



# Census Developments & Their Impact on Market Analysis

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U.S. Census Bureau

NCHMA Annual Meeting  
December 8, 2020

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2020

# Acknowledgements

**This presentation includes work by the Census Bureau's 2020 Disclosure Avoidance System development team, Census Bureau colleagues, and our collaborators, including:** John Abowd, Tammy Adams, Robert Ashmead, Craig Corl, Ryan Cummings, Jason Devine, John Fattaleh, Simson Garfinkel, Nathan Goldschlag, Michael Hawes, Michael Hay, Cynthia Hollingsworth, Michael Ikeda, Kyle Irimata, Dan Kifer, Philip Leclerc, Ashwin Machanavajjhala, Christian Martindale, Gerome Miklau, Claudia Molinar, Brett Moran, Ned Porter, Sarah Powazek, Vikram Rao, Chris Rivers, Anne Ross, Ian Schmutte, William Sexton, Rob Sienkiewicz, Matthew Spence, Tori Velkoff, Lars Vilhuber, Bei Wang, Tommy Wright, Bill Yates, and Pavel Zhurlev.

For more information and technical details relating to the issues discussed in these slides, please contact the author at [michael.b.hawes@census.gov](mailto:michael.b.hawes@census.gov).

Any opinions and viewpoints expressed in this presentation are the author's own, and do not represent the opinions or viewpoints of the U.S. Census Bureau.

The statistics included in this newsletter have been cleared for public dissemination by the Census Bureau's Disclosure Review Board (CBDRB-FY20-DSEP-001, CBDRB-FY20-281, and CBDRB-FY20-101).

# Our Commitment to Privacy and Confidentiality

Data stewardship is central to the Census Bureau's mission to produce high-quality statistics about the people and economy of the United States.

Our commitment to protect the privacy of our respondents and the confidentiality of their data is both a legal obligation and a core component of our institutional culture.



# Upholding our Promise: Today and Tomorrow

We cannot merely consider privacy threats that exist today.

We must ensure that our disclosure avoidance methods are also sufficient to protect against the threats of tomorrow!



# The Census Bureau's Privacy Protections Over Time

Throughout its history, the Census Bureau has been at the forefront of the design and implementation of statistical methods to safeguard respondent data.

Over the decades, as we have increased the number and detail of the data products we release, so too have we improved the statistical techniques we use to protect those data.



# The Privacy Challenge

Every time you release any statistic calculated from a confidential data source you “leak” a small amount of private information.

If you release too many statistics, too accurately, you will eventually reveal the entire underlying confidential data source.

*Dinur, Irit and Kobbi Nissim (2003) “Revealing Information while Preserving Privacy” PODS, June 9-12, 2003, San Diego, CA*



# The Growing Privacy Threat

## More Data and Faster Computers!

In today's digital age, there has been a proliferation of databases that could potentially be used to attempt to undermine the privacy protections of our statistical data products.

Similarly, today's computers are able to perform complex, large-scale calculations with increasing ease.

These parallel trends represent new threats to our ability to safeguard respondents' data.

# Differential Privacy

- quantifies the precise amount of privacy risk...
  - for all calculations/tables/data products produced...
    - no matter what external data is available...
      - now, or at any point in the future!



# Precise amounts of noise

Differential privacy allows us to inject a precisely calibrated amount of noise into the data to control the privacy risk of any calculation or statistic.

# Privacy vs. Accuracy

The only way to absolutely eliminate all risk of re-identification would be to never release any usable data.

Differential privacy allows you to quantify a precise level of “acceptable risk,” and to precisely calibrate where on the privacy/accuracy spectrum the resulting data will be.

Providing accurate data



Safeguarding individual privacy

Data Quality | Bnae Kegouqe  
Dada Quality | Vrkk Jzcfkdy  
Data Quality | Dncb PrhvBl  
Dzte Quality | Dncb Prtnavy  
Dfha Quapyti | Tgta Ppijacy  
Tgta Qucjity | Dfha Pnjvico  
Dncb Qhulitn | Dzhe Njivaci  
Ntue Quevdto | Dzte Privacy  
Vrkk Zuhnvry | Dada Privacg  
Bnaq Denorbe | Data Privacy

# Establishing a Privacy-loss Budget

This measure is called the “Privacy-loss Budget” (PLB) or “Epsilon.”

