

# Carbon, Water, & Money



Dr. Charlie Hall  
Professor & Ellison Chair  
charliehall@tamu.edu

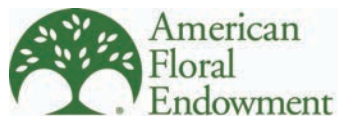
An Update on Marketing and  
Economic Research

*It is easy to lie with statistics. It is  
hard to tell the truth without them.*

Andrejs Dunkels,  
mathematician, teacher, writer

1

## Acknowledgements



2

## Topics

1. What's the status of the carbon/water footprint research?
2. How much has the cost of grower inputs increased?
3. What are some key grower-level benchmarks?
4. How's the economy and when will the next recession start?

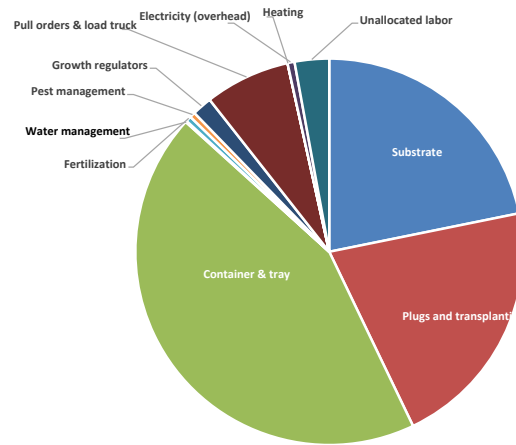
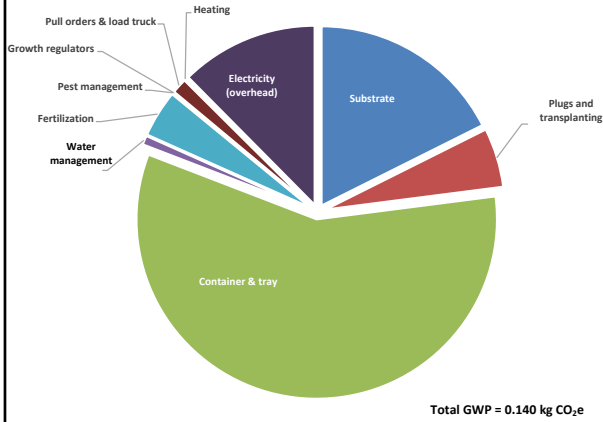
3

## Carbon/water footprint research:

- FNRI & SCRI & HRI funding.
- Economic engineering approach.
- Representative growing/irrigation BMPs.
- 3-gal woodies on East and West Coast, Young plants, Annuals (Begonias), Potted Flowering (Poinsettias), Outdoor (Mums)

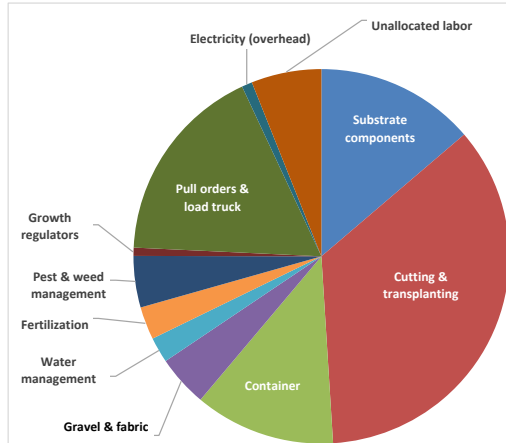
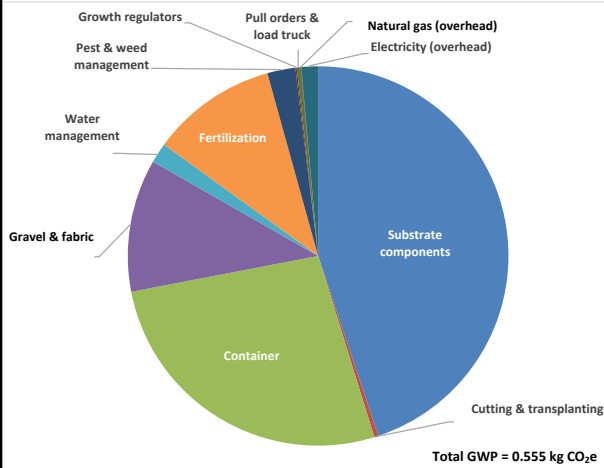
4

# Begonias



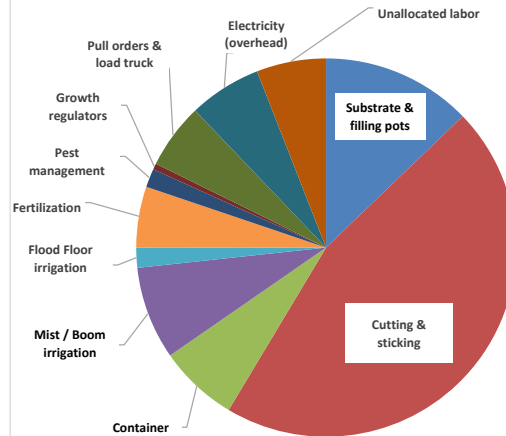
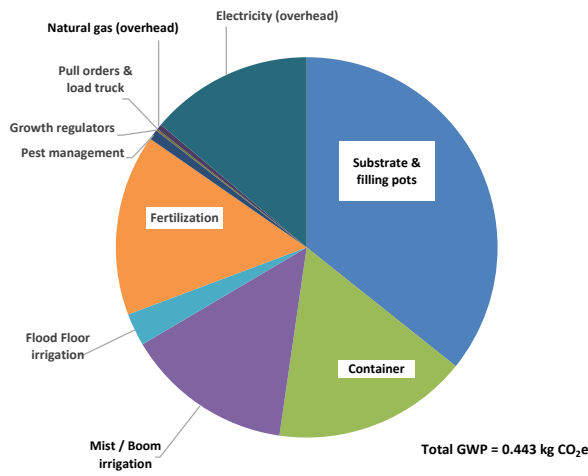
5

# Mums



6

# Poinsettias



7

## Why does this matter?



1. A correlation exists between GWP & costs.
2. Sustainable messages increase LTP and WTP.
  - Biodegradable & recyclable containers
  - Pollinator-friendly
  - Water and energy conserving
  - Carbon neutral or saving
  - Functional benefits (JEH 4-part series)

8

**Journal of Environmental Horticulture**

Horticultural Research Institute

Home Content For Authors About HRI Editorial Board Publication Policy Help

Well-being benefits Go

Home > Advanced Search

Advanced Search

Search For:

Author:

Title:

Keyword:

Anywhere in Article:

Well-being benefits

Abstract:

DOI:

Publication Date:

Start: Month Year

End: Month Year

Search Clear

Search Results

View Abstracts Add to Favorites Share Article Export Citations Track Citations (RSS | Email)

Open access Full access Partial access No access

Search for "All: well-being benefits"

