BAUER
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INSTITUTE FOR
REGIONAL FORECASTING

Houston After COVID-19: Taking Stock And Looking Forward

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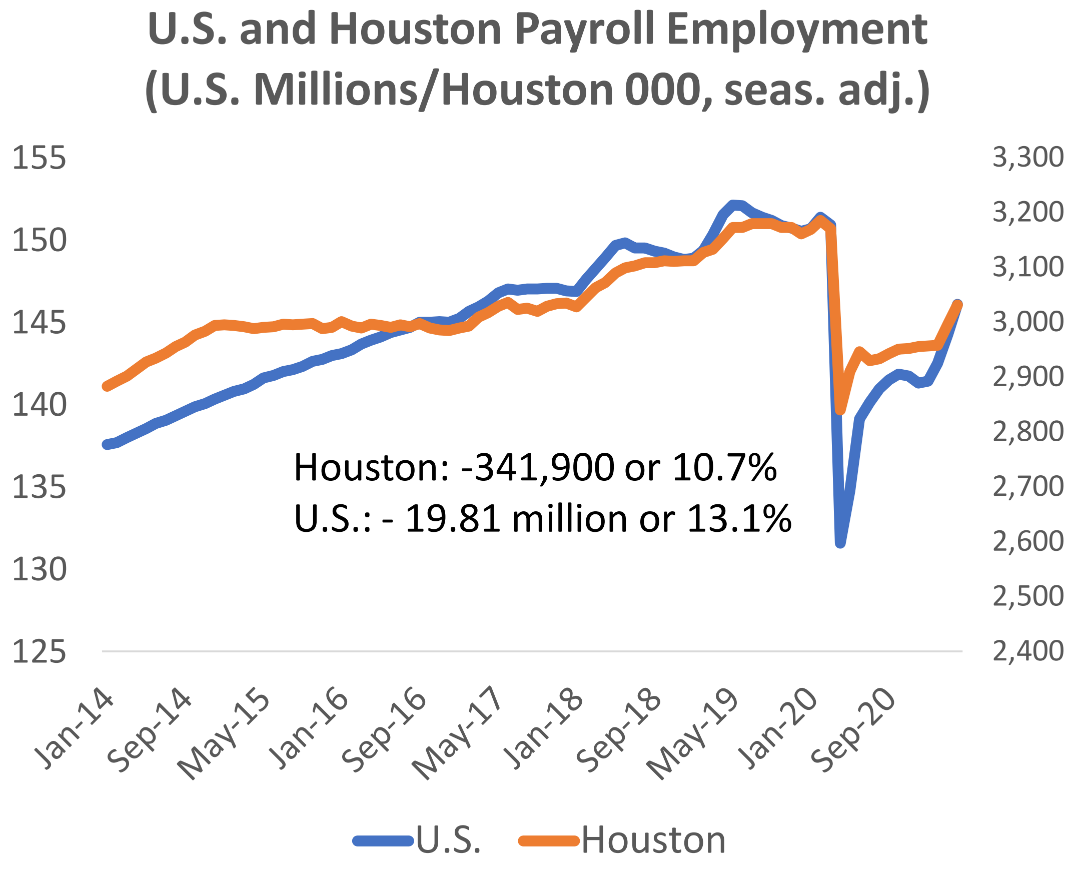
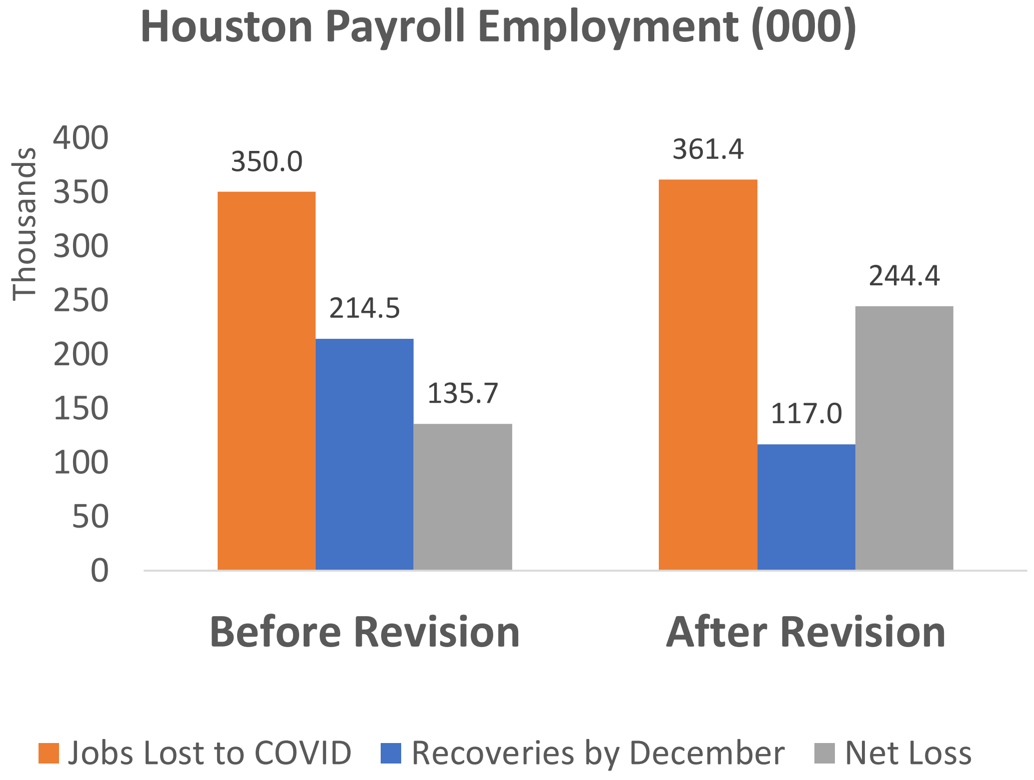
Today's Agenda

- *COVID's Impact on Houston*
  - Employment
  - Income
- *How Bad Was It? Very Bad … But Maybe Not THAT Bad*
- *We Have Already Lost 15 Months of Growth*
  - As we coming out of the COVID crisis, but we are just returning to the starting point of March 2020
  - It will be well into 2022 before all the jobs have returned. COVID vaccine-sensitive jobs come back first, then the cyclical jobs, followed last by oil
- *Oil Problems Still With US After COVID Is Gone*
  - Deep financial problems in oil produce a tentative recovery
  - A smaller US industry going forward … and a smaller Houston
- *Pull It All Together With a Specific Job Growth Forecast*
- *Special Topics*
  - The Global Outlook
  - Inflation Prospects
  - Infrastructure and Federal Spending

