Aspects of the Hawaii outlook with impediments and constraints on labor, investment, and tourism

A presentation adapted for the Hawaii Workforce Development Council from the

2025 PATA/TTRA Annual Outlook & Economic Forecast Forum

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February 4, 2025 revised February 13, 2025

A macroeconomic outlook overview

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Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents

Percent

Variable	Median[1]				
	2024	2025	2026	2027	Longer run
Change in real GDP	2.5	2.1	2.0	1.9	1.8
September projection	2.0	2.0	2.0	2.0	1.8
Unemployment rate	4.2	4.3	4.3	4.3	4.2
September projection	4.4	4.4	4.3	4.2	4.2
PCE inflation	2.4	2.5	2.1	2.0	2.0
September projection	2.3	2.1	2.0	2.0	2.0
Core PCE inflation[4]	2.8	2.5	2.2	2.0	
September projection	2.6	2.2	2.0	2.0	
Memo: Projected appropriate policy path					
Federal funds rate	4.4	3.9	3.4	3.1	3.0
September projection	4.4	3.4	2.9	2.9	2.9

1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections. 4. Longer-run projections for core PCE inflation are not collected.
Source: FRB (https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20241218.htm)

Economic forecasts from Hawaii DBEDT

Economic Indicators	2022	2023	2024	2025	2026	2027
Percent	Actual		Forecast			
Total population growth	-0.5	-0.3	-0.2	0.1	0.1	0.1
Visitor arrivals growth	36.2	4.6	-0.6	3.2	2.6	2.4
Visitor days growth	30.5	1.4	-3.3	2.8	2.2	2.2
Visitor expenditure growth	50.5	5.4	-1.4	4.3	3.9	4.0
Honolulu CPI-U inflation	6.5	3.1	4.3	3.1	2.7	2.6
Personal income growth	1.9	5.5	4.7	4.4	4.1	4.1
Real personal income growth	-4.7	2.5	1.8	1.6	1.6	1.7
Personal income deflator growth (inflation)	7.0	2.8	3.1	2.7	2.5	2.4
Non-agricultural wage & salary job growth	5.3	2.3	0.9	1.2	1.2	1.0
Civilian unemployment rate	3.5	3.0	2.9	2.7	2.6	2.5
Gross domestic product growth	10.4	6.9	4.5	4.5	4.2	4.2
Real gross domestic product growth	2.9	2.0	1.6	2.0	2.0	1.8
Gross domestic product deflator growth (inflation)	7.3	4.8	2.9	2.6	2.4	2.5

Source: Hawaii State Department of Business, Economic Development & Tourism, December 4, 2024 (https://dbedt.hawaii.gov/economic/qser/outlook-economy/).

Inflation and monetary policy

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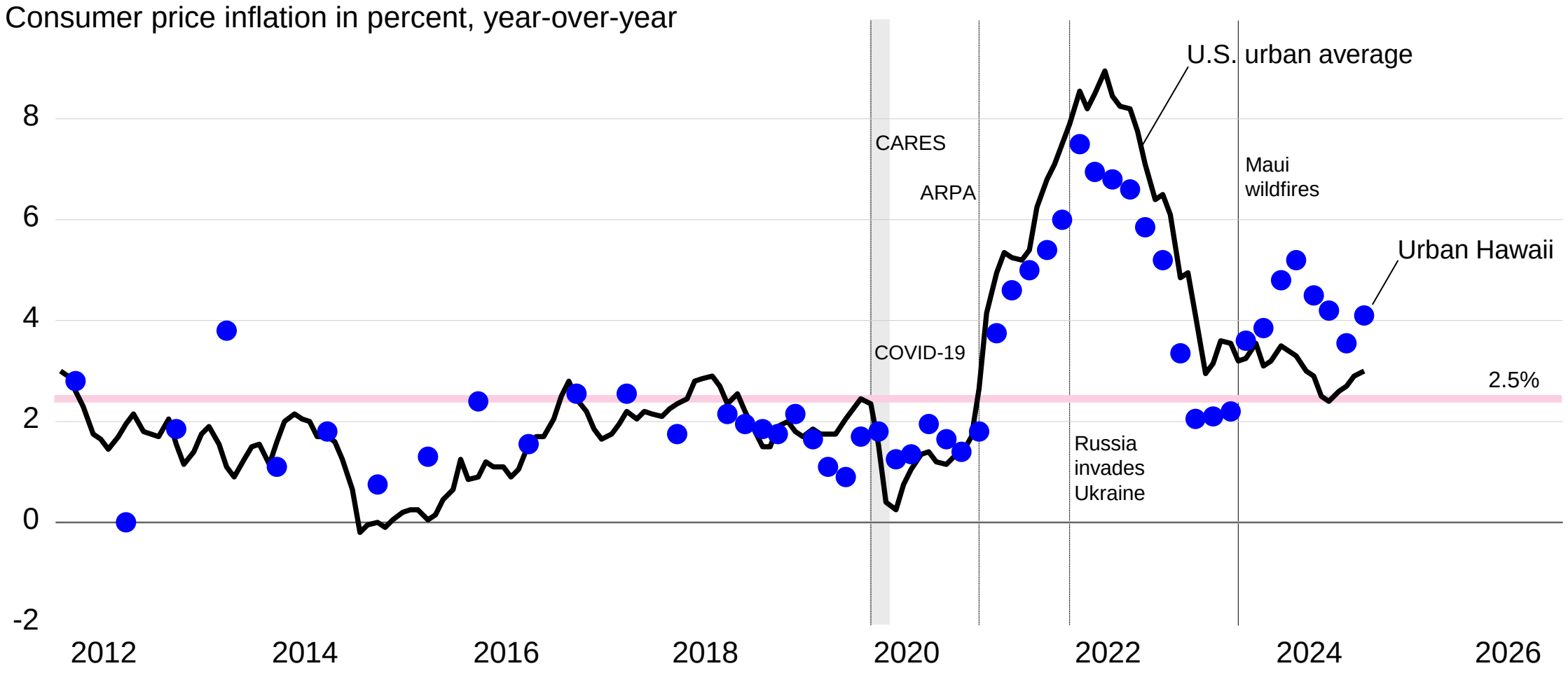
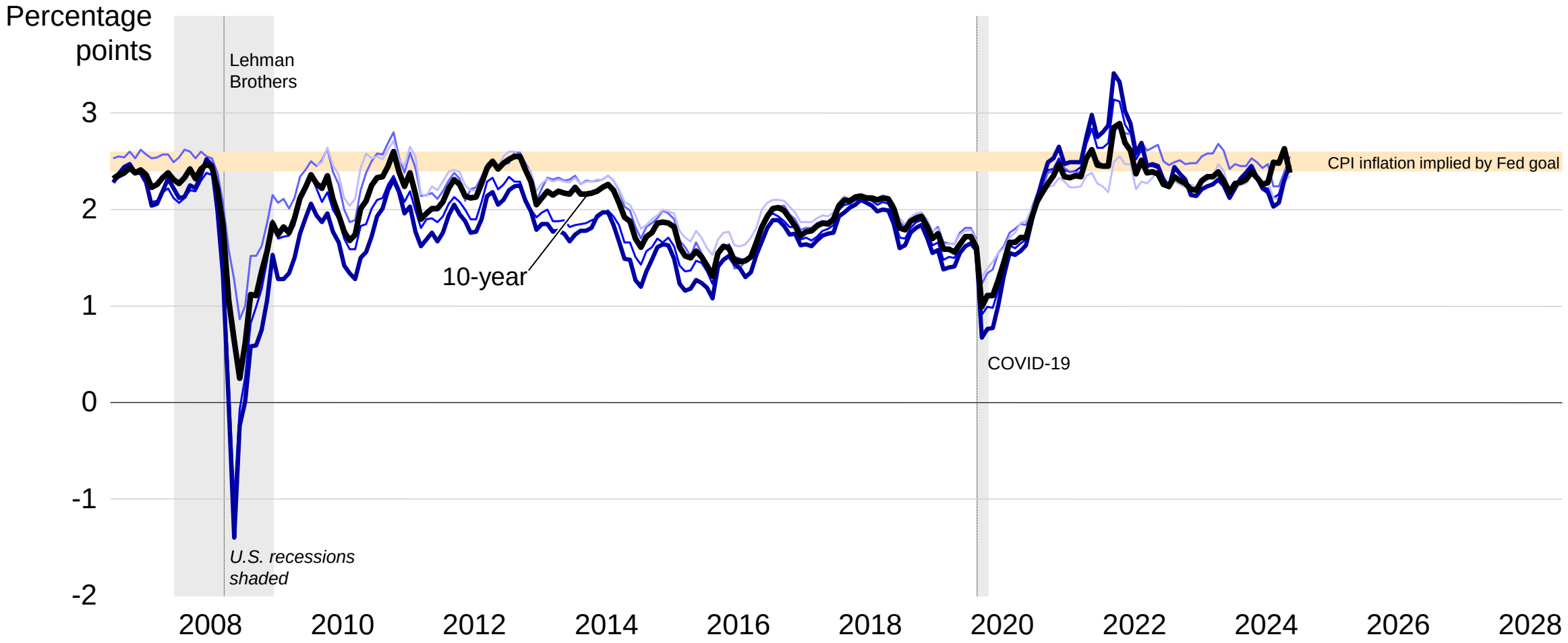
Urban Hawaii CPI inflation eased after post-wildfire housing cost surge (FEMA rent); renewed upward drift most recently



Sources: U.S. Bureau of Labor Statistics (https://data.bls.gov/cgi-bin/surveymost?r9), data through January 2025

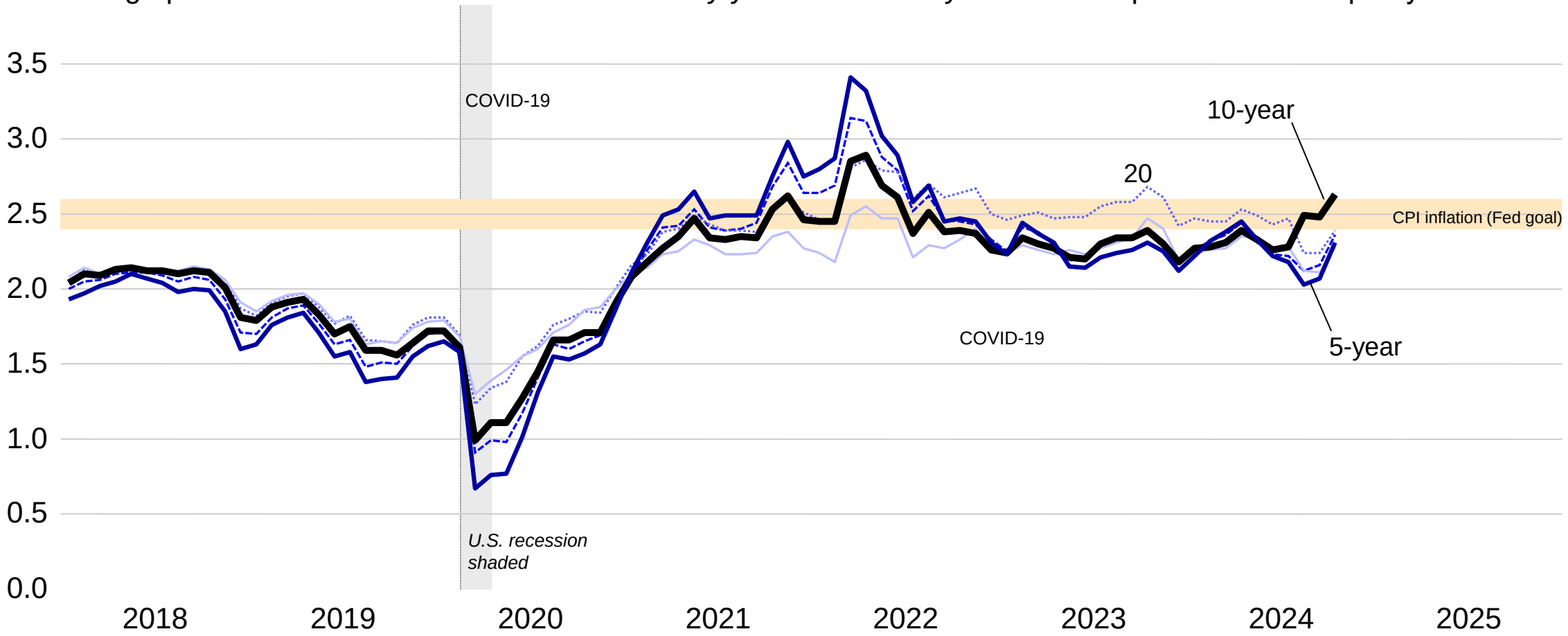
Term structure of expected inflation implied by nominal U.S. Treasury minus real (TIPS) yields stable (2% PCE goal ⇔ 2.5% CPI inflation)



Sources: Board of Governors of the Federal Reserve System (https://www.federalreserve.gov/releases/h15); monthly data through November 7, 2024.

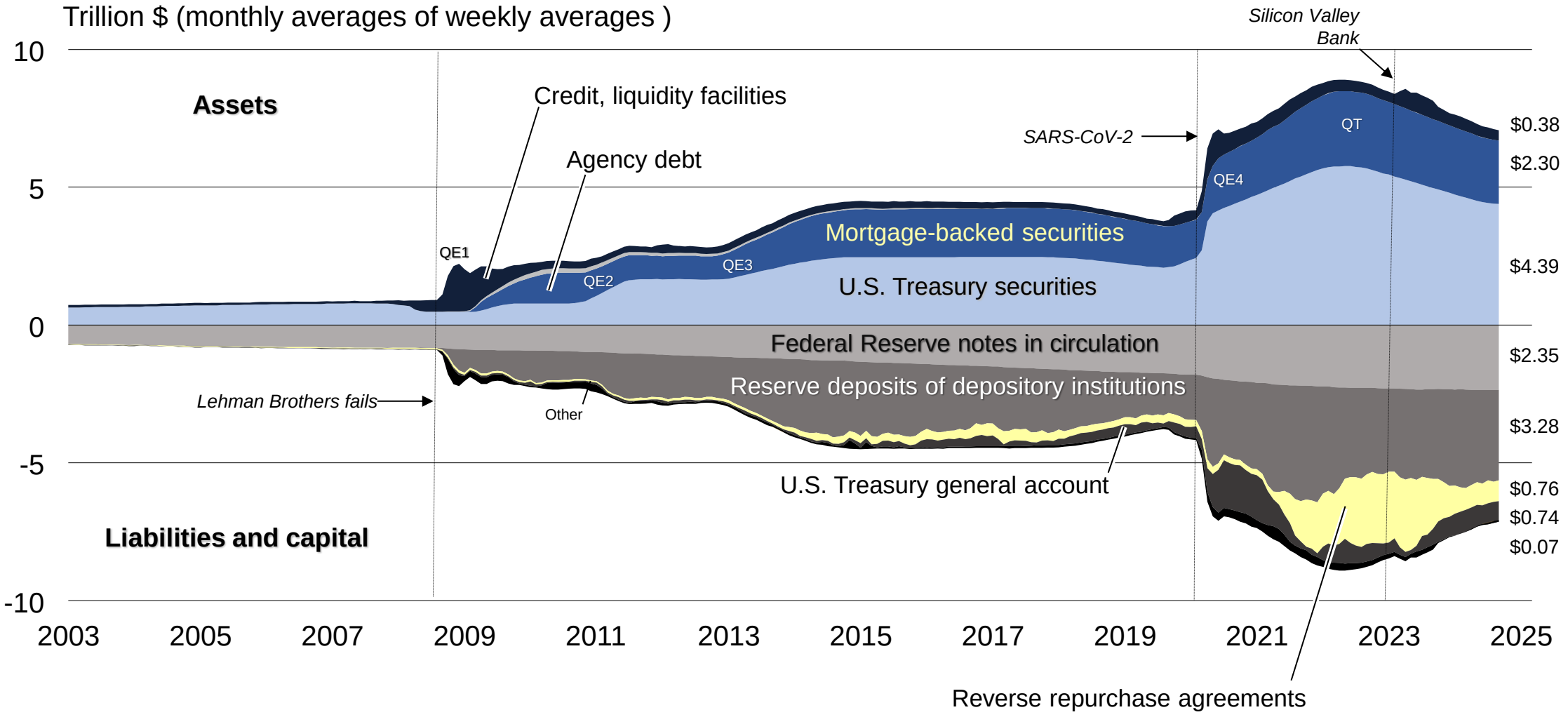
Term structure of expected ("breakeven") inflation began lifting off (along with Bitcoin) as prospect of Trump election gained credibility

Percentage point difference between nominal Treasury yields and TIPS yields—an "expected inflation" proxy



Sources: Board of Governors of the Federal Reserve System (https://www.federalreserve.gov/releases/h15); monthly averages through October 2024.

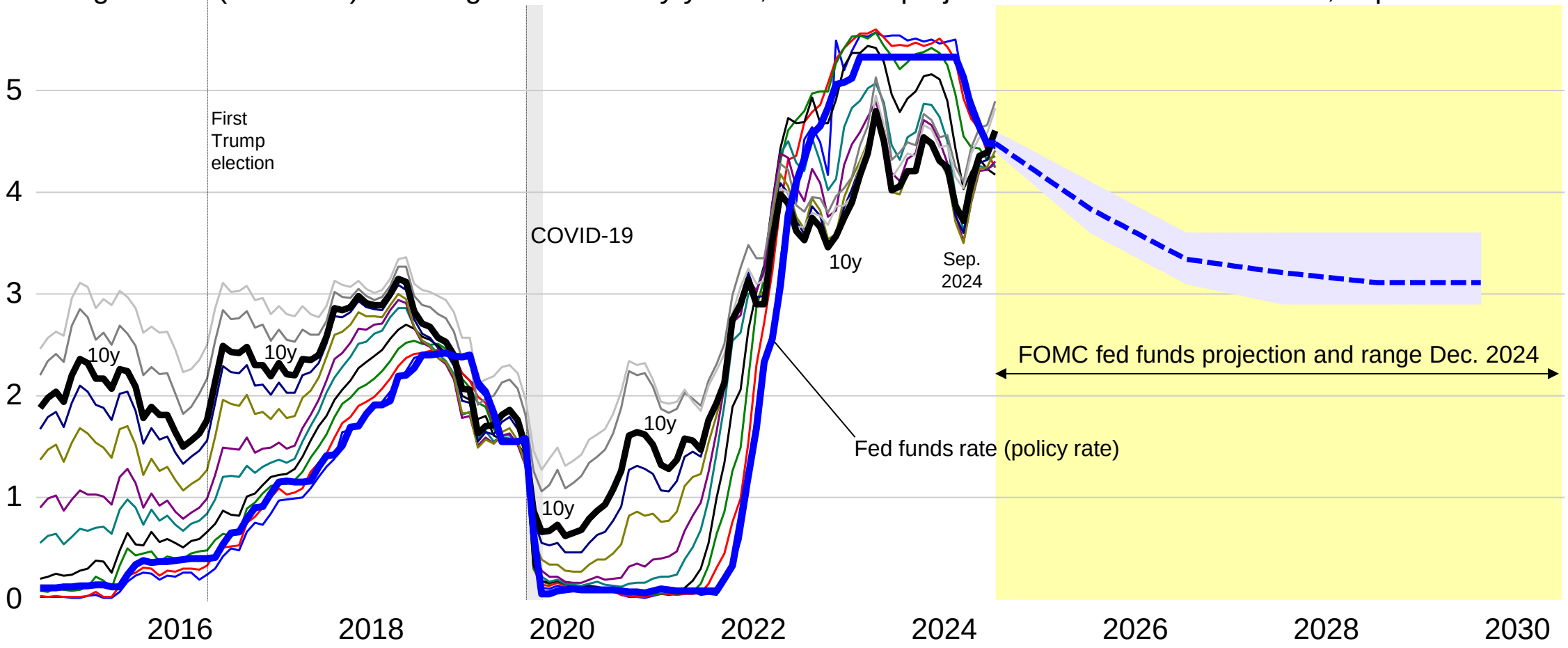
Quantitative tightening (QT) shrinking Fed balance sheet while policy pivots to lower target rates: reserves stable, reverse repos shrinking



Sources: Monthly averages of weekly averages, Federal Reserve Board (Statistical Release H.4.1), compiled through week released September 11, 2024 (https://www.federalreserve.gov/releases/H41/default.htm); on September 18, 2024, FOMC guidance capped monthly runoff at $25 billion for Treasuries and $35 billion for MBS and set the bid-offer spread on O/N reverse repos at 5.0-4.8 percent (https://www.federalreserve.gov/newsevents/pressreleases/monetary20240918a1.htm).