$\epsilon=0$  (perfect privacy) would result in completely useless data

$\epsilon=\infty$  (perfect accuracy) would result in releasing the data in fully identifiable form



Epsilon

# Comparing Methods

## Data Accuracy

Differential Privacy is not inherently better or worse than traditional disclosure avoidance methods.

Both can have varying degrees of impact on data quality depending on the parameters selected and the methods' implementation.

## Privacy

Differential Privacy is substantially better than traditional methods for protecting privacy, insofar as it actually allows for measurement of the privacy risk.

# Implications for the 2020 Census

The switch to Differential Privacy does not change the constitutional mandate to apportion the House of Representatives according to the actual enumeration.

As in 2000 and 2010, the Census Bureau will apply privacy protections to the PL94-171 redistricting data.

The switch to Differential Privacy requires us to re-evaluate the quantity of statistics and tabulations that we will release, because each additional statistic uses up a fraction of the privacy-loss budget (epsilon).

# Additional Resources

## Disclosure Avoidance and the 2020 Census Website

[https://www.census.gov/about/policies/privacy/statistical\\_safeguards/disclosure-avoidance-2020-census.html](https://www.census.gov/about/policies/privacy/statistical_safeguards/disclosure-avoidance-2020-census.html)

## Questions? Suggestions?

Email them to [2020DAS@census.gov](mailto:2020DAS@census.gov)

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# Overview

## Assessing Housing Markets in 2020 with Census Data

### Roadmap:

- **How has the pandemic affected the Housing Vacancy Survey and related surveys?**
- **What does the Household Pulse Survey reveal about housing experiences in 2020?**

# Housing Vacancy Survey

## Changes in Data Collection Procedures and Non-Response Patterns

### **Housing Vacancy Survey:**

- Quarterly and annual estimates for U.S. & 75 Largest MSAs:
  - Rental vacancy rate (Primary Economic Indicator)
  - Homeowner vacancy rate
  - Homeownership rate
  - Housing inventory
- Collected as a supplement to the Current Population Survey every month
- A multi-stage stratified sample of ~72,000 housing units