Results: 1-10 of 523

1 2 3 4 5 6 7 8 9 10

Sort by: Relevance

Select All Show excerpts on page

- ☐ An Update of the Literature Supporting the Well-Being Benefits of Plants: Part 2 Physiological Health Benefits  
Charles R. Hall and Melinda J. Knuth  
Journal of Environmental Horticulture Jun 2019, Vol. 37, No. 2 (June 2019) pp. 63-73  
Abstract | Full Text | PDF (115 KB) | Track Citations (RSS | Email)
- ☐ An Update of the Literature Supporting the Well-Being Benefits of Plants: A Review of the Emotional and Mental Health Benefits of Plants  
Charles Hall and Melinda Knuth  
Journal of Environmental Horticulture Mar 2019, Vol. 37, No. 1 (March 2019) pp. 30-38  
Abstract | Full Text | PDF (93 KB) | Track Citations (RSS | Email)
- ☐ Economic, Environmental, and Health/Well-Being Benefits Associated with Green Industry Products and Services: A Review  
Charles R. Hall and Madeline W. Dickson  
Journal of Environmental Horticulture Jun 2011, Vol. 29, No. 2 (June 2011) pp. 96-103  
Abstract | PDF (127 KB) | Track Citations (RSS | Email)

9

ellisonchair.tamu.edu/benefitsofplants/

TEXAS A&M AGRILIFE EXTENSION

**Ellison Chair in International Floriculture**  
Teaching, Research, Extension and Service

BLOG BENEFITS OF PLANTS MARKETING & ECONOMICS WATER RESOURCES SUSTAINABILITY

EXECUTIVE ACADEMY FOR GROWTH & LEADERSHIP (EAGL)

**Our value proposition for the future:  
Emphasizing the benefits of flowers,  
shrubs, trees, and turfgrass**

Summary publications:

1. Economic, Environmental, and Health/Well-Being Benefits Associated with Green Industry Products and Services: A Review (Journal of Environmental Horticulture 29(2):96-103.)
2. An Update of the Literature Supporting the Well-Being Benefits of Plants: A Review of the Emotional and Mental Health Benefits of Plants (Journal of Environmental Horticulture 37(1):30-38.)
3. An Update of the Literature Supporting the Well-Being Benefits of Plants: Part 2 Physiological Health Benefits (Journal of Environmental Horticulture 37(2):63-73.)
4. Plant Benefit Factsheets produced by The Green City

Click below to see more detailed information:

1. Economic benefits of plants
2. Eco-systems services/benefits of plants
3. Health and well-being benefits of plants

Other popular websites summarizing plant benefits:  
Green Cities: Good Health  
Human Dimension of Urban Forestry & Urban Greening  
Landscape & Human Health Laboratory

ABOUT THE CHAIR

- About the Chairholder
- Donors
- Contacts

ADVISORY COMMITTEE

- Overview
- Permanent Seats
- Rotating Seats
- Ex-Officio Members
- Members Emeritus
- Early History of the Ellison Chair

MULTIMEDIA

- Charlie's Angle
- Webinars
- Distinguished Lecture Series
- Recent Presentations
- YouTube - Ellison Chair Channel
- Introductory Employee Training Program for Greenhouse Croon Production

<https://ellisonchair.tamu.edu/benefitsofplants/>

10

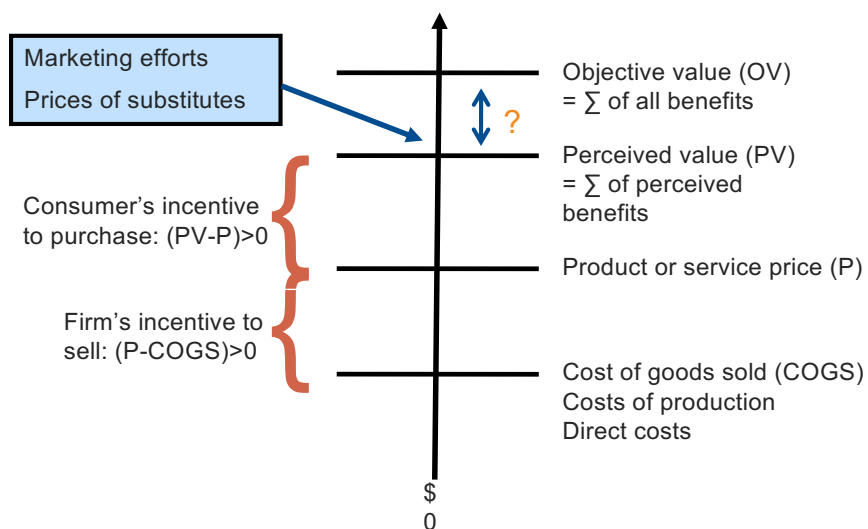
## The Power of Plants!



[ellisonchair.tamu.edu](http://ellisonchair.tamu.edu) -- Benefits of Plants

11

## The value perspective



12

# Topics

1. What's the status of the carbon/water footprint research?
2. How much has the cost of grower inputs increased?
3. What are some key grower-level benchmarks?
4. How's the economy and when will the next recession start?

13

## How much has the cost of grower inputs increased?

Relative weighting of items included in the Index of Prices Paid by Growers.

Cost category	% of sales	% of tracked expenses
Containers	4.50%	7.09%
Media (peat-based)	2.50%	3.94%
Propagation stock	15.00%	23.62%
Plant protection products	1.00%	1.57%
Fertilizers	1.00%	1.57%
Labor (wages)	22.00%	34.65%
Fuel/Energy	2.50%	3.94%
Maintenance	2.00%	3.15%
Freight and trucking	11.00%	17.32%
POP, tags, labels, etc.	2.00%	3.15%
<b>Total</b>	<b>63.50%</b>	
Other expenses	36.50%	---
	<b>100.0%</b>	<b>100.00%</b>