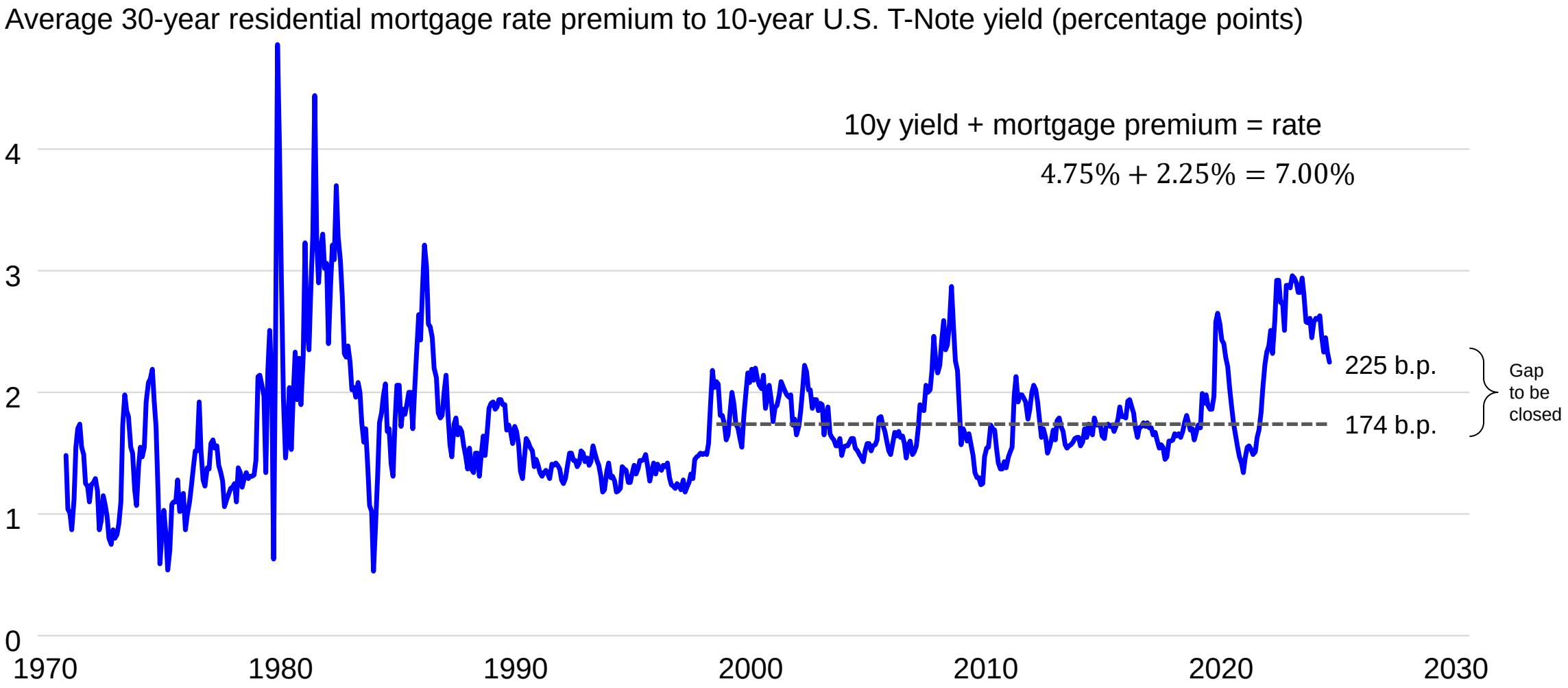
Term structure of interest rates, Dec 2024 projections; uncertain LR and overnight "neutral rates:" $3.5 \leq r^*_{10y} \leq 4.75$ and $2.8 \leq r^*_{O/N} \leq 3.6$

Overnight rates (fed funds) and long-term Treasury yields, and FRB projections for the fed funds rate, in percent



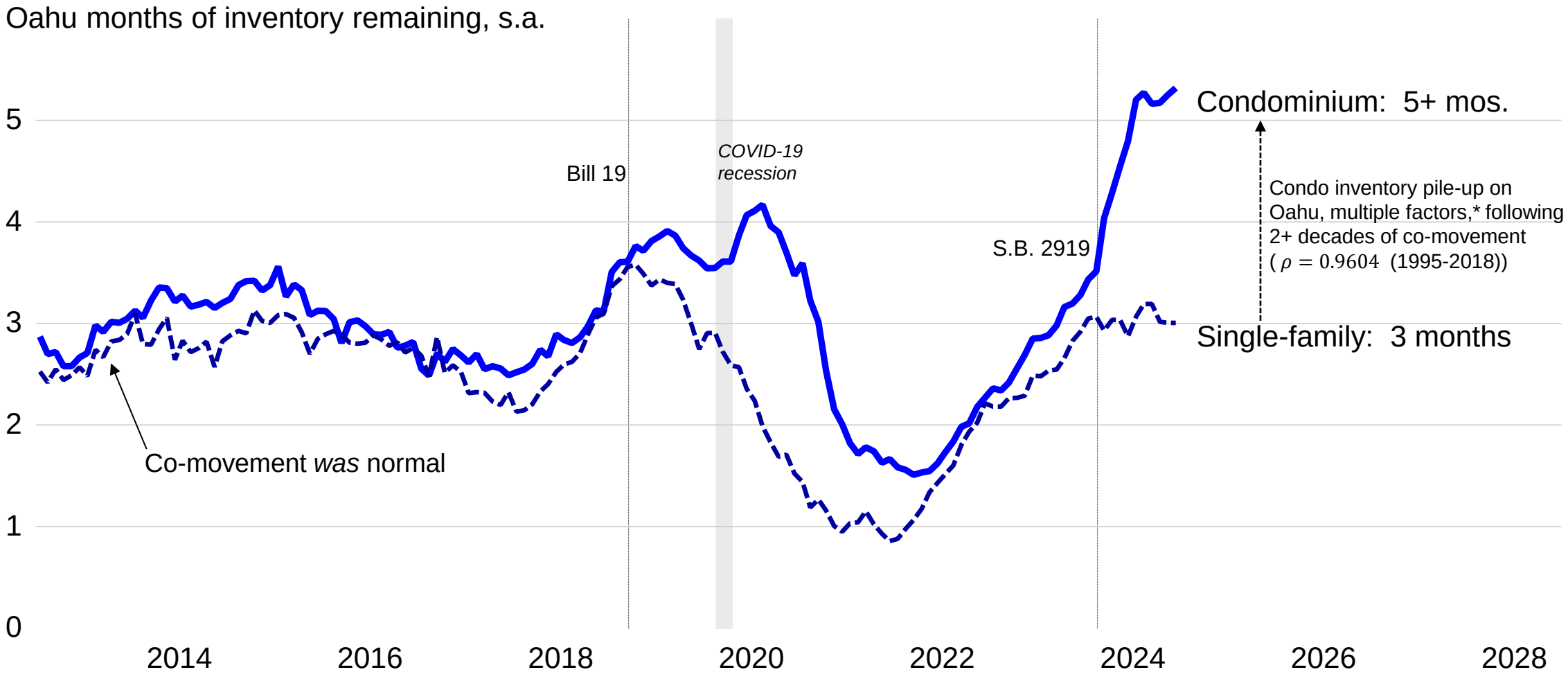
Source: Federal Reserve Board (December 2024) (https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20241218.htm and https://www.federalreserve.gov/releases/h15/).

Mortgage rate premium of 175 basis points to 10-year U.S. T-Note yield about 50 basis points too high (descending but still at 225 b.p.)



Sources: Federal Reserve Board (https://www.federalreserve.gov/releases/h15/), Freddie Mac, retrieved from FRED, Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org/series/MORTGAGE30US).

Honolulu Bill 19 (2019), S.B. 2919 (2024) ⇒ condo stigma, raise investor uncertainty, lower risk-adjusted returns on condos, inventory pile-up



*Condo risk-adjusted returns impaired by vintage issues (maintenance and operation expenses), rising insurance premia, tourism pandemic hiatus in 2020, and political risk posed by county council and state legislative initiatives to affirm county governments' abilities to police, suppress short-term rentals

Source: Honolulu Board of Realtors; seasonal adjustment using Census X-13 ARIMA filter by TZE.

TZ ECONOMICS
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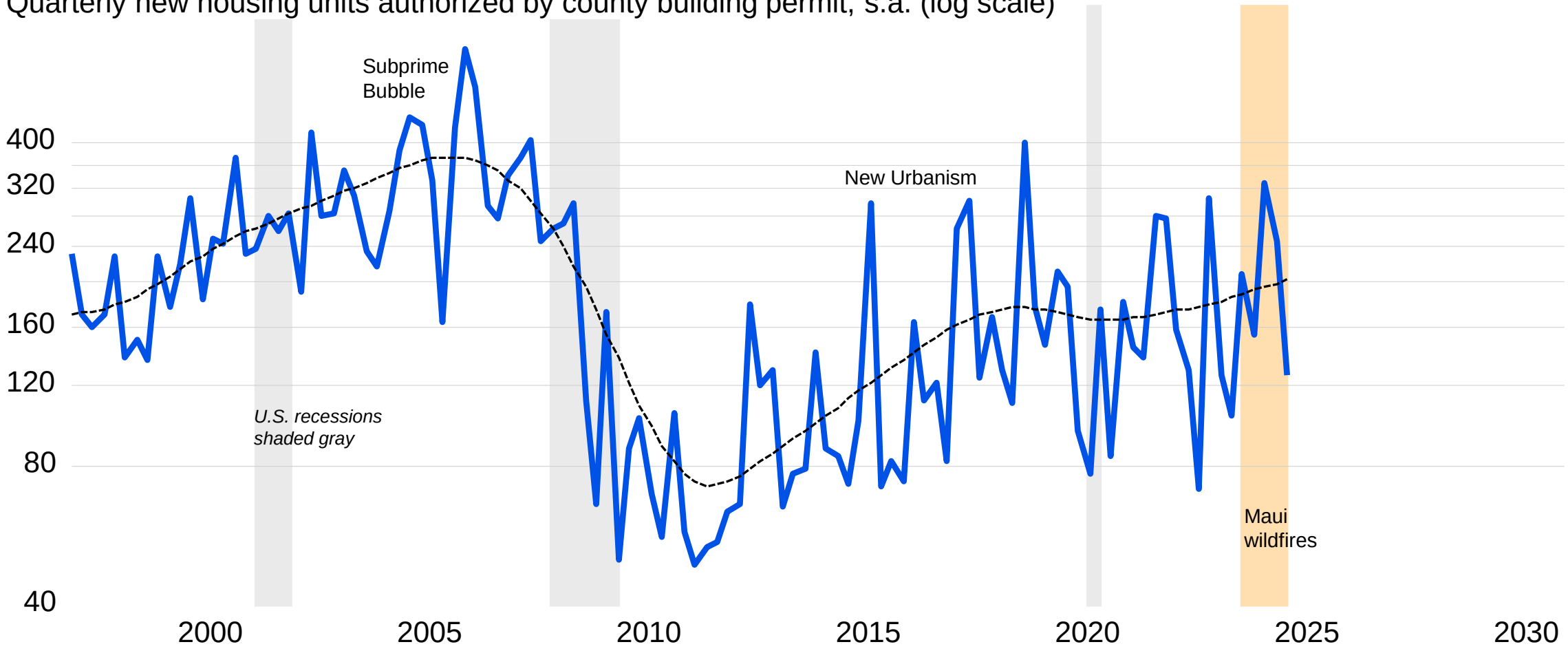
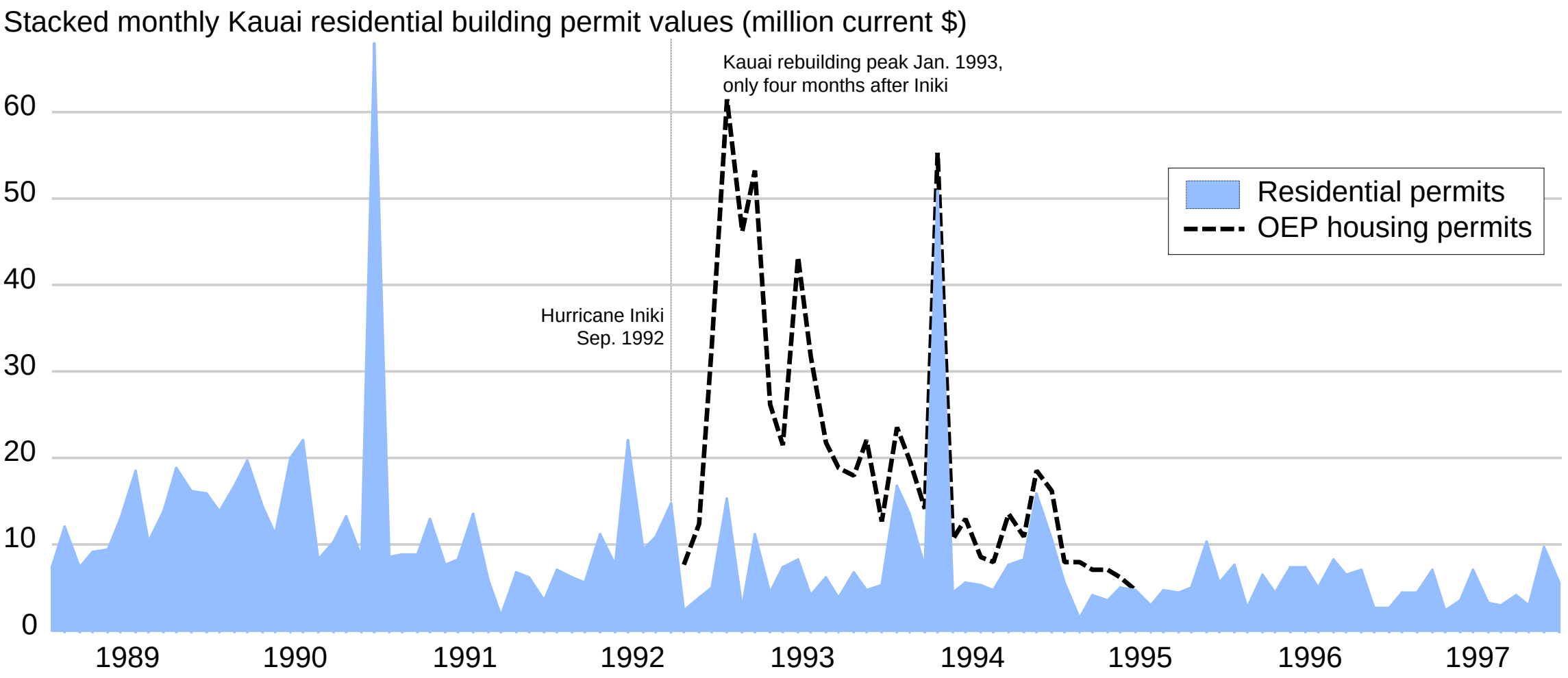
One year later, Maui new residential building permits exhibited little evidence of replacement for 2,000 houses destroyed in August 2023 wildfire

Quarterly new housing units authorized by county building permit, s.a. (log scale)



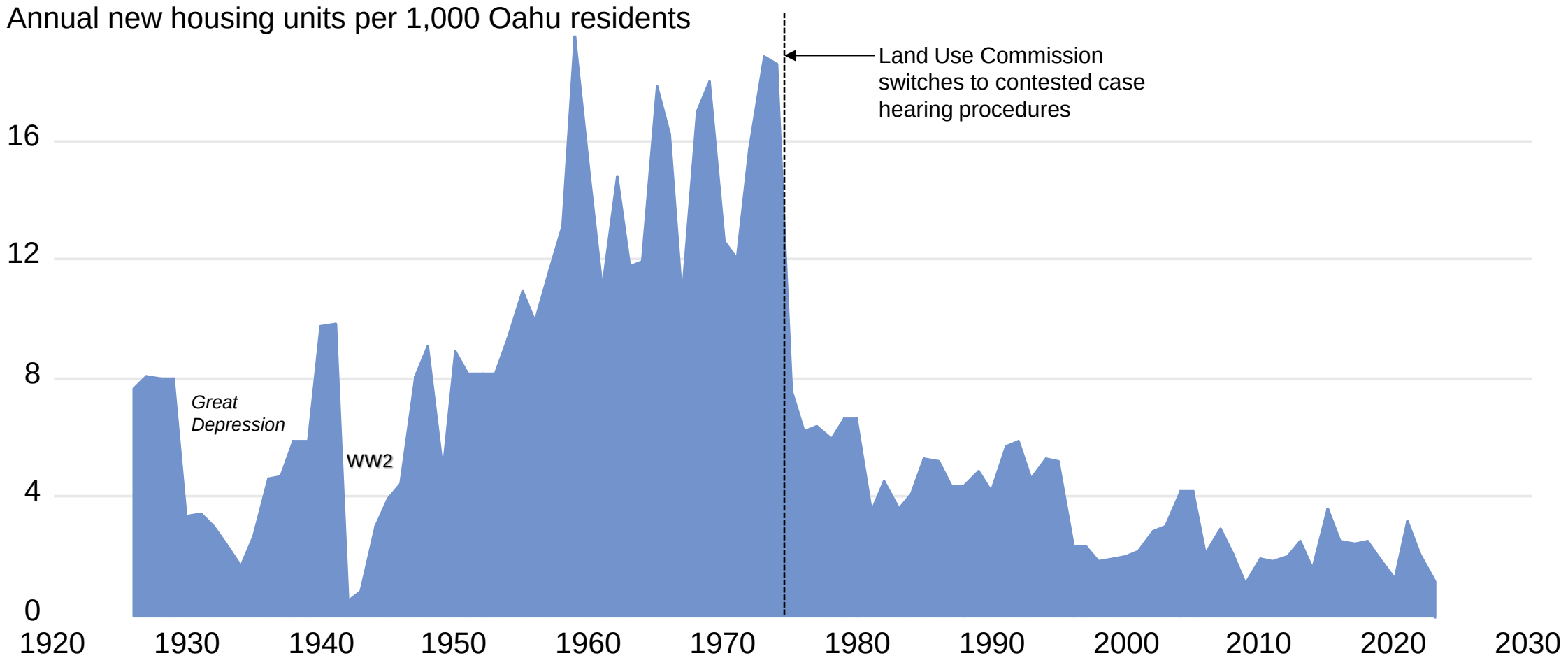
Sources: Hawaii DBEDT (https://dbedt.hawaii.gov/economic/qser/selected-county-tables/), data through third data 2024; seasonal adjustment using X-13 ARIMA filter, deflation, and Hodrick-Prescott filter trend extraction by TZE

How the big girls do it: Kauai Mayor Joanne Yukimura Office of Emergency Permitting issuance peaked four *months* after hurricane Iniki (1992)



Source: Kauai Building Department (OEP = Office of Emergency Permitting (established September 1992)), Bank of Hawaii, Hawaii DBEDT (https://dbedt.hawaii.gov/economic/mei/, https://files.hawaii.gov/dbedt/economic/data_reports/mei/2023-10-kauai.xls), TZ Economics

Oahu new housing units authorized by county building permit per 1,000 residents: "so good in 2023, only world war was worse"



Source: County building department (currently DPP), Bank of Hawaii, Hawaii DBEDT; trust me you can't make this up.

