ECONOMIC OUTLOOK

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3RD QTR 2019

TEXAS

“**Texas’ economy remained healthy in the longest U.S. economic expansion on record.** Payroll growth slowed, but unemployment rates hovered at historical lows. Hourly earnings failed to make positive headway after adjusting for inflation; second-quarter real income per capita, however, increased.

Retail sales improved, but overall perceptions were tainted by political and trade-related concerns. Energy prices remained low amid record-breaking production and lowered expectations of global demand in 2020.

Escalating trade tensions, political uncertainty, and the slowing world economy continue to be the largest headwinds to the current business-cycle expansion.” – Oct 2019 - Outlook for the Texas Economy - Real Estate Center (REC) – Texas A&M University

AUSTIN

“**The Austin economy posted a strong performance in August.** The Austin Business-Cycle Index expanded at a solid pace, and most job sectors experienced payroll gains, although health and private education services continued to decline. Hourly wages climbed in August. Housing construction permits continued to increase, and home sales grew.”- Oct 2019 – Austin Economic Indicators – Dallas Fed

UNITED STATES

“**Real consumer spending increased solidly in July.** Real business equipment spending remained sluggish in 2019 Q2, and its growth over the first half of 2019 was well below its pace in 2018.

Housing activity indicators improved slightly in July. A still-strong labor market and low mortgage rates could provide more support to housing.

Payroll growth was moderate in August, softer than that in July.” - Sept 2019 - Research Function - New York Fed

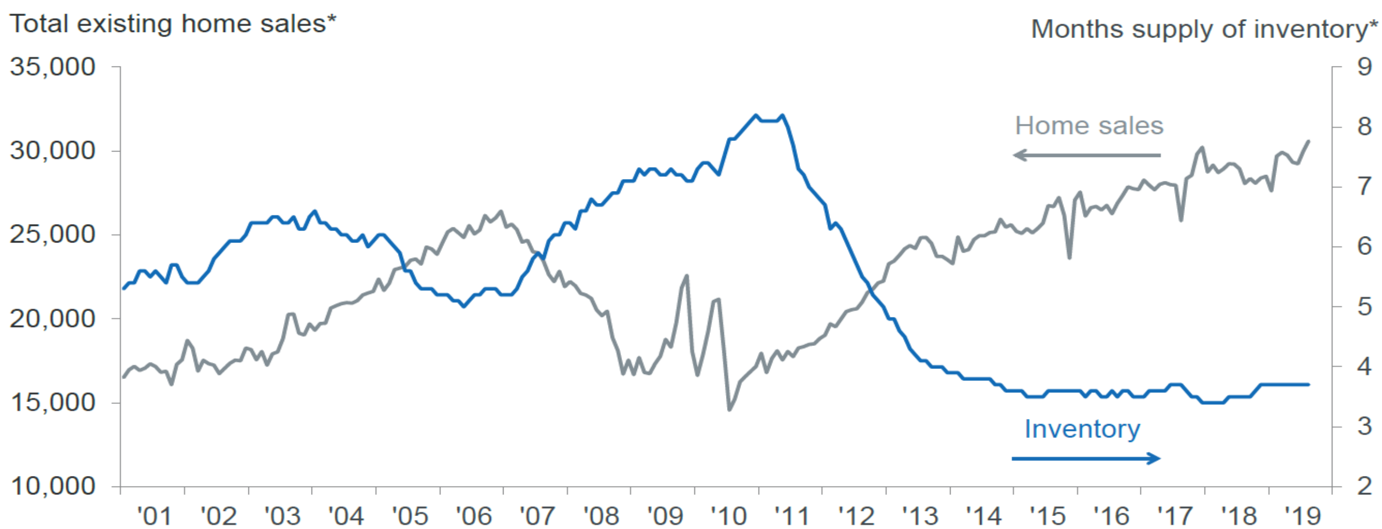
HOUSING – HOME SALES AND MONTHS OF INVENTORY

"**Total housing sales ticked up 1 percent in August** after data revisions and business-day adjustments brought July's increase of 17 percent down to 3 percent. Despite the correction, sales extended a steady trend upwards, albeit at a slower pace than during the first three months of the year. **Transactions for homes priced $200,000-$300,000 accounted for most of the uptick**, increasing 5.5 percent after tepid second-quarter growth.

Growth in Fort Worth and San Antonio's $200,000-$300,000 market supported the statewide trend. Fort Worth's total sales increased 2.9 percent after a five-month stagnation in the aforementioned price cohort. San Antonio exceeded 3,000 monthly sales for the first time in series history. Houston activity hovered at a record 7,800 sales reached in July. Austin and Dallas sales registered six percent below December 2017 all-time highs but increased 8.0 and 8.4 percent YOY, respectively.

Robust demand held Texas' average days on market (DOM) at 59 days. The DOM in Houston and San Antonio stabilized at 59 and 60 days, respectively. Austin's DOM hovered at 57 days, two days less than the metric's yearlong average. The DOM in North Texas continued to adjust after reaching unsustainable levels in 2016-2017, registering 56 and 45 days in Dallas and Fort Worth, respectively." – Oct 2019 – Texas Housing Insight – Real Estate Center

Texas Home Sales Remain Elevated, Inventories Remain Flat

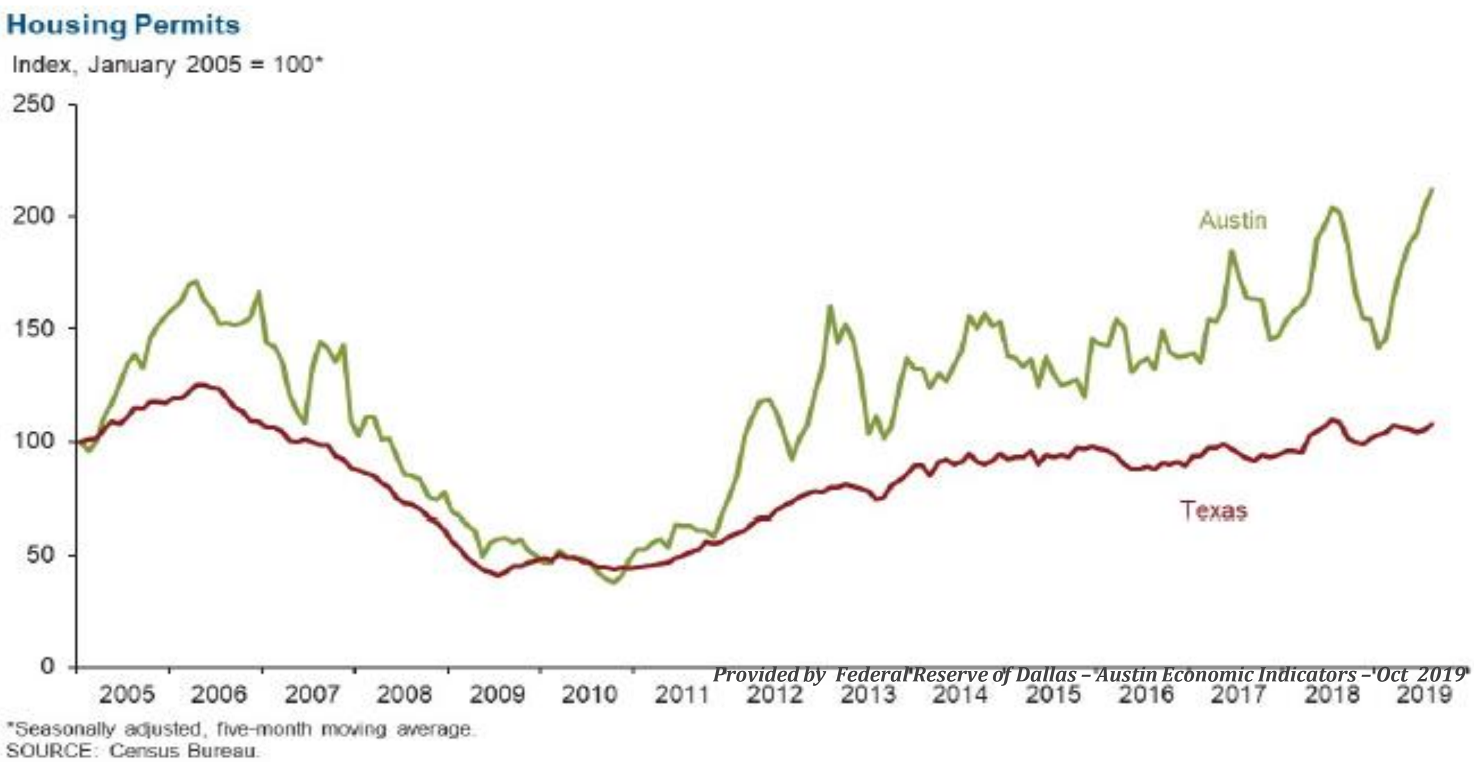


*Seasonally adjusted.
NOTE: Data through August 2019.
SOURCES: Multiple Listing Service; seasonal and other adjustments by FRB Dallas.

Provided by Federal Reserve of Dallas – Your Texas Economy – Sept 2019

HOUSING – SINGLE FAMILY BUILDING PERMITS

"**The five-month moving average for total housing construction permits (single family and multifamily) swelled 3.9 percent from July to August in Austin, compared with an increase of 2.9 percent in Texas.** From December 2018 to August 2019, permits surged 37.3 percent in the metro, indicating further strength in residential building activity. The growth is significantly stronger than at the state level, where total home construction permits increased 6.5 percent during the same period." – Oct 2019 – Austin Economic Indicators



Provided by Federal Reserve of Dallas – Austin Economic Indicators – Oct 2019

"Texas' 11,545 monthly permits (nonseasonally adjusted) accounted for 17 percent of the U.S. total. The Lone Star State led the nation in total permits but ranked seventh in per capita issuance behind Arizona and Florida. On the metropolitan level, Houston topped the list for the tenth consecutive month with 3,674 permits in August. DFW issued 3,328 permits, increasing after permit activity fell in the first half of the year. **Central Texas extended a seven-month upward trend, issuing 1,820 and 891 permits in Austin and San Antonio, respectively."** – Texas Housing Insight - REC

