



## TEXAS

“**Economic activity moderated** but remained positive as Texas enters the ninth year of the business-cycle expansion. Payroll employment grew at a steady pace despite historically low unemployment. Headline wage numbers, however, remained sluggish despite labor-market tightness and decreased inflationary pressure. Energy prices stabilized after a recent bout of volatility, and crude oil production and exports held firm. **Texas exports continued to flourish as products shifted from China to other economic partners**, but the ongoing dispute between the world's two largest economies could contribute to waning global activity. Political tension and gridlock in Washington added to the current state of uncertainty.” - Outlook for the Texas Economy - Real Estate Center – Texas A&M (REC)

## AUSTIN

“The **Austin economy grew moderately** in February. The Austin Business-Cycle Index expanded but remained below its long-term trend. Recent **job growth was generally positive across sectors**, outside of weakness in the health and private education industry. Hourly wages ticked down, while **home prices declined and sales increased**” - April 2019 – Austin Economic Indicators



## UNITED STATES

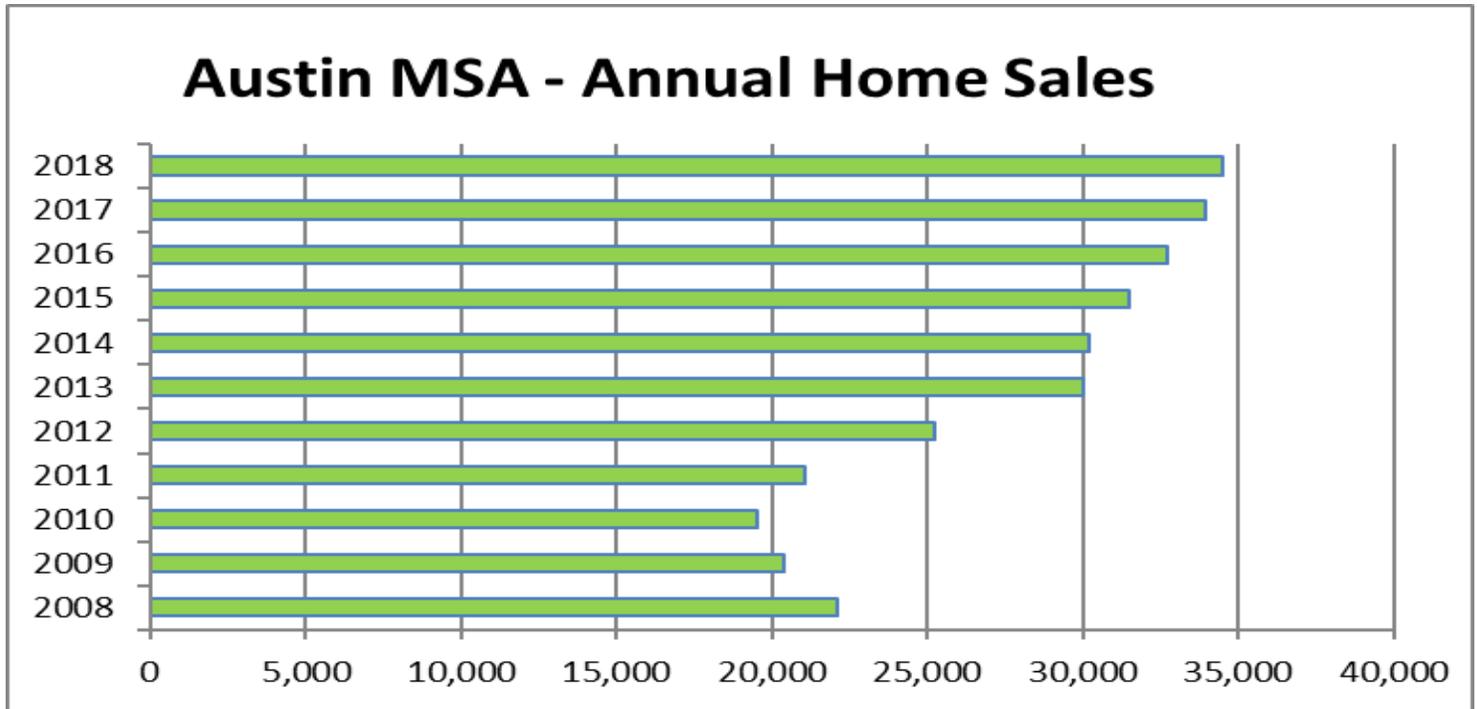
“**Home sales rebounded in February**, likely fueled by a substantial decline in mortgage rates in recent months. A strong labor market continues to have the potential to provide support to the housing sector.”

“**Retail sales were weak in February**; consumer confidence measures remain high but seem to have lost momentum.”

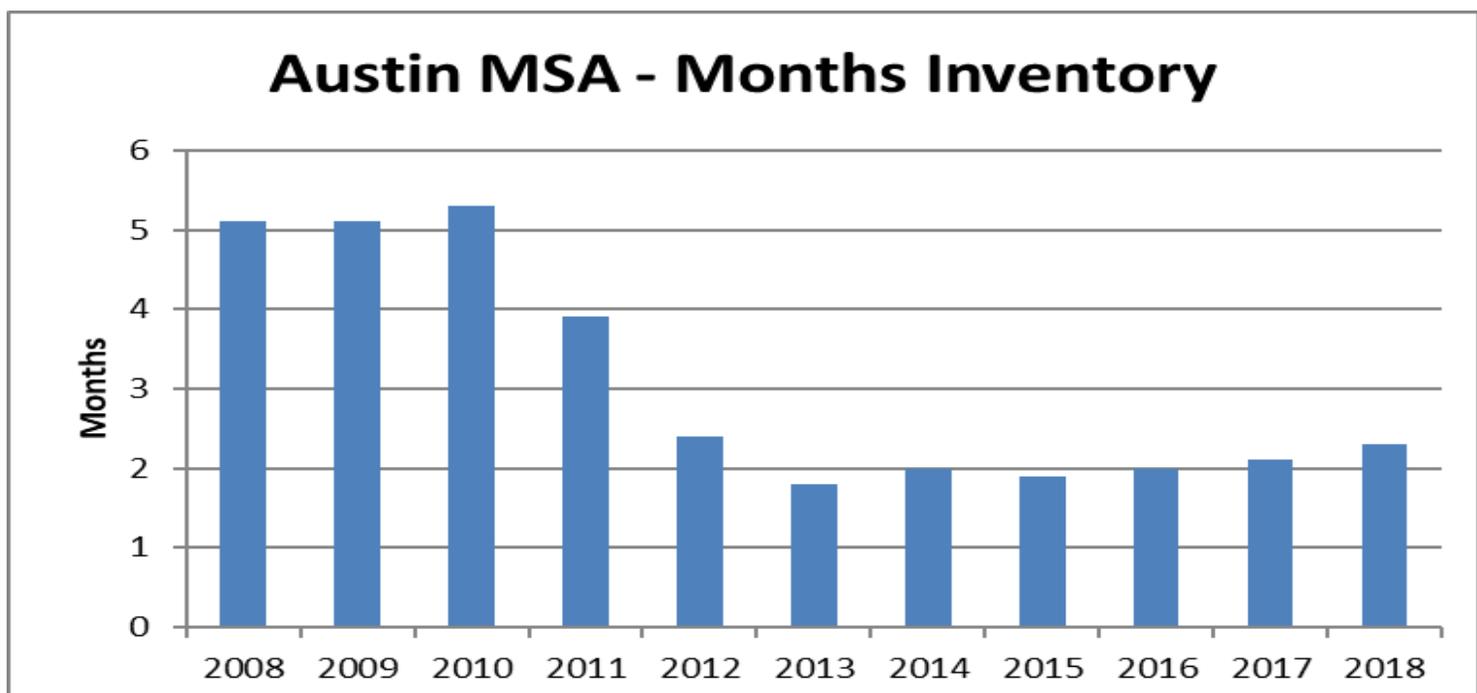
“**Payroll growth was solid in March**. The unemployment rate remained unchanged, while the employment-to-population ratio and the labor force participation rate both edged down.” - April 2019 - Research Function - New York Fed

## HOUSING – ANNUAL AUSTIN MSA SALES AND MONTHS INVENTORY

On the next couple of pages are the Austin MSA Annual Home Sales, Months Inventory, Sales Price, and Price Distribution graphs. The graphs highlight the reality of the Austin housing market (**high demand + low inventory = higher prices**).

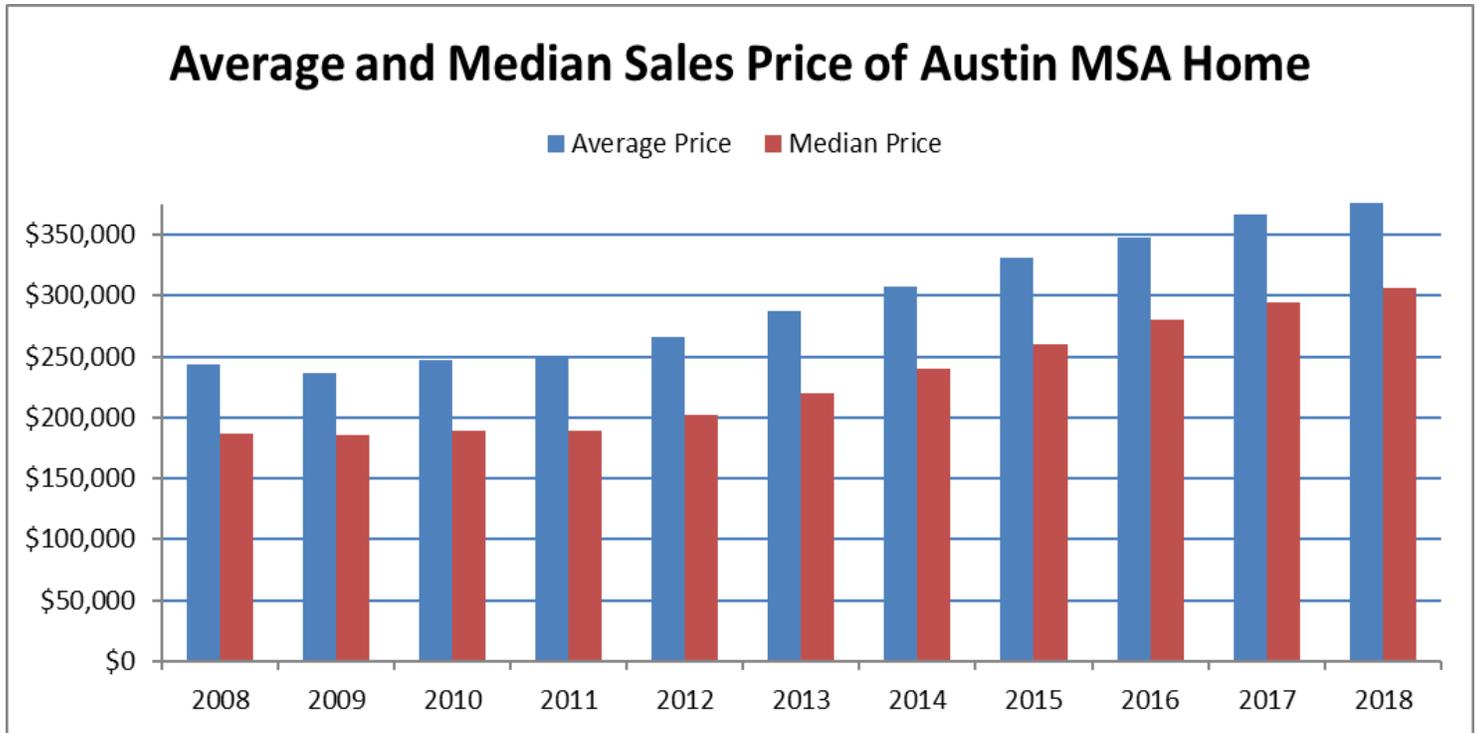


Source: Real Estate Center at Texas A&M University

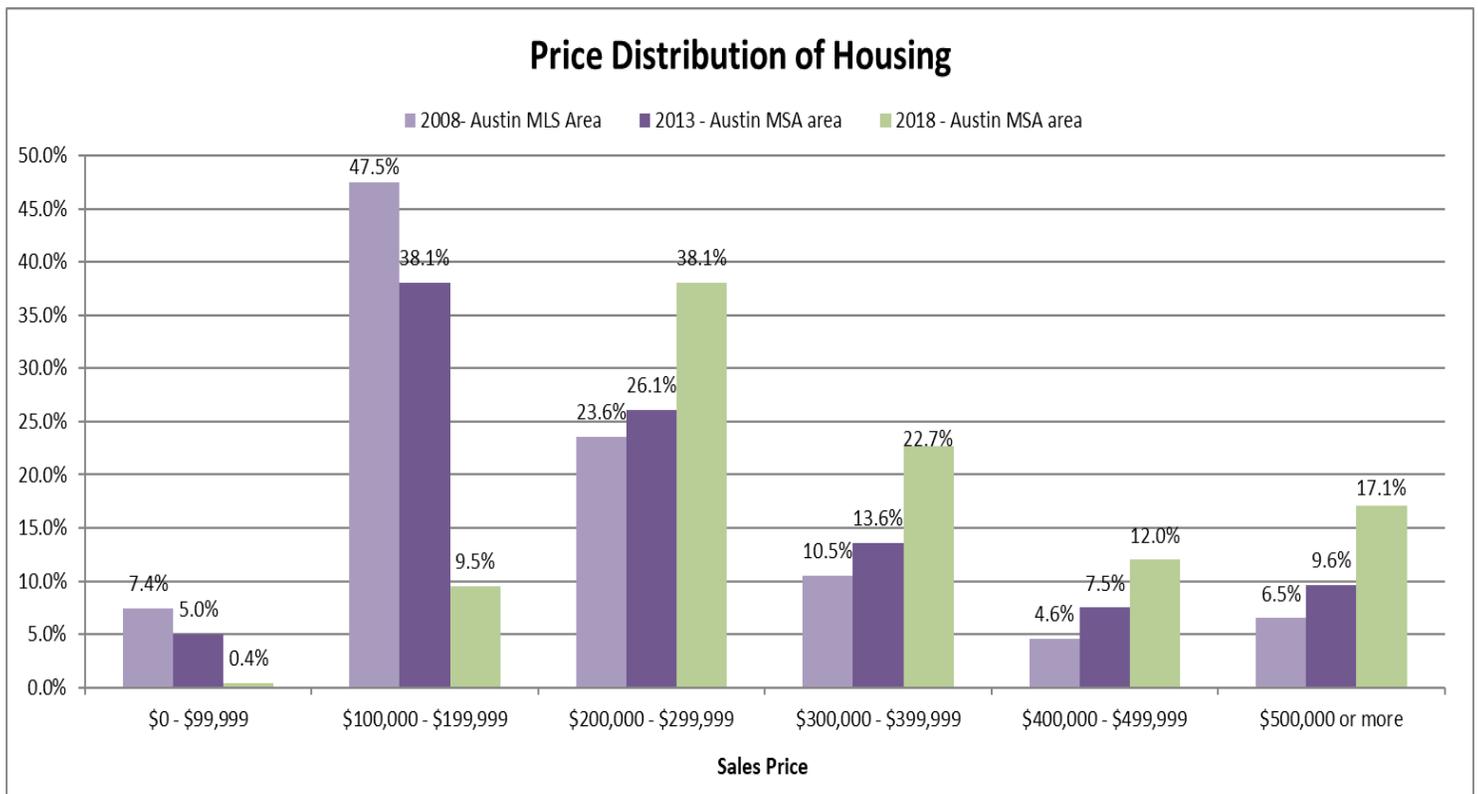


Source: Real Estate Center at Texas A&M University

## HOUSING – AUSTIN MSA SALES PRICE AND PRICE DISTRIBUTION



Source: Real Estate Center at Texas A&M University



Source: Real Estate Center at Texas A&M University  
Percentages may not equal 100% due to rounding