Demographic, workforce trends mixed

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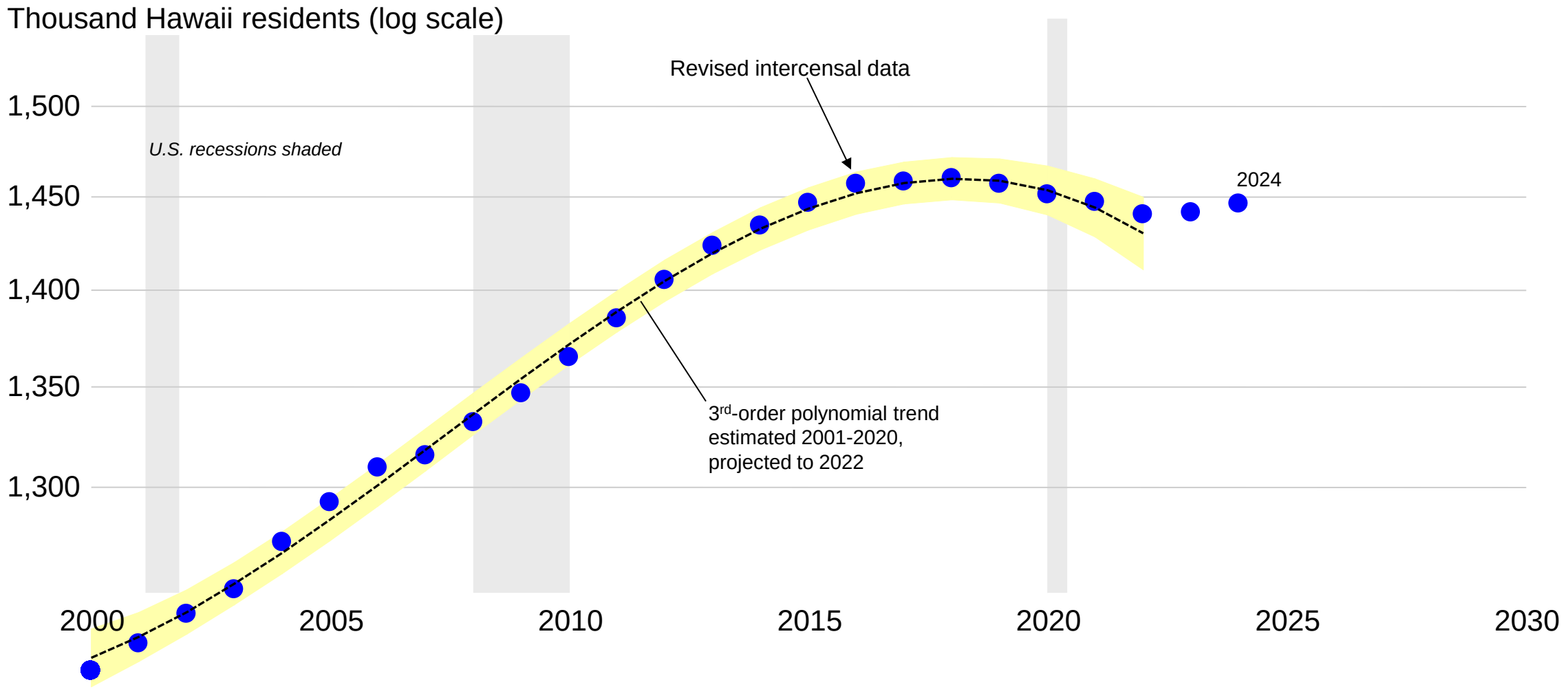
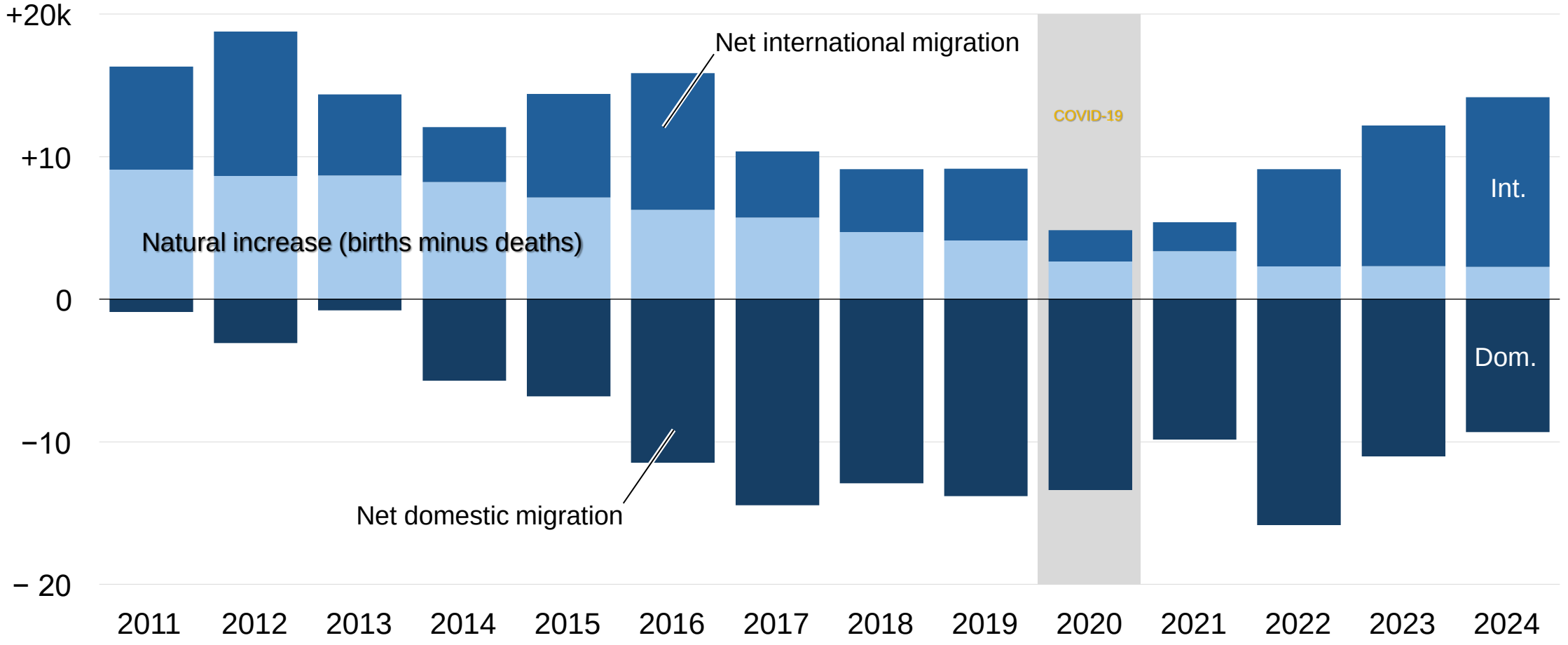
Hawaii statewide resident population intercensal estimates to 2024: some post-pandemic factor now reversing late-2010s decline



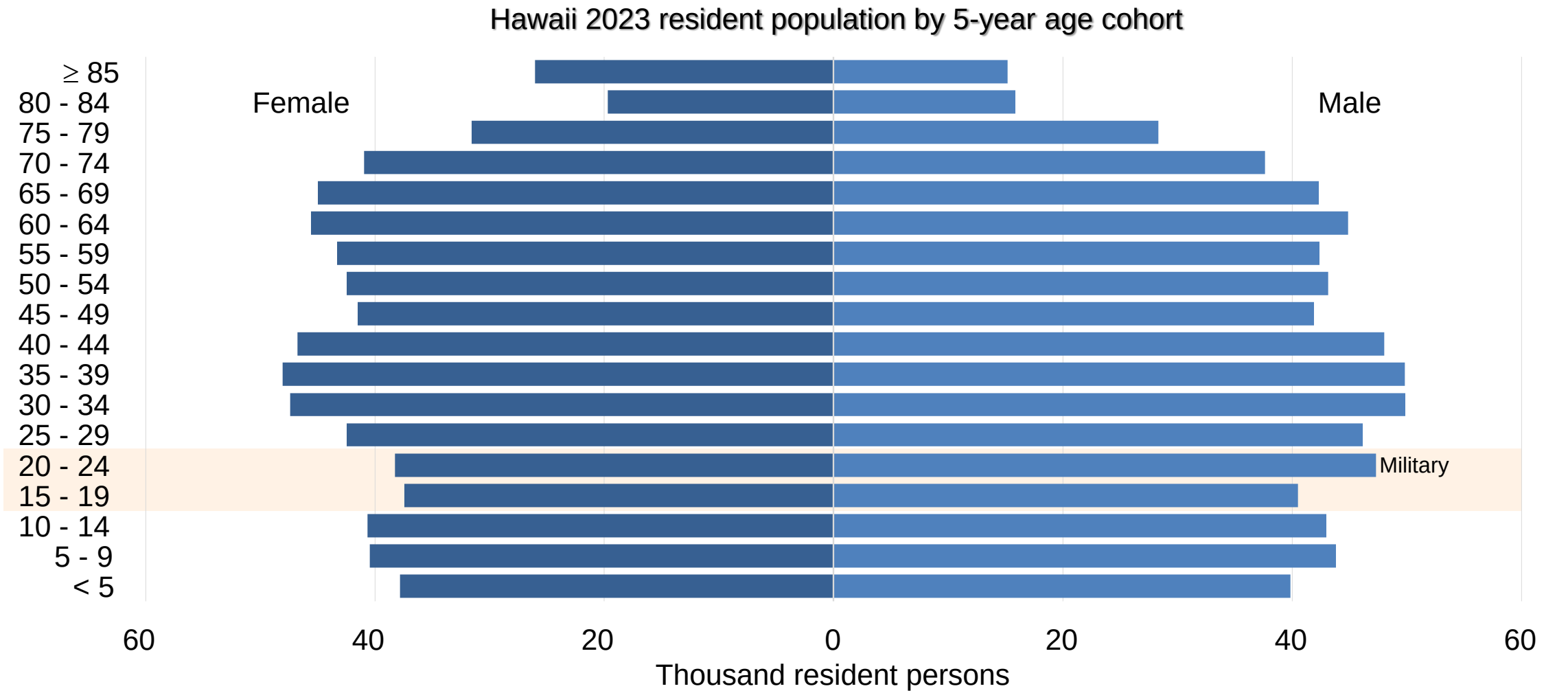
Sources: U.S. Bureau of Economic Analysis (quarterly data) (https://www.bea.gov/data/income-saving/personal-income-by-state), U.S. Census Bureau (annual data), Hawaii DBEDT (https://census.hawaii.gov/home/population-estimate/ and https://dbedt.hawaii.gov/economic/datawarehouse/); data for 2011-2019 are DBEDT estimates; nonlinear regression 2001-2020

Components of Hawaii population change after 2020: increase in net international in-migration, decrease in net domestic out-migration



Sources: U.S. Bureau of the Census, Hawaii DBEDT (https://census.hawaii.gov/home/population-estimate/). Intercensal estimates 2011-2019 may not reflect most recent revisions.

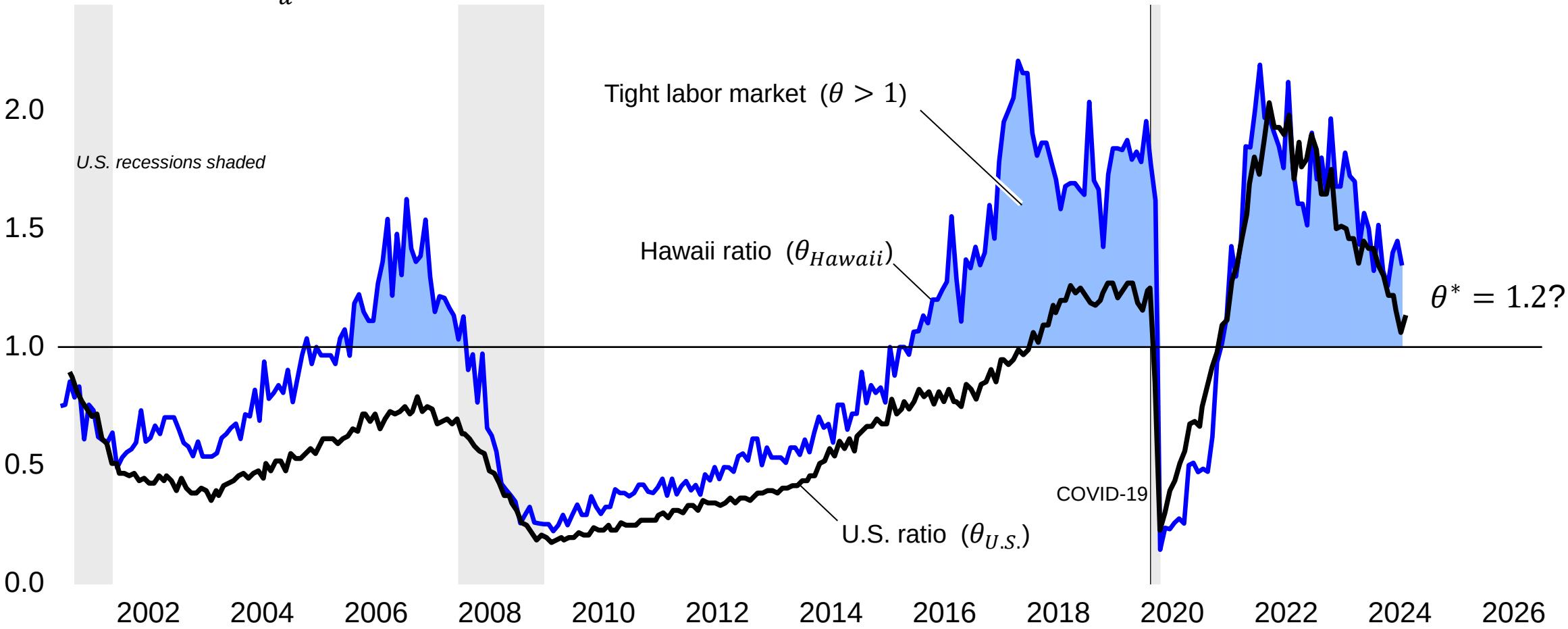
Labor constraint: more ≥ 40 than < 40; more in every 10-year cohort *including* age 65-74 than in age 15-24 cohort (workforce entrants)



Source: Hawaii DBEDT (https://census.hawaii.gov/home/population-estimate/, https://files.hawaii.gov/dbedt/census/popestimate/2023/state-county-char/sc-est2023-syasex-15.xlsx).