# Housing Vacancy Survey

## Changes in Data Collection Procedures and Non-Response Patterns

### **The COVID-19 Pandemic Led to Changes in Data Collection Procedures:**

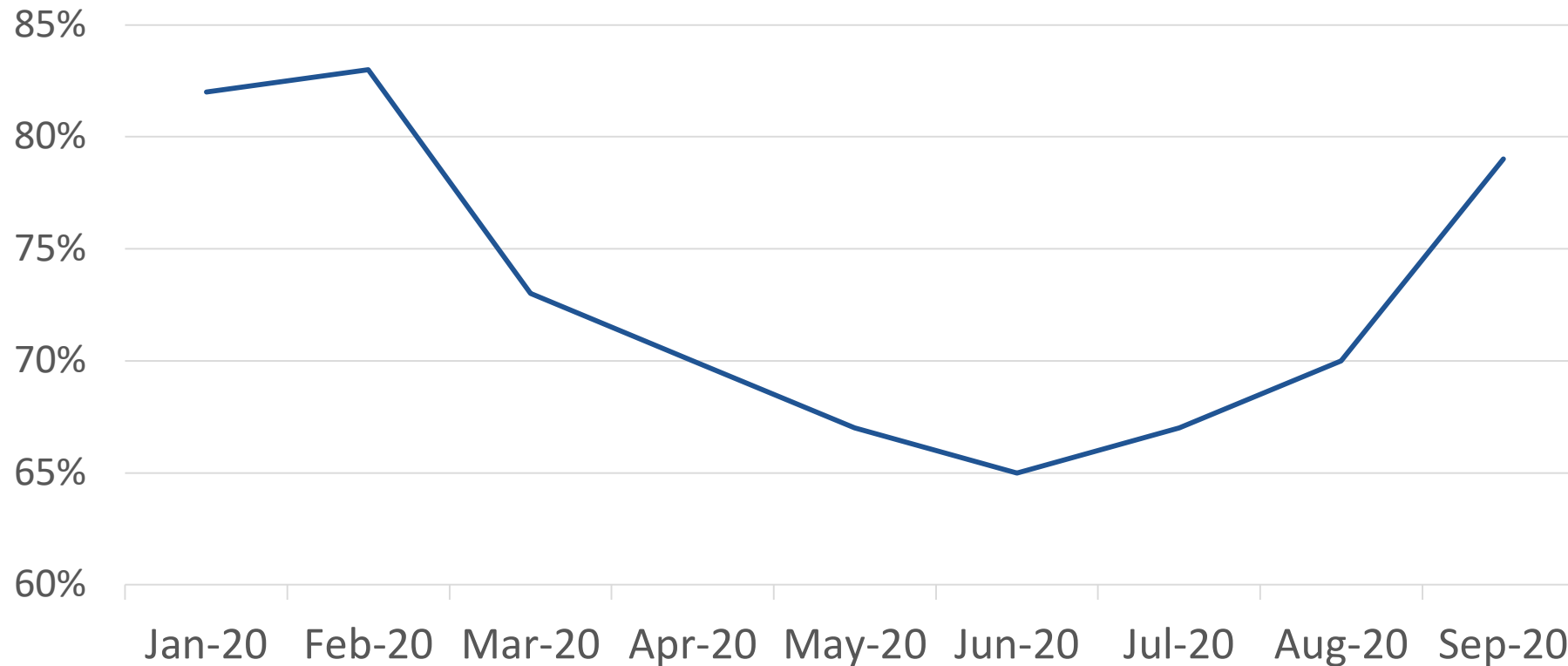
- **Standard Data Collection Procedures:**
  - Sample housing units are in sample for 4 consecutive months, out for 8 months, and then back in sample for 4 months.
  - In-person data collection is required in months 1 and 5. Telephone interviews are allowed in other months only if certain conditions are met.
- **Changes Made in Response to COVID-19 Pandemic:**
  - In-person visits were suspended on March 20<sup>th</sup>, 2020.
  - Data collection shifted to telephone attempts. Telephone numbers were identified through multiple sources: HVS recontact information from prior month, telephone lookup databases, public records data, knowledgeable local sources, etc.
  - In-person visits were reintroduced in some geographies in July (39%) and August (50%) and all areas in September (100%).

