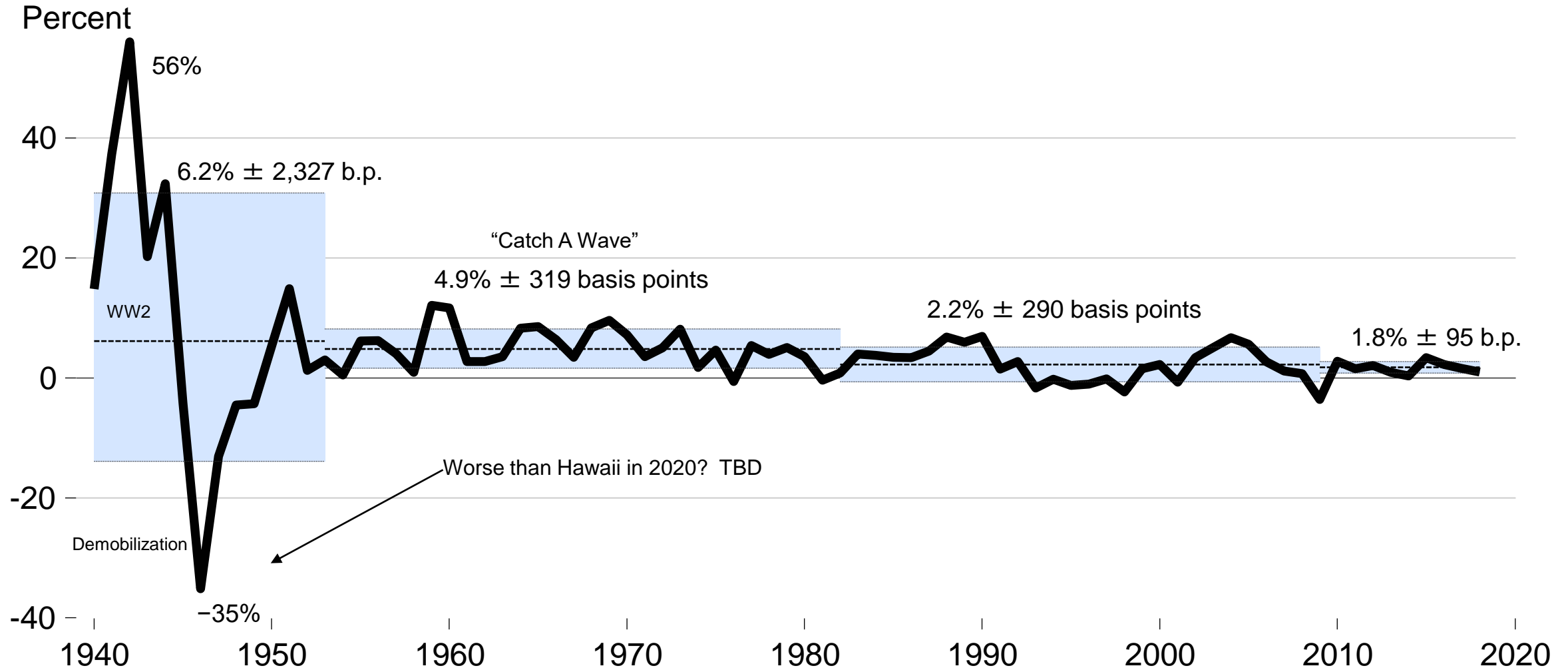
Source: Bureau of Economic Analysis, U.S. Department of Commerce (<https://www.bea.gov/data/gdp/gross-domestic-product>, <https://www.bea.gov/data/gdp/gdp-state>), National Association for Business Economics (https://www.nabe.com/NABE/Surveys/Outlook_Surveys/June_2020_Outlook_Survey_Summary.aspx); quarterly data through 2020Q1, including revisions, NABE June 2020 outlook survey.