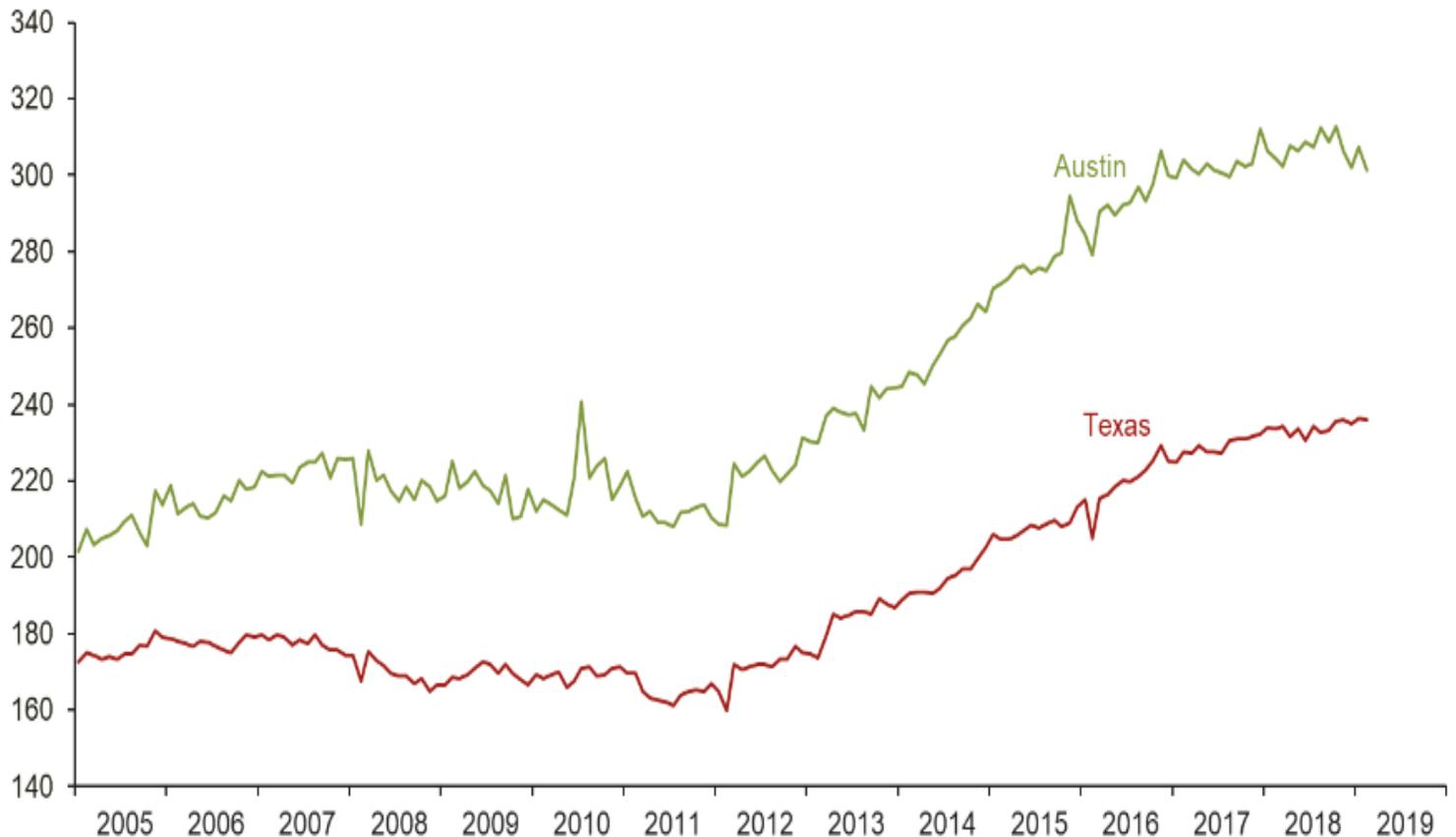
## HOUSING – MEDIAN HOME PRICES

“The median home price in Austin decreased in February to \$301,418, down 1 percent year over year, whereas the median home price for Texas increased 1.1 percent to \$236,112. The housing market remained active as existing-home sales in the metro increased 7.1 percent from January to February and 4.1 percent year over year.” - Austin Economic Indicators - Dallas Fed – April 5, 2019

“Healthy activity in the \$200,000-\$300,000 cohort, which constitutes the lower end of the Austin market, provided the recent relief in price pressure.” – February Summary - Texas Housing Insight

### Median Home Prices

Thousands of dollars, real

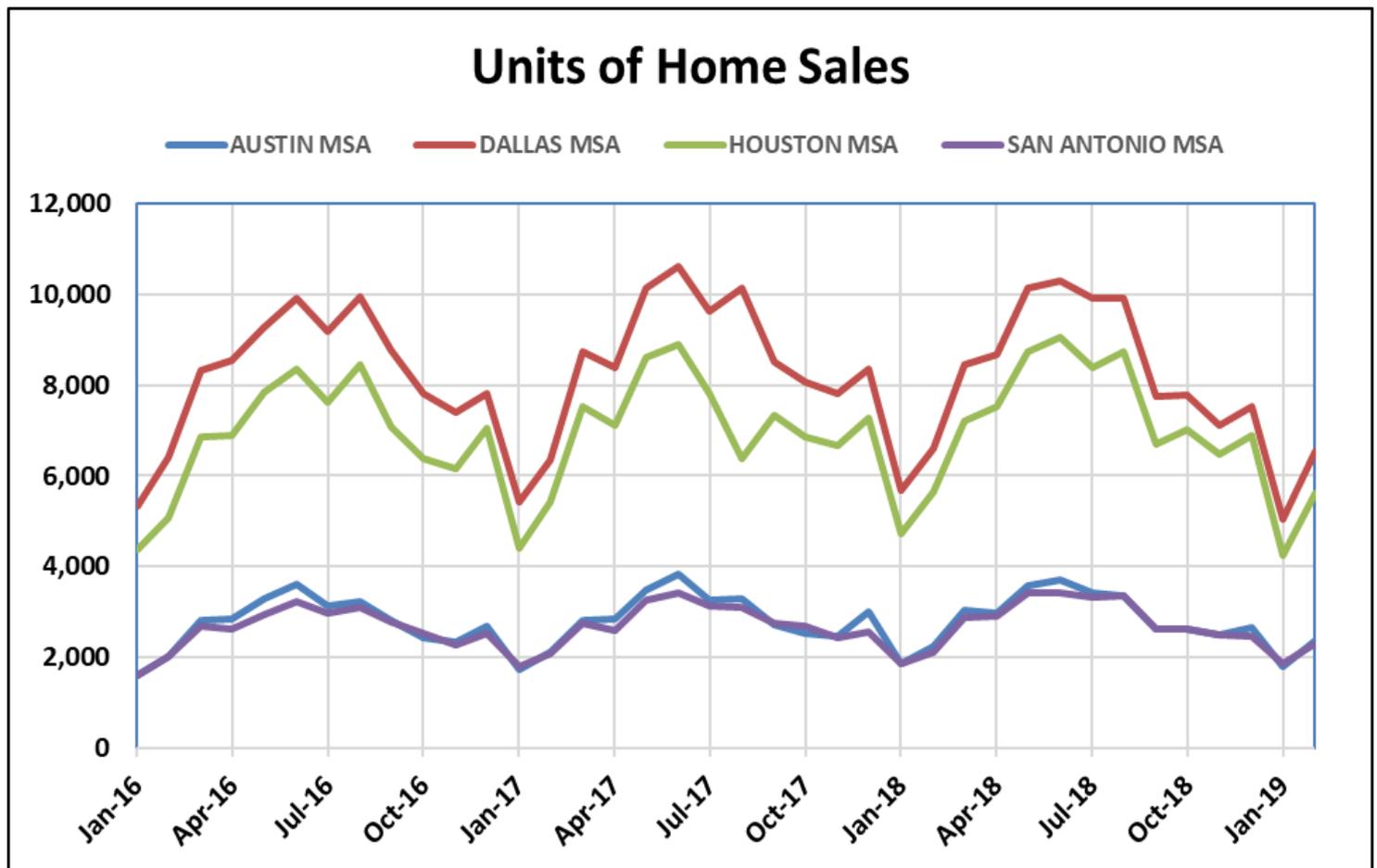


SOURCE: Multiple Listing Service.

## HOUSING – HOME SALES

“Texas housing sales increased 5.2 percent from January amid lower mortgage rates and decreased price pressure.” – February Summary - Texas Housing Insight

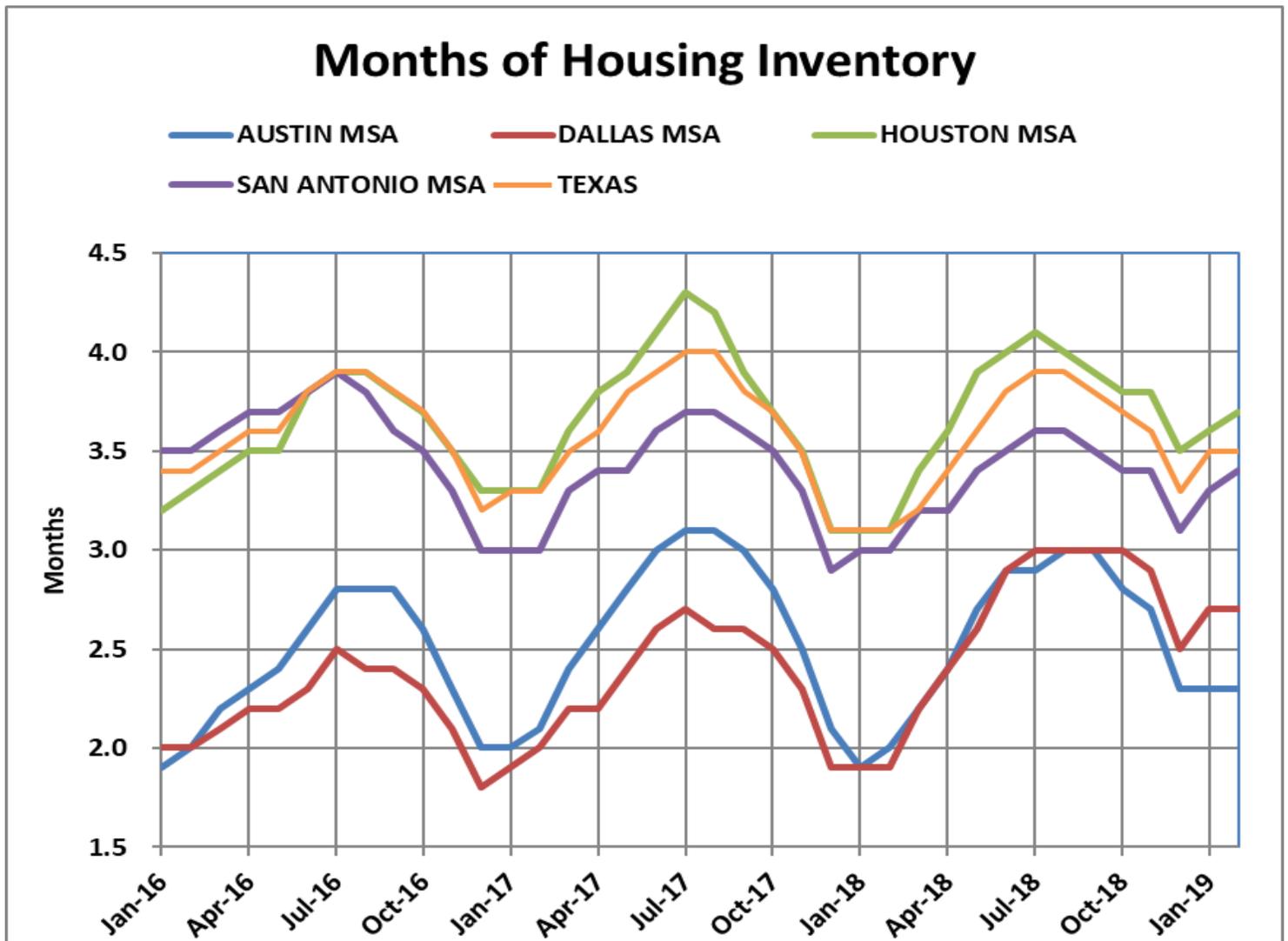
“Lower mortgage rates provided incentives for prospective purchasers, but housing affordability remained a challenge across the state. Overall, the healthy labor market, population growth, and the economic expansion supported strong housing demand.” – February Summary - Texas Housing Insight