# Housing Vacancy Survey

## Changes in Data Collection Procedures and Non-Response Patterns

**The HVS response rate declined during the period of suspended in-person visits.**

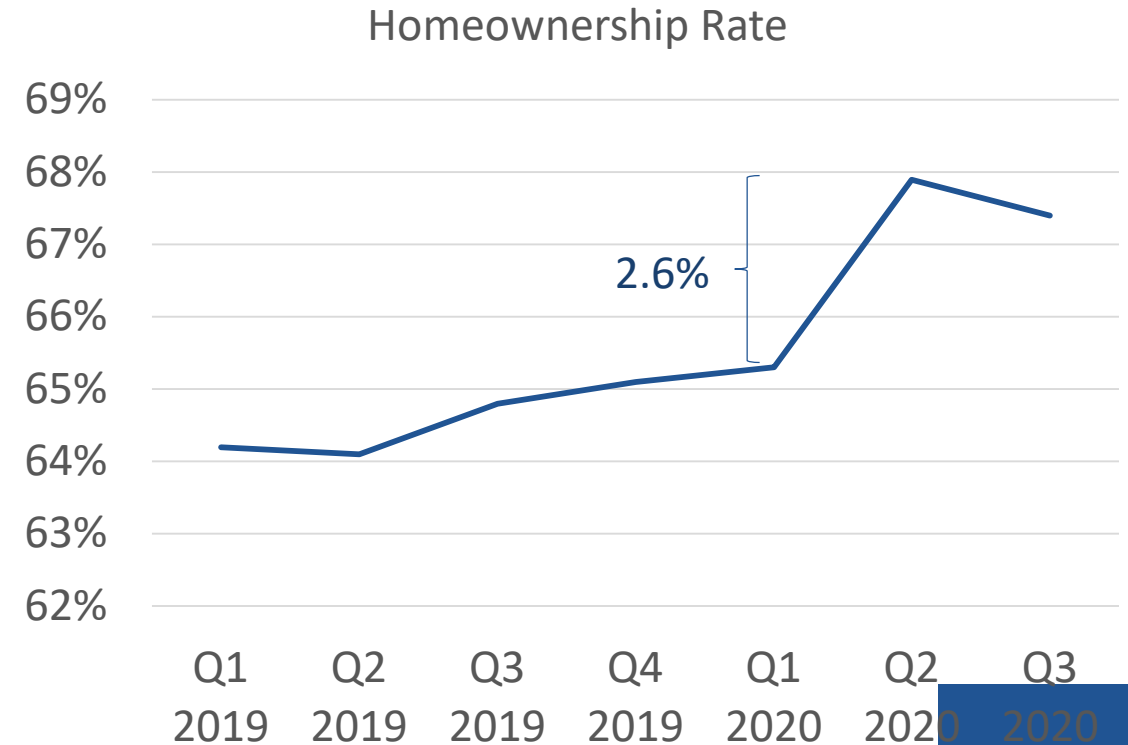
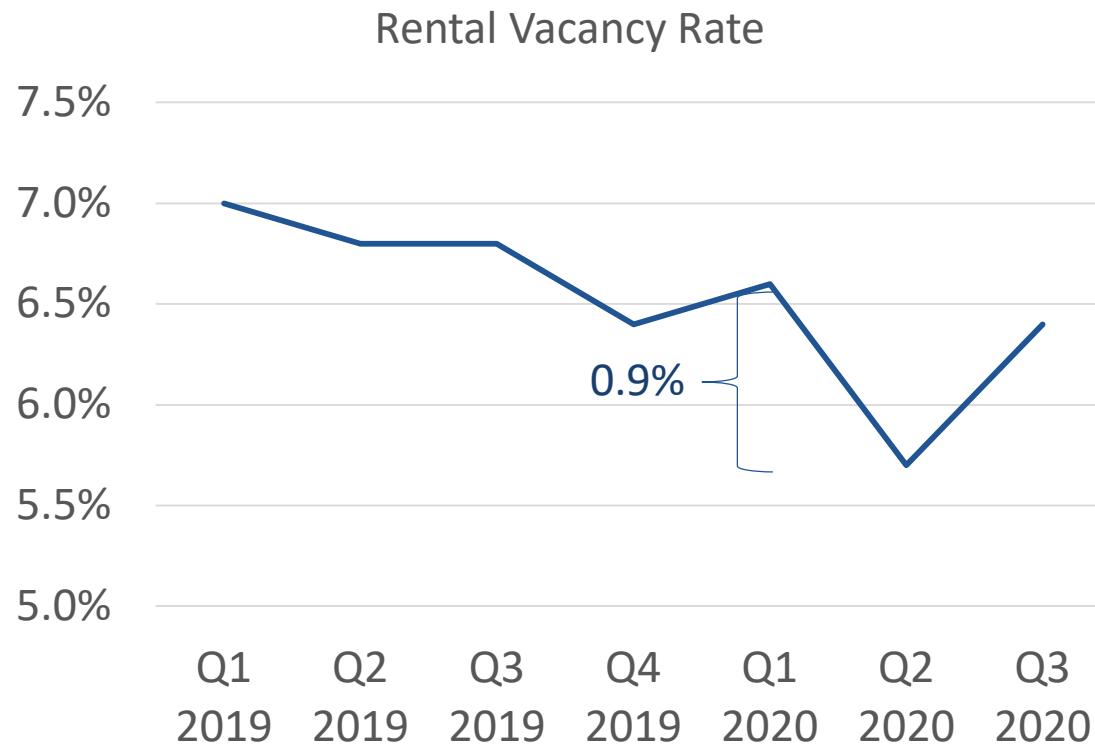
CPS/HVS Response Rate by Month