Federal Reserve FOMC members' projections for real U.S. GDP growth rates, 2020-2022 and the longer run, June 10, 2020



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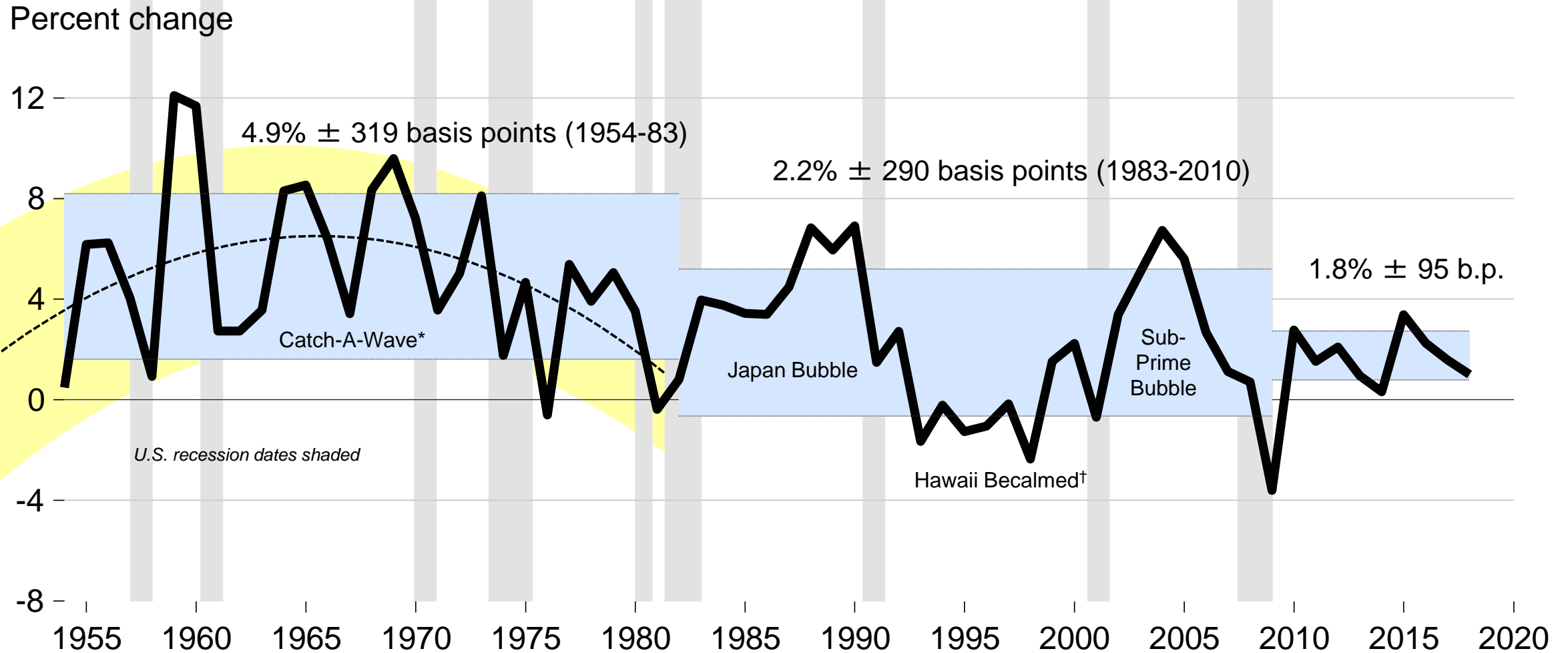
This never happened before? Try: 1915-1945—two world wars, global pandemic, The Depression; then 1950-1980 “Catch-A-Wave” breakout



Slide copyright 2020 TZ E C VO N O M A C S

Sources: Robert C. Schmitt, Table 6.1 (1976) *Historical Statistics of Hawaii*, based on UH Economic Research Center work by Harry Oshima, Mitsuo Ono, Bank of Hawaii (unpublished), Yung Shang, William Albrecht, Glenn Ifuku, Hawaii DPED (1988) *Hawaii's Income and Expenditure Accounts*, U.S. BEA (<https://www.bea.gov/data/economic-accounts/regional>), interval growth rates and 2 standard deviation bandwidths based on log changes of real GDP (or GSP, pre-1977) re-mapped to constant, 2018 dollars from NAICS data 1997-2018, SIC data 1977-1997, and prior estimates

Estimated Hawaii annual real GDP growth rates: islands' trend growth decelerated, lower volatility, clear post-WW2 arc of economic growth



*Tom Coffman (1973), *Catch a wave: A case study of Hawaii's new politics*, UH Press

† Chris Grandy (2002), *Hawaii's Becalmed: Economic Lessons of the 1990s*, UH Press