Source: Real Estate Center at Texas A&M University

## HOUSING – MONTHS OF INVENTORY

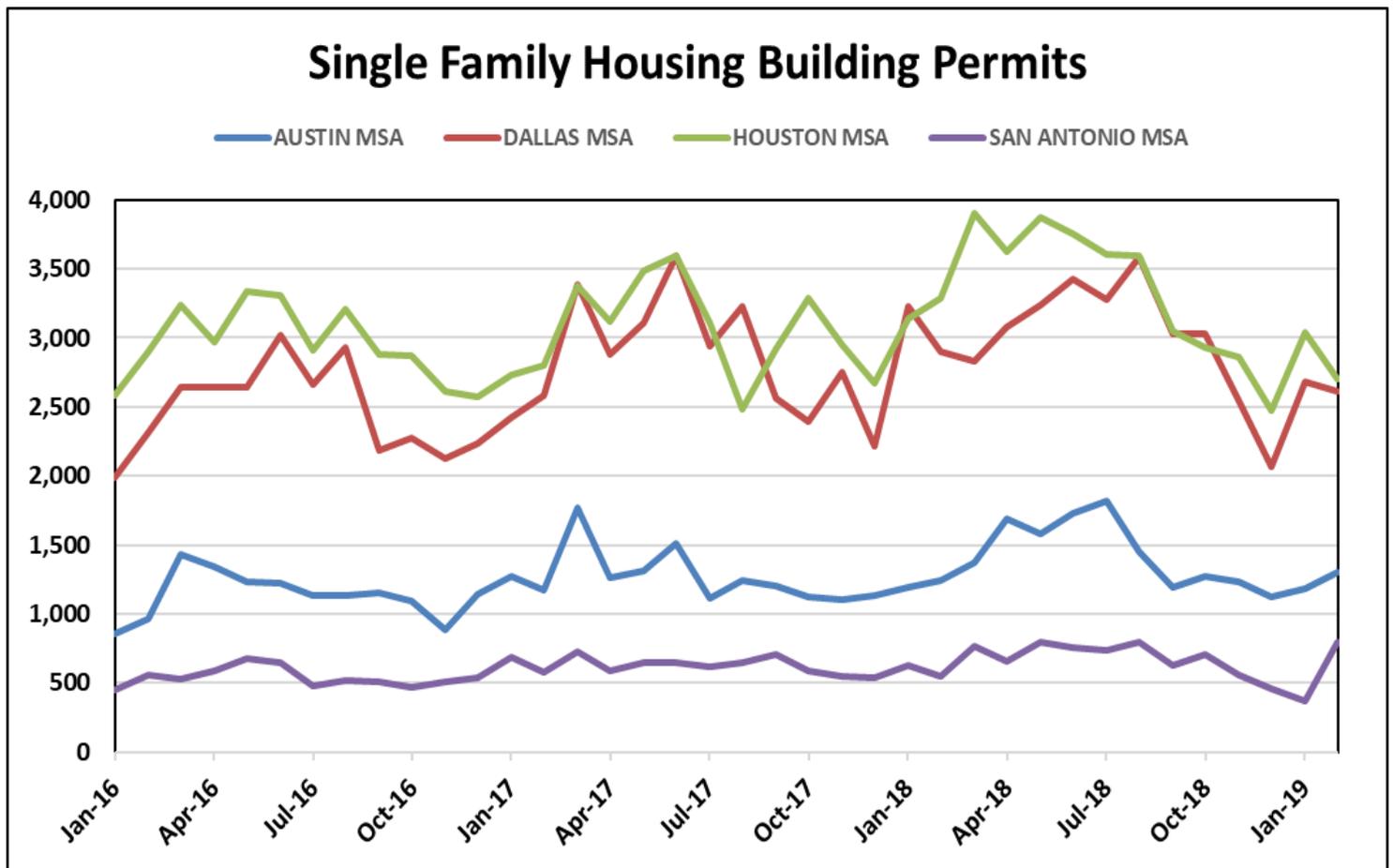
As of February 2019, the Austin MSA’s months of housing inventory has been 2.3 for the last three months. The Real Estate Center has estimated that “seasonally adjusted; around 6.5 months of inventory is considered a balanced housing market in which neither sellers nor buyers dictate prices.”



Source: Real Estate Center at Texas A&M University

## HOUSING – SINGLE FAMILY BUILDING PERMITS

“Supply indicators were mixed with **single-family construction permits** and total housing starts **stabilizing after a shaky end to 2018**, but single-family private construction values continued to slide.” – February Summary – Texas Housing Insight



Source: Real Estate Center at Texas A&M University

## HOUSING – AFFORDABILITY

“Housing affordability, defined as the **percentage of homes sold that the median-income household can afford, remained relatively unchanged** at the metro and national levels from the third to fourth quarter of 2018. Austin’s affordability index fell from 54.5 to 54.3, while the national index increased from 56.4 to 56.6. Generally speaking, **housing affordability in major metros of Texas has been on the decline since the first quarter of 2013.**” - Austin Economic Indicators – Dallas Fed – April 5, 2019

“Although Texas' affordability remained favorable compared with other states, the gap is narrowing. This presents a significant challenge to Texas' demographic advantages that have supported its economic prosperity over the past decade.” – February Summary - Texas Housing Insight

### Housing Affordability

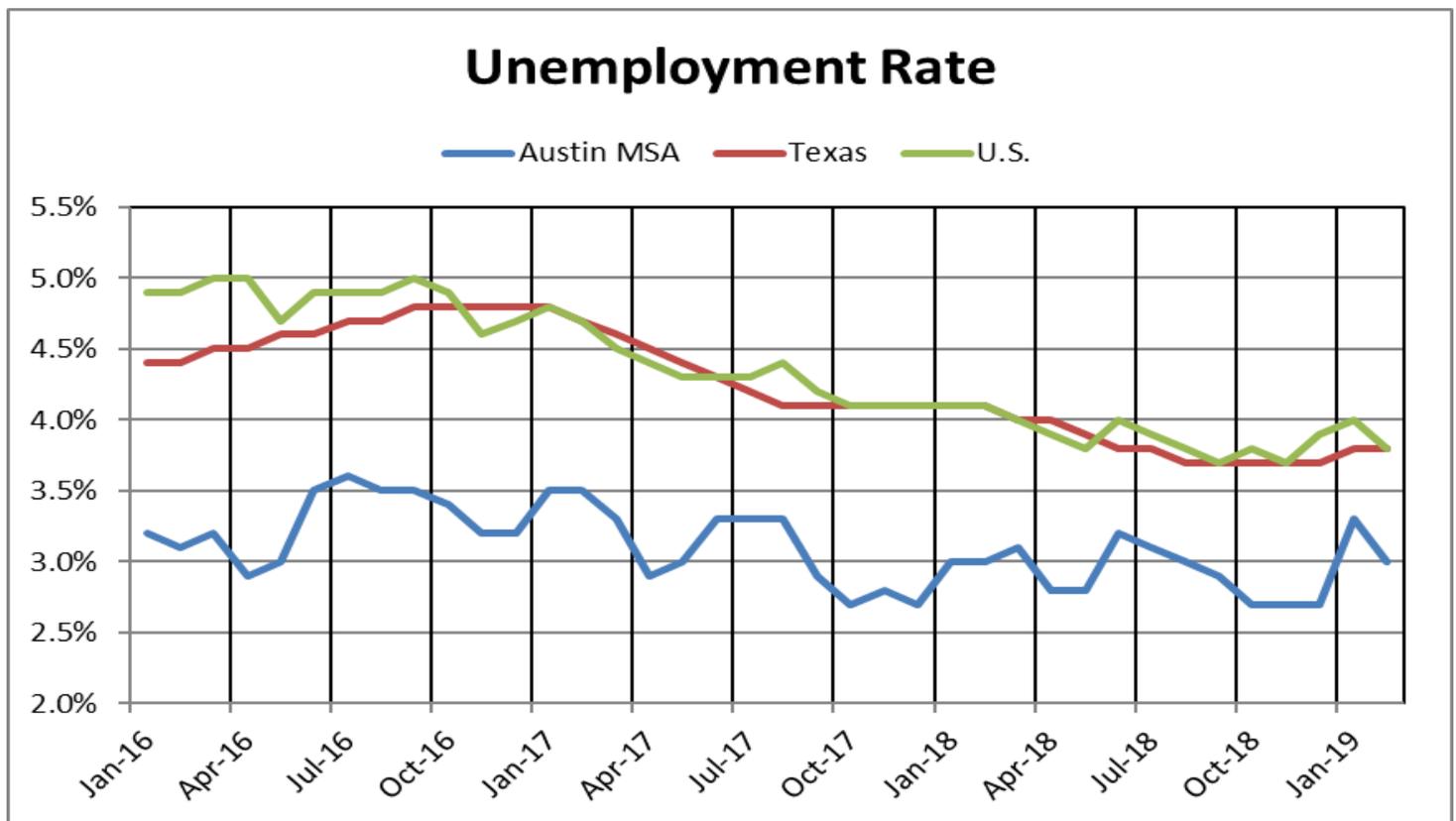


SOURCE: National Association of Home Builders/Wells Fargo.

## JOBS - UNEMPLOYMENT RATES – AUSTIN MSA, TEXAS, U.S.

“The **Texas unemployment rate held steady at 3.8 percent** in February, matching the U.S. rate. Both are well below their long-run averages, indicating continued labor market tightness.” – Texas Economic Update – Federal Reserve Bank of Dallas – March 25, 2019

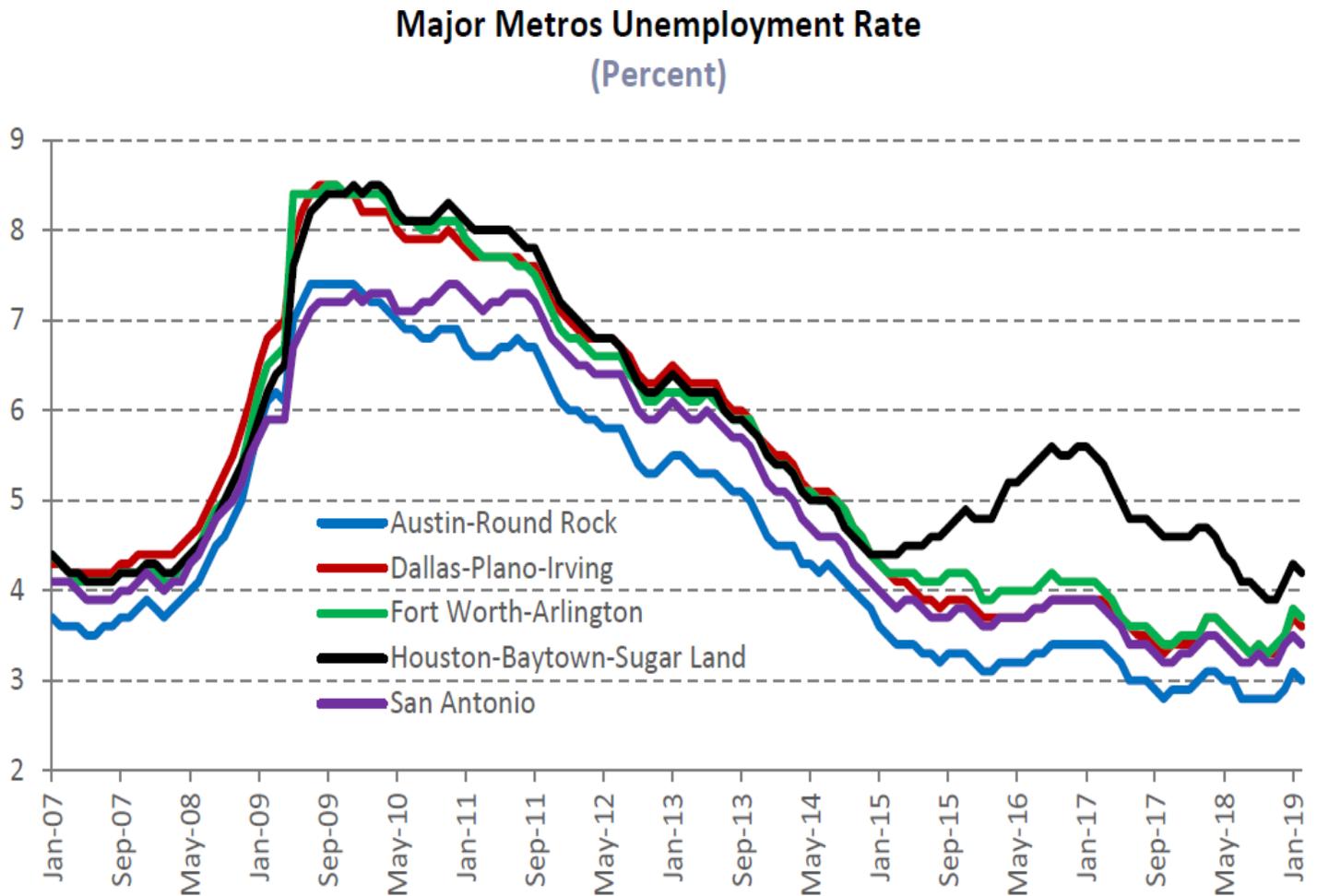
“**Austin’s unemployment rate declined to 3.0 percent** in February.” – Austin Economic Indicators



*Note: U.S. and Texas seasonally adjusted, Austin MSA not seasonally adjusted. Source: Bureau of Labor Statistics*

## JOBS - UNEMPLOYMENT RATES – MAJOR METROS

**“Unemployment rates dipped in all of the state’s major metros. McAllen’s 6.5 percent unemployment was the highest among the major metros, and Austin’s 3.0 percent was the lowest.”** – Texas Economic Update – Federal Reserve Bank of Dallas – March 25, 2019