# Housing Vacancy Survey

## Changes in Data Collection Procedures and Non-Response Patterns

**Q2 2020 shows sizable changes in both rental vacancy and homeownership.**



# Housing Vacancy Survey

## Changes in Data Collection Procedures and Non-Response Patterns

**The changes in data collection procedures were accompanied by changes in the attributes of respondents vs. non-respondents in the March CPS ASEC.**

### Coronavirus Infects Surveys, Too: Nonresponse Bias During the Pandemic in the CPS ASEC\*

Jonathan Rothbaum  
U.S. Census Bureau

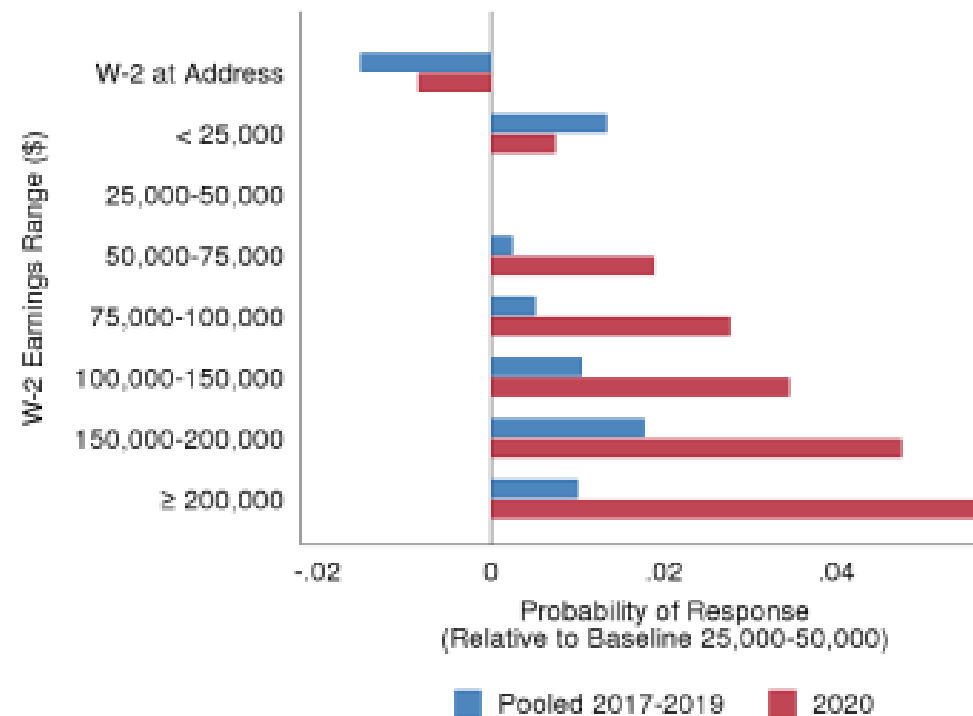
Adam Bee  
U.S. Census Bureau

SEHSD Working Paper Number 2020-10  
September 15, 2020

#### Abstract

The Coronavirus pandemic has had wide-ranging impacts on the lives and well-being of individuals and households. Surveys of those individuals and households are an important input into understanding those impacts. However, survey operations themselves have also been affected by the pandemic. We evaluate how response in the Current Population

### B. Pooled 2017-2019 and 2020



# Overview

## Assessing Housing Markets in 2020 with Census Data

### Roadmap:

- How has the pandemic affected the Housing Vacancy Survey and related surveys?
- **What does the Household Pulse Survey reveal about housing experiences in 2020?**

# Household Pulse Survey

# Goals, Timeline, and Collaboration

## Goal

The Household Pulse Survey is designed to deploy quickly and efficiently, collecting data on a range of ways in which people's lives have been impacted by the pandemic. Since the environment and circumstances we are operating in are rapidly changing, the Household Pulse Survey design was meant to be able to quickly assess and report on critical issues, as fast as possible.