COVID and the Houston Economy

COVID-19 Shock Plays Out With Deep Job Losses: But Stronger Recovery Began This February

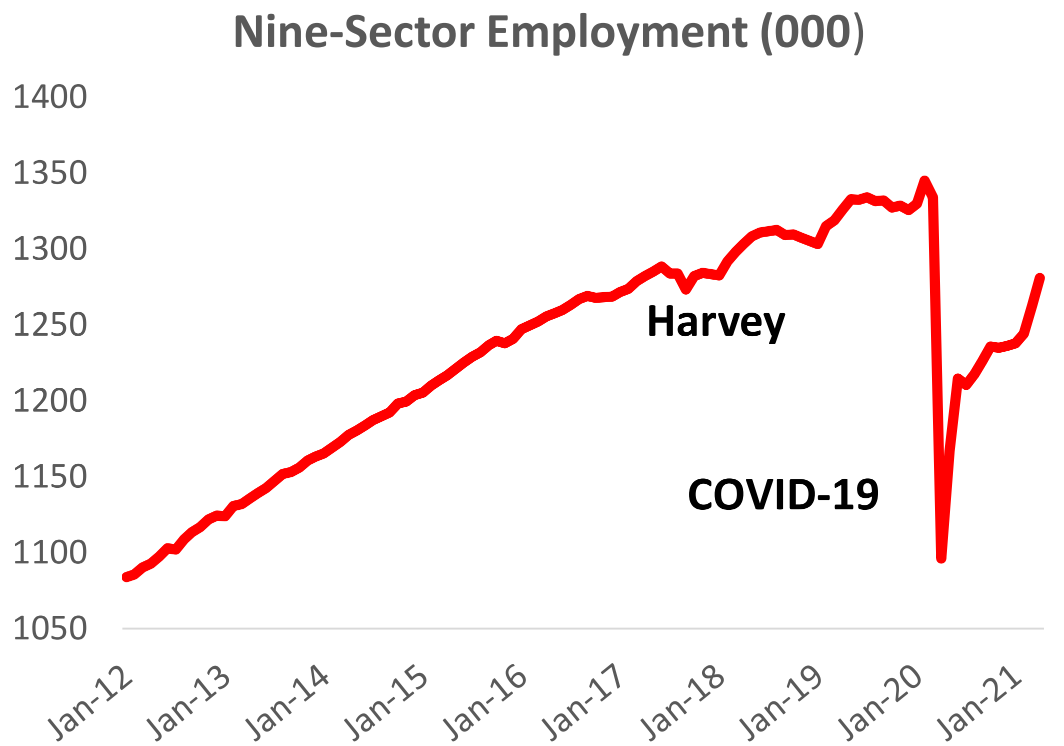




Not seasonally adjusted

Nine Local Service Sectors Account for 42% of Houston's Jobs in 2019, But Contributed 72% of March/April Job Losses

Nine Service Sectors Lost 248,900 Jobs Or 72.2% of Houston's April Losses



Sectors Sensitive to Close Contact Made Up 41.9% of Local Jobs in 2019

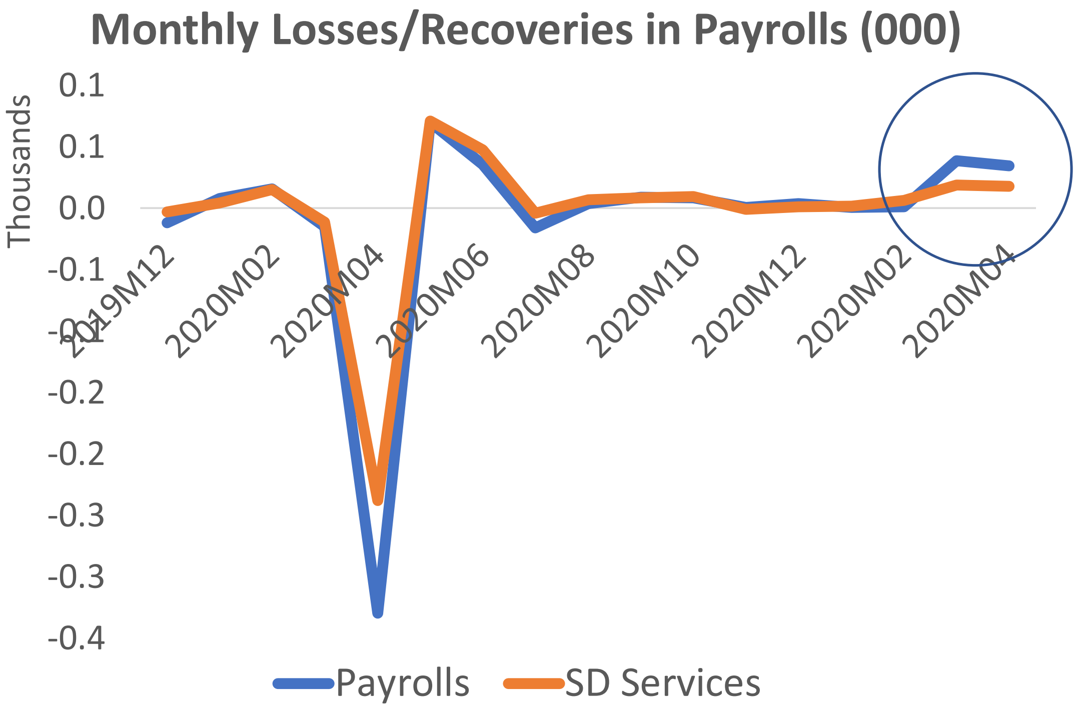
- 341,200 Health Care
- 304,200 Retail
- 268,400 Food Service
- 166,600 Finance
- 88,300 Other Services
- 63,200 Private Education
- 37,200 Arts and Entertainment
- 28,800 Accommodation

