



## Economic expansion and return to the steady-state

*prepared for the*  
**Hawaii Workforce Development Council**

February 24, 2011

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Principal, TZ Economics

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US Dept of State Geographer

41°14'36.84" N 132°20'34.32" W elev -12928 ft

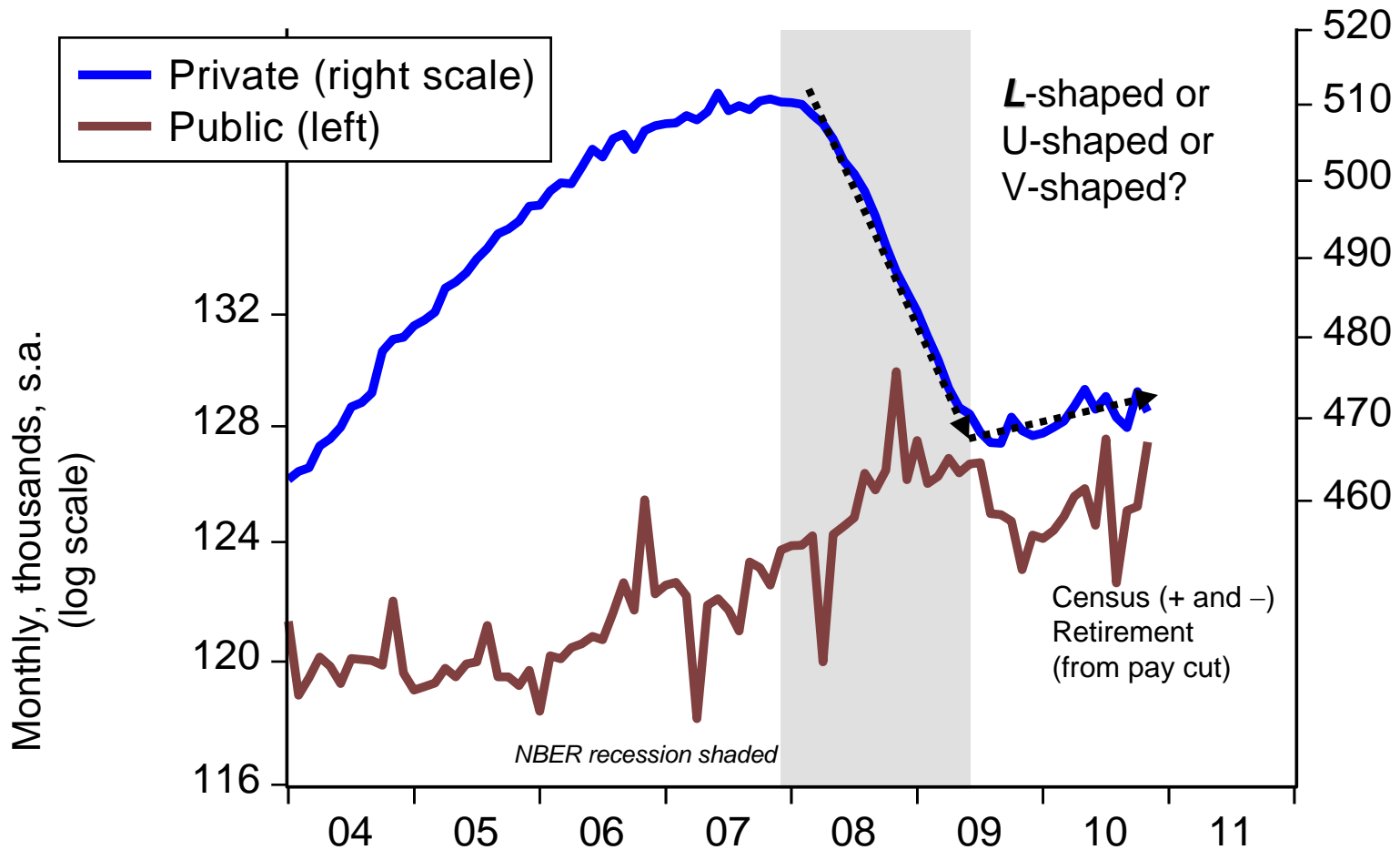
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# Labor markets

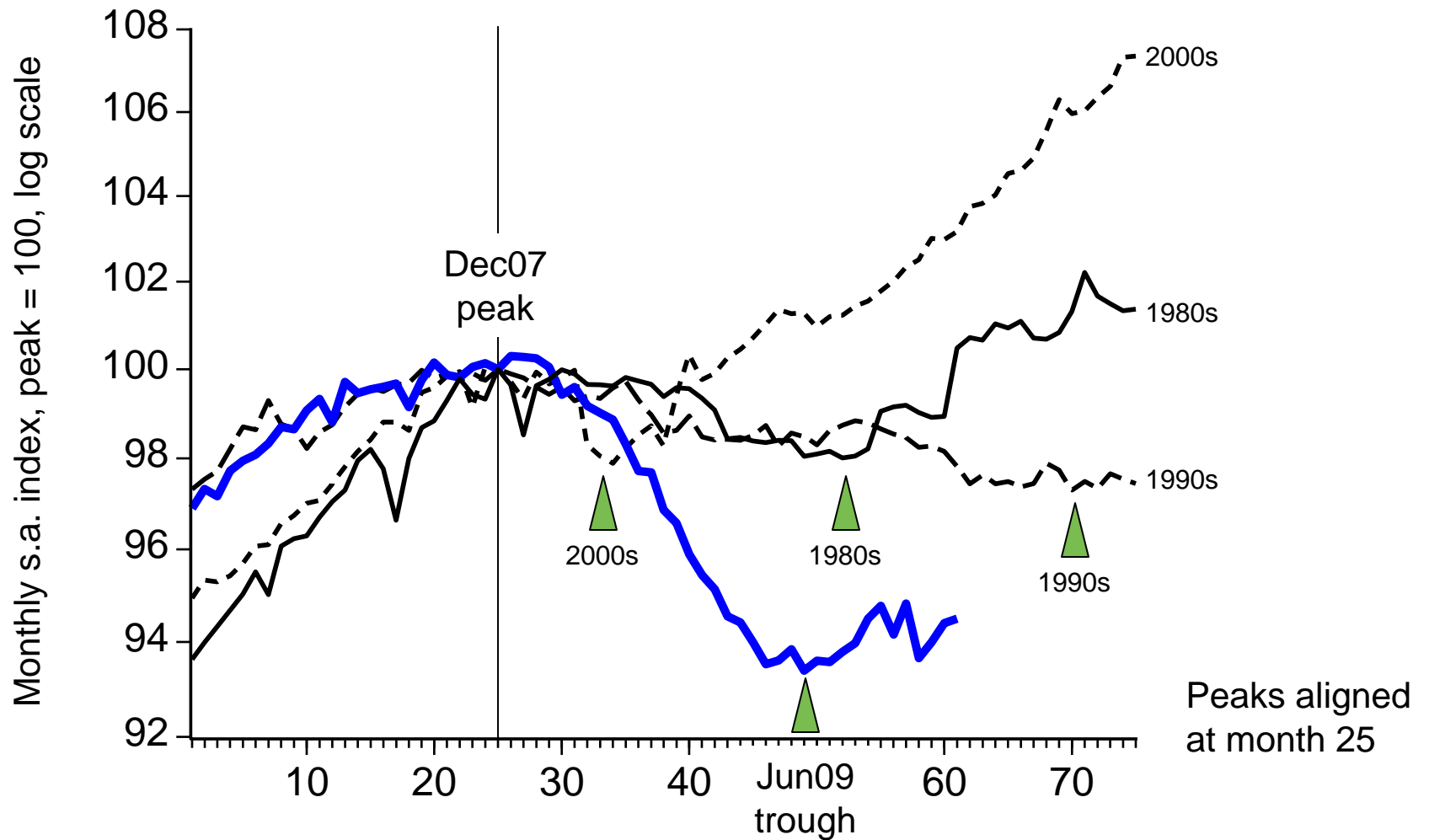
# Hawaii payroll employment: L-shaped recovery



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Source: Hawaii DLIR, Hawaii DBEDT; seasonal adjustment using Census X-12 ARIMA filter by TZE

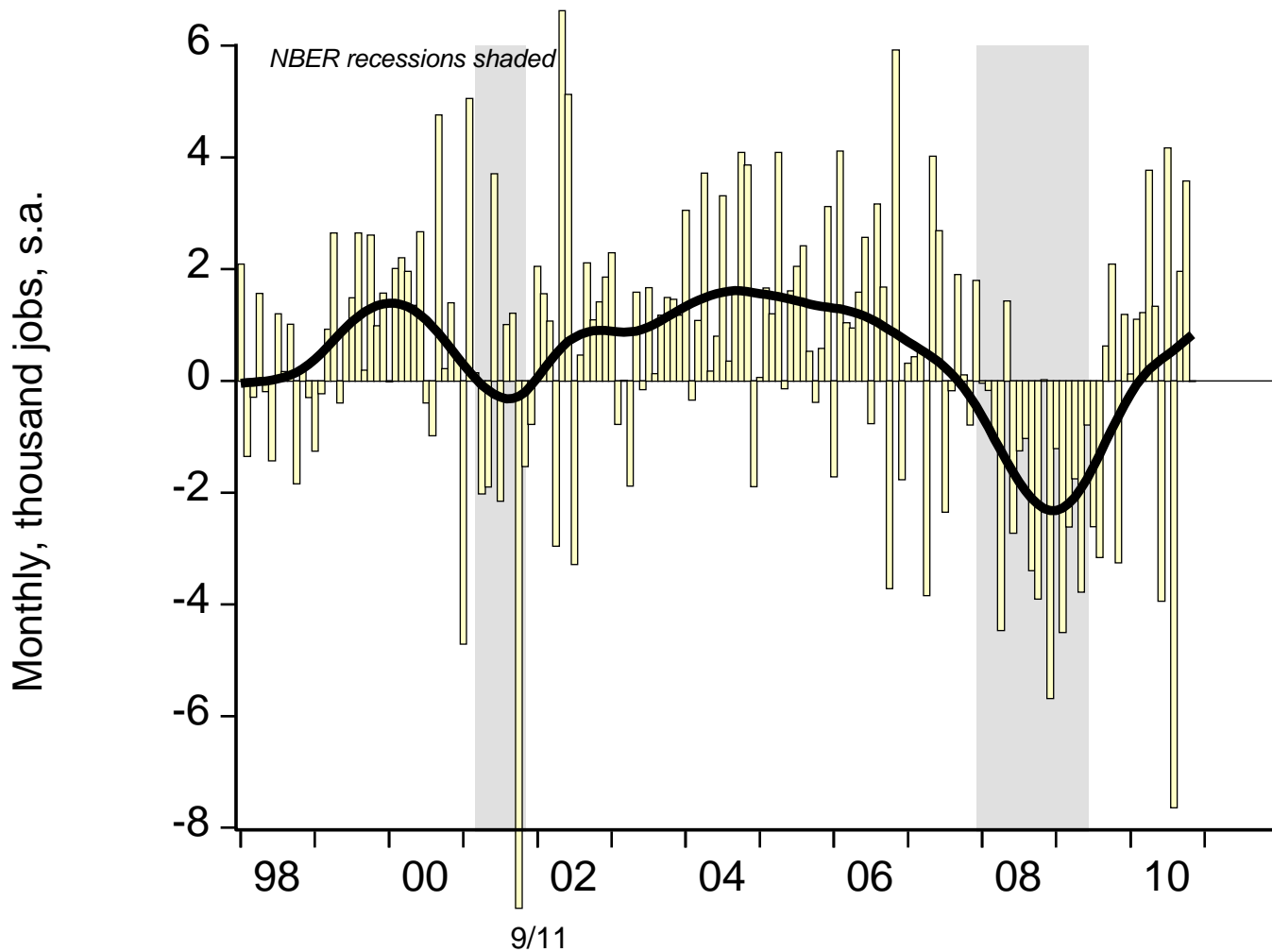
# Hawaii payroll employment: comparing the last four recession/recovery cycles



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Source: Honolulu Board of Realtors; seasonal-adjustment and trend extraction by TZE

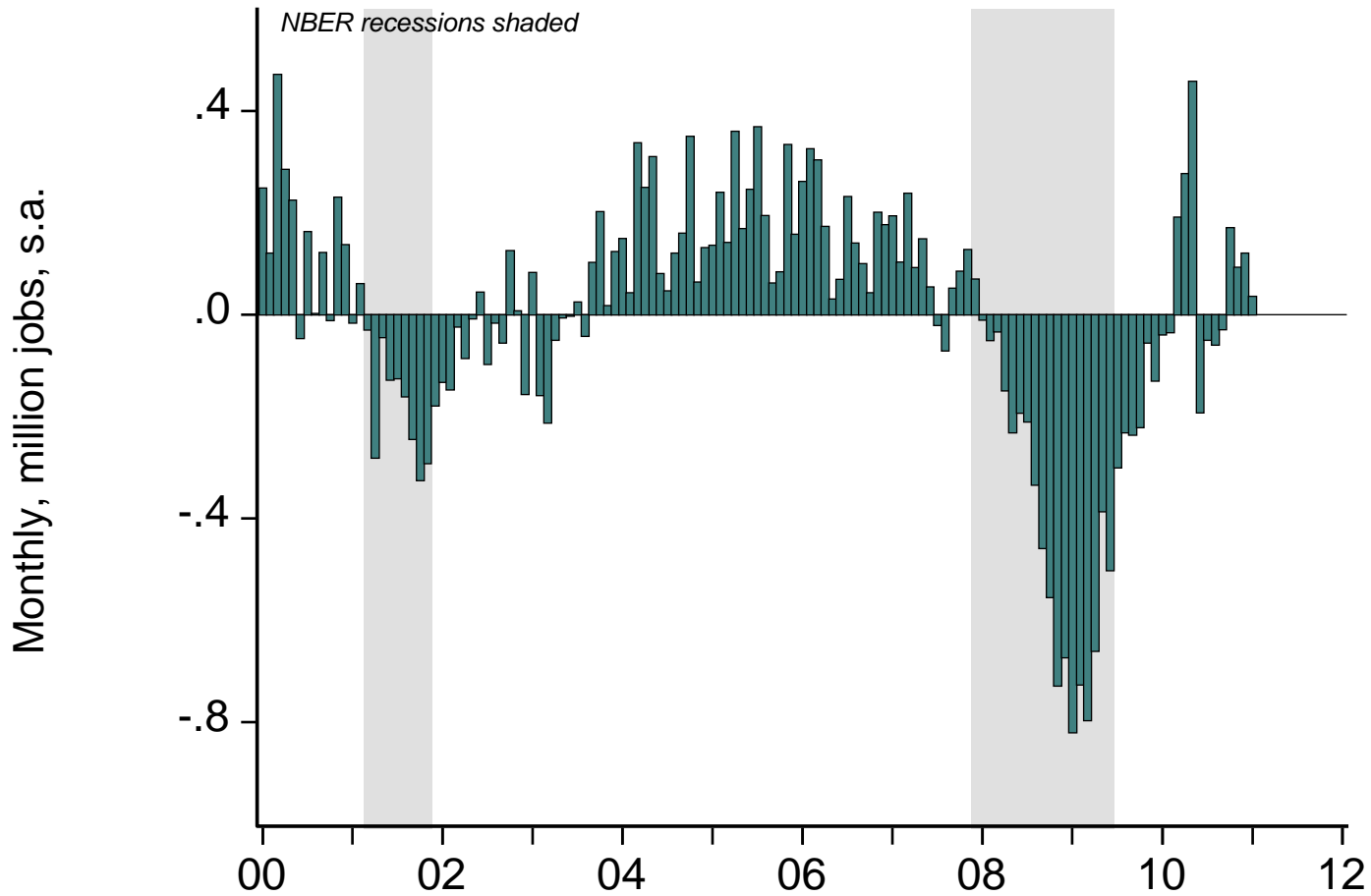
# Monthly change in Hawaii payroll employment



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Source: Hawaii DLIR, Hawaii DBEDT; seasonal adjustment using Census X-12 ARIMA filter, H-P filter by TZE

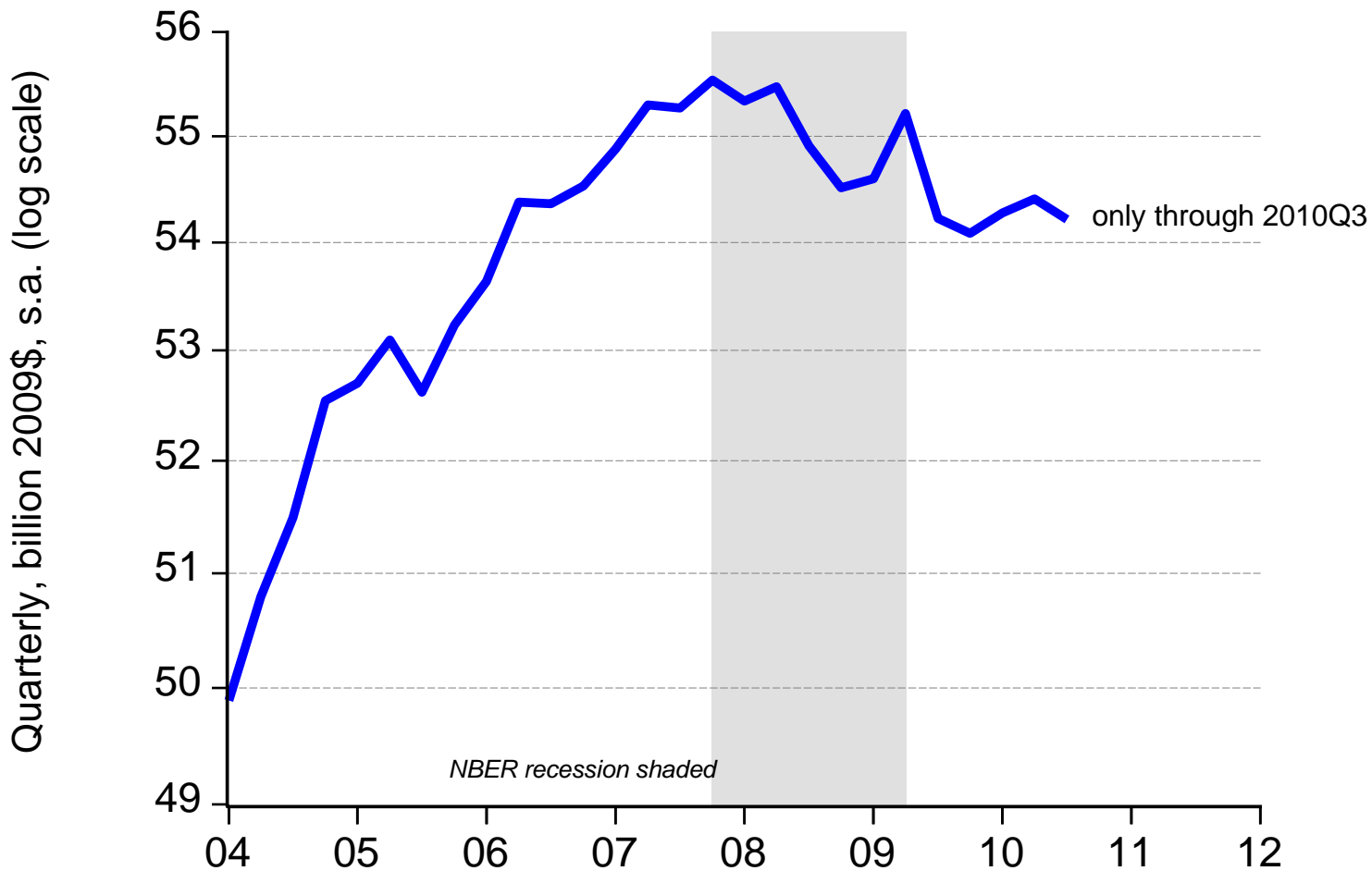
# Monthly change in U.S. payroll employment





# Longer-term trends

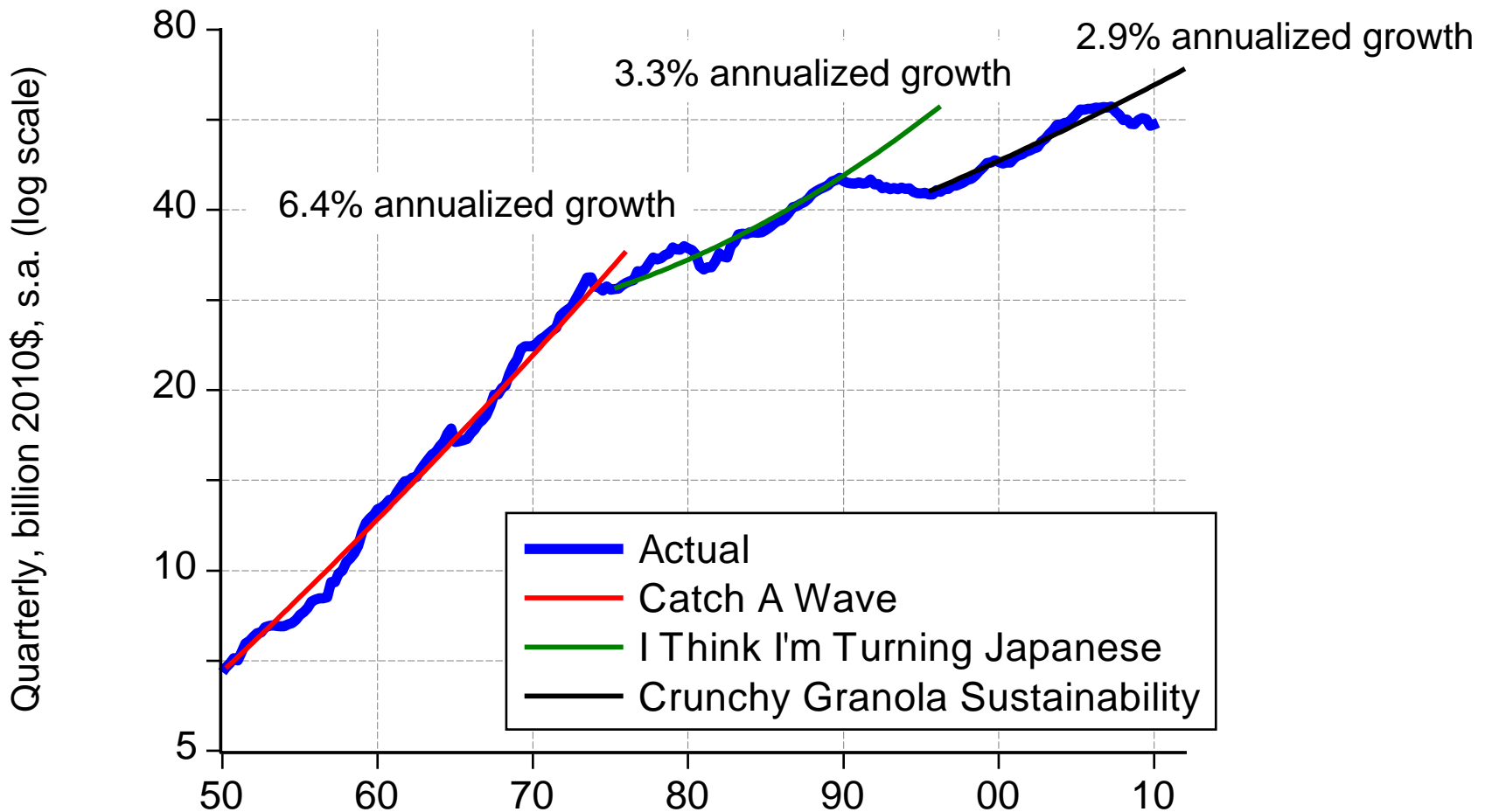
# Sluggish Hawaii employment recovery helps explain slow Hawaii real personal income recovery



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Source: BEA, BLS; seasonal adjustment using Census X-12 ARIMA filter and deflation with Honolulu CPI-U by TZE

# Long-term real Hawaii personal income growth shows three phases 1950-74, 1975-89, 1995-2007

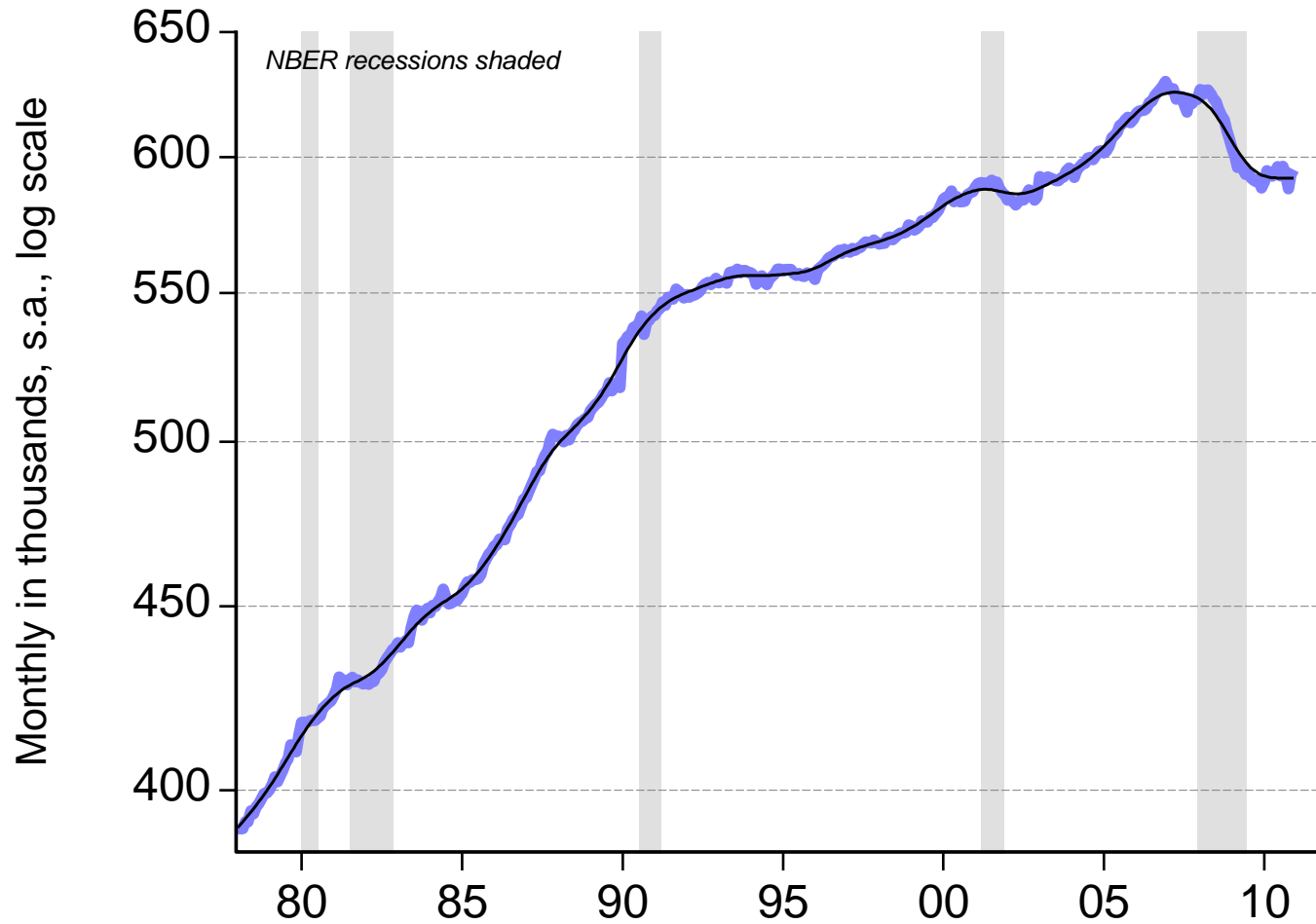


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Source: BEA, BLS; seasonal adjustment using Census X-12 ARIMA filter and deflation with Honolulu CPI-U by TZE, growth rates are annualized from regressions on log changes 1950.1-1974.1, 1975.2-1989.4, 1995.3-2007.2



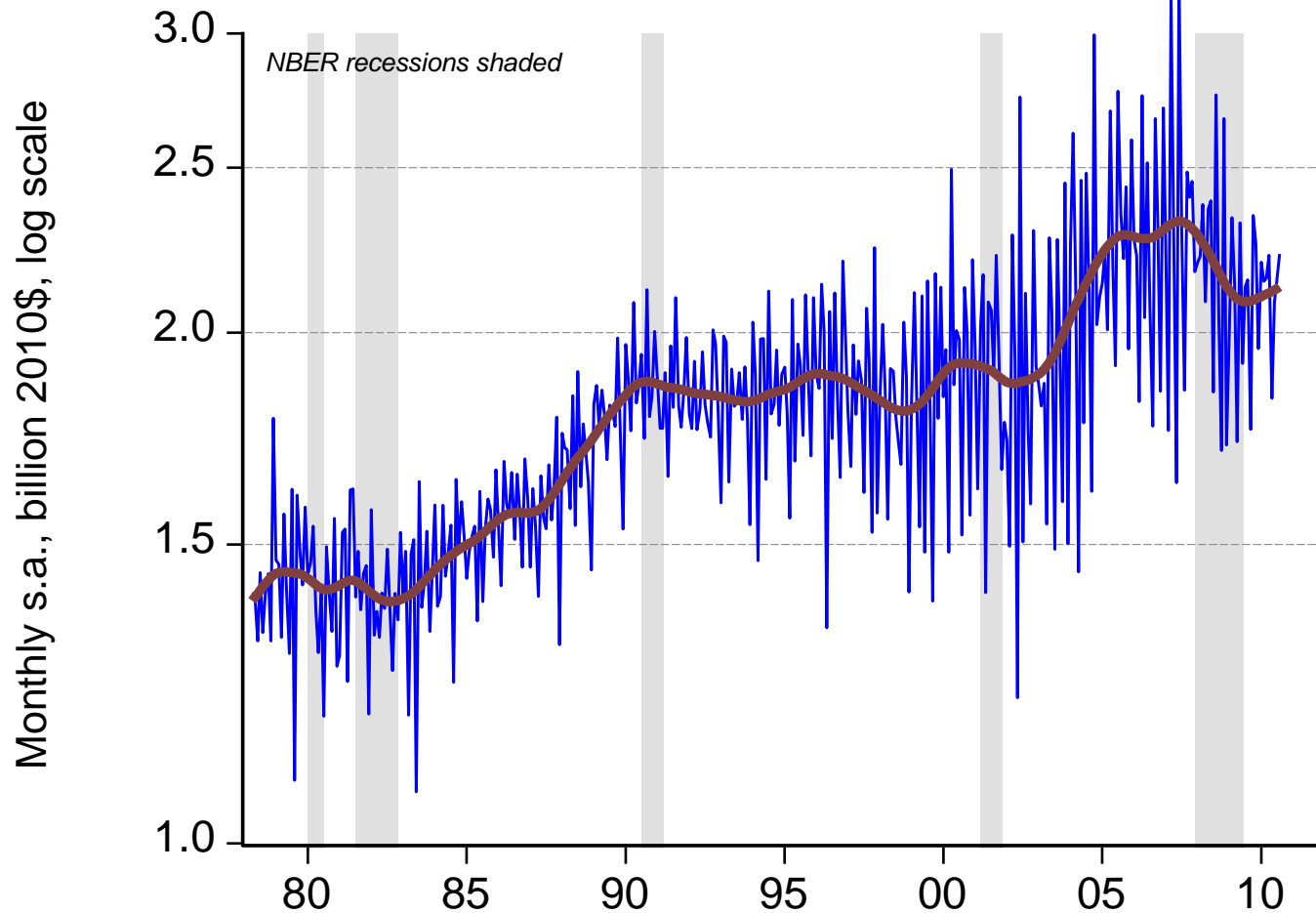
# Hawaii persons employed



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Source: Hawaii DLIR ([https://www.hiwi.org/admin/gsipub/htmlarea/uploads/LFR\\_LAUS\\_LF.xls](https://www.hiwi.org/admin/gsipub/htmlarea/uploads/LFR_LAUS_LF.xls)); seasonal adjustment and trend extraction by TZE

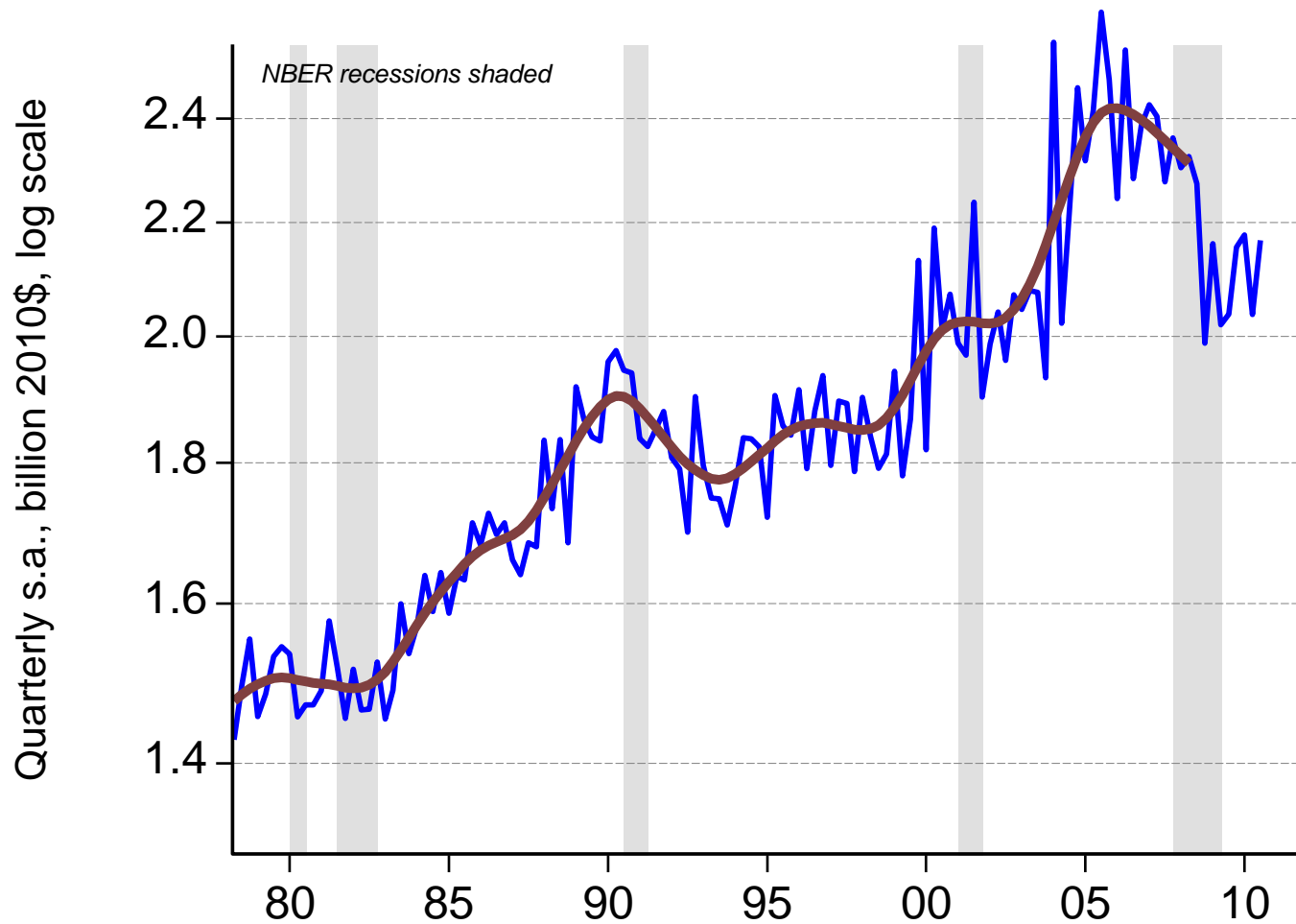
# Longer-term transactions measures more-or-less mirror jobs: Hawaii monthly real retail sales



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Source: Hawaii DoTAX; deflation using U.S. CPI-U, seasonal adjustment and trend extraction byTZE

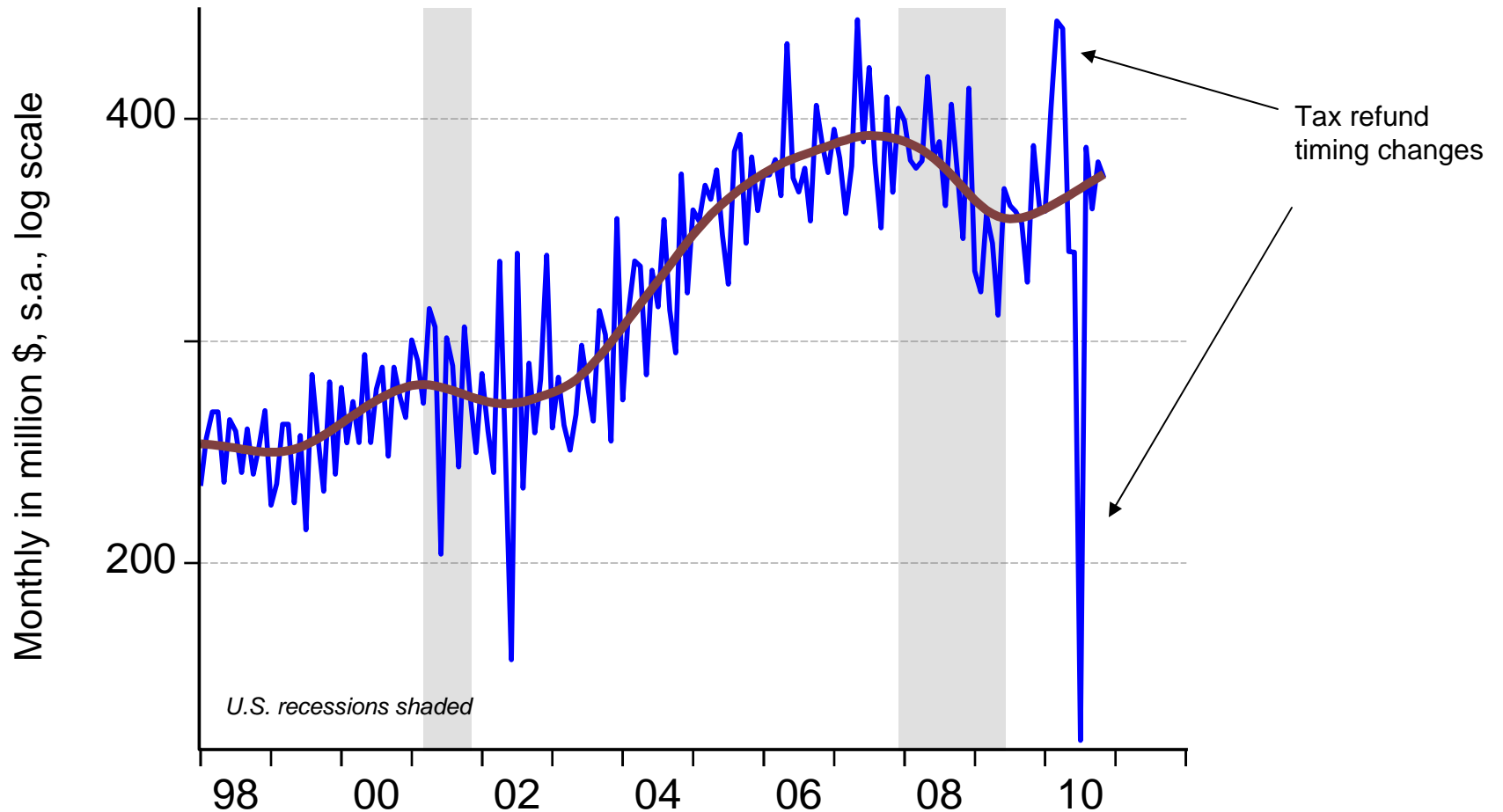
# Longer-term transactions measures more-or-less mirror jobs: Hawaii quarterly real retail sales