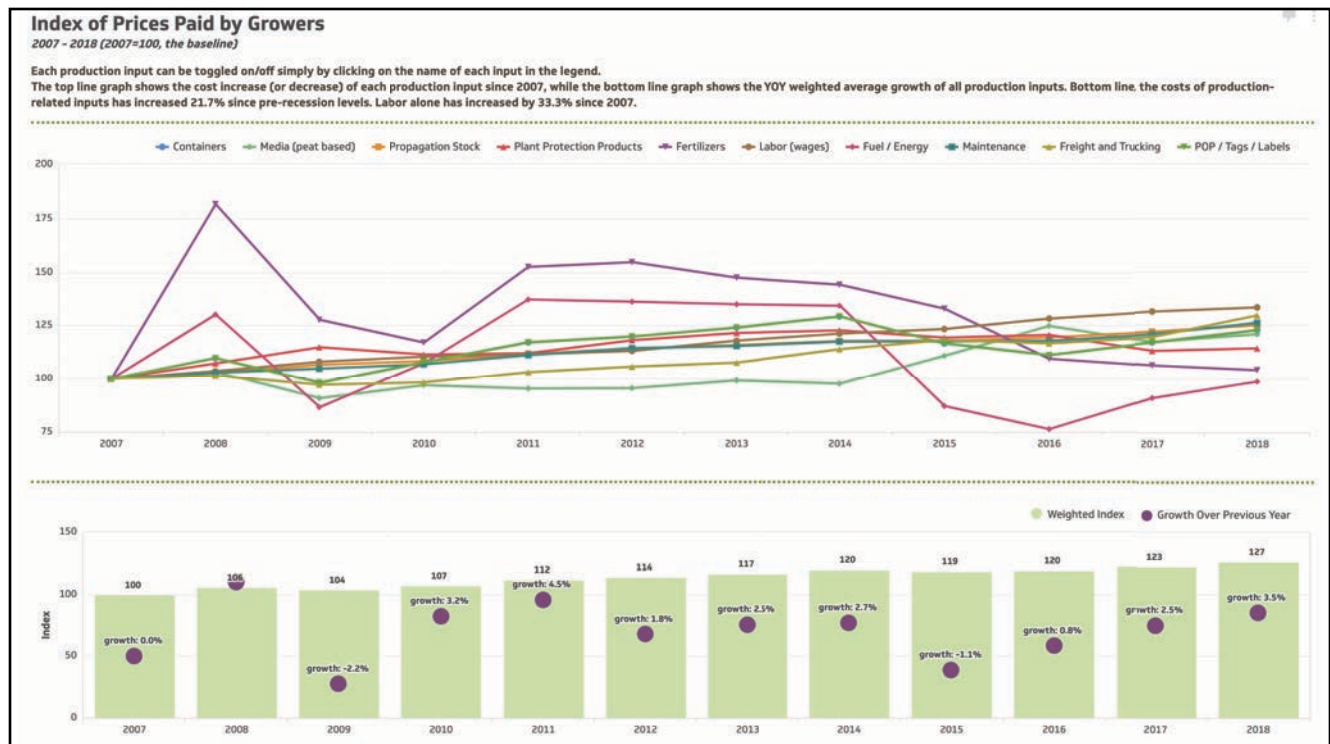
14



Index of Prices Paid by Growers, 2007-2018 (2007=100)													
Cost category	Weight	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Containers	7.09%	100	109.8	98.0	107.9	117.2	119.9	124.1	129.3	116.7	111.2	117.0	122.7
Media (peat-based)	3.94%	100	103.2	90.8	96.9	95.3	95.5	99.1	97.6	110.9	124.9	117.2	120.8
Propagation stock	23.62%	100	102.8	106.7	108.4	111.9	114.2	115.9	117.8	117.9	119.5	122.0	125.0
Plant protection products	1.57%	100	107.3	114.9	111.5	112.1	118.2	121.6	122.8	119.4	120.7	113.0	114.2
Fertilizers	1.57%	100	181.7	127.7	117.1	152.4	154.6	147.4	144.1	132.9	109.5	106.2	104.0
Labor (wages)	34.65%	100	103.7	108.1	110.5	111.7	113.2	118.0	121.3	123.4	128.3	131.4	133.3
Fuel/Energy	3.94%	100	130.2	86.6	107.4	137.2	136.2	135.0	134.3	87.1	76.3	91.1	98.8
Maintenance	3.15%	100	102.9	104.9	106.9	111.2	114.5	115.5	117.6	117.7	117.9	120.8	126.1
Freight and trucking	17.32%	100	101.4	97.1	98.2	103.2	105.8	107.7	114.0	118.3	116.7	119.5	129.6
POP, tags, labels, etc.	3.15%	100	109.8	98.0	107.9	117.2	119.9	124.1	129.3	116.7	111.2	117.0	122.7
Other expenses	43.50%												
Weighted index (2007=100)		100	106.0	103.6	107.0	111.8	113.8	116.7	119.9	118.5	119.5	122.5	126.8

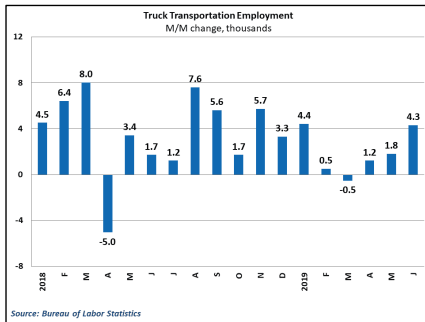
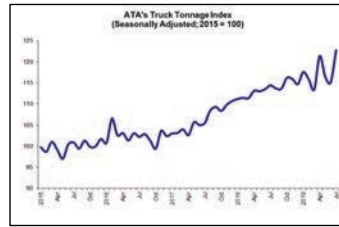


15



16





Costs  
declining,  
industry hiring.

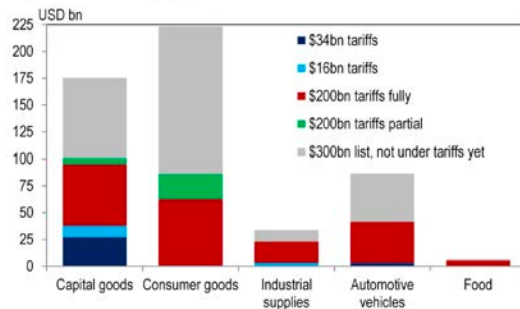
Freight/  
Trucking

But, a 25.6% increase in  
tonnage by 2030.

17

## Tariff effects

U.S. - Importer Tariffs on China on Section 301 Investigation (\$100m)



**\$106 billion / year**  
( **\$831** per HH)

### Impact on consumers

While importing firms will absorb some of the tariff costs through lower profit margins, US consumers will bear the cost.

(average log price of imported goods in the US, June 2018 = 1)



Source: Cavallo, Gopinath, Neiman and Tang (2019), "Tariff Passthrough at the Border and at the Store: Evidence from US Trade Policy," mimeo.

18

# Topics

1. What's the status of the carbon/water footprint research?
2. How much has the cost of grower inputs increased?
3. What are some key grower-level benchmarks?
4. How's the economy and when will the next recession start?

19

## SCOPE OF THE INDUSTRY

The business of horticulture is significant and has a big impact. Our businesses include growers, retailers, breeders, suppliers, landscape designers and installers. Most are small and family-owned. Many are into their third or even fifth generation of family ownership. They are found in every state. Greenhouse and nursery crops comprise one-third of the total value of all specialty crops, and 10 percent of the value of all crop production in America. More than just a "pretty face," horticulture's products and services add to property values, clean and filter air and water, make our cities cooler and more livable, and increase health and well-being.



**HORTICULTURE:**  
A Growing Industry



**\$348 Billion**  
Contribution to the U.S. Economy (total output)



**30% Growth**  
in employment in the landscape services sector of horticulture (period of 2010 to 2018)



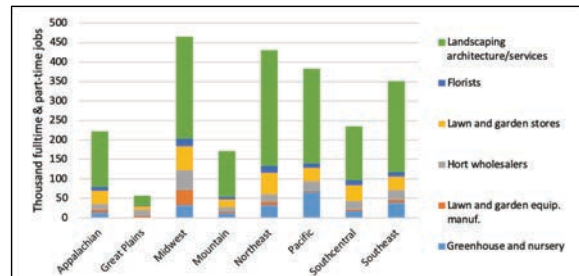
**2.32 Million**  
total job contribution