20,000 Air Transportation

- *1,325,500 All 9 sectors*
- *3,160,100 Total Payrolls*

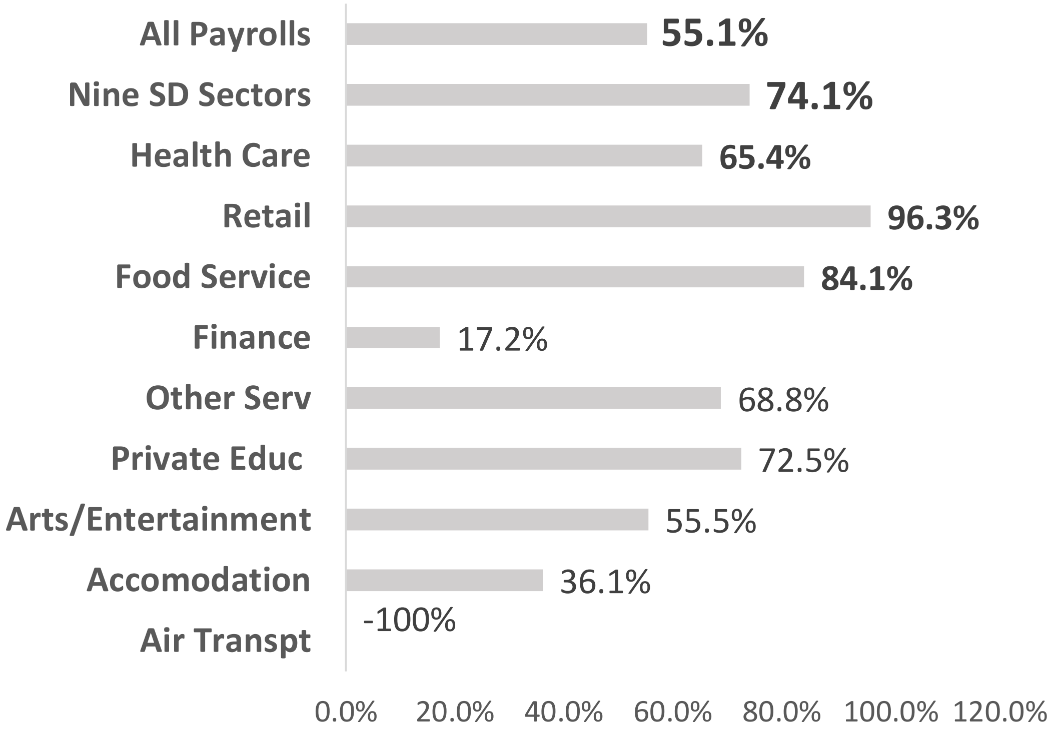
Houston Had Recovered Only 31.4% of March/April Losses By Summer 2020 And Solid Recovery Is Only Now Beginning

Close-Contact Services Fell in March/April And Recovered 74.1% By This Feb 2021



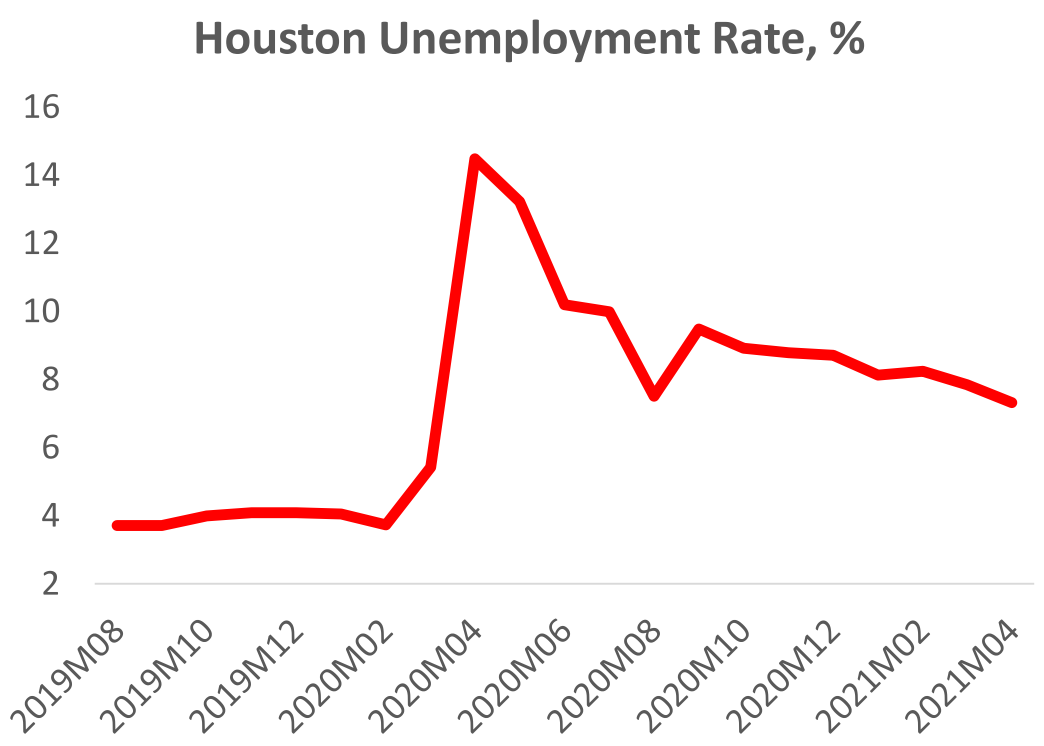
Social-Distanced Services:

Percent Recovery By Sector Since April 2020

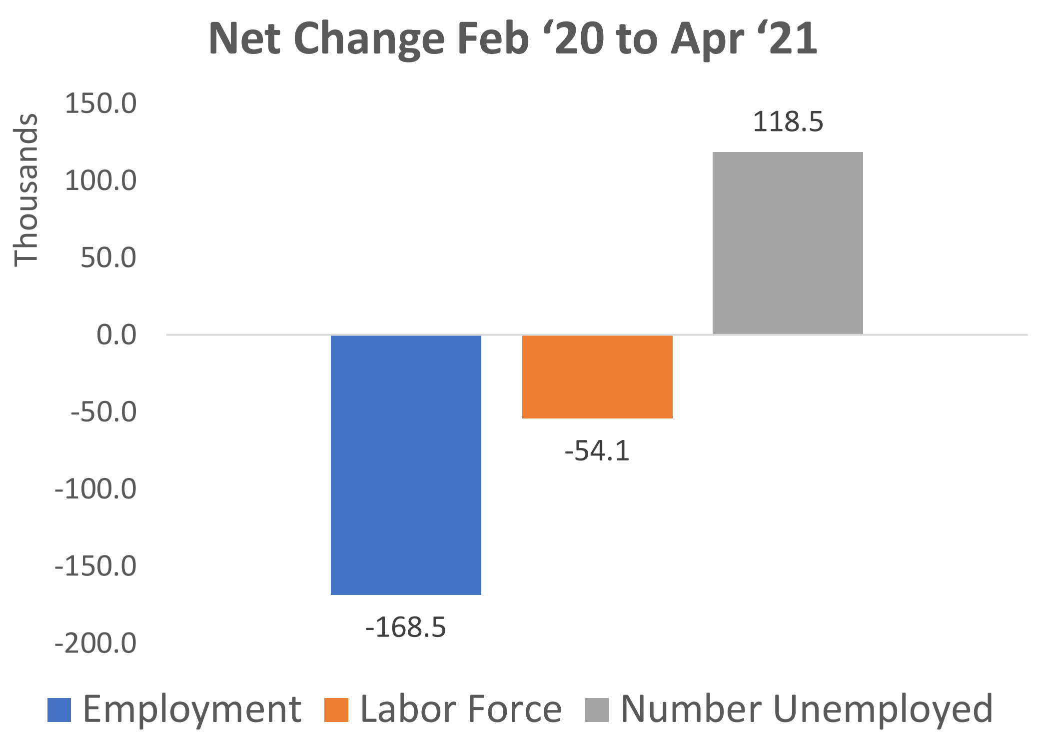


Houston's Unemployment Is a Mirror of the Bad News on Pandemic Payrolls

Houston's Unemployment Rate Peaks at 14.5% in April, Stuck Near 8% Since Sept

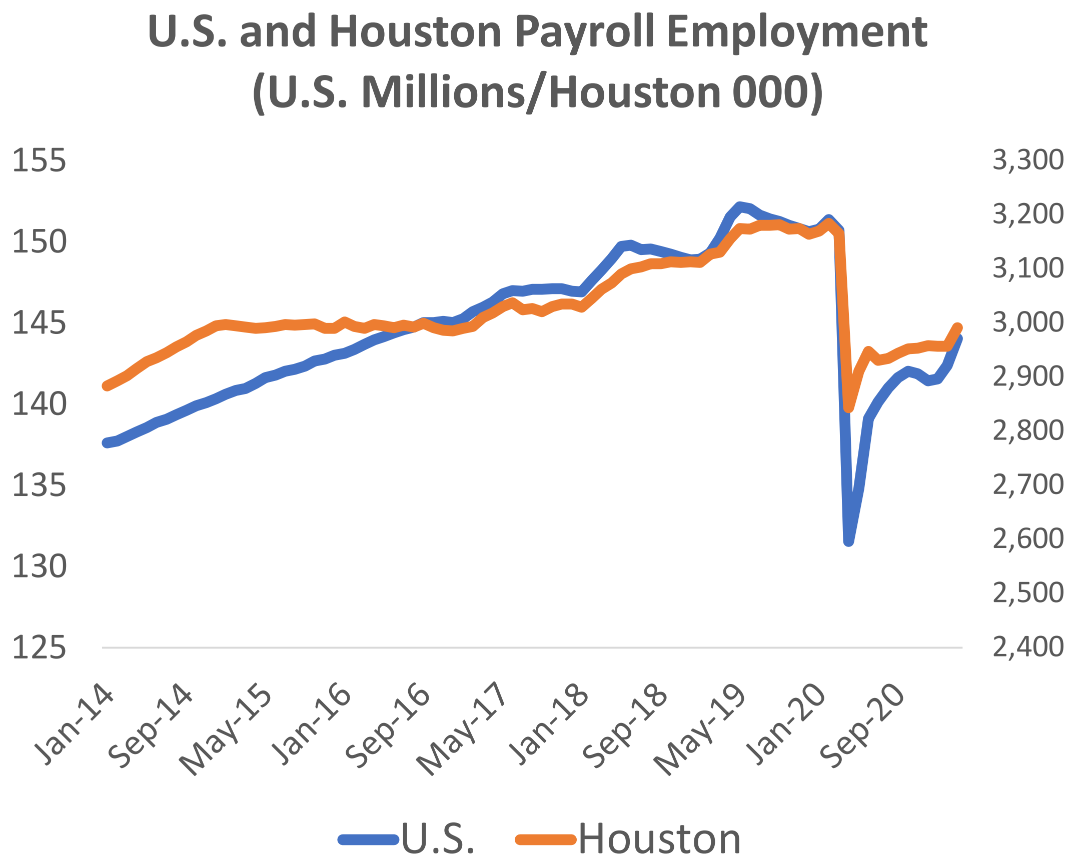


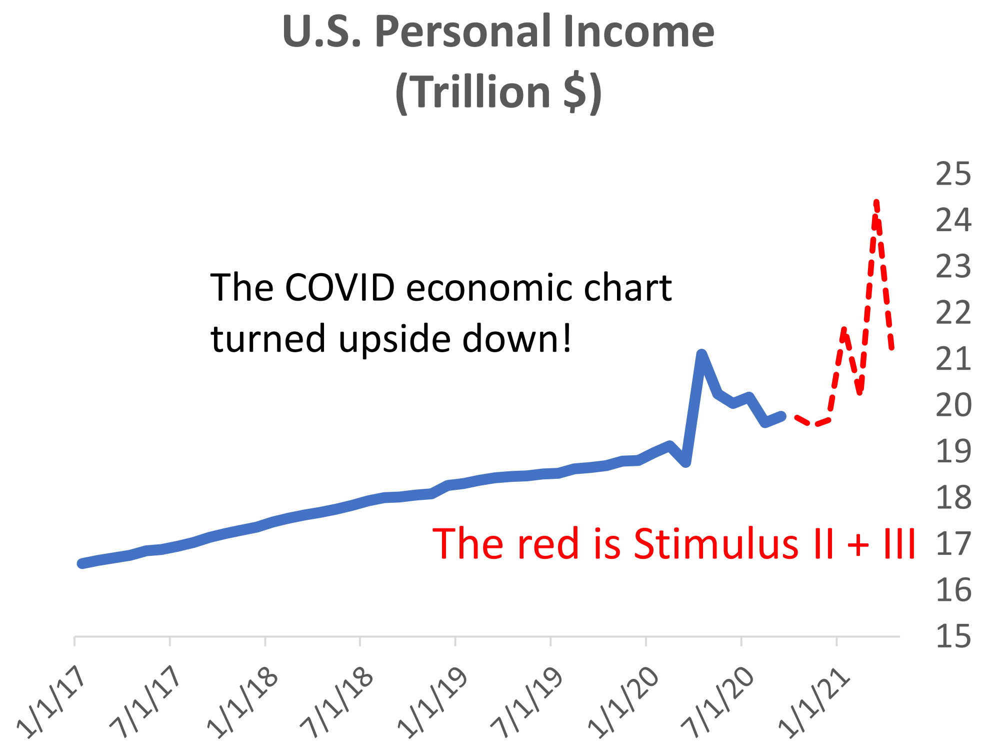
Still 118,500 Local Workers Unemployed in March, Labor Force Is Shrinking