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Source: Hawaii DoTAX; deflation using interpolated Honolulu CPI-U, seasonal adjustment and trend extraction by TZE

# Hawaii *nominal* general fund tax revenue: tax refund timing noise can't suppress the recovery trend



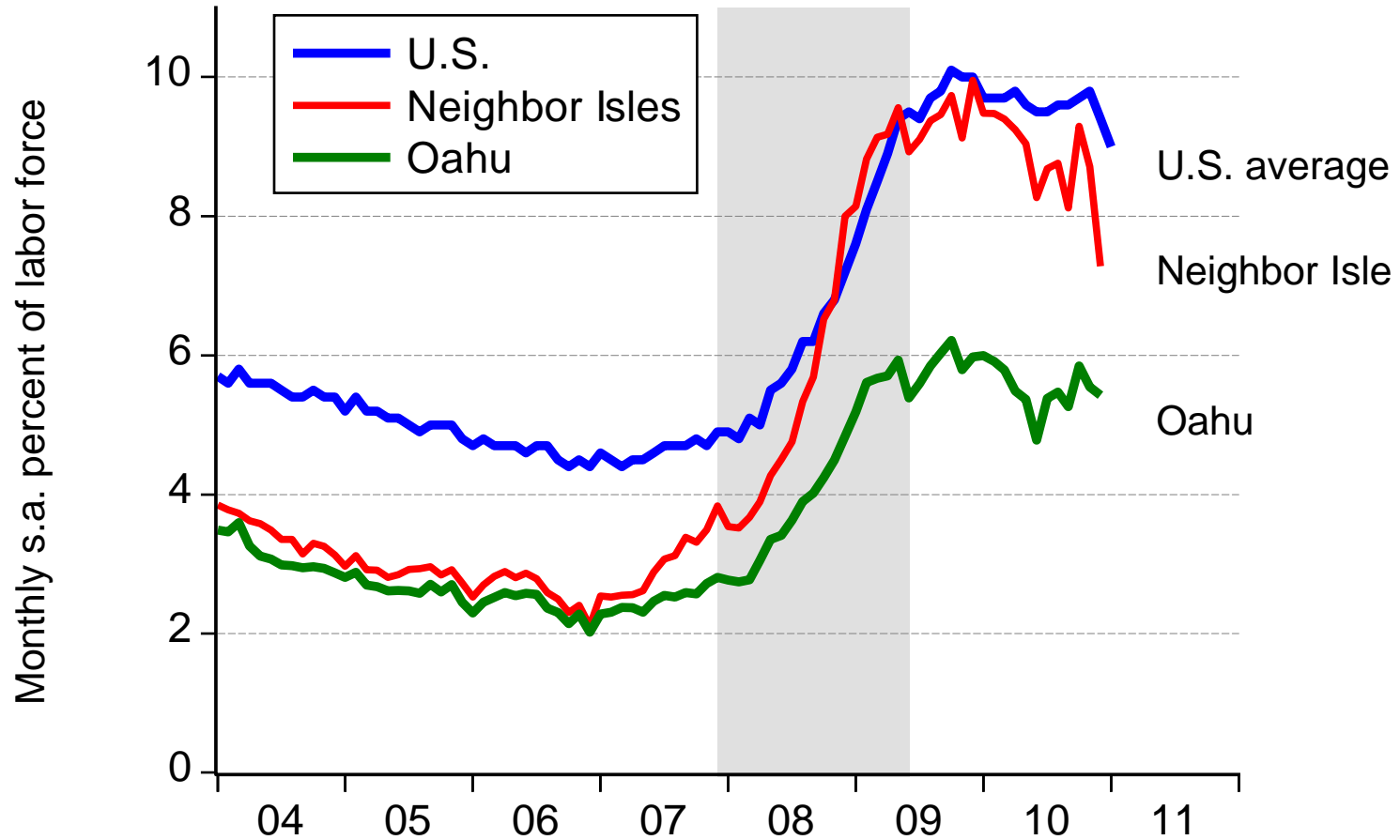
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Source: Hawaii Department of Taxation; Hawaii DBEDT; seasonal adjustment and trend extraction by TZ Economics



# Phillips Curves

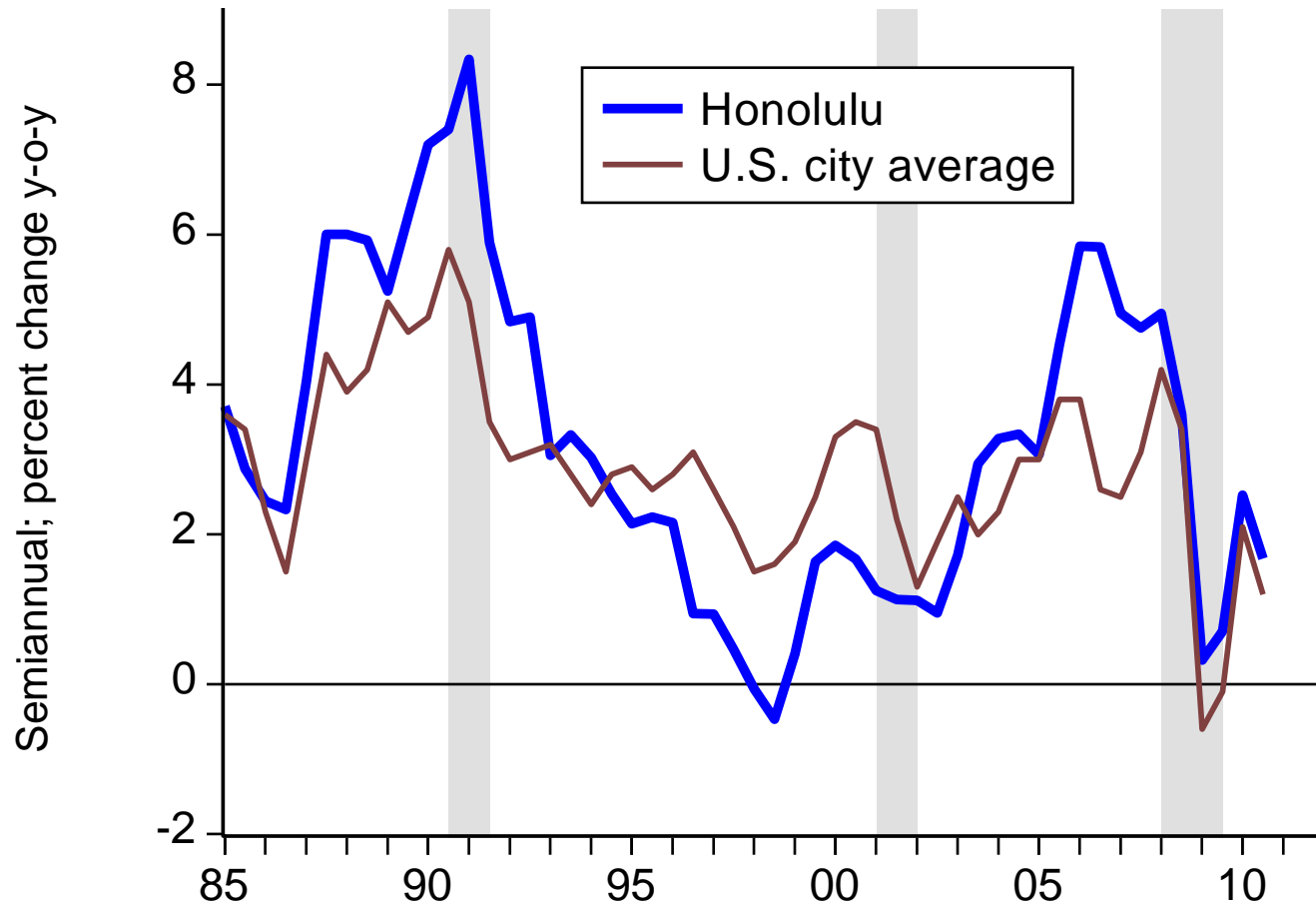
# Comparing unemployment rates



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Source: BLS, U.S. Department of Labor, Hawaii DLIR; seasonal-adjustment of Hawaii data by TZE

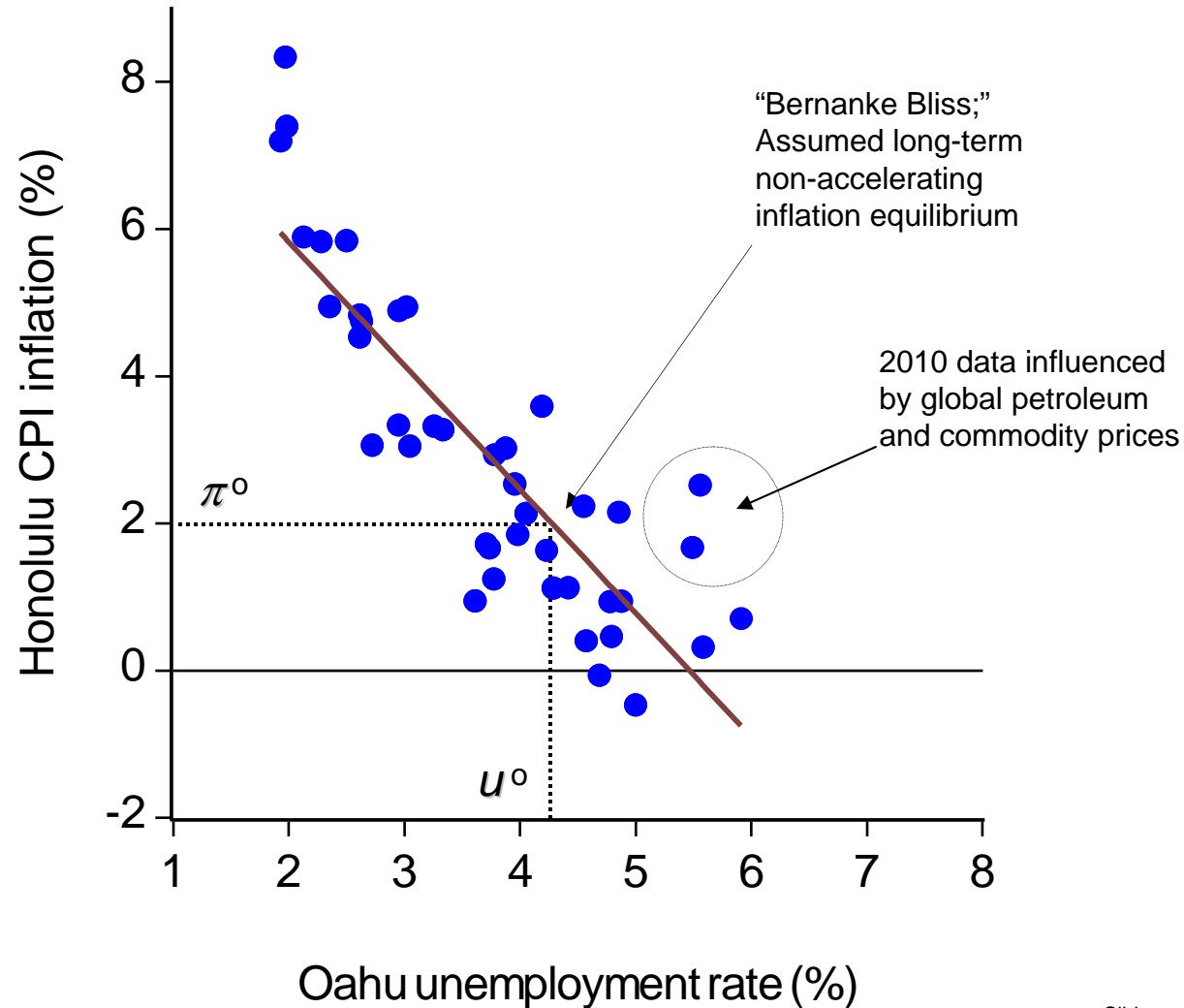
# Honolulu inflation varies around the U.S. urban average over the business cycle (booms and busts)



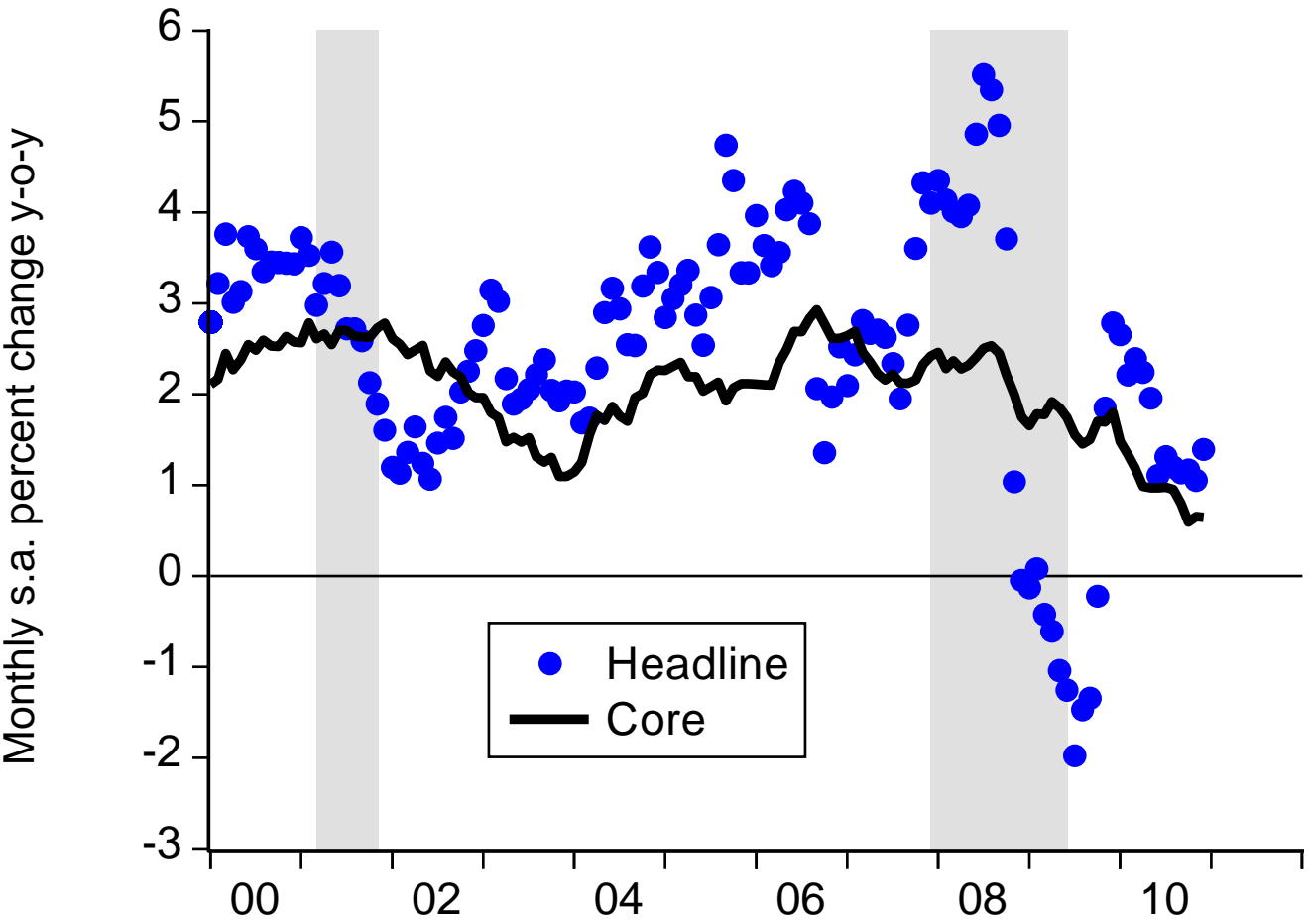
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Source: BLS, U.S. Department of Labor

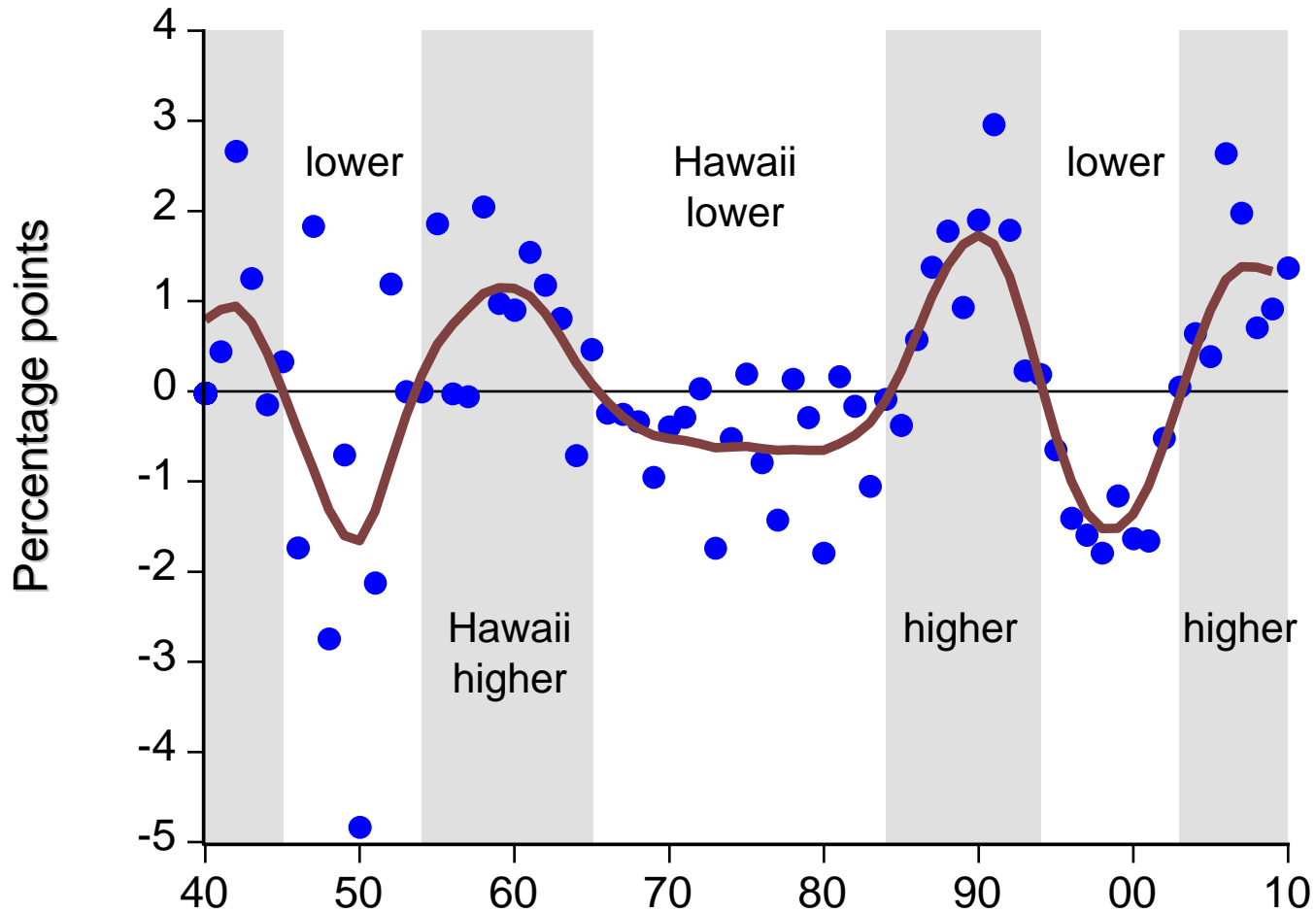
# Oahu inflation, unemployment: inversely-related (semi-annual data 1990-2010)



# U.S. consumer price inflation rates



# Differential between Honolulu and urban U.S. inflation: within a monetary union, inflation converges (think EU)



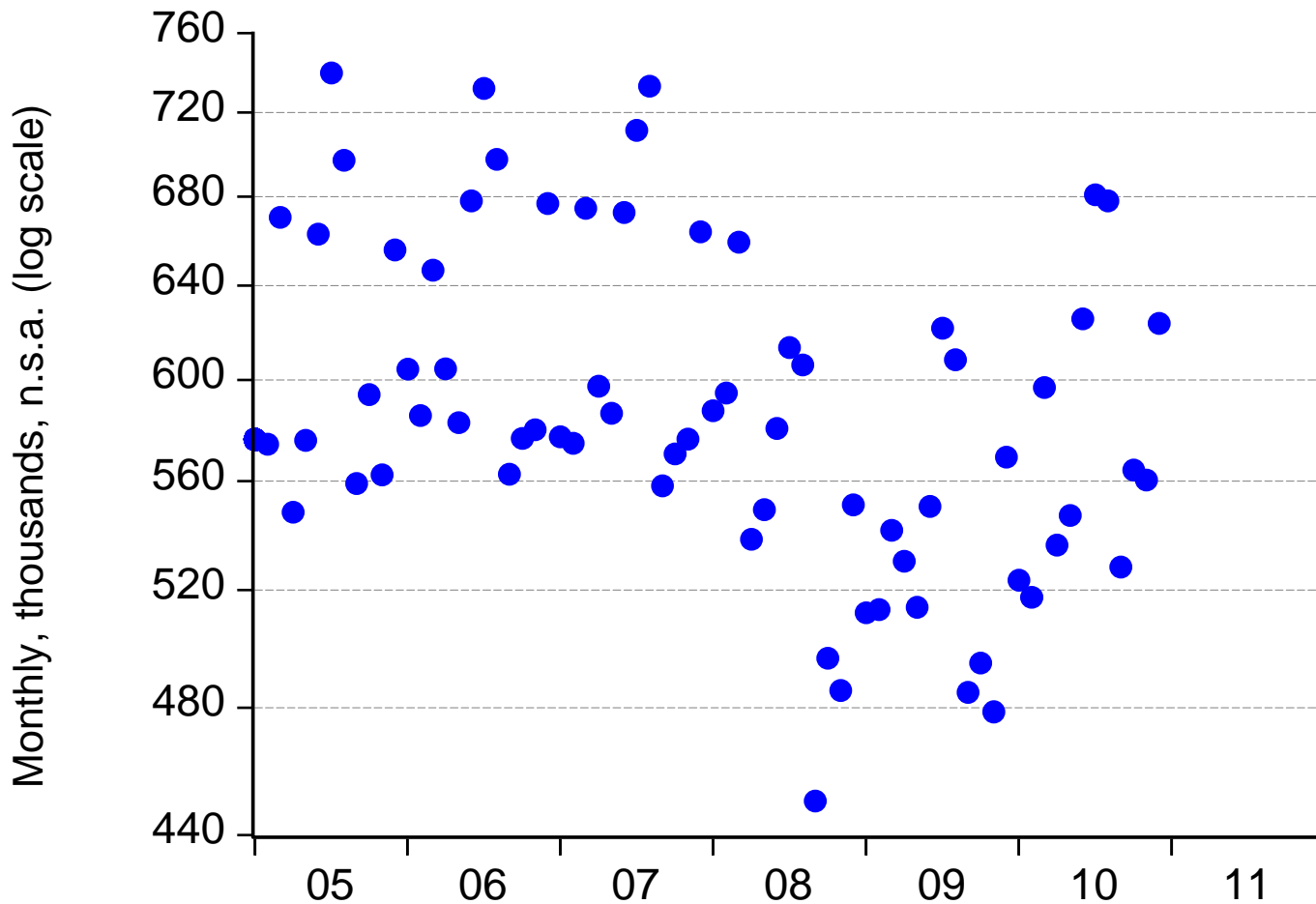
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Source: Bureau of Labor Statistics, US Department of Labor; H-P filter calculations by author

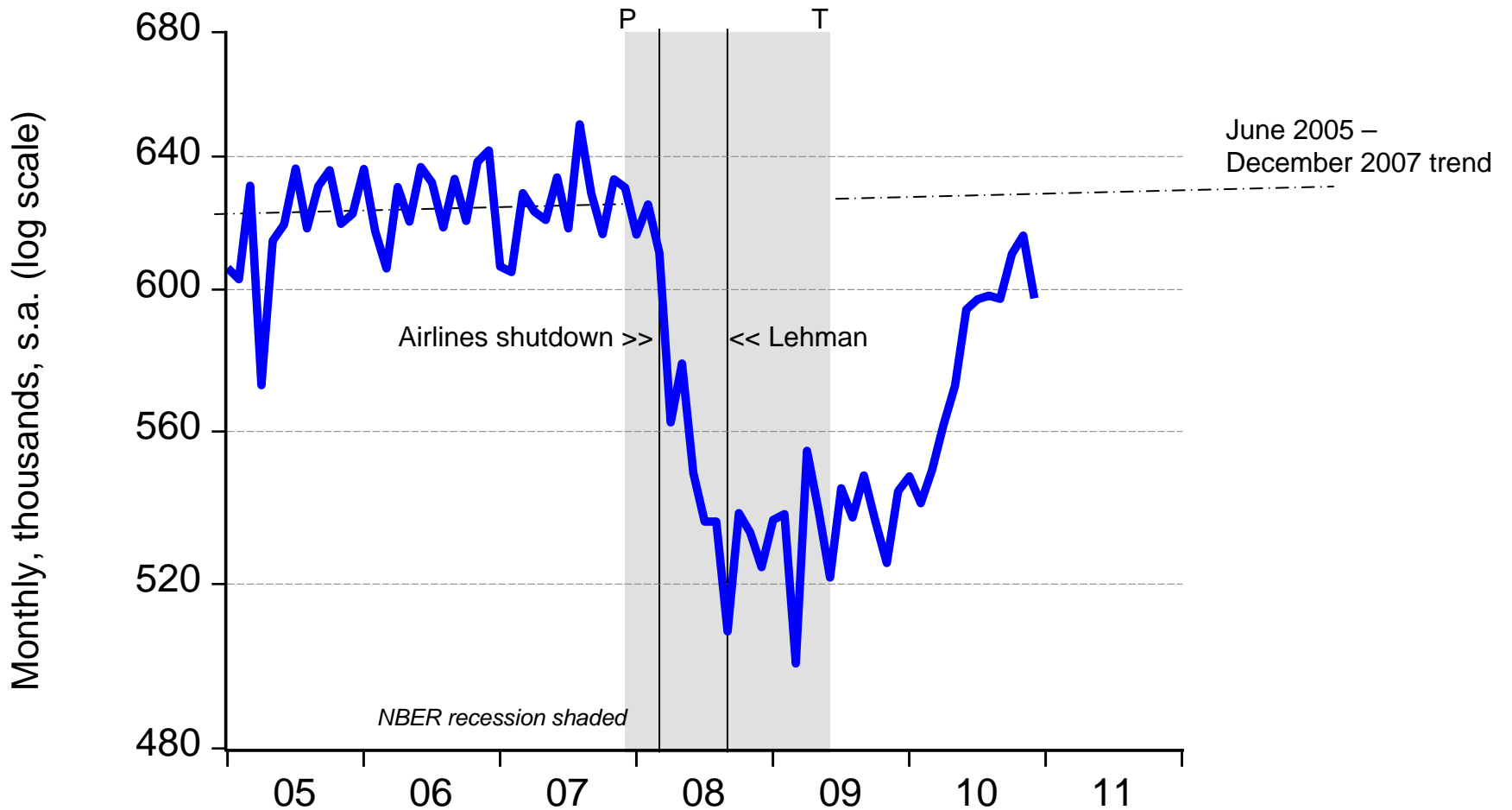


# Tourism

# Without seasonal adjustment: noise drowns signal (total Hawaii visitor arrivals through December 2010)

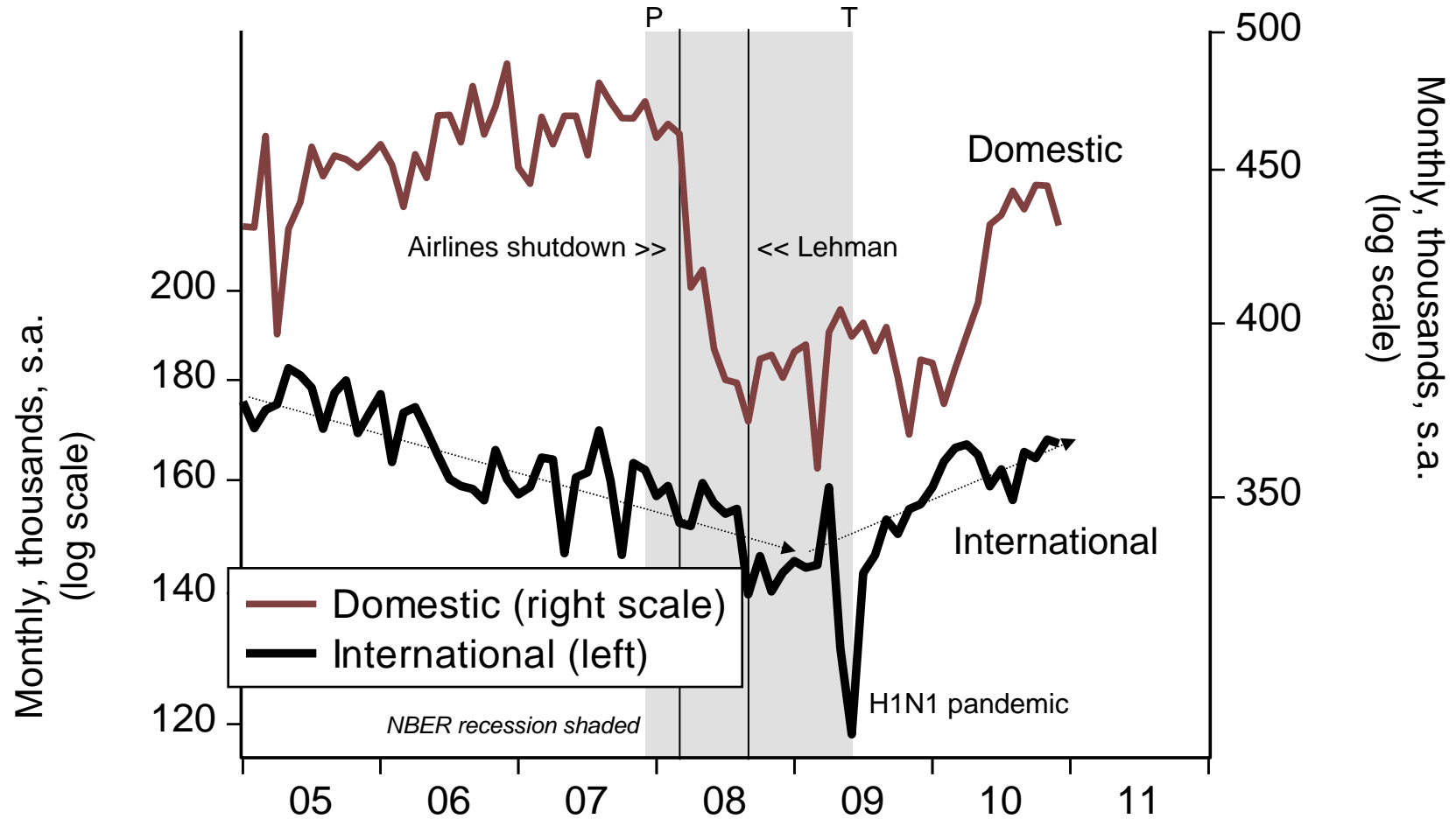


# Seasonally-adjusted total visitor arrivals: U-shaped (through December 2010)



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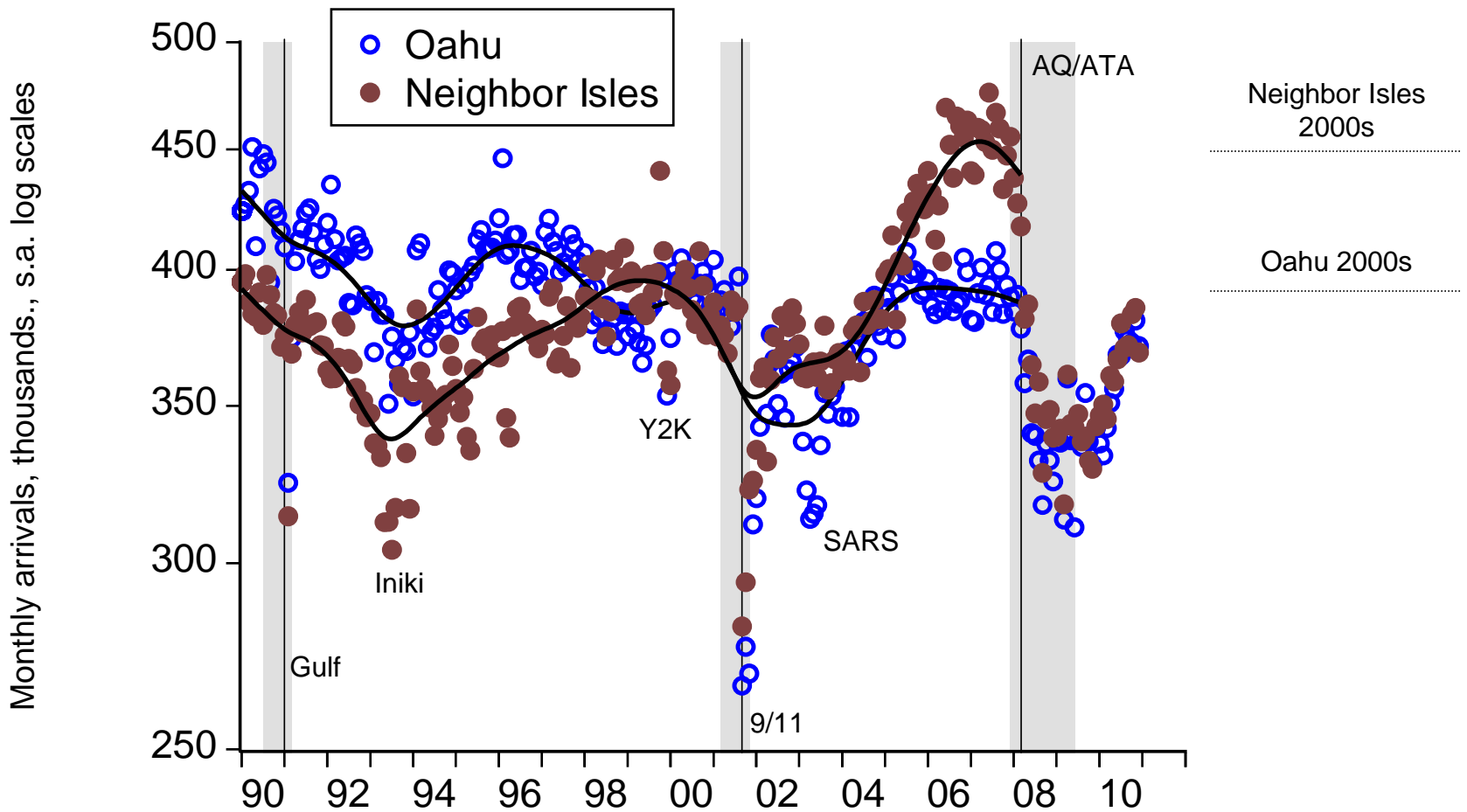
# Domestic and international visitor arrivals



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Source: HTA, Hawaii DBEDT; seasonal adjustment using Census X-12 ARIMA filter by TZE

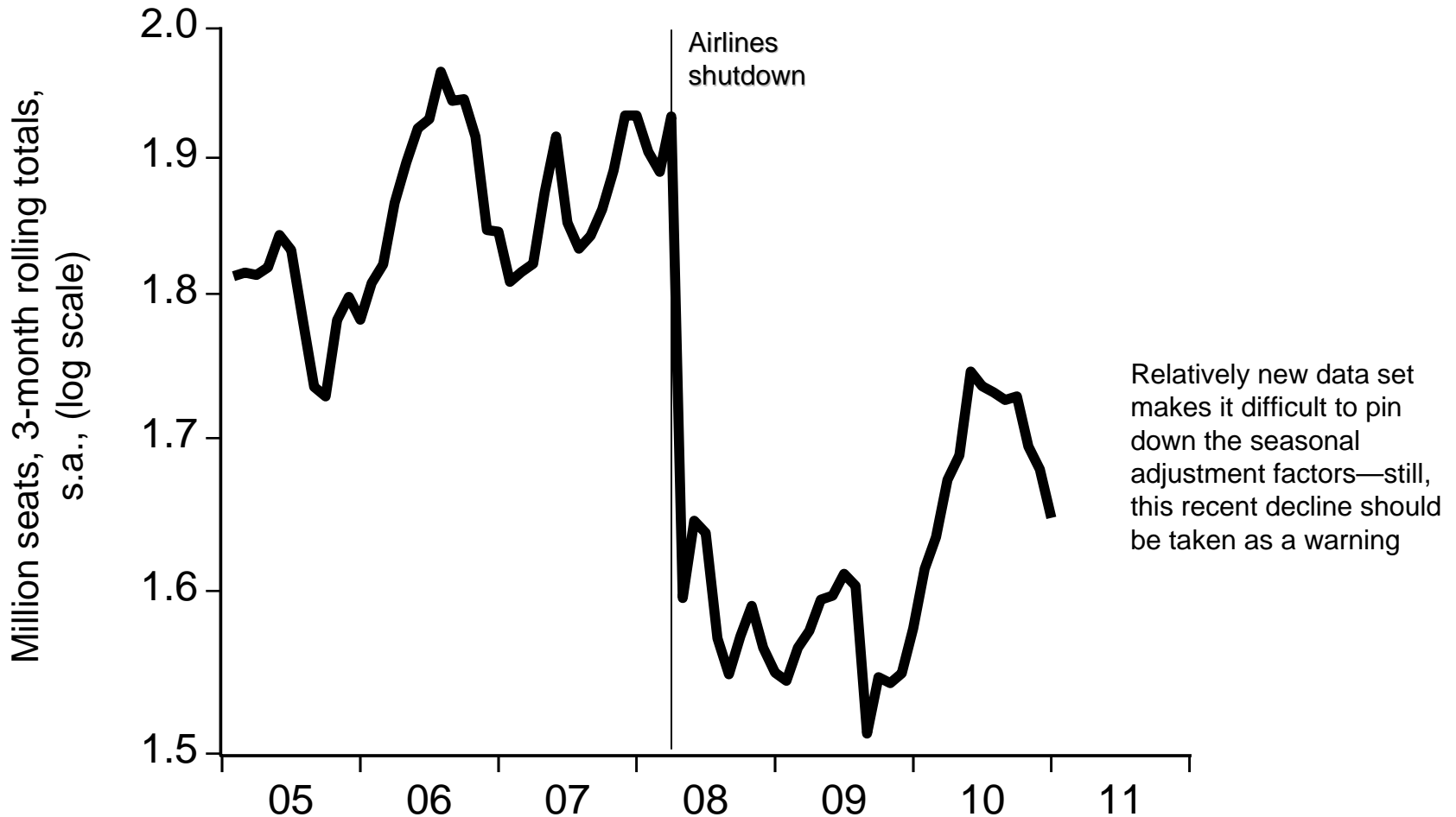
# Neighbor island visitor arrivals took a bigger hit



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Sources: HTA, Hawaii DBEDT; seasonal adjustment, Hodrick-Prescott filter trends by TZE