HOUSING – MEDIAN HOME PRICES

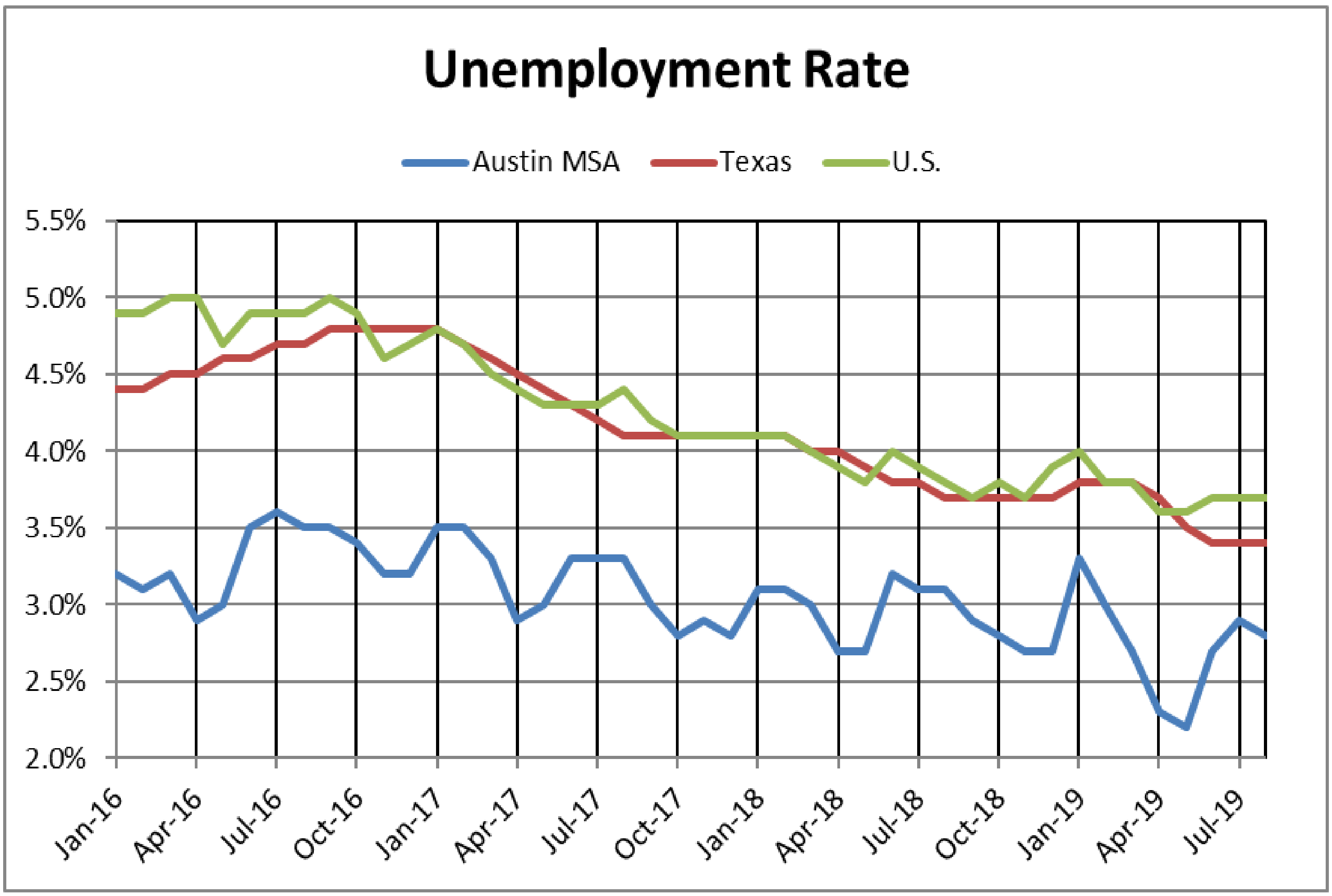
“**The median-home price in Austin ticked up to $314,649 in August**, but prices were down 0.4 percent year over year. **At the state level, the median-home price increased to $241,861 in August** and was up 2.7 percent relative to a year prior. Existing-home sales in the metro increased a steady 2.0 percent from July to August and sales volumes were 7.2 percent higher than the monthly average in 2018. Sales in the state also grew at 2.0 percent in August and were 6.6 percent higher than the monthly average last year. **Inventory in Austin edged down to 2.3 months in August, far below the six months considered a balanced market**.” – Oct 2019 – Austin Economic Indicators

Provided by Federal Reserve of Dallas – Austin Economic Indicators – Oct 2019

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

"Get ready for the already abundant 'Help Wanted' signs around **Austin** to multiply, because the region's **latest unemployment rate is once again at a 20-year monthly low and growth in the pool of available workers is continuing to ebb**.

The local jobless rate for August came in at 2.8%, according to the Texas Workforce Commission, about average so far in 2019 but the lowest level for the month of August since 1999, when it hit 2.2%. Unemployment in the Austin metro area registered 2.9% in July this year and 3.1% in August 2018." – Sept 2019 - Statesman



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

JOBS – GROWTH RATE – AUSTIN

"**Jobs were added at a 3.4 percent annualized rate in Austin during the three months ending in August.** Growth was generally positive across industries. Professional and business services grew 9.0 percent, adding approximately 4,300 net jobs. Trade, transportation and utilities (8.7 percent; 3,800 net jobs) and leisure and hospitality (6.8 percent; 2,250 net jobs) also expanded at a healthy pace. Payrolls within government (-2.5 percent; -1,125 jobs) and construction and mining (-11.6 percent; -2,000 jobs) contracted in the three months through August after growing earlier in the year. Health and private education services jobs continued to decline." - Oct 2019 - Austin Economic Indicators – Dallas Fed

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

"The three-month moving average of private sector hourly wages for the metro area climbed to $28.81 in August. **Wages decreased 1.1 percent year over year in Austin, while they were relatively flat at 0.6 percent in the state and up 3.2 percent in the nation.**" – Oct 2019 - Austin Economic Indicators – Dallas Fed

JOBS – LABOR PARTICIPATION RATE

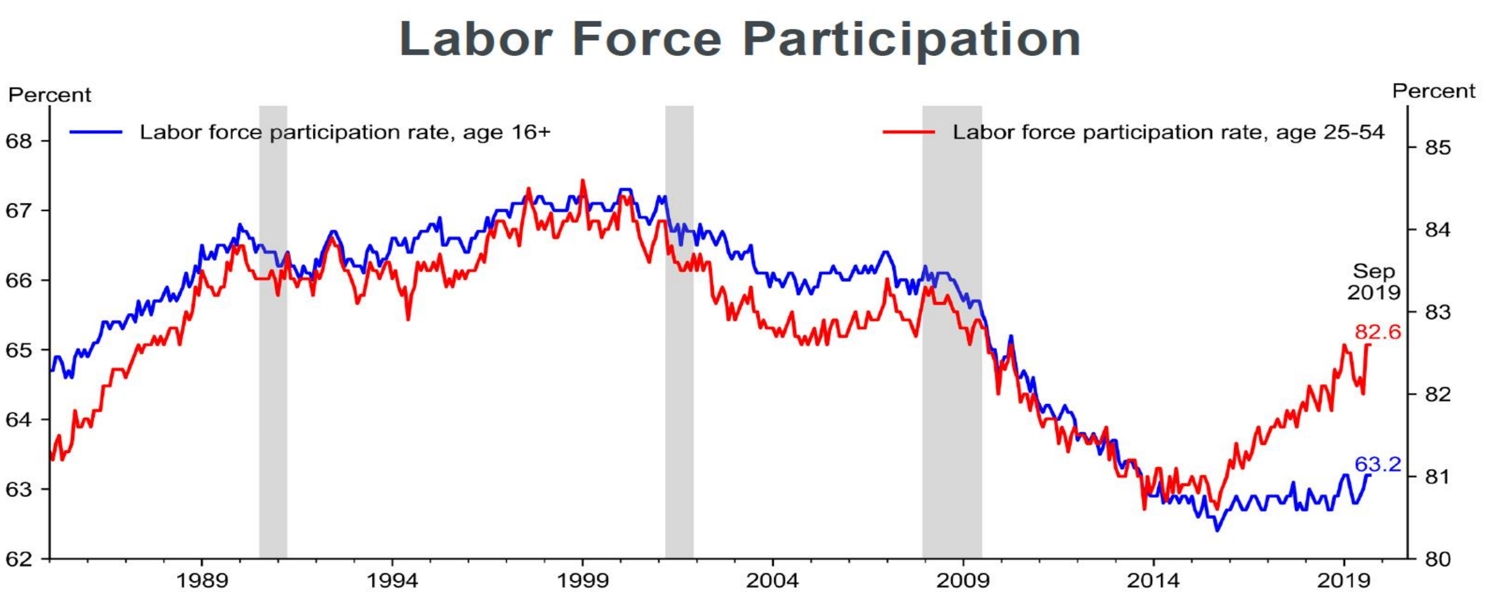
“In September, the civilian non-institutional population in the United States was 259,638,000. That included all people 16 and older who did not live in an institution (such as a prison, nursing home or long-term care hospital). Of that civilian non-institutional population, 164,039,000 were in the labor force, meaning that they either had a job or were actively seeking one during the last month.

That produced a labor force participation rate of 63.2 percent, the same as it was in August, and a Trump-era high.

Of the 164,039,000 who were in the labor force, 5,769,000 were unemployed, which put **the unemployment rate at a 50-year low of 3.5 percent.**

The unemployment rate for Hispanics, 3.9 percent in September, has never been this low. The unemployment rate for blacks remained at the record low of 5.5 percent set in August.

Among the other major worker groups, the unemployment rate for whites declined to 3.2 percent last month.” – Oct 2019 - cnsnews



SOURCES: Bureau of Labor Statistics.

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

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® decreased in September, following a slight decline in August. The Index now stands at 125.1 (1985=100), down from 134.2 in August. ‘**Consumer confidence declined in September**, following a moderate decrease in August,’ said Lynn Franco, Senior Director of Economic Indicators at The Conference Board. ‘Consumers were less positive in their assessment of current conditions and their expectations regarding the short-term outlook also weakened.’” – Sept 2019 – The Confidence Board

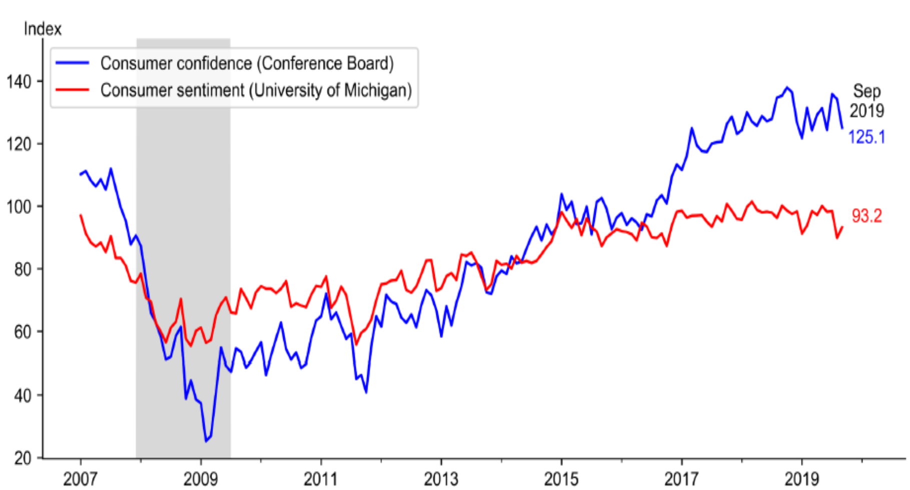
Surveys of Consumers, Chief economist, Richard Curtin, commented “**Sentiment rebounded in early October as consumers anticipated larger income gains and lower inflation during the year ahead.** As a result, real income expectations rose to their most favorable level in two decades. Stronger finances and lower interest rates helped to modestly bolster buying plans. These favorable trends did not change consumers' overall prospects for the national economy. A slower pace of overall economic growth is still anticipated, including some modest increases in the national unemployment rate during the year ahead.