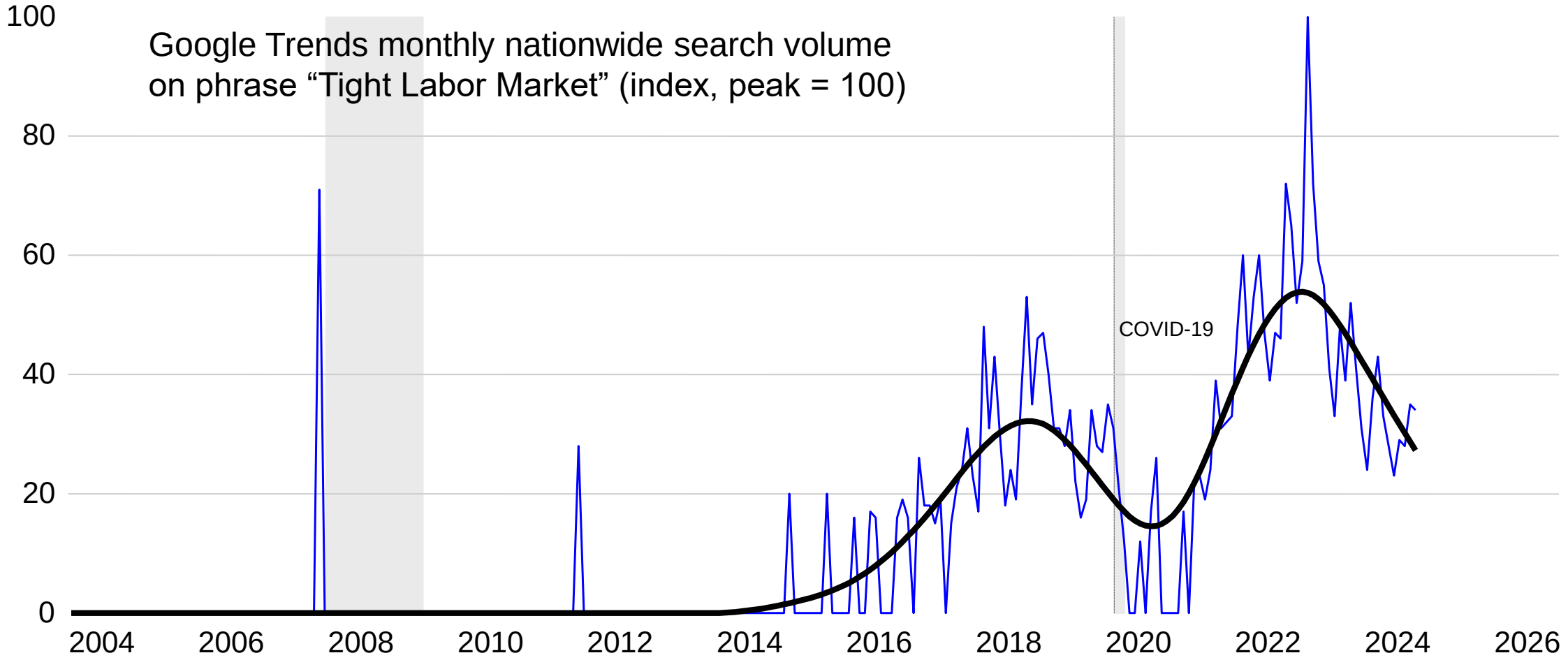
U.S. national Beveridge ratio only significantly exceeded 1 *post*-pandemic; recent easing of tightness vulnerable to policy uncertainty

Beveridge ratio ($\theta = \frac{v}{u} \geq 1$): vacancy rate (job openings) divided by unemployment rate



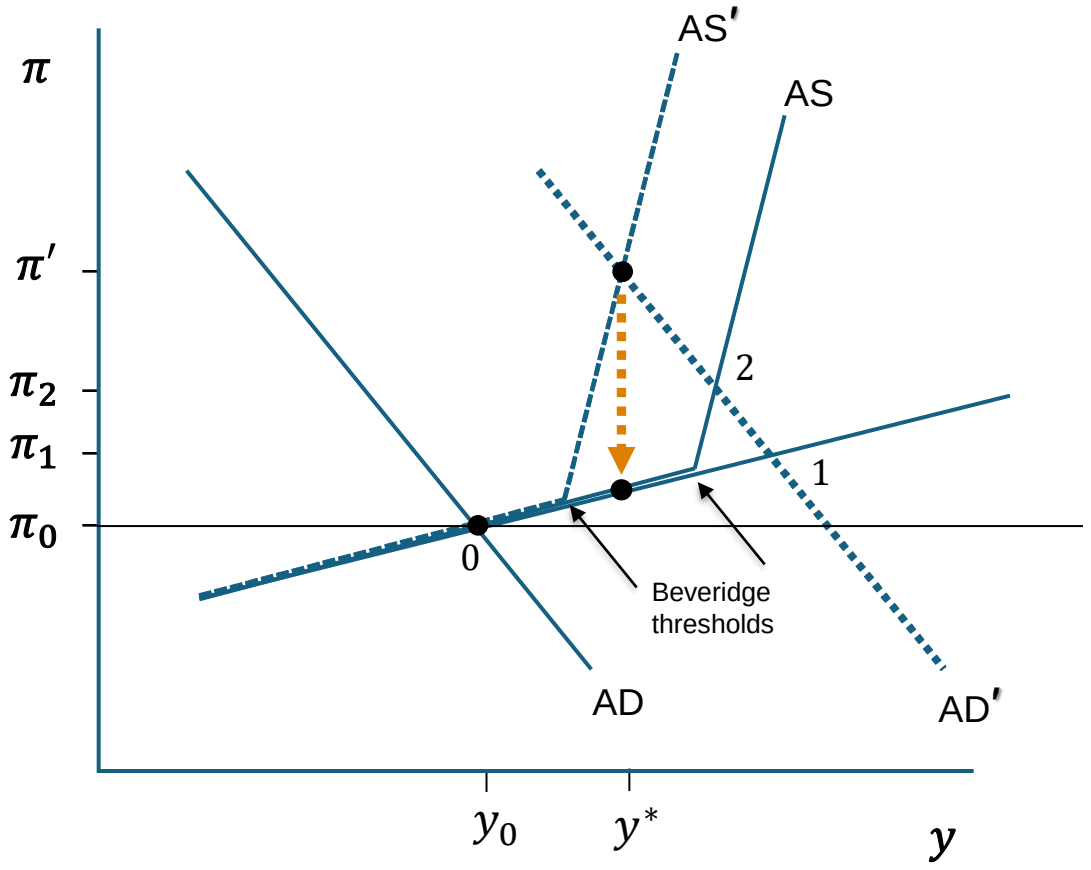
Source: U.S. Bureau of Labor Statistics Job Opening and Labor Turnover Survey (JOLTS) (https://www.bls.gov/data/home.htm).

FOMC stuck the Soft Landing: what did fearful of "1970s Repeat" miss? (1) Inflation expectations well-anchored; (2) tight labor markets

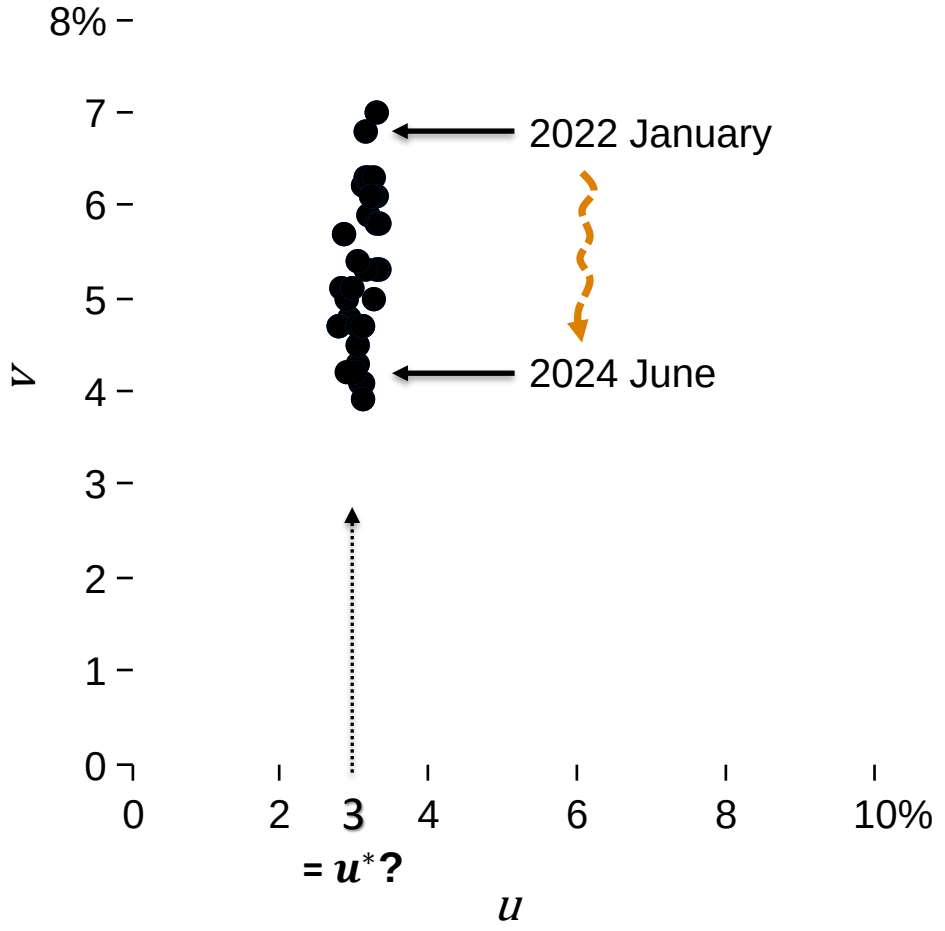


Source: Google Trends (https://trends.google.com/trends/); Hodrick-Prescott filter trend on monthly data 2014-2024 using tuning parameter ($\lambda = 2{,}000$) by TZ Economics.

Fed Jackson Hole conference (Aug. 2024): disinflation ⇒ job openings down (not $du > 0$)



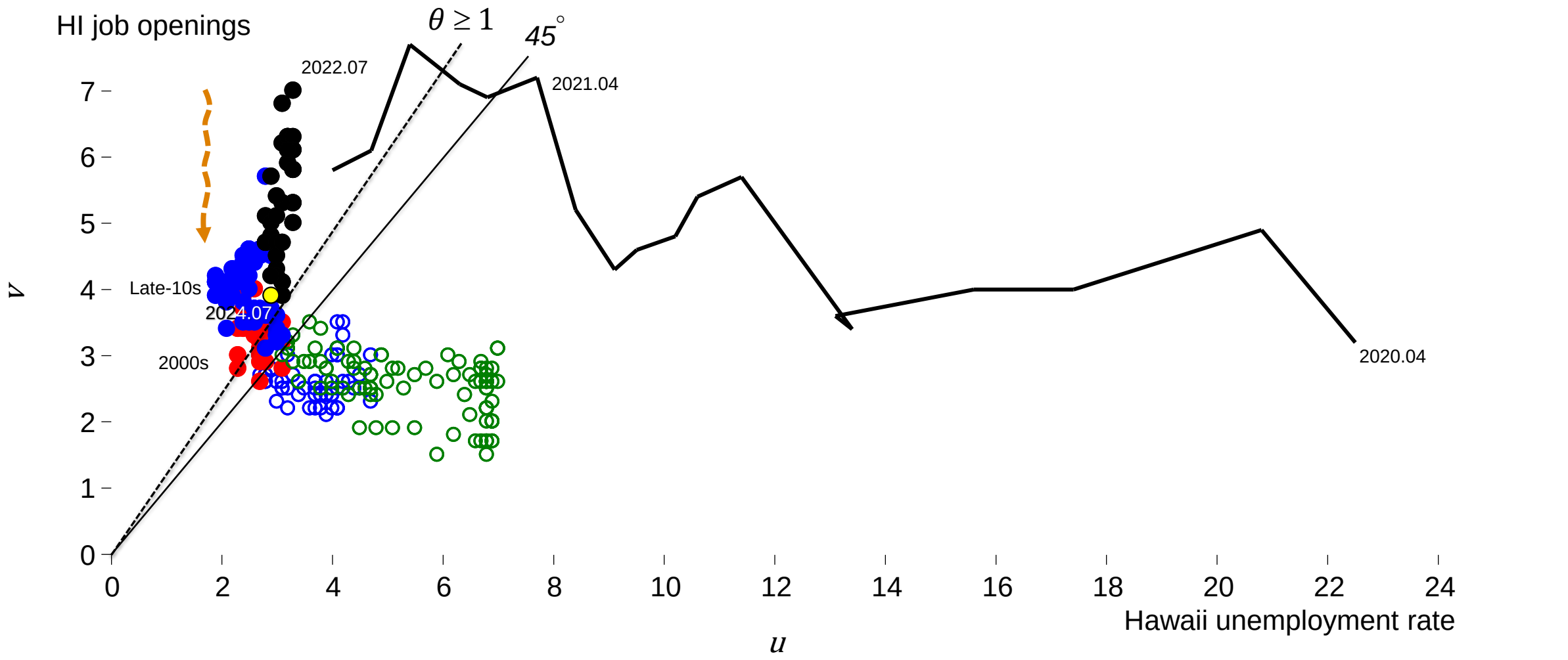
π_1 = Demand shock without Beveridge kink
π_2 = Demand shock with Beveridge kink
π' = Demand shock compounded by supply shock



Hawaii disinflation after waning fiscal stimuli, plus global supply chain rearticulation: falling vacancies

Source: U.S. Bureau of Labor Statistics Job Opening and Labor Turnover Survey (JOLTS) (https://www.bls.gov/data/home.htm); analytics after Pierpaolo Benigno and Gauti B. Eggertsson (August 2024) "Revisiting the Phillips and Beveridge Curves: Insights from the 2020s Inflation Surge" presentation at the Jackson Hole Economic Policy Symposium (https://www.kansascityfed.org/Jackson%20Hole/documents/10385/Eggertsson_Paper_JH.pdf and https://www.kansascityfed.org/Jackson%20Hole/documents/10432/Eggertsson-Handout.pdf).

Hawaii Beveridge Curve (full dataset 2001-2024))—post-pandemic job openings cycled up and over 7 percent; once $\frac{v}{u} > \theta \approx 1$, combined with supply chain rearticulation, $d\pi \ll 0,\ du = 0$.

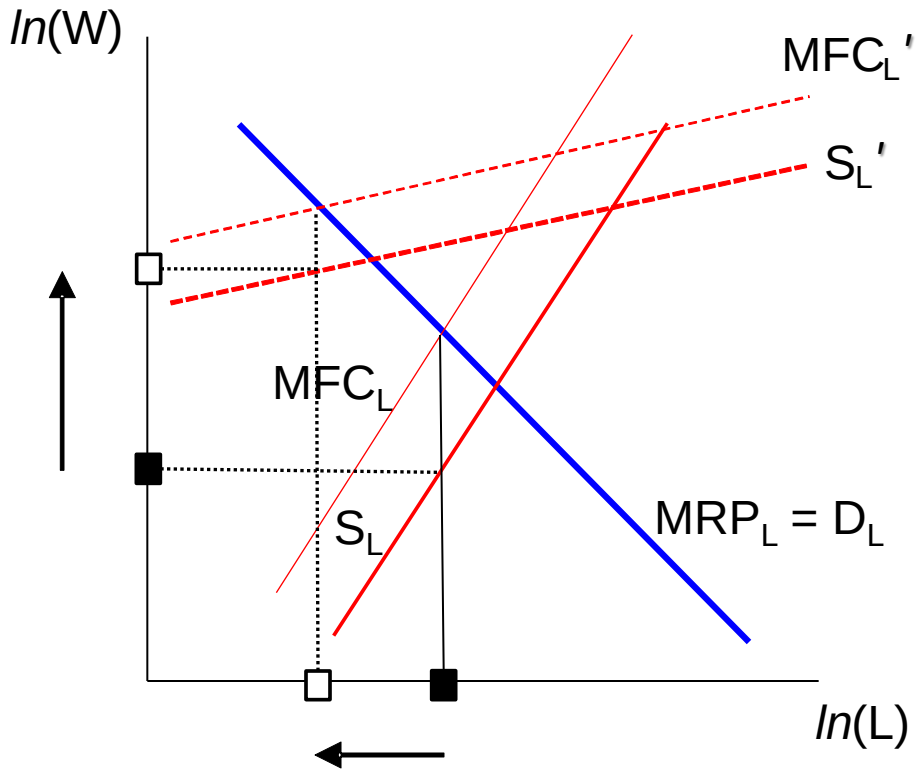


Source: U.S. Bureau of Labor Statistics Job Opening and Labor Turnover Survey (JOLTS) (https://www.bls.gov/data/home.htm)

Derived demand is marginal revenue product of labor (MRP_L), it equals marginal factor cost (MFC_L) at $Max(\pi)$ employment, but market *wage* determined by supply; now suppose reservation wage *rises*

Pandemic recovery: increased quit elasticity among young, non-college workers moving from lower-paying to higher-paying, more productive jobs (monopolistic competition)

1. Half of wage increase from job change rather than same-job wage growth
2. Increased pattern of competition reallocating workers from low- to higher-wage employers
3. Boost to wages in low-productivity firms larger than for high-productivity firms!
4. Consistent with higher employment share of larger firms



After "Figure 2: Effect of Rotation of Labor Supply Curve in Monopsonistic Labor Market"

Sources: David Autor, Arindrajit Dube, Annie McGrew (March 2023) "The Unexpected Compression Competition at Work in the Low Wage Labor Market" *NBER Working Paper 31010* (http://www.nber.org/papers/w31010)

Autor *et al*: Quit elasticity rose for young, non-college workers; half of wage increase from job changes from low- to high-wage employers

- "The pandemic increased the elasticity of labor supply to firms in the low-wage labor market, reducing employer market power and spurring rapid relative wage growth among young non-college workers who disproportionately moved from lower-paying to higher-paying and potentially more-productive jobs."

- Rising labor market tightness drove wage compression, boosting quit elasticity, augmenting competition in the low-wage labor market

Source: David Autor, Arindrajit Dube, Annie McGrew (March 2023) "The Unexpected Compression Competition at Work in the Low Wage Labor Market" NBER Working Paper 31010 (http://www.nber.org/papers/w31010) and May 2023, *NBER, The Digest*

Search for jobs with amenities: worker preference shift—take working-from-home (WFH) in place of pay (Şahin; Autor; Bloom)

"The pandemic increased the elasticity of labor supply to firms in the [*monopsonistically-competitive*] low-wage labor market, reducing employer market power and spurring rapid relative wage growth among young non-college workers who disproportionately moved from lower-paying to higher-paying and potentially more-productive jobs." (Autor *et al*)

1. Quits rose: Great Resignation in search for more flexible job opportunities
2. Vacancies increased: hard-to-fill, *low*-amenity vacancies
3. Job-filling rate decreased: shift in worker preferences to more flexible jobs
4. Wage compression at bottom of distribution (Autor *et al*)
5. Workers at top of distribution "willing to pay" up to 8-10% of income for full-time WFH (Bloom *et al*)

Şahin *(et al):* *the shift in worker preferences coupled with rapid recovery triggered an increase in quits in search of more flexible job opportunities and put downward pressure on wages in high amenity jobs*

Sources: David Autor *et al* (prior slides); Long-Term Labor Market Trends in the Wake of Pandemic-Related Disruptions, presentations Nick Bloom, Professor of Economics, Stanford University and by Ayşegül Şahin, Richard J. Gonzalez Regents Chair in Economics, University of Texas at Austin, and by 65th Annual NABE Conference NBER Session (October 8, 2023);

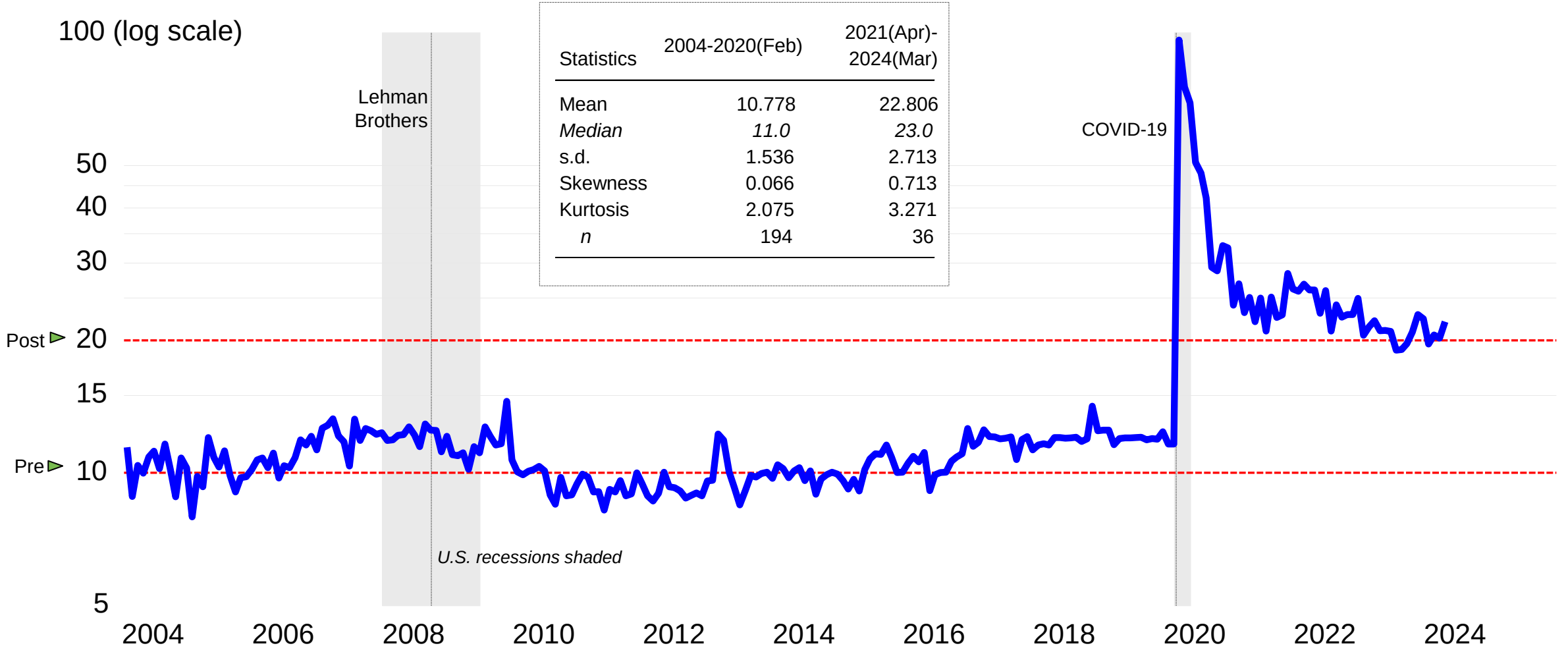
WFH post-pandemic = simultaneous, unplanned, successful universal experiment in distributed work; stabilized at higher share than before