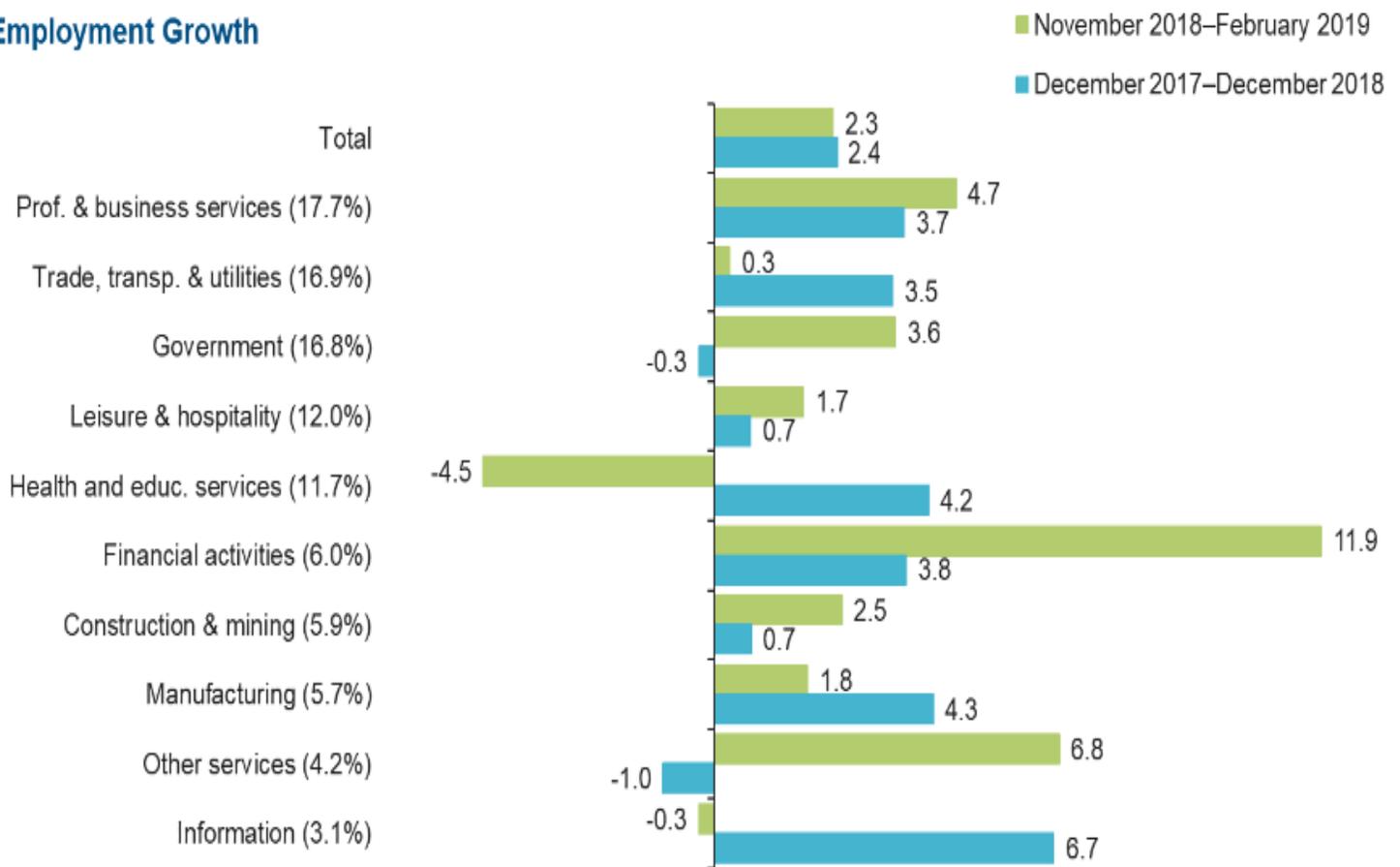


Source: Bureau of Labor Statistics – Seasonally adjusted. February 2019  
 Provided by: Real Estate Center at Texas A&M University

## JOBS – GROWTH RATE – AUSTIN

“After growing 2.4 percent in 2018, **Austin employment expanded at an annualized rate of 2.3 percent** during the three months ending in February. Growth was led by the **financial activities industry**, which **surged** at an annualized rate of 11.9 percent, or a net of 1,800 jobs. Professional and business services (up a net 2,200 jobs) and government (up almost 1,600), which collectively account for one-third of Austin’s jobs, also saw healthy growth. **An area of weakness was health and education services**, which shed approximately 1,500 jobs within the three-month period.” – Austin Economic Indicators – Dallas Fed – April 5, 2019

### Employment Growth

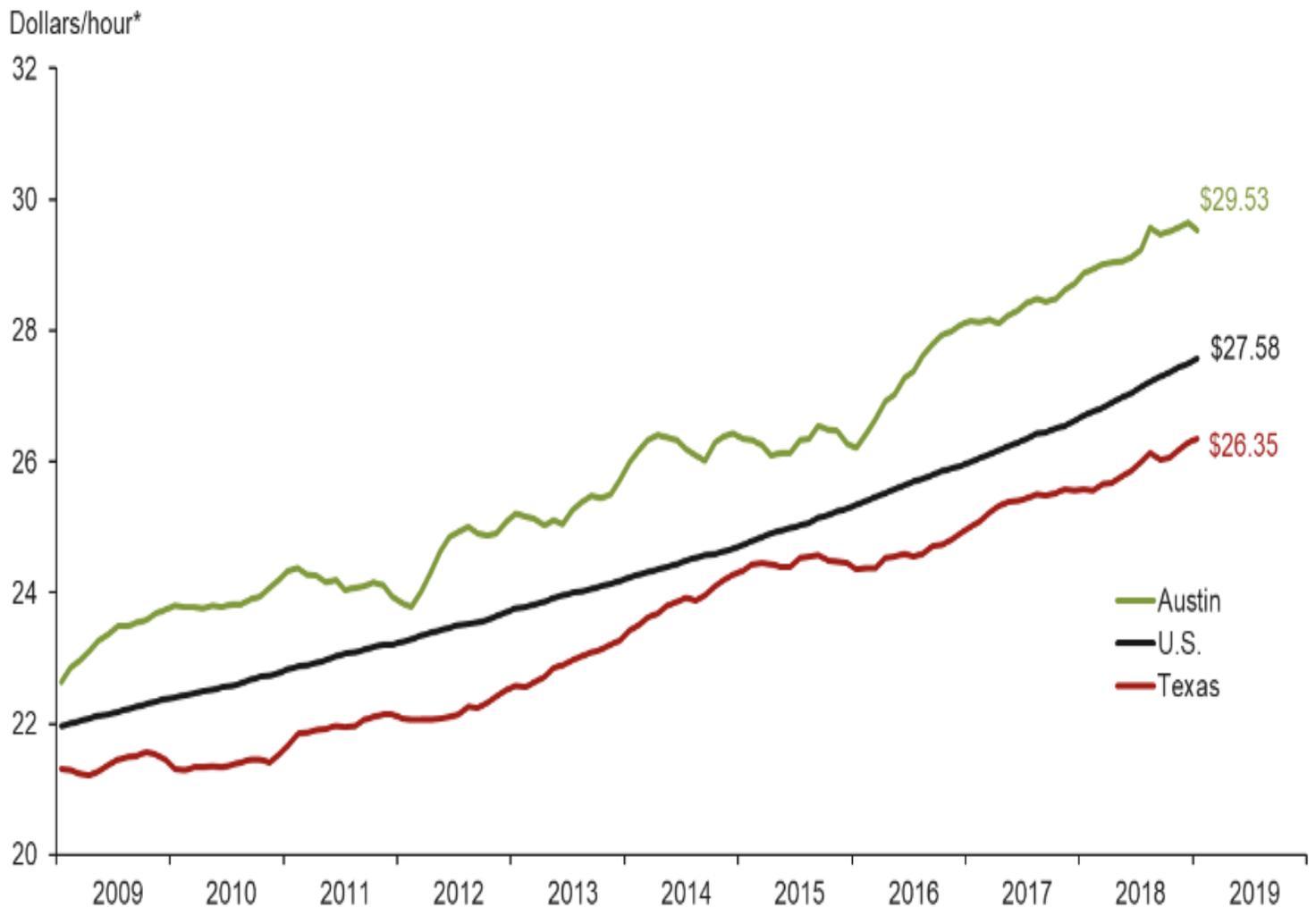


NOTES: Data show seasonally adjusted and annualized percentage employment growth by industry. Numbers in parentheses represent share of total employment and may not sum to 100 due to rounding.  
 SOURCES: Bureau of Labor Statistics; Texas Workforce Commission; adjustments by the Dallas Fed.

## JOBS – AUSTIN’S PRIVATE SECTOR AVERAGE HOURLY EARNINGS

“Austin’s three-month moving average for **private sector hourly wages ticked down** slightly in February, though it remained above the Texas and U.S. averages. Year over year, Austin wages grew a sluggish 0.5 percent, below the nation’s 3.4 percent and state’s 2.9 percent increases.” – Austin Economic Indicators – Dallas Fed – April 5, 2019

### Private Sector Average Hourly Earnings



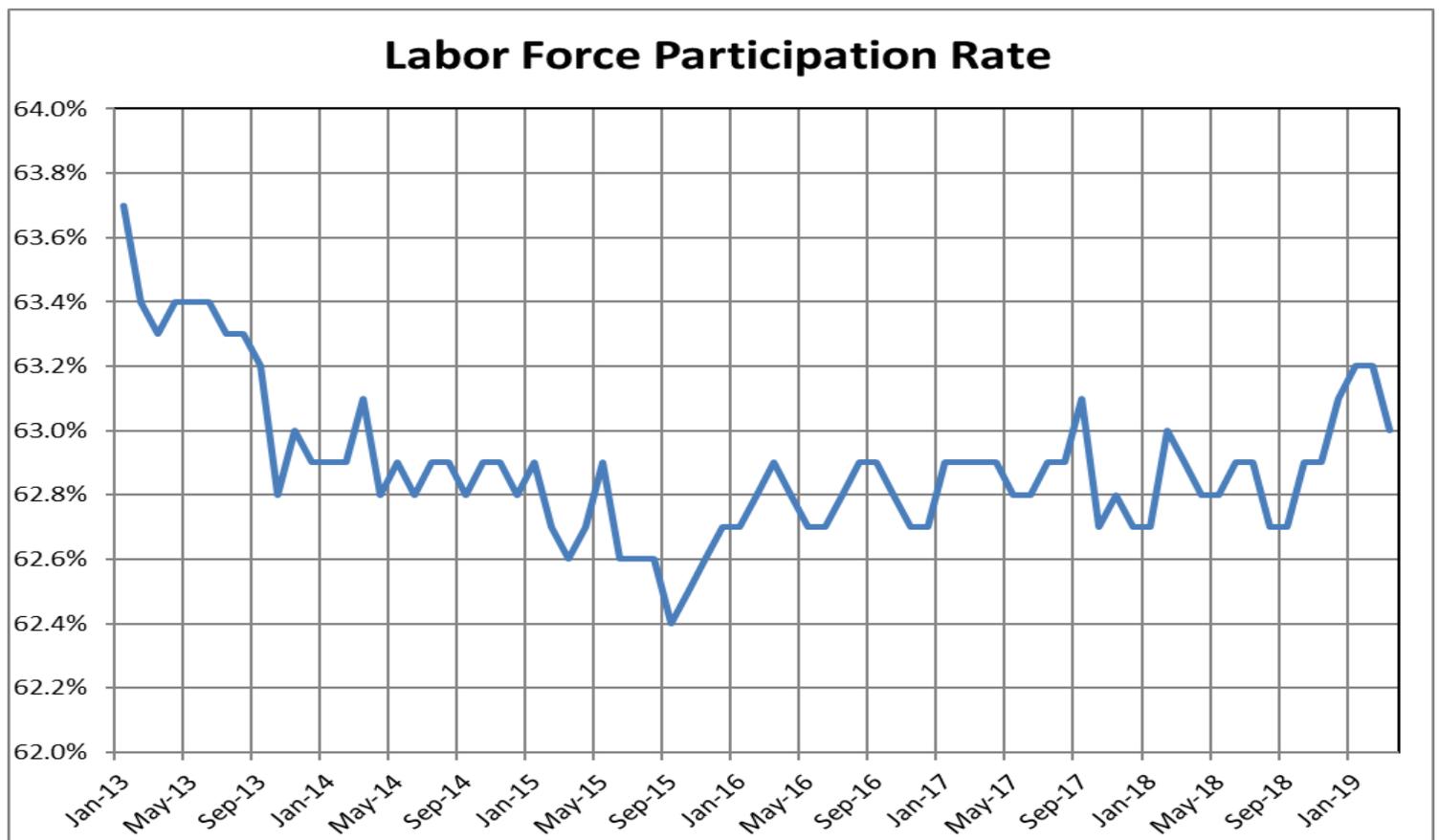
\*Seasonally adjusted, three-month moving average.

SOURCES: Bureau of Labor Statistics; Texas Workforce Commission; adjustments by the Dallas Fed.

## JOBS – LABOR PARTICIPATION RATE

“The number of Americans working in March declined by 201,000, dropping from 156,949,000 in February to 156,748,000 in March, according to the data released today by the Bureau of Labor Statistics.”

“In March, the nation’s civilian noninstitutionalized population, consisting of all people age 16 or older who were not in the military or an institution, reached 258,537,000. Of those, 162,960,000 participated in the labor force by either holding a job or actively seeking one. The 162,960,000 who participated in the labor force equaled 63 percent of the 258,537,000 civilian noninstitutionalized population.” – April 2019 CNS News



Source of Data: Bureau of Labor Statistics

The **labor force participation rate**, as defined by the Bureau of Labor Statistics (BLS), is “the percentage of the population [16 years and older] that is either employed or unemployed [that is, either working or actively seeking work].”