While uncertainties about trade policies have continued to depress economic prospects, its negative impact has slightly lessened (cited by 29%, down from 36%). **Importantly, the impeachment inquiry has not had a significant negative impact on economic prospect; it was negatively mentioned by about half as many as negatively mentioned the GM strike (3% versus 5%).** Overall, the data indicate that consumption spending will be strong enough to offset weakness in business investment spending so as to keep the economy expanding into 2020.”

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

Consumer Confidence



SOURCES: University of Michigan; The Conference Board.

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

BUSINESS CYCLE INDEX – AUSTIN MSA

"**The Austin Business-Cycle Index expanded at a 7.8 percent annualized rate from July to August.** Strength in the index so far this year can be attributed to lower unemployment rates and stronger job growth, indicating robust expansion in the metro's economy." – Oct 2019 - Austin Economic Indicators - Dallas Fed

*Seasonally adjusted, annualized rate.
SOURCE: Dallas Fed.

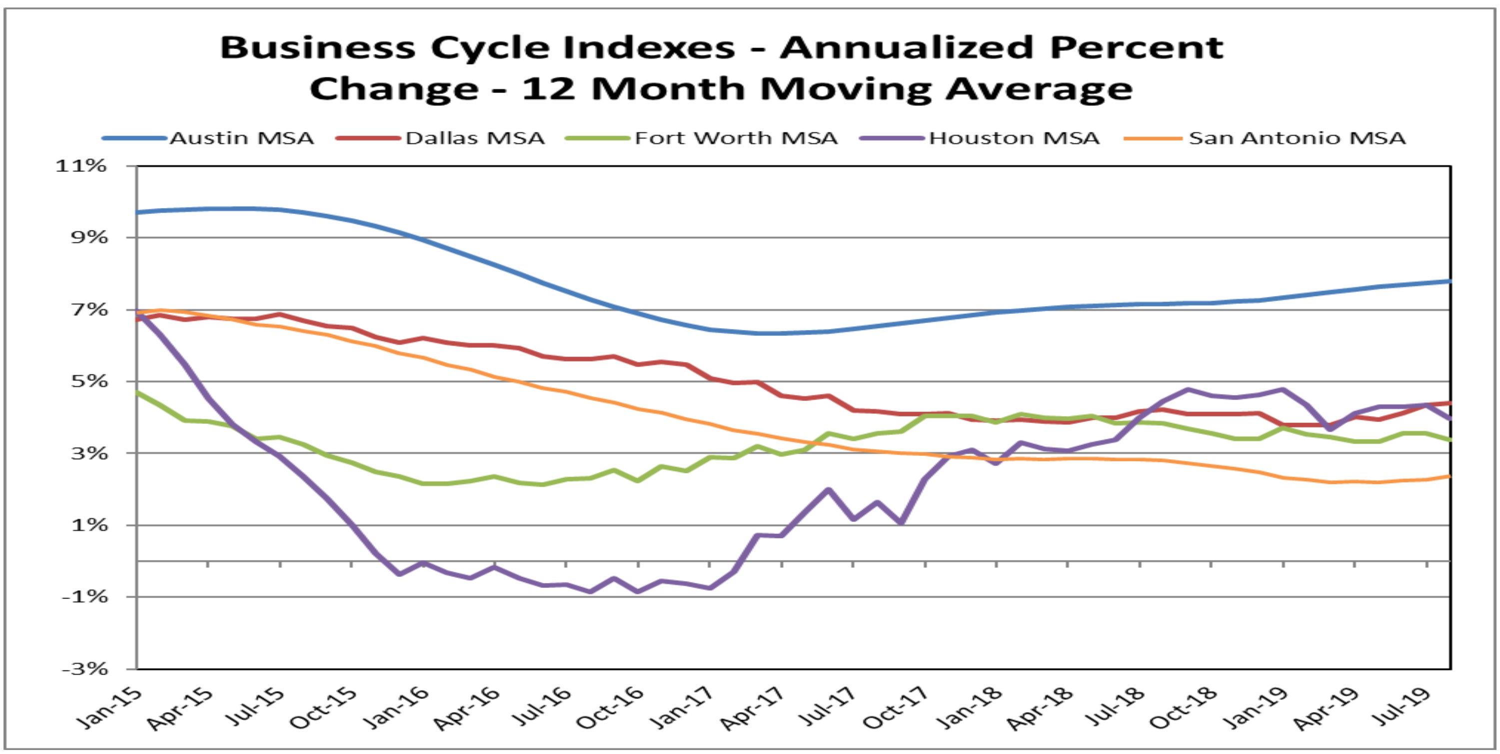
Business Cycle Indexes are meant to reflect broad movements in local economic conditions. The Dallas Fed states that "the [local area] indexes are constructed based on the aggregated movements in the local area unemployment rate, nonagricultural employment, inflation-adjusted wages, and inflation-adjusted 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 **San Antonio Business-Cycle** Index—a broad measure of economic activity in the metro—picked up to an annualized rate of 3.5 percent in August, shooting past its long-term trend of 2.9 percent. **Recent index growth has been driven by an acceleration in job growth, along with an unemployment rate that has held near multi-decade lows. These factors suggest that the regional economy has picked up after weakening early in the year**." – Sept 2019 – San Antonio Economic Indicators

"**Year over year in August, the Dallas and Fort Worth indexes expanded at an above-average pace**, with the Dallas index growing 4.4 percent and the Fort Worth index up 3.4 percent." - Sept 2019 – Dallas-Ft 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.



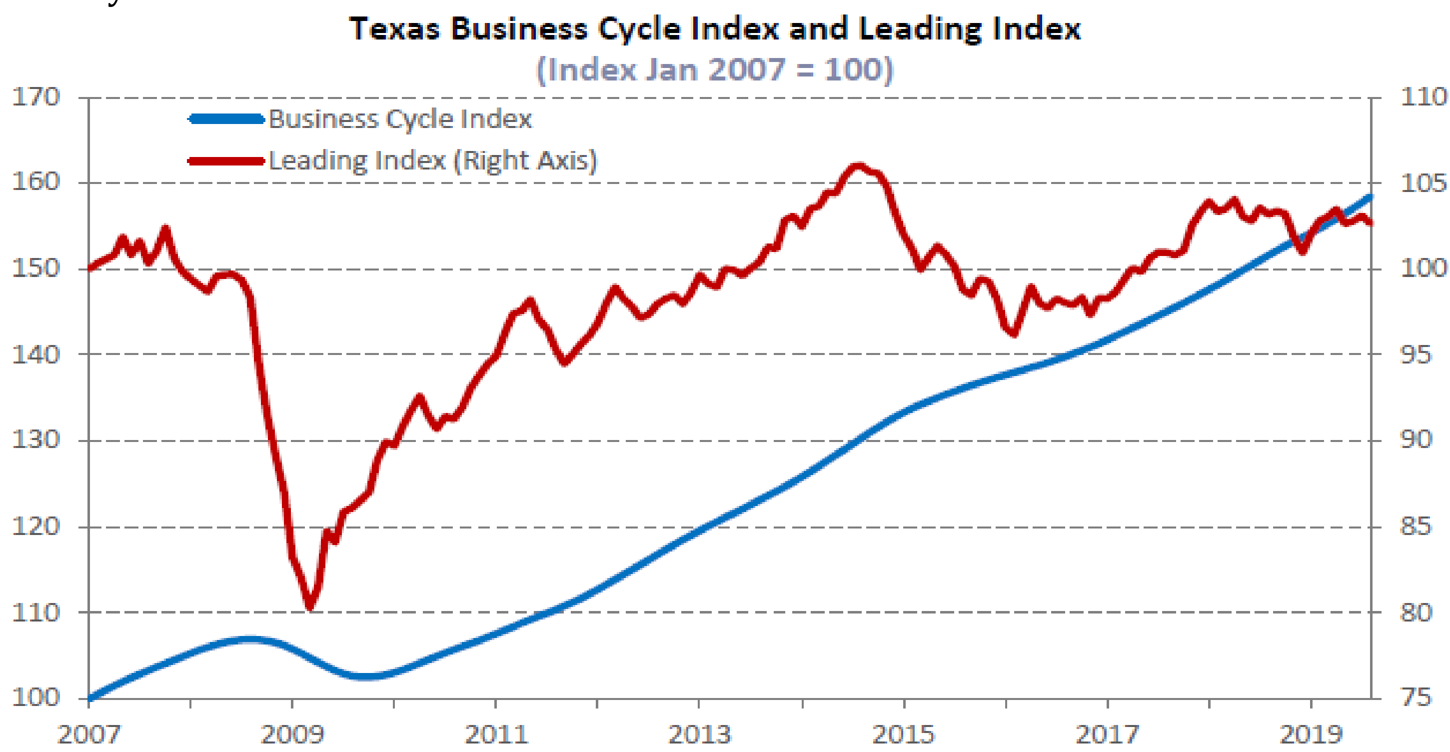
Source: Federal Reserve Bank of Dallas – Index 1980 = 100

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 AND LEADING INDEX – TEXAS

"**Economic activity stabilized at 5.1 percent on a seasonally adjusted annualized rate (SAAR) as indicated by the Dallas Fed's Texas Business-Cycle Index**.