**19.2% Increase**  
in jobs since 2010



**\$41.8 Billion**  
contributed in local, state, and federal taxes



**Horticultural Research Institute**  
The AmericanHort Foundation

20

### Aggregate Net Sales

Dotted line = year over year change

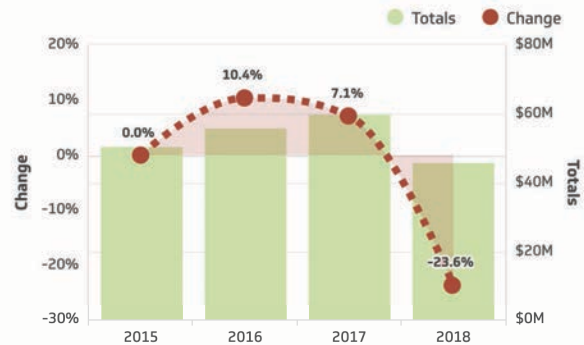
Showing 50 firms with Firm Type equal to 'any' and Sales Volume equal to 'any'



### Aggregate Net Profit Dollars

Dotted line = year over year change

Showing 50 firms with Firm Type equal to 'any' and Sales Volume equal to 'any'

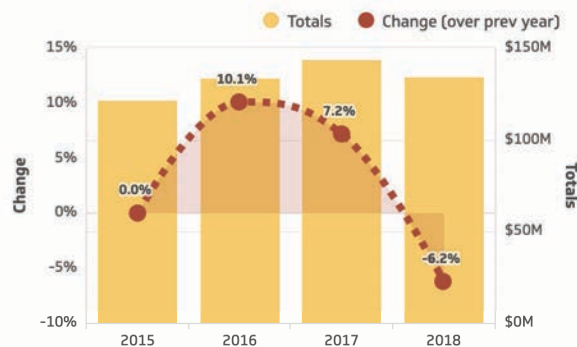


21

### Aggregate EBITDA Dollars

Dotted line = year over year change

Showing 50 firms with Firm Type equal to 'any' and Sales Volume equal to 'any'



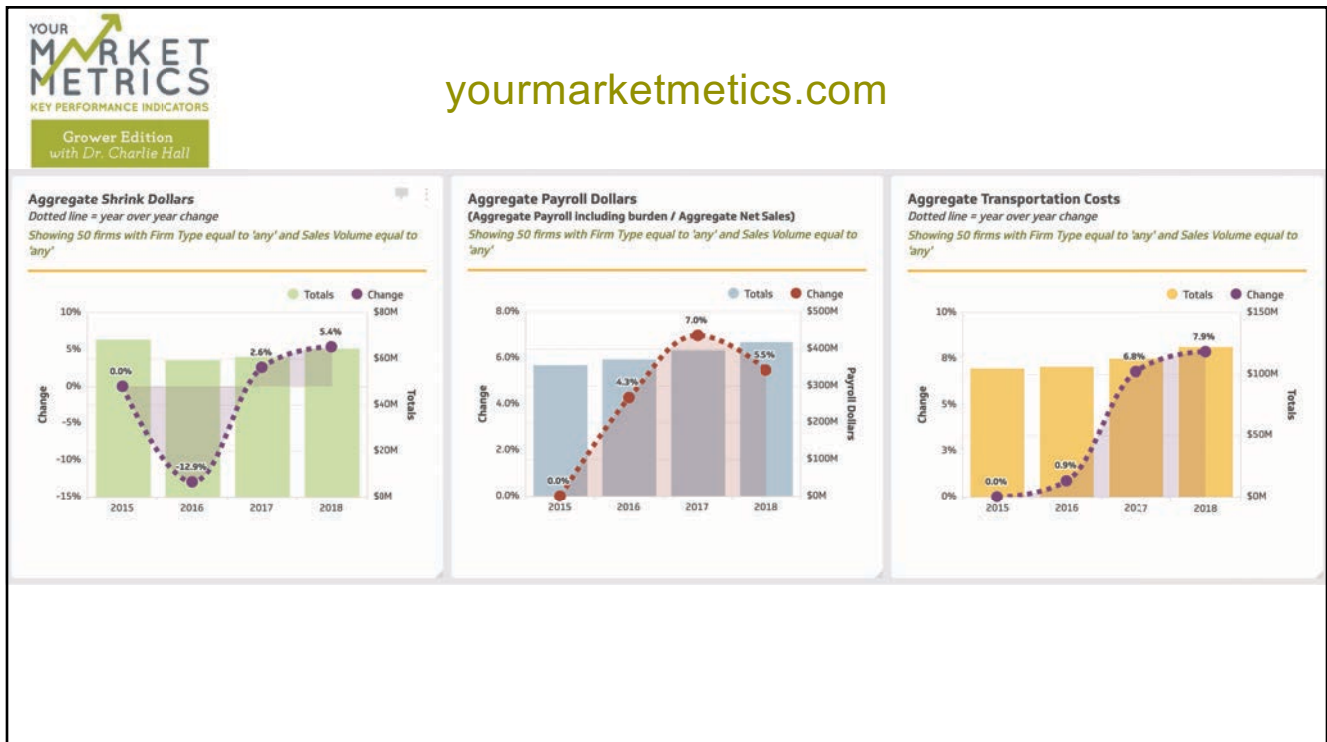
### Aggregate Operating Profit Dollars

Dotted line = year over year change

Showing 50 firms with Firm Type equal to 'any' and Sales Volume equal to 'any'



22



23

## Topics

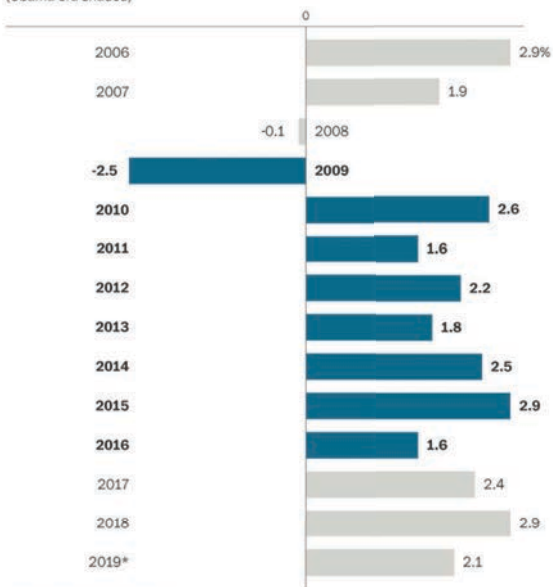
1. What's the status of the carbon/water footprint research?
2. How much has the cost of grower inputs increased?
3. What are some key grower-level benchmarks?
4. How's the economy and when will the next recession start?