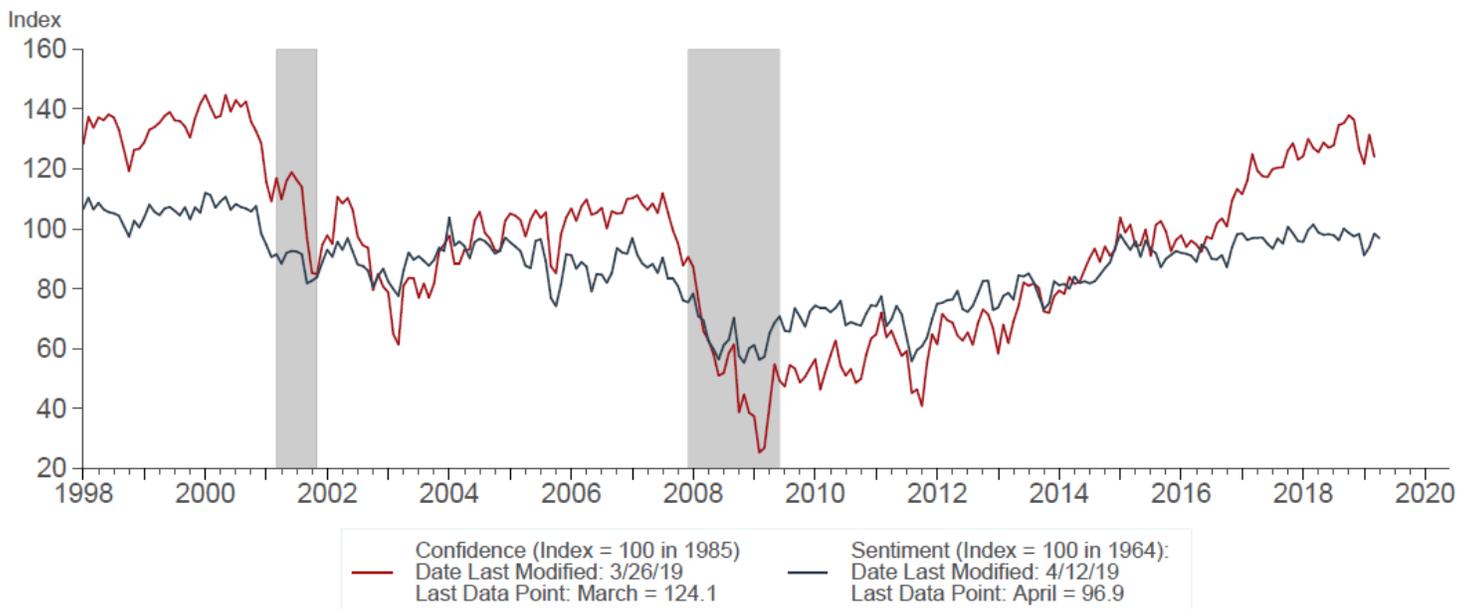
## CONSUMER CONFIDENCE AND SENTIMENT – U.S.

“The Conference Board *Consumer Confidence Index*<sup>®</sup> declined in March, after increasing in February. The Index now stands at 124.1 (1985=100), down from 131.4 in February.”

According to Senior Director, Lynn Franco, “Confidence has been somewhat volatile over the past few months, as consumers have had to weather volatility in the financial markets, a partial government shutdown and a very weak February jobs report. Despite these dynamics, **consumers remain confident that the economy will continue expanding in the near term**. However, the overall trend in confidence has been softening since last summer, pointing to a moderation in economic growth.” - The Conference Board – March 2019

Surveys of Consumers, Chief economist, Richard Curtin, commented “Consumer confidence continued its sideways shuffle in early April, posting an insignificant decline following the small gain recorded last month. Overall, **the level of the Sentiment Index during the past 30 months was higher than any other time since 1997 to 2000**, the final phase of the record 10-year expansion; a record that will be soon overtaken by the current expansion.”

Consumer Confidence and Sentiment



NOTE: Gray shaded areas indicate NBER recessions.

SOURCES: The Conference Board; Survey of Consumers; Survey Research Center; U. of Michigan.

Provided by Federal Reserve of Dallas – U.S. Economy Charts– April 2019

U.S. consumer **confidence** index (CCI) is defined as “**the degree of optimism on the [current] state of the economy** that consumers are expressing through their activities of savings and spending.” – Wikipedia

U.S. consumer **sentiment** is defined as “the indicator of the **future course of the national economy**.” – Investopedia

## BUSINESS CYCLE INDEX – AUSTIN MSA

“The Austin Business Cycle Index expanded at an annualized rate of 4.5 percent in February. This marks the seventh month in which growth in **the metro’s business-cycle index was below its long-term average of 6 percent**. The unemployment rate declined, and February jobs accelerated after contracting in January.” - Austin Economic Indicators - Dallas Fed

### Austin Business-Cycle Index

Percent, two-month change\*



\*Seasonally adjusted, annualized rate.

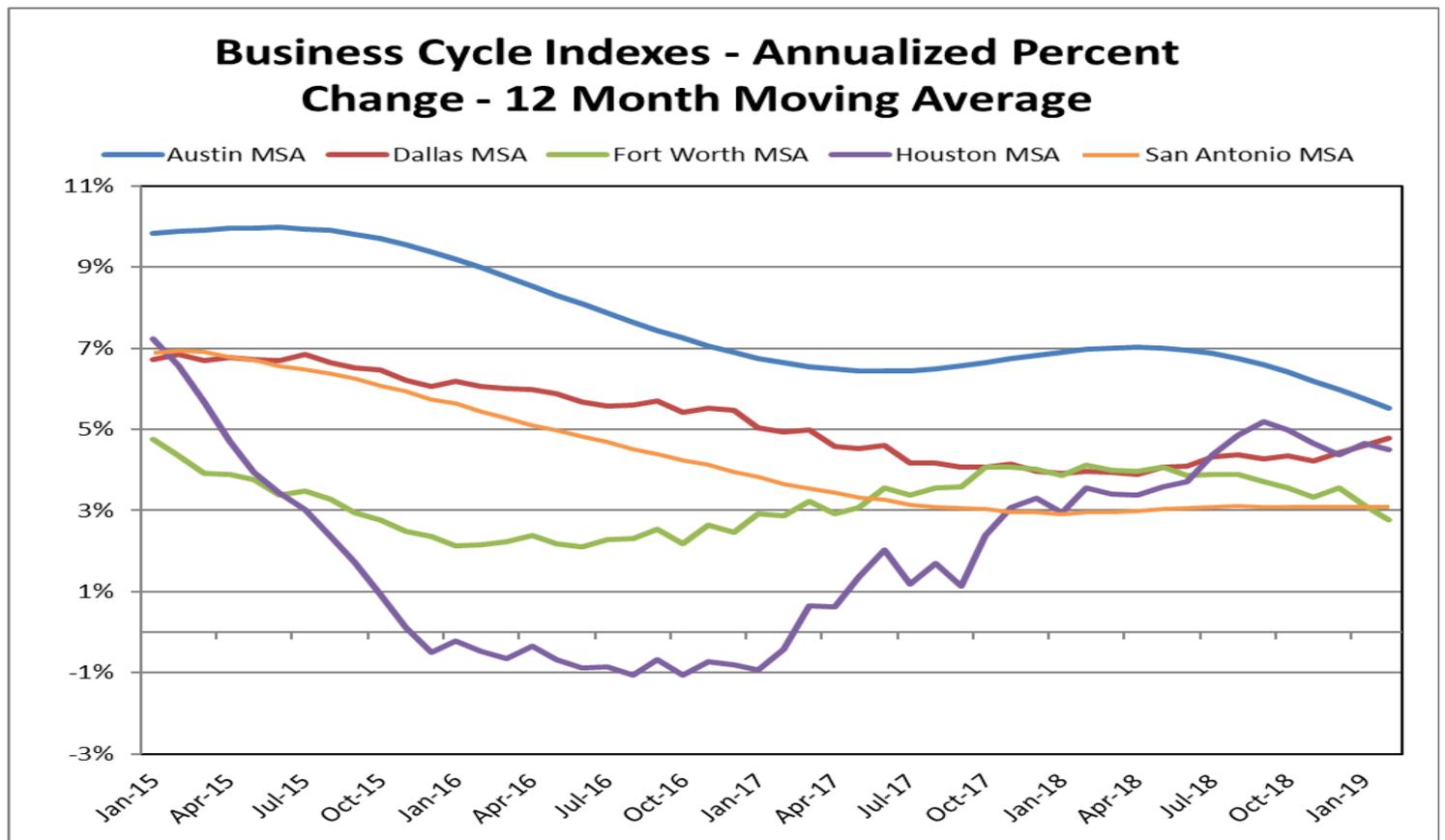
SOURCE: Dallas Fed.

**Business Cycle Indexes** are meant to reflect broad movements in local economic conditions. The Dallas Fed states that “the [local area] indexes are constructed based on the aggregated movements in the local area unemployment rate, nonagricultural employment, inflation-adjusted wages, and inflation-adjusted retail sales. The weights of the components are statistically optimized for each metropolitan area in order to best capture the underlying cyclical movements in the local area economy.”

## BUSINESS CYCLE INDEX – MAJOR METROS

“The **Dallas Business Cycle Index strengthened** in February as job growth improved and unemployment fell. The Dallas index rose an annualized 6.7 percent in February, quicker than January’s 5.4 percent rate. **Due to declining payrolls, the Fort Worth Index dipped** in February for the second straight month. Before diverging recently, the two metro indexes had tracked each other closely from late 2017 to mid-2018.” – Dallas-Fort Worth Economic Indicators

In the chart below, a twelve month moving average was incorporated to smooth out short-term fluctuations and highlight longer-term cycles.

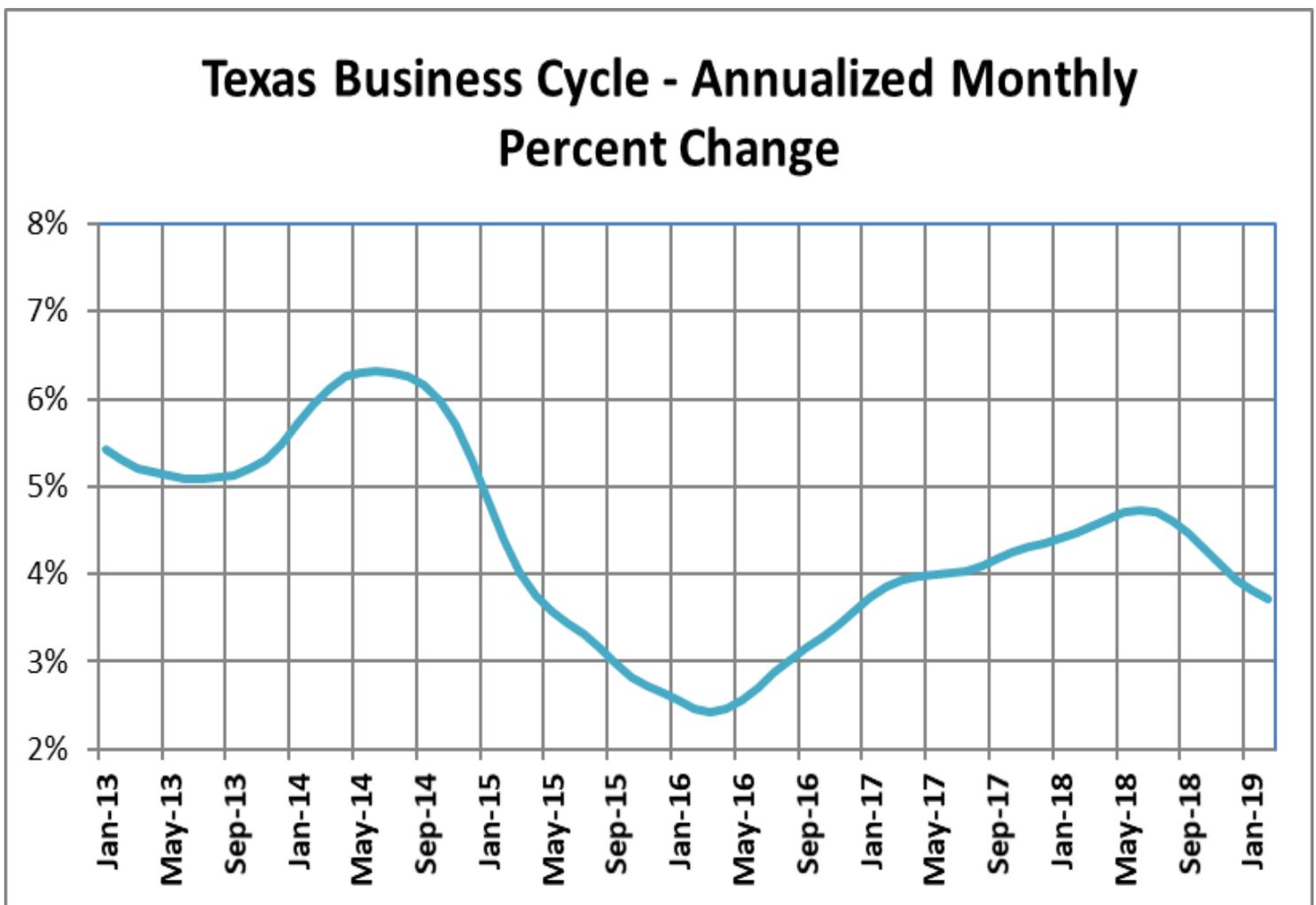


Source: Federal Reserve Bank of Dallas – Index 1980 = 100

**Business Cycle Indexes** are meant to reflect broad movements in local economic conditions. The Dallas Fed states that “the [local area] indexes are constructed based on the aggregated movements in the local area unemployment rate, nonagricultural employment, inflation-adjusted wages, and inflation-adjusted retail sales. The weights of the components are statistically optimized for each metropolitan area in order to best capture the underlying cyclical movements in the local area economy.”