The **Texas Leading Economic Index** (a measure of future directional changes in the business cycle) stumbled amid falling oil prices and some weakness in national economic data, **suggesting slower growth in the coming months**." - Oct 2019 - Outlook for the Texas Economy - REC



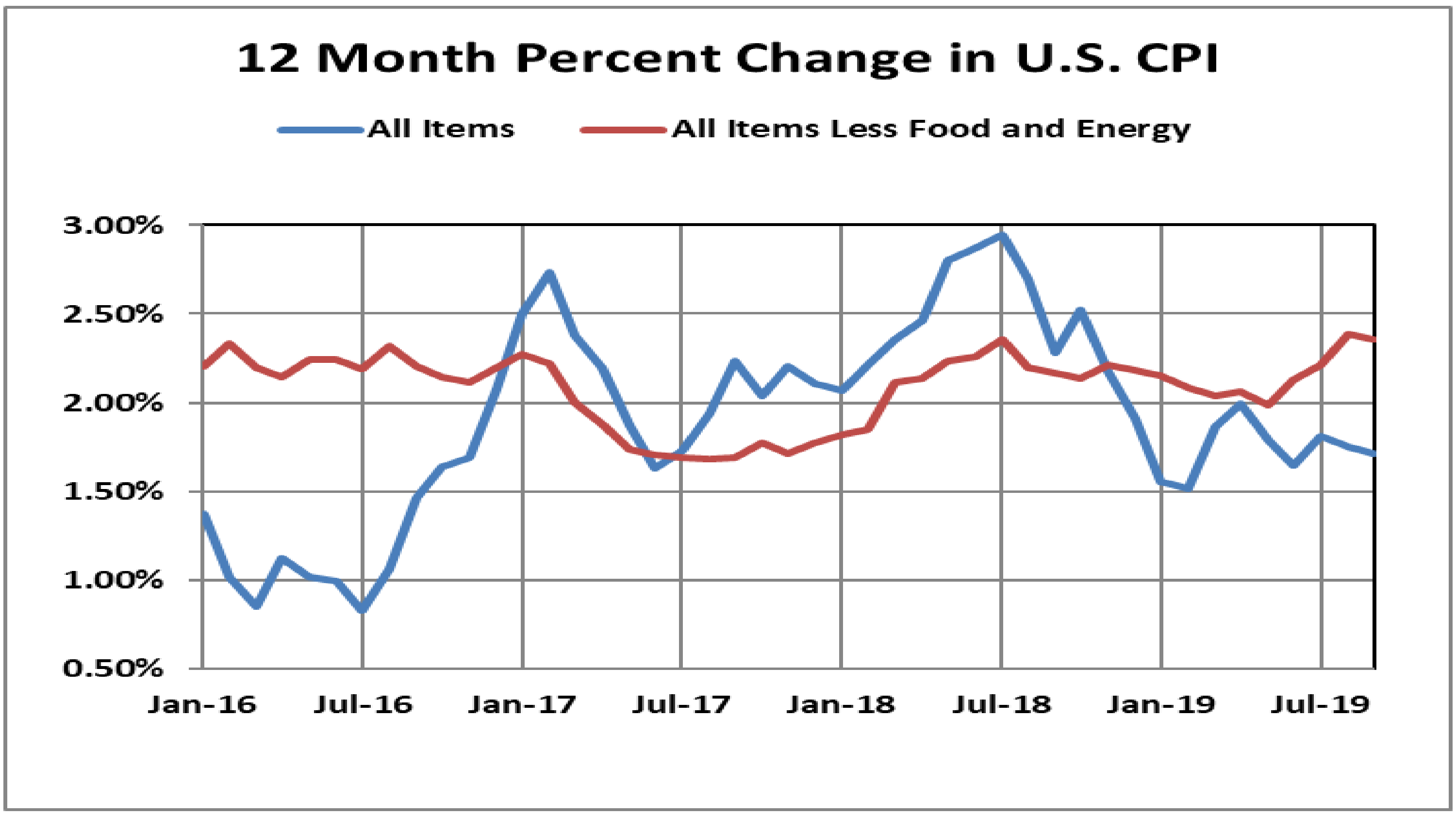
Source: Federal Reserve of Dallas – Index, 2007 = 100
Provided by : Texas A&M Real Estate Center – Outlook for the Texas Economy

"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

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 1.7 percent** for the 12 months ending September, the same increase as for the 12 months ending August. **The index for all items less food and energy rose 2.4 percent over the last 12 months**, also the same increase as the period ending August. The food index increased 1.8 percent over the last year, while the energy index decreased 4.8 percent." – Bureau of Labor Statistics – Oct 2019 - Economic News Release

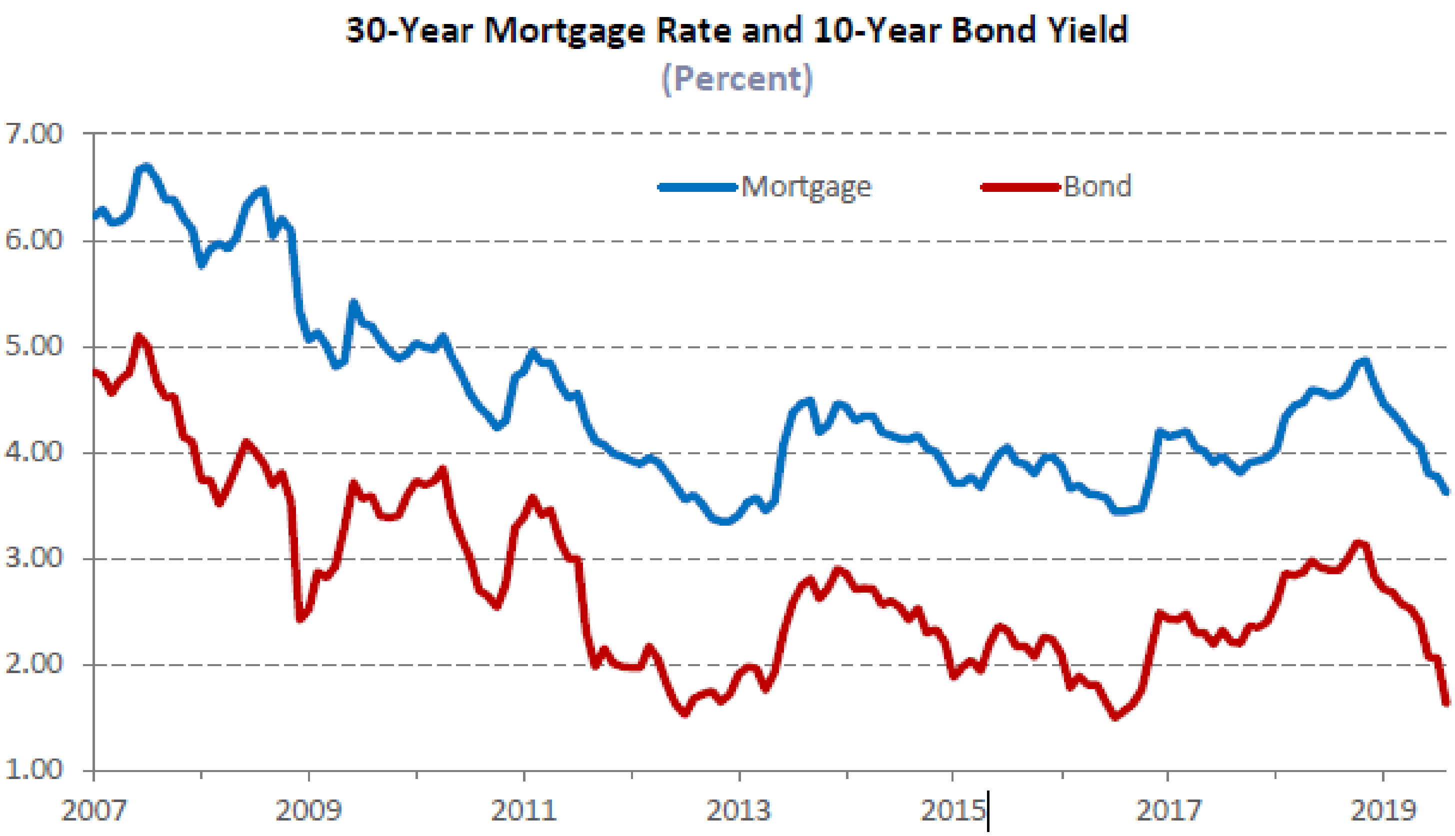


Source: Bureau of Labor Statistics, not seasonally adjusted, 1982-84=100

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."

30 YEAR MORTGAGE RATES vs. 10 YEAR BOND YIELD

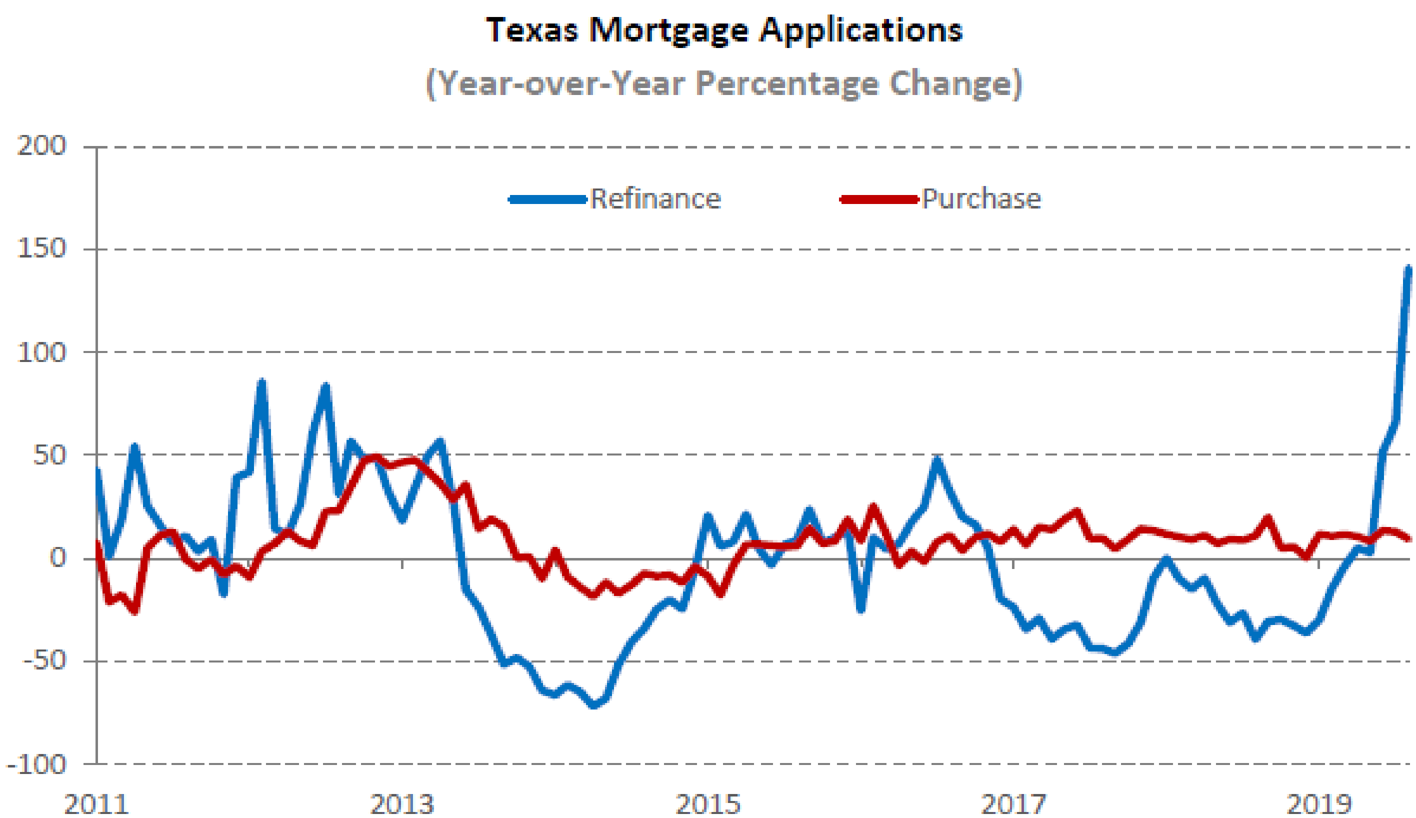
"Continued concerns about global economic growth and trade uncertainty pulled interest rates down for the tenth consecutive month. **Long-term rates remained lower than those for short-term instruments, inverting the yield curve and sustaining talks of a recession**. Economic fundamentals at the state and national level, however, are healthy and stable. Interest rates could fall further following the Federal Reserve's second rate cut of the year in September." - Oct 2019 - Outlook for the Texas Economy - REC