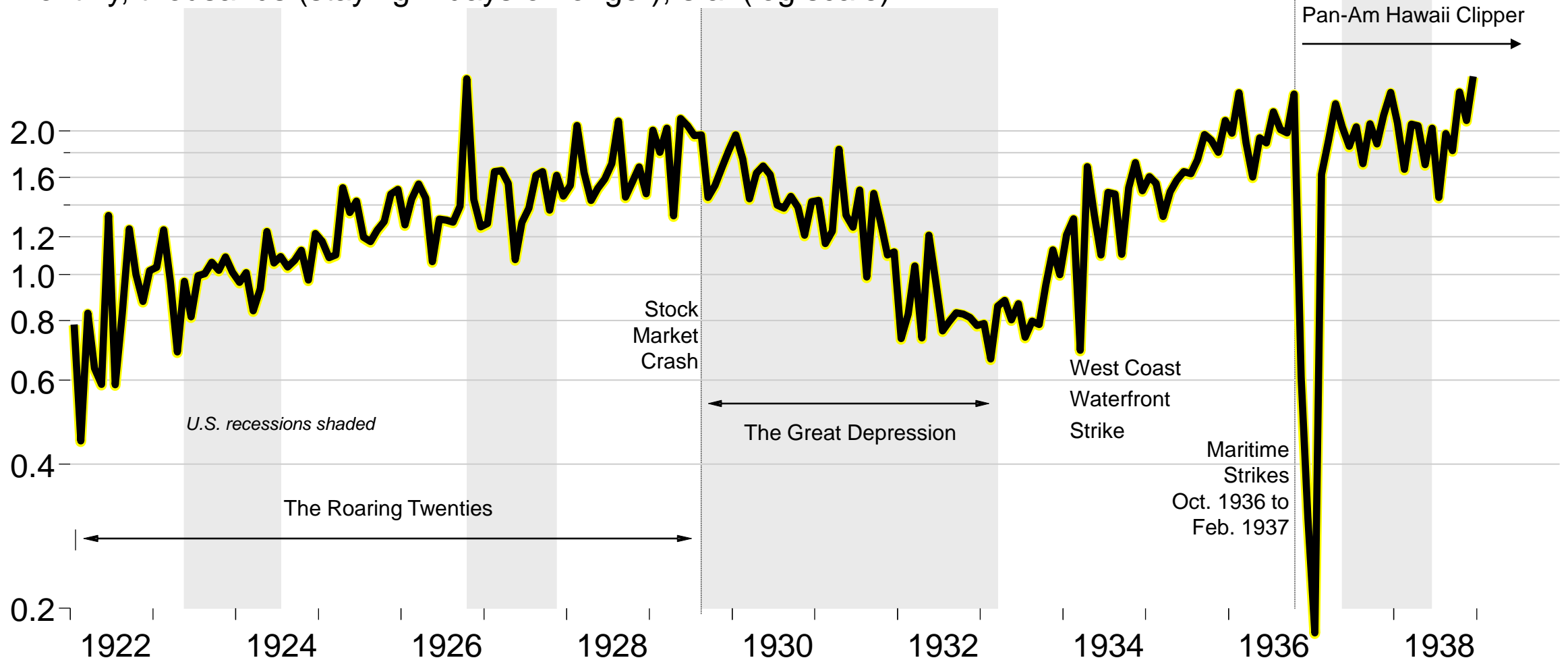
Note: "smooth pasting" issues complicate interpretation before and after 1997, as underlying data are not strictly comparable

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Sources: Robert C. Schmitt, Table 6.1 (1976) *Historical Statistics of Hawaii*, based on UH Economic Research Center work by Harry Oshima, Mitsuo Ono, Bank of Hawaii (unpublished), Yung Shang, William Albrecht, Glenn Ifuku, Hawaii DPED (1988) *Hawaii's Income and Expenditure Accounts*, U.S. BEA (<https://www.bea.gov/data/economic-accounts/regional>), interval growth rates and 2 standard deviation bandwidths based on log changes of real GDP (or GSP, pre-1977) re-mapped to constant, 2018 dollars from NAICS data 1997-2018, SIC data 1977-1997, and prior estimates

Monthly Hawaii visitor arrivals 1922-38—excluding passengers on ships in transit—exhibited business cycle, Sudden Stops, just as today