24

# 124 MONTHS

25

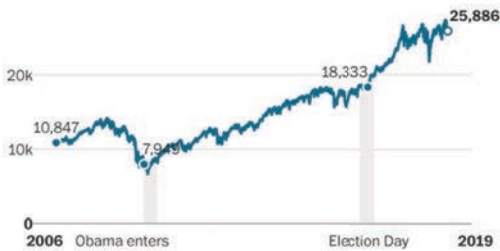
**U.S. Economic Growth (GDP)**  
(Obama era shaded)



\*Federal Reserve GDP estimate

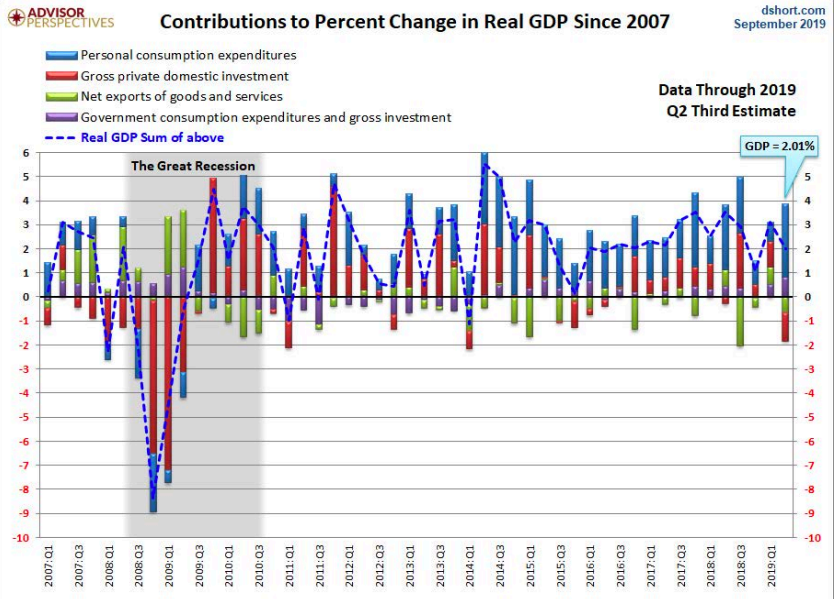
**Stock Market Performance**

Dow Jones Industrial Average. (Shaded area at start and end of Obama term).

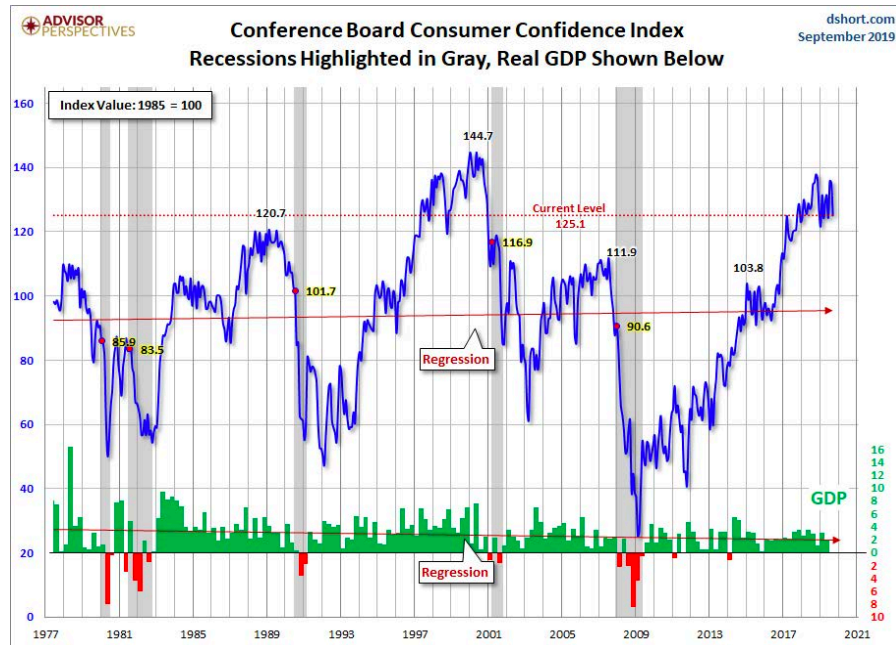


26

BEA Estimates of 2019 Q1 Contributions to GDP			
Category	Advance	Second	Third
Percent change at annual rate:			
Gross domestic product	2.1	2.0	2.0
Percentage points at annual rates:			
Personal consumption expenditures	4.30	4.70	3.03
Goods	8.30	8.80	1.74
Durable goods	12.9	13.00	0.87
Nondurable goods	6.00	6.80	0.87
Services	2.50	2.80	1.29
Gross private domestic investment	-5.50	2.80	-1.16
Fixed investment	-0.80	-6.10	-0.25
Nonresidential	-0.60	-1.10	-0.14
Structures	-10.60	-0.60	-0.36
Equipment	0.70	-9.40	0.05
Intellectual property products	4.70	0.70	0.17
Residential	-1.50	3.70	-0.11
Change in private inventories		-2.90	-0.91
Net exports of goods and services	-5.10	-5.70	-0.68
Exports	-5.20	-5.80	-0.69
Goods	-5.00	-5.60	-0.48
Services	-5.60	-6.30	-0.21
Imports	0.10	0.10	0.01
Goods	0.20	0.30	-0.02
Services	-0.30	-0.80	0.02
Government consumption expenditures	5.00	4.50	0.82
Federal	7.90	8.10	0.53
National defense	2.80	3.10	0.13
Nondefense	15.90	16.00	0.40
State and local	3.20	2.30	0.29

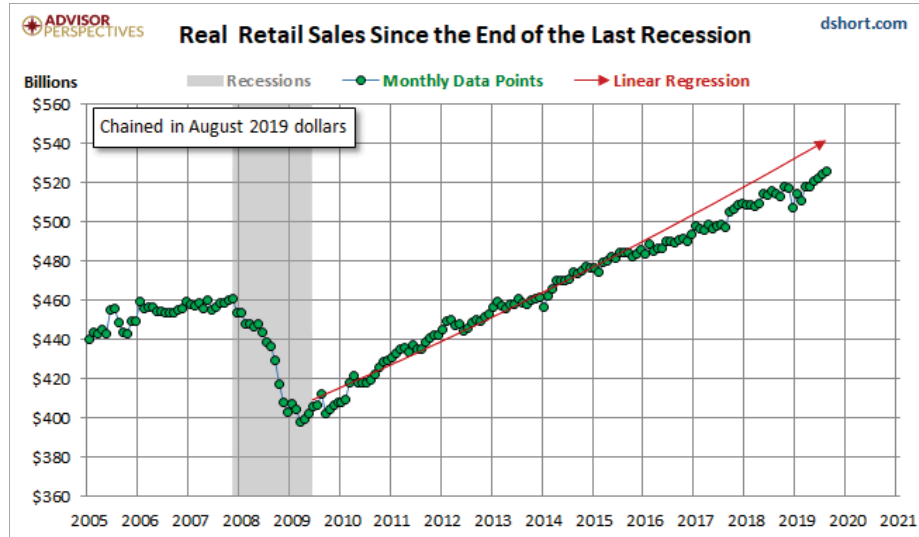


27



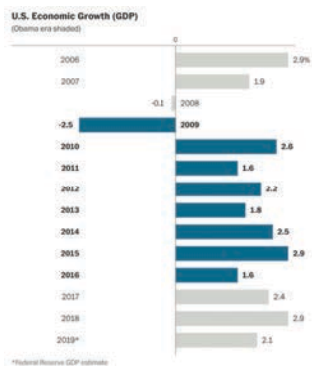
28



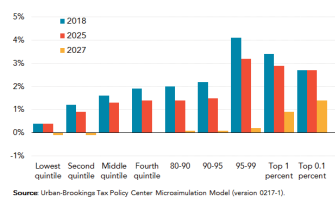


29

## Effect of TCJA?

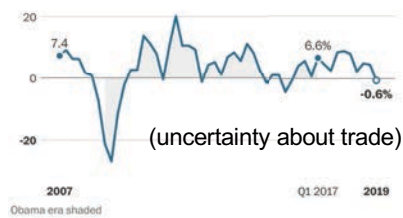


Percent Change in After-tax Income of the Conference Agreement for the Tax Cuts and Jobs Act  
By expanded cash income percentile, 2018, 2025, and 2027