## Timeline

Development: March 23–April 23, 2020

Phase 1: April 23–July 21, 2020

Phase 2: August 19–October 26, 2020

Phase 3: October 28–December 2020

## Experimental Rapid Response Survey

Proof of Concept

## Partners

### Phase 1

Bureau of Labor Statistics

National Center for Health Statistics

Housing and Urban Development

National Center for Education Statistics

USDA Economic Research Service

Office of Management and Budget

### Phase 2 Additional Agencies:

Bureau of Transportation Statistics

Social Security Administration

# Household Pulse Survey

# Data Collection

## Phase 1

- April 23 – July 21
- Email and text invitations
- Weekly Thursday through Tuesday data collection
- Weekly data releases through interactive data tool, static tables, and public-use microdata file
- National and state-level data and 15 largest MSAs
- Longitudinal Sample
- 40,000-100,000 responses (1-4% response rate)

## Changes for Phase 2 & Phase 3

- August 19 – October 26; October 27 – December 21
- Two-week Wednesday to Monday data collection
- Data released every two weeks via interactive data tool, static tables, and public-use microdata file
- No longitudinal sample
- 80,000-110,000 responses (8-11% response rate)

# Household Pulse Survey

## Content: Phase 1 and Phase 2

### Basic demographics

Age, sex, race, Hispanic origin, marital status, educational attainment

### Employment questions

Employment and employment income (BLS/Census)

Spending source of funds (BLS)

Series on expenditures (BLS)

Commuting and Telework series (BTS)

Transportation Questions (BTS)

### Food security questions

Past and current food sufficiency (USDA-ERS)

Free meals (USDA-ERS)

Money spent on groceries and prepared foods (USDA-ERS)

SNAP receipt (USDA-ERS)

### Program use

Social Security programs (SSA)

Unemployment Insurance (BLS)

### Health questions

Overall health (NCHS)

Mental health and mental health services use (NCHS)

Health insurance (NCHS/Census)

Access and delays in health care (NCHS)

### Housing questions

Tenure (HUD)

Living quarters and bedrooms (HUD)

Rent and mortgage current payment status (HUD)

Confidence about paying rent/mortgage next month (HUD)

Eviction and foreclosure expectations (HUD)

### Education questions

Effects of COVID on how K-12 children received education (NCES)

Access to computer/digital device and internet availability (NCES)

Time spent with teachers, spent on educational activities, and studying (NCES)

Post-Secondary questions (NCES)



## Household Pulse Survey

Expected Loss in Employment Income

Telework

Food Scarcity

**Housing Insecurity**

Likelihood of Eviction or Foreclosure

Difficulty Paying for Usual Household Expenses

Change in Post-Secondary Education

**Filter By:**

States: Oregon, Washington

Metro Areas: —

Reset

The Household Pulse Survey is designed to deploy quickly and efficiently, collecting data on a range of ways in which people's lives have been impacted by the pandemic. Data will be disseminated in near real-time to inform federal and state response and recovery planning.

**Measure Definition:** Percentage of adults who are not current on rent or mortgage payments, or who have slight or no confidence that their household can pay next month's rent or mortgage on time.

**Notes:**

• Percentages are based on reporting

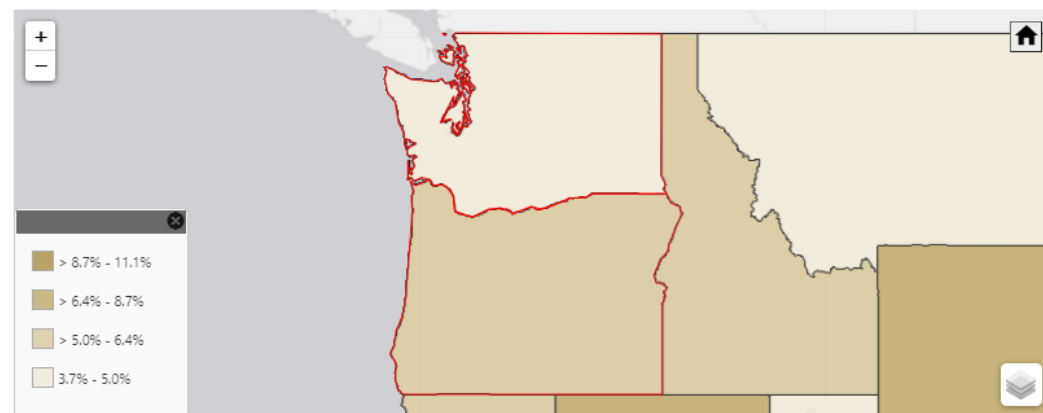
### Housing Insecurity

Percentage of adults who are not current on rent or mortgage payments, or who have slight or no confidence that their household can pay next month's rent or mortgage on time