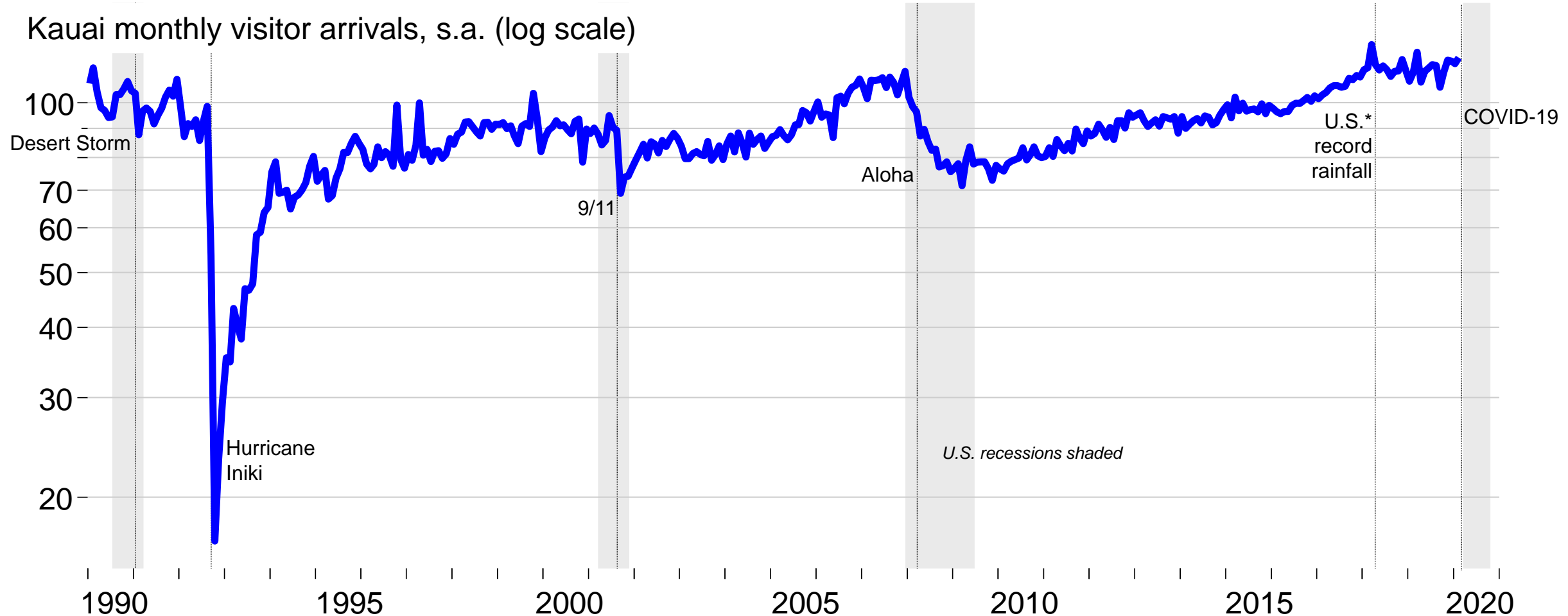
Monthly, thousands (staying 2 days or longer), s.a. (log scale)



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Sources: George T. Armitage, Hawaii Tourist Bureau, "Hawaii's Tourist Business," Hawaii Territorial Planning Board *An Historic Inventory of the Physical, Social and Economic and Industrial Resources of the Territory of Hawaii* (February 8, 1939), p. 317; U.S. Bureau of Labor Statistics "The Maritime Strikes of 1936-37." *Monthly Labor Review* 44, no. 4 (1937): 813-27. Accessed January 29, 2020 (www.jstor.org/stable/41815101)

Kauai Hurricane Iniki (1992): a once in a century event ten years after once in a century event (Hurricane Iwa (1982)); “look under the hood”



* NOAA (<https://www.weather.gov/hfo/RecordKauaiandOahuRainfallAndFlooding-April2018>)

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Kauai and Hurricanes Dot (1959), Iwa (1982), Iniki (1992): leptokurtotic events induce changes in capital allocation for risk management