# Monthly estimates of quarter-ahead domestic lift through the January – March 2011 quarter

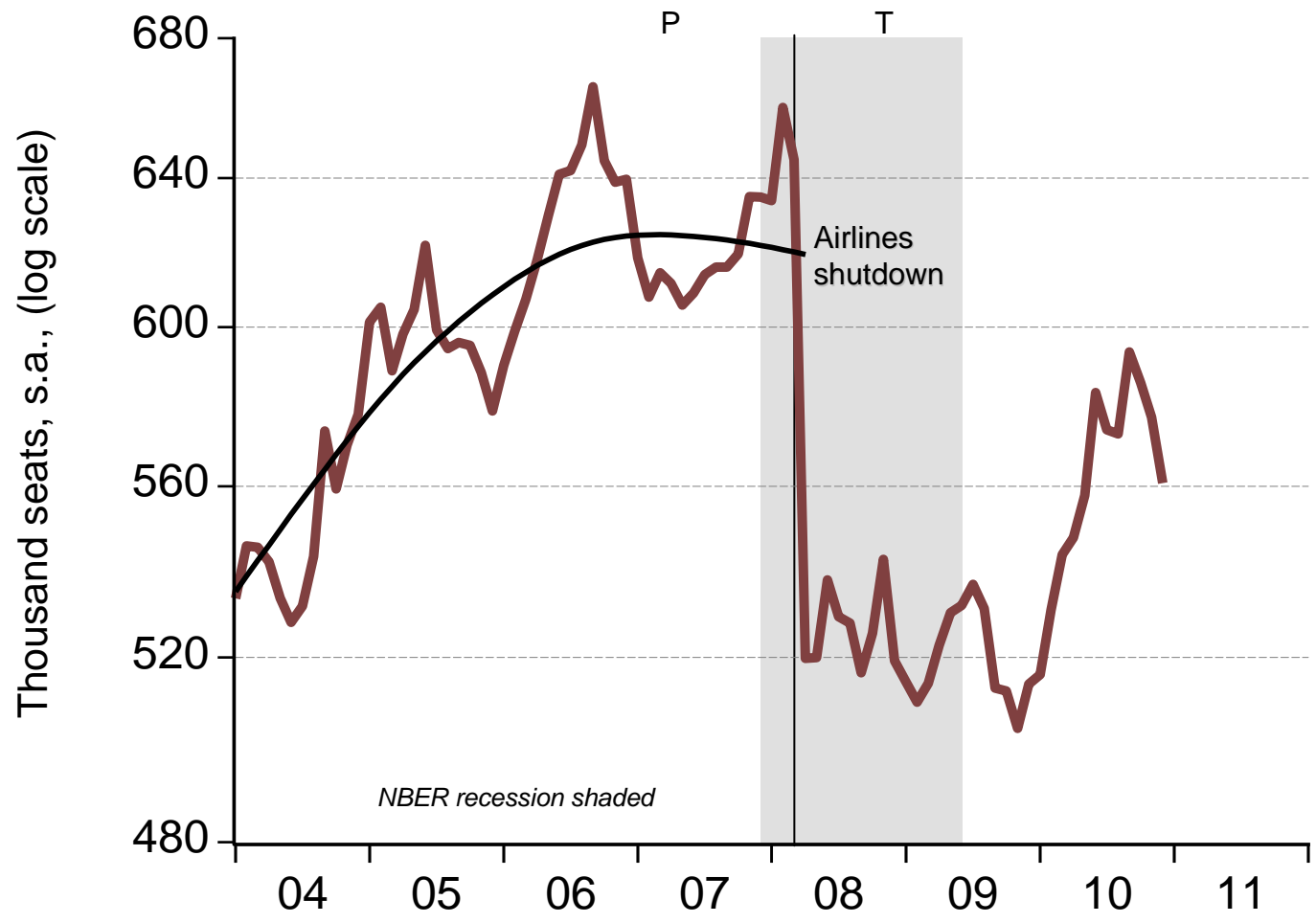


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Source: (through January - March 2011 quarter) Hawaii DBEDT, HTA; seasonal adjustment by TZE

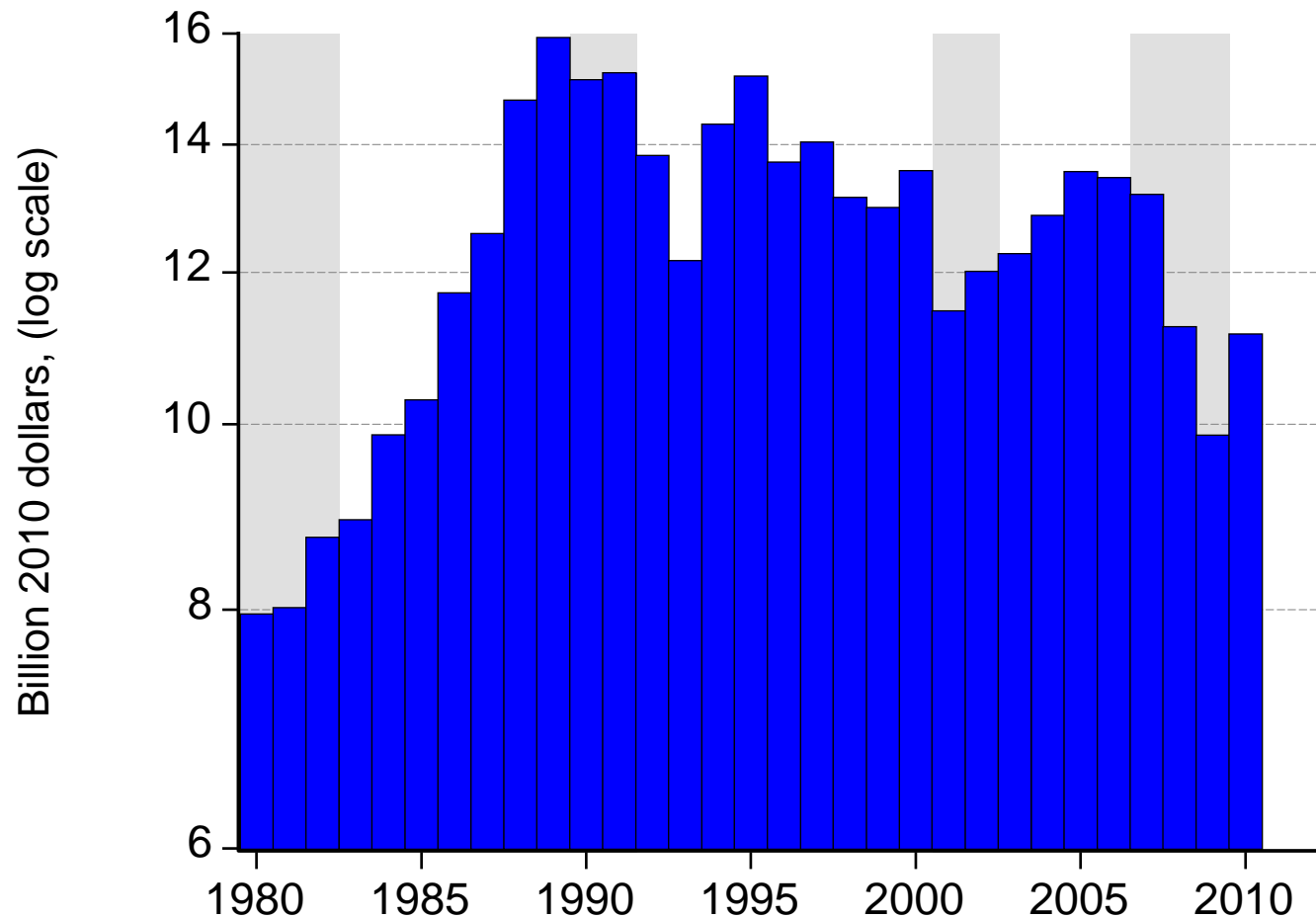


# Actual monthly domestic lift through December 2010

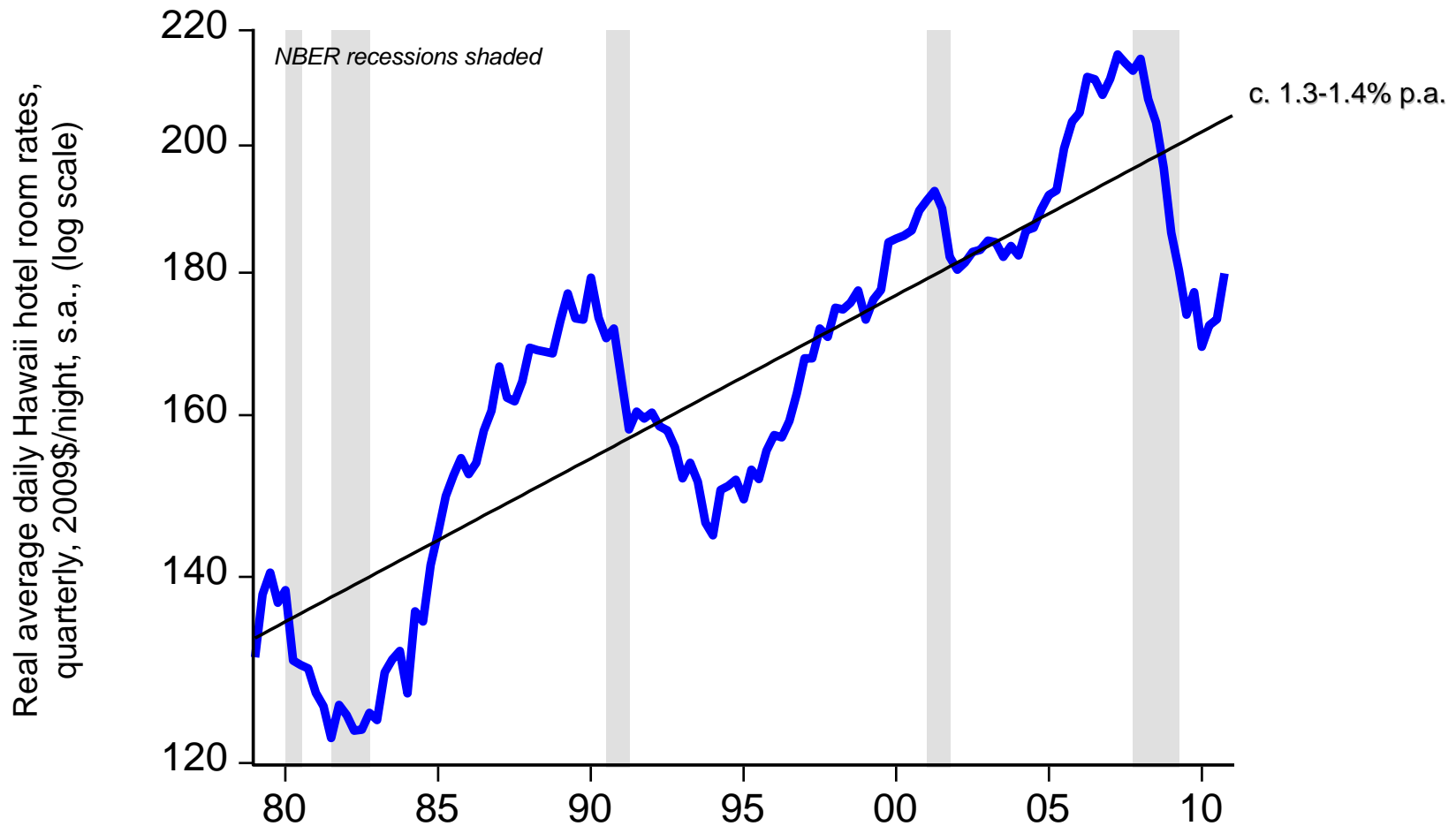




# Real Hawaii total visitor expenditure



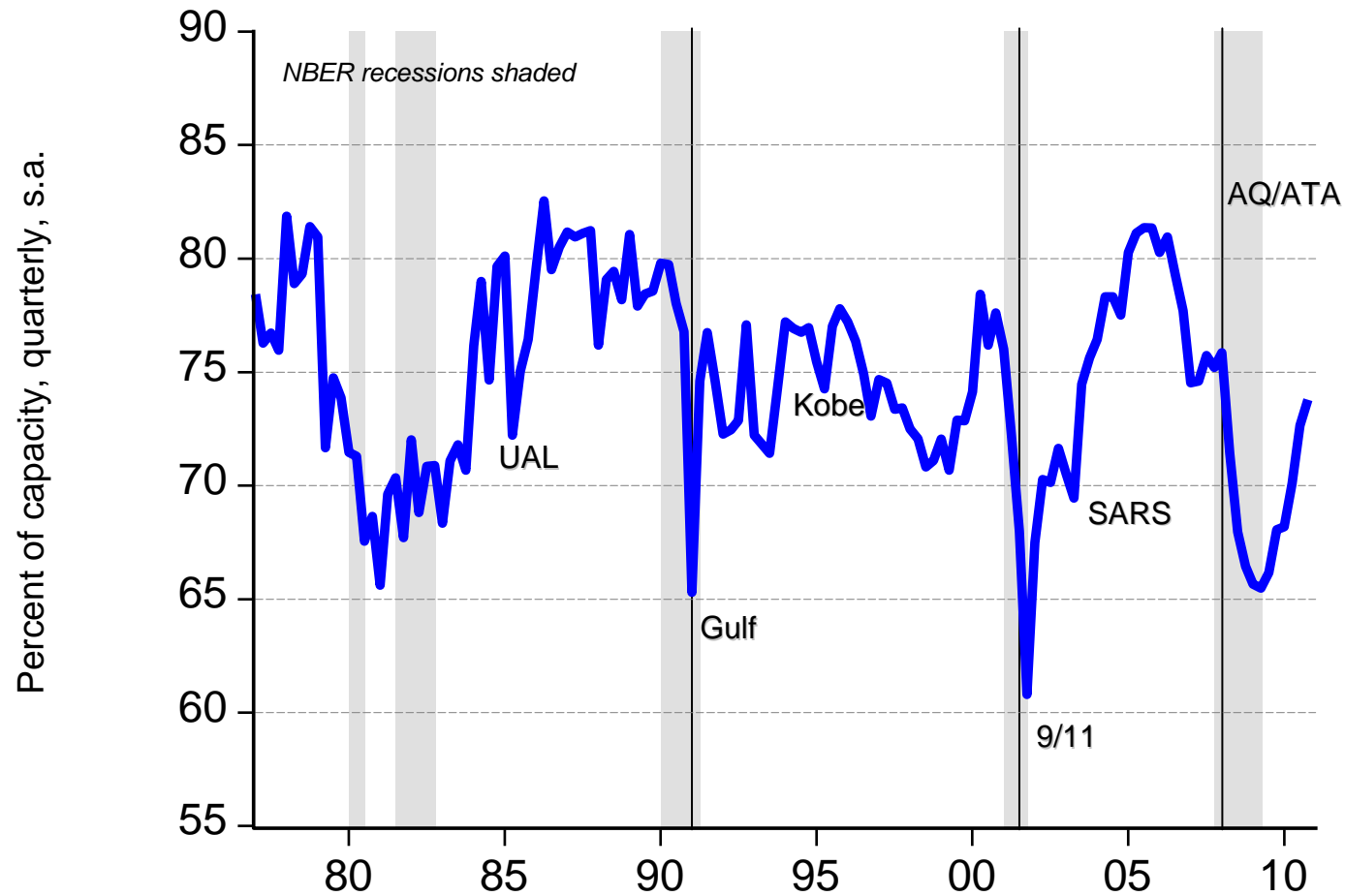
# Real ADR increases on trend, so recent drop helped to sustain travel demand



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Sources: Hospitality Advisors LLC, UHERO, BLS; deflation, seasonal-adjustment, graphic and log-trend estimation by TZE

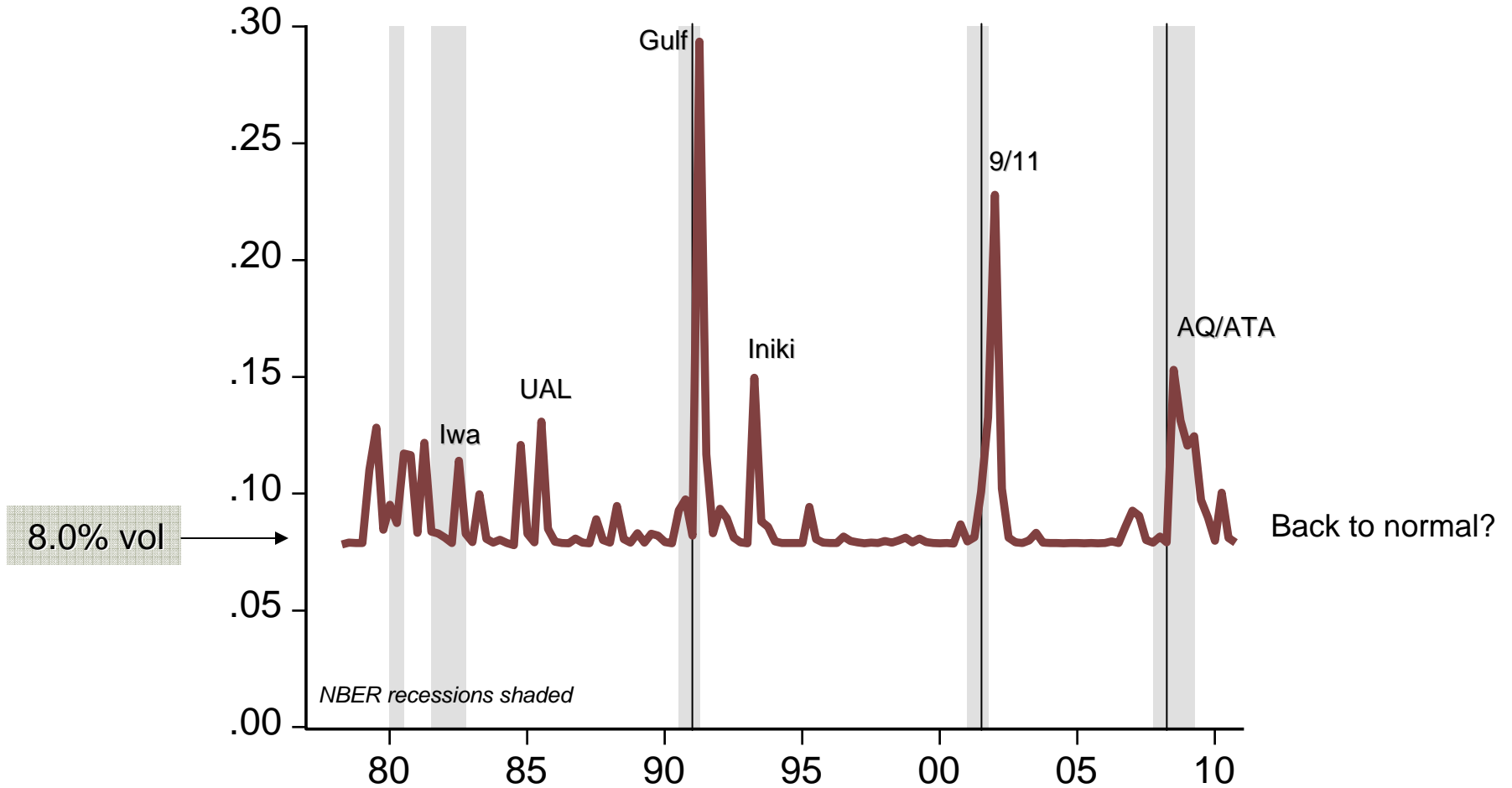
# Hotel occupancy is in seasonally-adjusted recovery



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Sources: Hospitality Advisors LLC, UHERO; seasonal-adjustment and graphic by TZE

# Conditional annualized volatility of seasonally-adjusted quarterly real revenue per available room



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Sources: Hospitality Advisors LLC, UHERO; REVPAR calculation and seasonal-adjustment, estimation of threshold autoregressive conditional heteroskedasticity volatility and graphic by TZE

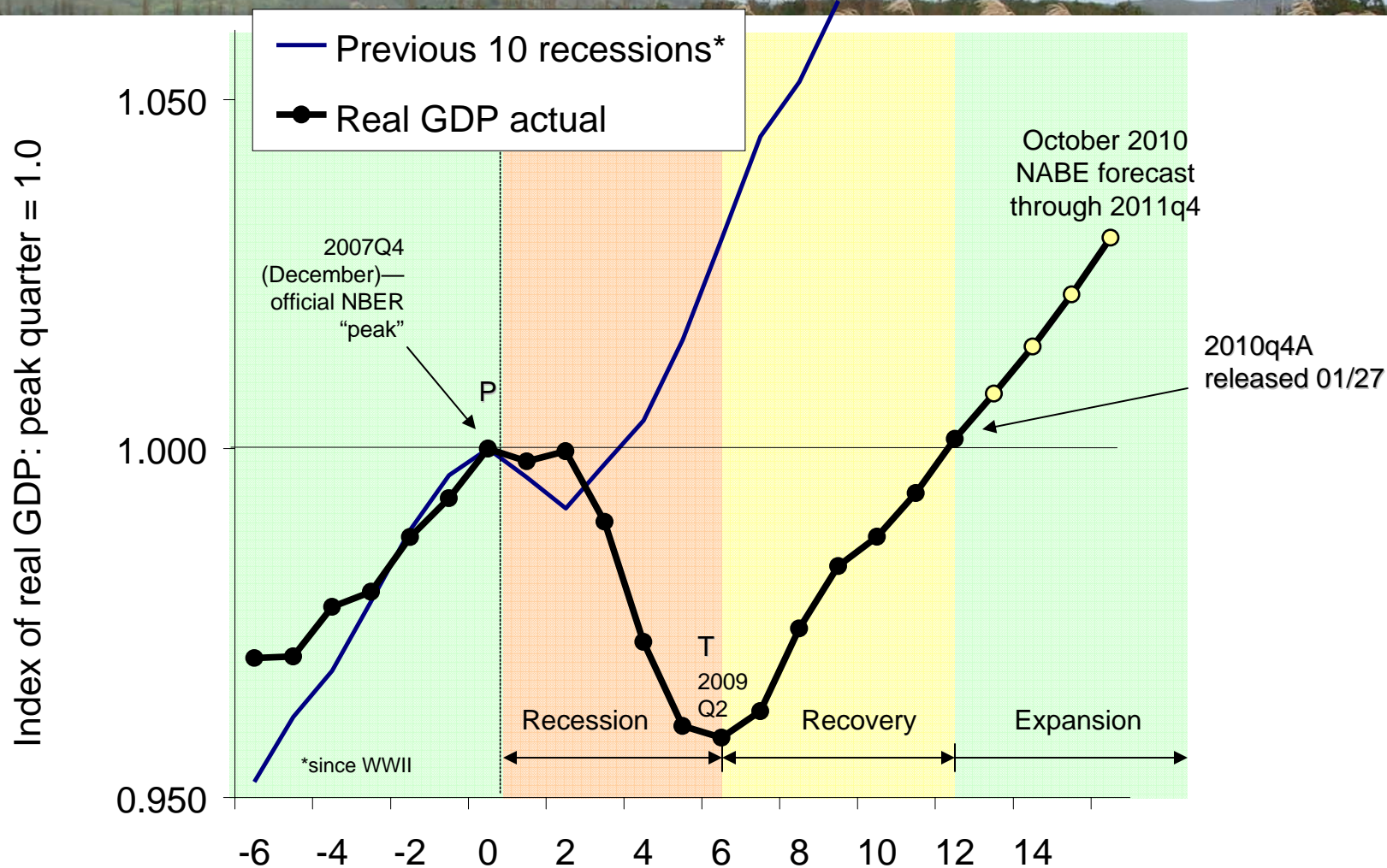


Pan



# Appendix 1: U.S. real GDP growth details

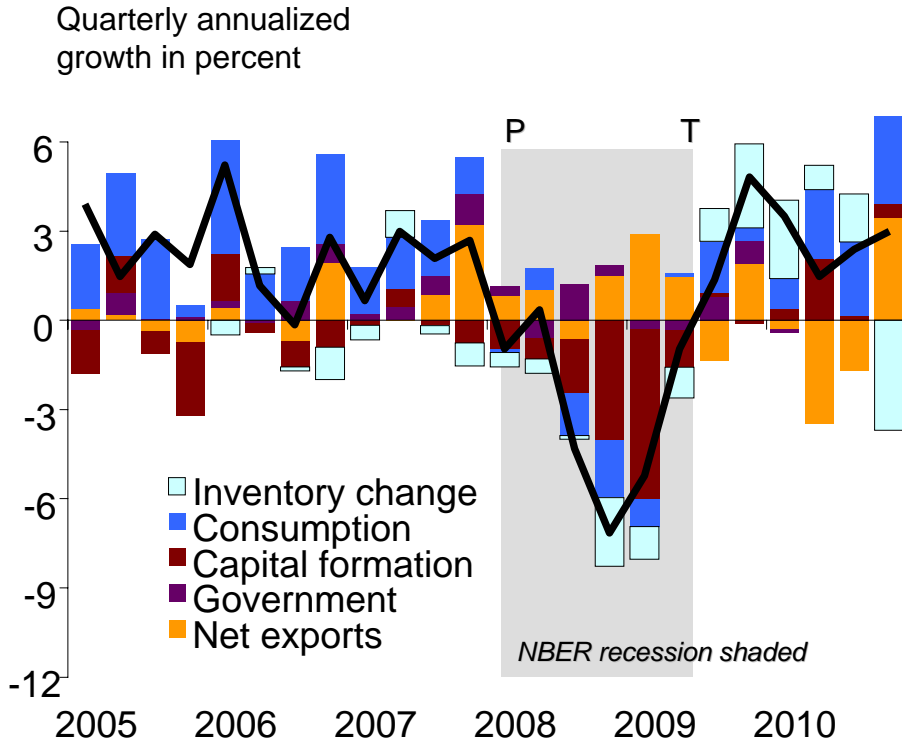
# Real activity (U.S. GDP) in *levels* (peak equals 1.0); including full-year 2010 data released in January 2011



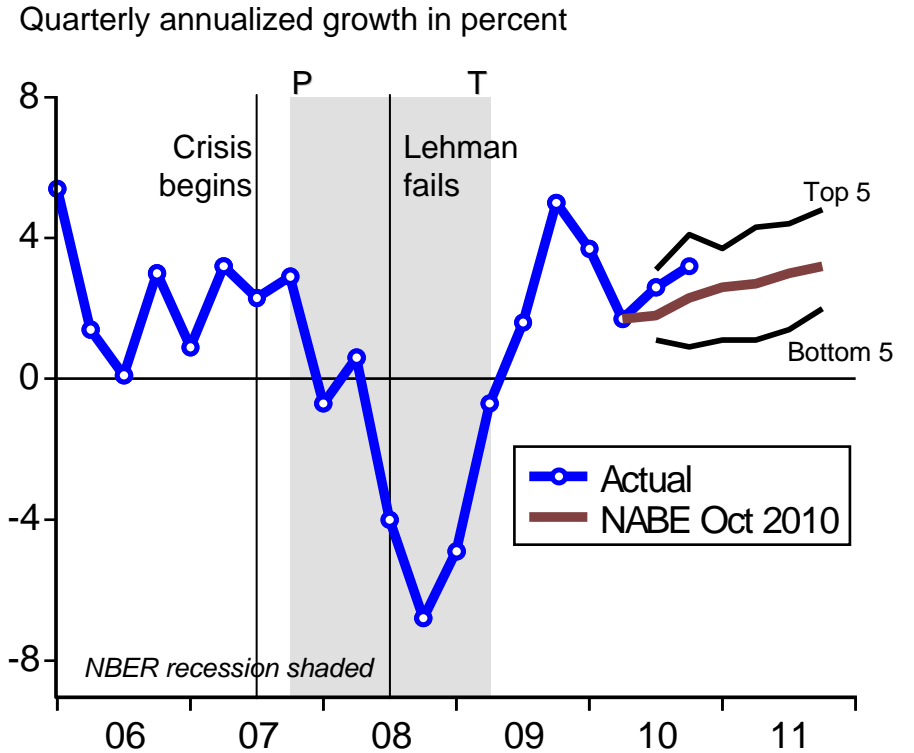
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Source: Professor Robert Hall, Stanford University and Chair, NBER Dating Committee; Bureau of Economic Analysis, U.S. Department of Commerce; includes 2010Q4A data and NABE forecast revisions through 2011Q4

# U.S. real GDP growth through 2010; 2011 forecast

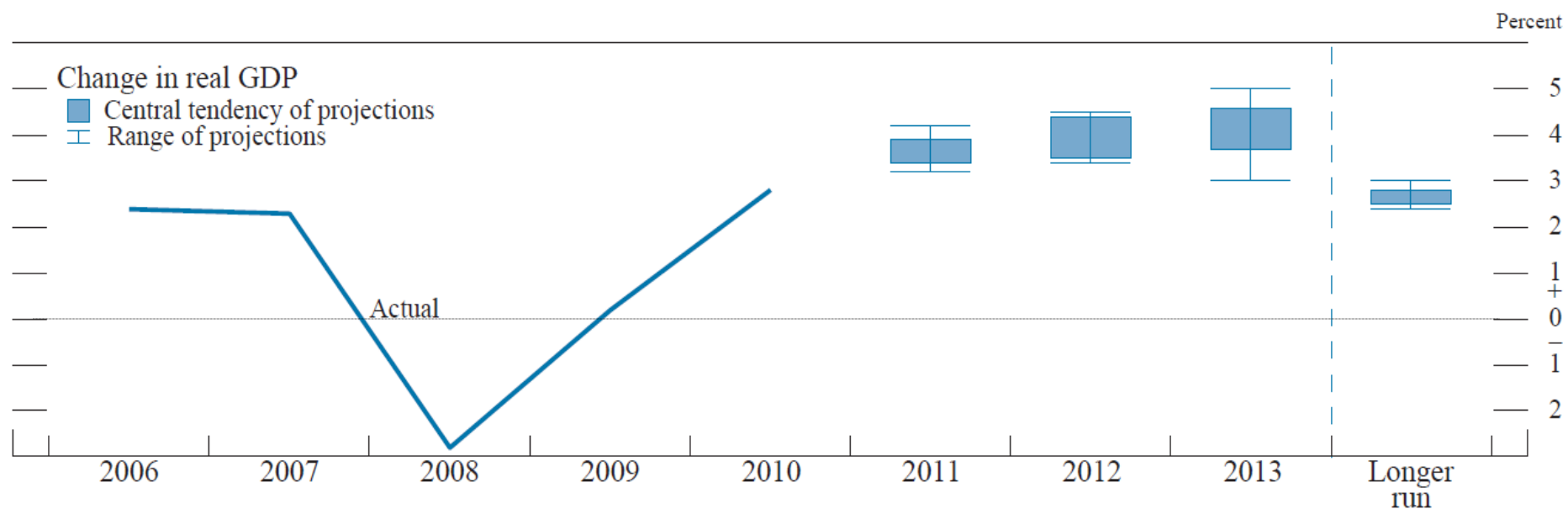


Contributions to real GDP growth



Real GDP growth forecast

# Federal Reserve real GDP forecasts from minutes of the January 2011 FOMC meeting



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Source: Federal Reserve Board minutes of the Federal Open Market Committee meeting January 25-26, 2011  
<http://www.federalreserve.gov/monetarypolicy/files/fomcminutes20110126.pdf>

# Policy-making can't get more transparent than that: forecasts of the Federal Reserve Board and system

Table 1. Economic projections of Federal Reserve Governors and Reserve Bank presidents, January 2011

Percent

Variable	Central tendency <sup>1</sup>				Range <sup>2</sup>			
	2011	2012	2013	Longer run	2011	2012	2013	Longer run
Change in real GDP. . . . .	3.4 to 3.9	3.5 to 4.4	3.7 to 4.6	2.5 to 2.8	3.2 to 4.2	3.4 to 4.5	3.0 to 5.0	2.4 to 3.0
November projection. . . . .	3.0 to 3.6	3.6 to 4.5	3.5 to 4.6	2.5 to 2.8	2.5 to 4.0	2.6 to 4.7	3.0 to 5.0	2.4 to 3.0
Unemployment rate. . . . .	8.8 to 9.0	7.6 to 8.1	6.8 to 7.2	5.0 to 6.0	8.4 to 9.0	7.2 to 8.4	6.0 to 7.9	5.0 to 6.2
November projection. . . . .	8.9 to 9.1	7.7 to 8.2	6.9 to 7.4	5.0 to 6.0	8.2 to 9.3	7.0 to 8.7	5.9 to 7.9	5.0 to 6.3
PCE inflation. . . . .	1.3 to 1.7	1.0 to 1.9	1.2 to 2.0	1.6 to 2.0	1.0 to 2.0	0.7 to 2.2	0.6 to 2.0	1.5 to 2.0
November projection. . . . .	1.1 to 1.7	1.1 to 1.8	1.2 to 2.0	1.6 to 2.0	0.9 to 2.2	0.6 to 2.2	0.4 to 2.0	1.5 to 2.0
Core PCE inflation <sup>3</sup> . . . . .	1.0 to 1.3	1.0 to 1.5	1.2 to 2.0		0.7 to 1.8	0.6 to 2.0	0.6 to 2.0	
November projection. . . . .	0.9 to 1.6	1.0 to 1.6	1.1 to 2.0		0.7 to 2.0	0.6 to 2.0	0.5 to 2.0	

NOTE: Projections of change in real gross domestic product (GDP) and in inflation are from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy. Projections for the unemployment rate are for the average civilian unemployment rate in the fourth quarter of the year indicated. Each participant's projections are based on his or her assessment of appropriate monetary policy. Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The November projections were made in conjunction with the meeting of the Federal Open Market Committee on November 2–3, 2010.

1. The central tendency excludes the three highest and three lowest projections for each variable in each year.
2. The range for a variable in a given year consists of all participants' projections, from lowest to highest, for that variable in that year.
3. Longer-run projections for core PCE inflation are not collected.



# Duration of the Great Recession: long(-ish)

Duration of U.S. (NBER) economic contractions  
months from NBER peaks to troughs

<i>months, or as noted</i>	Mean	Median	Max	s.d./mean (%)	skew	n
1857-1927	20.5	18	65	73.5	2.163	19
1928-1982	13.8	11	43	92.5	2.373	11
1983-2010	11.3	8	18 <sup>*</sup>	72.2	0.707	3

*\*Great Recession*                      18                      (2008-2009)

\* The National Bureau of Economic Research dates the last U.S. business cycle as having reached a peak in economic activity in December 2007 and a trough in June 2009. The previous trough was November 2011. The previous peak was March 2001.

# Duration of economic expansions: lengthening

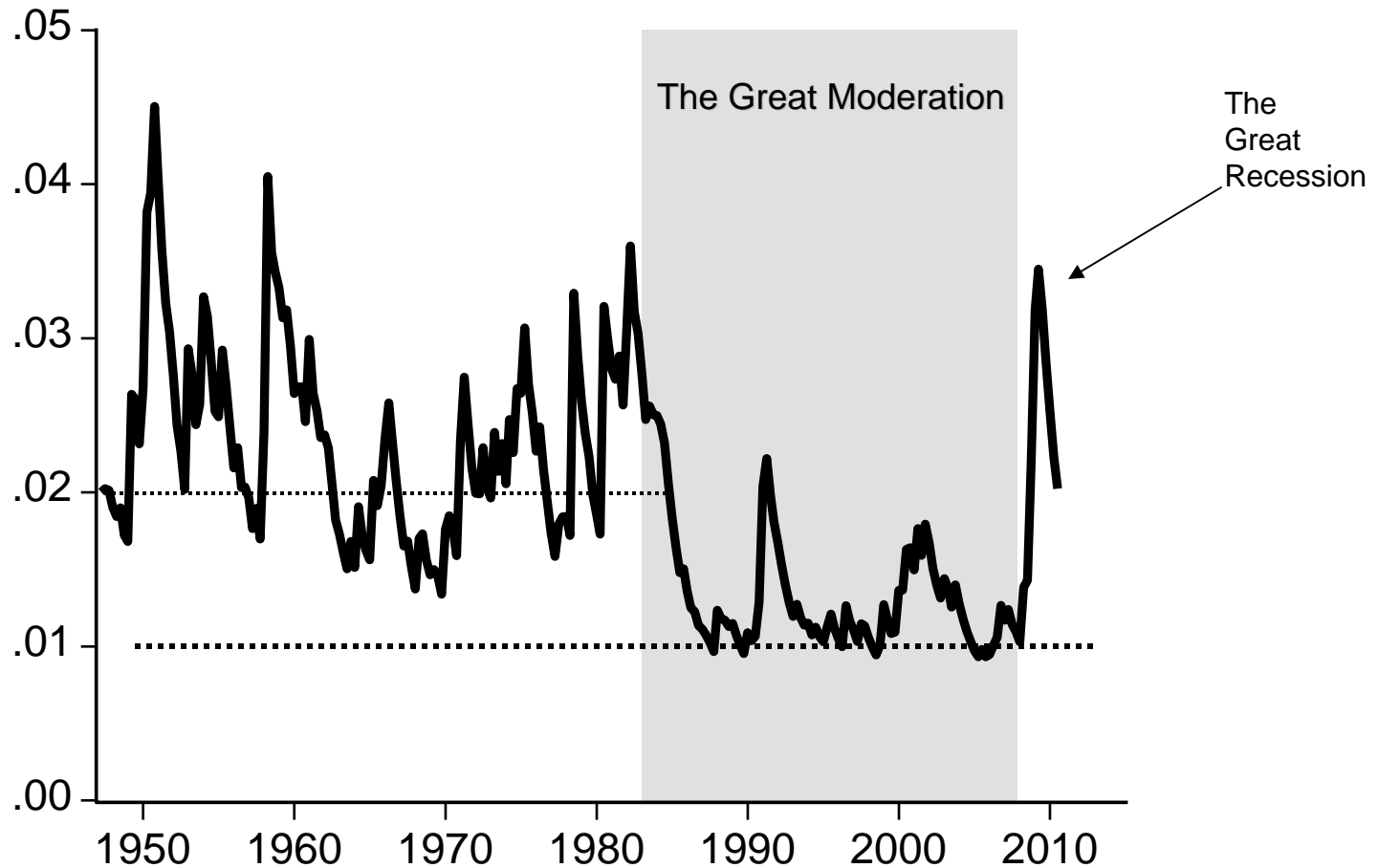
Duration of economic recoveries + expansions  
from NBER troughs to peaks

<i>months, or as noted</i>	Mean	Median	Max	s.d./mean (%)	skew	n
1857-1927	25.5	22.0	46	86.2	0.589	19
1928-1982	46.2	39.0	106	84.4	0.964	11
1983-2010	95.0	92.0	120	96.8	0.229	3

*20-teens expansion*

*(2010-2018)*

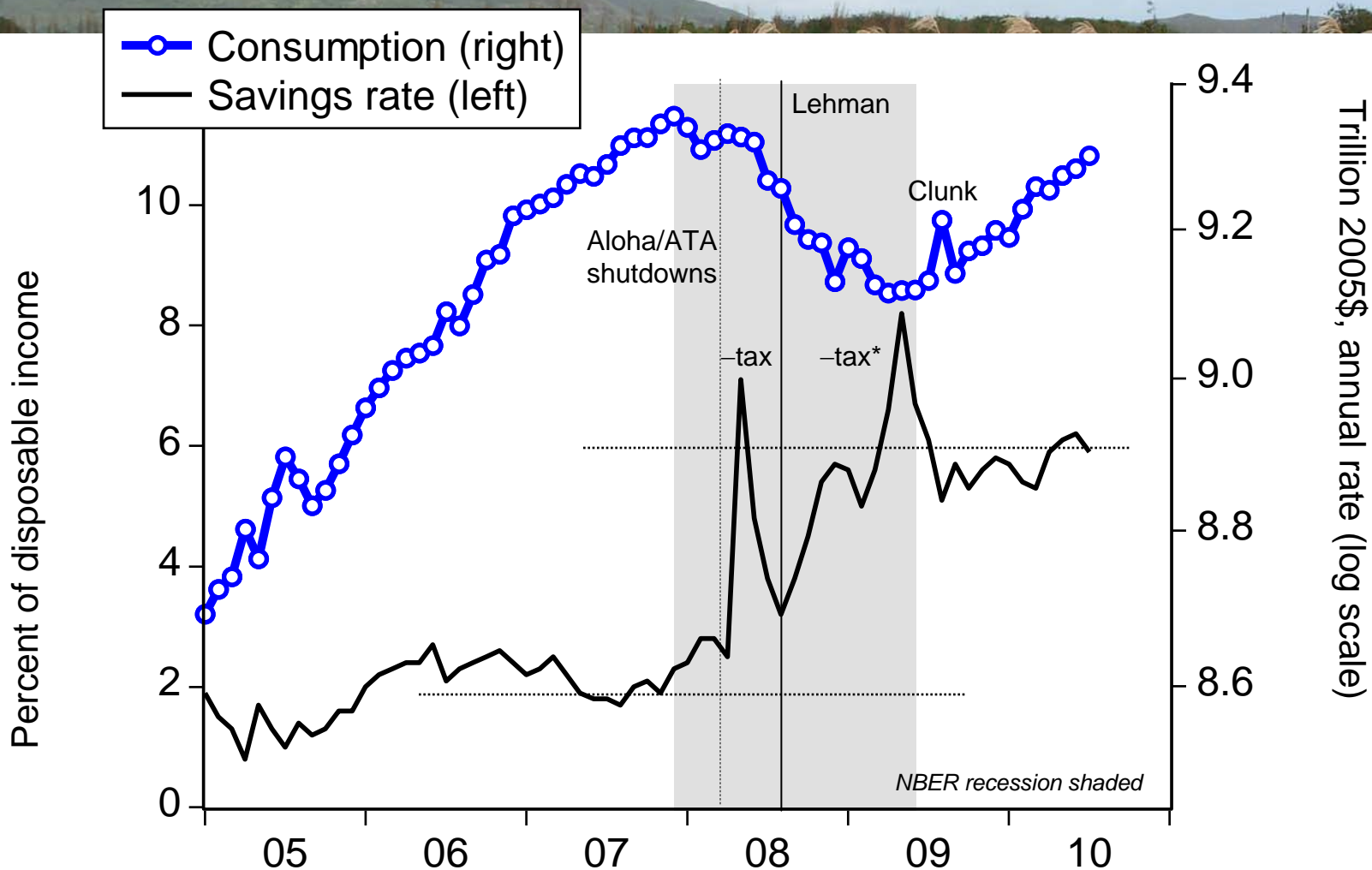
# Conditional annualized volatility of U.S. real GDP