- WFH significant impact on residential real estate (spatial and temporal pattern of housing valuation dynamics) and some CRE classes (office primarily, retail secondarily)
  1. Urban core (Oahu) Donut Effect (Nick Bloom, Stanford): one-time WFH demand wave toward suburbs, exurbs, Zoomtowns (e.g. Maui, Kona-Kohala *resort condos*)
  2. Lesser impact on urban core condos (Survival of the City (Ed Glaeser, Harvard)

- Recent empirical analysis: John Mondragon and Johannes Wieland (May 2022), "Housing Demand and Remote Work" Federal Reserve Bank of San Francisco, suggesting that one-half of U.S. annual home price appreciation since 2019 is attributable to remote work

Sources: Arjun Ramani & Nicholas Bloom (May 2021), "The Donut Effect of Covid-19 on Cities," *NBER Working Paper 28876* (https://www.nber.org/papers/w28876) and "Nick Bloom on Working From Home...Will it Persist?" Bendheim Center for Finance (Princeton) webinar (https://bcf.princeton.edu/events/nick-bloom-working-from-home-will-it-persist/), Edward Glaeser (October 2021), "Survival of the City," Bendheim Center for Finance (Princeton) webinar (https://bcf.princeton.edu/events/edward-glaeser-on-triumph-of-the-city-the-future-of-urban-life-and-work/), John Mondragon and Johannes Wieland (May 2022), "Housing Demand and Remote Work" *NBER Working Paper No. w30041* (https://www.frbsf.org/wp-content/uploads/sites/4/wp2022-11.pdf).

Global Google searches on the phrase “working from home” jumped at pandemic onset, still *double* pre-pandemic volumes after settling

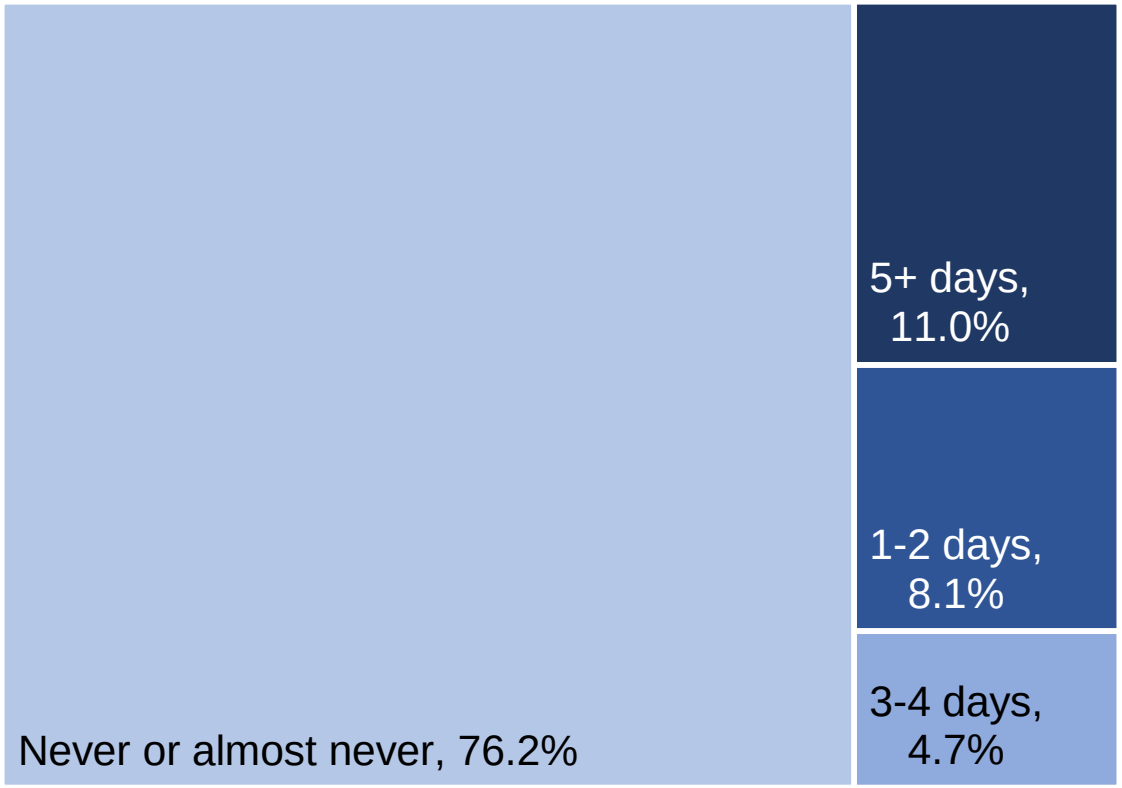


Statistics	2004-2020(Feb)	2021(Apr)-2024(Mar)
Mean	10.778	22.806
Median	*11.0*	*23.0*
s.d.	1.536	2.713
Skewness	0.066	0.713
Kurtosis	2.075	3.271
n	194	36

Source: Google Trends monthly index, March 2020 = 100 (https://trends.google.com/trends/explore?date=all&geo=US&q=working%20from%20home&hl=en), seasonal adjustment using Census X-13 ARIMA filter by TZE through 2020(Feb), then four-month moving averages of same month of prior years, 2020(March) – 2023(December).

Almost 90% of U.S. workers never worked from home before 2020; in 2024 almost 25% of all Hawaii workers did, full-time or hybrid WFH

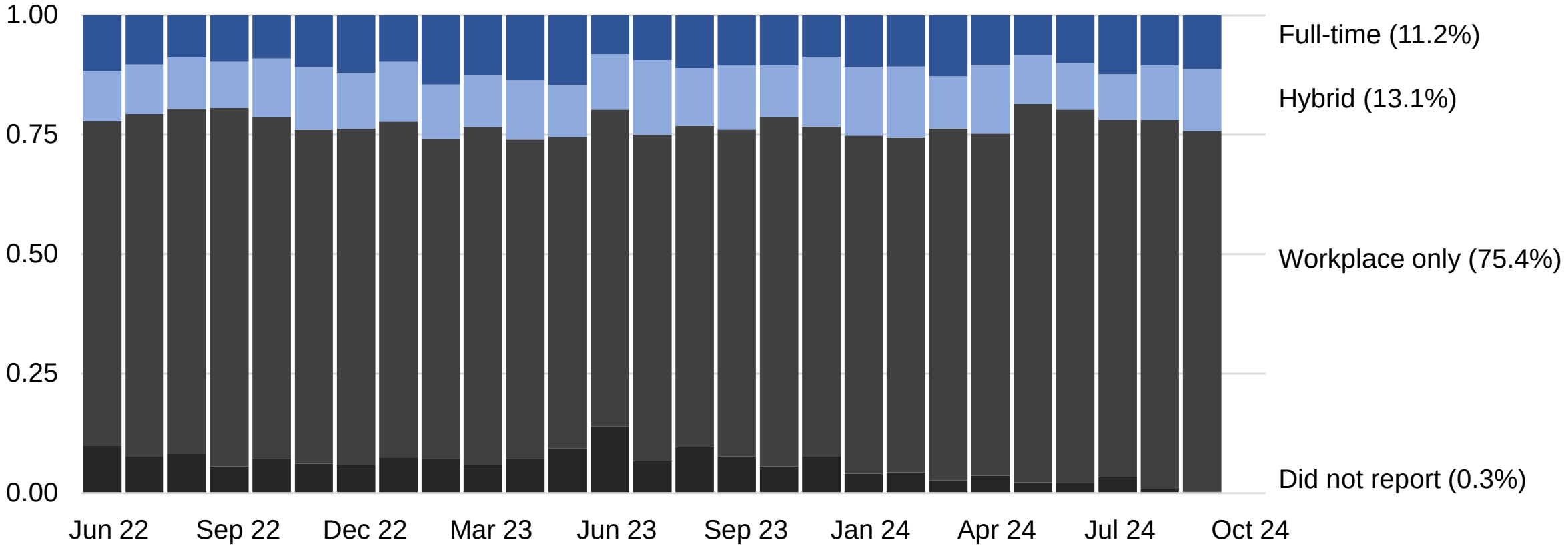
Pre-pandemic (U.S.)



September 2024 (Hawaii)

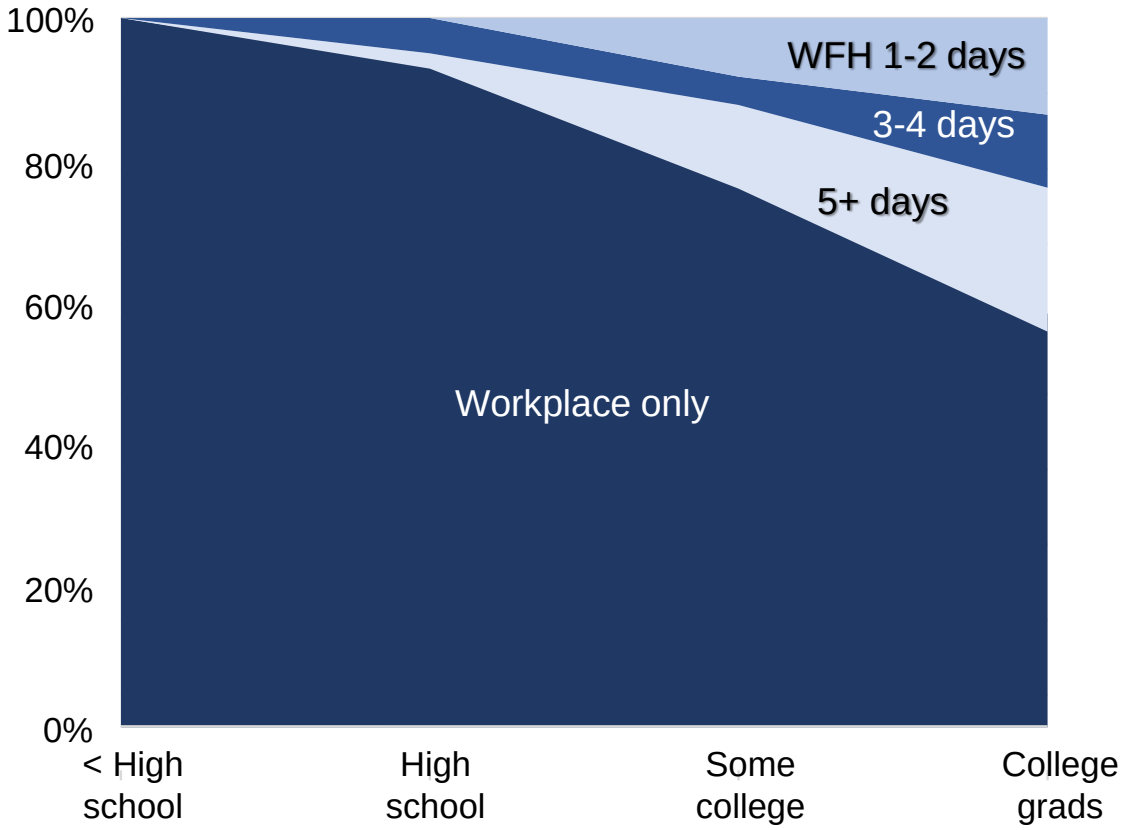
Sources: U.S. Bureau of the Census, American Community Surveys, Household Pulse Surveys (https://www.census.gov/programs-surveys/household-pulse-survey/data.html); data shown are from Household Pulse Survey August 20 - September 16, 2024 (https://www.census.gov/data/tables/2024/demo/hhp/cycle09.html).

Hawaii working in workplaces and from home—full-time and hybrid—remained steady in 2022-24 Census Bureau Household Pulse Surveys

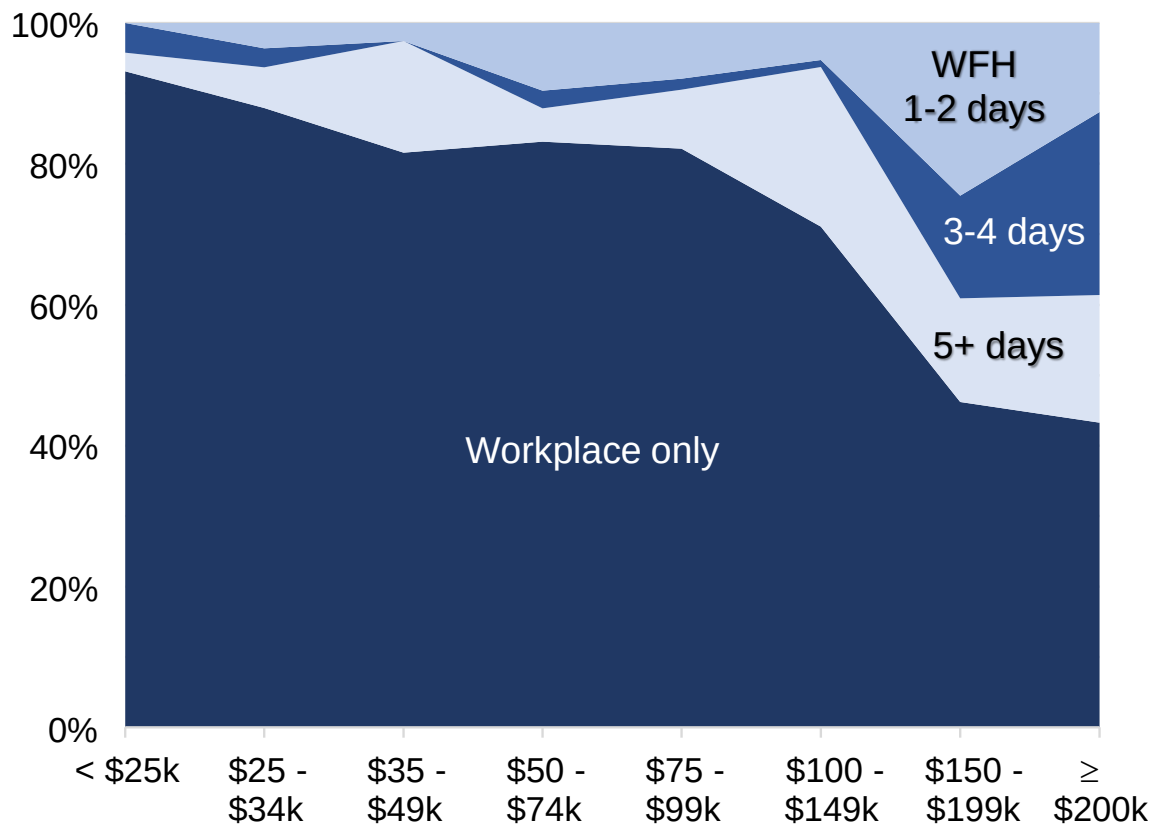


Sources: U.S. Bureau of the Census, Household Pulse Surveys (https://www.census.gov/programs-surveys/household-pulse-survey/data.html); latest data shown are from Household Pulse Survey August 20 - September 16, 2024 (https://www.census.gov/data/tables/2024/demo/hhp/cycle09.html).