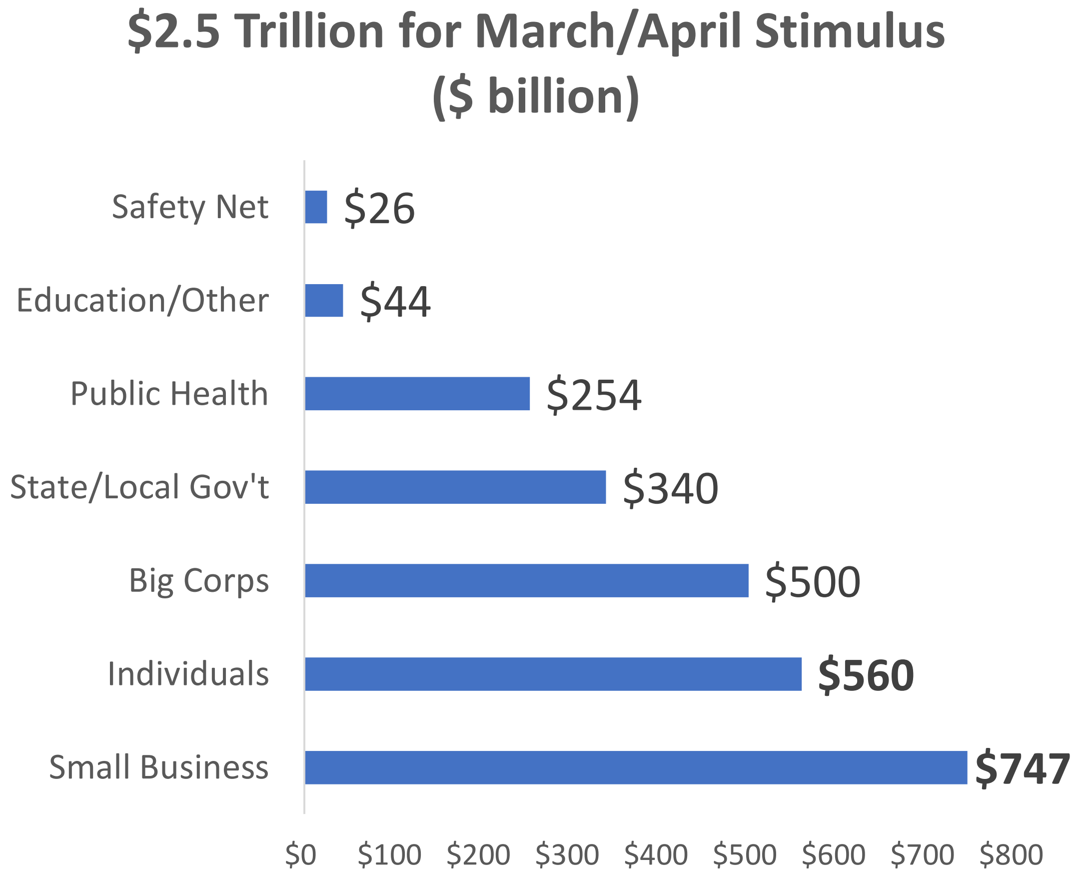
Now for the Good News:
A Large Positive Shock From Stimulus

Stimulus I: Brought a Large *Positive* COVID-19 Shock to the U.S. Economy In March/April: Now Stimulus II & III





Stimulus I: Trillions of Dollars Poured Into COVID-19 Programs to Support the Economy in March/April



Federal Reserve/Treasury Stimulus

- Return of 2008-style zero rates, QE2, forward guidance
- The Federal Reserve's 2008 emergency credit market facilities returned, but are all now closed
- Other emergency Treasury Programs like the Payroll Protection Program are closed
- Two additional COVID stimulus packages arrived in December 2020 and January 2021

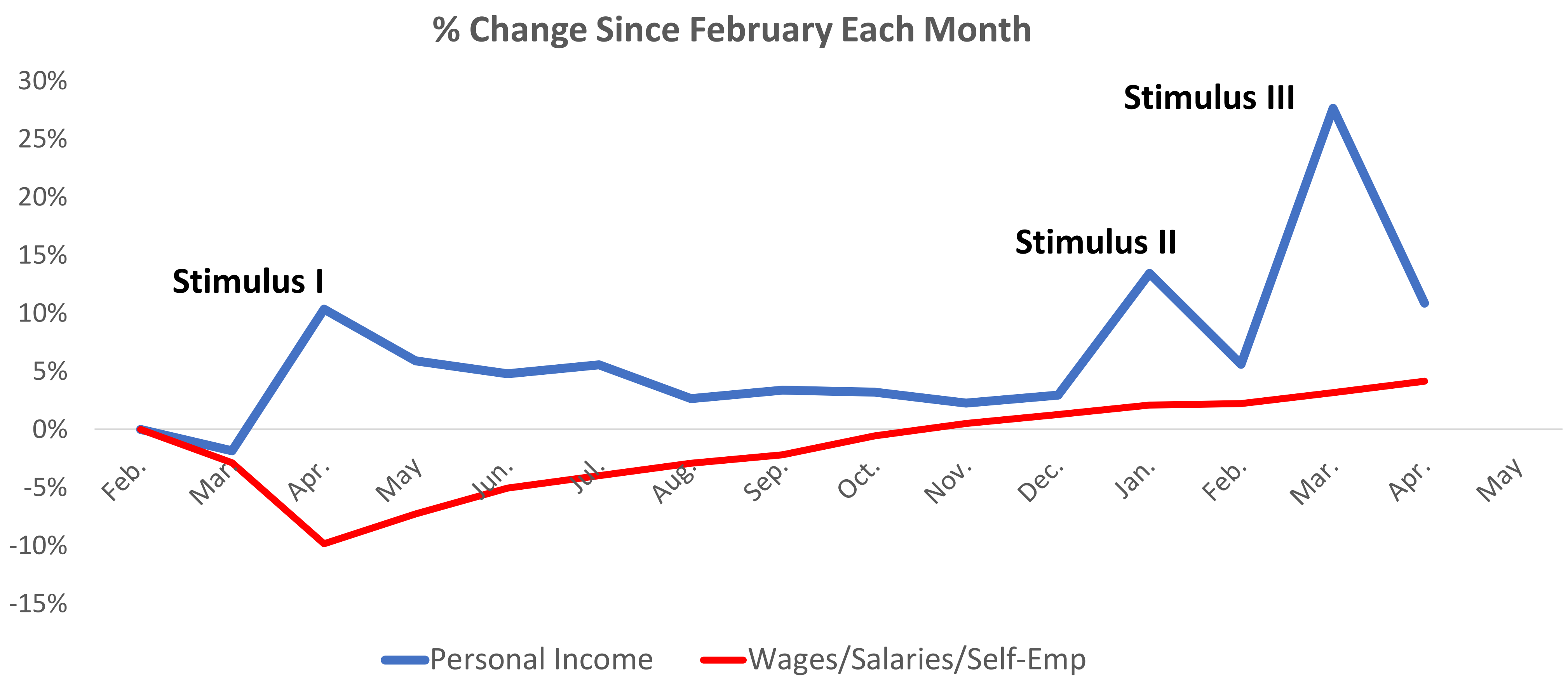
March/April total Includes $470 in additional stimulus from April supplemental appropriation for the Paycheck Protection Program and public health