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Source: Bureau of Economic Analysis, U.S. Department of Commerce, <http://www.bea.gov/national/index.htm#gdp>; GARCH(1,1) annualized standard deviation calculations by TZE

# Recession started *before* consumption tanked (post-Lehman): “recession” was a rise in saving



\*“-tax” reflect Bush one-time tax rebate (spring 2008) and tax cut component (roughly one-third) of Obama ARRA (February 2009)

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# The FOMC characterization (January 26, 2011)

- Economic recovery continuing but progress “disappointingly slow”
- Growth in consumer spending constrained by:
  - *High unemployment*  
(U.S. 9.0%; HI 6.4%)
  - *Modest income growth*  
(U.S. 2010Q4: 3.2%)
  - *Lower housing wealth*  
(except on Oahu)
  - *Tight credit* (no duh)
- Nonresidential investment is still weak
- Housing sector continues to be depressed

## FEDERAL RESERVE press release



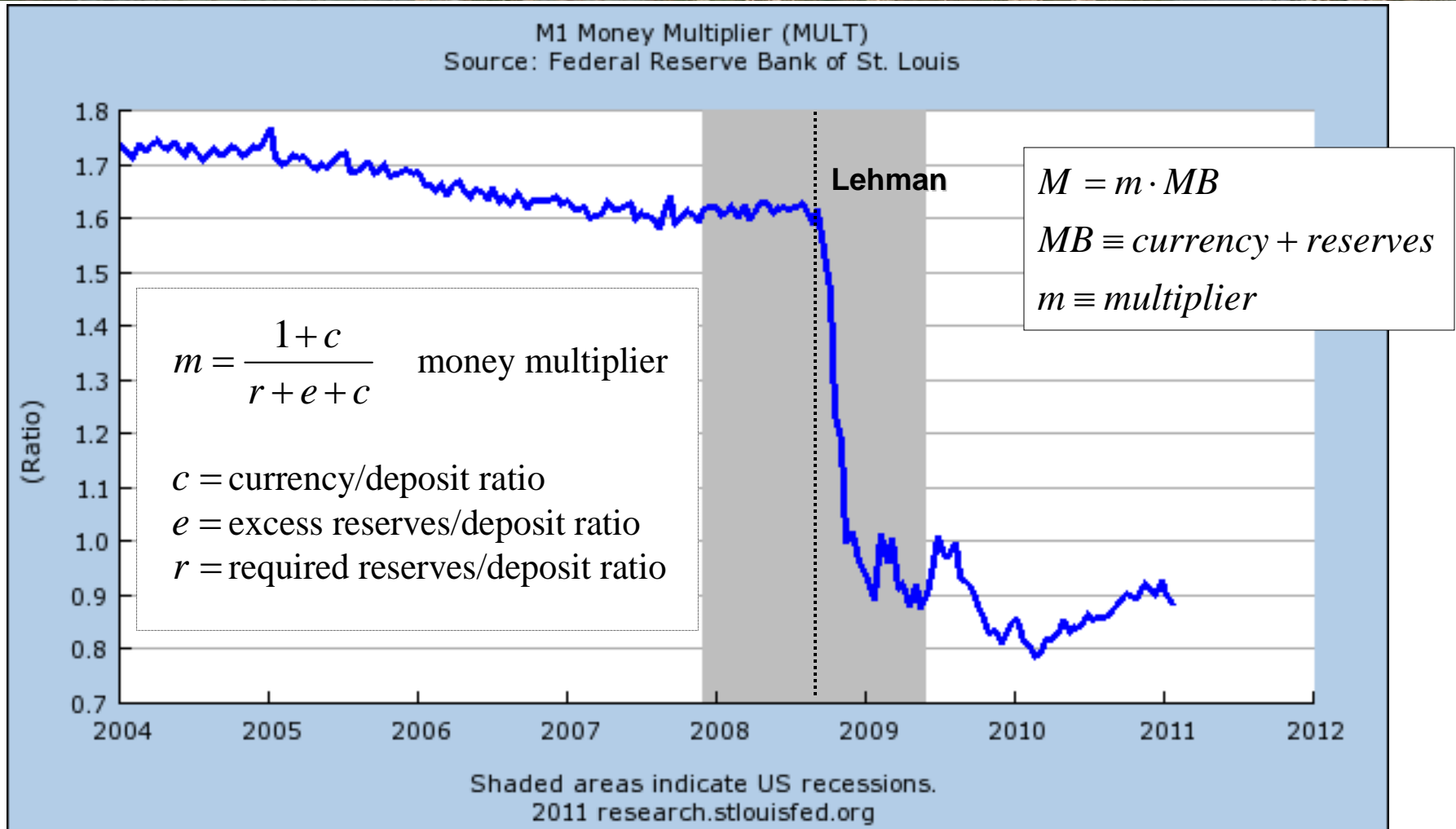
*Release Date: January 26, 2011*

### **For immediate release**

Information received since the Federal Open Market Committee met in December confirms that the economic recovery is continuing, though at a rate that has been insufficient to bring about a significant improvement in labor market conditions. Growth in household spending picked up late last year, but remains constrained by high unemployment, modest income growth, lower housing wealth, and tight credit. Business spending on equipment and software is rising, while investment in nonresidential structures is still weak. Employers remain reluctant to add to payrolls. The housing sector continues to be depressed. Although commodity prices have risen, longer-term inflation expectations have remained stable, and measures of underlying inflation have been trending downward.

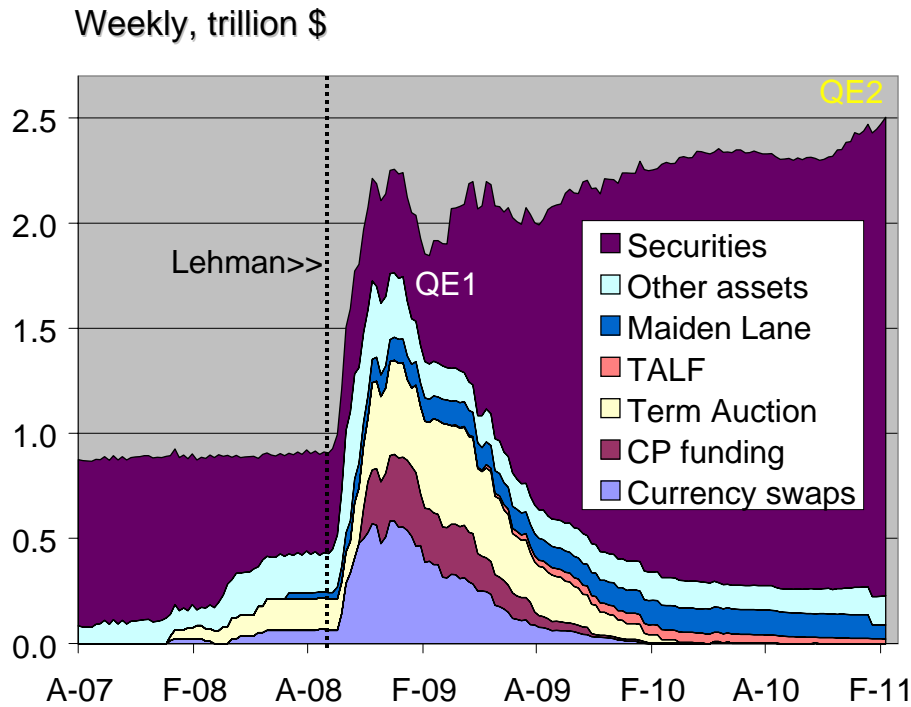
Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. Currently, the unemployment rate is elevated, and measures of underlying inflation are somewhat low, relative to levels that the Committee judges to be consistent, over the longer run, with its dual mandate. Although the Committee anticipates a gradual return to higher levels of resource utilization in a context of price stability, progress toward its objectives has been disappointingly slow.

# Problem: Lehman Brothers' collapse caused a collapse of the M1 money multiplier ( $m$ ) (bi-weekly data)

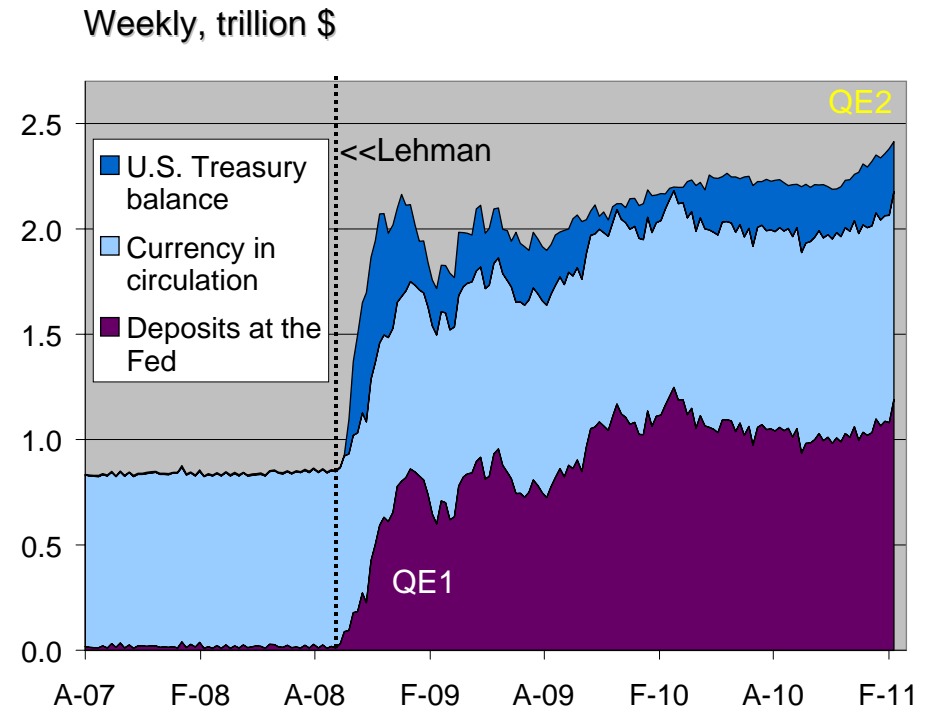


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# Quantitative easing: increase in monetary base— assets and liabilities on the Fed's balance sheet



Federal Reserve Assets

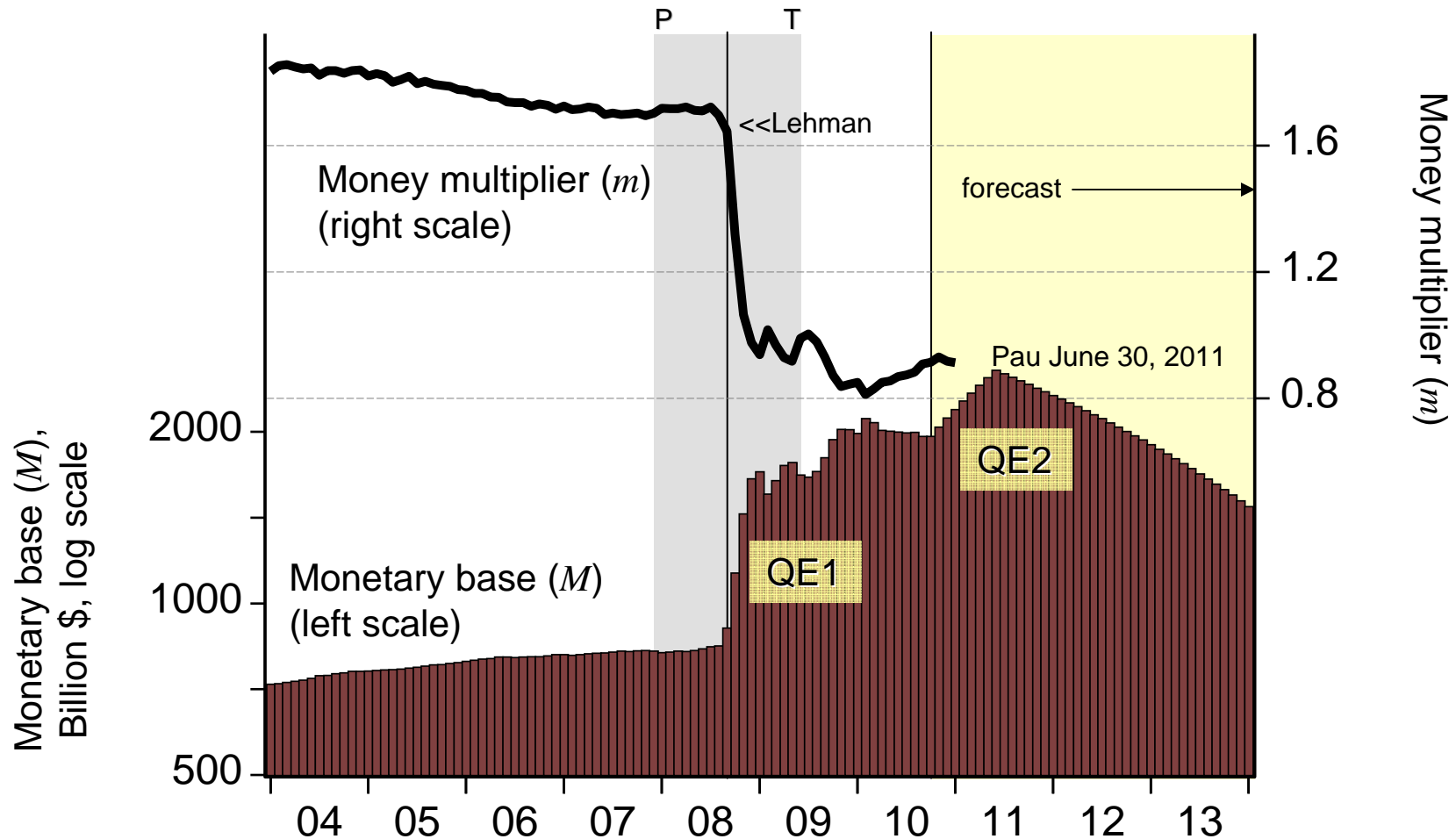


Federal Reserve Liabilities

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Sources: Federal Reserve Board ([http://www.federalreserve.gov/monetarypolicy/bst\\_recenttrends.htm](http://www.federalreserve.gov/monetarypolicy/bst_recenttrends.htm)), balance sheet data through week of February 9, 2011; calculations by TZE

# QE1: money multiplier ( $m$ ) decrease requires a monetary base ( $MB$ ) increase; QE2: light up the afterburner



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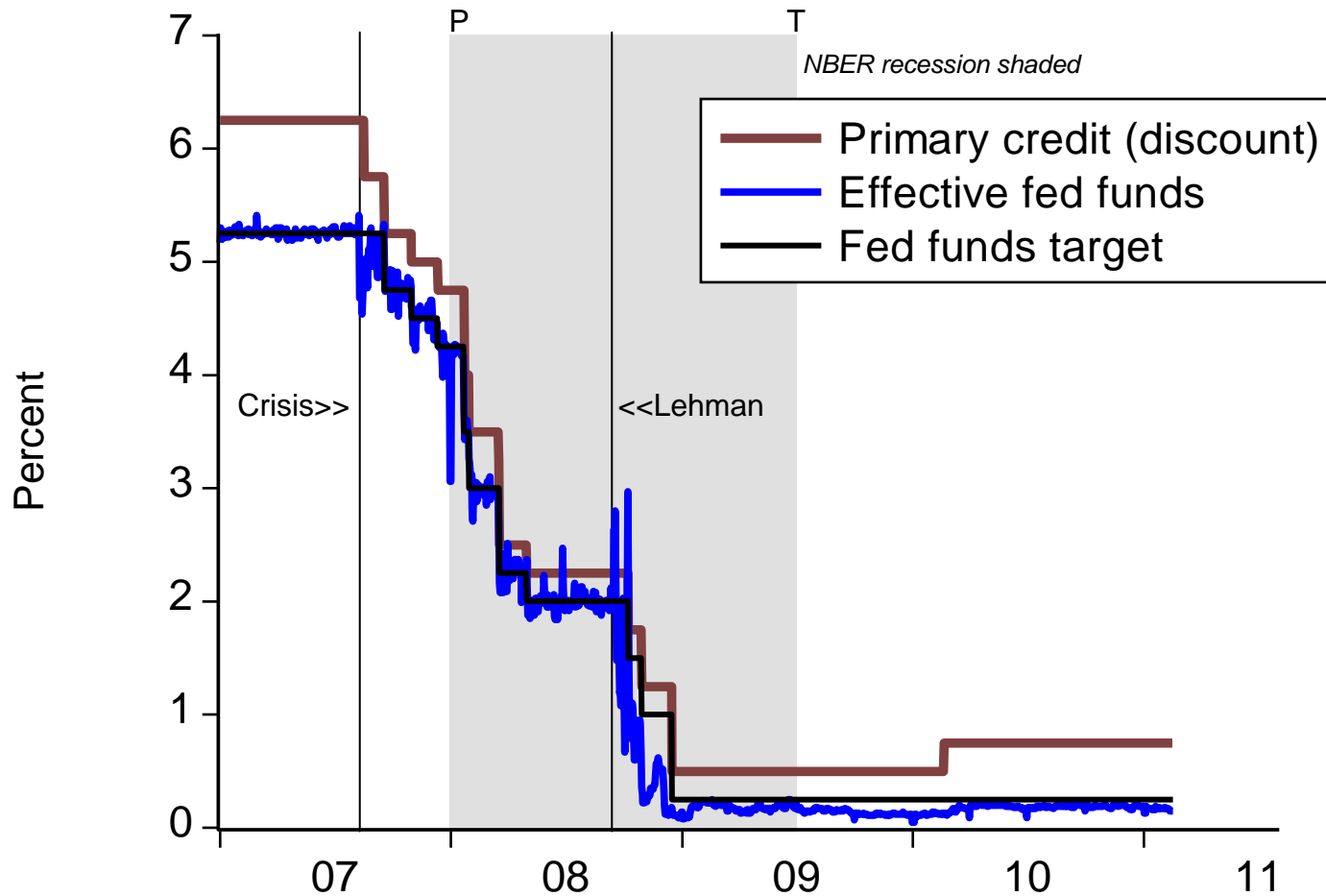
Source: Federal Reserve Bank of St. Louis (<http://research.stlouisfed.org/fred2/series/MULT?cid=25>)



# Challenge now: unwind monetary policy interventions

- At the zero bound, *another* form of monetary policy stimulus required
- Quantitative easing offset catastrophic drop in the money multiplier  
[*Great Depression lesson: “don’t do what we did” when banks fail*]
- Credit crunch as banks continue to hold \$1 trillion in *excess reserves*
- Now, restore credit—raise money multiplier: drain off excess reserves
- Long-term interest rates front-running return to normalcy (circa 4.5%)

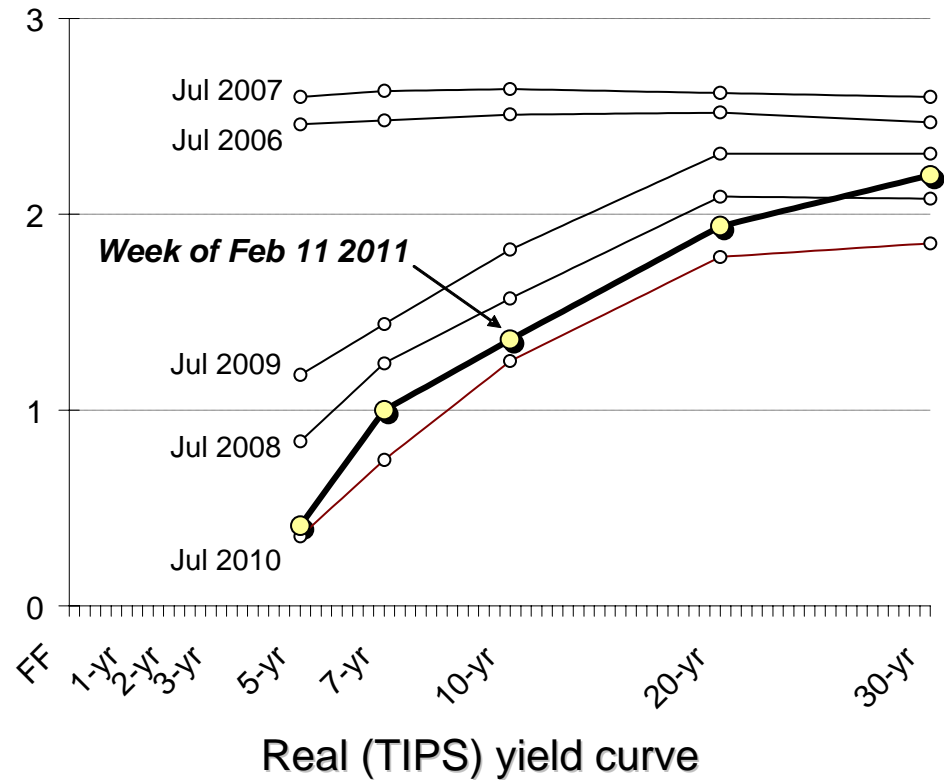
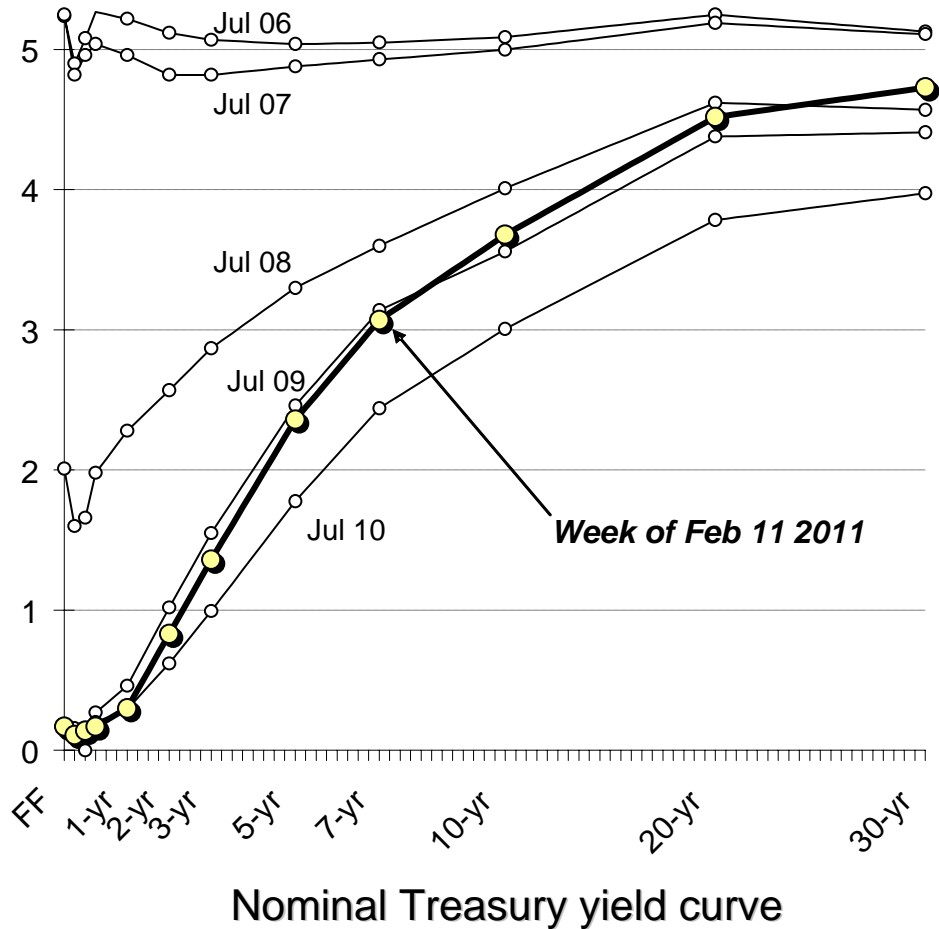
# Monetary policy rates: out of ammo at the zero bound



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Sources: Daily through February 16, 2011, Federal Reserve Board; TZ Economics

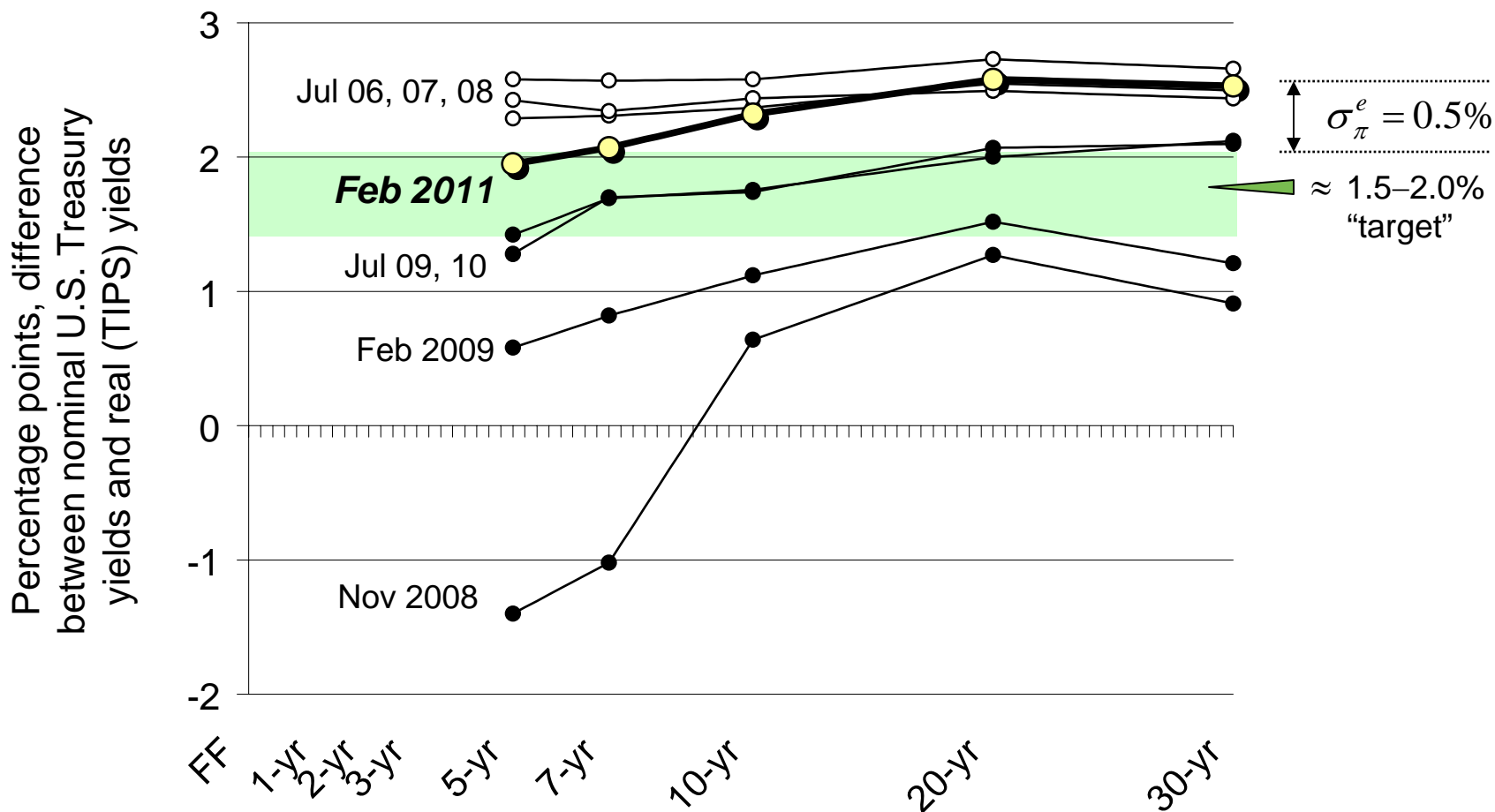
# Nominal and real U.S. Treasury yields now are responding to *anticipation* of Fed “exit strategy”



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Source: Federal Reserve Board (H.15 constant maturity yields); calculations by TZE through February 11, 2011

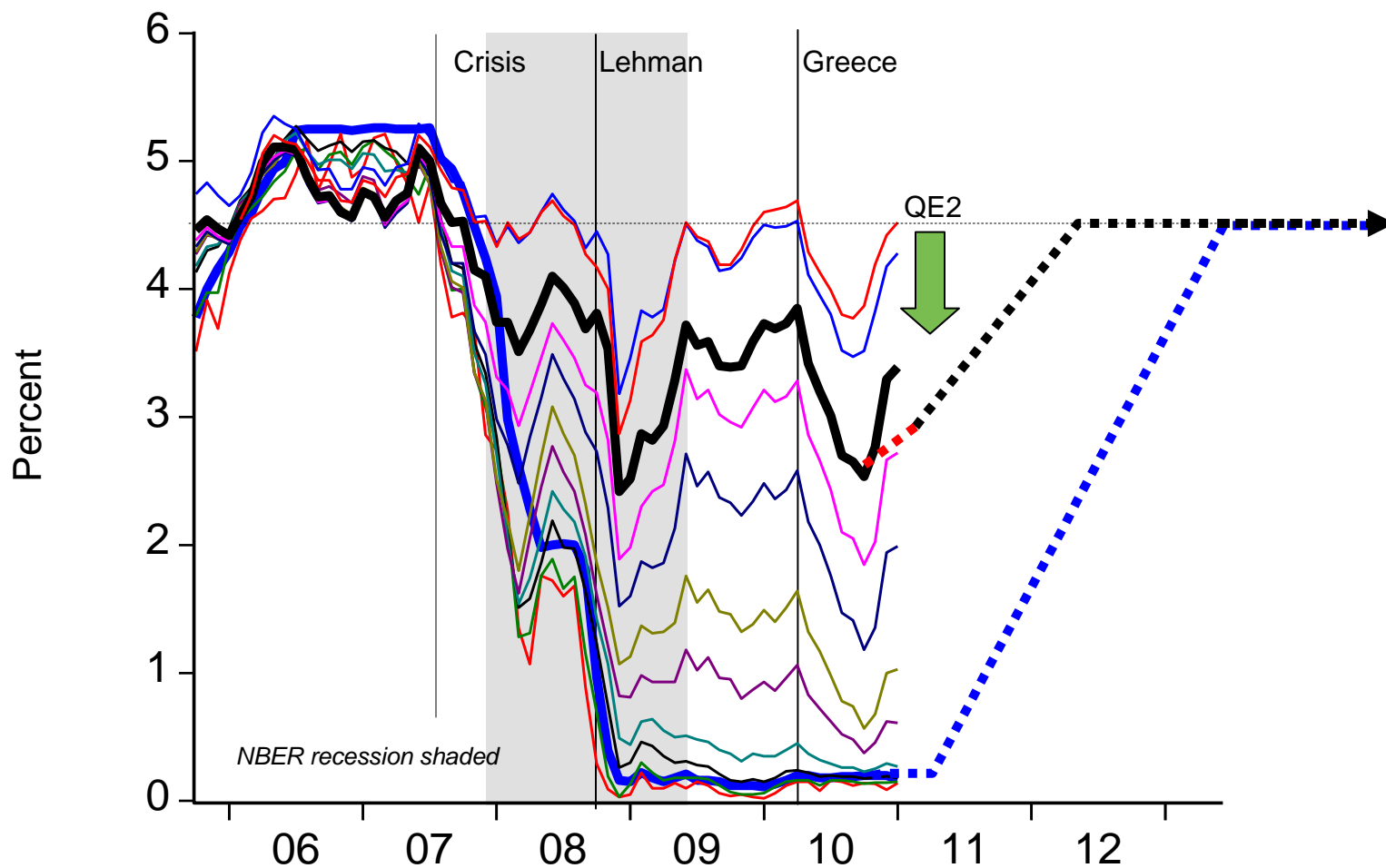
# Outcome: implied LR inflation expectations rising (possibly just the unobserved inflation risk premium)



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Source: Federal Reserve Board (H.15 constant maturity yields); calculations by TZE through February 11, 2011

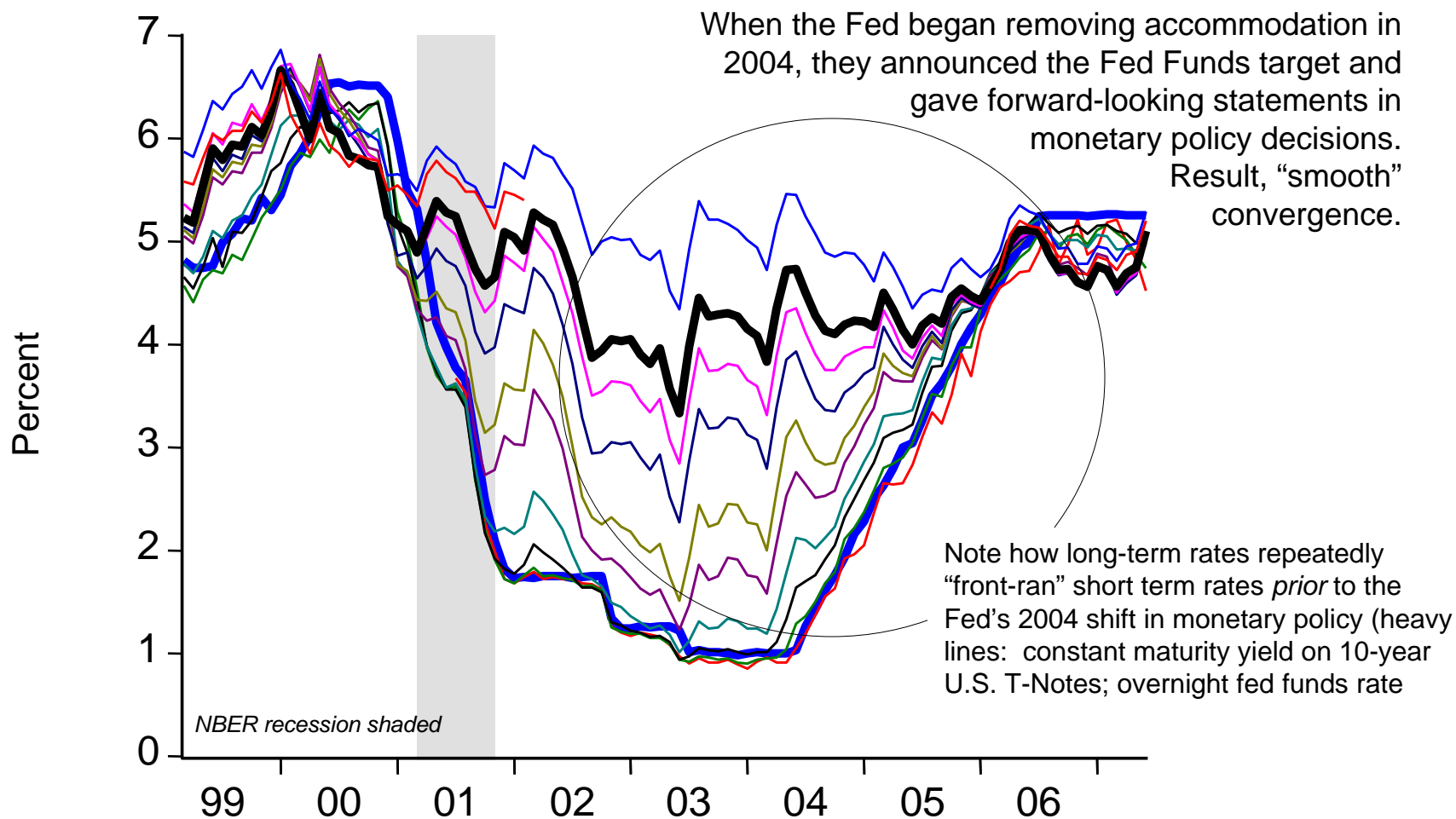
# Forecast yield trajectories: knowing that QE2 ends in June 2011 limits its downward force on long rates



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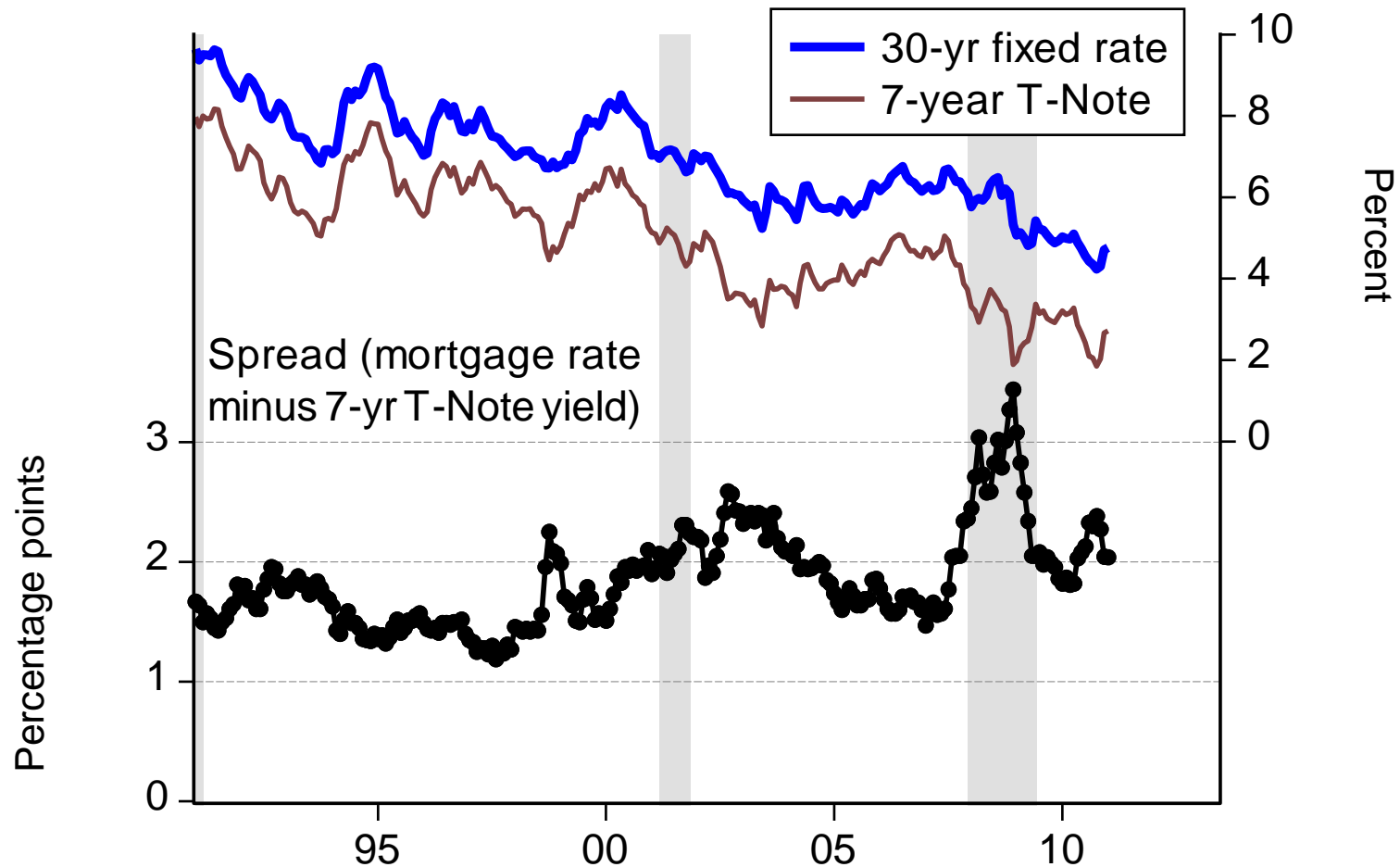
Sources: Federal Reserve Board (<http://www.federalreserve.gov/newsevents/press/monetary/20100810a.htm>), Federal Reserve Bank of St. Louis; TZ Economics