Hawaii WFH by education, income: tasks, occupations, industries with remote workers distinctly influence commercial real estate



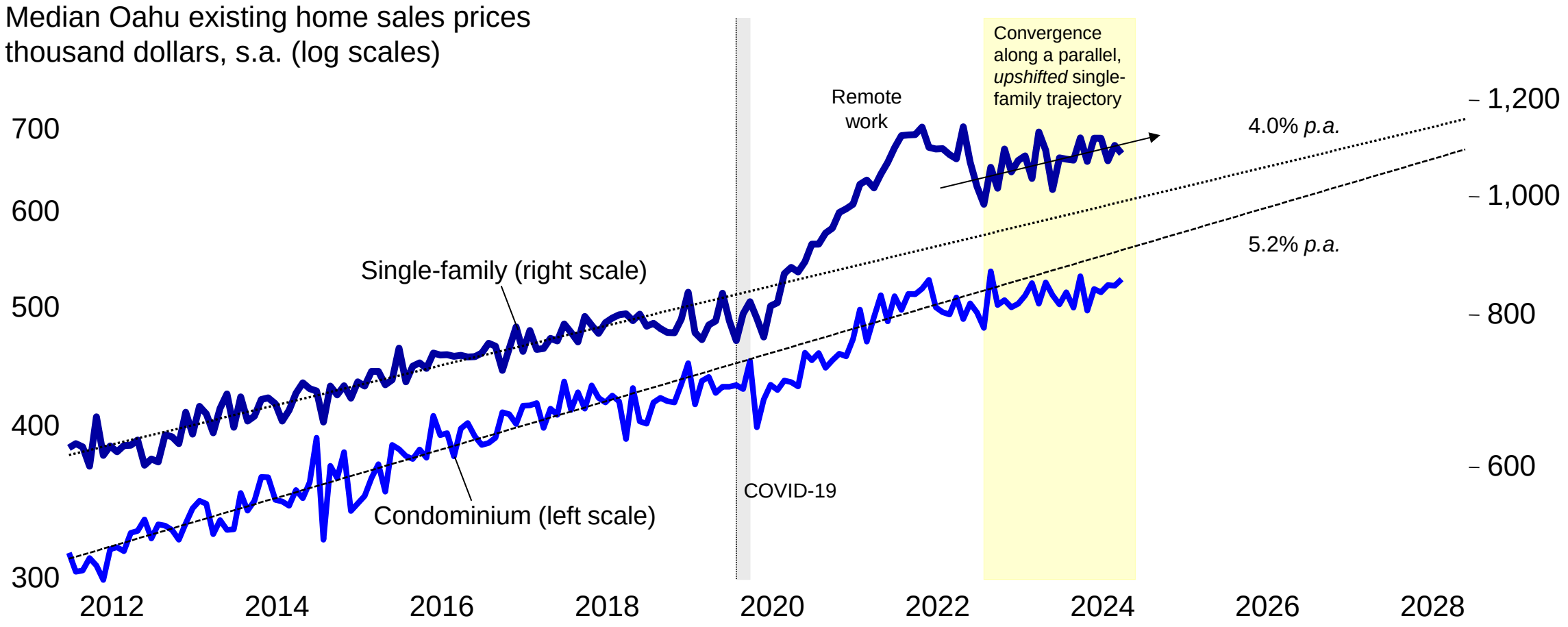
By educational attainment



By household income

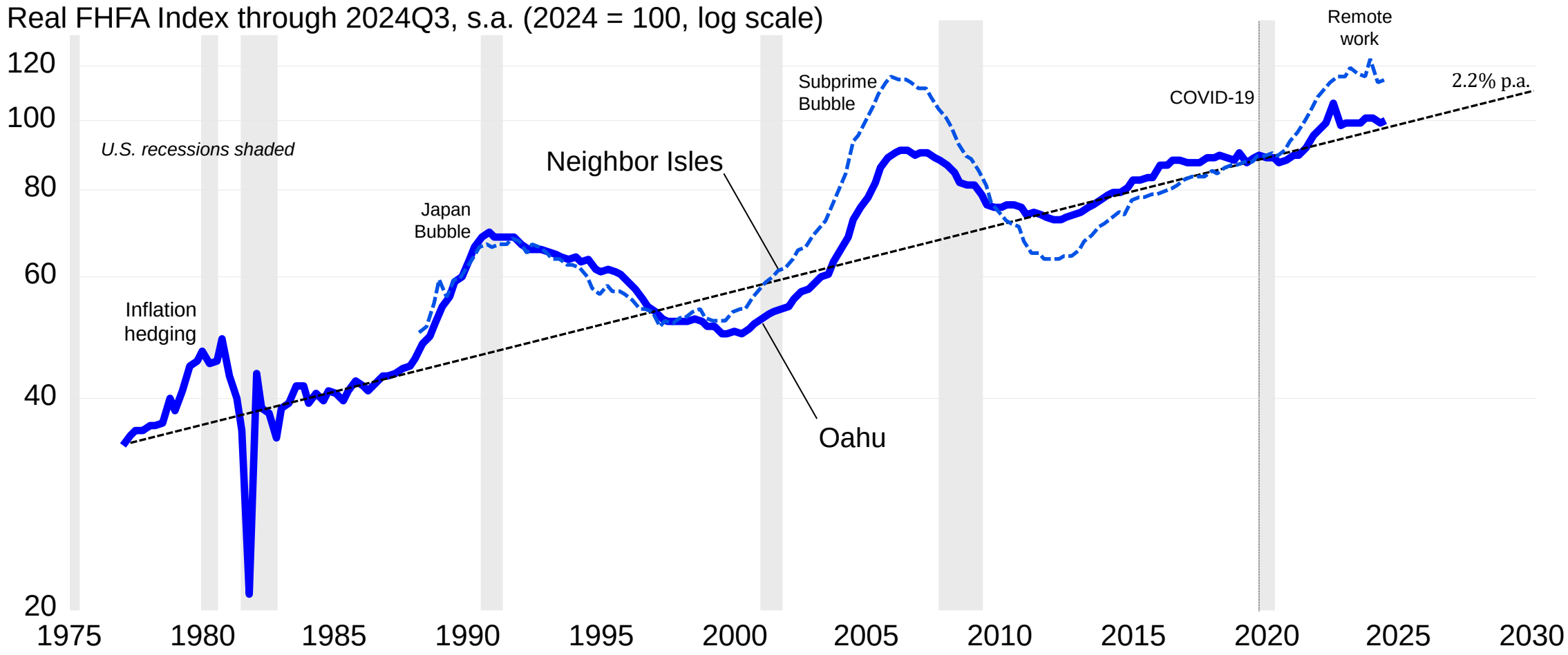
Sources: U.S. Bureau of the Census, Household Pulse Surveys (https://www.census.gov/programs-surveys/household-pulse-survey/data.html); data shown are from Household Pulse Survey August 20 - September 16, 2024 (https://www.census.gov/data/tables/2024/demo/hhp/cycle09.html).

Oahu median existing home sales prices trajectories since 2022: SF prices *above*, parallel to 2010s pre-pandemic trend (not condos)



Sources: Honolulu Board of Realtors, Hawaii DBEDT (http://dbedt.hawaii.gov/economic/mei/); monthly median existing home sales prices seasonally adjusted using Census X-13 ARIMA filter through December 2024, with stationary trend regressions on pre-pandemic interval 2011(June)-2018(June), by TZ Economics.

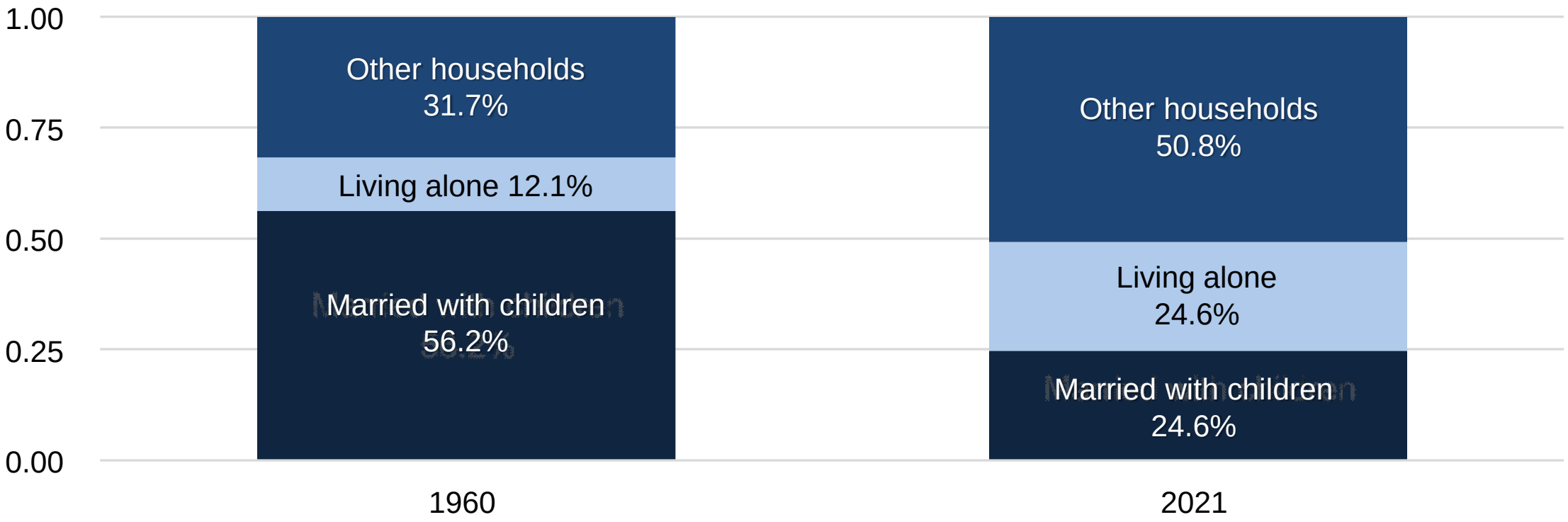
Real—inflation-adjusted—quarterly housing valuation impulses above, around LR appreciation rate (sales *and* mortgage collateral values)



Sources: Federal Housing Financial Administration (https://www.fhfa.gov/DataTools/Downloads/Documents/HPI/HPI_AT_metro.csv), U.S. Bureau of Labor Statistics (https://data.bls.gov/cgi-bin/surveymost?r9); seasonal adjustment, index re-basing, deflation using quarterly interpolated Honolulu CPI-U, regression of the stationary component (change in the natural log) of real FHFA valuations on time, 1977Q1-2020Q1 by TZE

Hawaii household *composition* since the mid-20th century: more units needed for more *independent* living—women, elderly, incels with trucks

Hawaii household composition, 1960 census *vs*. 2021 ACS data



Sources: Figures 11-12: U.S. Bureau of the Census, American Community Survey (https://api.census.gov/data/2021/acs/acs1/subject); Hawaii DBEDT (June 2014) *Kakaako: Urban Core Living* (http://files.hawaii.gov/dbedt/economic/reports/2014-06-kakaako-study.pdf).

Demographic, workforce trends: post-pandemic *structural* change

- Resident population *increased*, 2022-2024, after decreasing, 2018-2022
  - Rising international in-migration to Hawaii
  - Falling domestic out-migration from Hawaii: post-pandemic *reversal*
  - Vagabond and remote workers moving *to* Hawaii? New STR tourist cohort?
- Easing of tight labor market (post-pandemic drop in $\frac{v}{u}$) may portend future macro slowdown
- Remote and hybrid work stabilized around one-quarter of Hawaii workforce, post-pandemic:
  - Donut Effect on housing valuations (housing demand spatially radiated to suburbs, exurbs)
  - Impact expressed as higher suburban SF home prices relative to urban condos
  - CRE implication: workers who don't commute don't stop at gym, mall on the drive home
  - Are Neighbor Islands now Zoomtowns? New offshore investor (Dick Mayer's worst nightmare)

See also: Augustus Kmetz, John Mondragon, and Johannes Wieland (September 26, 2022), "Remote Work and Housing Demand," *FRBSF Economic Letter* 2022-26 (https://www.frbsf.org/wp-content/uploads/el2022-26.pdf).

Hawaii real GDP per capita permanently was reduced 10 percent by pandemic legacy and official state policies to suppress tourism

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Word

O‘AHU DESTINATION MANAGEMENT ACTION PLAN 2021–2024

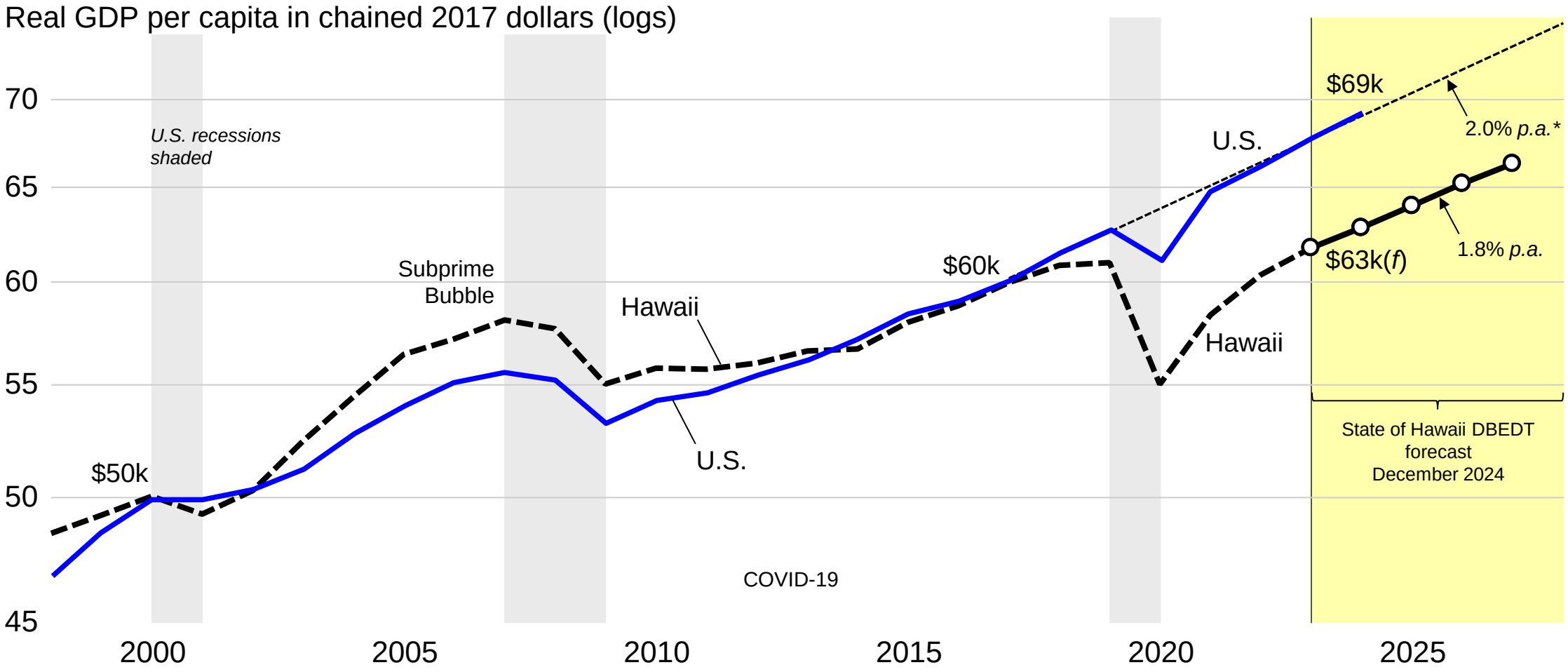
O‘AHU

Action A

Decrease the total number of visitors to O‘ahu to a manageable level by controlling the number of visitor accommodations and exploring changes to land use, zoning and airport policies.

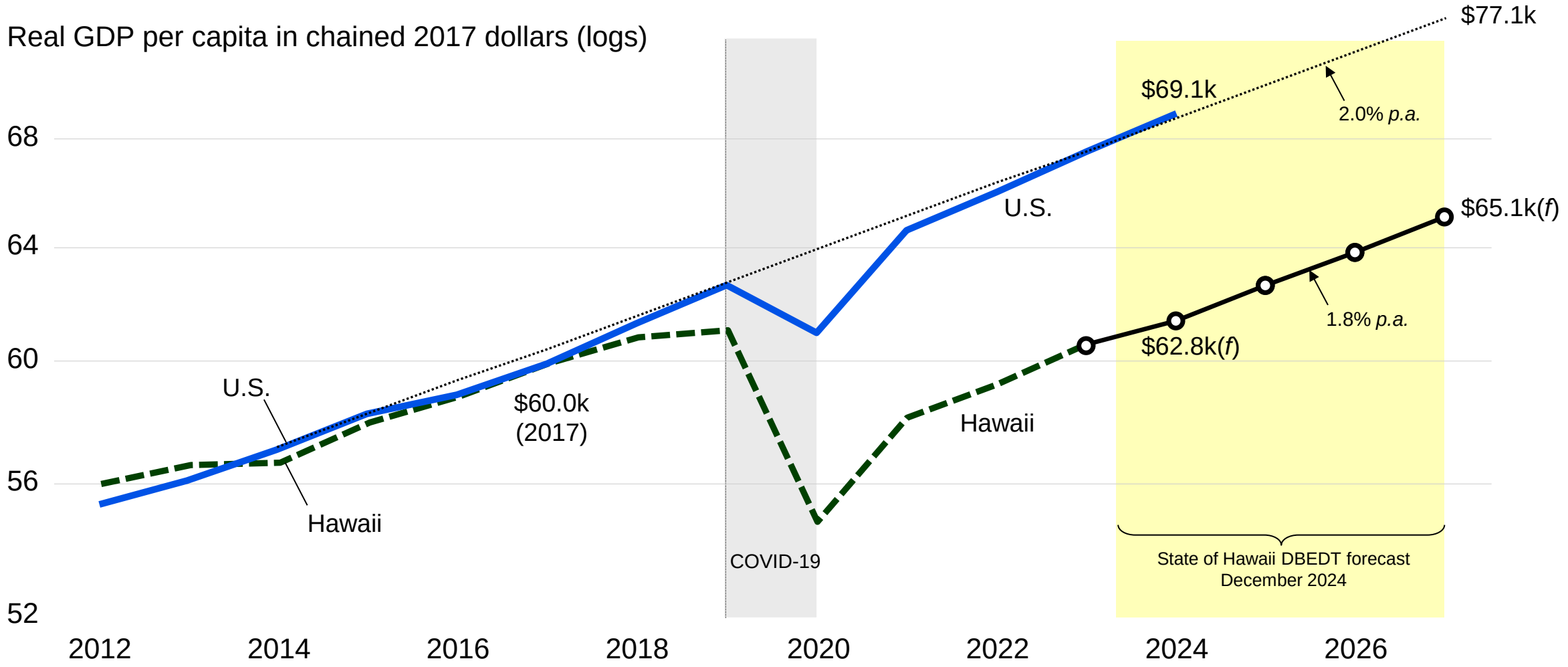
Source: Hawaii Tourism Authority (https://www.hawaiitourismauthority.org/media/7785/hta-oahu-dmap.pdf)

Hawaii and U.S. per capita real GDP matched, traded places over pre-pandemic decades; risk of persistent Hawaii shortfall in 2020s



Source: U.S. Bureau of Economic Analysis, (https://www.bea.gov/data/gdp/gdp-state). *Stationary trend regression on U.S. real per capita GDP, 2017-2023. Hawaii real per capita GDP forecast growth rate calculated from Hawaii DBEDT (December 4, 2024) *Quarterly Statistical & Economic Report: Outlook for the Economy* (https://dbedt.hawaii.gov/economic/qser/outlook-economy/). Annual U.S. data for 2024 GDP scheduled for release January 30, 2025, and GDP by state data for 2024 scheduled for release March 28, 2025 (https://www.bea.gov/system/files/2024-09/2025-News-Release-Schedule.pdf).