## BUSINESS CYCLE INDEX – TEXAS

“The Dallas Fed's **Texas Business-Cycle Index** slowed to 3.8 growth on a seasonally adjusted annualized rate (SAAR), the slowest in over a year but continued to press forward.”  
 – Outlook for the Texas Economy - April 8, 2019 - REC

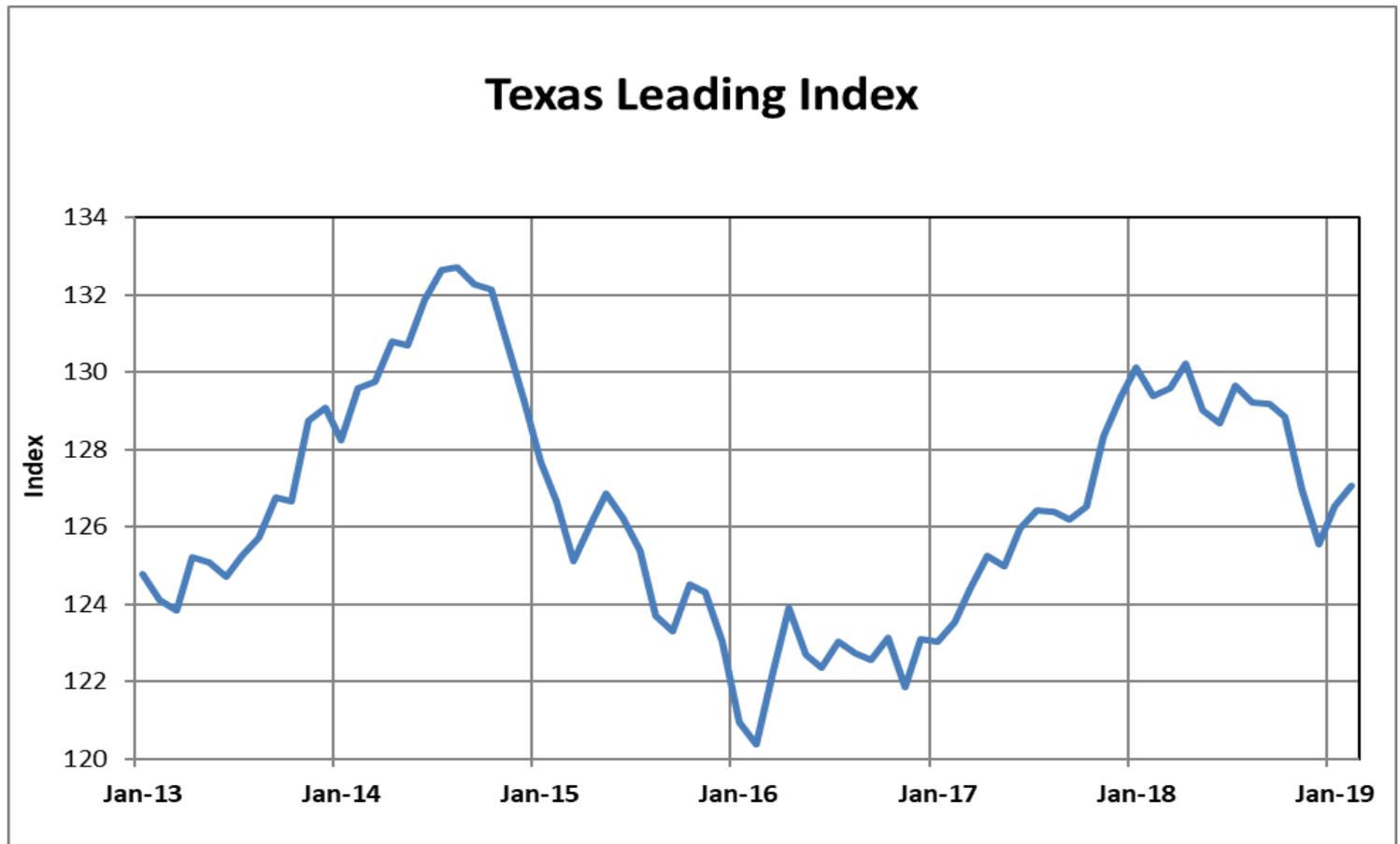


Source: Federal Reserve of Dallas - Index, 1987 = 100

“The **Texas Business-Cycle Index** is a single economic statistic that helps gauge the **current state** of the Texas economy. The Texas Business-Cycle Index is constructed using payroll employment, gross state product and the unemployment rate.” – Dallas Fed

## LEADING INDEX – TEXAS

“The **Texas Leading Economic Index** (a measure of future directional changes in the business cycle) **inched forward** amid labor-market strength and stable crude oil production. Some signs of weakness in national economic data, however, suggest slower growth over the next year. Texans remained cautiously optimistic after the sharp drop in oil prices last fall.” - Outlook for the Texas Economy - April 8, 2019 - REC

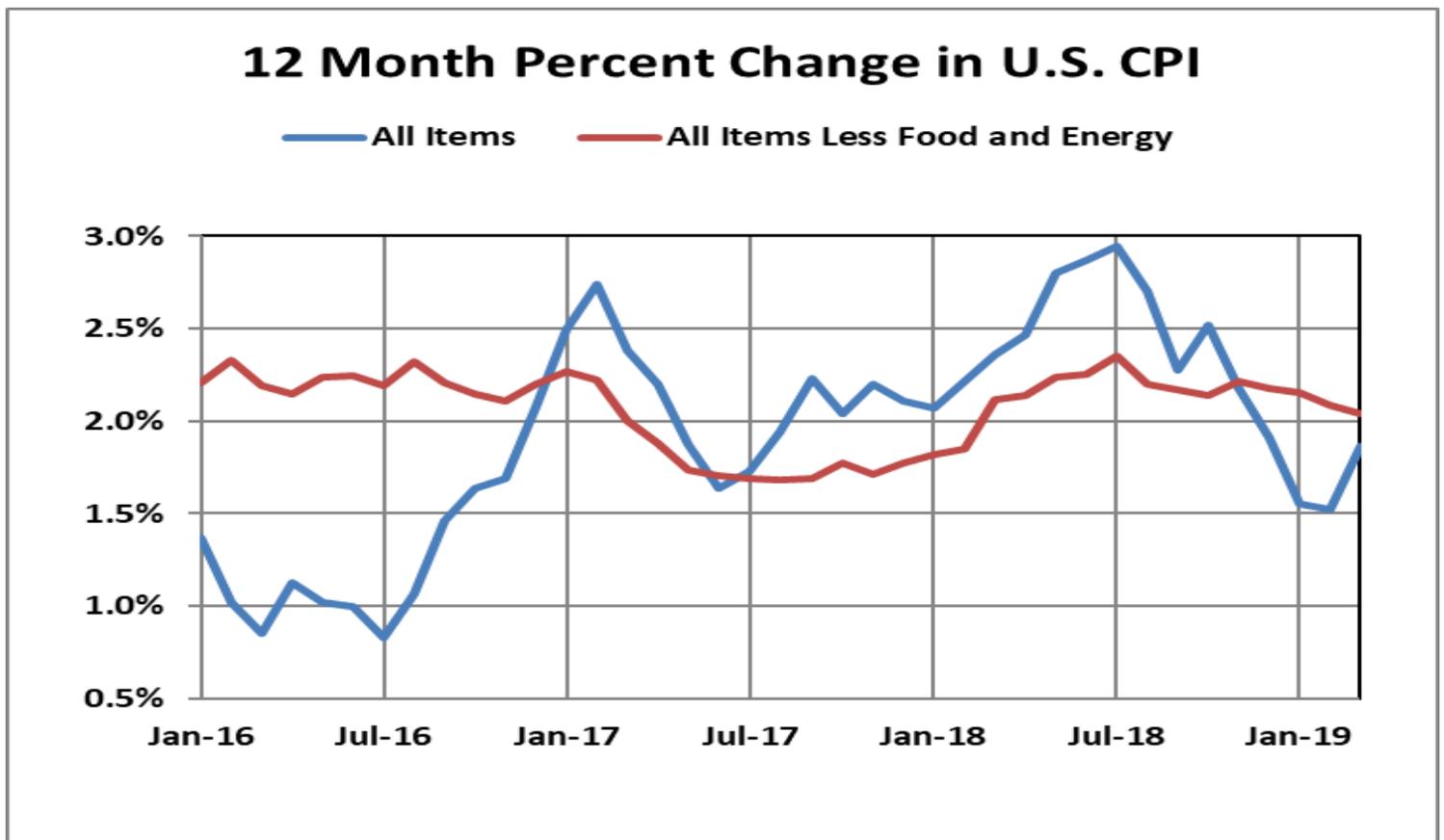


Source: Federal Reserve of Dallas - Index, 1987 = 100

Dallas Fed has defined the **Texas Leading Index** as the “single summary statistic that sheds light on **the future of the State's economy**.” The Texas Leading Index is made up of eight leading indicators that have been shown to change direction – up or down – before the overall economy. The eight indicators used by the Dallas Fed are the Texas value of the dollar, U.S. leading index, real oil price, well permits, initial claims for unemployment insurance, Texas stock index, help-wanted index and average weekly hours worked in manufacturing.

## CONSUMER PRICE INDEX

“The **all items index increased 1.9 percent** for the 12 months ending March, a larger increase than the 1.5 percent rise for the period ending February. **The index for all items less food and energy rose 2.0 percent** over the last 12 months. The food index rose 2.1 percent over the past year, its largest 12-month increase since the period ending March 2015, while the energy index declined 0.4 percent over the past year.” - BLS – March 2019 - Economic News Release



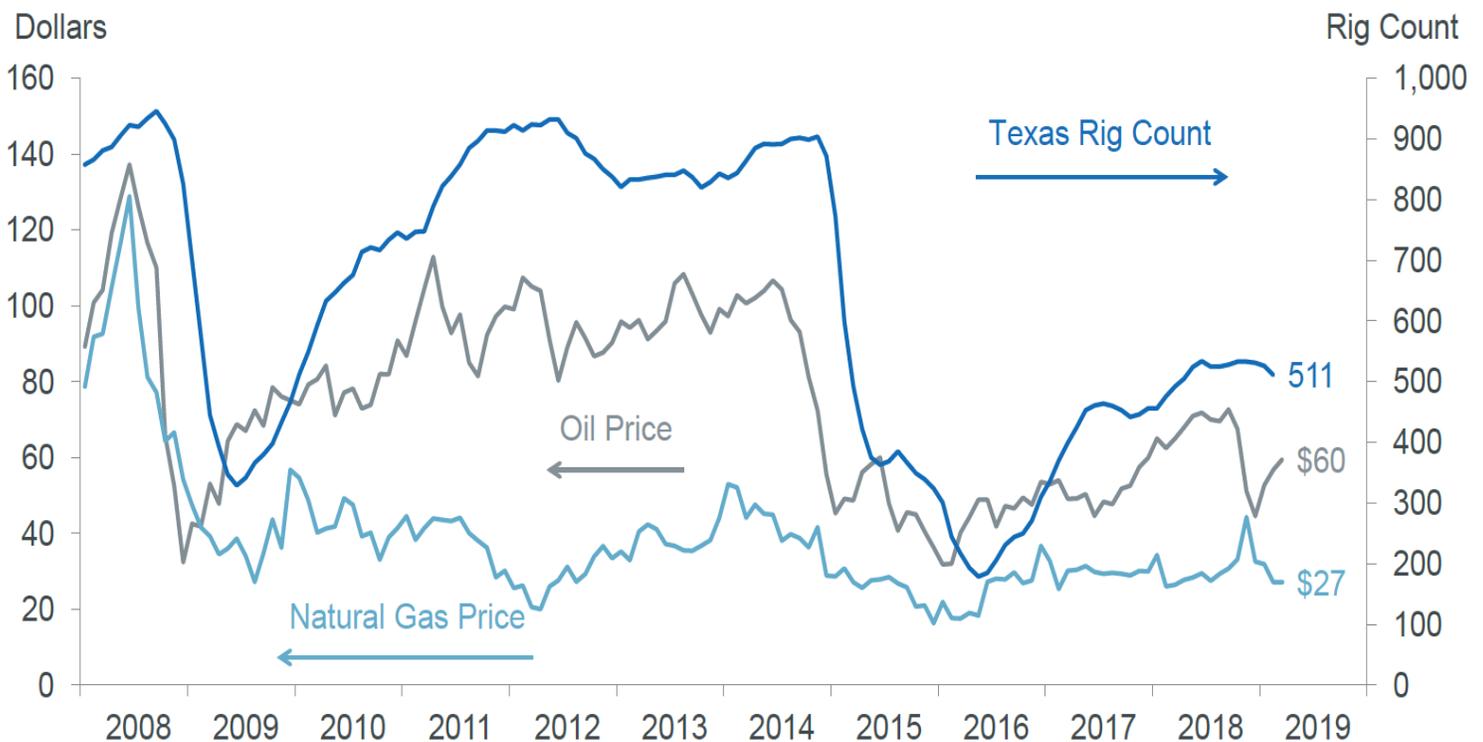
Source: Bureau of Labor Statistics, not seasonally adjusted, 1982-84=100

According to the Bureau of Labor Statistics (BLS), “There are a variety of CPI numbers generated each month. In the graph above, two numbers are compared. The first is the **Official CPI Number** that is reported to the media. It is the broadest and most comprehensive CPI and is called the **All Items CPI for All Urban Consumers**. The second one is called the **All items less food and energy**.” The BLS mentions that “Some users of CPI data use this index because food and energy prices are relatively volatile, and these users want to focus on what they perceive to be the ‘core’ or ‘underlying’ rate of inflation.”

## OIL AND NATURAL GAS

“The average **West Texas intermediate crude oil spot price rebounded above \$54 per barrel after four consecutive monthly declines**. OPEC production cuts and oilfield disruptions in Nigeria and Libya supported higher prices despite soft economic data at the national level. Texas production balanced around a record-high 4.8 million barrels per day in **January** while the **active rig count inched down to 512**. Additional pipeline capacity relieved bottlenecks in West Texas, but anticipated supply growth could quickly diminish the impact. On the natural gas front, the Henry Hub spot price ticked above \$3 per million British thermal units after a sharp drop in January. A warmer-than-usual winter, however, maintained downward pricing pressure.” – Outlook for the Texas Economy – April 8, 2019 – REC

### Oil Prices Rebound Slightly, Rig Count Softening

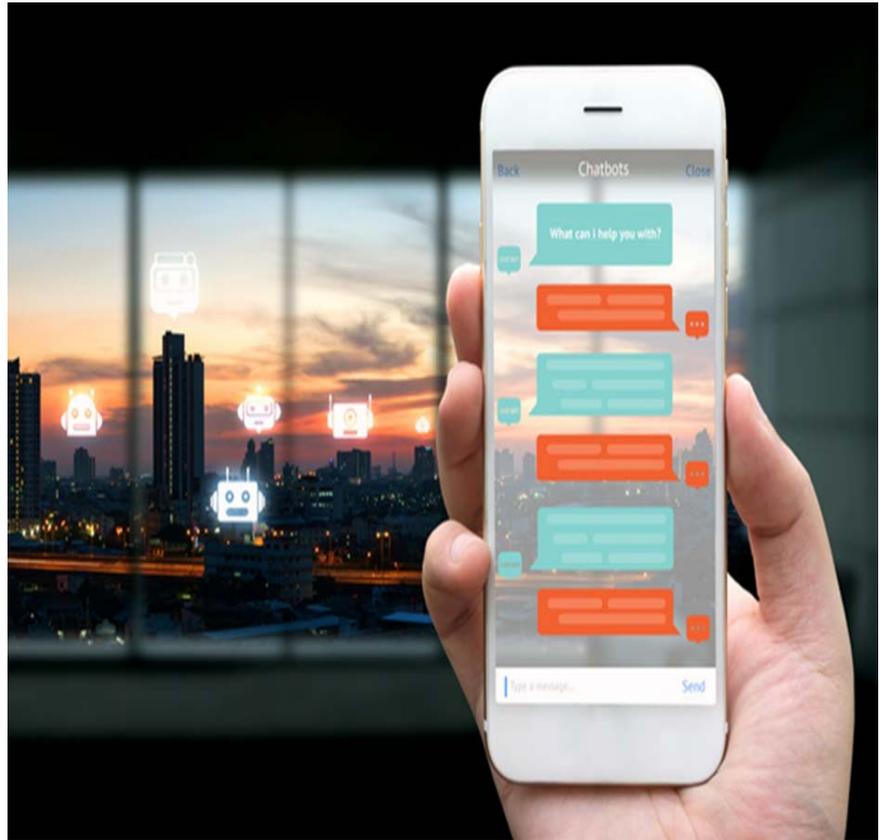


NOTES: Oil price is dollars per barrel. Natural gas price is dollars per million Btu, multiplied by 10. Texas rig count data through February 2019. Other data through March 2019. SOURCES: Wall Street Journal; Baker Hughes; U.S. Energy Information Administration; Haver Analytics.