# Dot.com recession ended (2001.11), “transparent” removal of accommodation began (2004.06), result: convergence



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# Mortgage rates, risk-free yield and spreads: the New Normal (4.5% 7-yr T-Note, 5.25% FRM)



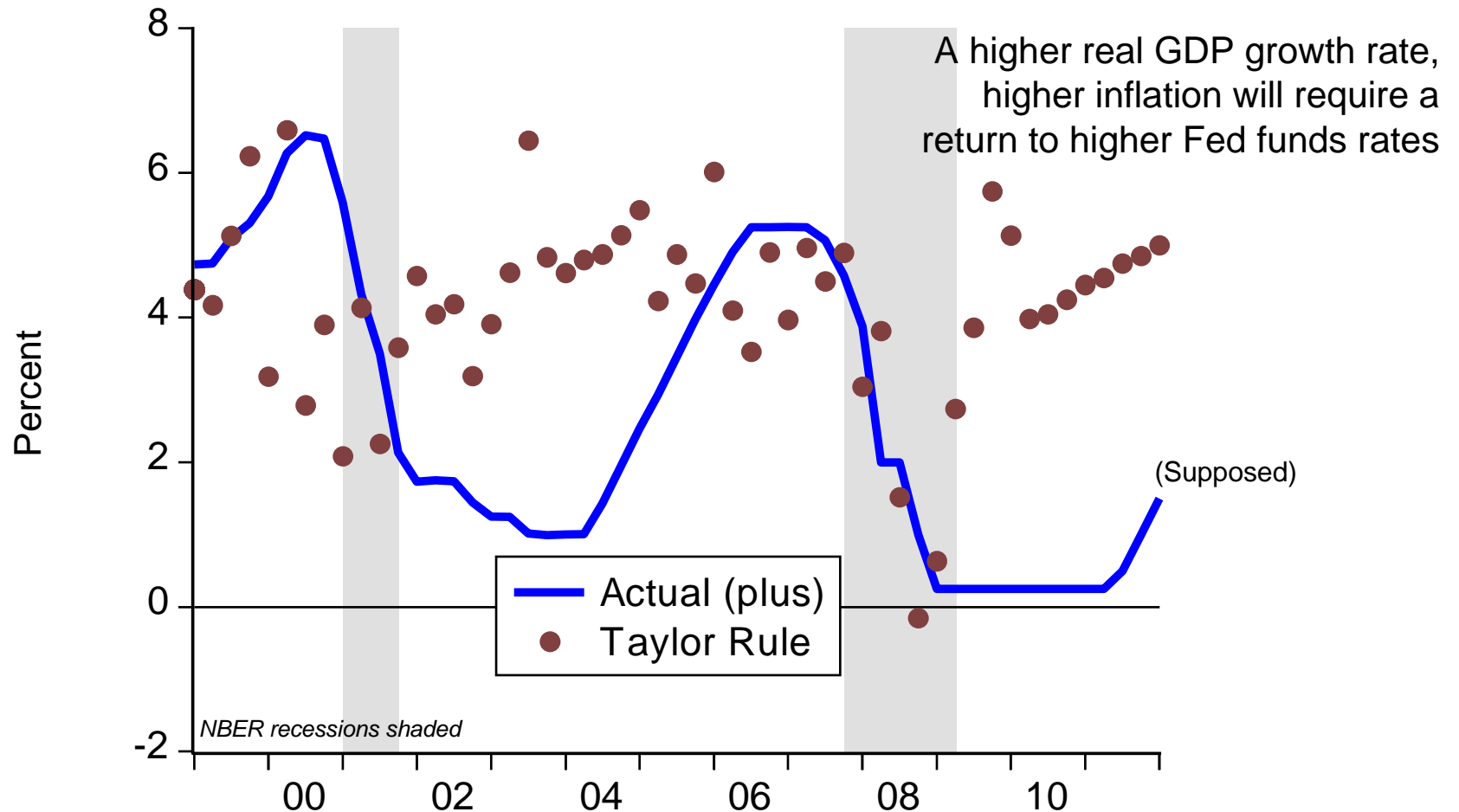
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Sources: Federal Reserve Board, Federal Reserve Bank of St. Louis; calculation by TZ Economics

Target Fed Funds as  $f$  [inflation gap, output (growth) gap]:  
 $r^* = [4.5 + (0.5)(p - p^*) + (0.5)(y - y^*)]$  (naïve version of rule)

- $r$  = Fed Funds rate
- $p$  = increase in the core PCE deflator [ $p^* = 1.7$  (target)]
- $y$  = real GDP growth rate [ $y^* = \text{potential GDP growth}$ ]

## Applying naive Taylor Rule





## New monetary policy dilemma: chasing bubbles?

- 2007-08 crisis: contagion amplified asset price declines, overshooting; generated a “fire-sale” externality aggravated by lack of liquidity
- Large, interdependent, systemically-important institutions translate idiosyncratic into economy-wide risk: requires “macroprudential supervision”
- Now: tendency towards Taylor rule violation—return to monetary neutrality during economic expansion comes too little, too late
- Monetary policy cannot deflate a specific asset pricing bubbles (e.g. commodities), attempt risks “false positives”—like Samuelson’s aphorism: “stock market predicted 9 of the last 5 recessions”



## Asset price overshooting (to the down side)

- 1980s version: Rudiger Dornbush “exchange rate overshooting:”

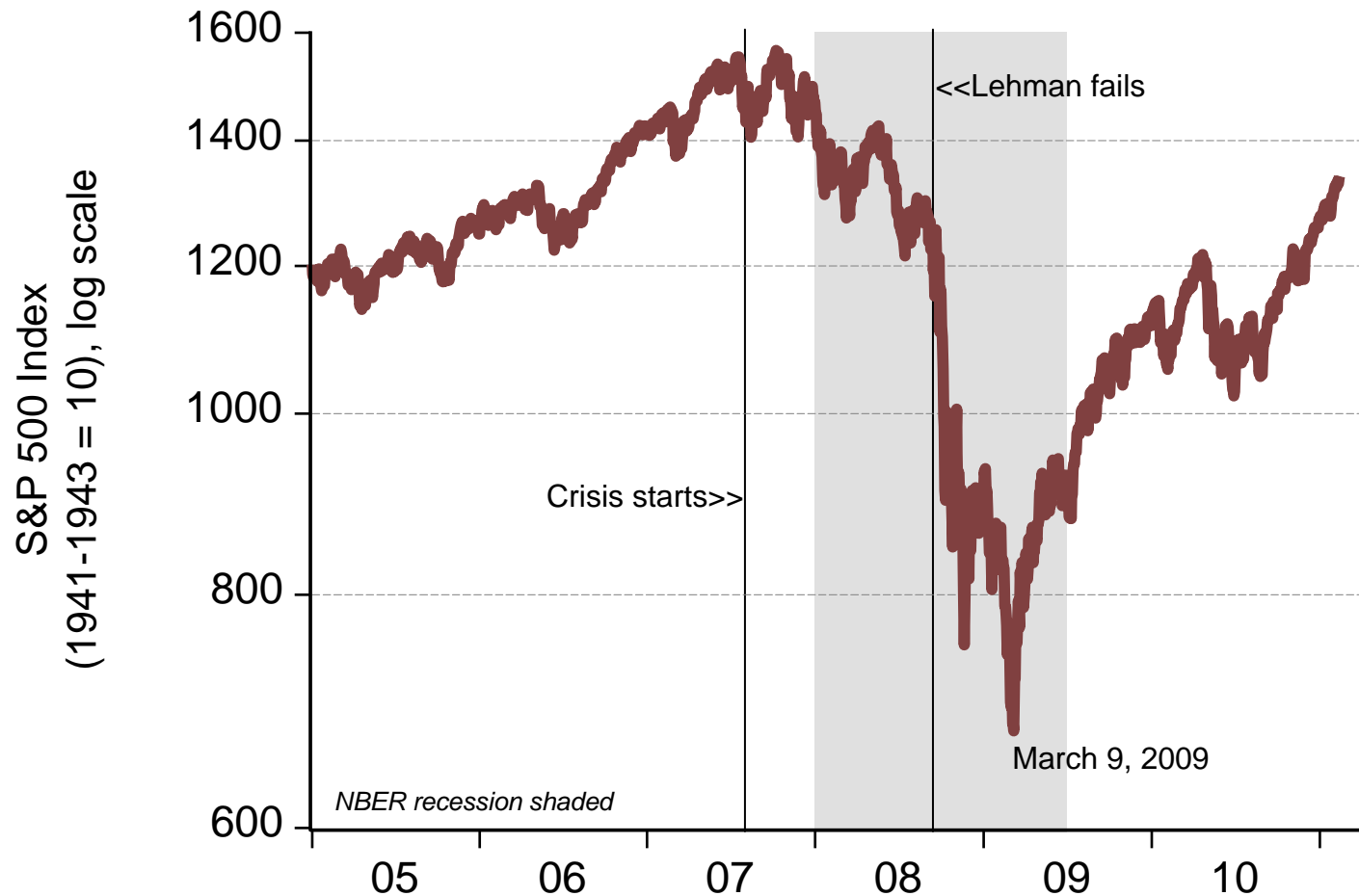
Currency instantaneously must depreciate *beyond* new long-run equilibrium to reward investors with higher expected return from subsequent appreciation

- 2000s version: Darrell Duffie “slow-moving capital:”

*“At any point in time, asset [price] shocks must be absorbed on short notice by a limited set of investors. The risk aversion or limited capital of the currently available investors leads them to require a price concession to absorb the...shock. They plan to ‘lay off’ the associated risk over time as other investors become available. As a result the initial price impact is followed by a price reversal.”*

⇒ Investors “rationally inattentive”

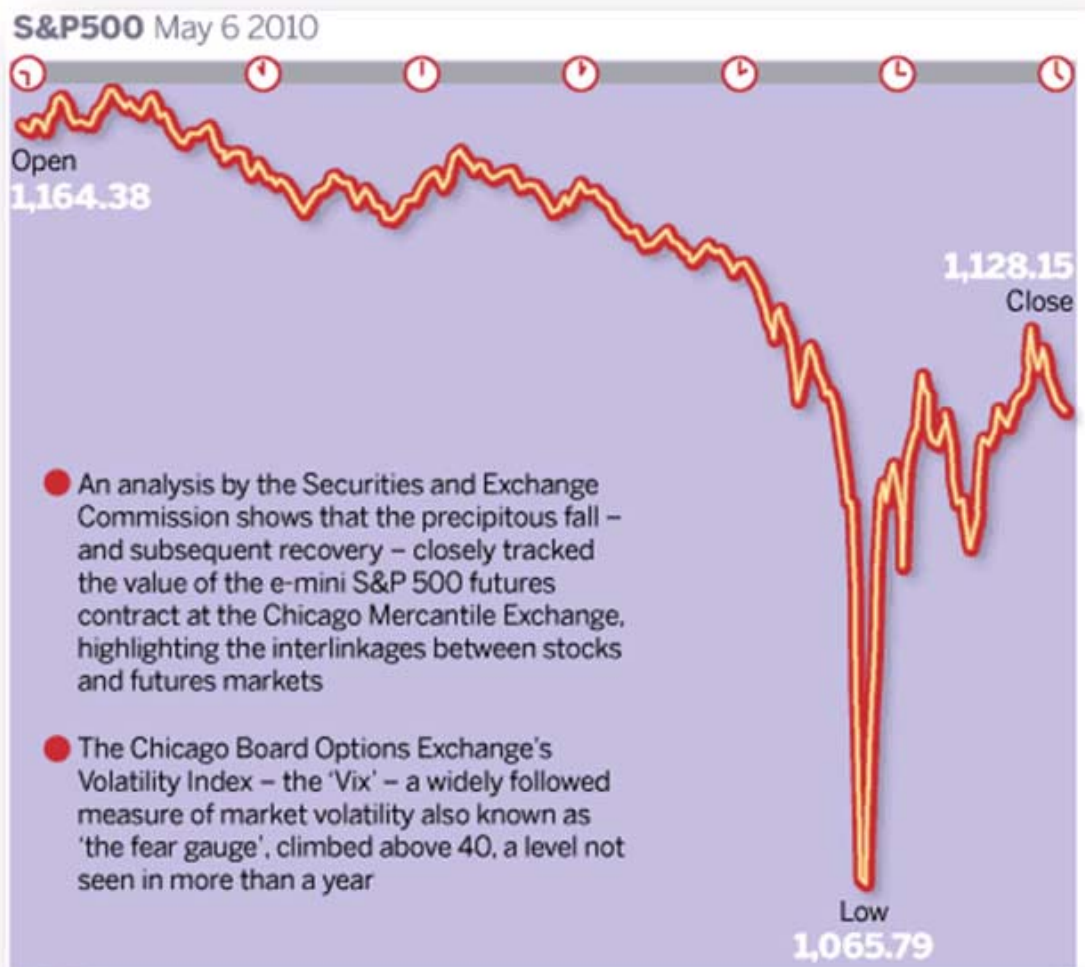
# Daily S&P 500 stock price index through Feb 17, 2011: slow and volatile recovery has accelerated



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Source: Standard & Poor's, eTrade; TZE

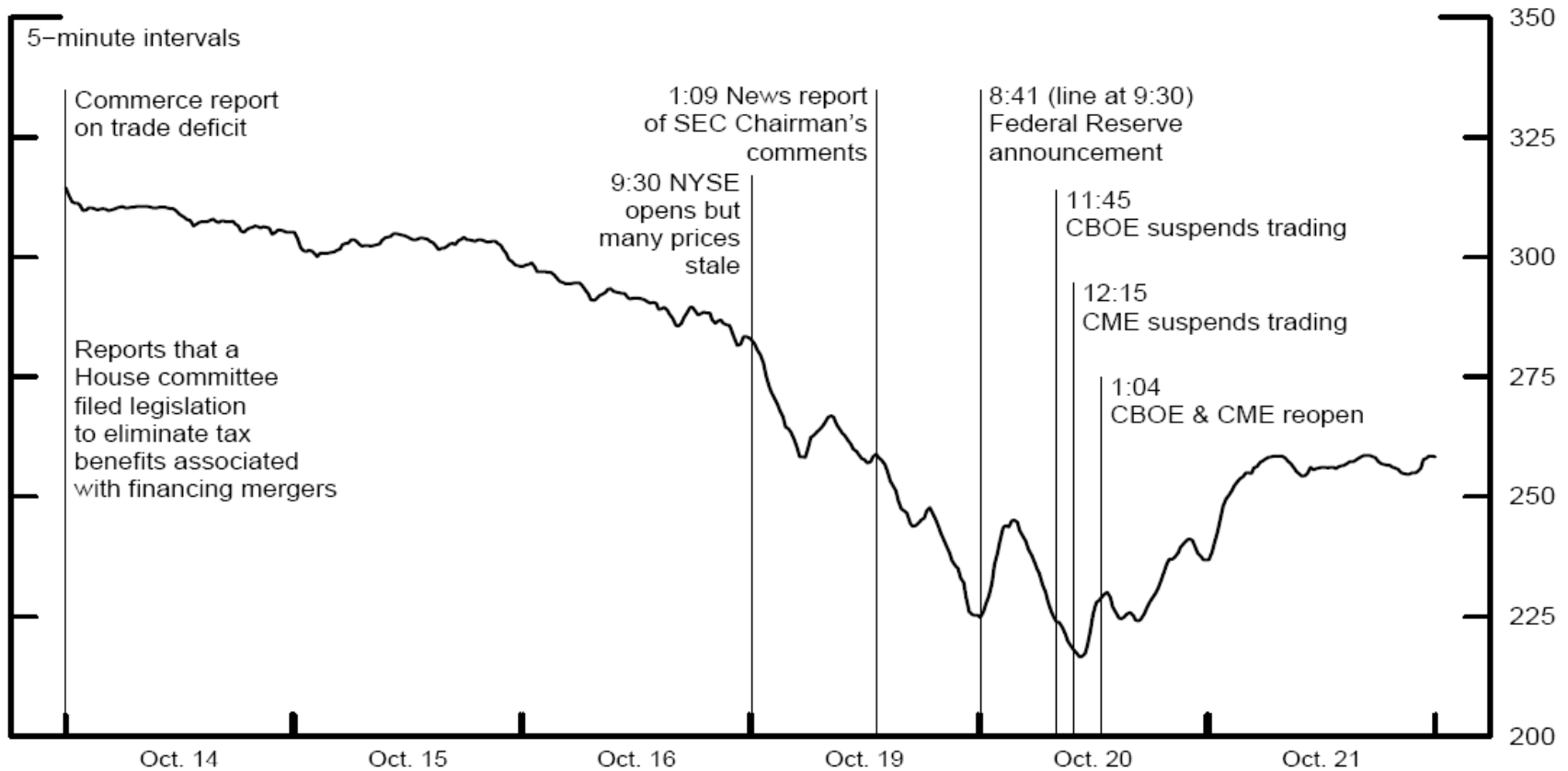
# Intra-day S&P 500 May 6, 2010 “Flash Crash”



↑  
↓  
-8.5%

# October 1987 stock market crash—six trading days

S&P 500 index around the time of the crash



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Source: [http://upload.wikimedia.org/wikipedia/en/d/de/S%26P\\_500\\_index\\_around\\_the\\_time\\_of\\_the\\_crash.png](http://upload.wikimedia.org/wikipedia/en/d/de/S%26P_500_index_around_the_time_of_the_crash.png)

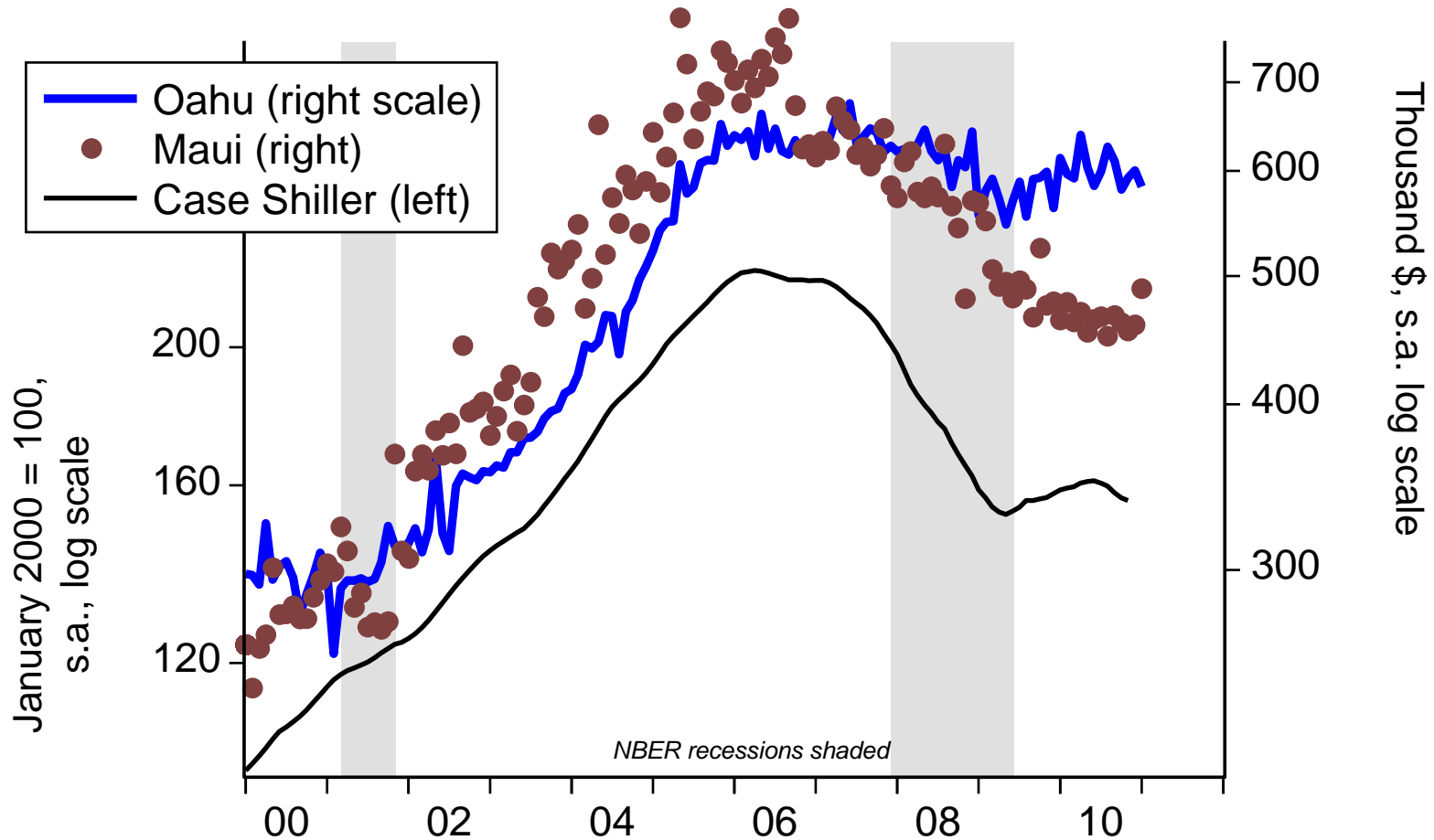
# Crude petroleum prices (monthly, through Jan 2011)



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Source: Federal Reserve Bank of St Louis, U.S. Department of Energy

# Median single-family home prices, Oahu and Maui, and S&P Case Shiller home price indexes



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Source: Honolulu Board of Realtors, Maui Realtors Association, Standard and Poor's




## Macroeconomic outlook

- U.S. real GDP growth rate likely to average around  $\geq 3\%$ , no inflation
- Fears of backsliding *misplaced*—remember last year:
  - “double-dip?” (pffff)
  - “Greece is the word?” (FAIL)
- What *is* the New Normal for the term structure of interest rates?
- QE2 slated to end in June 2011—what comes next?
- Taylor Rule says “don’t wait too long to raise the overnight rate target”
- Asset price overshooting is the *norm*, not the exception
- Event risk has probability 1, with stochastic intensity arrival times—  
*translation*: you know “it” is going to happen, you just don’t know what, when or how hard (the next hurricane, tsunami, terror attack, pandemic; deal with it)



**Appendix 2: background on quantitative easing  
QE0 (1930s FAIL), QE1 (2008Q4) and QE2 (2010Q4)**



**Great Depression lesson: if the money multiplier ( $m$ ) declines, the monetary base ( $MB$ ) must rise to offset**

$$M = m \cdot MB \quad \text{money stock}$$

$$MB = RR + ER + C \quad \text{monetary base}$$

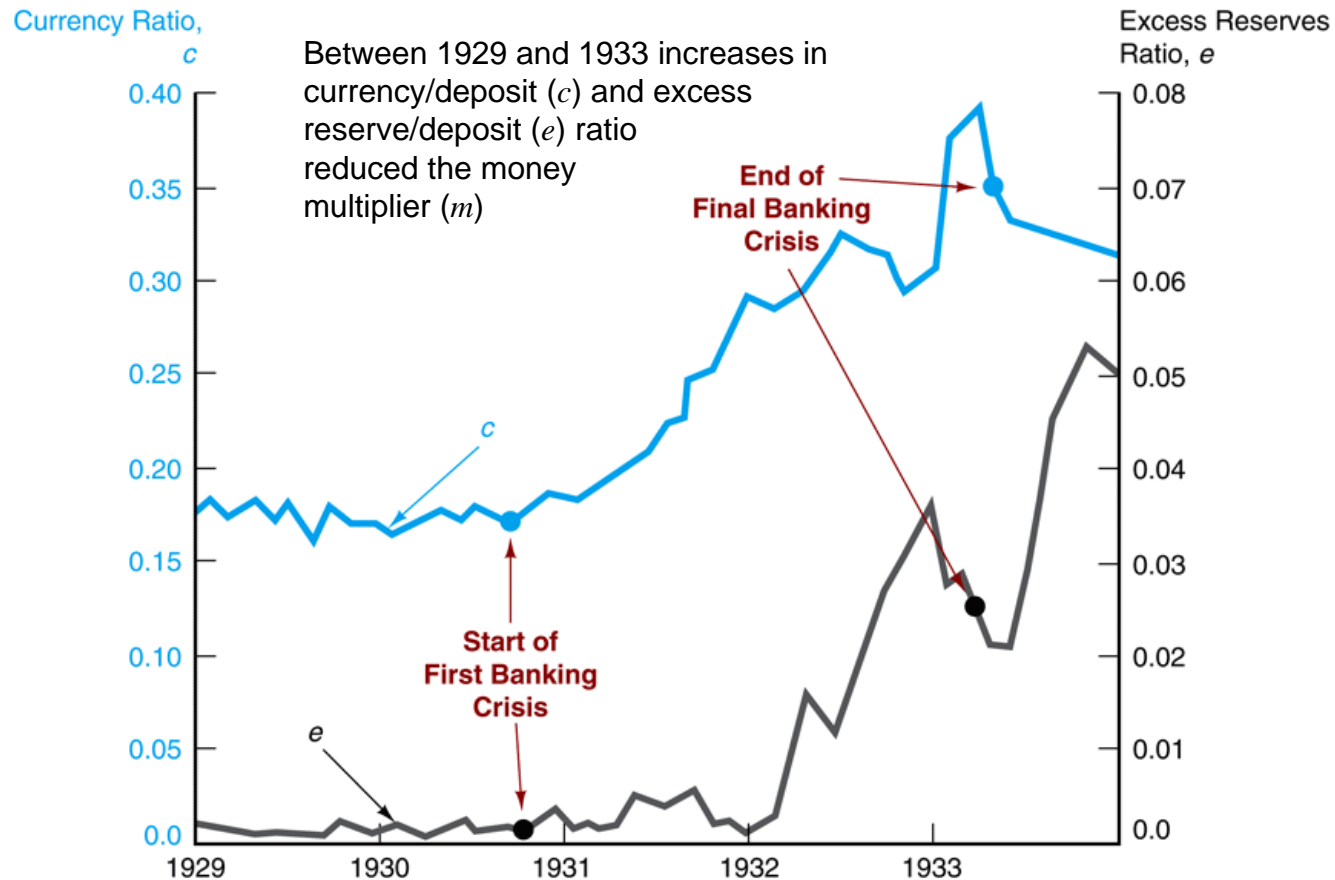
$$m = \frac{1 + c}{r + e + c} \quad \text{money multiplier}$$

$c$  = currency/deposit ratio (C/D)

$e$  = excess reserves/deposit ratio (ER/D)

$r$  = required reserves/deposit ratio (RR/D)

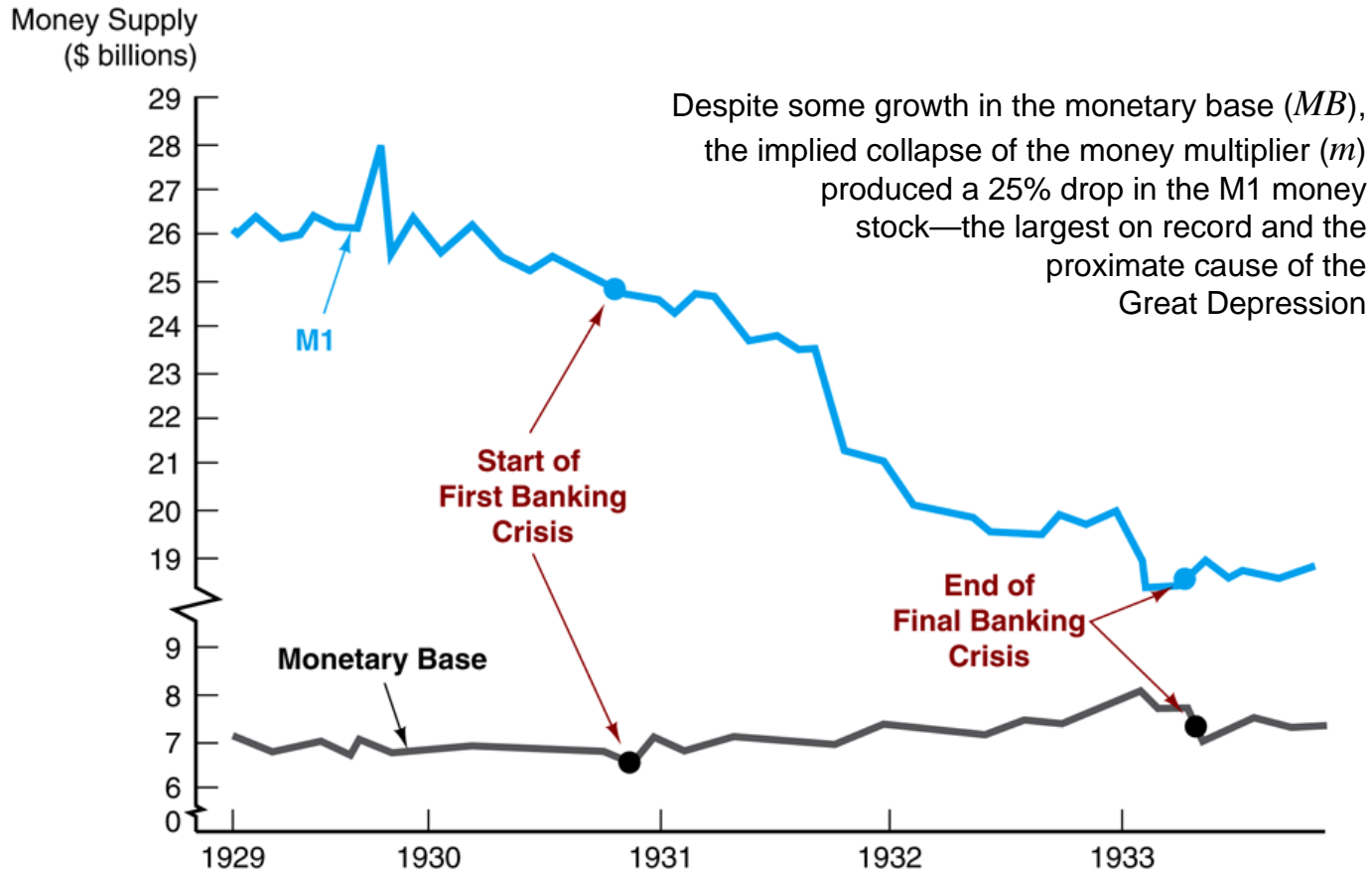
# Mishkin's Figure 2 (Ch. 14): increases in the ratios of currency/deposits and excess reserves/deposits



Mishkin's sources: Federal Reserve *Bulletin*; Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, NJ: Princeton University Press, 1963), p. 333.

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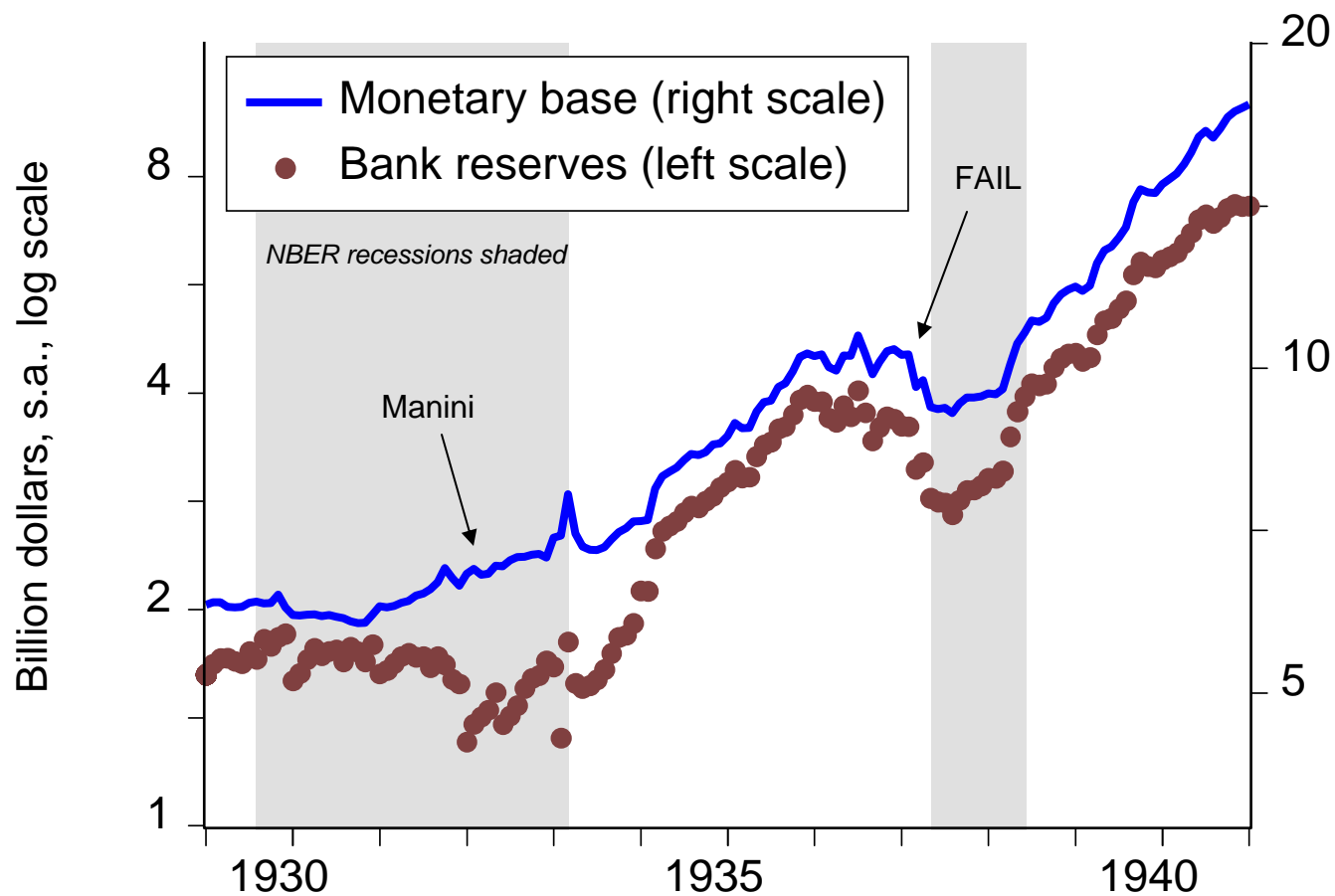
# Mishkin's Figure 3 (Ch. 14): parameter shifts reduced the money multiplier ( $m$ ) and money stock ( $M1$ )



Mishkin's sources: Federal Reserve *Bulletin*; Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, NJ: Princeton University Press, 1963), p. 333.