Note: Seasonally adjusted.
Sources: Federal Home Loan Mortgage Corporation and Federal Reserve Board
Provided by : Texas A&M Real Estate Center – Outlook for the Texas Economy

TEXAS MORTGAGE APPLICATIONS

“The ten-year U.S. Treasury bond yield fell 40 basis points to a three-year low of 1.6 percent, while the Federal Home Loan Mortgage Corporation’s 30-year fixed-rate inched down to 3.6 percent. Texans capitalized on lower rates, pushing mortgage applications for home purchases up 21.6 percent year to date (YTD). **Refinance mortgage applications, which are more sensitive to interest rate fluctuations, have more than doubled since year-end.”** - Oct 2019 - 2019 - Outlook for the Texas Economy - REC

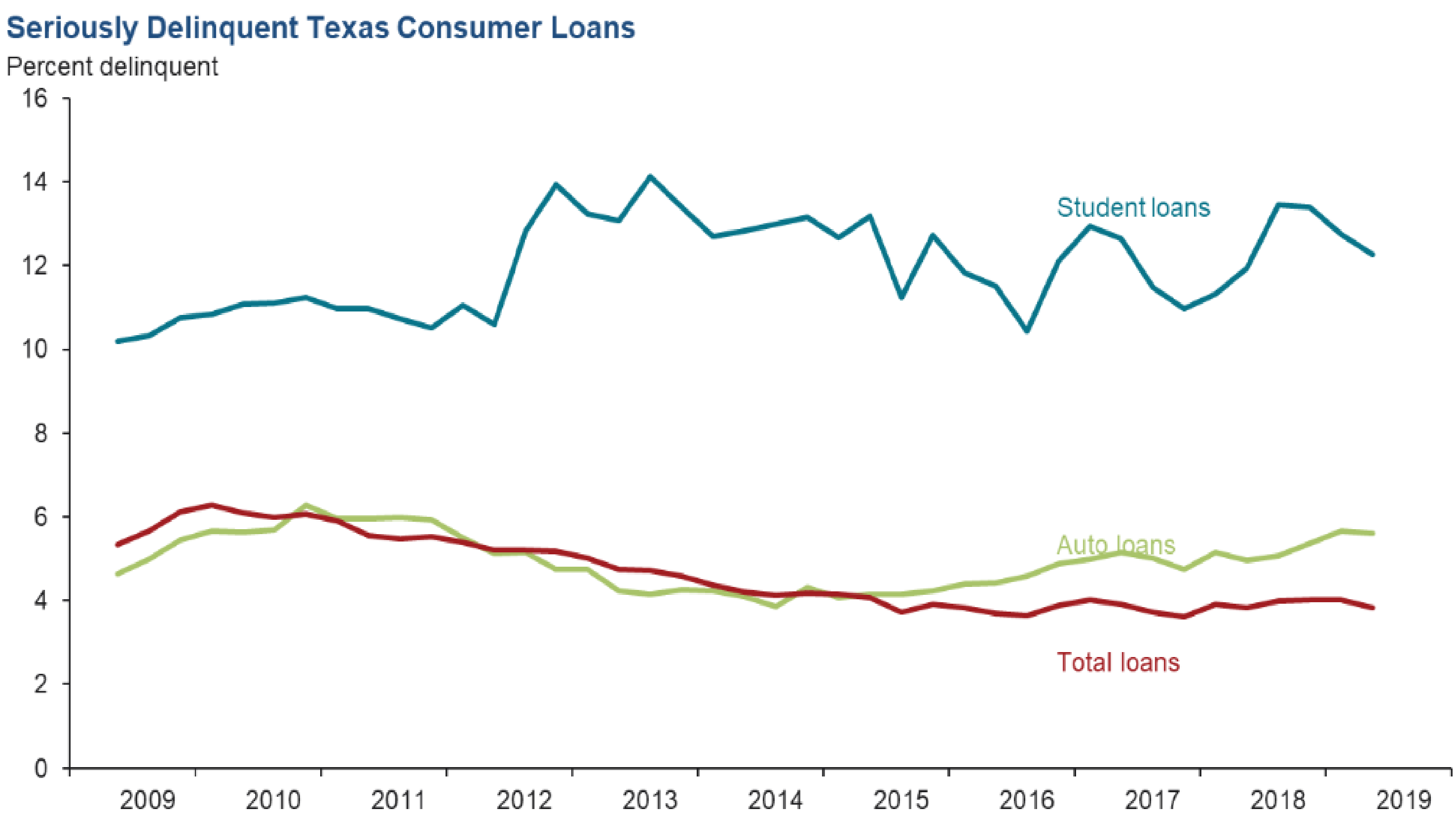


Note: Seasonally adjusted.
Source: Mortgage Bankers Association

Provided by : Texas A&M Real Estate Center – Outlook for the Texas Economy

TEXAS DELINQUENT CONSUMER LOANS

"**Delinquency rates for consumer loans in Texas dipped in the second quarter of this year.** The decline was most pronounced for student loans, which fell to 12.3 percent from 13.4 percent in third quarter 2018. Auto loan delinquencies, which have been slowly rising since the second half of last year, dipped in the most recent quarter. In Texas, overall consumer loan delinquencies fell to 3.8 percent in the second quarter from 4.0 percent in fourth quarter 2018." – Sept 2019 – Texas Economic Indicators – Dallas Fed



NOTES: Data through June 30, 2019. Seriously delinquent loans are loans which are 90+ days late.
SOURCES: Federal Reserve Bank of New York Consumer Credit Report; Equifax.

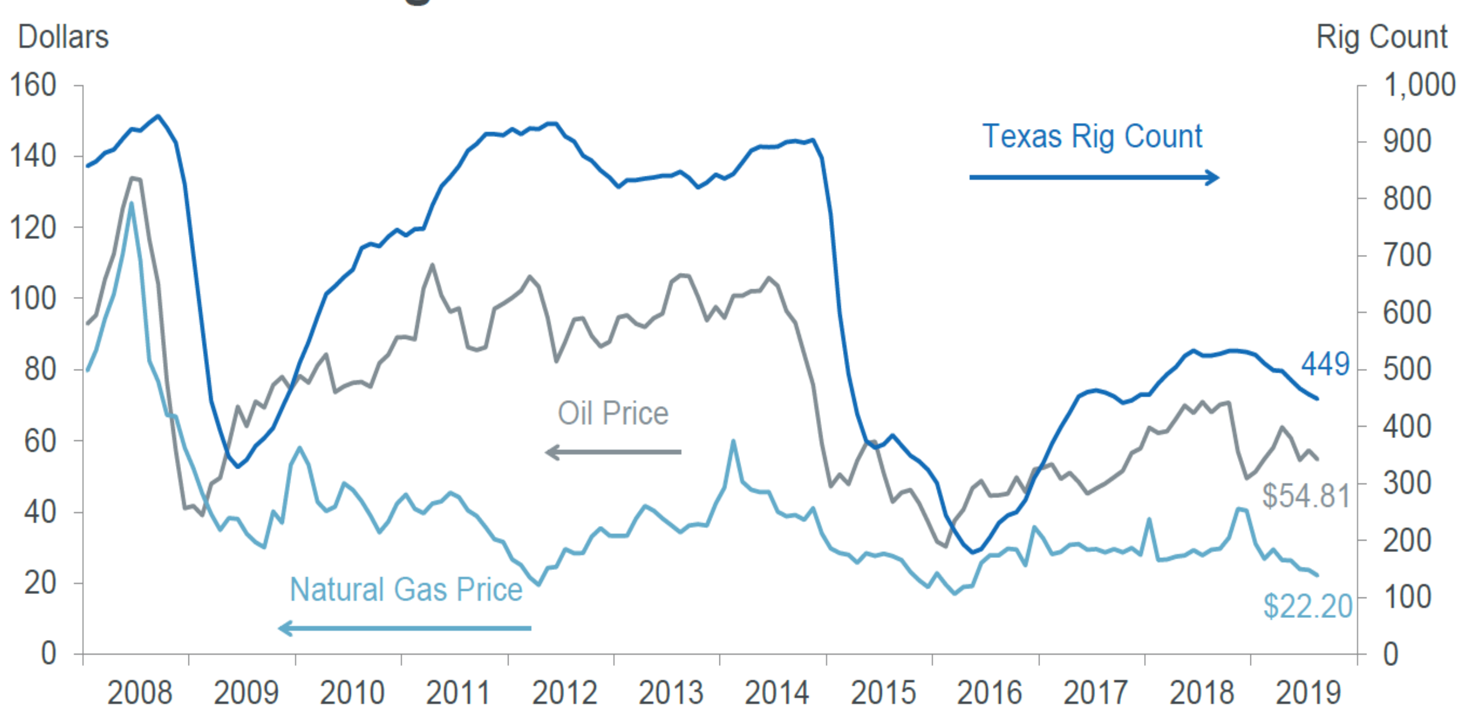
Provided by : Dallas Fed – Texas Economic Indicators

OIL AND NATURAL GAS

“The average **West Texas intermediate crude oil spot price dipped below $55 per barrel**, falling within $3.50 of the December trough. An attack on a Saudi oil facility in August pushed prices up temporarily, but ample supply from the U.S. prevented a prolonged price spike. Disruptions in the Middle East are less likely to affect global prices in the long-term due to stable American output.