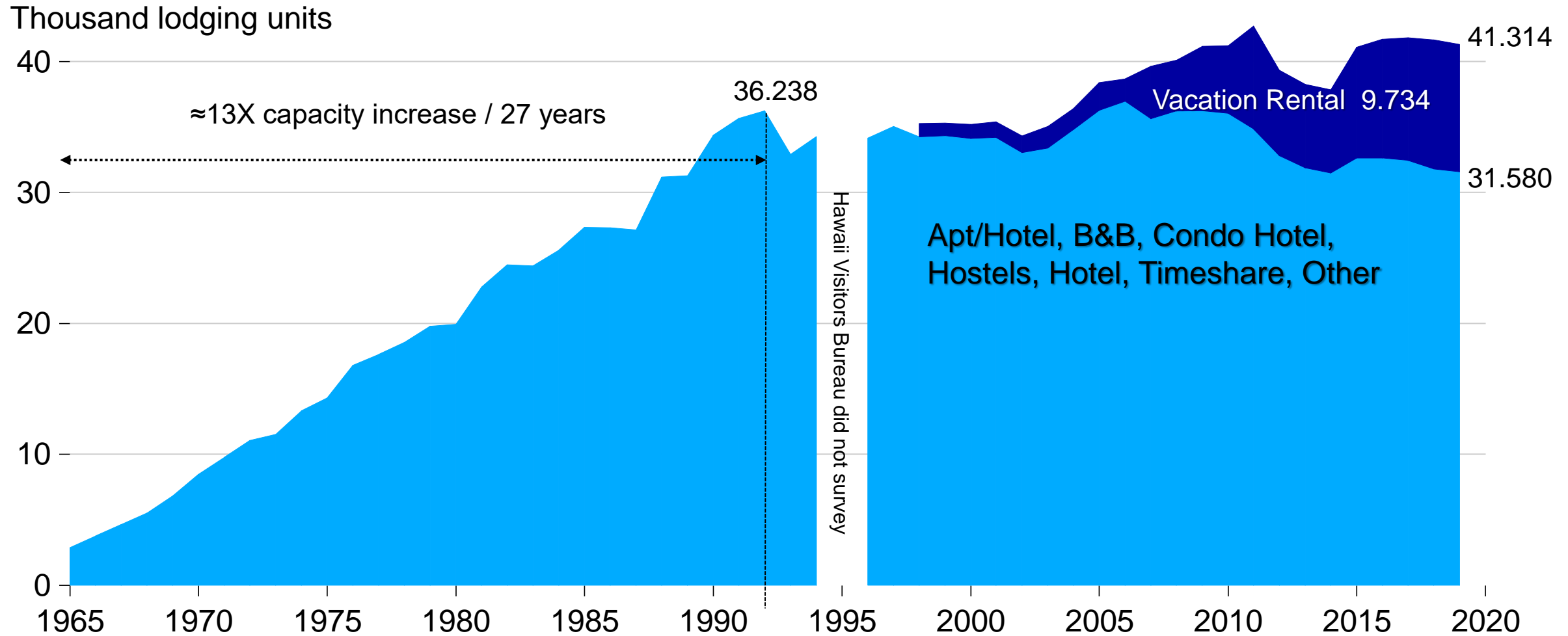
- Kauai monthly visitor arrivals, s.a. 2015-16 (98k) essentially same as 1990-91 (100k)
- Pre-Iniki Kauai visitor plant inventory comprised hotel, condos (securitized hotel rooms); post-Iniki securitization: sell intervals, distribute risk, remove from balance sheet

Kauai lodging shares:	<i>percent of total*</i>	1998	2015-2019
Condo Hotel		41%	18
Hotel		50	32
Timeshare		0	30
Vacation Rental		5	20
Other		4	1

*Total units 6,969 (1998), 8,781 (average 2015-2019), 9,036 (2019)