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# Great Depression lesson: monetary base must be *more aggressively expanded*, given shrinking bank reserves



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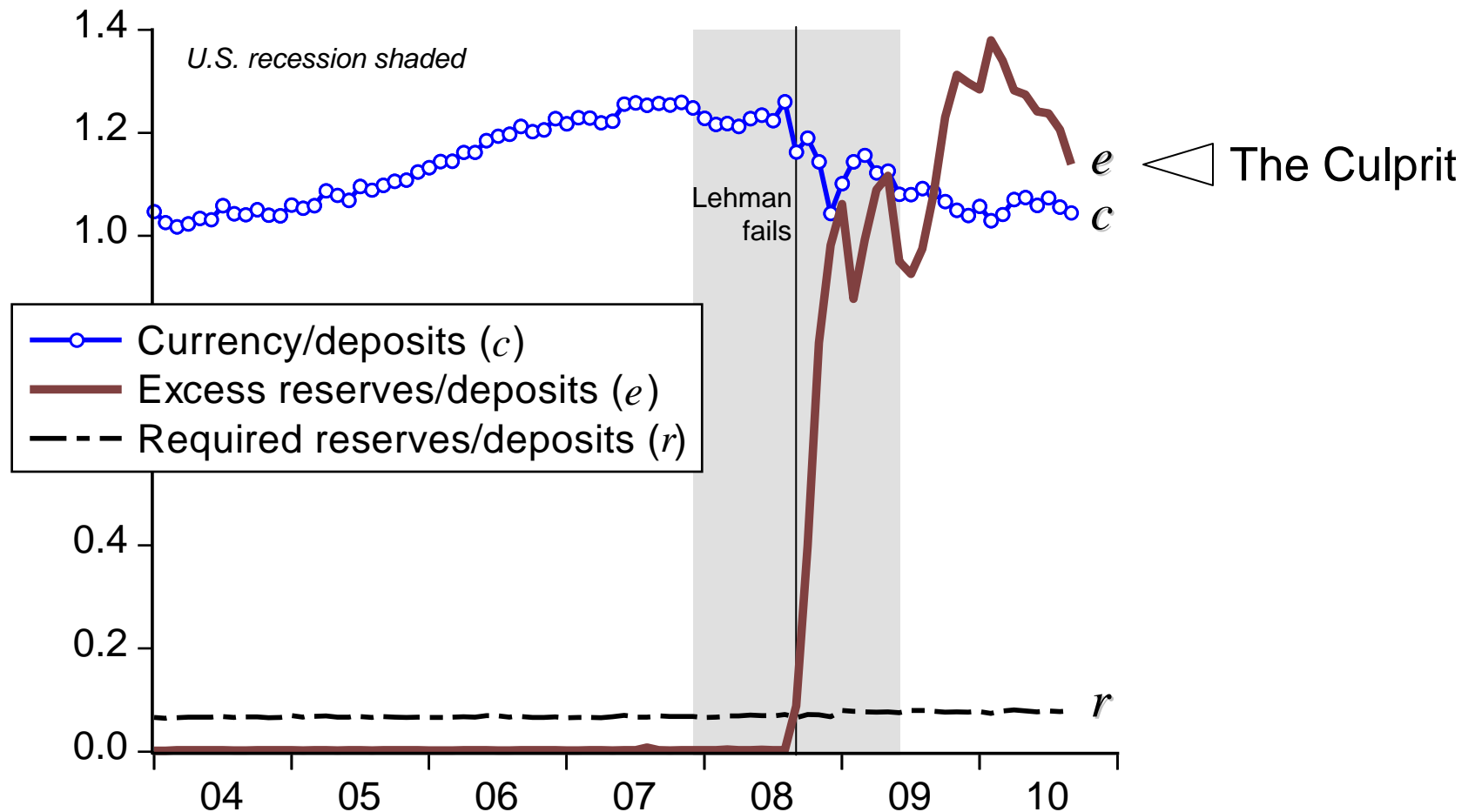
Source: Federal Reserve Bank of St. Louis (M1 monetary base); see Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867-1960* (1963) Princeton University Press

## Quantitative easing: decrease money multiplier ( $m$ ) requires compensatory rise in monetary base ( $MB$ )

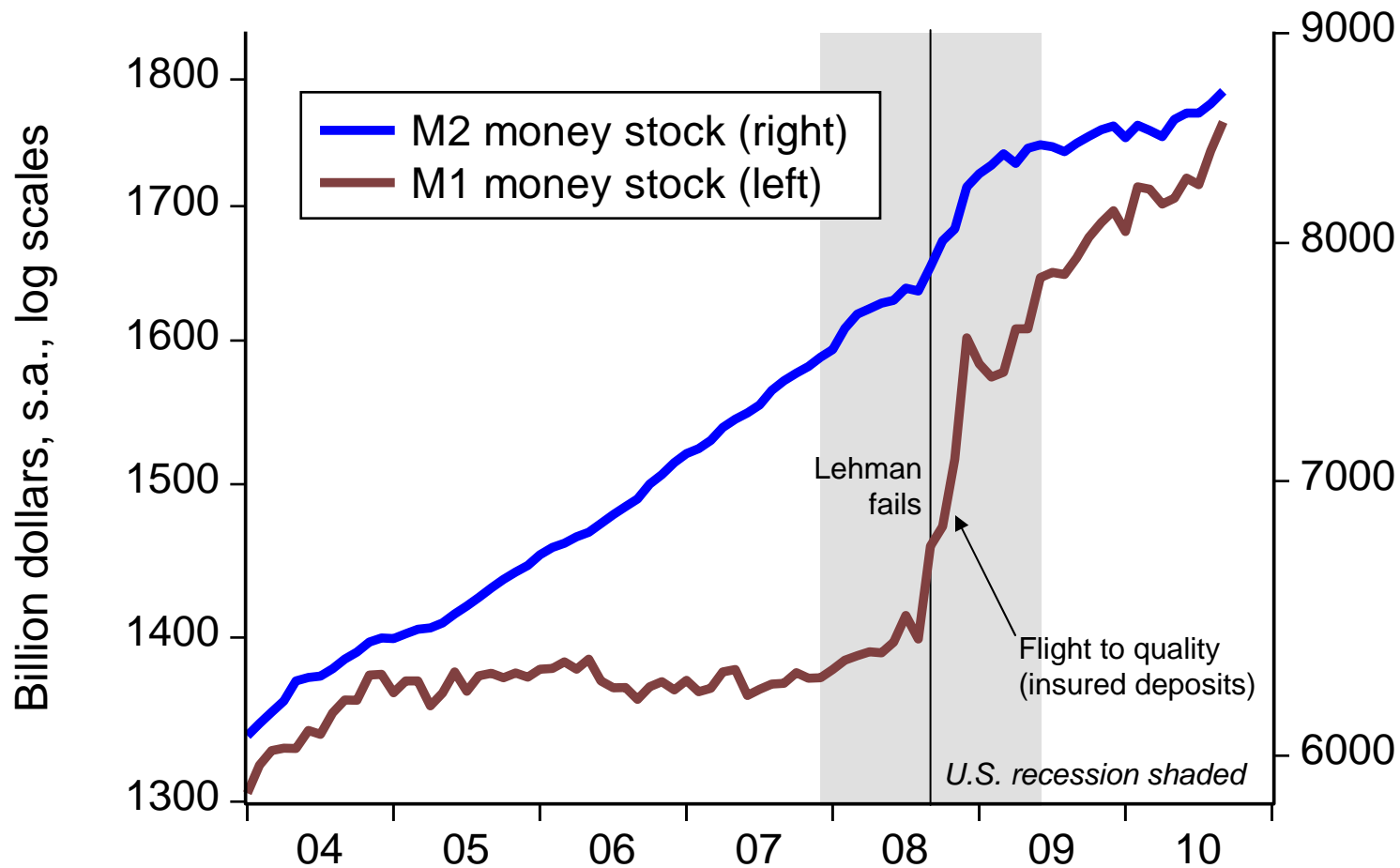
- The lesson learned from the 1930s: don't let bank failures and extinguished bank deposits cause the money stock to implode
- A “run” on banks in 2007-08: failure to roll overnight repos, asset-backed commercial paper; money market mutual fund withdrawals (etc.), aggravated by fire sales externalities from falling asset values
- Securitization undermined as *primary* U.S. lending conduit (70% of credit) and until rehabilitated leaves us with bank lending as the only channel
- Post-Lehman flight to safe haven of (insured) bank deposits swelled banks' excess reserves *without* a corresponding rise in bank lending: the multiple deposit-creation process was truncated by banks' “risk aversion”
- Money stock  $M = m \cdot MB$  so if  $m$  falls,  $MB$  must rise to offset  
(after Lehman failed,  $m$  fell by almost *half* from 1.6 to around 0.9!)

# Post-Lehman—bank excess reserves; parameters of the money multiplier ( $m$ ):

$$m = \frac{1 + c}{r + e + c}$$



**Fed accommodated public's higher "liquidity preference" as perceptions of risk increased, but flight to the safe haven of bank deposits was *not* deployed in bank lending**



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Source: Federal Reserve Bank of St. Louis <http://research.stlouisfed.org/fred2/series/M1SL?cid=25> and <http://research.stlouisfed.org/fred2/series/M2SL?cid=25>



## Appendix 3. mortgage lending and toxicity



## Appendix 4: aspects of Hawaii economic recovery

- Sluggish employment growth is structural: market power of managerial class, “disposable workers,” unions’ demise: acceleration in 2012
- Real estate investment recovery continues: trough was 2009Q2
- Home sales volumes overshoot, found the New Normal; valuations—stable on Oahu—finding bottom on Neighbor Islands
- Real asset price dynamics in 20-teens should mimic past cycles
- Private construction commitments have been *rising* for more than a year; the recent trough was *not* as low as in the 1990s or 1980s
- Tourism has almost completed its speedy (2010) volume recovery: it’s about demand *and supply*—seats (lift) and rooms
- Public infrastructure investment: absent—until now?



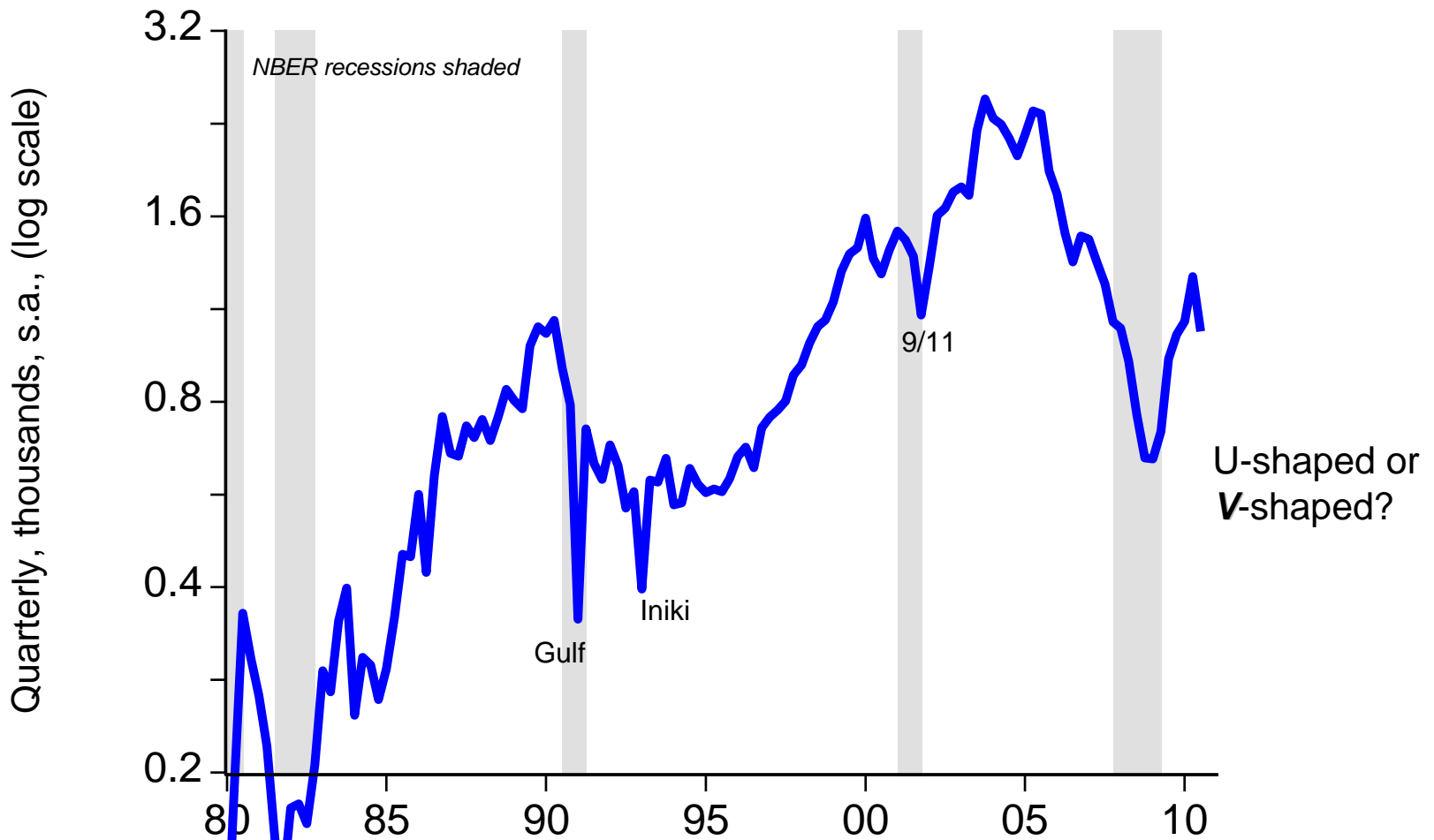
## Summarizing tourism the Great Recession and not so great recovery, 2008-2010

- The Great Recession ended in second quarter 2009; the economic recovery ended in fourth quarter 2010; the economic expansion of the 20-teens began in first quarter 2011
- Virtually all of the recession in tourism occurred between March and September 2008 (Aloha Airlines through Lehman Brothers); virtually all of the recovery in tourism occurred between March and September 2010
- The pattern of arrivals loss and subsequent arrivals retrieval masks a more complicated underlying interaction between travel supply (aviation fuel cost; lift) and travel demand (procyclical consumption; prices of travel complements like room rates)—*both* supply and demand matter, but former was and is a constraint on the latter\*
- The expansion of the 20-teens is, statistically-speaking, more likely to extend through the decade than not, but exogenous event risk—geopolitical, meteorological, biological, seismic—remains pertinent (whether illustrated with REVPAR or something else, like arrivals)



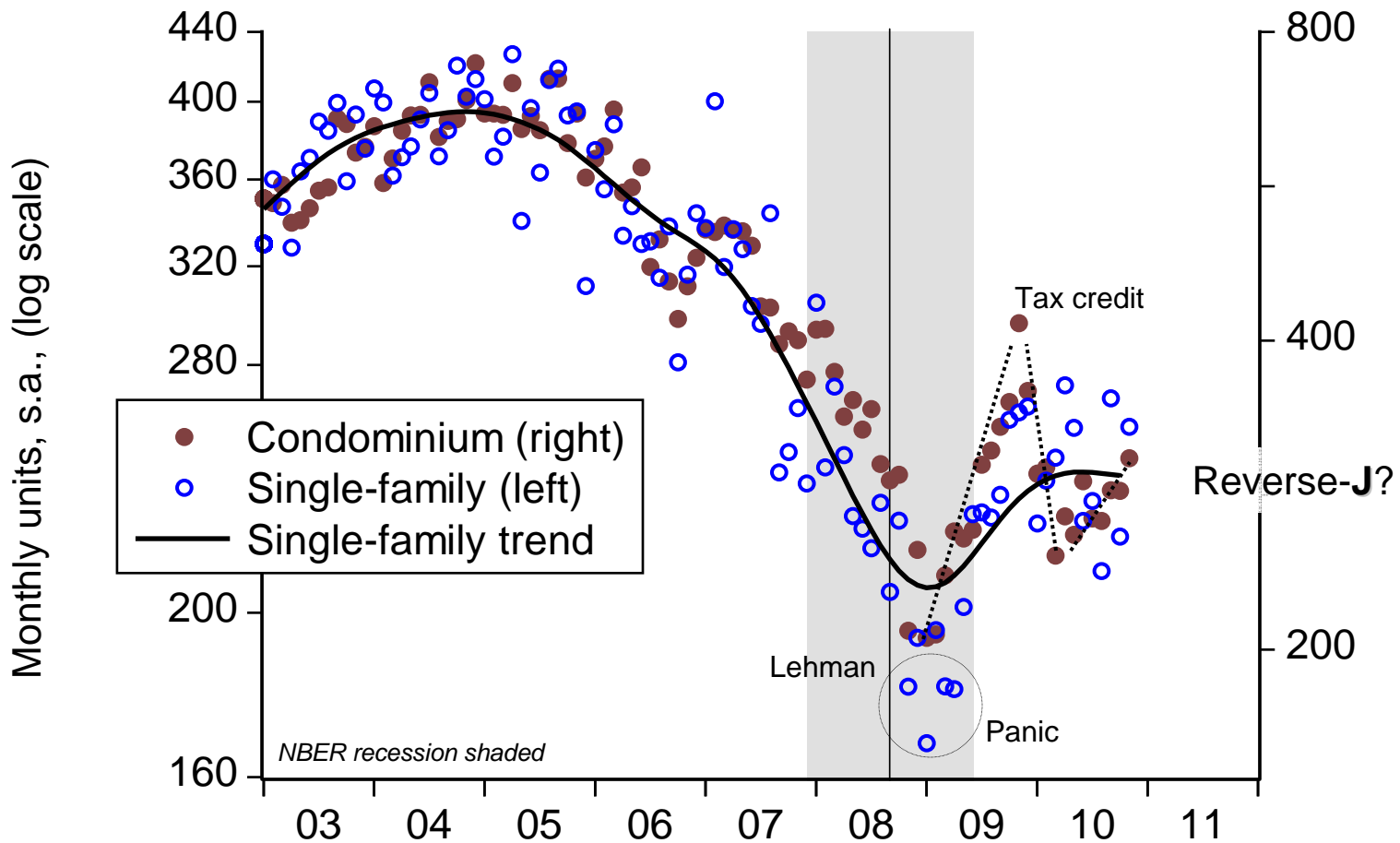
# Real estate

# Neighbor island existing home sales: more like the 80s than the 90s?

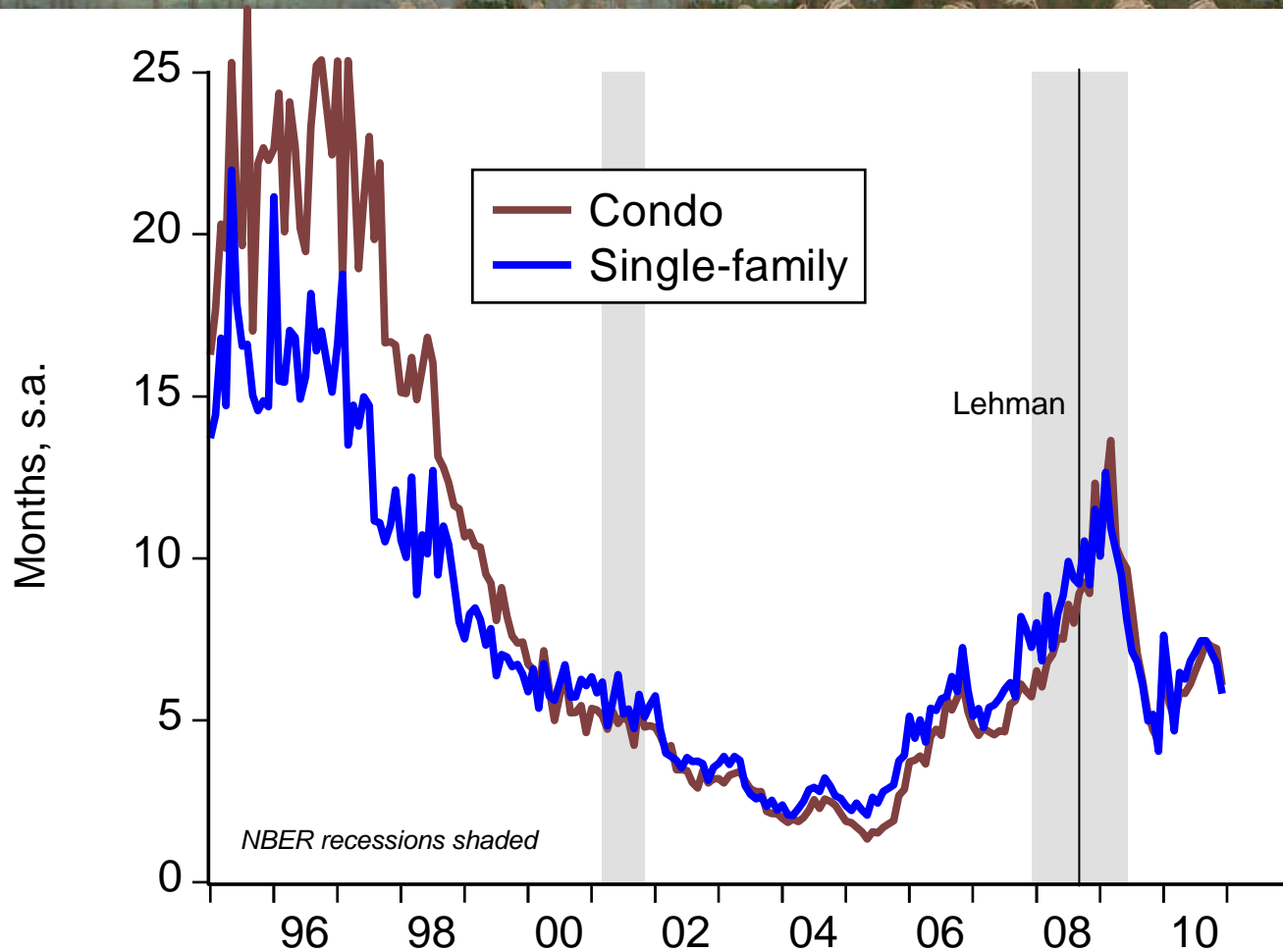


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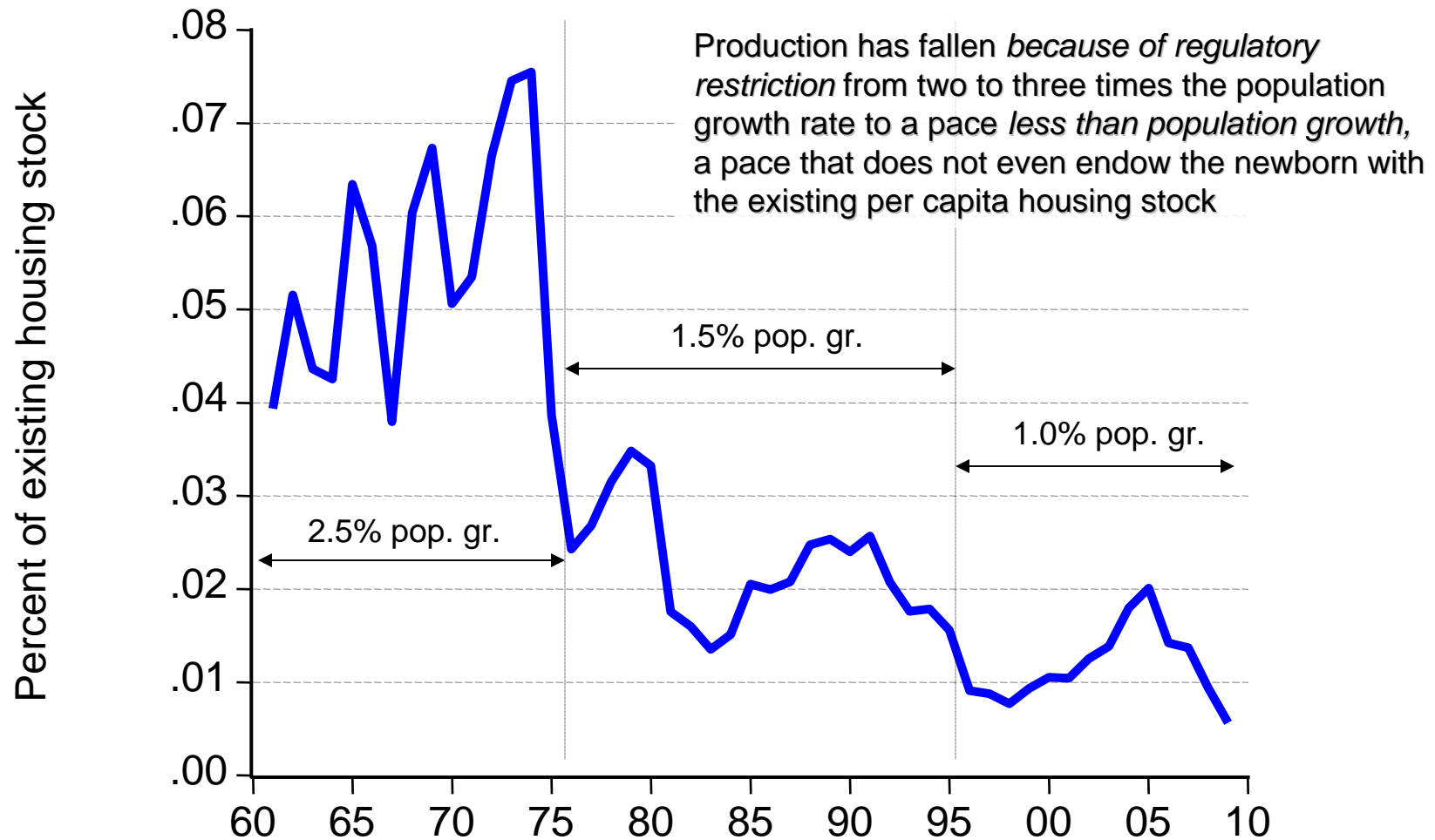
# Oahu existing single-family and condominium sales: neither V- nor U-shaped—a “reverse-J”



# Oahu months of inventory remaining: no glut



# Hawaii new housing units / existing inventory: $(\Delta K_t / K_t)$ the investment/capital ratio—too low, and not by accident

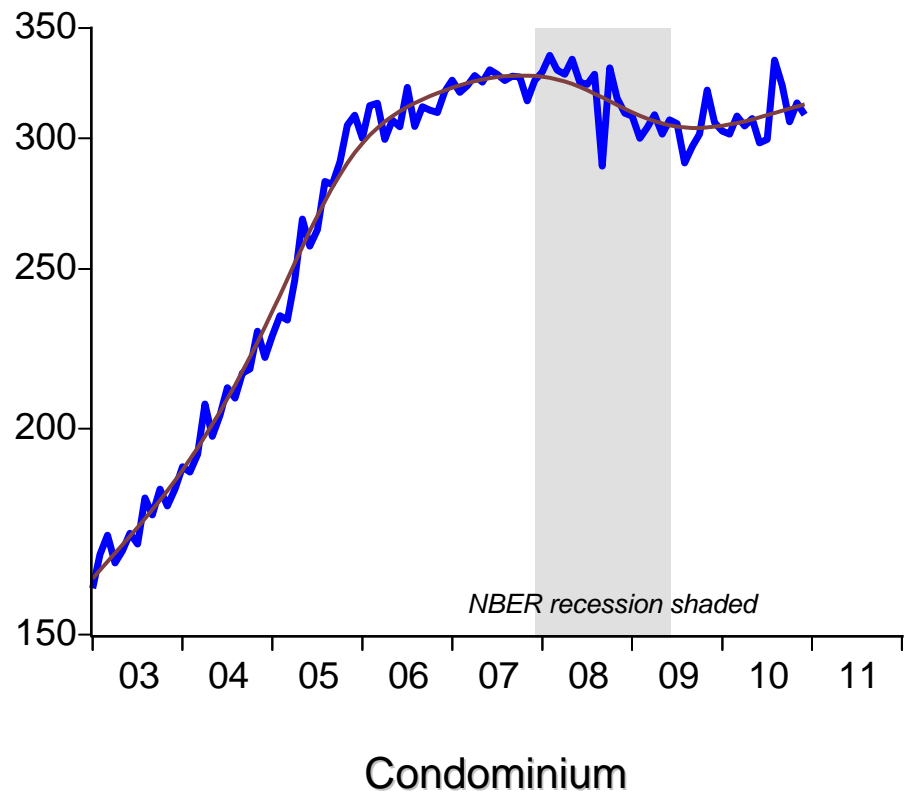
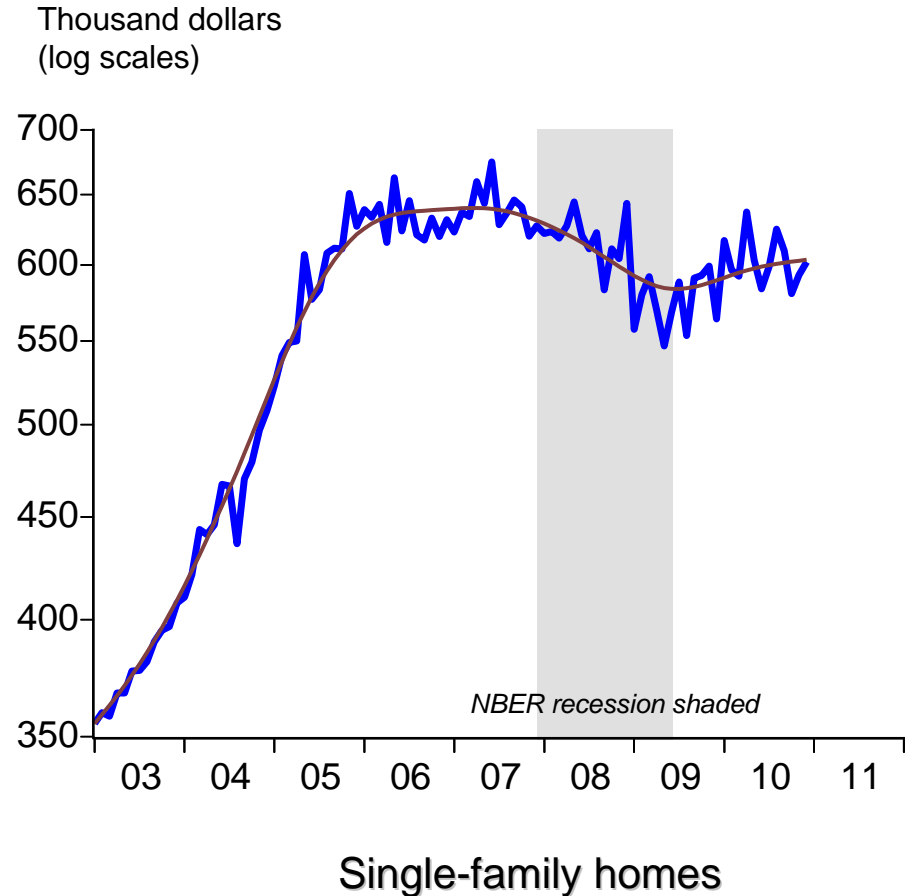


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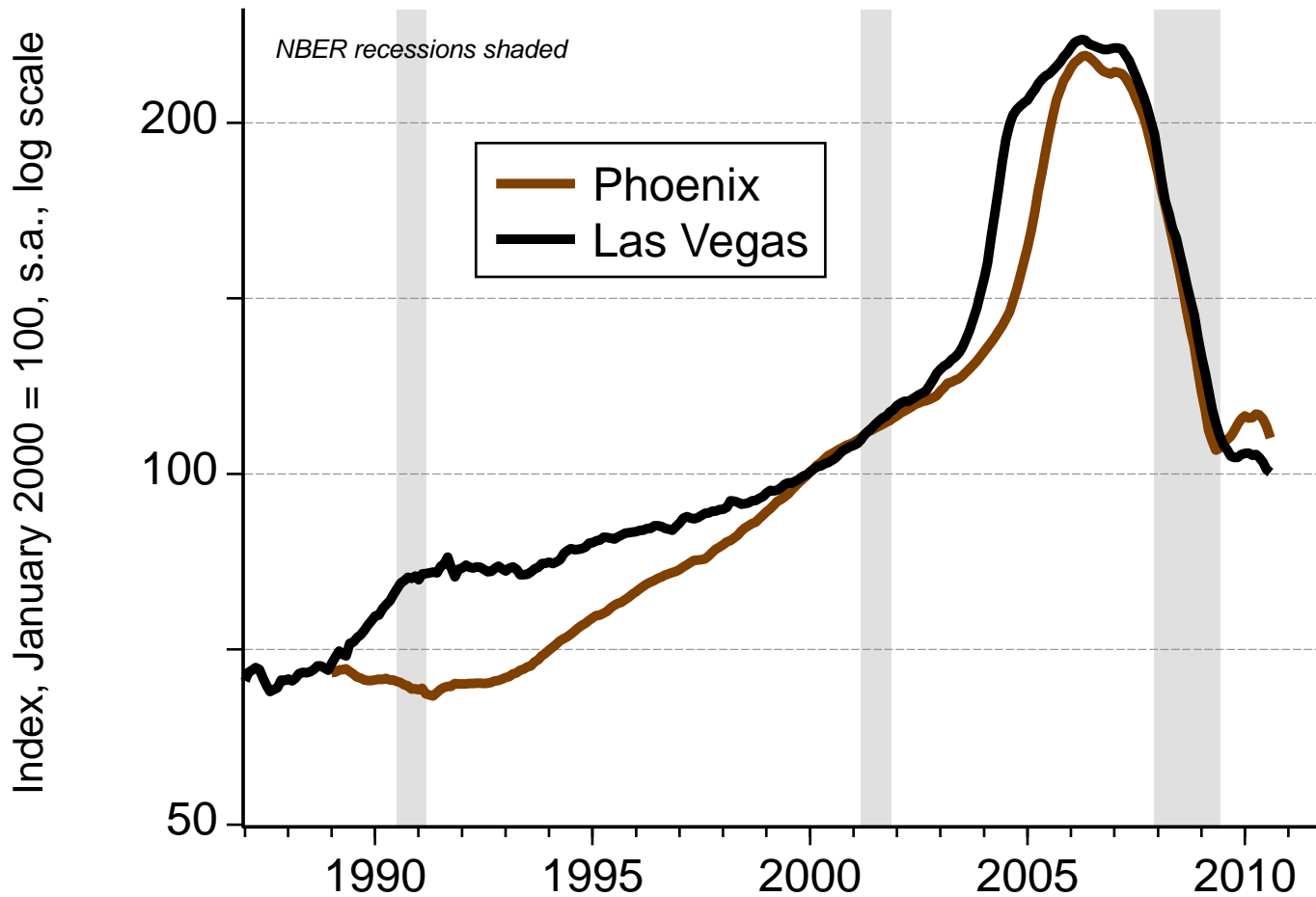


# Valuation dynamics

# Seasonally-adjusted Oahu existing home prices: notable pattern of resilience, wealth *preservation*



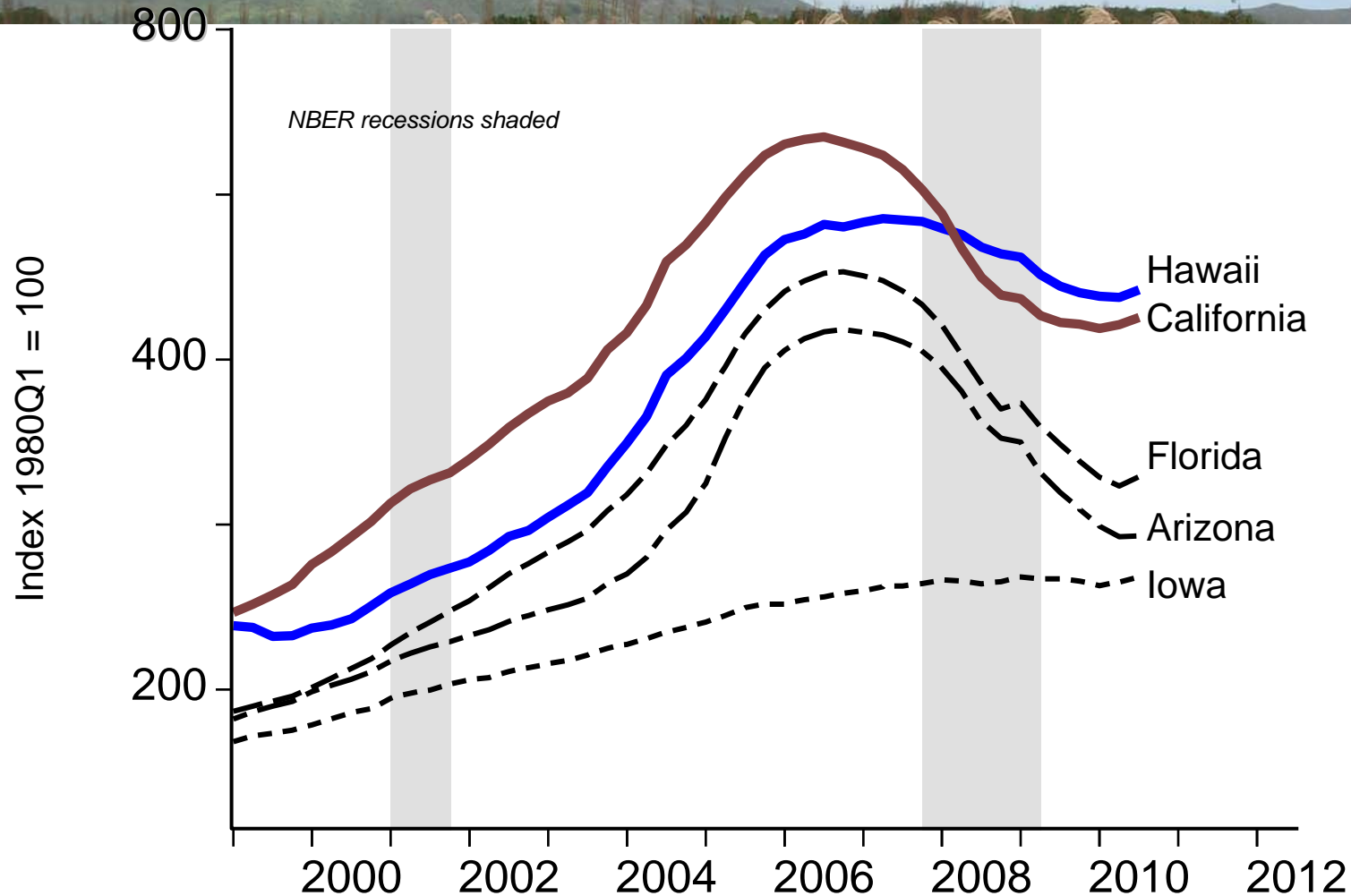
# S&P Case Shiller indexes for Phoenix, Las Vegas



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Source: Standard & Poor's (<http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff--p-us---->)

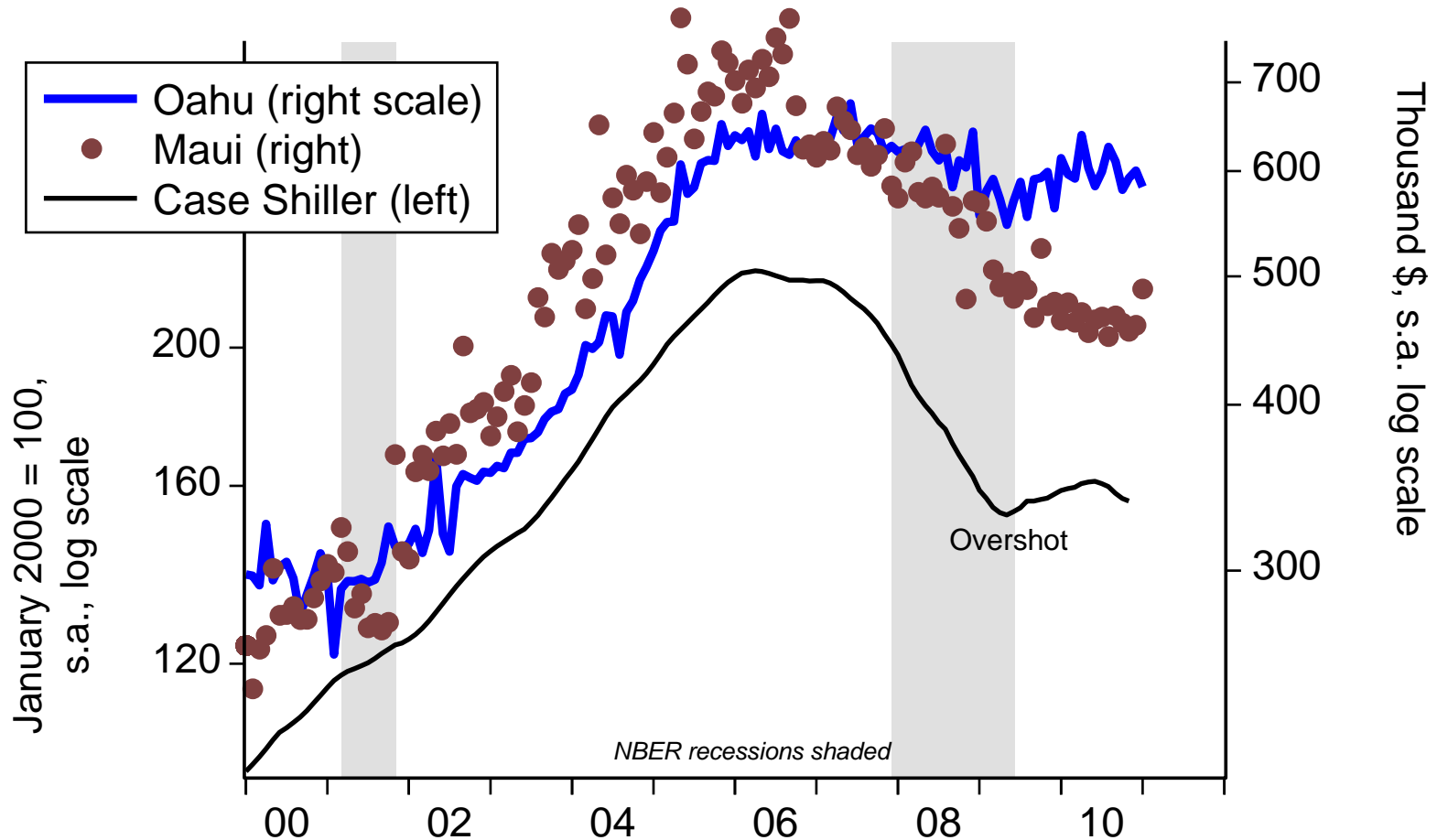
# FHFA state home price indexes: from bubblicious to log-linear, Hawaii relatively resilient



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Source: FHFA; seasonal adjustment using Census X-12 ARIMA filter by TZE