Stimulus II & III: December and January Packages Total Another $2.7 Trillion in Fiscal Stimulus

- These federal payments follows on the $2.4 trillion in total spending from March and April. Like these earlier payments, about half go directly to individuals
- *Payments to Individuals and Small Business*
  - Economic Impact Payments is made directly to individuals: $700 Billion
  - Expanded Unemployment Insurance: $240 Billion
  - Small Business/Payroll Protection: $385 Billion
- *Other*
  - State and Local Government Aid: $400 Billion
  - Education/Public Health: $420 Billion
  - Children/Housing/Health Insurance: $250 Billion
  - Other: $300 Billion

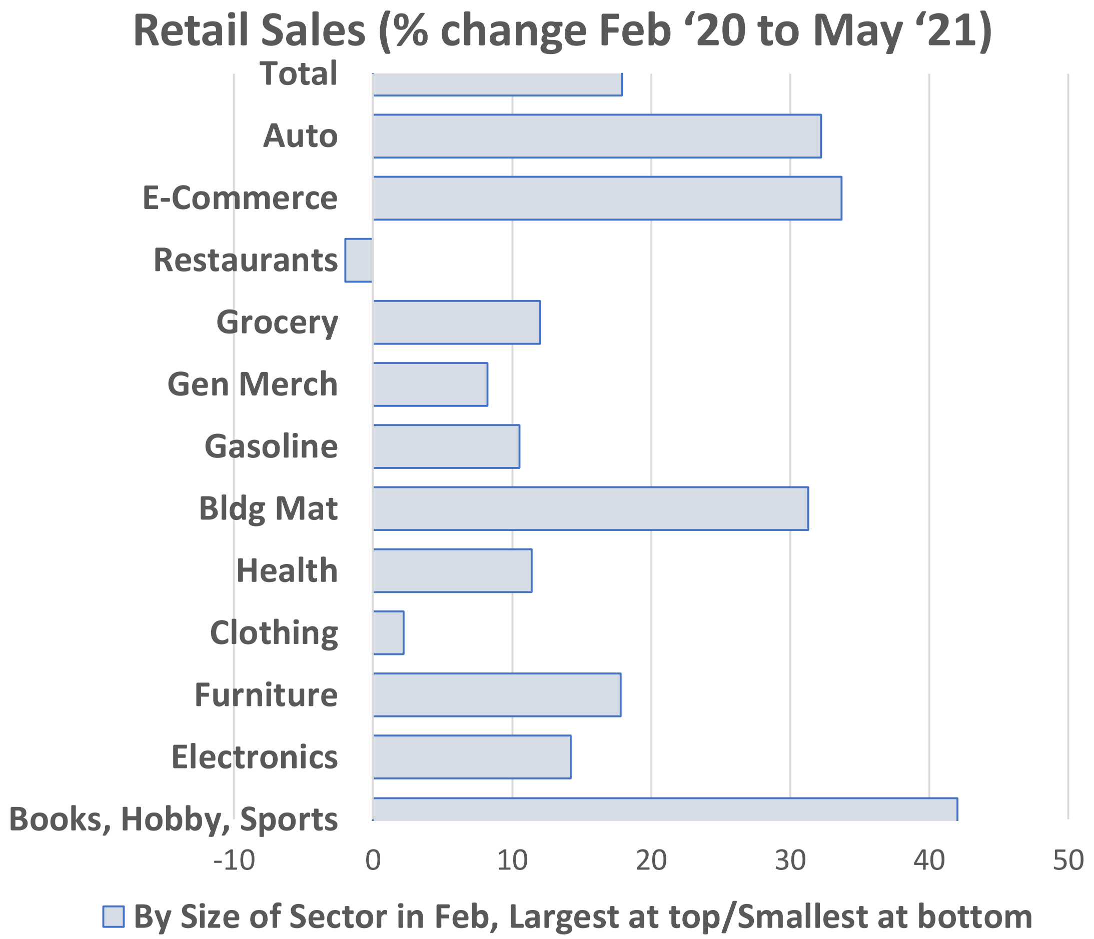
Press and other reports. Categories are rough approximations to reconcile the contents of two different bills.