Texas crude oil production exceeded five million barrels per day in July although the active rig count fell to 449. On the natural gas front, built-up inventories restricted prices. The Henry Hub spot price fell to $2.19 per million British thermal units (BTU). In the Permian Basin, **the West Texas Waha spot price remained low but ticked up amid anticipation of the Gulf Coast Express pipeline beginning commercial in-service in September.”** – Oct, 2019 - Outlook for the Texas Economy – REC

Rig Count Continues to Soften



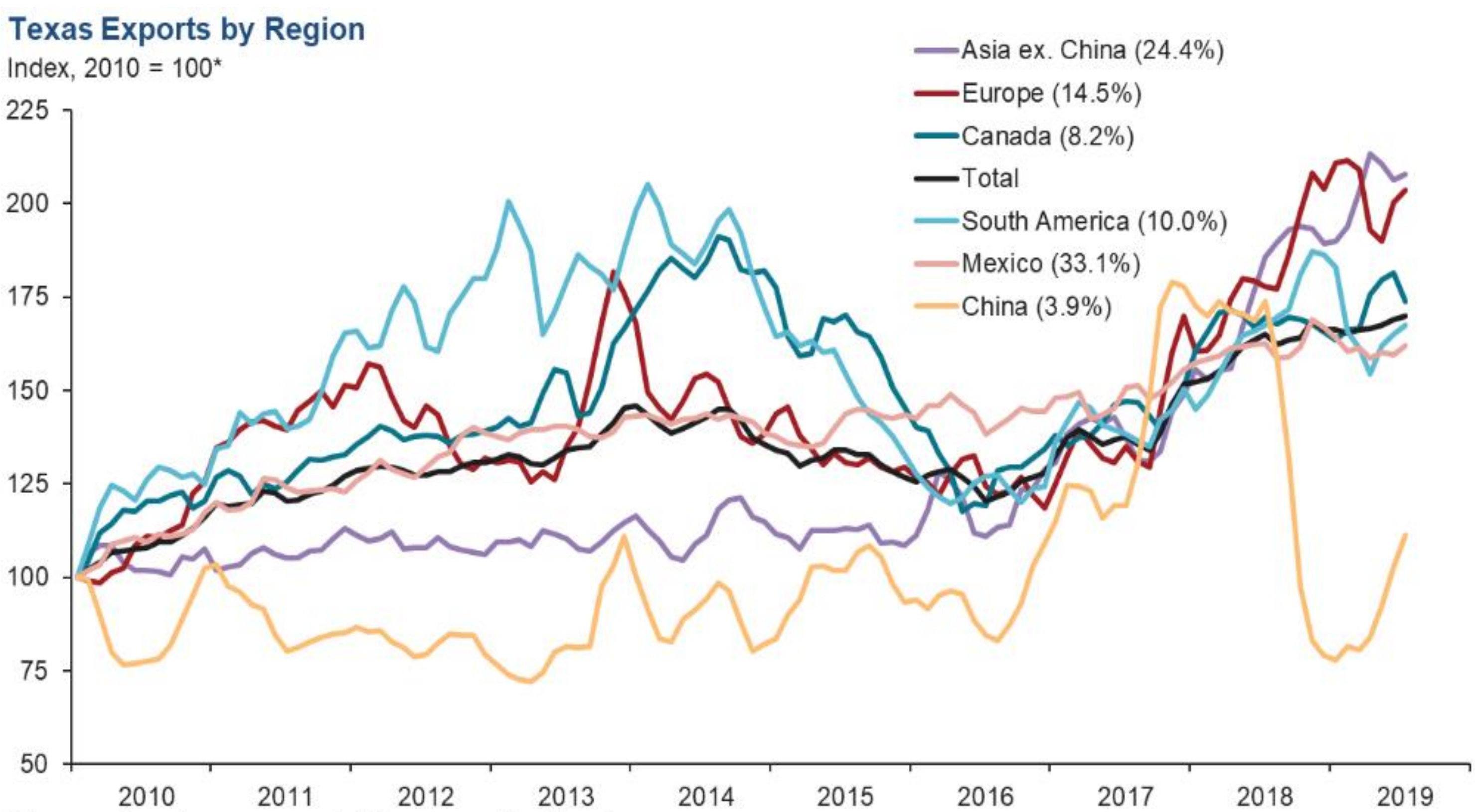
NOTES: Oil price is dollars per barrel. Natural gas price is dollars per million Btu, multiplied by 10. Data through August 2019.
SOURCES: *Wall Street Journal;* Baker Hughes; U.S. Energy Information Administration.

Provided by Federal Reserve of Dallas – Your Texas Economy – Sept 2019

TEXAS EXPORTS

"Texas exports rose 2.2 percent in July, while exports from the rest of the U.S. jumped 4.7 percent. Texas exports to Africa, China, Europe and Canada dipped, while exports to South America, Mexico and Asia (excluding China) ticked up.

Texas exports expanded 5.0 percent in the first seven months of the year compared with the same period in 2018, while exports from the rest of the U.S. slipped 1.7 percent. Texas exports to Asia (excluding China) advanced 23.1 percent, and exports to Europe rose 17.5 percent over the same period. **Exports to China slumped 59.9 percent from their peak in mid-2018 to the end of 2018, but have partially recovered over the past few months.**" – Sept 2019 – Texas Economic Indicators – Dallas Fed



*Three-month moving average, real dollars, seasonally adjusted.
NOTE: Numbers in parentheses refer to share of July 2019 Texas exports.
SOURCES: Census Bureau; Bureau of Labor Statistics.

Provided by Federal Reserve of Dallas – Texas Economic Indicators

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

PROLOGUE

In September 2019, repo market rates increased threatening the financial system.

The size of the rate increase caught the Federal Reserve by surprise.

The repo rate increase caused the Federal funds rate to rise above its targeted range.

The big banks that normally supplied $2 trillion daily to the repo market suddenly could not or would not fund the total amount of lending requested.

The Federal Reserve stabilized the repo market by making tens of billions of dollars available for lending each day.

In addition, for the first time in a decade, the Federal Reserve began buying hundreds of billions of dollars of treasuries to provide liquidity in the financial system.

The big banks are using this situation to demand an end to regulations that were put in place to prevent another Great Recession.

There are many possible reasons for the increase in repo rates. The unsettling part is that no one is really sure what the catalyst was that caused rates to rise.

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

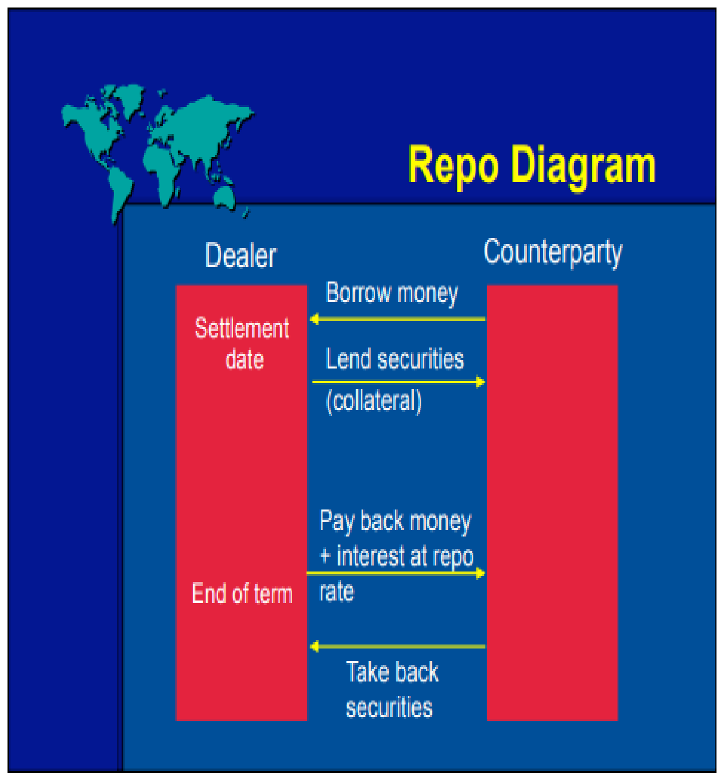
WHAT IS A REPURCHASE AGREEMENT?

"**A [repurchase agreement or] repo is when one party lends out cash in exchange for a roughly equivalent value of securities, often Treasury notes.** This market exists to allow companies that own lots of securities but are short on cash to cheaply borrow money. And it allows parties with lots of cash to earn a small return while taking little risk, because they hold the securities as collateral." – Sept 2019 - WSJ

OVERVIEW OF A REPO TRANSACTION

A money-market fund (counterparty) wants a place to invest their cash on a short term basis. A hedge fund (dealer) that has a large portfolio of assets including Treasury notes needs cash (a short term loan) to fund their day to day trading.

The money-market fund lends cash to the hedge fund by purchasing their Treasury notes. The hedge fund agrees to buy back (repurchase) the Treasury notes on a specific day, at a specific price.



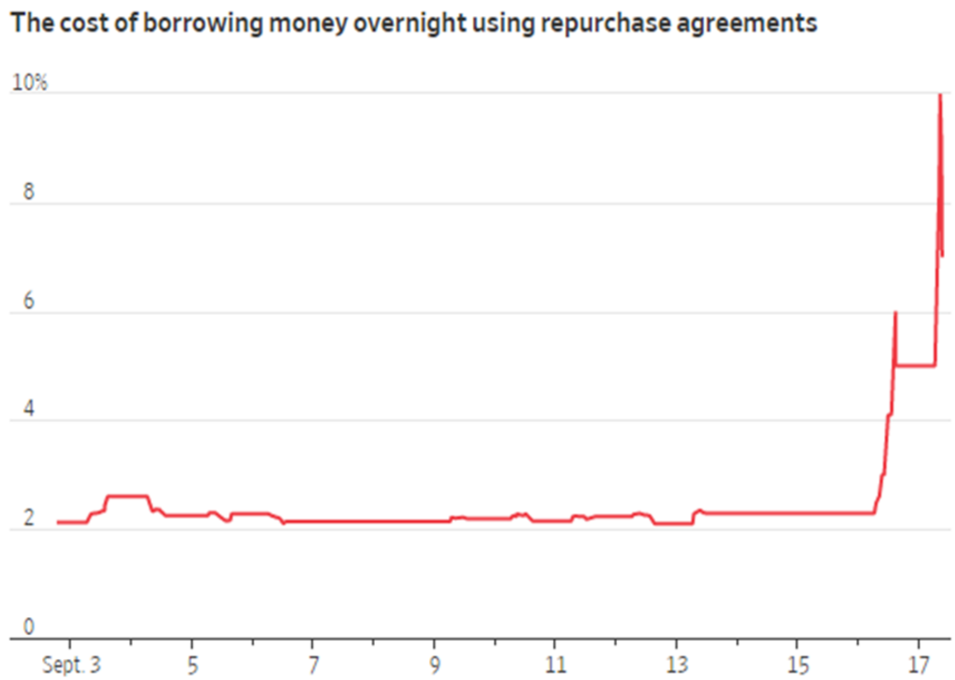
Source: New York University – Professor Carpenter

"The difference between **the purchase price and repurchase price is the repo rate**. A dealer sells securities to a counterparty with the agreement that he will buy them back at a higher price on a specific date. In this agreement, the counterparty gets the use of the securities for the term of the transaction, and will earn interest stated as the difference between the initial sale price and the buyback price." - Investopedia

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

REPO MARKET RATES SURGED IN SEPTEMBER 2019

"In the **repo market**, where banks and money-market mutual funds typically lend cash for periods as short as one night in exchange for safe collateral such as [Treasuries], **rates surged as high as 10%** last month [September] from about 2.25% amid an **unexpected shortage of available cash** in the financial system." – Oct. 7, 2019 – WSJ



Source: Refinitiv *Courtesy of WSJ – Sept 17, 2019*

DID THE FEDERAL RESERVE LOSE CONTROL OF THE MARKET?