State of Hawaii output forecast 2024-2027: growth near that for U.S. during 2020s, still *lower* per capita GDP in 2027 than in U.S. *last year*

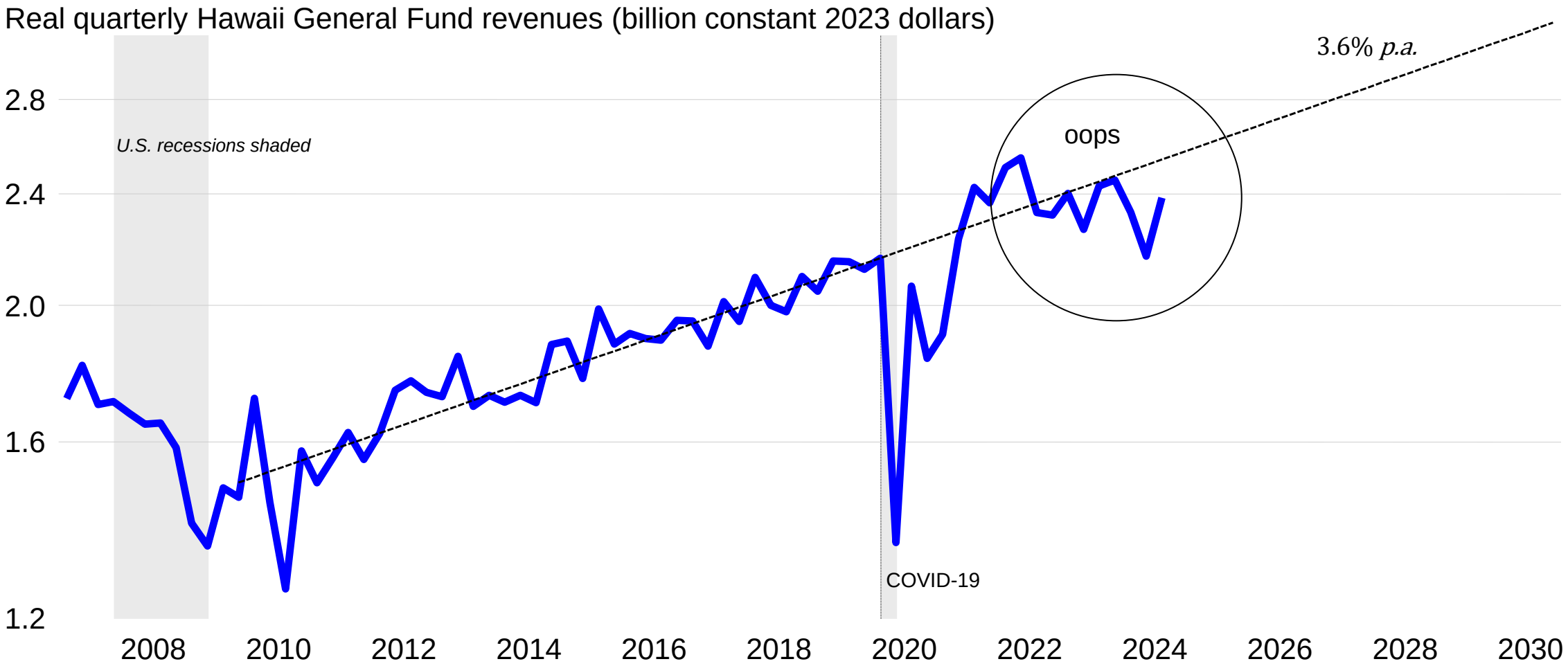


Source: U.S. Bureau of Economic Analysis, (https://www.bea.gov/data/gdp/gdp-state), stationary trend regression on U.S. real per capita GDP, 2014-2023, at 2.0% compound annual growth rate; Hawaii real per capita GDP forecast growth rate by Hawaii DBEDT (December 4, 2024) (https://dbedt.hawaii.gov/economic/qser/outlook-economy/). U.S. data through 2024; GDP by state data for 2024 to be released March 28, 2025 (https://www.bea.gov/system/files/2024-09/2025-News-Release-Schedule.pdf).

Final takeaways: monetary policy trajectory in hand—lower interest rates if inflation subsides on trend—fiscal policy chaotic, uncertain

- U.S. Federal Reserve anticipating gradual interest rate descent—risk now is federal *fiscal* policy (risk of incipient U.S. recession induced by instantaneous federal government downsizing)
  1. Overnight policy rate—fed funds rate—has another 100-150 basis points to subside
  2. Difference between long-term rates (say, 10-year today @ 4.50%) and short-term rates (say, overnight today @ 4.25%) should widen through 2027 (maybe to 4.0% long, 3.0% short)
- Hawaii's options limited in dealing with global and national macro shocks (layoffs, tariffs, *etc*.)
  1. At 150-160 ¥/$ not much Hawaii can do to retrieve Japanese travelers
  2. Federal government in Hawaii dominated by defense, but non-defense remains vulnerable
  3. Hawaii also throttled by self-owns (anti-tourism, anti-science, anti-development denialism)
  4. Demographic realities: absent immigration, only *human capital* can mitigate labor shortages
- Systemic vulnerability (Washington D.C.) can be countered by local initiatives to clear pathway for greater flows of *physical* capital formation (urban density; *multiples* of homebuilding): leadership

Current real General Fund revenue trends suggest Hawaii not as resilient as perceived, not robust to fading federal stimuli, tourism



Source: Hawaii Dept. of Taxation, Hawaii DBEDT (https://files.hawaii.gov/dbedt/economic/data_reports/mei/2024-08-state.xls), U.S. BLS (https://data.bls.gov/toppicks?survey=r9), quarterly data including 2024Q3 estimate based on year-over-year nominal change in July-August monthly data. Seasonal adjustment, deflation with quarterly interpolated Urban Hawaii CPI-U, and stationary trend regression by TZE. .

Appendix: resilience means returning to pre-shock trajectory

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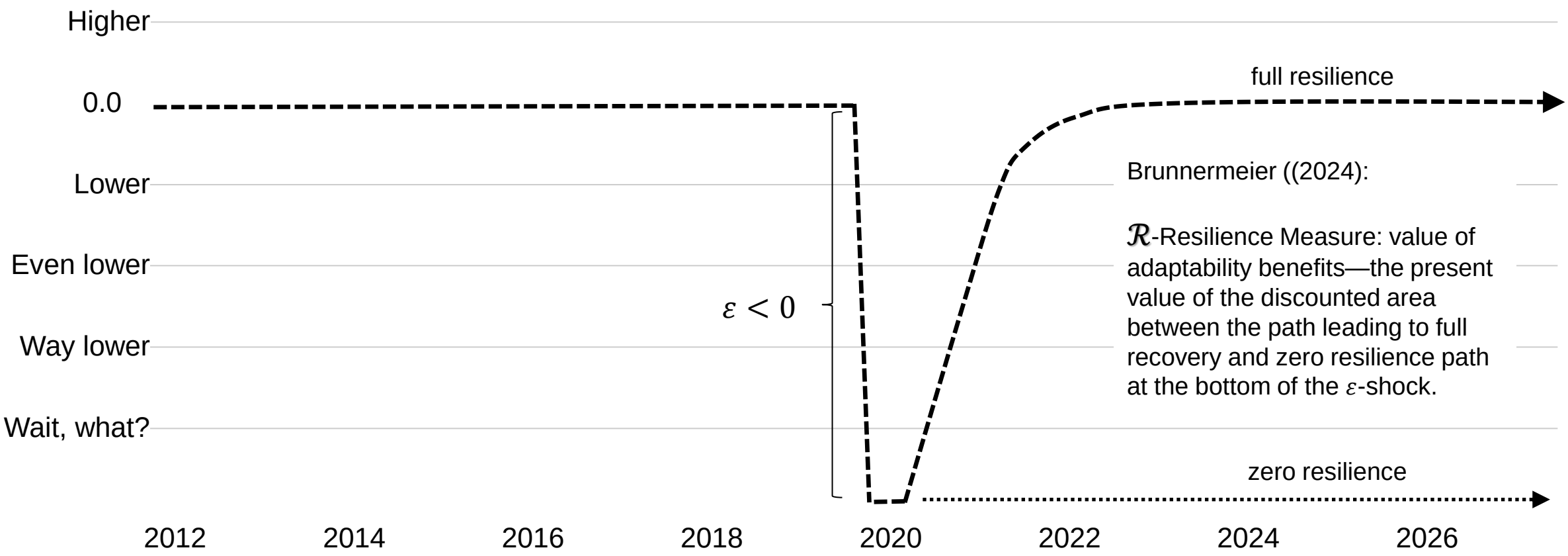
Theoretically: does economic system *adapt* to exogenous shock ($\varepsilon < 0$)?

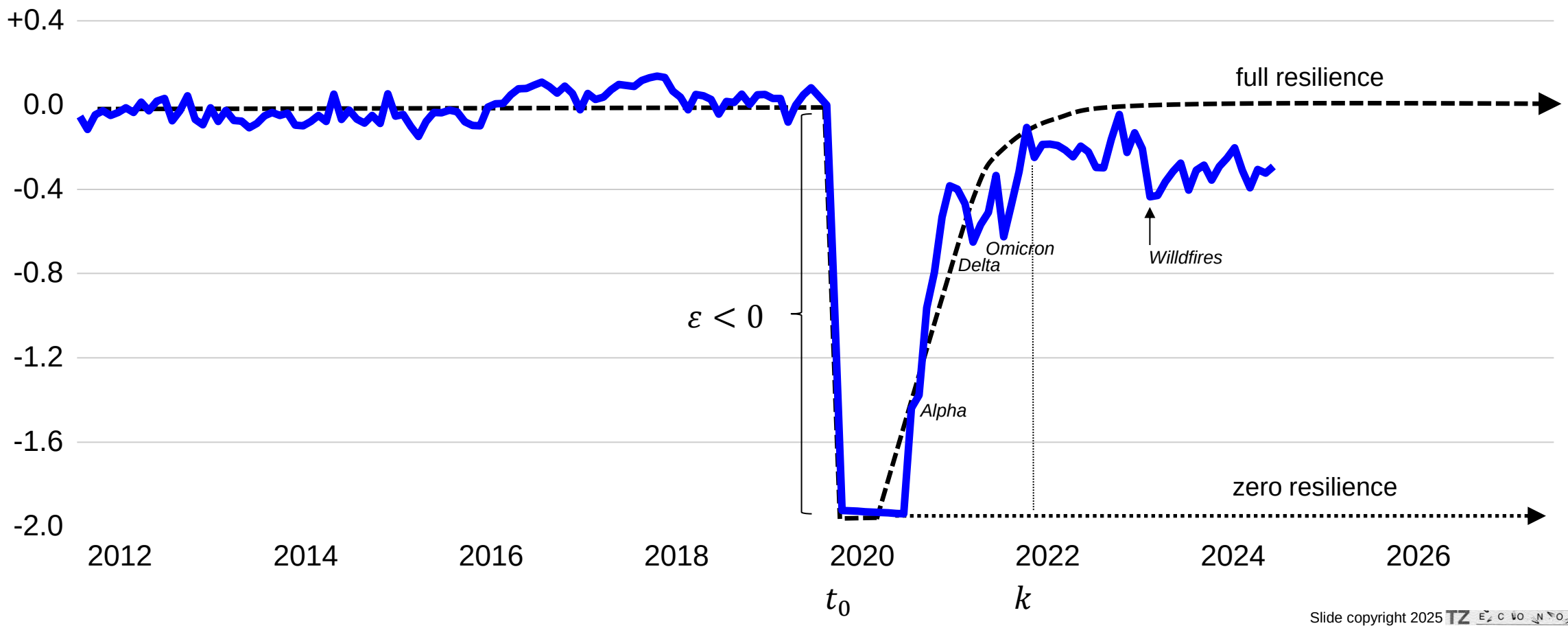
A resilient stochastic process bounces back to the original stationary dynamic equilibrium



After Markus K. Brunnermeier (January 6, 2024), "Macrofinance and Resilience," *American Finance Association Presidential Address*, Allied Social Science meetings, San Antonio, Texas (https://www.youtube.com/watch?v=z94l-G5gz4o). See also Markus K. Brunnermeier (December 2024), "Presidential Address: Macrofinance and Resilience," *Journal of Finance* vol. **79** no. 6, pp.2683-3728

Practically: are Hawaii real tourism receipts resilient?

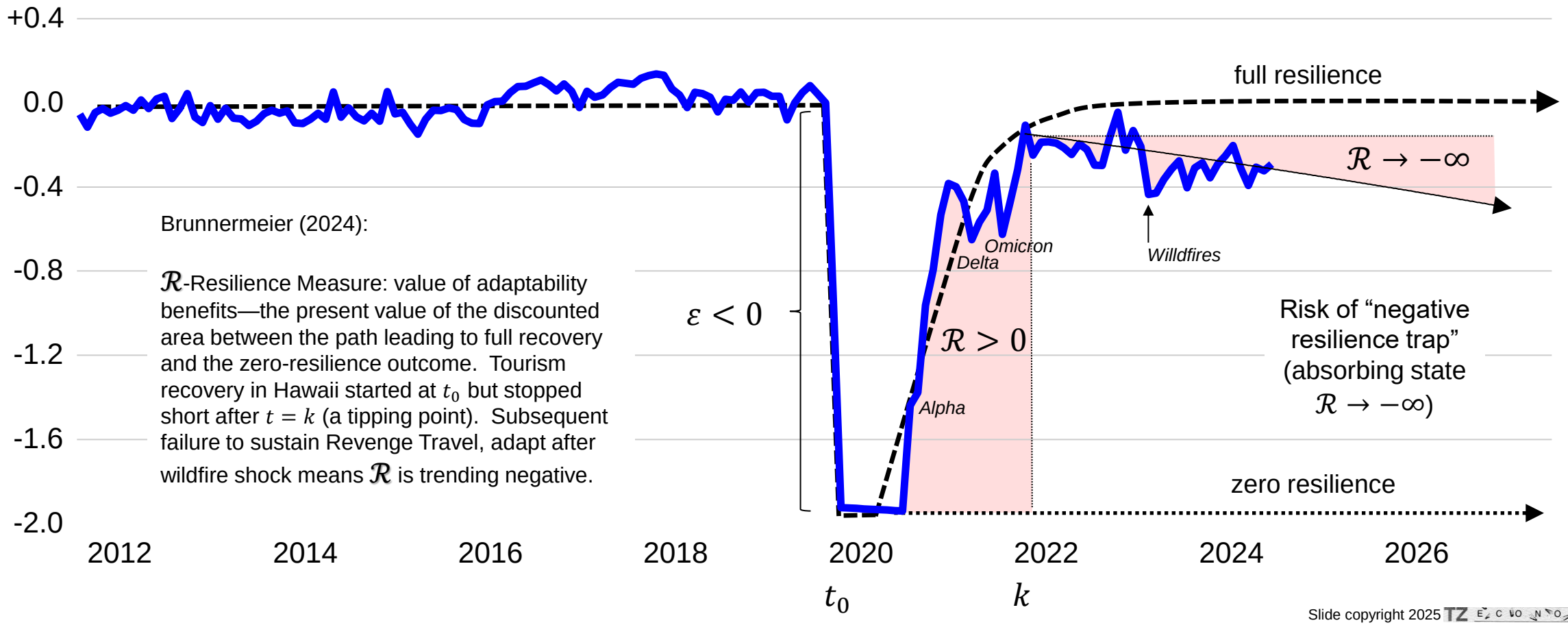
Monthly detrended Hawaii tourism receipts in billion constant 2024 dollars, s.a.



Source: Hawaii DBEDT (https://dbedt.hawaii.gov/visitor/tourismdata/); data through December 2024 seasonally adjusted by TZ Economics using Census X-13 ARIMA filtter. This analysis after Markus K. Brunnermeier (January 6, 2024), "Macrofinance and Resilience," *American Finance Association Presidential Address*, Allied Social Science meetings, San Antonio, Texas (https://www.youtube.com/watch?v=z94l-G5gz4o). See also Markus K. Brunnermeier (December 2024), "Presidential Address: Macrofinance and Resilience," *Journal of Finance* vol. **79** no. 6, pp.2683-3728.

Recent: ε-shock at t_0, recovery after k stopped short (tipping point?), benefit of adaptability, the $\mathcal{R}$-Resilience Measure, not fully realized

Monthly in billion constant 2024 dollars, seasonally adjusted

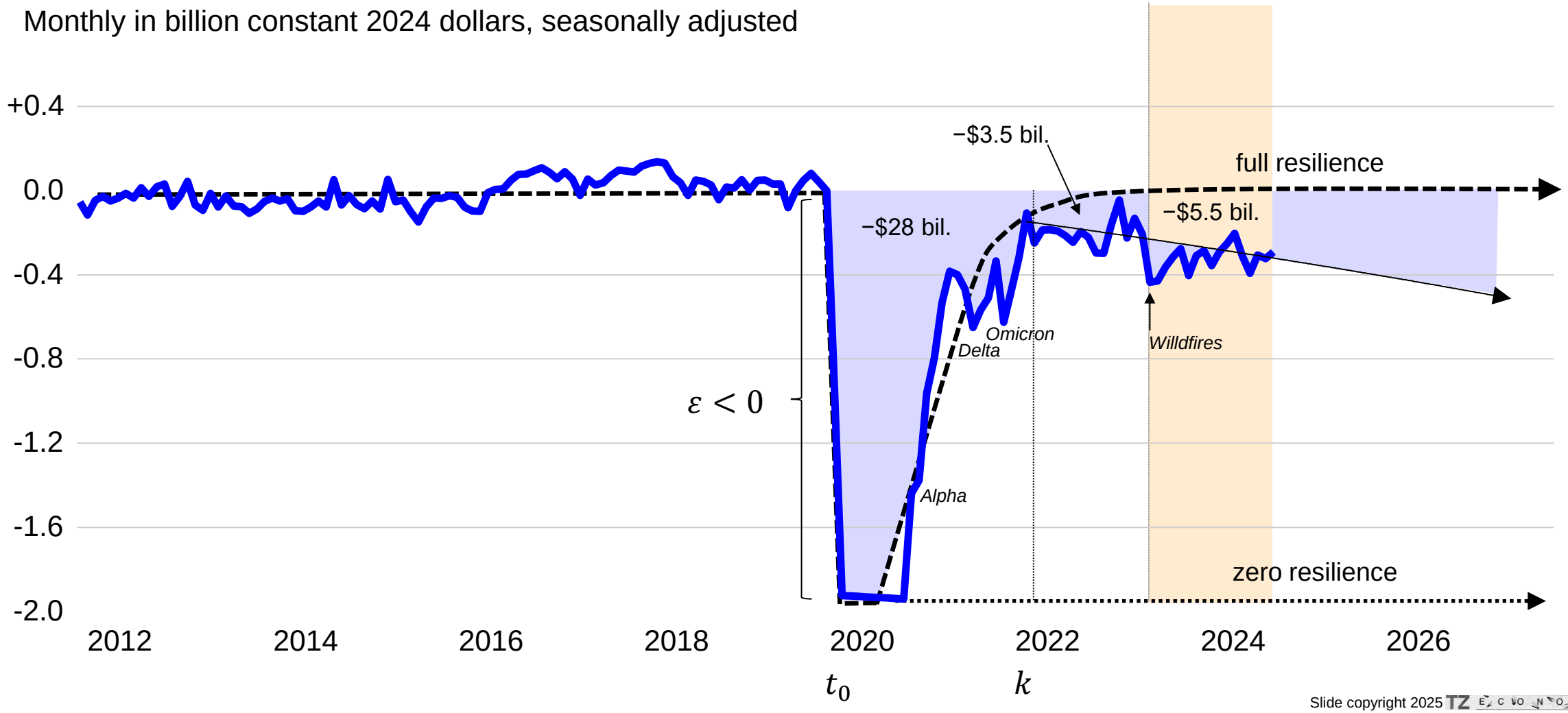


Brunnermeier (2024):

$\mathcal{R}$-Resilience Measure: value of adaptability benefits—the present value of the discounted area between the path leading to full recovery and the zero-resilience outcome. Tourism recovery in Hawaii started at t_0 but stopped short after $t = k$ (a tipping point). Subsequent failure to sustain Revenge Travel, adapt after wildfire shock means $\mathcal{R}$ is trending negative.