Changes in Income-Related Activity: Compares Each Month to February 2020



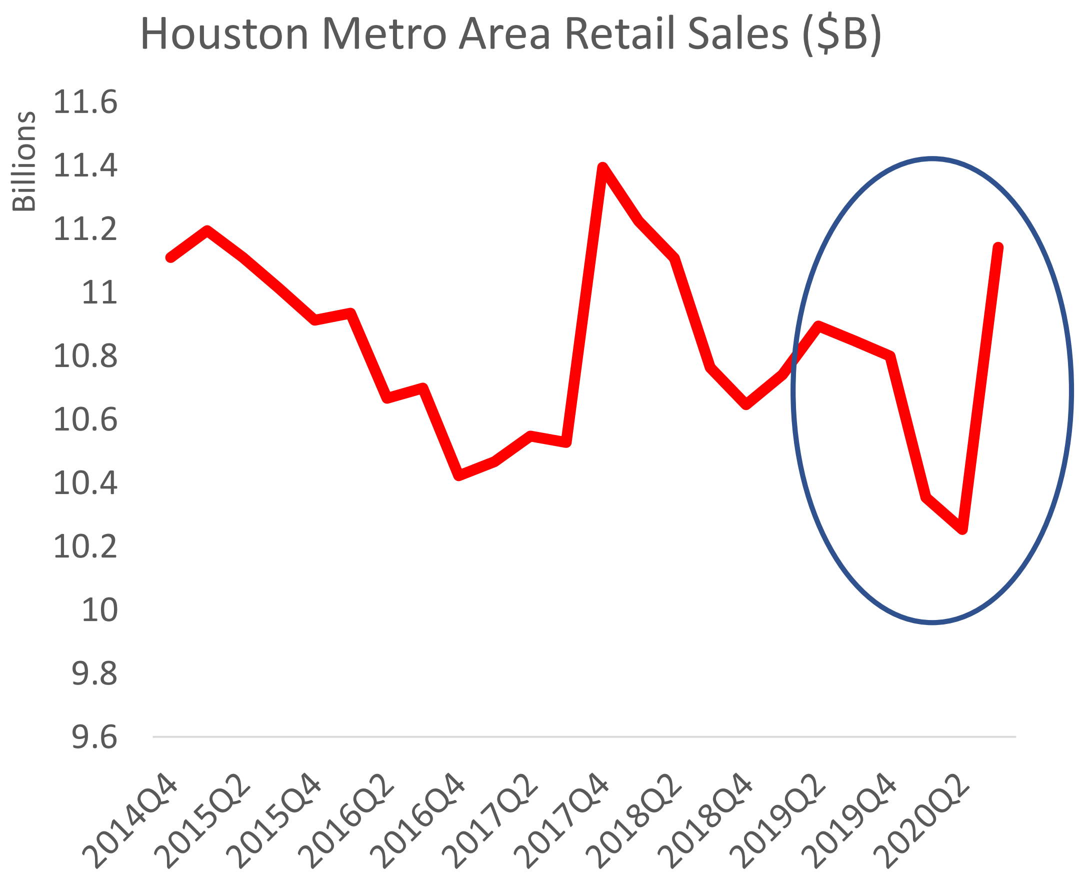
More Fiscal Support, Cheap Money, and E-Commerce Drive U.S. Retail Sales Past Pre-COVID Levels to Record Highs

- Income support pushed July/August retail sales past February pre-COVID levels and to all-time highs. The two largest sectors (autos and e-commerce) are also the big winners in percentage terms
- A distinctive COVID-period pattern is now disappearing. It saw big gains in e-commerce, food and beverage stores, books and hobbies, and home improvement filled in for big losses in restaurants, clothing, electronics, and gasoline.
- E-commerce is up an extraordinary 33.7 percent as consumers avoid in-person purchases
- Trends in stimulus payments and easy credit also drive the push to high levels of home sales, including a turnaround in sales of autos and existing homes in Houston



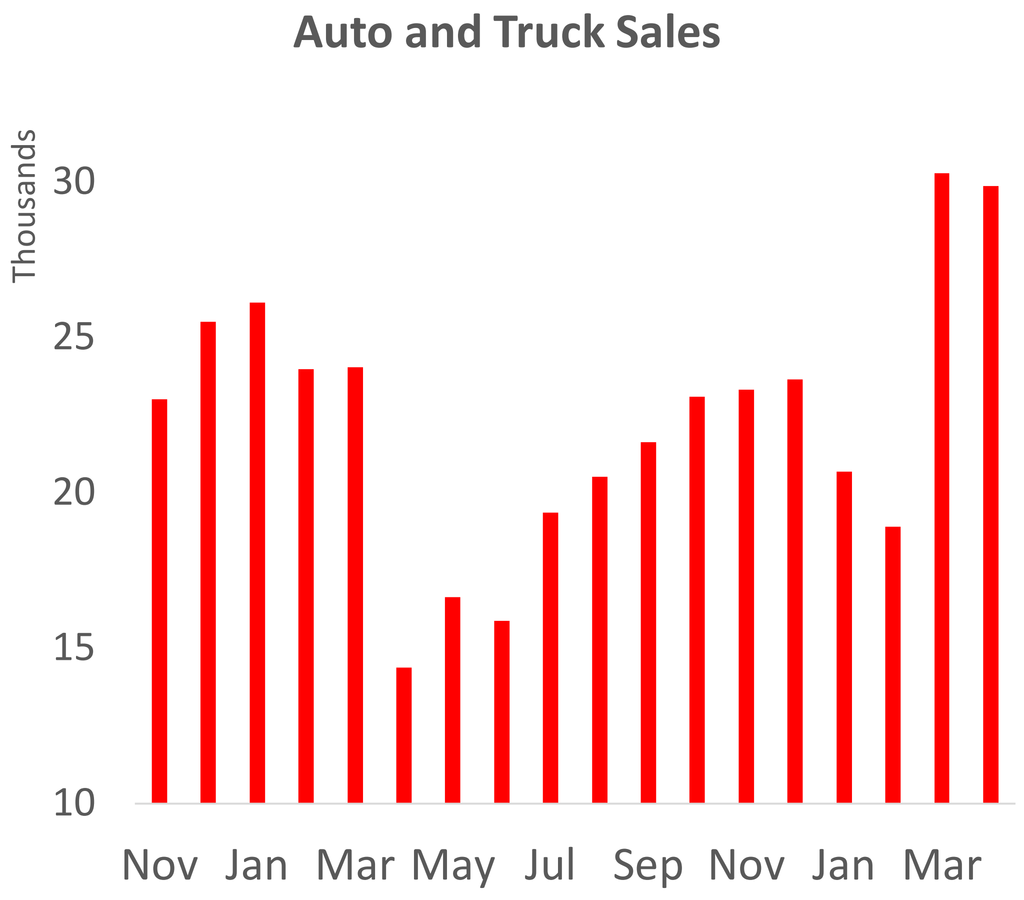
U.S. Census Bureau, May 14, 2021

After Falling 5.1% in Q1 and Q2, Houston Retail Sales Bounce Back By 8.7% in 2020Q3