The "**U.S. central bank briefly lost its grip on its policy interest rate in September**, said the head of U.S. short rates strategy for Bank of America Merrill Lynch in an interview with MarketWatch." – Oct 23, 2019 – Market Watch

However, **"At no point during the Repo market panic did credit break down.** The market didn't seize up. Counterparties continued to trade. Just interest rates went higher and higher. In other words, there was never a time when there was no bid for collateral. There was always a bid. The bids just kept moving higher." – Oct 2019 - Zero Hedge

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

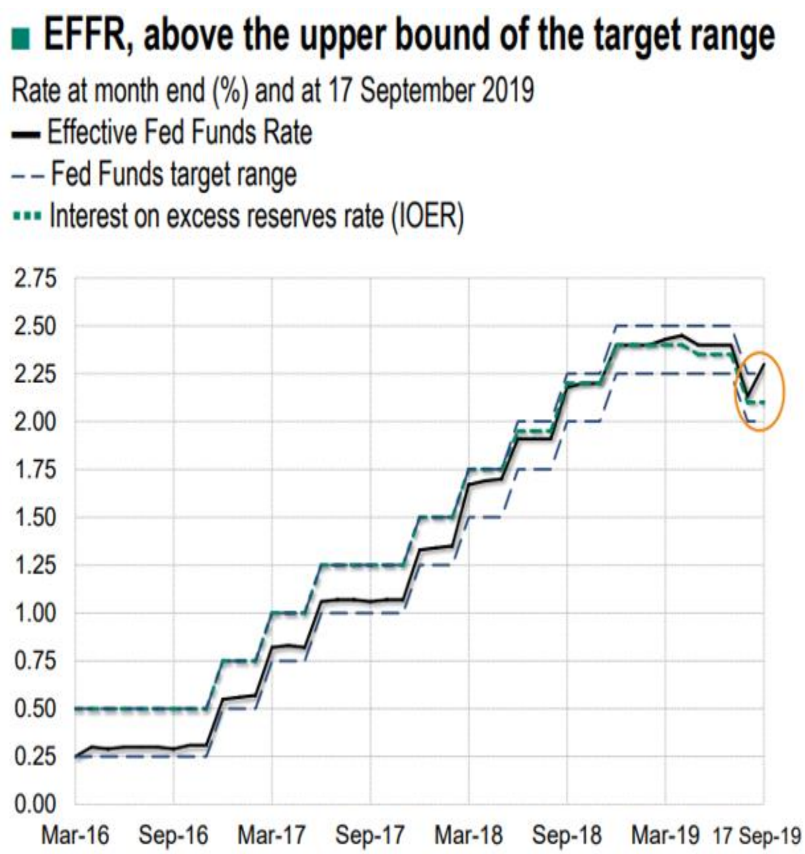
WAS THE FED SURPRISED BY THE SUDDEN RATE INCREASE?

Yes. "In response to criticism of the Fed's failure to foresee the problem, Chairman Jay Powell asserted that the Fed understood repos as well as anyone and observed that market participants had also been surprised." – Oct. 1, 2019 – WSJ

TURMOIL IN THE REPO MARKET CAUSED THE EFFECTIVE FED FUNDS RATE TO RISE

What was "**alarming for the Fed was the way volatility in the repo market pushed the effective federal funds rate to 2.30%,** above the 2.25% upper limit of the Fed's target range -- just as the Fed was preparing to drop that ceiling to 2%." – Sept 2019 – Washington Post

The federal funds increased because the "repo rate spiked. Some banks stepped in, lending to companies at elevated rates. But then those banks tried to borrow from other banks in the federal funds market, pushing up the rate." – Sept 2019 – Economist



Source: Macrobound Provided by Market Watch – Oct 2019

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

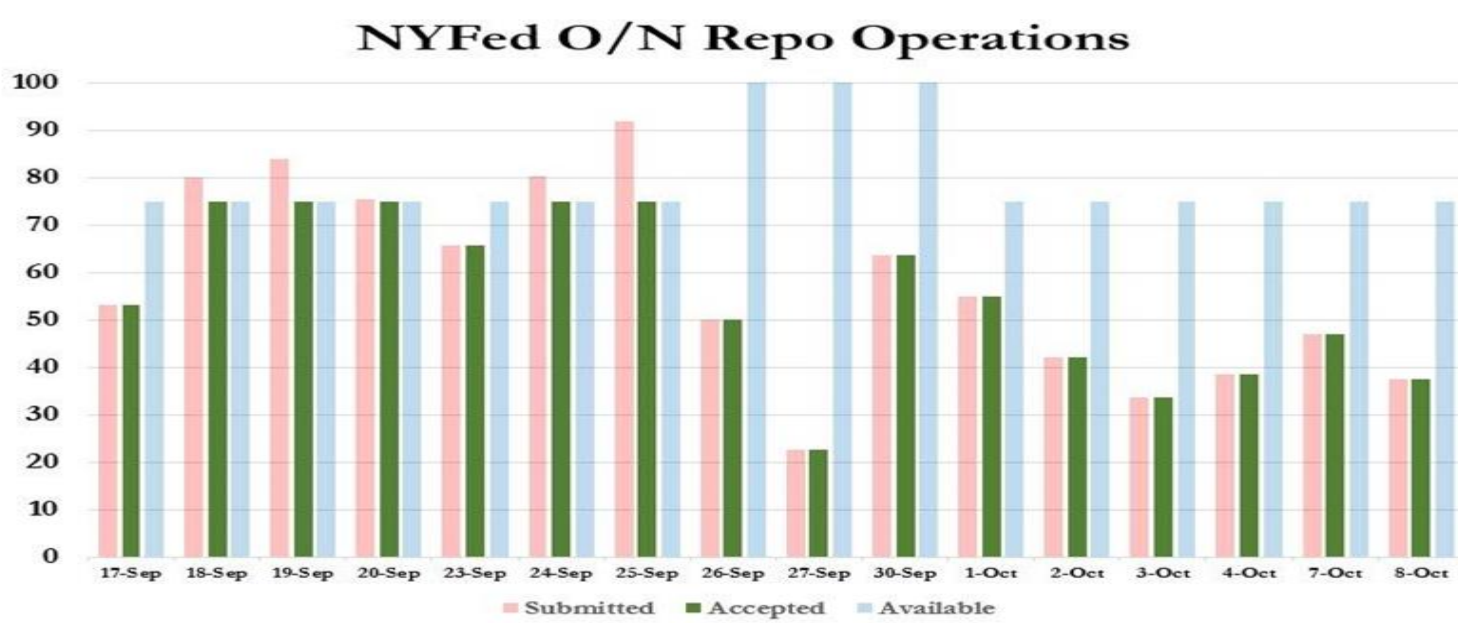
HOW DID THE FED STABLIZE THE REPO MARKET?

"On September 17th, **for the first time in a decade, the Fed injected cash into the short-term money market**. The intervention was needed after the federal funds rate, at which banks can borrow from each other, climbed above the Fed's target. It rose as the 'repo' rate—the price at which high-quality securities such as American government bonds can be temporarily swapped for cash—hit an intra-day peak of over 10%. On September 17th, the Fed offered $75bn-worth of overnight funding, of which banks took up $53bn. The following two days it again offered $75bn-worth. Banks gobbled it up.

That sent shivers down spines. **A spiking repo rate was an early warning sign before the financial crisis.** In 2007, as market participants began to doubt the quality of collateral backed by mortgage lending, repo rates jumped as lenders hoarded cash.

The latest jump was unlikely to have been caused by such doubts. Most collateral is now high-quality American Treasury bonds or bills. Even so, there are reasons to worry. **America's banks and companies seem to be short of cash**." – Sept 2019 – Economist

In the graph below, the pink bar is the amount requested to be borrowed, blue is the amount of cash available by the fed and green is the amount actually borrowed.



Courtesy of Bloomberg

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

POSSIBLE REASONS BANKS FAILED TO FUND THE REPO MARKETS

BANK REGULATIONS REGARDING LIQUIDITY AND CAPITAL REQUIRMENTS

“Regulations introduced in the wake of the 2008 financial crisis require banks to hold a certain amount of cash [reserves] as a cushion for liquidity pressures. Large banks have lodged their complaints about the regulations, as they leave the banks with less free-flowing capital.” – Oct 2019 – Business Insider

“JPMorgan Chase CEO Jamie Dimon said October 15 that **liquidity laws kept the firm from releasing additional capital to calm September's overnight rate spike**.” – Oct 2019 – Business Insider

ACTION TAKEN BY THE FED: None

The response from the Federal Reserve was fairly quick. New York Fed President Williams said “capital requirements were ‘there for a reason,’ citing the soundness of the biggest U.S. banks.” – Oct 2019 – Market Watch

“Sen. Elizabeth Warren sent a letter to US Treasury Secretary Steven Mnuchin warning him to not ease bank regulations in the wake of September's liquidity scare.”

The Democratic primary frontrunner also expressed concern that the Federal Stability Oversight Council may back efforts to loosen liquidity laws for major banks. "These rules were designed to ensure that banks have enough cash on hand to meet their obligations in the event of another market crash,” Warren wrote. – Oct 2019 - Business Insider

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

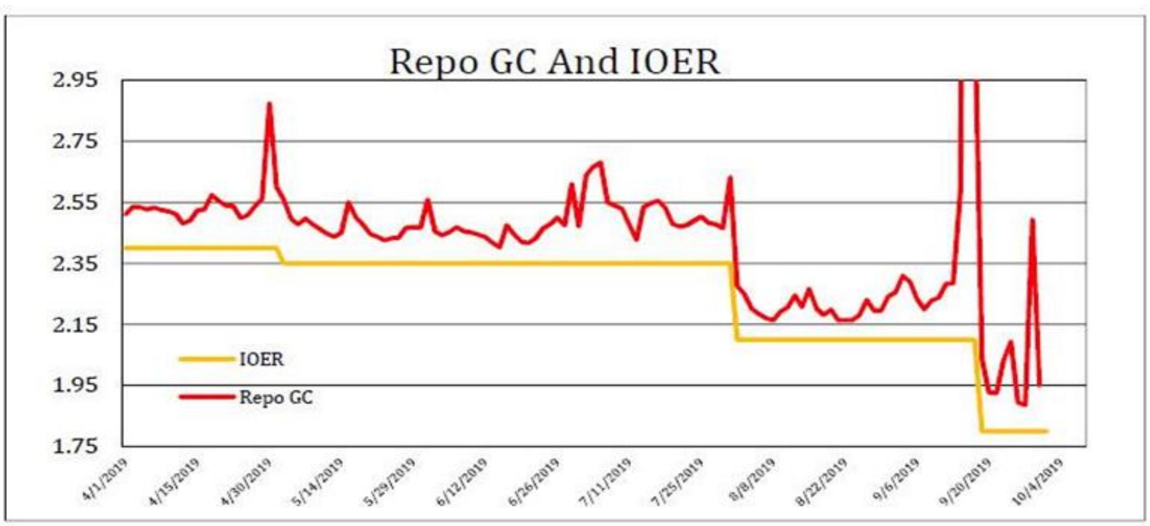
POSSIBLE REASONS BANKS FAILED TO FUND THE REPO MARKETS (cont'd)

THE FED WAS PAYING TOO HIGH OF INTEREST ON EXCESS BANK RESERVES

"Banks are required to hold a certain percentage of their liabilities in cash. This cash can be delivered to a special account at the Federal Reserve and the Fed will pay the banks an interest rate on their cash/reserves. What's more, if banks have extra cash, they can deposit that cash at the Fed and the Fed will pay them interest on their 'excess reserves.' That's the Interest On Excess Reserves (IOER) rate. But the key point is that banks choose to leave excess reserves at the Fed. If there is a better short-term investment, they are allowed to remove that cash and invest it elsewhere." – Oct 2019 – Zero Hedge

If the **Fed was paying too high of interest on excess banks reserves [IOER]** the banks did not have any incentive to loan money in the repo market.