Source: Hawaii DBEDT (https://dbedt.hawaii.gov/visitor/tourismdata/); data through December 2024 seasonally adjusted by TZ Economics using Census X-13 ARIMA filtter. This analysis after Markus K. Brunnermeier (January 6, 2024), "Macrofinance and Resilience," *American Finance Association Presidential Address*, Allied Social Science meetings, San Antonio, Texas (https://www.youtube.com/watch?v=z94l-G5gz4o). See also Markus K. Brunnermeier (December 2024), "Presidential Address: Macrofinance and Resilience," *Journal of Finance* vol. **79** no. 6, pp.2683-3728.

ε-shock at t_0, truncated recovery at k (tipping point?), Black Swan (wildfires), each leading Hawaii to forego cumulative tourism receipts



Source: Hawaii DBEDT (https://dbedt.hawaii.gov/visitor/tourismdata/); data through December 2024 seasonally adjusted by TZ Economics using Census X-13 ARIMA filtter. This analysis after Markus K. Brunnermeier (January 6, 2024), "Macrofinance and Resilience," *American Finance Association Presidential Address*, Allied Social Science meetings, San Antonio, Texas (https://www.youtube.com/watch?v=z94l-G5gz4o). See also Markus K. Brunnermeier (December 2024), "Presidential Address: Macrofinance and Resilience," *Journal of Finance* vol. **79** no. 6, pp.2683-3728.

Losses associated with each ε-shock are a measure of potential benefit of greater adaptability, greater resilience, faster recovery

Foregone economic benefits of adaptability as potential gains from maximizing $\mathcal{R}$-measure (resilience measure)

Billion 2024$*	Event ("ε-shock")	Interval (Hawaii dates, not NBER dates†)
−14.372	Great Recession + "Jobless Recovery"	Jan 2008 - Aug 2012 (incl. Tohoku seismic event)
−27.803	Covid Pandemic + "Reopening"	Mar 2020 - Feb 2022 (through Omicron)
−3.473	Revenge Travel (incl. weak yen)	Mar 2022 – Jul 2023
−5.536	Maui wildfires (Lahaina, *etc*.)	Aug 2023 - Dec 2024

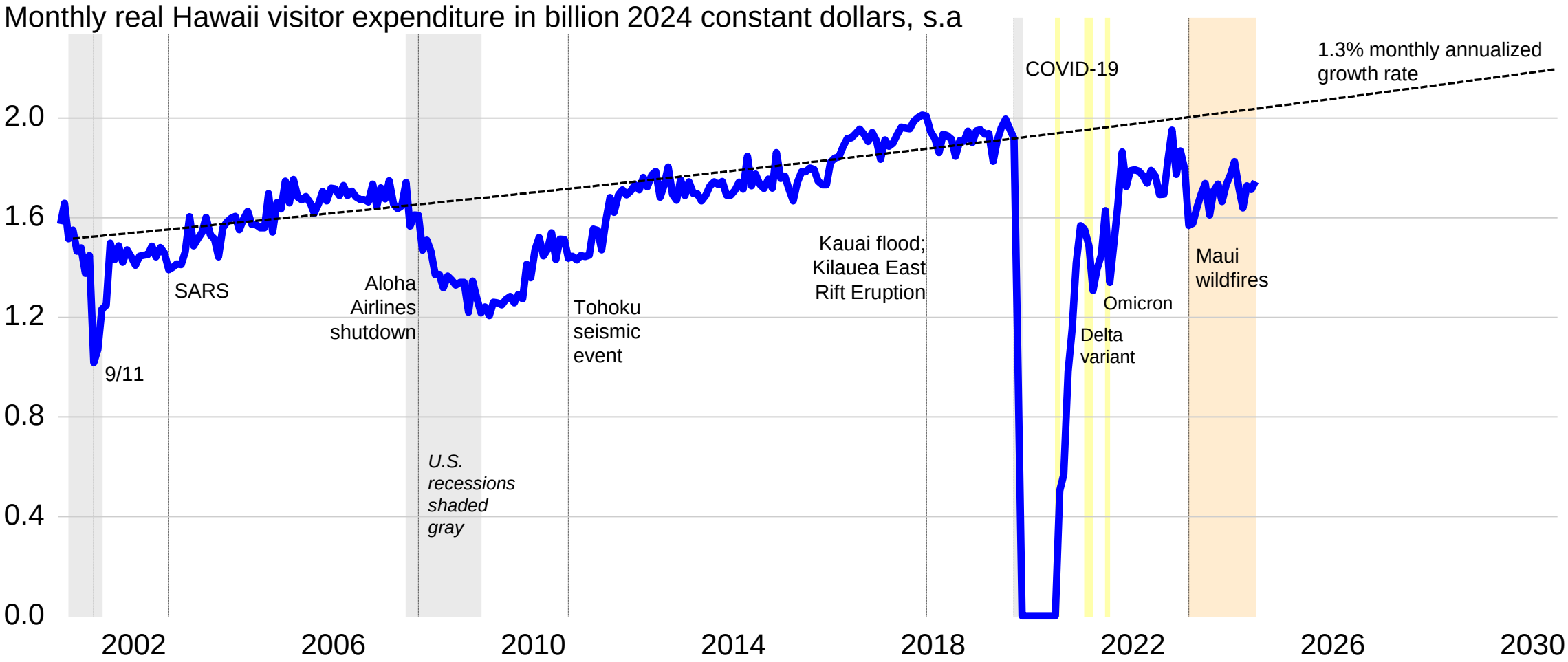
Example: implementation of pre-flight PCR covid testing protocols—partly because of signaling—from October 15, 2020 immediately began to stem losses from pre-vaccination travel volumes constrained by uncertainty and pandemic quarantines, an *adaptation* to an ε-shock which, by reviving travel to Hawaii, restored otherwise foregone tourism receipts; widespread availability of vaccination for general public, April 2021, accelerated the recovery trend

Others: HEPA filters on commercial passenger aircraft (High Efficiency Particulate Air filters), N95 mask-wearing, public reporting of high-frequency COVID-19 morbidity and mortality data, other public health interventions—partly by rebuilding confidence (trust) in travel safety protocols: *perceptions* (trust)

FAIL: Maui post-wildfire tourism messaging—*e.g.* Aquamansplaining DO NOT GO TO MAUI; little Maui replacement homebuilding for > 18 months post-wildfire

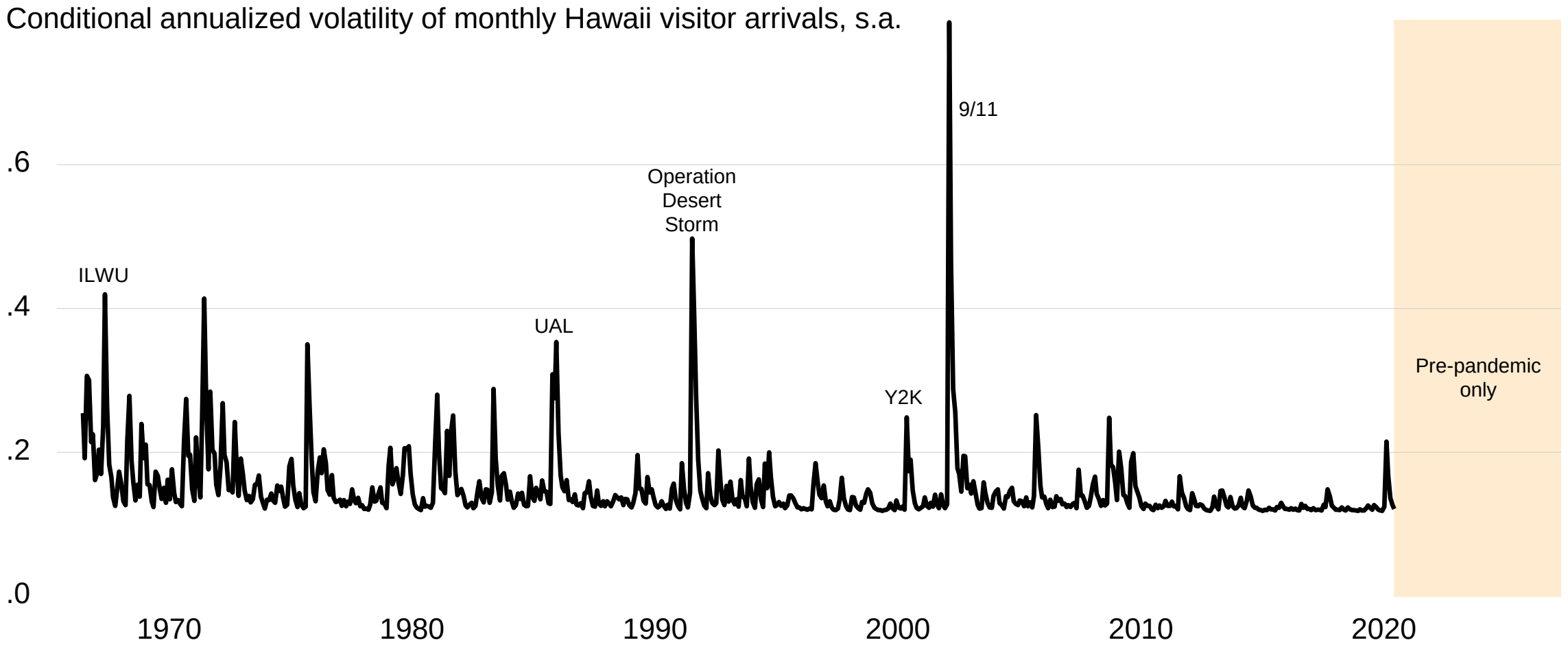
*Updated and re-estimated through December 2024
† National Bureau of Economic Research (NBER), https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions

Various cyclical factors and asymmetric exogenous shocks deviate real Hawaii tourism exports from dynamic, stationary equilibrium



Sources: Hawaii DBEDT (https://dbedt.hawaii.gov/visitor/tourism/, https://dbedt.hawaii.gov/visitor/tourism-price-index/), data through December 2024; TPI is seasonally-adjusted then integrated with U.S. CPI-U and rebased to 2024 = 100; visitor expenditure is also seasonally-adjusted and deflated with transformed TPI; real visitor expenditure long-term trend estimated from stationary component, 2001 (Apr) – 2020 (Feb).

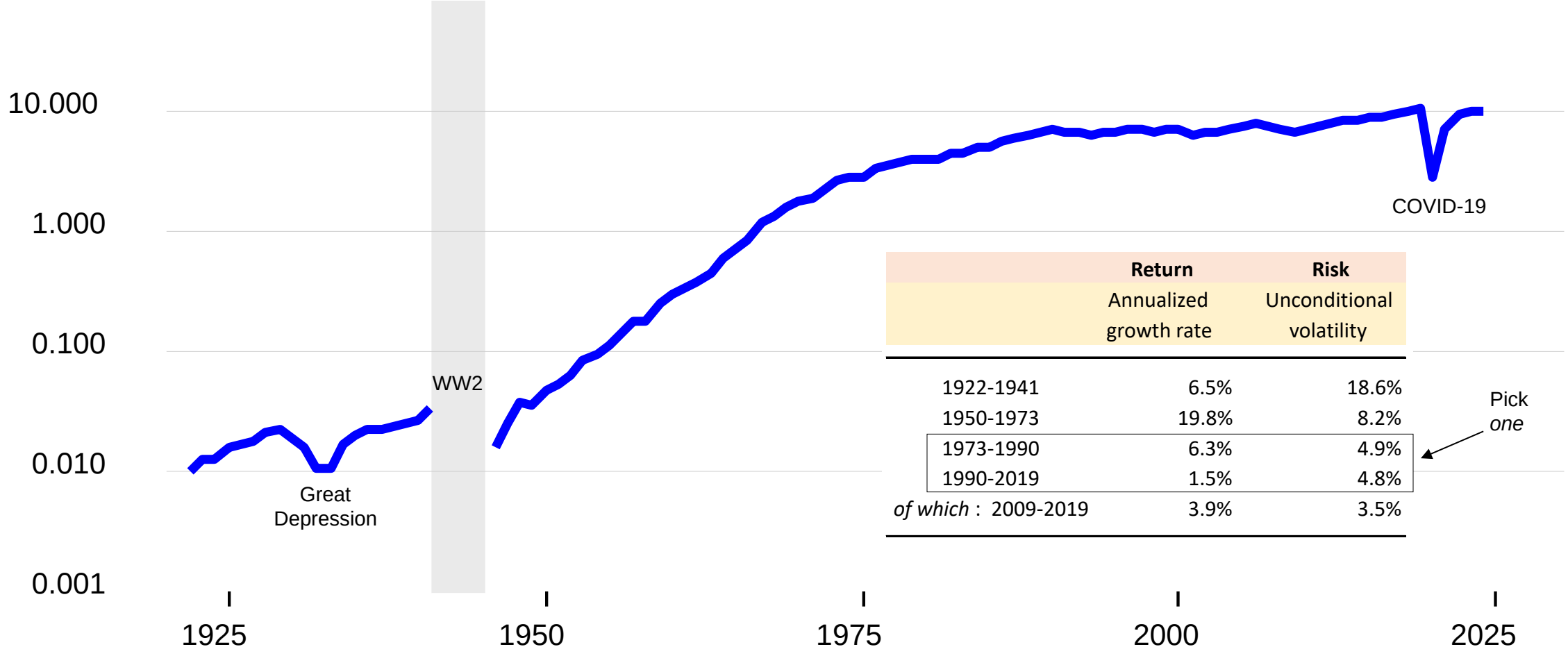
Conditional annualized monthly volatility of visitor arrivals was about 13.3 percent (like S&P 500), pre-pandemic (seek *risk-adjusted* return)



Sources: Hawaii DBEDT (https://dbedt.hawaii.gov/visitor/tourism/); seasonal adjustment using Census X-13 ARIMA filter and Threshold Autoregressive Conditional Heteroskedasticity annualized monthly standard deviations estimated by TZE from January 1966 through February 2020.

Annual statewide visitor arrivals 1990-2019 grew at a compound annual rate of 1.5 percent with 4.8 percent annual volatility

Annual Hawaii visitor arrivals by air (post-WW2) and by sea (pre-WW2) (log scale)

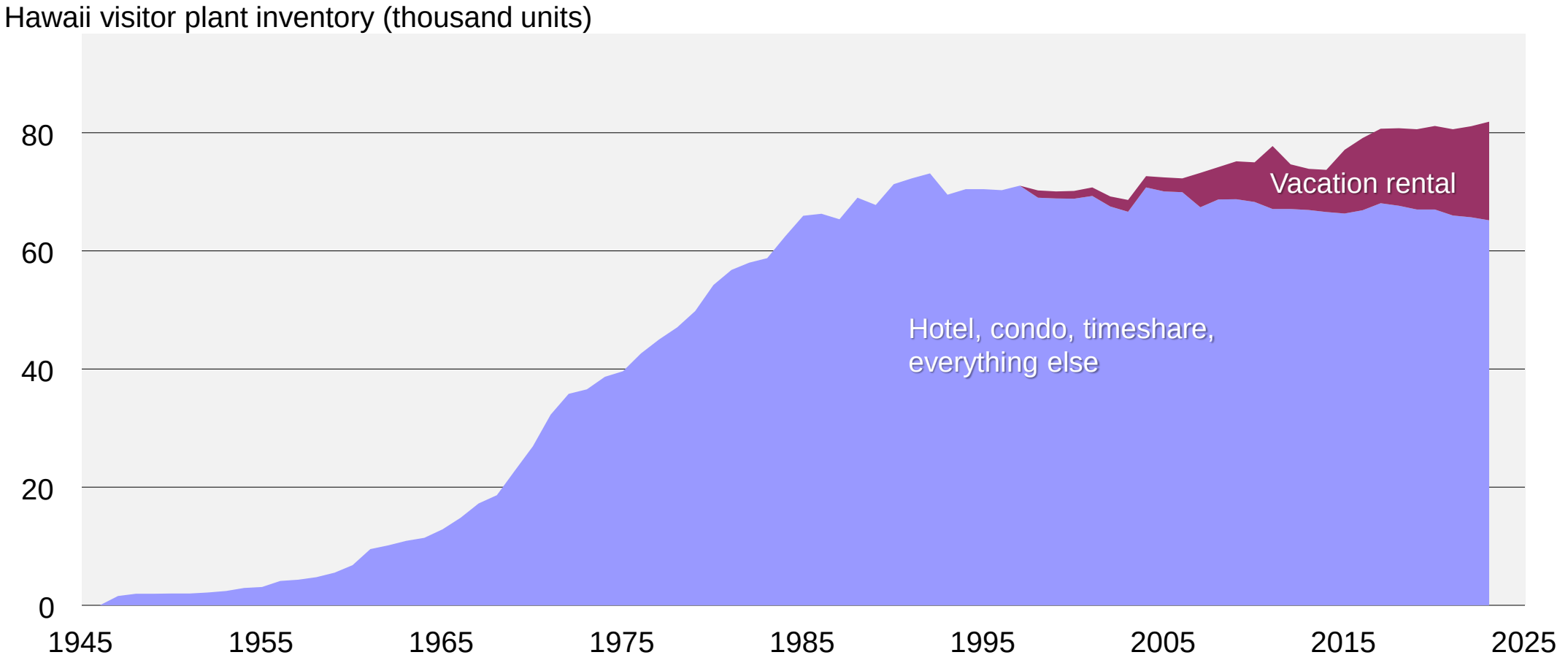


	Return	Risk
	Annualized growth rate	Unconditional volatility
1922-1941	6.5%	18.6%
1950-1973	19.8%	8.2%
1973-1990	6.3%	4.9%
1990-2019	1.5%	4.8%
of which : 2009-2019	3.9%	3.5%

Pick *one*

Source: Hawaii DBEDT (https://dbedt.hawaii.gov/visitor/tourismdata/); growth rate from slope of stationary regression 1989-2019 and its unconditional standard error estimated by TZ Economics.

Traditional Hawaii lodging capacity peaked *c.* 1990, later growth is *all* short-term rentals; global brands consolidating traditional



Sources: Robert C. Schmitt (1977) *Historical Statistics of Hawaii*, UH Press; Hawaii Visitors Bureau (pre-1990s); Hawaii DBEDT (https://files.hawaii.gov/dbedt/visitor/visitor-research/2022-annual-visitor.xlsx and https://files.hawaii.gov/dbedt/visitor/visitor-plant/2023VPI.pdf and prior issues).

Tourism strategic fails ⇒ mid-2020s Hawaii > $35 billion foregone

- Underappreciated: risk asymmetric, leptokurtic (downside only; “fat-tailed” events—Black Swans)
- Appeasing anti-tourism denialism with bogus no-growth “solutions” to overtourism
- Only *active* destination management mitigates negative externalities—tourism spillovers—not tourism suppression
- Tourism does not pre-empt other economic activities from diversifying Hawaii’s economy
- Should we be celebrating achievement of HTA Glorious Goal to “decrease the total number of visitors to Oahu” in *2021-2024 Destination Management Action Plan*?

Pau