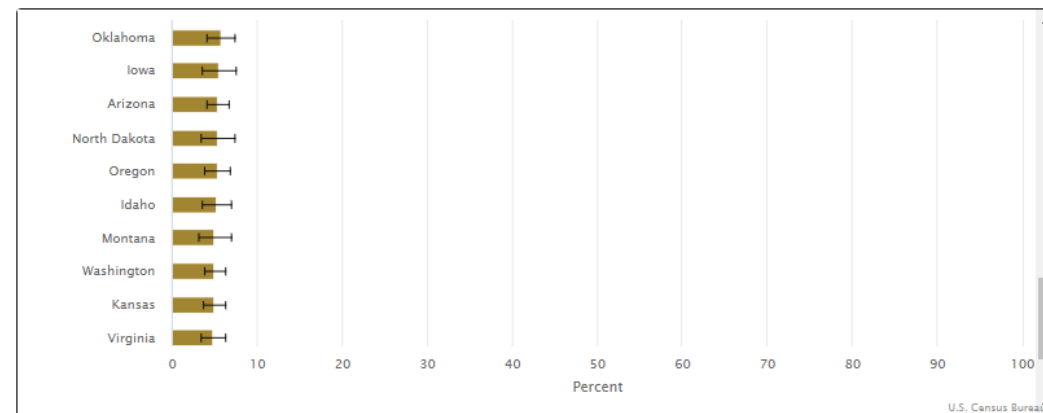
Week 14

States



Week 14

States

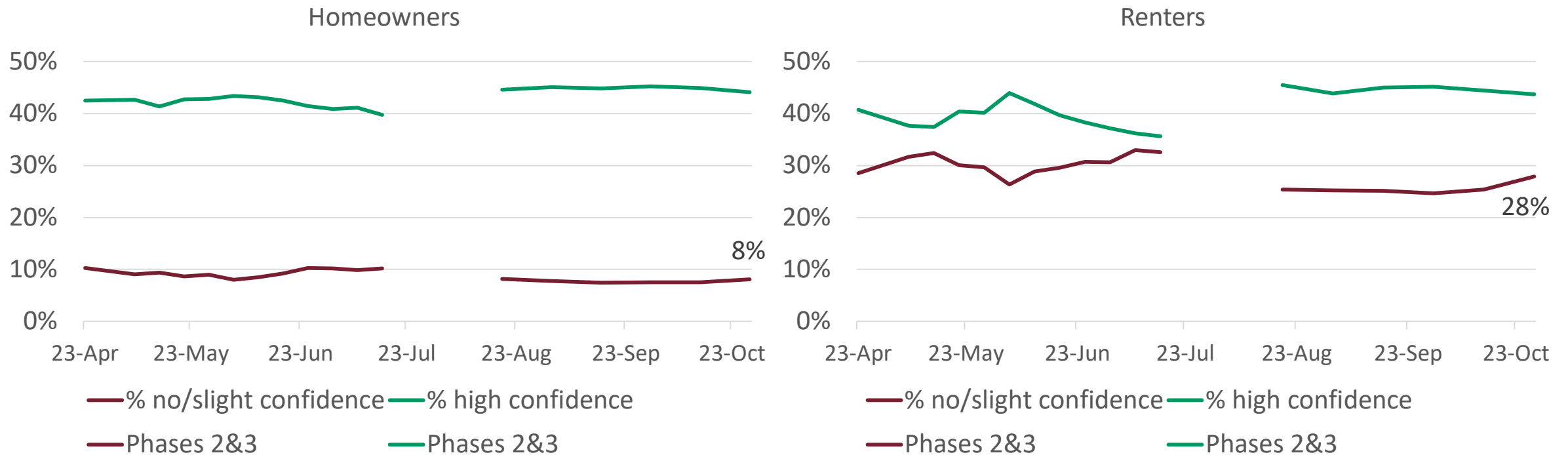


Week	Area	Total Housing Insecurity			Housing Insecurity Percent	
		Total Individual Population age 18+	Number	Margin of Error +/-	Percent	Percent Margin of Error +/-
14	United States	249,170,916	10,672,074	572,299	7.3	0.4
14	Oregon	3,302,727	114,517	31,747	5.3	1.5
14	Washington	5,890,357	185,459	46,126	5.0	1.2

Is this page helpful?   
 Yes No

# Household Pulse Survey Findings

**28% of adult renter population and 8% of adult homeowner population had no or slight confidence in their ability to make their next month's payment.**



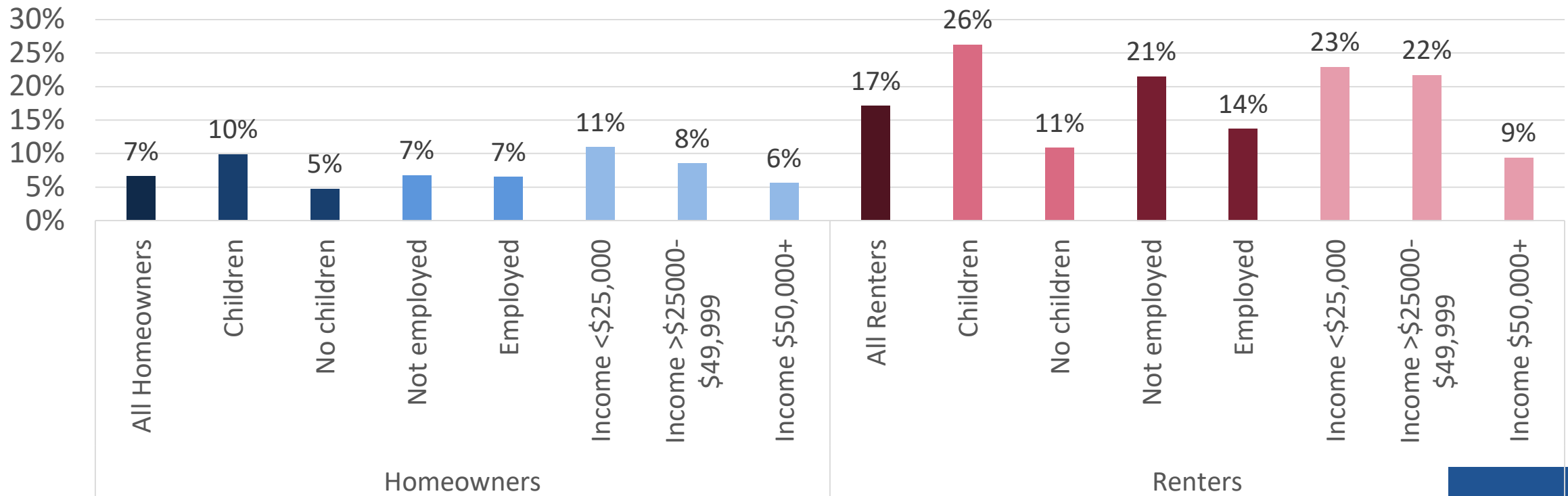
Note: Estimates show the ratio of the total 18+ homeowner (renter) population living in units with the identified confidence level to the total 18+ homeowner (renter) population.

Source: U.S. Census Bureau Household Pulse Survey. Weeks 1-18.

# Household Pulse Survey Findings

## 17% of Adult Renter Population & 7% of Adult Homeowner Population Live in Households Currently Behind on their Payments.

% of Homeowners/Renters Currently Behind on Mortgage/Rent Payments



Source: U.S. Census Bureau Household Pulse Survey. Week 18.

# Household Pulse Survey

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# Questions