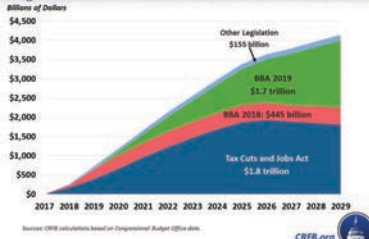


### U.S. Business Investment

Quarterly growth in non-residential business fixed investment



### Legislation Will Have Added \$4.1 Trillion to Debt Since 2017

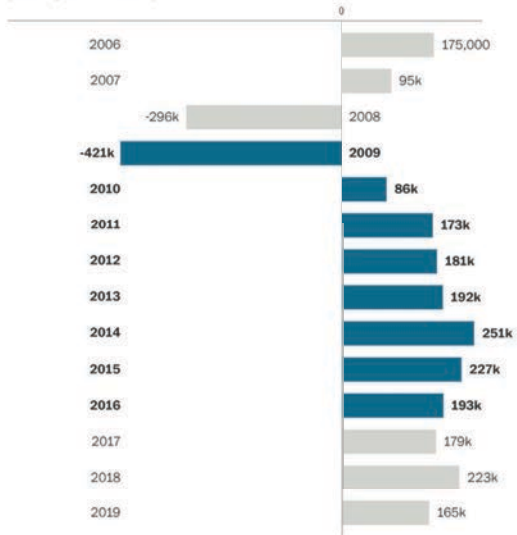


30



# What's the job market situation?

**Average monthly job gains**  
(Obama years are shaded)

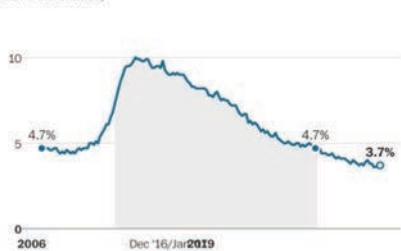


Source: BLS

Heather Long/The Washington Post

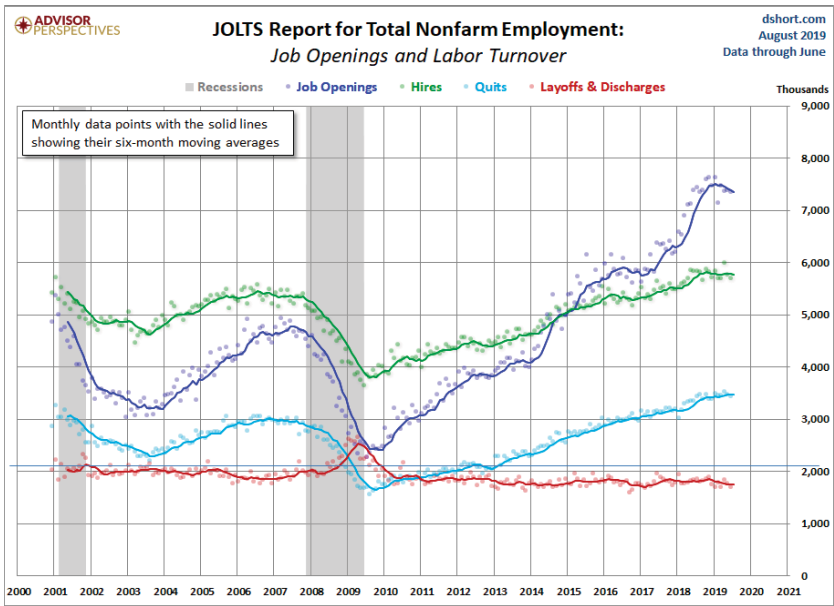
U6 rate 7.2%

**U.S. Unemployment Rate**  
(Obama era shaded)