## IN-DEPTH – CHATBOTS

### WHAT IS A CHATBOT?

“A chatbot is a computer program that simulates interactive human conversation, usually over the internet.” Chatbot comes from “a combination of the words chatter which means informal, superficial talk and bot, an abbreviation for *robot*.” – Grammarist



Source: chatbotslife Image courtesy: disruptionhub.com

### CONVENTIONAL CHATBOT

“A conventional chatbot is one that converses with the user via texts only. When you enter a question, the chatbot immediately pops up an answer to it. It tries to respond like a human as much as possible. A user while chatting hardly feels that it is chatting with a chatbot and not with a real human. You can also call them as Messenger bots.” – Jun 2018 - Quora

### VOICE CHATBOT

“A voice chatbot is one that either replies to a user’s query through voice or text and sometimes both. You can ask questions to these bots orally with a voice command and they have the ability to answer back in a specific voice.” – Jun 2018 - Quora

## IN-DEPTH – CHATBOT

### IMPACT ON CUSTOMER SUPPORT

“IBM states that close to **80% of customer queries could be answered by a chatbot**. Answering these fast, at any hour of the day and any day of the year, while also providing consistent reliability, are all tools that a chatbot has in its arsenal.” – Dec 18 - Content Fly

“That **call [center] workers may be particularly at risk from AI** is something that has been discussed for many years. But now the shift actually seems to be happening, says Brian Manusama, an analyst at market research firm Gartner.

“**The number one use case for applying AI is in this call [center]** and customer service space,’ [Manusama] explains. ‘At the end of 2017 about 70% of all use cases in AI were related to customer service and call [centers].’

**Several million people are employed in call [center] roles in the US and UK** and hundreds of thousands more rely on such work in countries like India and the Philippines. Unless these people quickly learn new skills, **they could soon be out of work.**” – Aug 2018 - BBC

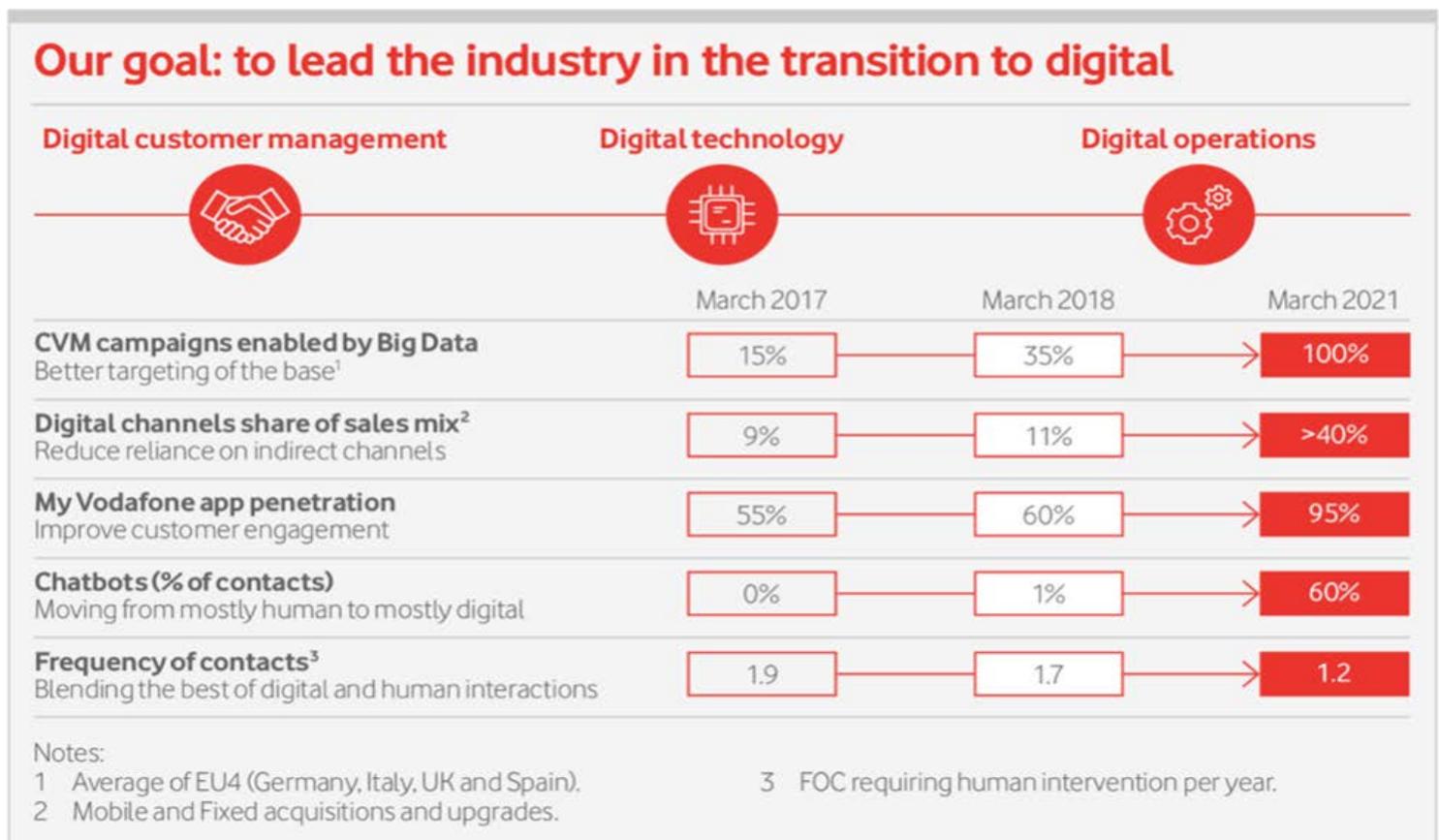
### CHATBOT ASSISTING HUMAN

The screenshot shows a chat interface with a user profile picture and the word "Chat" at the top right. The conversation starts with a blue bubble from "Sophia" asking if the user can follow a workflow to create an account. A system message indicates a transfer to a bot assistant. The bot (pink bubbles) asks for the user's email, which is "thomas@jaster.com", and then the user's name, which is "Thomas". The bot then navigates the user to the "Create account" page and asks for a password. After successful account creation, the bot asks if the user wants to be transferred back to a live agent. The user selects "Yes", and a system message indicates a transfer to a live agent. Finally, the live agent (blue bubble) welcomes the user back and offers to look at their order.

## IN-DEPTH – CHATBOTS

### EXAMPLE - VODAFONE - A MULTINATIONAL TELECOMMUNICATIONS COMPANY FOCUSED ON INCREASING CHATBOTS FROM 1% TO 60%

“Today, only around 1% of its customers talk to a chatbot for simple tasks like changing an address or payment details. But Vodafone wants to bring that number up significantly, to 60% by March 2021. That means more job cuts are likely on the way.” – Feb 2019 - Forbes



Source – Forbes - A graphic from Vodafone's 2018 annual report. IMAGE VIA VODAFONE

“When asked how Vodafone **measured the success of the chatbot software** it had licensed from IPSoft [licensor of chatbot software], Heenan-Jalil [European CEO of IPSoft] said, ‘Vodafone has been explicit to this. The number of FTEs, **the number of full-time equivalent employees, that have been reduced.**’” – Feb 2019 – Forbes

## IN-DEPTH – CHATBOT

### 5 INDUSTRIES EMBRACING CHATBOT TECHNOLOGY

“AI chatbots are disrupting a number of industries in a variety of ways. Here are just a handful of industries that are feeling the biggest impact:

#### Customer service

The largest immediate opportunity for chatbots is in the customer service industry. Customer service calls cost businesses as much as \$1.3 trillion annually, and simple requests eat up a considerable amount of customer service agents’ time. Studies show that the use of AI chatbots can decrease companies’ operating costs by as much as 30 percent. The result? Live agents can bypass simple issues and spend more time working on complex problems that require a human touch.

#### Airlines

A growing number of airlines are embracing chatbots to help answer customers’ frequently asked questions and provide basic flight information. For instance, Alaska Airlines introduced “Ask Jenn” to offer simple answers to hundreds of common questions that arise when people book travel plans. This blending of customer service with increased operational efficiency is indicative of how AI can streamline processes in other industries.

#### Food service

Food delivery chains have also been eager to adopt chatbots — in this case, to allow customers to place orders through digital channels. Domino’s, which generates \$5 billion a year from digital ordering, was one of the first household brands to launch chatbot ordering on Facebook Messenger. Other brands that have jumped on the bot-ordering bandwagon include Taco Bell, Wingstop, and Burger King.

#### Financial services

Because it’s by nature a transactional industry that is increasingly adopting mobile and wearable devices to carry out payments, the financial arena is an excellent fit for chatbots and other AI applications. One example: Bank of America’s Erica, a chatbot that provides customer service online by responding to basic inquiries.

#### Healthcare

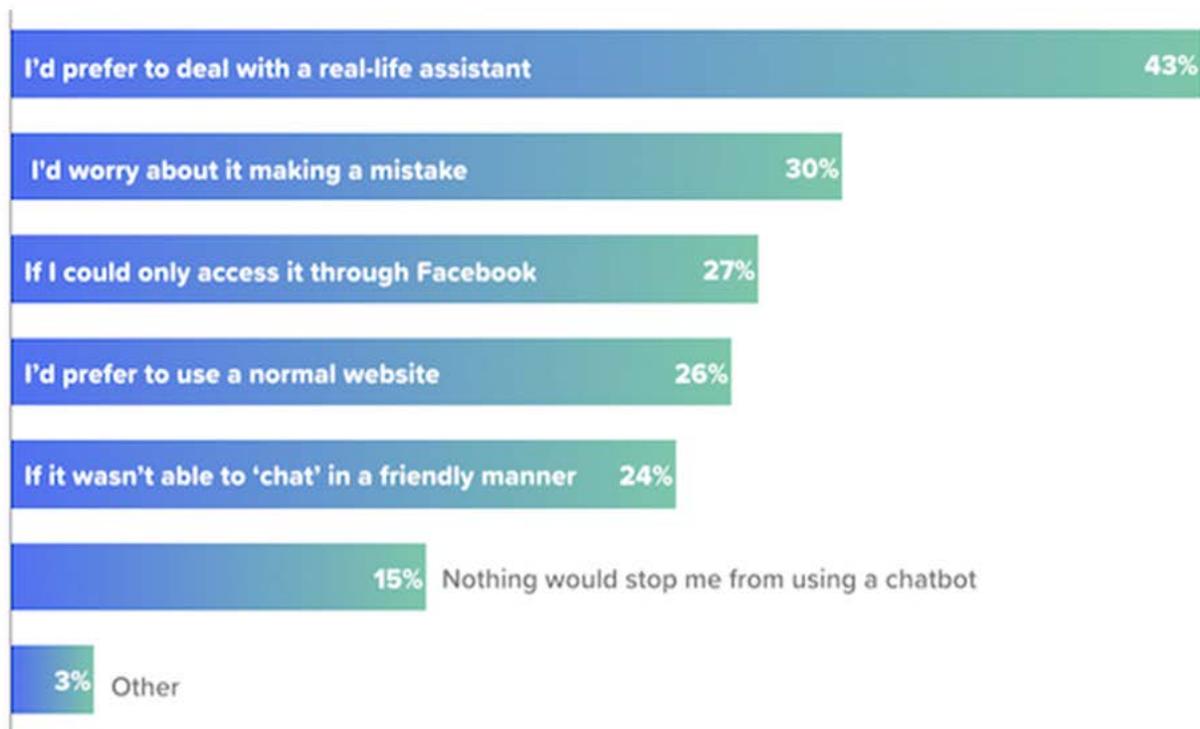
With so many people seeking healthcare information online (72 percent of U.S. adult internet users in 2014, and counting), the use of AI chatbots is a clear opportunity in the healthcare sector. Most healthcare information searches are questions that can be triaged quickly with health chatbots and apps. In fact, HealthTap, known as ‘the world’s first Global Health Practice,’ is able to process requests and route questions to a network of more than 100,000 physicians, who then provide specialized responses to patients’ healthcare questions.” – Mar 2018 – born2invest