# Median single-family home prices, Oahu and Maui, and S&P Case Shiller home price indexes



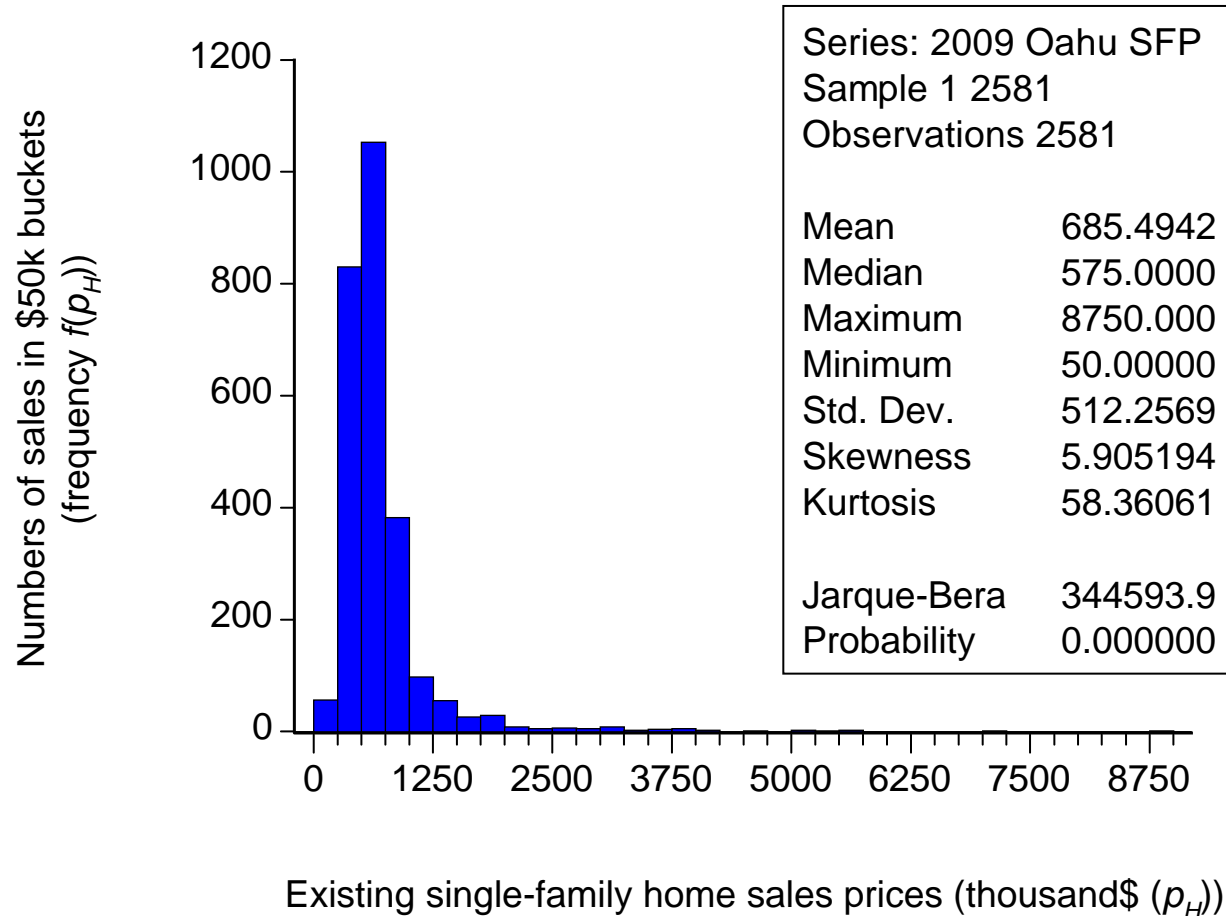
Slide copyright 2011 TZ Economics

Source: Honolulu Board of Realtors, Maui Realtors Association, Standard and Poor's

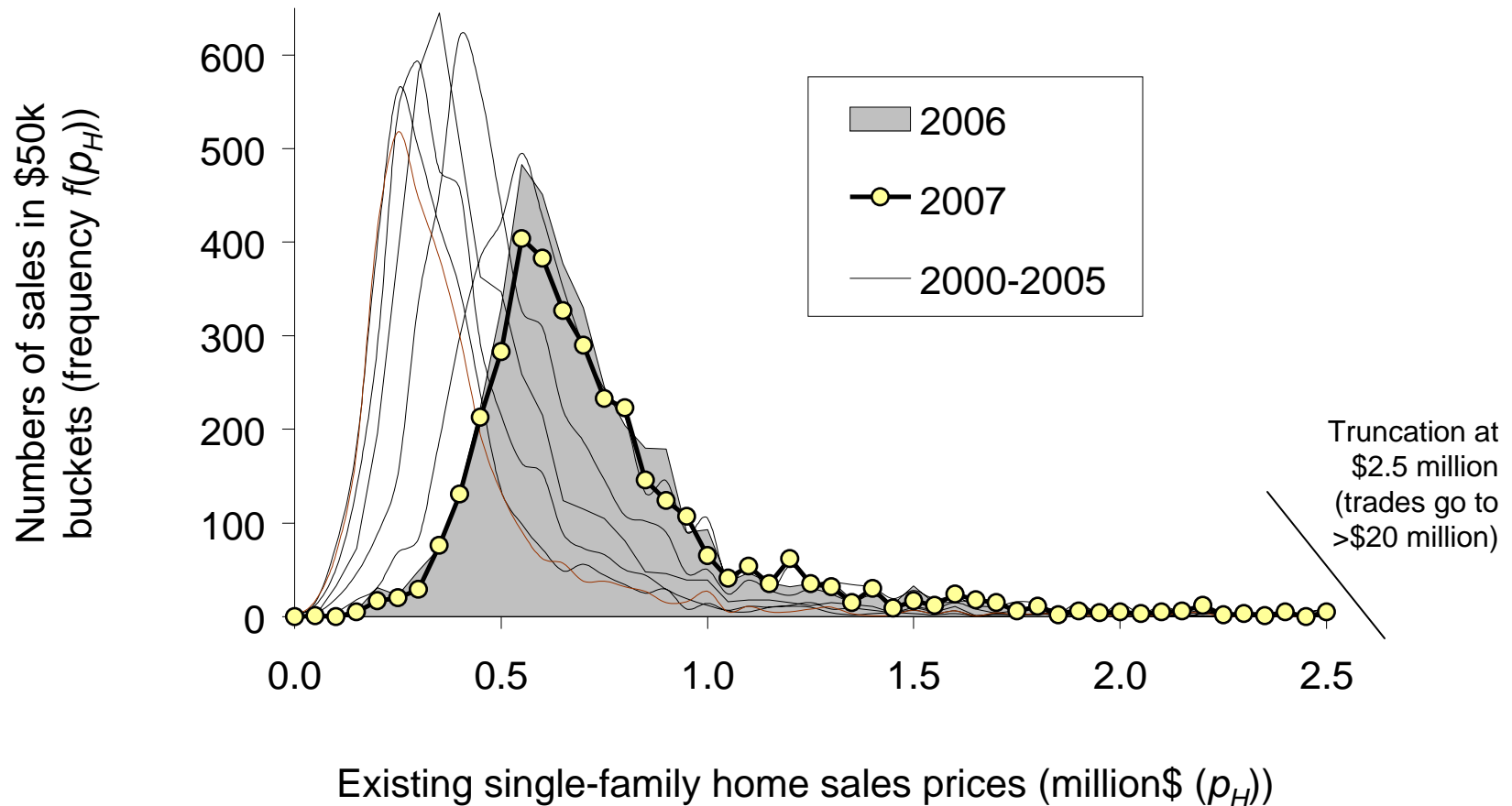


# Longer-term home price considerations

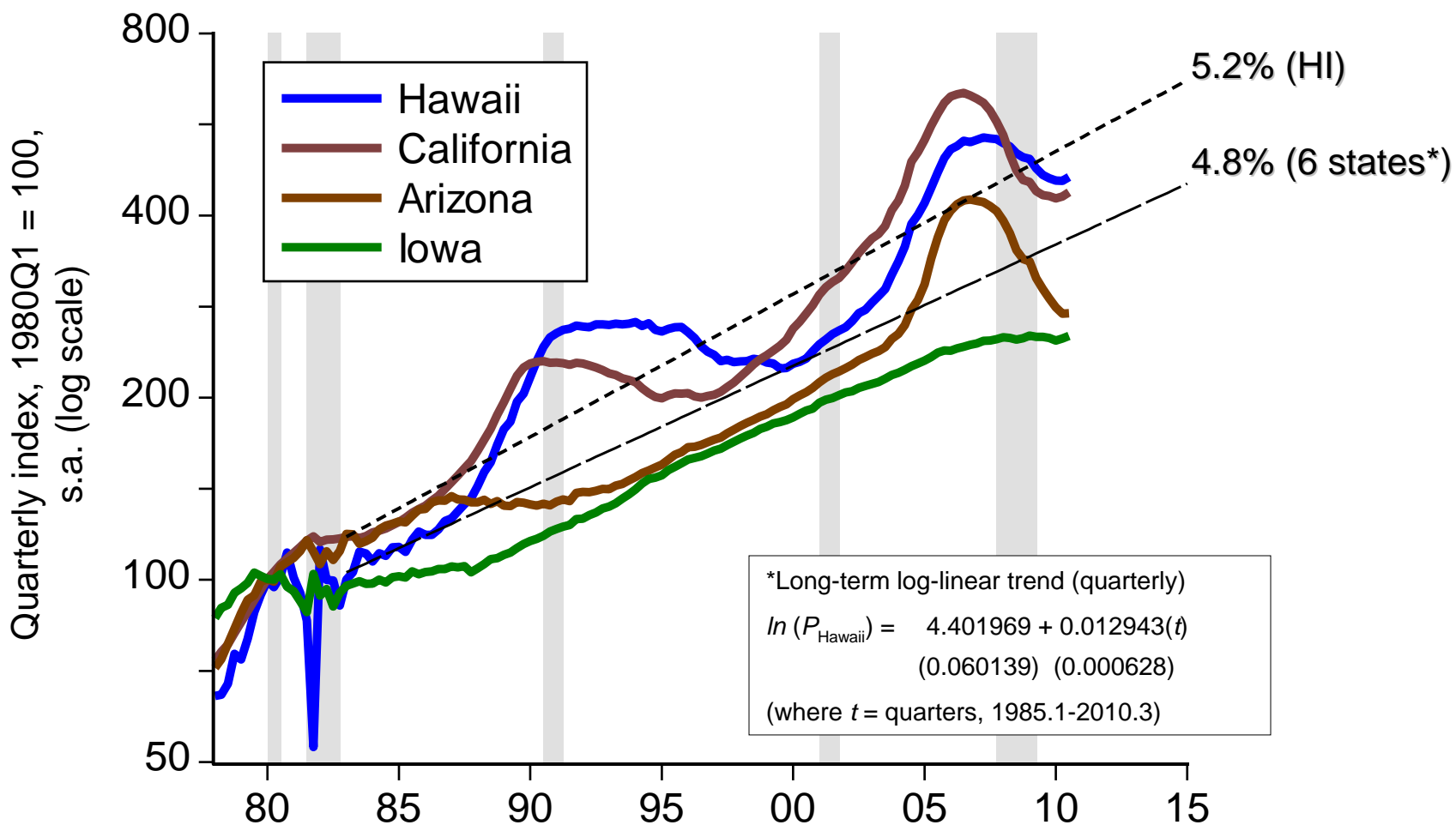
# Oahu single-family home price distribution 2009



# Early-2000s Oahu home price distribution: existing home sales prices skewed, leptokurtotic



# State home price dynamics: a mix of log-linear, cyclical, and bubblicious paths with common trends

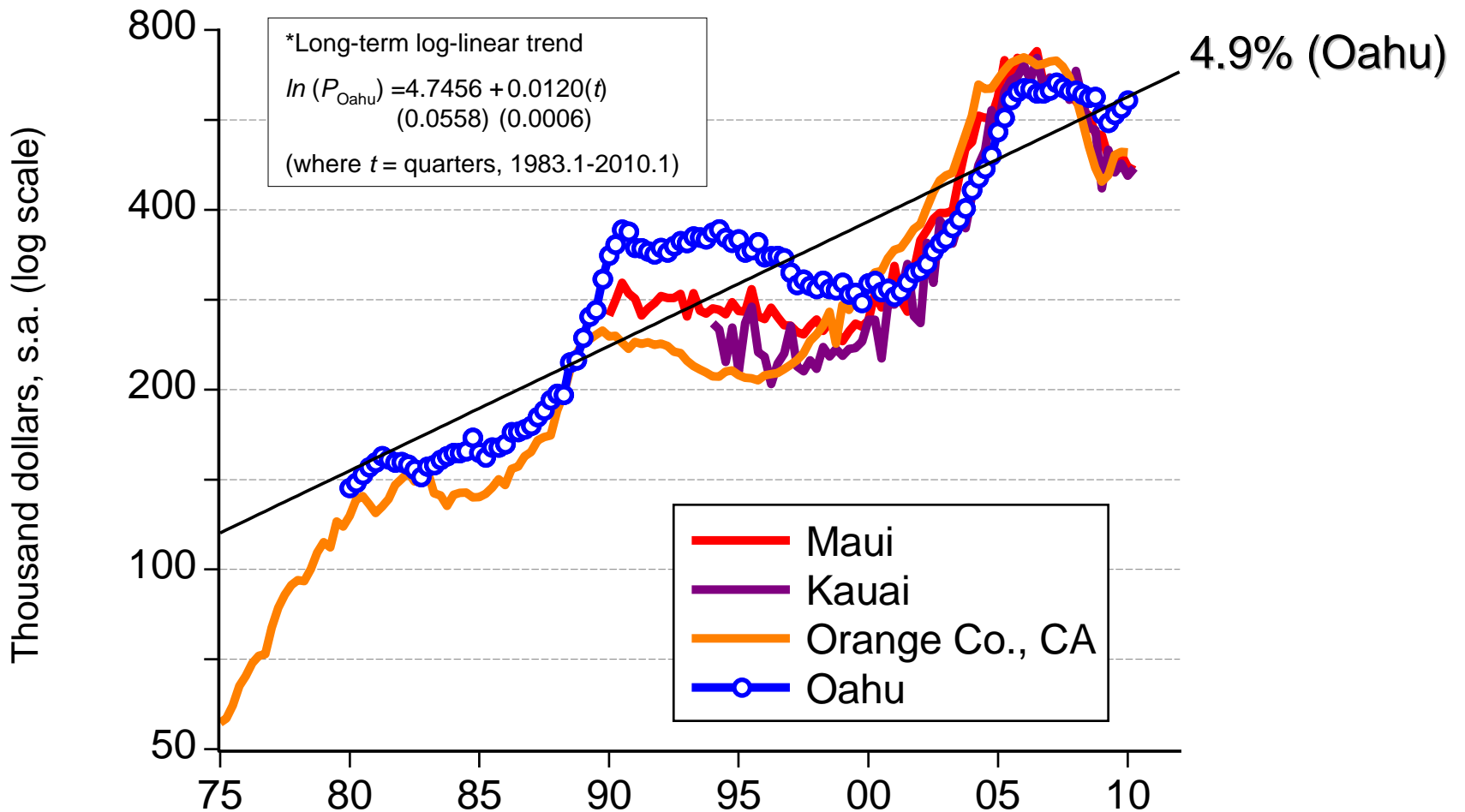


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Source: Federal Housing Finance Authority <http://www.fhfa.gov/Default.aspx?Page=14>; regression by TZE

\* Composite regression on equally-weighted prices from Arizona, Colorado, Florida, Iowa, Illinois, Nevada

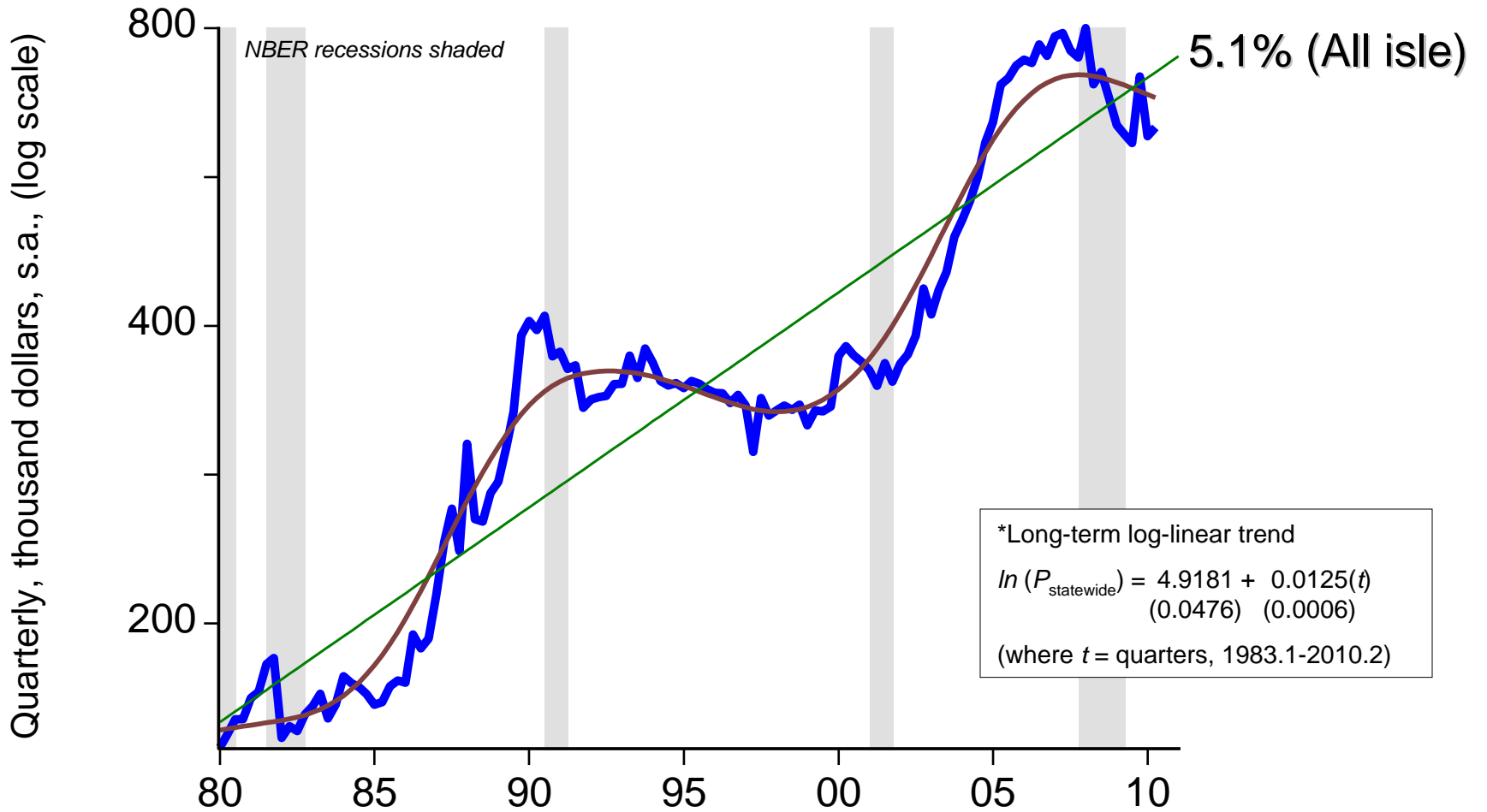
# Median SF pricing cycling around log-linear trend: California/Hawaii price cycles are not all bubbles



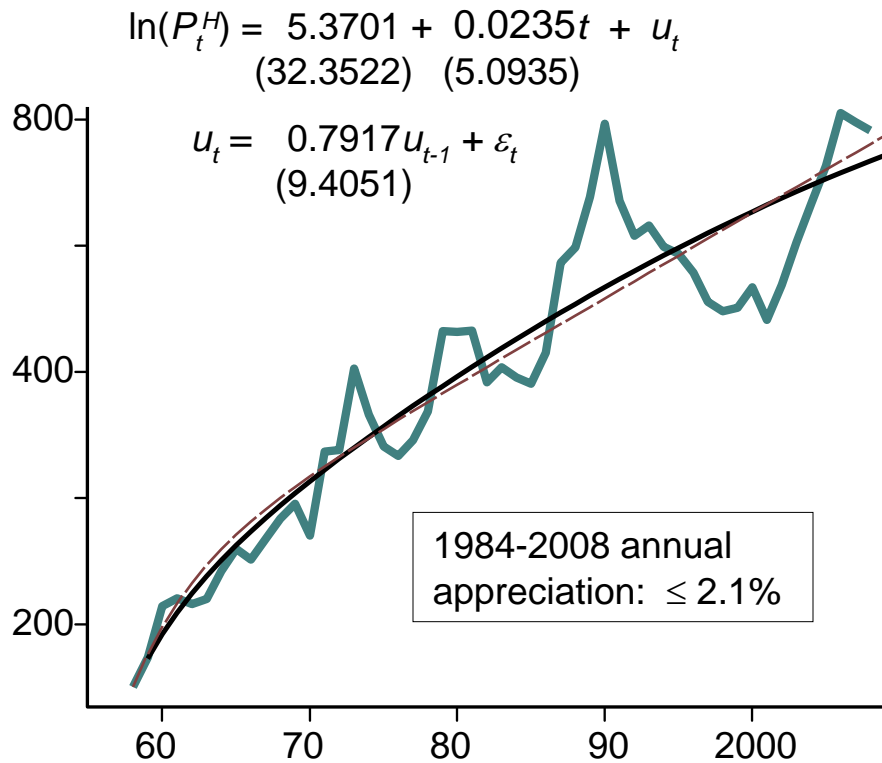
Slide copyright 2011 TZ Economics

Source: National Association of Realtors, Honolulu Board of Realtors, Realtors Association of Maui, Hawaii Information Service (Kauai); all calculations and seasonal adjustment by TZE

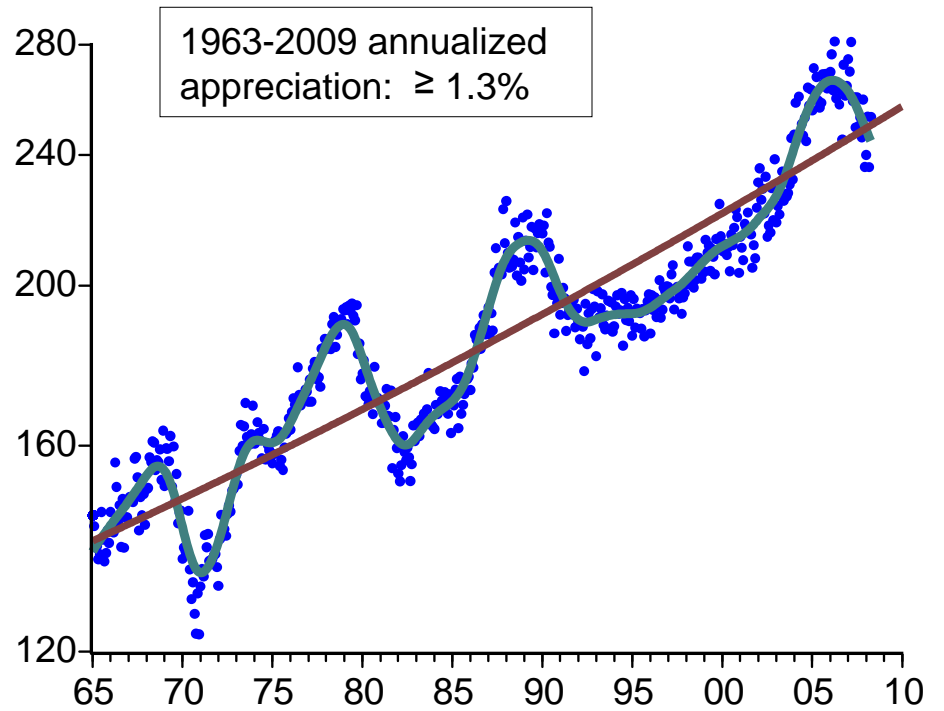
# Hawaii statewide existing SF home mean sales prices



# Adjusted for inflation: asset-pricing bubbles? or garden-variety valuation cycles?



Mean Oahu real *existing* SF home prices



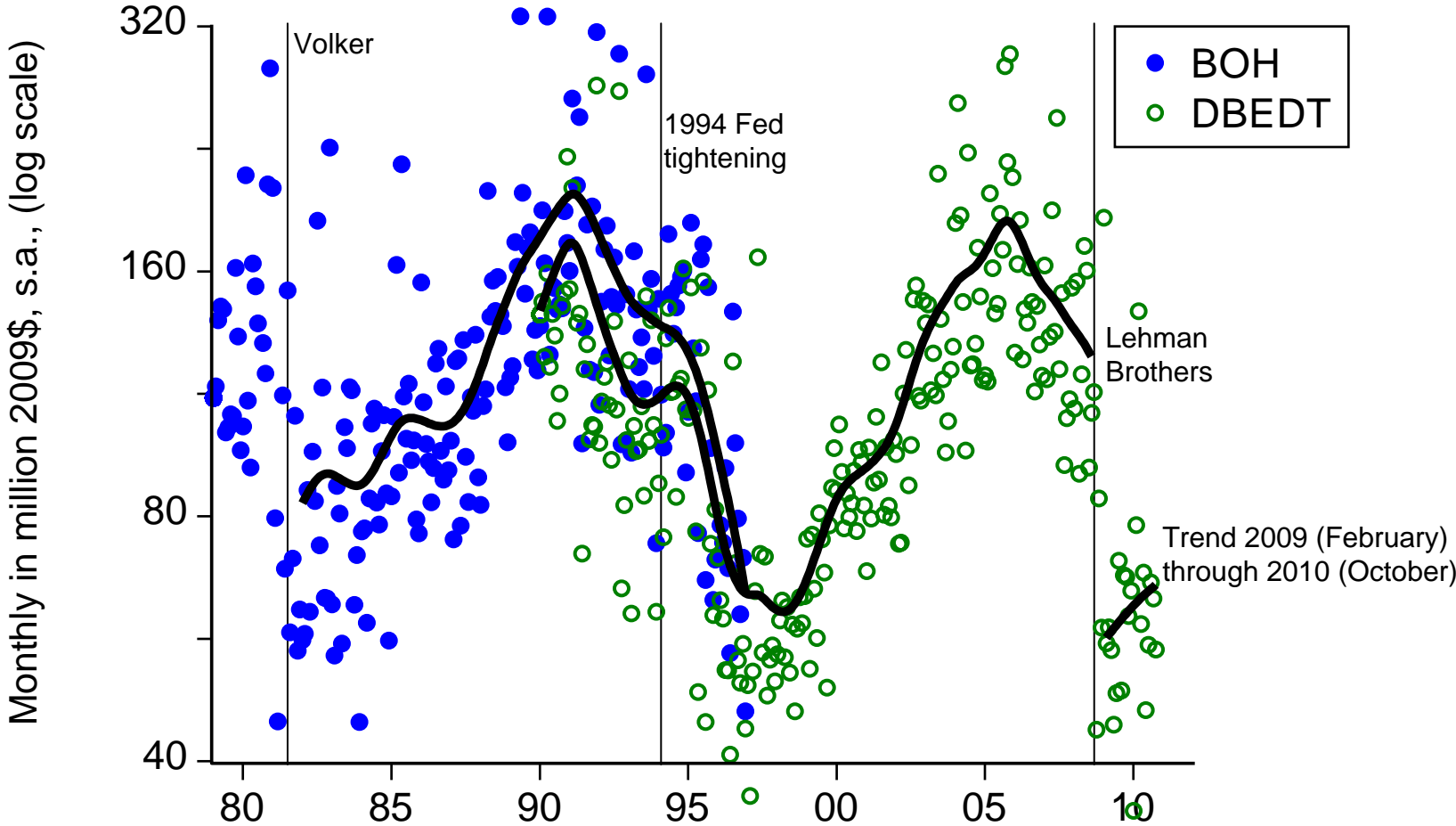
Median U.S. real *new* SF home prices



# Capital formation in Hawaii: construction

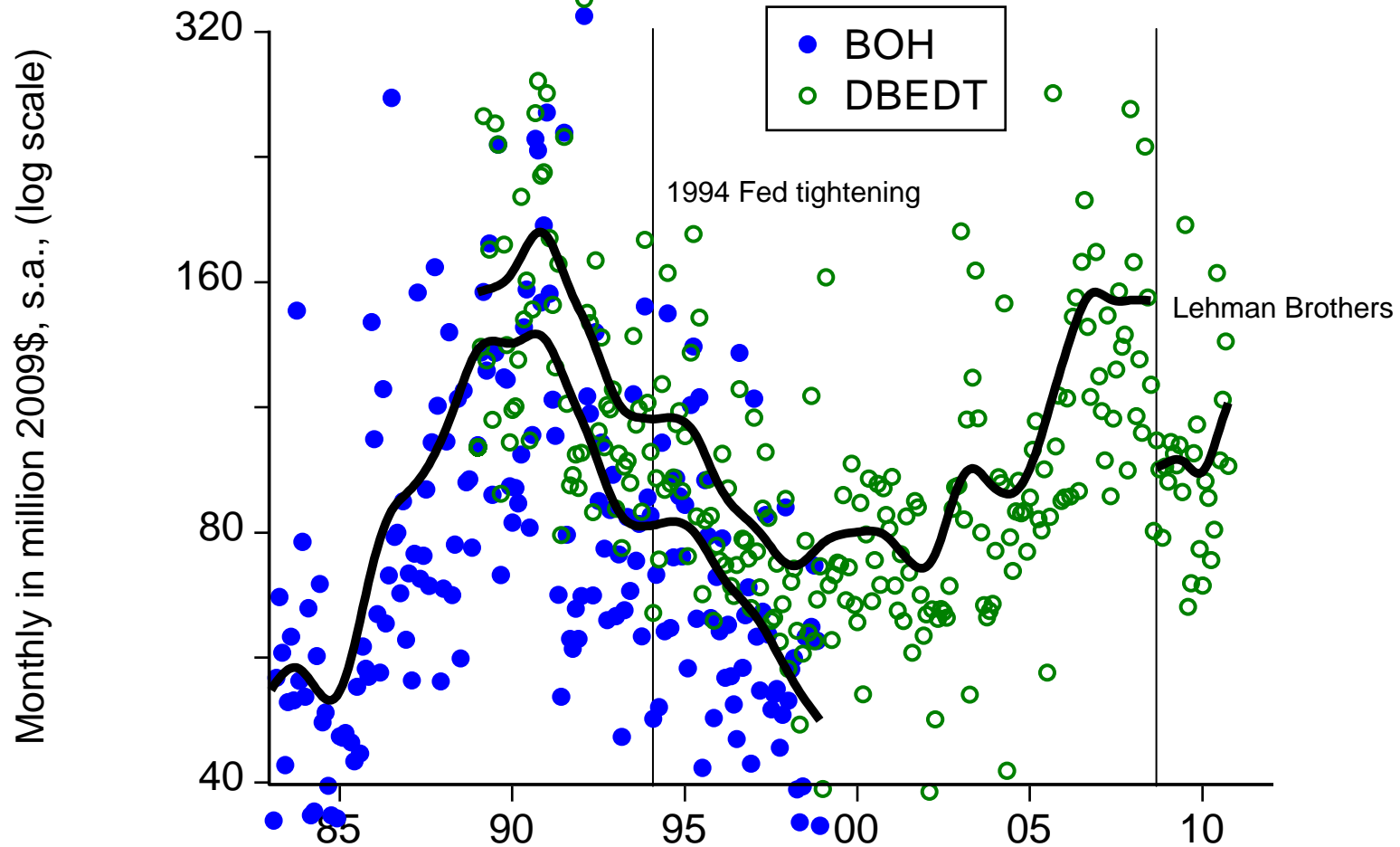


# Real value of Hawaii private residential building permits



Source: County building departments, Bank of Hawaii, Hawaii DBEDT, U.S. Census Bureau (deflator); monthly through October 2010; seasonal adjustment, trend/cycle extract using Hodrick-Prescott filter by TZE

# Real value of Hawaii private nonresidential building permits

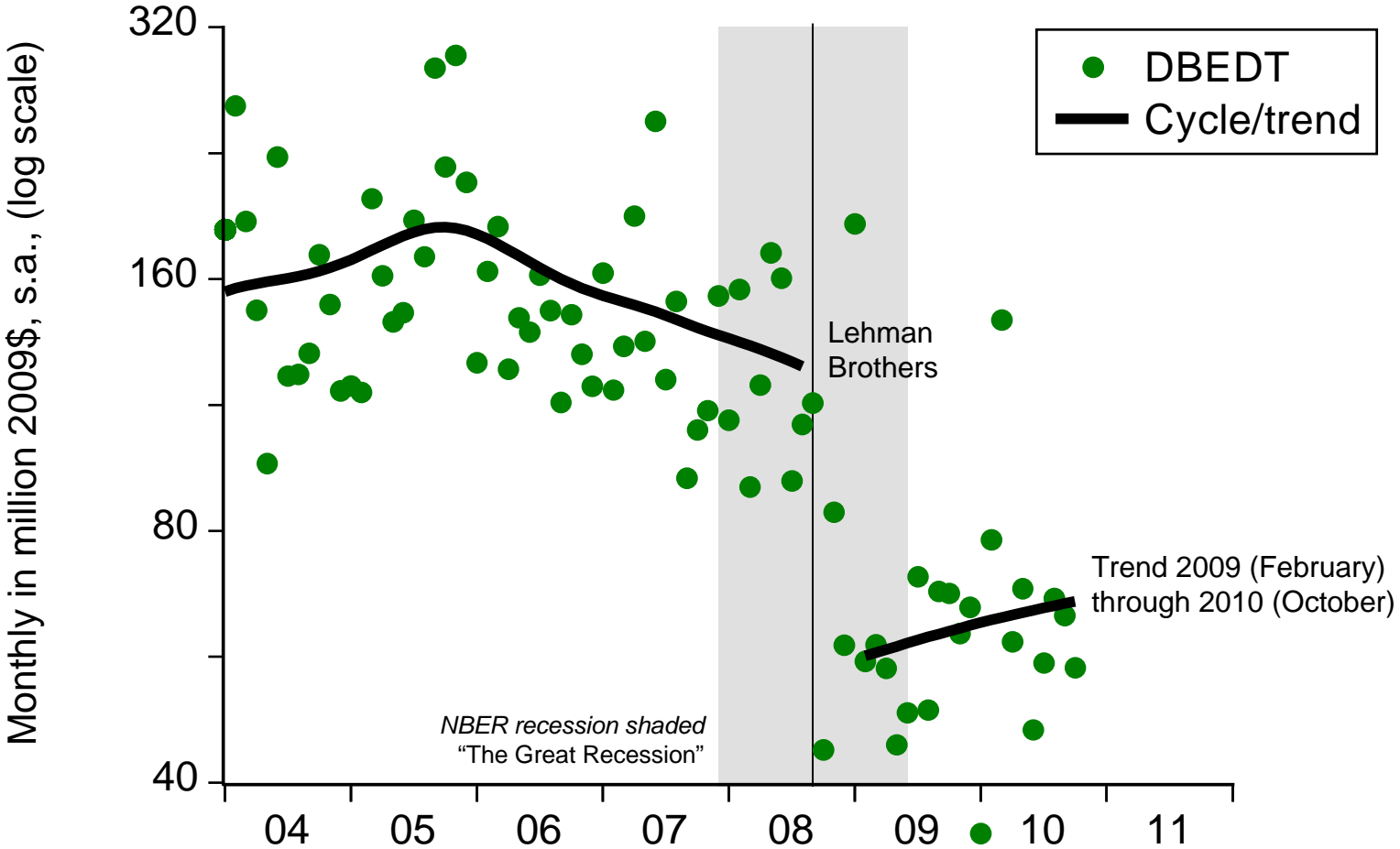


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Source: County building departments, Bank of Hawaii, Hawaii DBEDT, U.S. Census Bureau (deflator); monthly through October 2010; seasonal adjustment, trend/cycle extract using Hodrick-Prescott filter by TZE

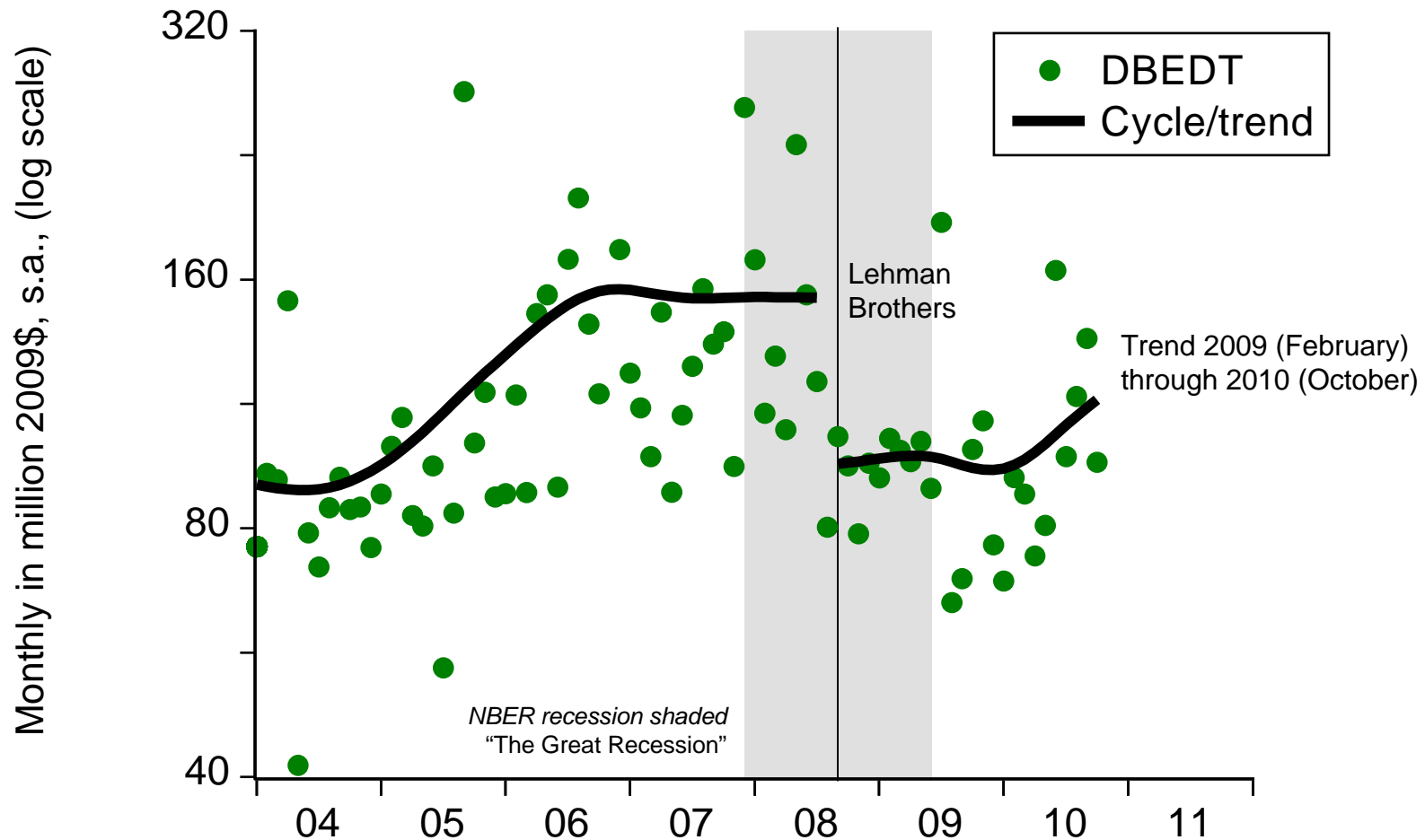


# Real value of Hawaii private residential building permits



Source: County building departments, Bank of Hawaii, Hawaii DBEDT, U.S. Census Bureau (deflator); monthly through October 2010; seasonal adjustment, trend/cycle extract using Hodrick-Prescott filter by TZE