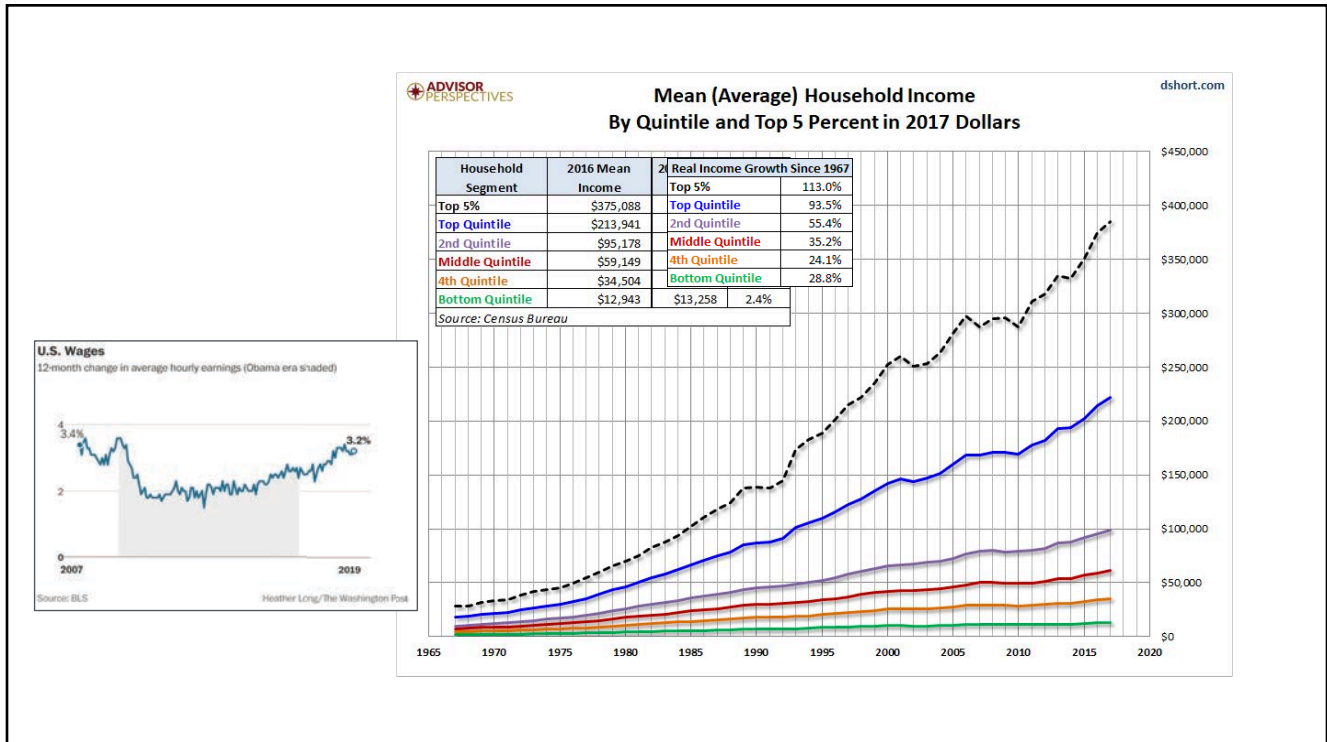


7.3M non-farm vacancies vs.  
6.4M workers

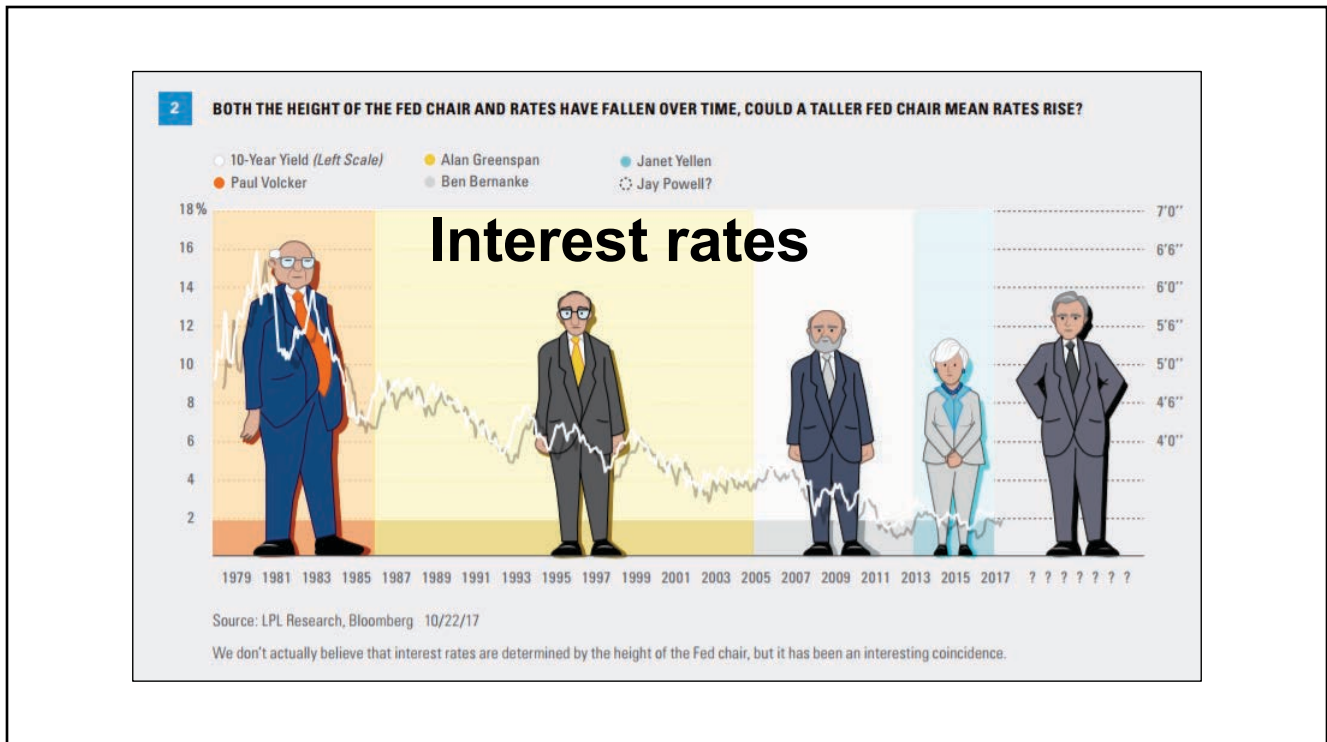
31



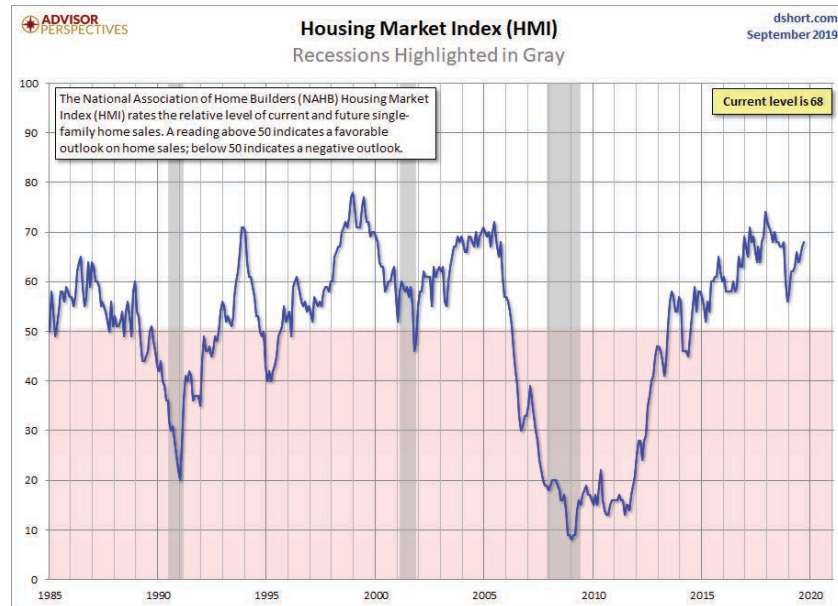
32



33



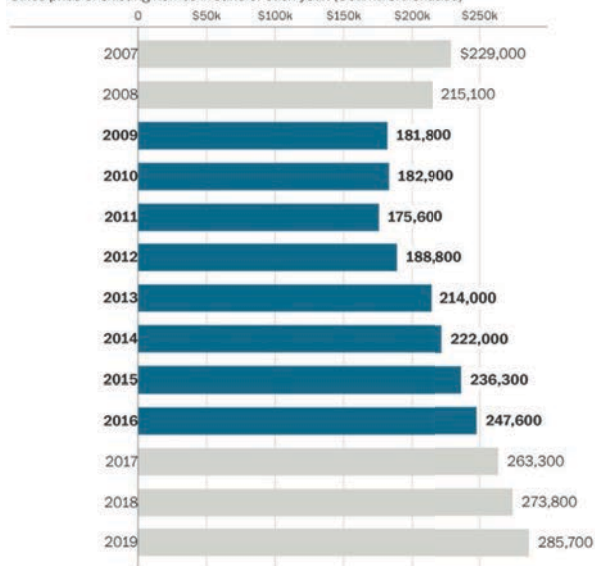
34



35

### Median sale price of U.S. homes

Sales price of existing homes in June of each year. (Obama era shaded)

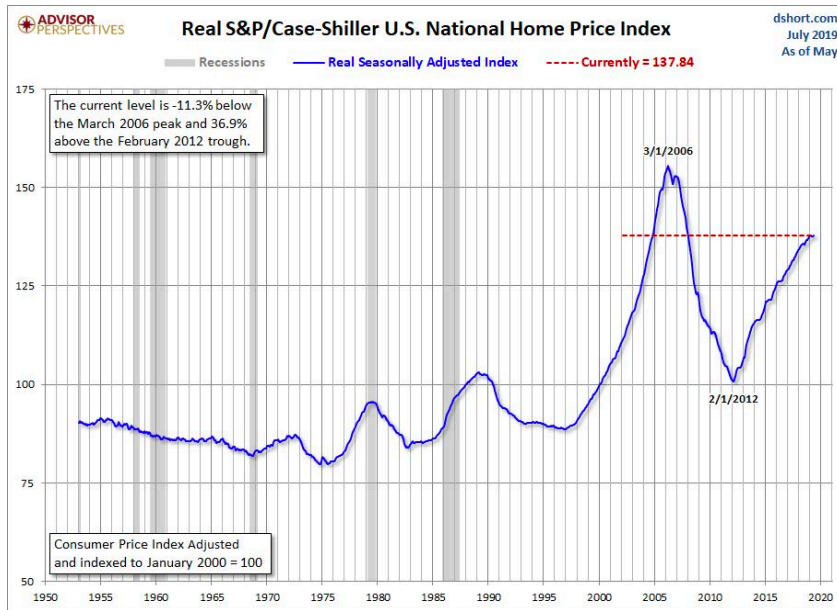


Source: National Association of Realtors

Heather Long/The Washington Post

Home prices  
have appreciated  
for 9 straight  
years.