## IN-DEPTH – CHATBOT

### ITEMS THAT COULD IMPEDE THE ROLLOUT OF CHATBOTS

## Potential Blockers to Using Chatbots

*What would stop you from using a chatbot?*

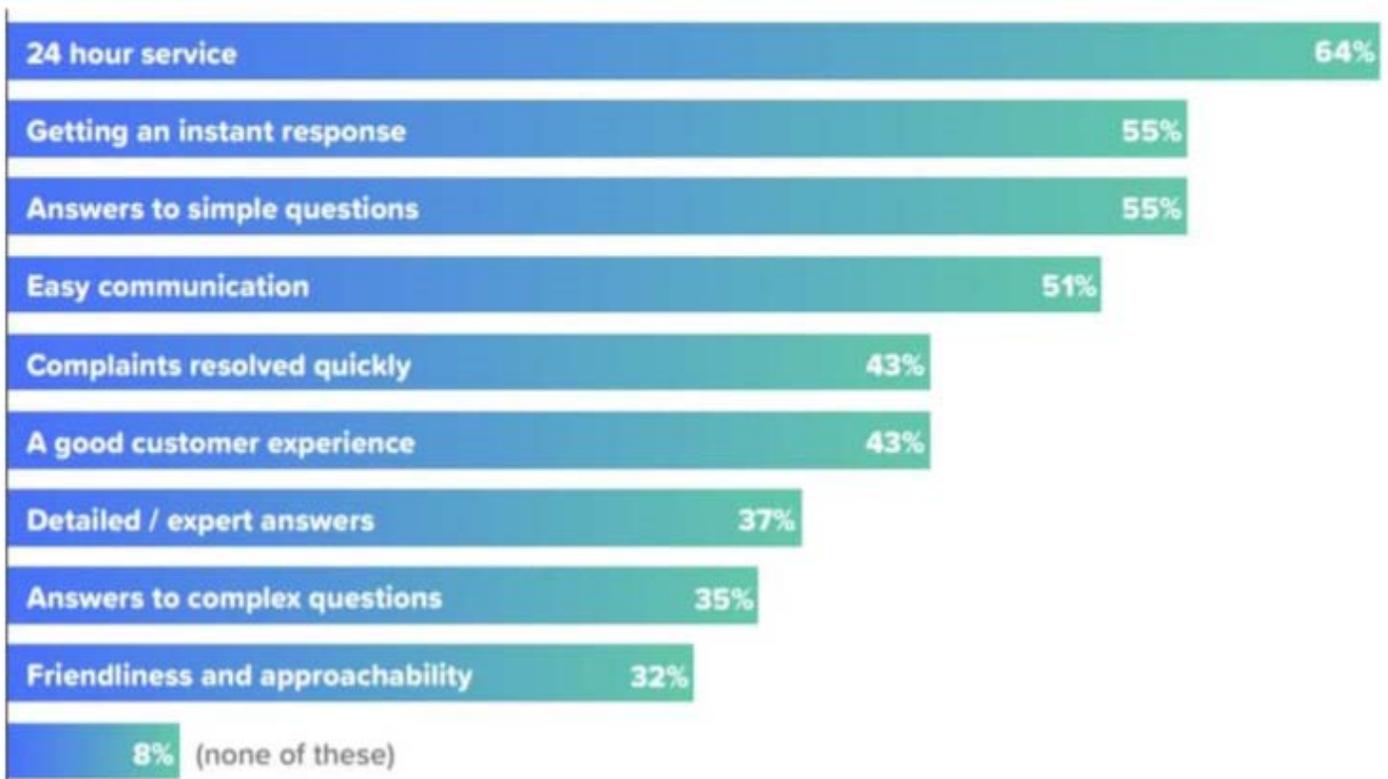


## IN-DEPTH – CHATBOT

### ITEMS THAT COULD AID THE IMPLEMENTATION OF CHATBOTS

## Potential Benefits of Chatbots

*If chatbots were available (and working effectively) for the online services that you use, which of these benefits would you expect to enjoy?*

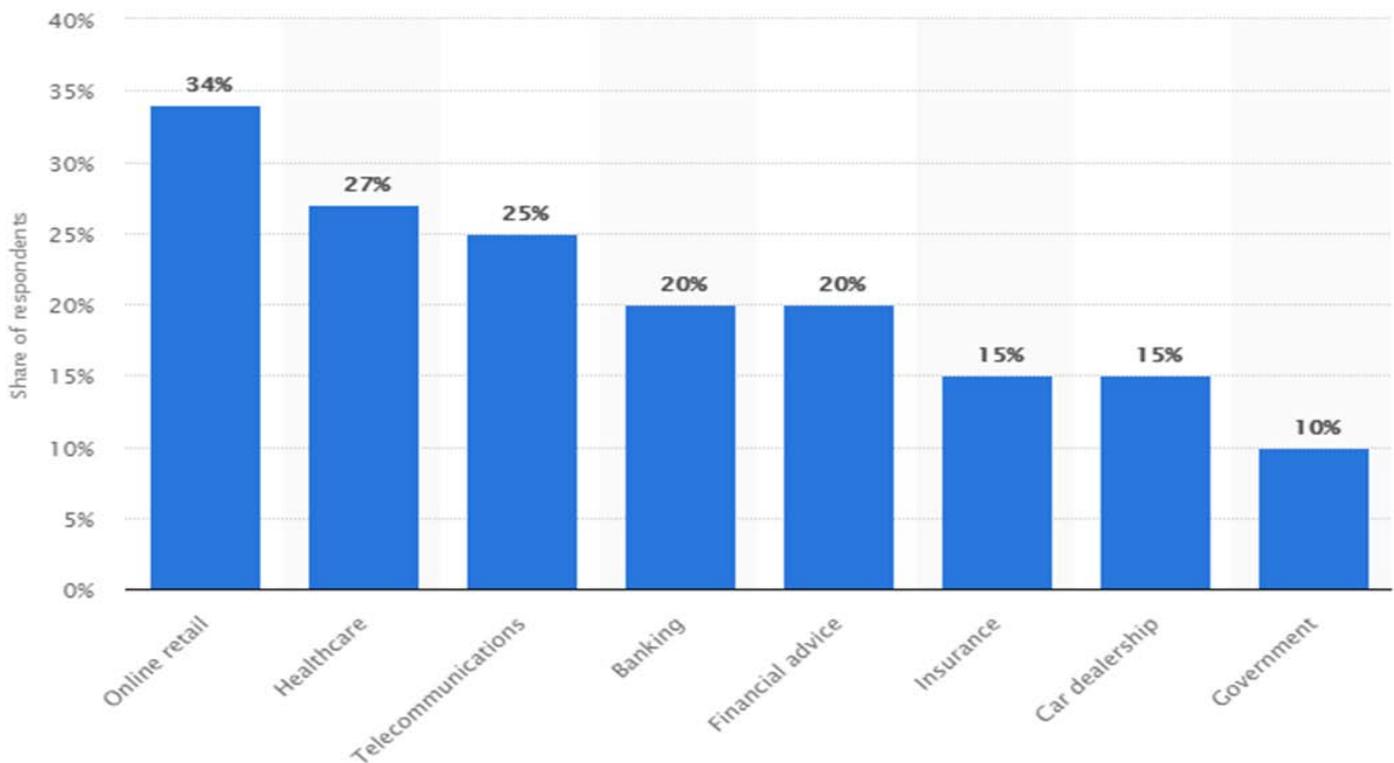


Source: AI Multiple  
Based on Drift's 2018 State of Chatbots Report

## IN-DEPTH – CHATBOT

### INDUSTRY ACCEPTANCE

Below is a graph of acceptance rates “of artificial intelligence chatbots by customers worldwide, as of 2017, by service.” – March 2018 – Chatsbotsmagazine



Source: Chatsbotsmagazine

In regards to e-commerce, “34% of respondents declared they would prefer to answer the questions from AI by means of a chatbot or a virtual assistant...” – March 2018 – Chatsbotsmagazine

“As chatbot technology becomes more robust, no industry will remain untouched by its reach.” – Jan 19 – paymentsjournal

## IN-DEPTH – CHATBOT

### WHY DO SOME PREFER CHATBOTS?



Source: 3 G Media

#### INHERENT TRUST

According to research performed by Mindshare in 2016, “We have found that **people are often more trusting of bots** around sensitive information than they are with human customer service operators.

**Only 37% say they are happier to give sensitive info over the phone to a human than to a chatbot.** For ‘embarrassing medical complaints’, twice as many people prefer talking to a chatbot than a human than for ‘standard medical complaints’.

We found that users consistently preferred to receive [behavioral] suggestions from an AI than from humans, and many of our participants at the Watson trial reflected this: ‘I would prefer the interaction with the AI over the human for things like budgeting and managing my money. I think **it would be quite intrusive if an actual person was trying to advise you on your spending**, but if you could set AI goals to manage your money better, and you could get advice and tips, that would be a really nice feature’.

This is largely because there is a feeling that the **bot will never judge you in the way a human might**. As Jonathan Crane, the CTO of Amelia puts it, ‘You are talking to a technology, providing information, and that technology isn’t [judgmental]. It can’t go further. It can’t misuse your information. And so we think there is going to be an increase in trust on the artificial intelligence’.

#### PROGRAMMED TRUST

To build trust, programmers use many techniques. Some may add pauses before delivering a response which gives the illusion of the bot ‘thinking’ of a solution, or they will quickly hand off calls to live operators if the chance of the bot answering the question successfully is low, or they may ask 5 or 6 questions instead of the optimal 3 because users are more comfortable with the responses if the bot asks five or six questions.” - Mindshare

## IN-DEPTH – CHATBOT

### WHY DO SOME PREFER CHATBOTS? (cont.)

#### MESSENGING APPS ARE GROWING IN POPULARITY

**Any business that still manages with emails or phone calls is considered to be outdated.** – March 2018 – Chatbotsmagazine

**“63 percent of the people prefer messaging an online bot to communicate with a business or brand.”** – G2 Crowd

**“Over the next 5 years, approximately 80% of communications businesses have with their customers will be done using chatbots, with an estimated 40% by the end of 2019. This is mostly due to an increasing number of people using messenger apps more than they are social media.”**

**“While baby boomers are still using Facebook for the majority of their interactions, younger users are turning to its messenger. A mere 50% of those aged between 65-75 use Facebook Messenger as opposed to a whopping 85% and 89% respectively for millennials and Generation Xers.”** – Dec 18 - Content Fly



Source: Medium

#### TALKING EASIER THAN TYPING

**“Chatbots are set to replace the web development services and apps. Virtual assistants are day-by-day becoming more popular. It is becoming easier to find the information through voice recognition for Siri that not only saves the time but also gradually becoming the potential competitor for traditional apps. The future is in telling the machine what we want. Talking to the computer is easier to get the job done instead of typing for more things. The use of chatbots in internet of things (IOT) keep user up to date.”** – Feb 2019 – customerthink

## IN-DEPTH – CHATBOT

### INCREASING THE ACCEPTANCE RATE

#### FOCUS ON NATURAL LANGUAGE PROCESSING (NLP)

“Natural language programming NLP is the special programming that powers the Chatbot to respond in a natural flow using dialects that are more specific and putting generic pauses for creating the similar impression as human.” – Feb 2019 – customerthink

“Due to become one of the biggest chatbot trends for 2019, NLP is about to make for more intelligent and humanistic technology.” – Dec 18 – Content Fly

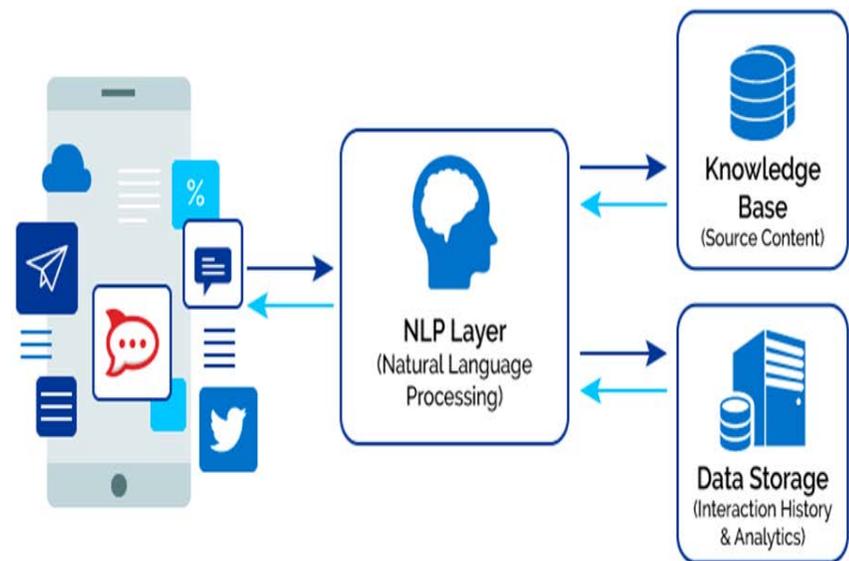


Image courtesy: bigdata made-simple

#### FOCUS ON MULTI-LINGUISTICS

“Back in August, Forbes reported that multilingual chatbots are about to change the business world. The newly advanced generation of chatbots are going to change the world, and with features like this one [multilingual], they’ll also **be able to speak to the world**. Smaller businesses will now be able to go global, being able to operate their applications through and beyond language barriers.

The big guns are all shooting for global success, but why should it just be them?

Only ten years ago, the majority of chatbots could only speak one language. Now, the possibility of a chatbot being able to speak hundreds of languages is a very real thing. Bot fluency is advancing at lightning speed, and it would do Airbnb and other such platforms like it a world of good.” – Dec 18 – Content Fly

## IN-DEPTH TOPICS COVERED IN PREVIOUS ISSUES – SEE AUDITOR WEBPAGE

- 5G Network 4<sup>th</sup> Qtr 2018
- Alibaba 3<sup>rd</sup> Qtr 2017
- Bitcoin 4<sup>th</sup> Qtr 2016
- Cashless Society 4<sup>th</sup> Qtr 2017
- Chatbots 1<sup>st</sup> Qtr 2019
- Facial Recognition 1<sup>st</sup> Qtr 2018
- Labor Participation Rate 4<sup>th</sup> Qtr 2015
- Money Market Fund Reform – New Rules 3<sup>rd</sup> Qtr 2016
- Negative Interest Rate Policy (NIRP) 2<sup>nd</sup> Qtr 2016
- New Silk Road 2<sup>nd</sup> Qtr 2017
- Quantitative Easing 1<sup>st</sup> Qtr 2016
- Texas Imports and Exports 2<sup>nd</sup> Qtr 2018
- Universal Postal Union 3<sup>rd</sup> Qtr 2018

## DISCLAIMER

THIS PUBLICATION WAS DEVELOPED FOR INTERNAL, GOVERNMENTAL PURPOSES ONLY. IT WAS PREPARED IN GOOD FAITH AND FOR GENERAL INFORMATIONAL PURPOSES ONLY. WE DO NOT MAKE ANY WARRANTIES ABOUT THE COMPLETENESS, RELIABILITY OR ACCURACY OF THE INFORMATION. YOU SHOULD NOT USE ANY OF THE INFORMATION CONTAINED IN THIS REPORT WITHOUT FIRST SEEKING LEGAL AND OTHER PROFESSIONAL ADVICE. USE AT YOUR OWN RISK.