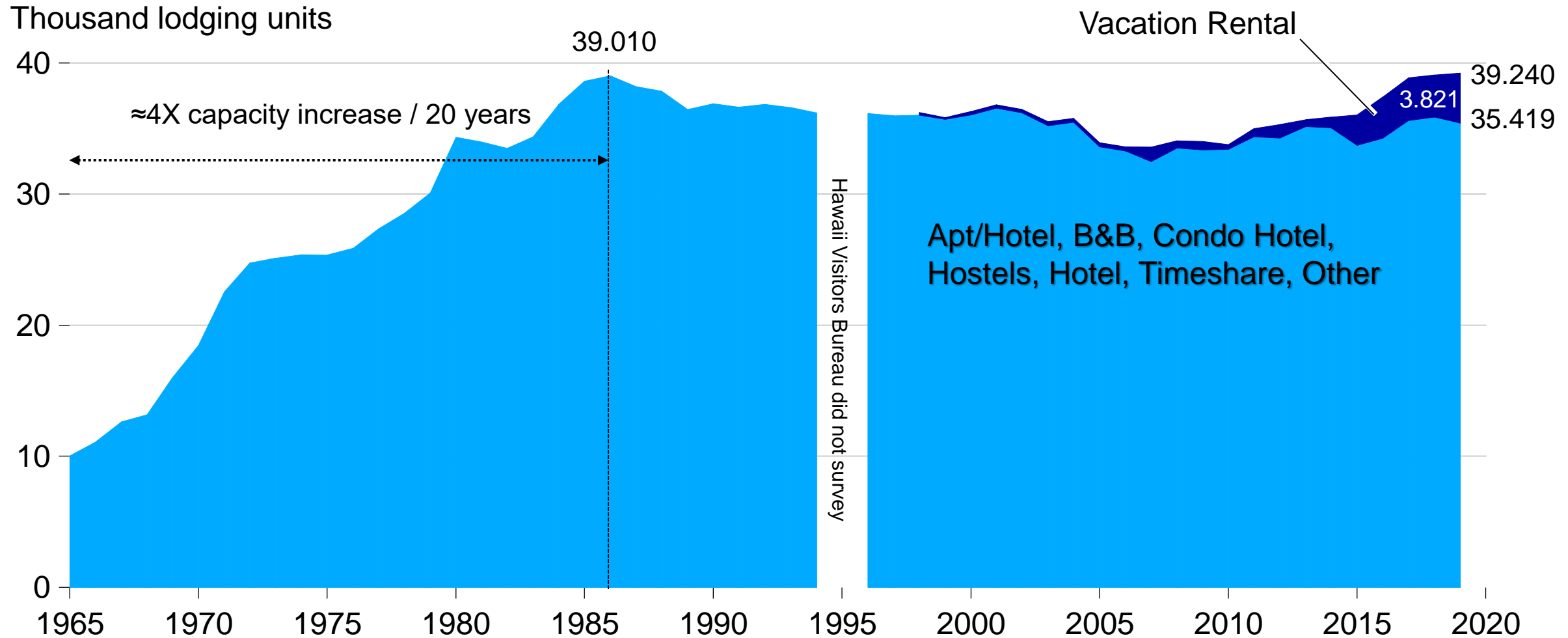
- Now: hosting apps lower search/matching cost, dismantle barriers to contestable entry
- “Undocumented vacation rentals” comprised *all* net growth in visitor plant inventory for last 28 years (Neighbor Islands), last 30 years (Oahu)

Neighbor Isle traditional lodging capacity growth ended 28 years ago; one-quarter now vacation rentals contesting global brands' oligopoly



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Oahu traditional lodging capacity growth ended 34 years ago; capacity growth since was in vacation rentals subverting exclusionary zoning



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Rebooting the economy after a “once-in-a century” viral pandemic

■ Space

- *Retail* ft² excessive? E-commerce
- *Food service*—50:50 supply chain rebalance, more apps than seats?
- *Office space*: End of the incredible shrinking cubicle (350 ft² → 150 ft²)
- *Warehouse*—Got toilet paper and PPE? YB weekly voyages 2 → 1 ITO, 3 → 2 OGG? Resilience investment?
- *Lodging* $E(R_t) = (\dot{P}_t + REVPAR_t)$
where $REVPAR_t$ is a S.D.E with jump
- *Residential*—condos vulnerable? (VR; excess hotel capacity); yard or tower?

■ Time

- **1910s-1960s** 8.26% annualized growth in real private building: from 2 world wars, influenza pandemic, “Roaring” to Depression, post-war demobilization, to “Catch A Wave” statehood transition:
growth crushed volatility
- **1960s-2010s** -0.1% annualized growth in real private building—excluding equipment and software—geopolitical, geophysical, and biological shocks, culminating in pandemic; excl. cycle:
volatility dominated growth
- 2020s how different the New Normal?

Highly recommended from the Univ. of Hawaii Econ. Research Org.

PREVENTION OF TRAVEL-RELATED REINTRODUCTION OF COVID-19 INFECTION IN THE STATE OF HAWAII

JUNE 9, 2020



By Tim Brown, Sumner La Croix, and F. DeWolfe Miller

This plan proposes to limit travel-related reintroduction of COVID-19 into Hawaii, averting further local transmission of the virus from travelers to the community. The plan is epidemiologically sound and conceptually straightforward. Air passengers cleared to travel by screening for specific markers will pose a much smaller risk of transmission to Hawaii residents. Individuals clearing both (1) temperature and symptom screening in their departure city and (2) a COVID-19 test in their departure city will not be required to quarantine for 14 days on arrival in Hawaii. Specific timelines for testing relative to embarkation are provided.

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Pau