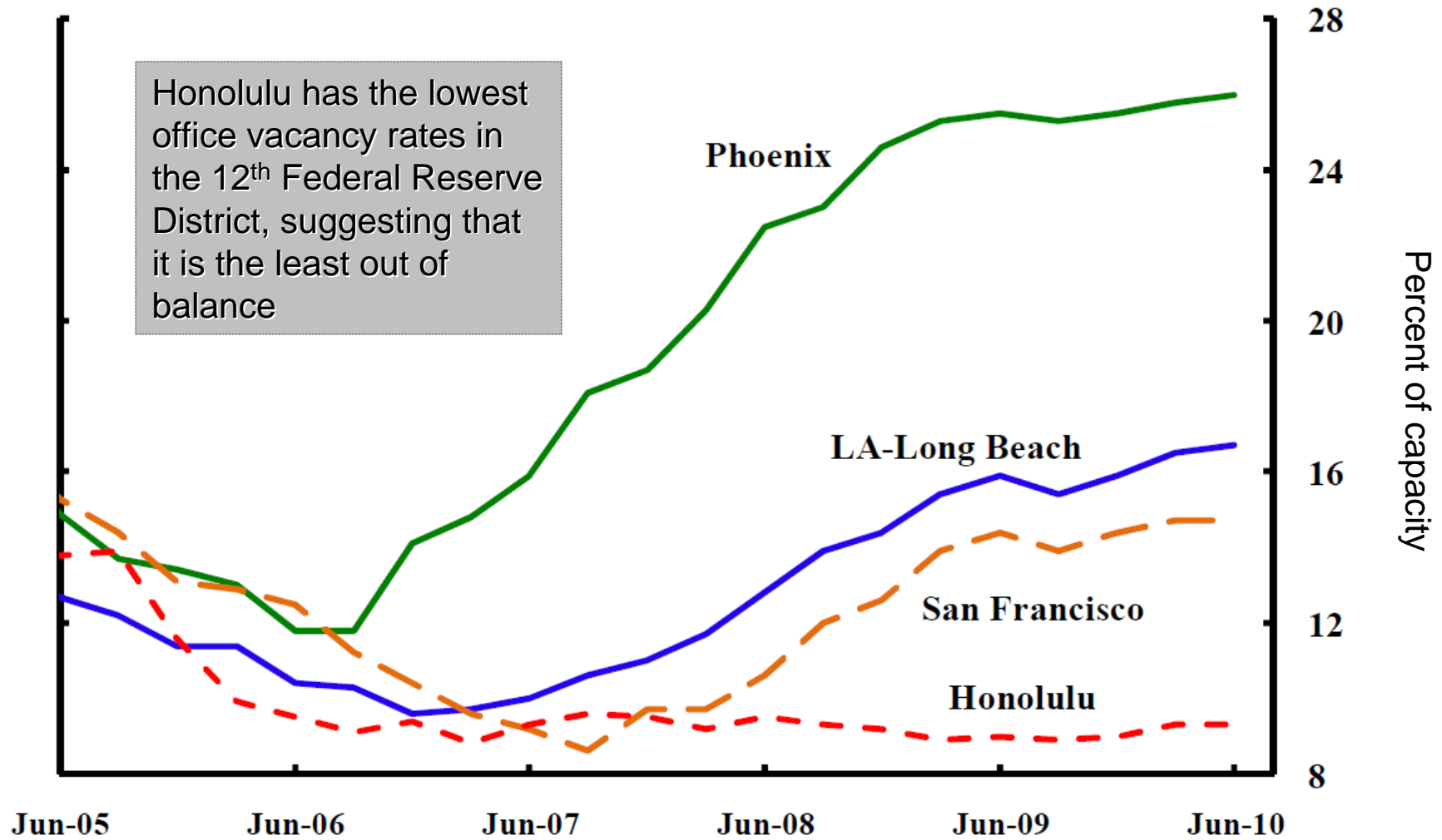
# Real value of Hawaii private nonresidential building permits



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Source: County building departments, Bank of Hawaii, Hawaii DBEDT, U.S. Census Bureau (deflator); monthly through October 2010; seasonal adjustment, trend/cycle extract using Hodrick-Prescott filter by TZE

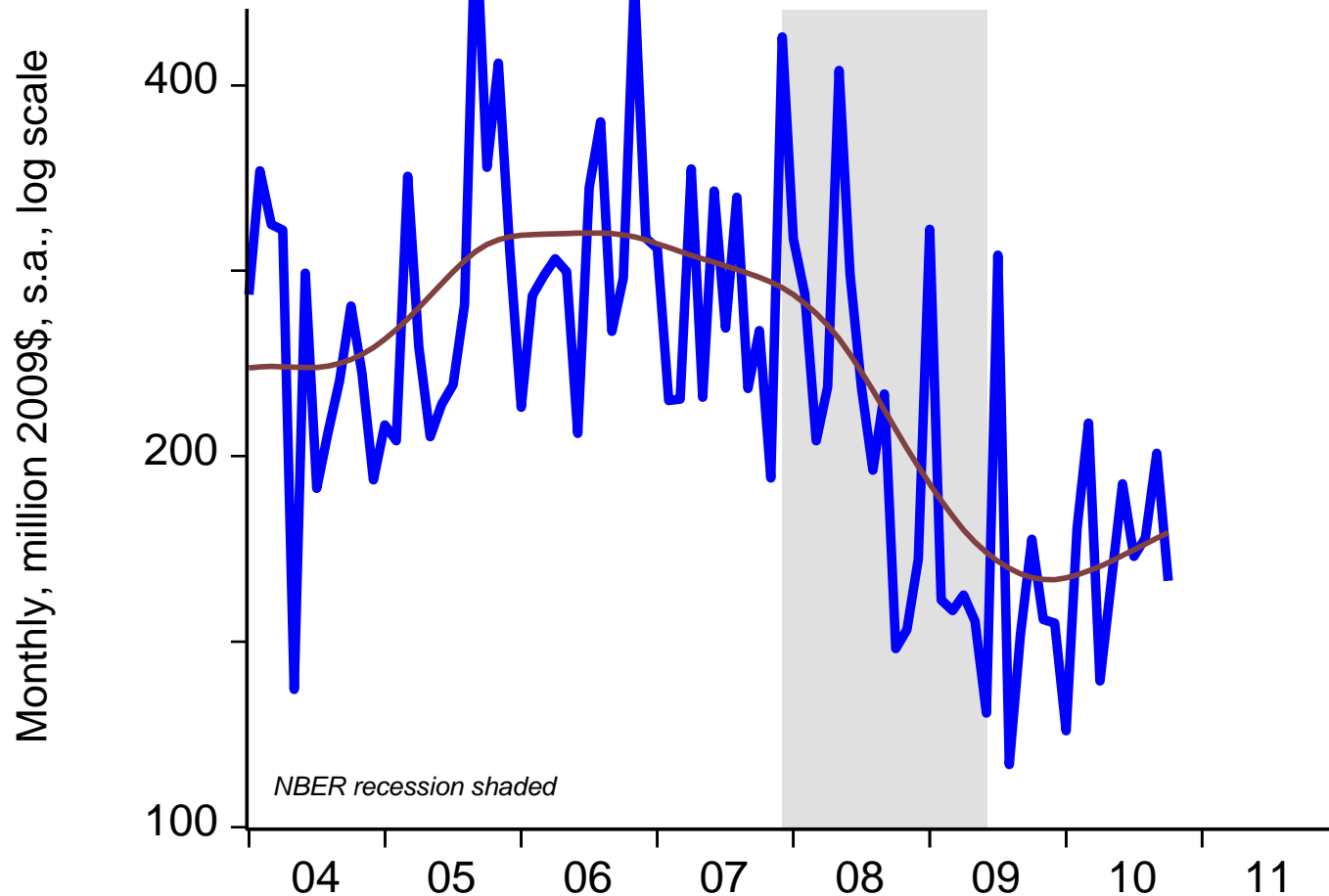
# Metro area office vacancy rates



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Sources: Federal Reserve Bank of San Francisco (<http://www.frbsf.org/publications/economics/et/index.pdf>) based on CBRE Econometric Advisors

# Despite Hawaii's credit crunch total private building commitments should continue rising

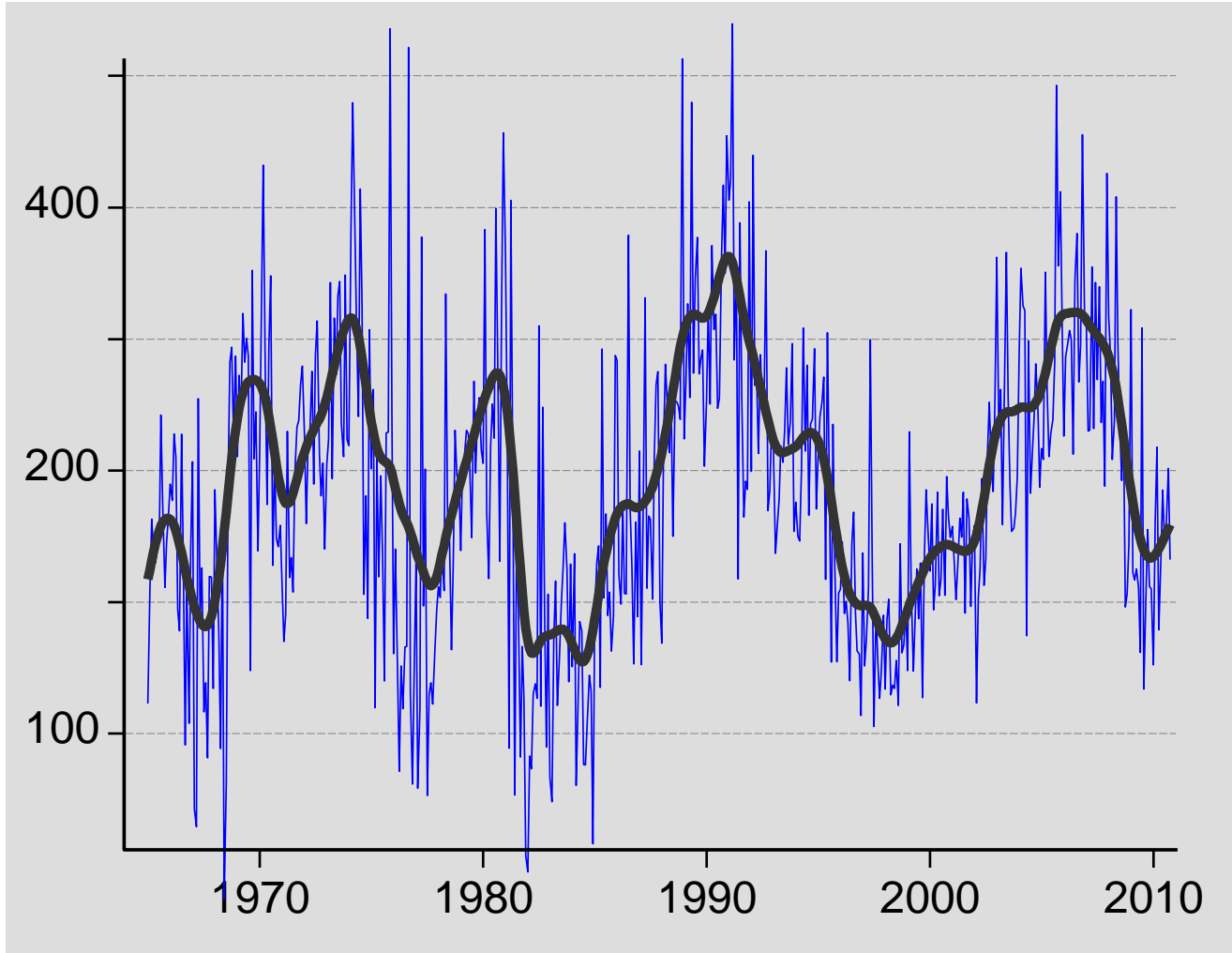


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Source: County building departments, Hawaii DBEDT, monthly through October 2010; seasonal adjustment, trend/cycle extract by TZE

# Real value of total private building permits: three major cyclical waves since the 1960s

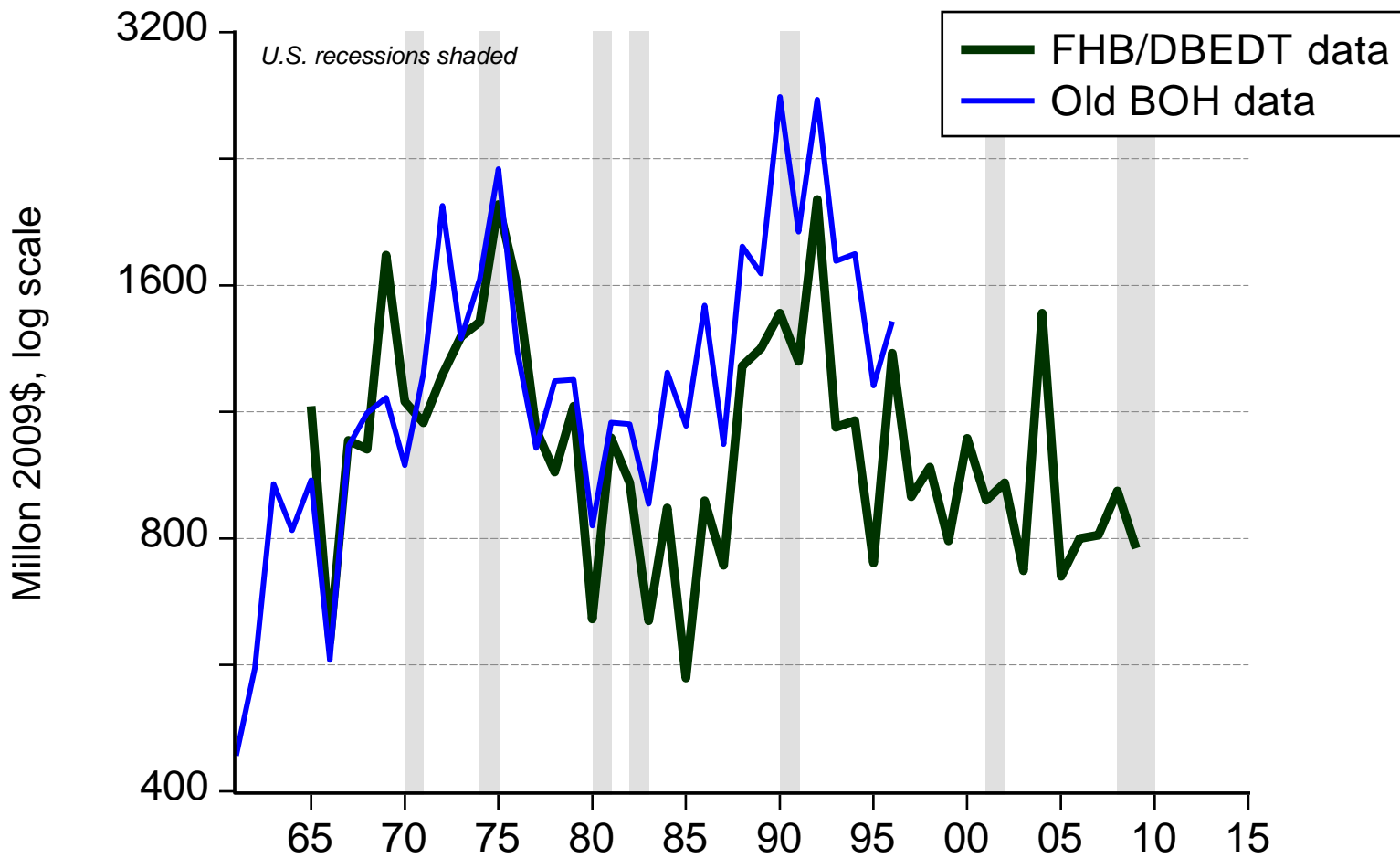
Monthly, million 2009\$, s.a., log scale



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Source: County building departments, Hawaii DBEDT, monthly through October 2010; seasonal adjustment, trend/cycle extract by TZE

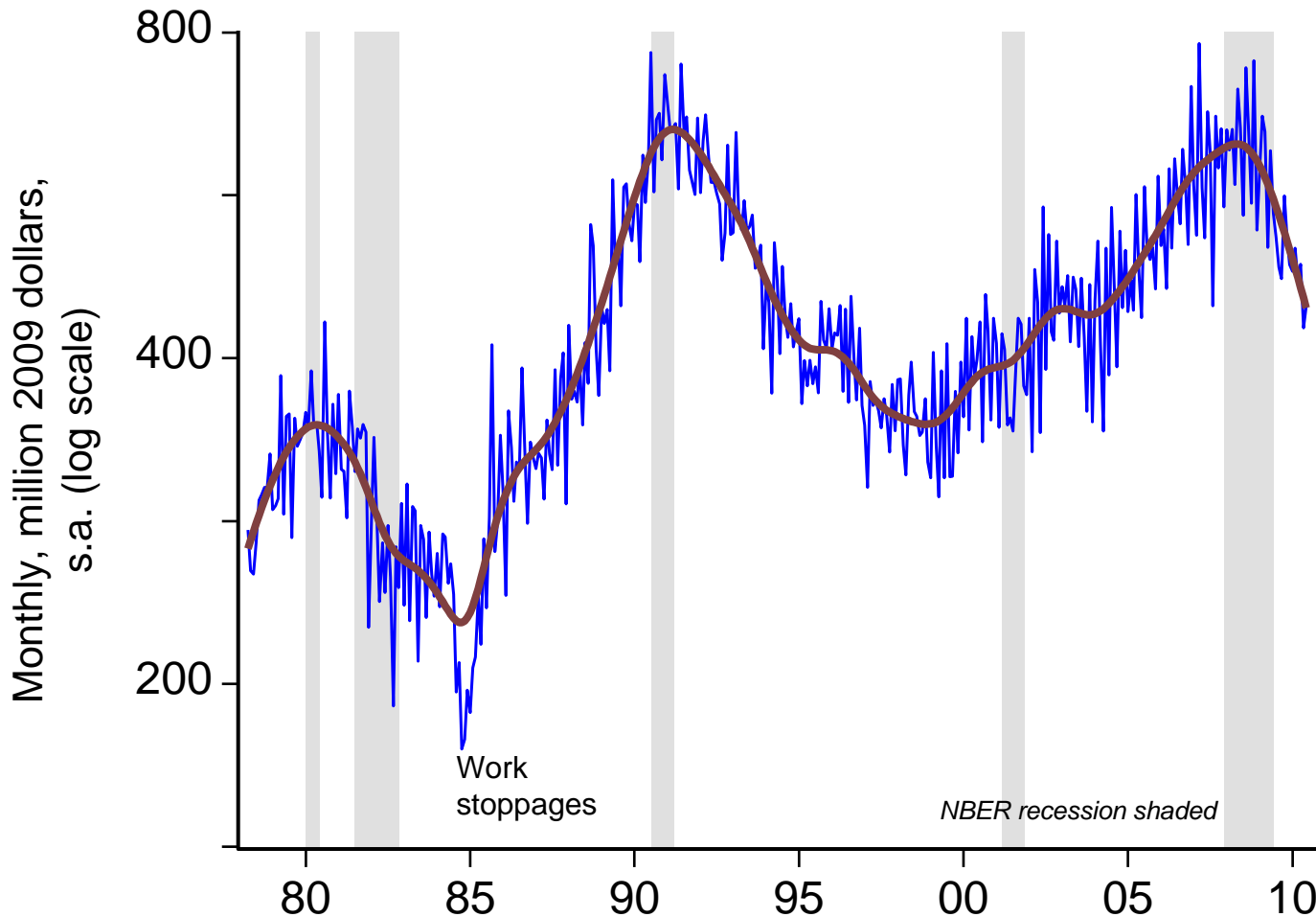
# Real total government construction contracts: *two major cyclical waves since the 1960s*



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Source: Hawaii DBEDT, U.S. Bureau of the Census, TZE

# No turn yet in construction spending data: Hawaii taxable contracting receipts through mid-year 2010



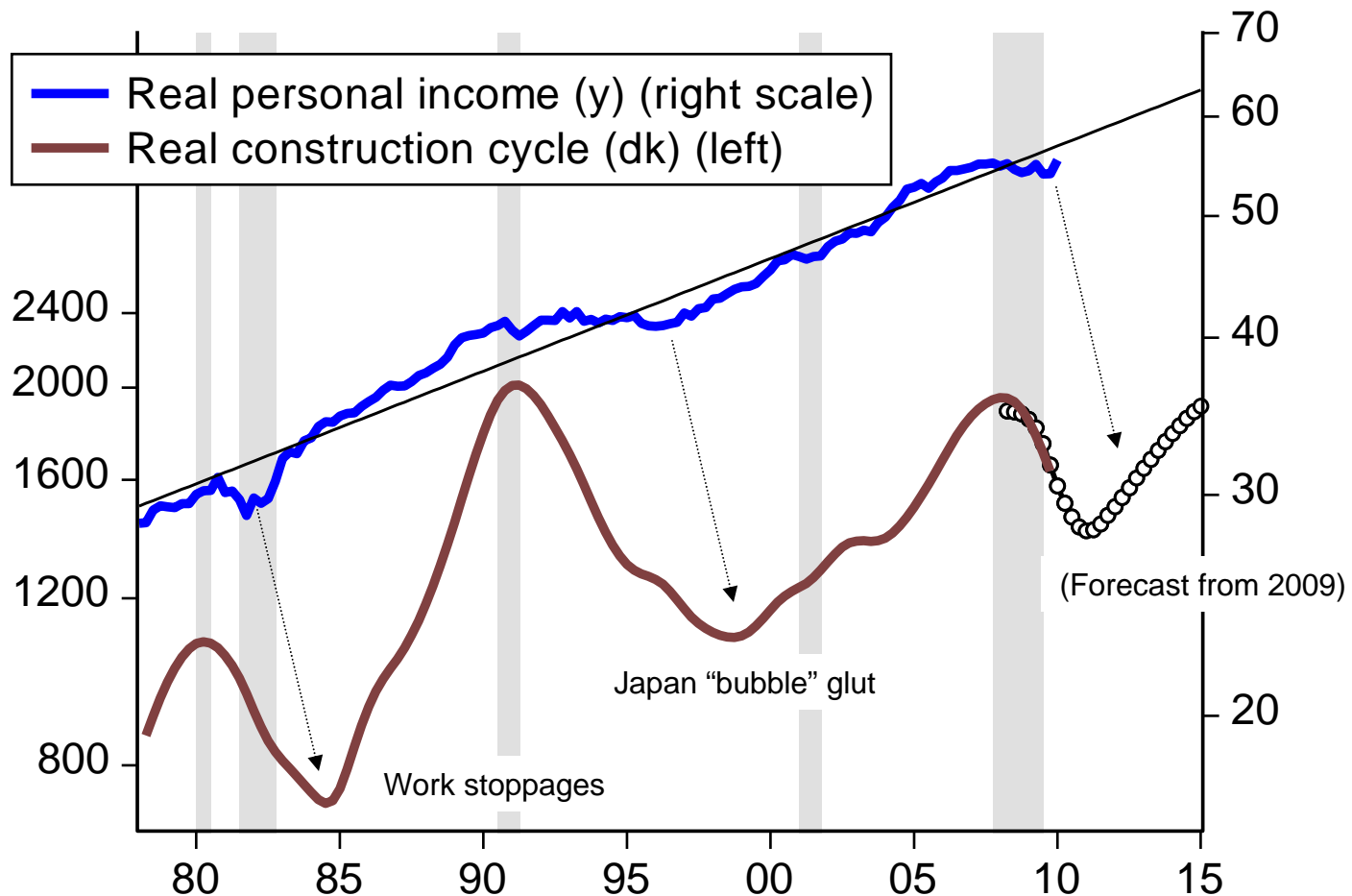
Yikes!

Give it time:  
my forecast  
says it will  
rise after  
March 2011

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Source: Hawaii DBEDT, U.S. Bureau of the Census; seasonal adjustment using Census X-12 ARIMA, cycle/trend using Hodrick-Prescott filter, both by TZE

# Construction math: “ $dy \Rightarrow d^2k$ ” (the accelerator) forecast *includes* TheTrain, State’s “billion dollars”



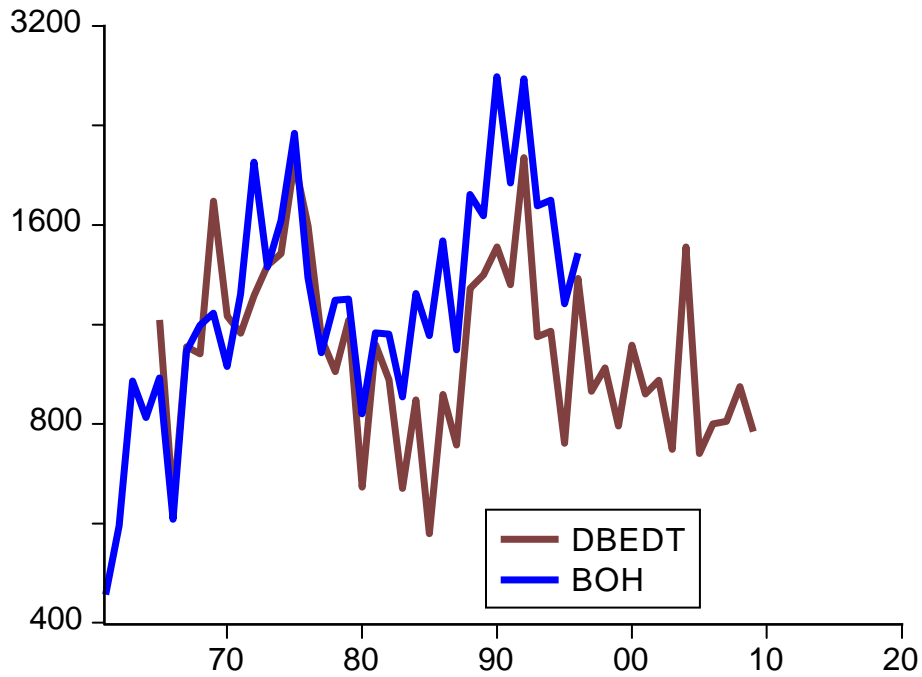
Slide copyright 2011 TZ Economics

Source: Bureau of Economic Analysis, Hawaii Department of Taxation; deflation, seasonal adjustment, trend estimation and construction H-P filter trend (cycle) extraction, and January 2009 forecast by TZ Economics

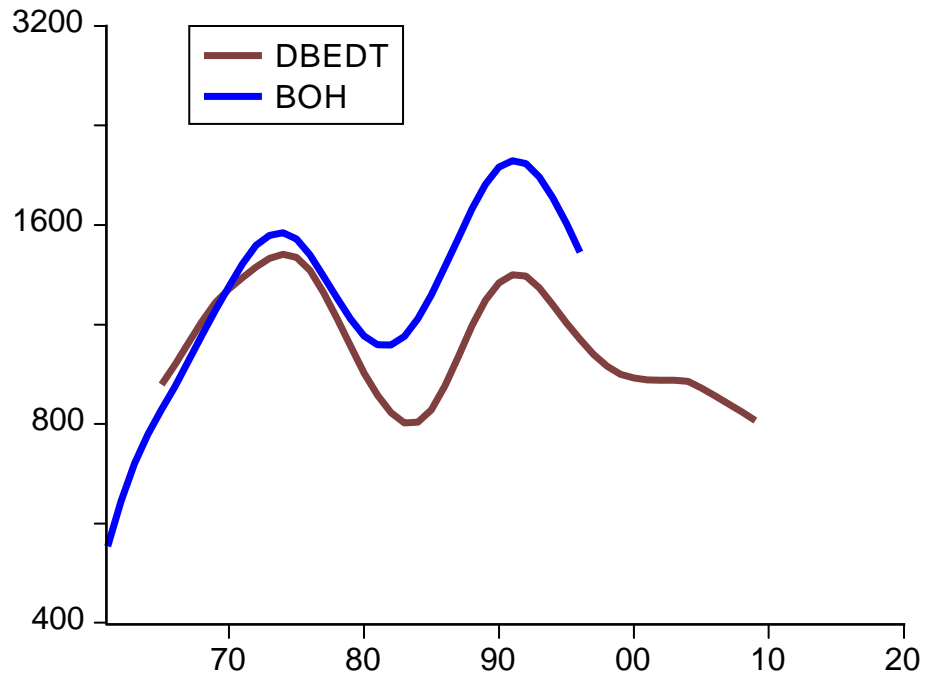


# Elements of a construction cycle forecast

# Extracting the cycles: government construction

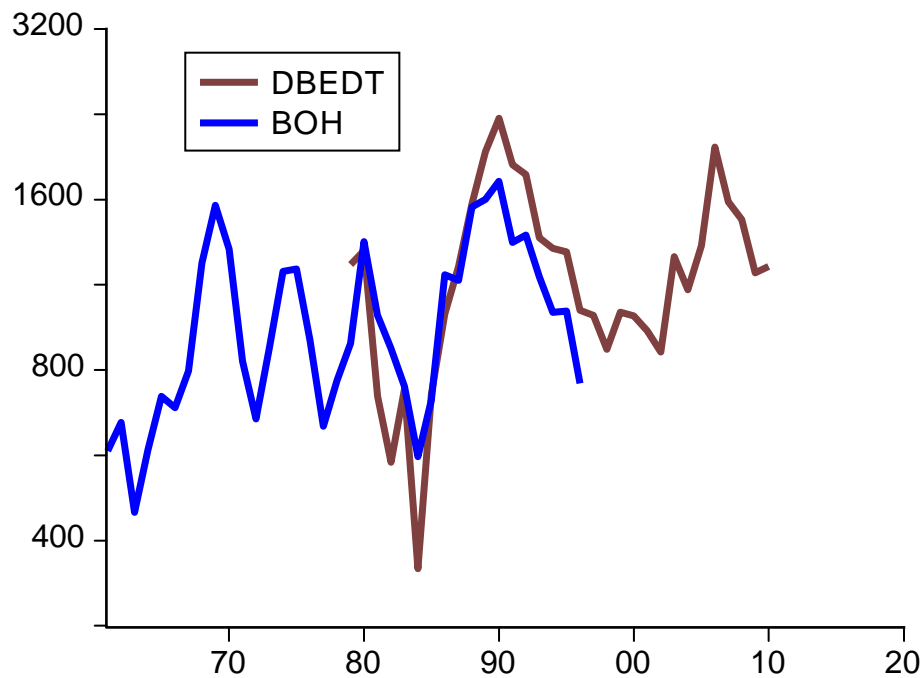


Raw data: constant dollars

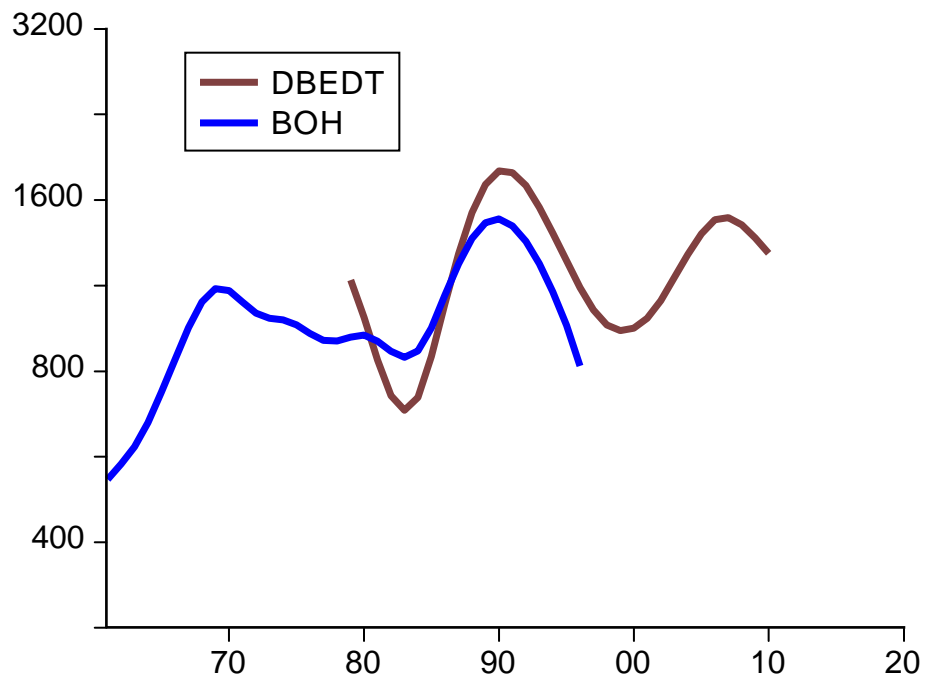


Extracted cycle/trend

# Extracting the cycles: nonresidential construction

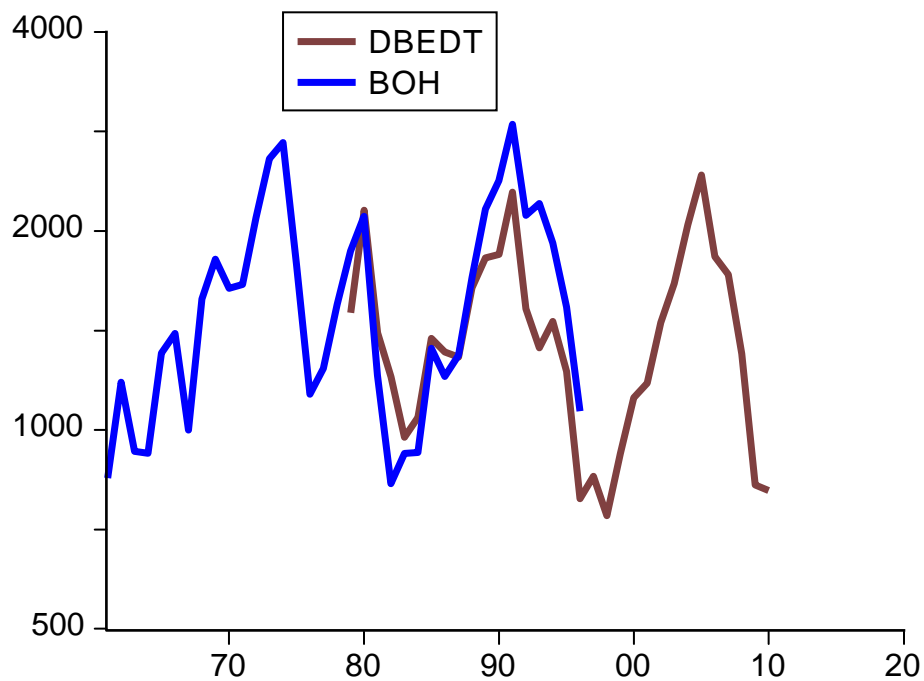


Raw data: constant dollars

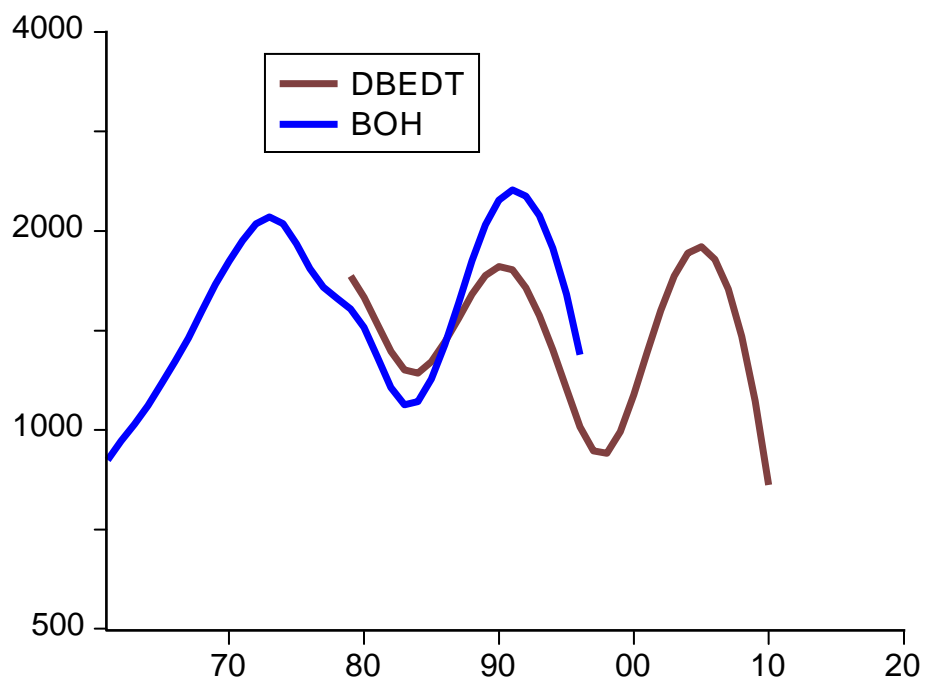


Extracted cycle/trend

# Extracting the cycles: residential construction

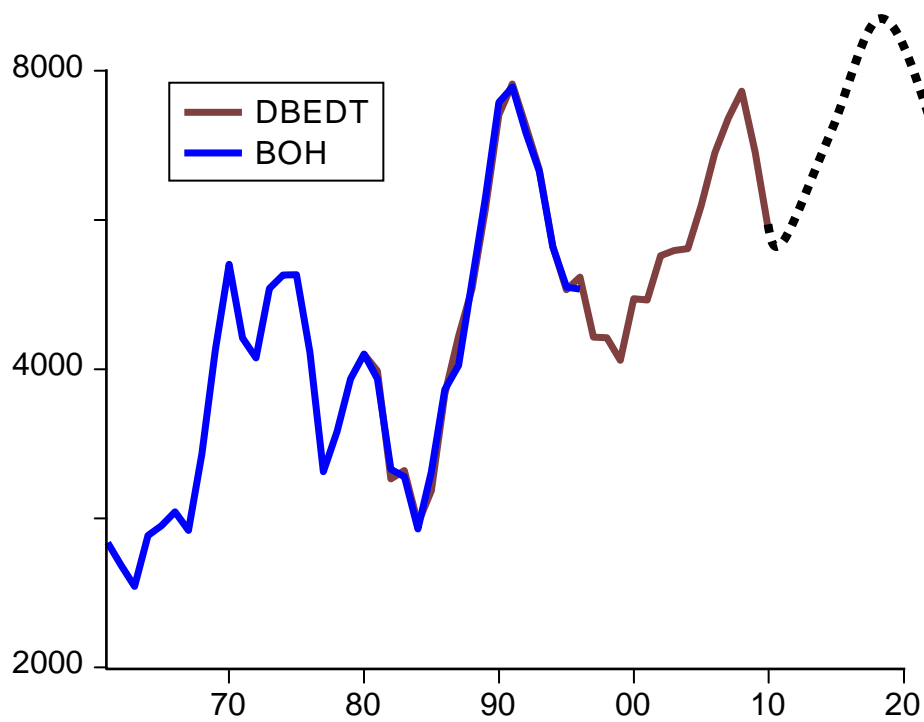


Raw data: constant dollars

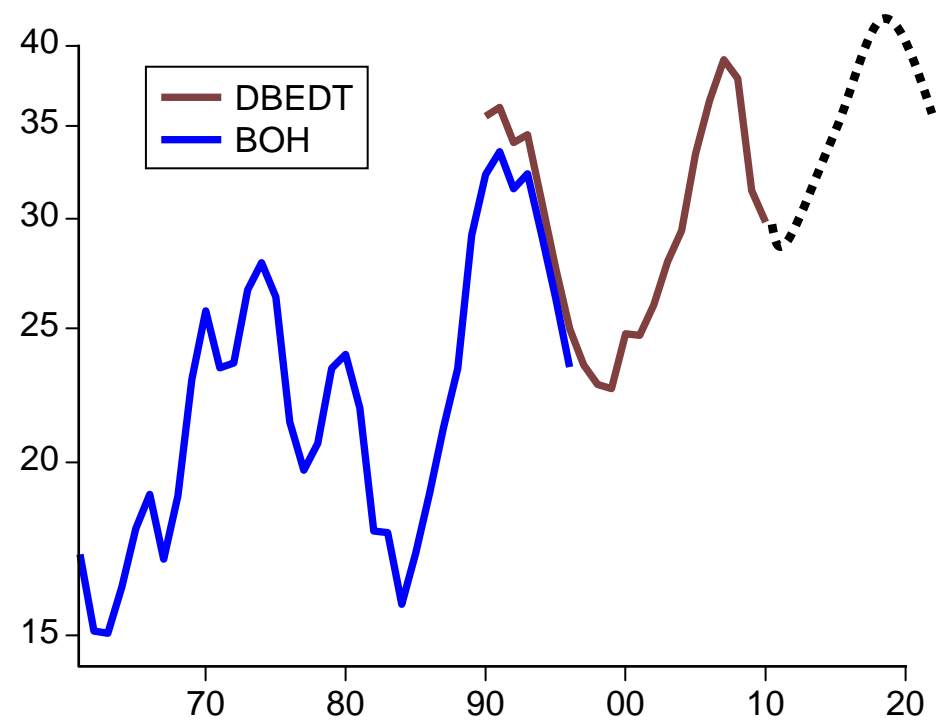


Extracted cycle/trend

# Extracting the cycles: spending and jobs



Real contracting receipts



Construction payroll employment