ACTION TAKEN BY THE FED: "The central bank lowered interest on excess reserves by 30 basis points, to 1.80%." - Sept 2019- Reuters



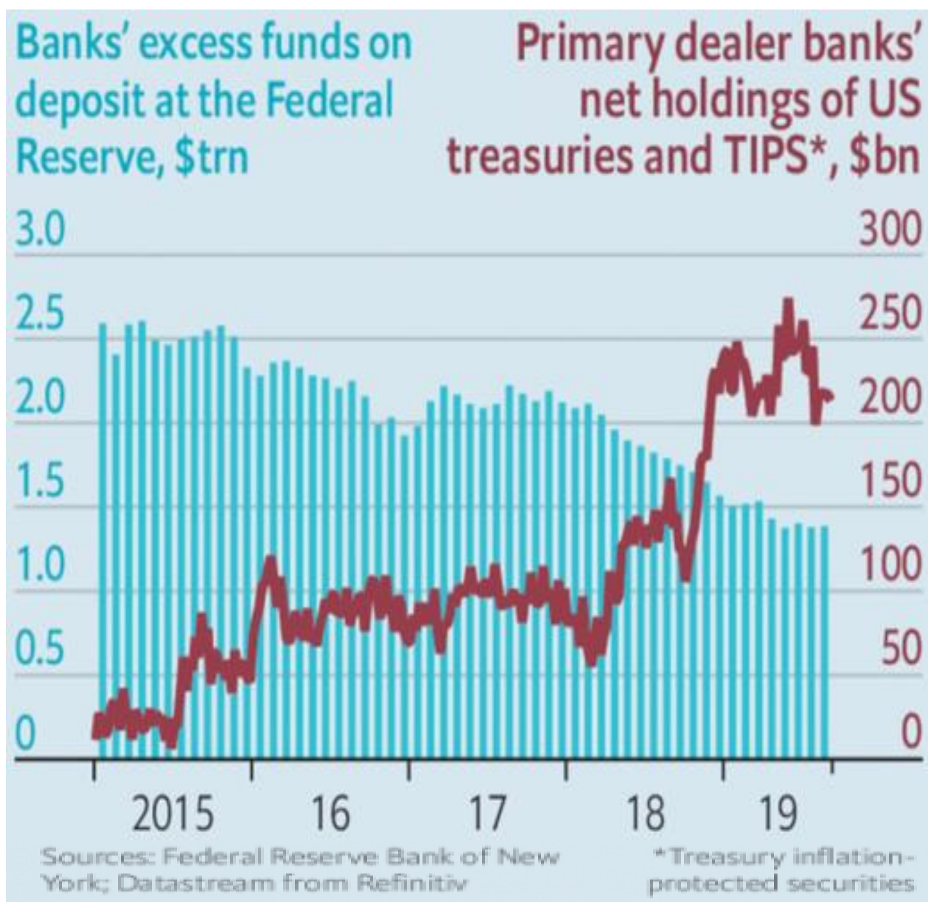
IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

POSSIBLE REASONS BANKS FAILED TO FUND THE REPO MARKETS (cont'd)

THE FEDS BALANCE-SHEET REDUCTION LOWERED BANK RESERVES

During the financial crisis and subsequent recession, the Fed created money to buy trillions of dollars of bonds from banks. This action increased the Fed's Balance-Sheet, reduced interest rates and increased bank cash reserves. Over the past couple of years, the Fed has reversed this action. As the Fed stopped buying Treasuries, the Primary Dealer Banks had to fill the void and buy Treasuries. This depleted their excess reserve balances.

"Banks' cash piles have dwindled of late. Since late 2017 the Fed has been reducing its balance-sheet by not reinvesting all the proceeds" back in Treasury bonds when they mature. "The balance-sheet shrank from $4.5trn in 2017 to $3.8trn in June this year. As banks buy Treasuries, their cash piles fall. The **surplus reserves** banks hold in their deposit accounts at the Fed **fell from $2.2trn in 2017 to $1.4trn now**." – Sept 2019 - The Economist



The Economist

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

POSSIBLE REASONS BANKS FAILED TO FUND THE REPO MARKETS (cont'd)

INCREASING FEDERAL DEBT DRAINED BANK RESERVES

"Plenty of factors helped cause liquidity to dry up, but one that's getting more attention is concern that [primary bank] dealers are starting to choke on Treasuries as the U.S. government goes deeper into the red."

"The problem is that with the financial system already inundated by over $16 trillion of Treasuries, banks constrained by crisis-era rules have fewer incentives to participate in repo. Simply put, there was too much new debt flooding the financial system and not enough money, causing lenders to jack up repo rates."

"[T]he mid-September repo upheaval is a clear sign there might actually be limits on just how much debt the U.S. can take before triggering more frequent disruptions. Deficits aren't exactly new, but they do add up. Since the crisis, the market for Treasury debt has roughly tripled in size."

"The growth [in Federal debt] was more than manageable in the years after the crisis because the Fed bought significant amounts of Treasuries (from dealers post-auction) with its quantitative easing, or QE."

"Without the Fed, which was arguably the biggest buyer of U.S. debt during the QE era, **[primary] dealers** have had to pick up the slack. In May, primary dealers' outright positions in Treasuries reached an all-time high of almost $300 billion -- more than double what they were the previous year." - Oct 2019 - Bloomberg

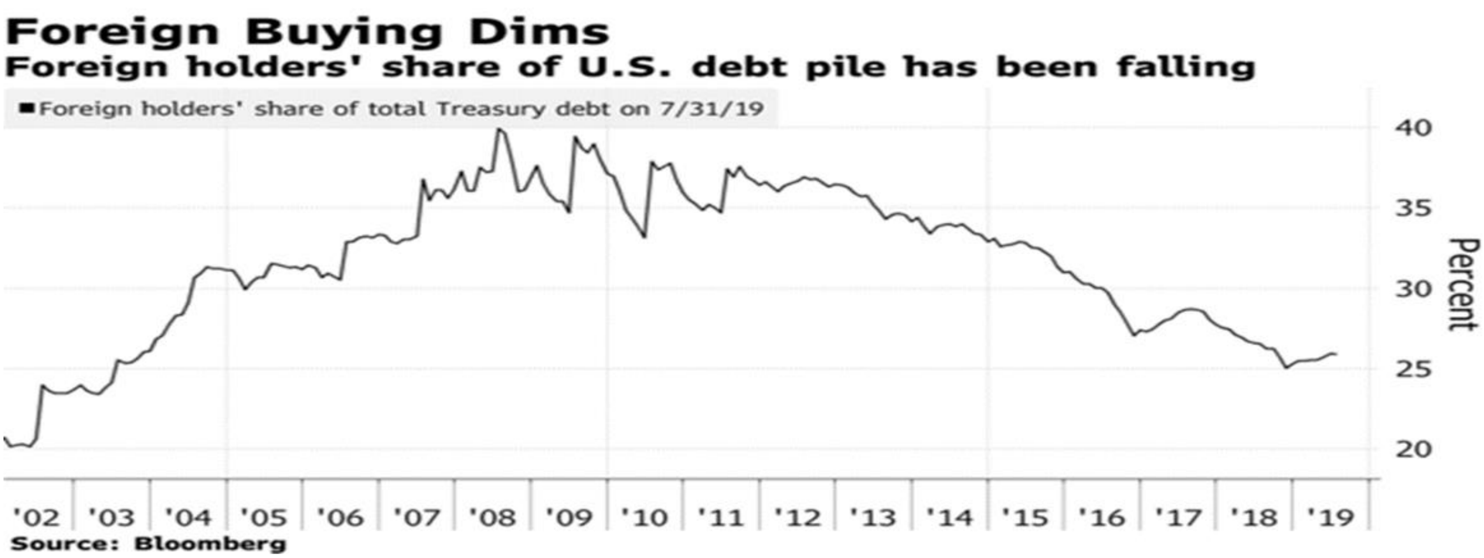
Primary Dealers – "sell the Treasury securities that they buy from the central bank to their clients, creating the initial market. They are required to submit meaningful bids at new Treasury securities auctions. In a way, primary dealers can be said to be market makers for Treasuries." - Investopedia

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

POSSIBLE REASONS BANKS FAILED TO FUND THE REPO MARKETS (cont'd)

DECLINING FOREIGN PURCHASES OF U.S. DEBT REDUCES BANK RESERVES

According to John Canavan, Oxford Economics' lead analyst, "The debt has become more difficult to digest as the rise in Treasury issuance is outpacing the rise in demand, and overall there's been a decline in recent years in foreign demand," – Oct 2019 - Bloomberg



"[Primary] Dealers aren't getting as much help from foreign investors to soak up all that additional supply. Big creditors like China and Japan have slowed their buying of Treasuries in recent years. Overall, the share of foreign official holdings has shrunk to just over 25% this year, from a high of about 40% in 2008." - Oct 8, 2019 - Bloomberg

IN-DEPTH – REPURCHASE AGREEMENTS – REPO MARKET IN CRISIS

HOW DID THE FED RESPOND TO DECLINING BANK RESERVES?

ACTION TAKEN BY THE FED: The U.S. central bank announced they are going to make "$60 billion of bill purchases [each month] at least through the second half of 2020." – Oct 2019 – Market Watch

In essence, the Federal Reserve is going to create hundreds of billions of dollars and buy short term treasuries from banks. This dollar influx will increase the Fed's Balance-Sheet and bank reserves. The hope is that banks will lend some of these excess reserves to the Repo Market.

"During the 2007-2008 financial crisis and subsequent recession, total assets increased significantly from $870 billion in August 2007 to $4.5 trillion in early 2015. Then, reflecting the FOMC's balance sheet normalization program that took place between October 2017 and August 2019, total assets declined to under $3.8 trillion. Beginning in September 2019, total assets started to increase." – Nov 2019 – Federal Reserve

Total Assets of the Federal Reserve (In millions of dollars)

Source: Federal Reserve

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• 5G Network	4th Qtr 2018
• Alibaba	3rd Qtr 2017
• Bitcoin	4th Qtr 2016
• Cashless Society	4th Qtr 2017
• Chatbots	1st Qtr 2019
• Facial Recognition	1st Qtr 2018
• Labor Participation Rate	4th Qtr 2015
• Libra, Calibra, Facebook	2nd Qtr 2019
• Money Market Fund Reform – New Rules	3rd Qtr 2016
• Negative Interest Rate Policy (NIRP)	2nd Qtr 2016
• New Silk Road	2nd Qtr 2017
• Quantitative Easing	1st Qtr 2016
• Repurchase Agreements – Repo Market in Crisis	3rd Qtr 2019
• Texas Imports and Exports	2nd Qtr 2018
• Universal Postal Union	3rd Qtr 2018