36



Current prices are 11.3% below the March 2006 peak and 36.9% above the Feb 2012 trough.

37

**When will the next recession start?**

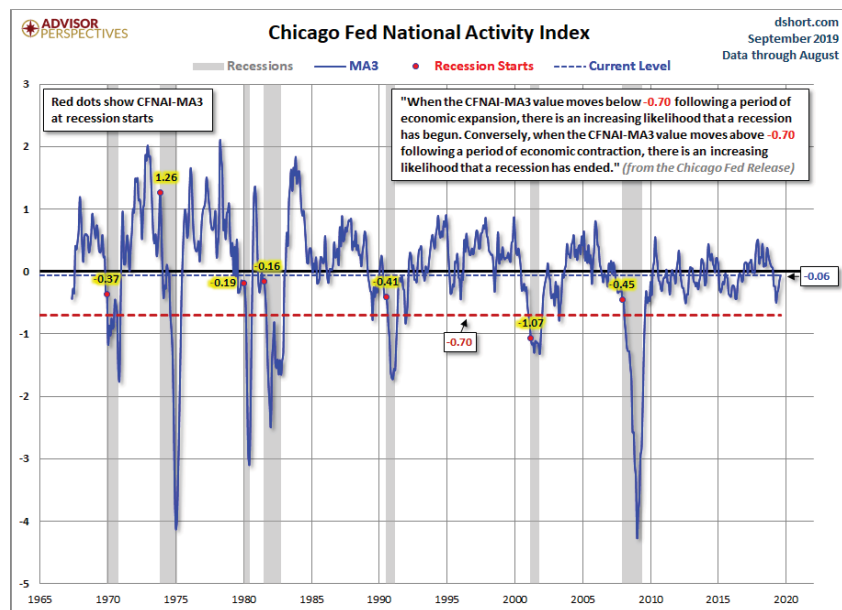


38



Financial  
sector risk is  
negligible.

39

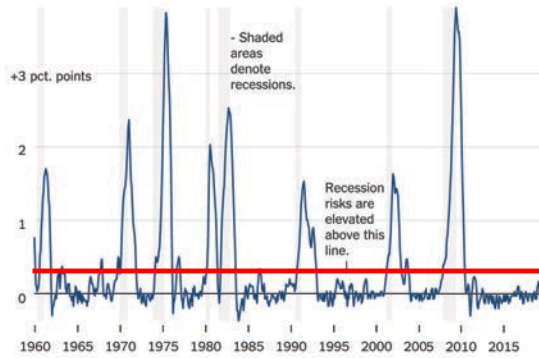


Growing  
slower  
than  
historic  
average.

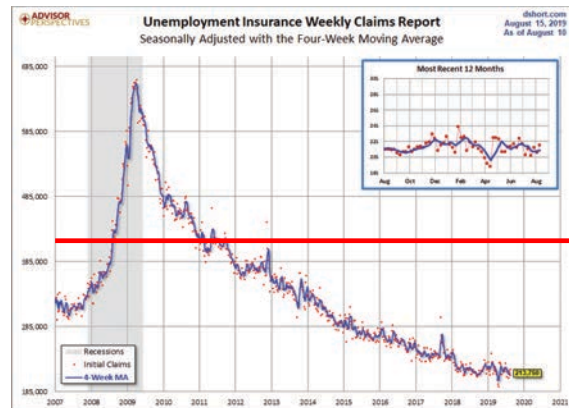
40

## The unemployment rate is still in the safe zone.

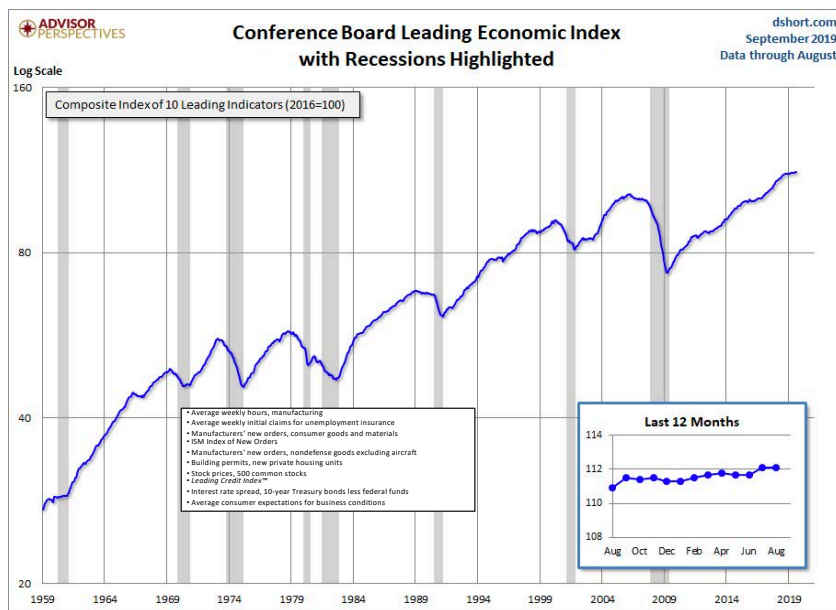
Gap between the unemployment rate and its low point over the previous 12 months



Note: Both unemployment rate and 12-month low are based on three-month rolling averages. Data is as originally reported (before revisions). | Source: Bureau of Labor Statistics via Brookings Institution.



41



Leading economic index is flattening.

42

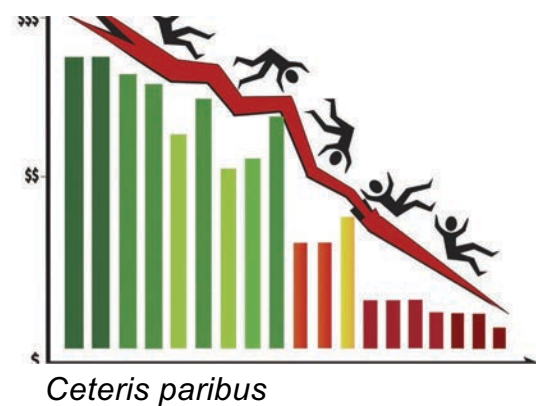


43

**33% chance of  
recession in 2019**

**50% chance of  
recession in 2020**

**80% chance of  
recession in 2021**



44



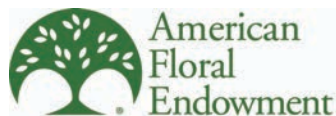
## What could derail this outlook?

Monetary policy gone awry.  
Trade war effects.  
OPEC reneging on output deal.  
Bubble bursting.  
Recession in China/Europe.



45

## Acknowledgements



46