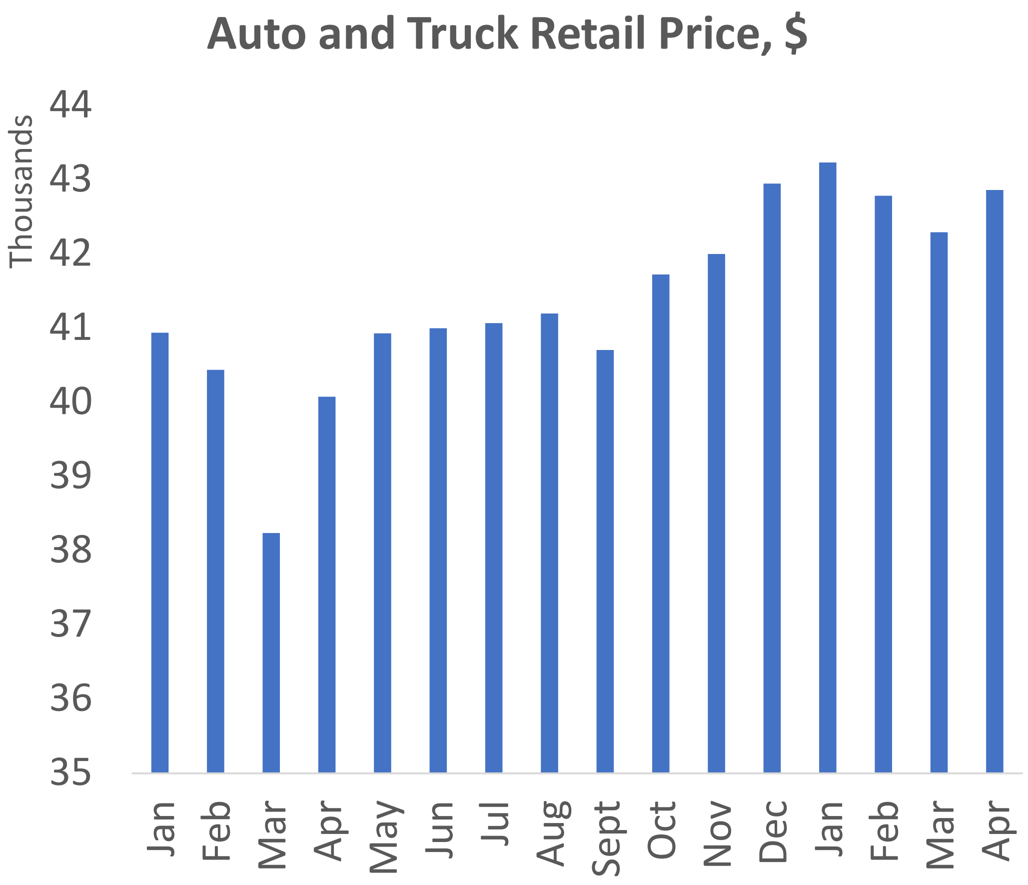


- Local retail sales jump 8.7% as stimulus arrives after a big drop
- Consumer ingenuity worked around social distancing issues especially using e-commerce for goods purchases
- Laggards in spending including bars and restaurants, entertainment, travel and other non-goods activities. Much smaller bounce here.
- Big ticket items like autos and home sales joined in the local sales surge

Houston Metro Area Auto Sales and Pricing Show the COVID Dip and Multiple Stimulus Impacts

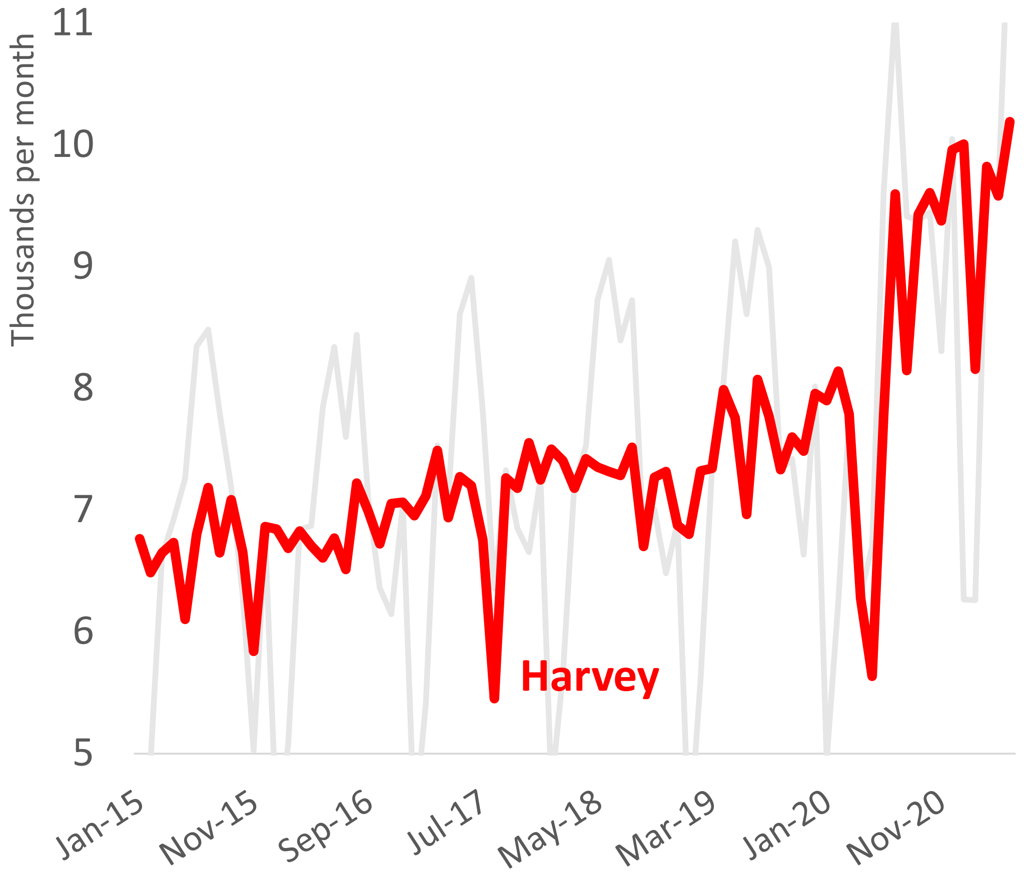


InfoNation



Houston Existing Home Sales Soar in Stimulus-Driven Pandemic

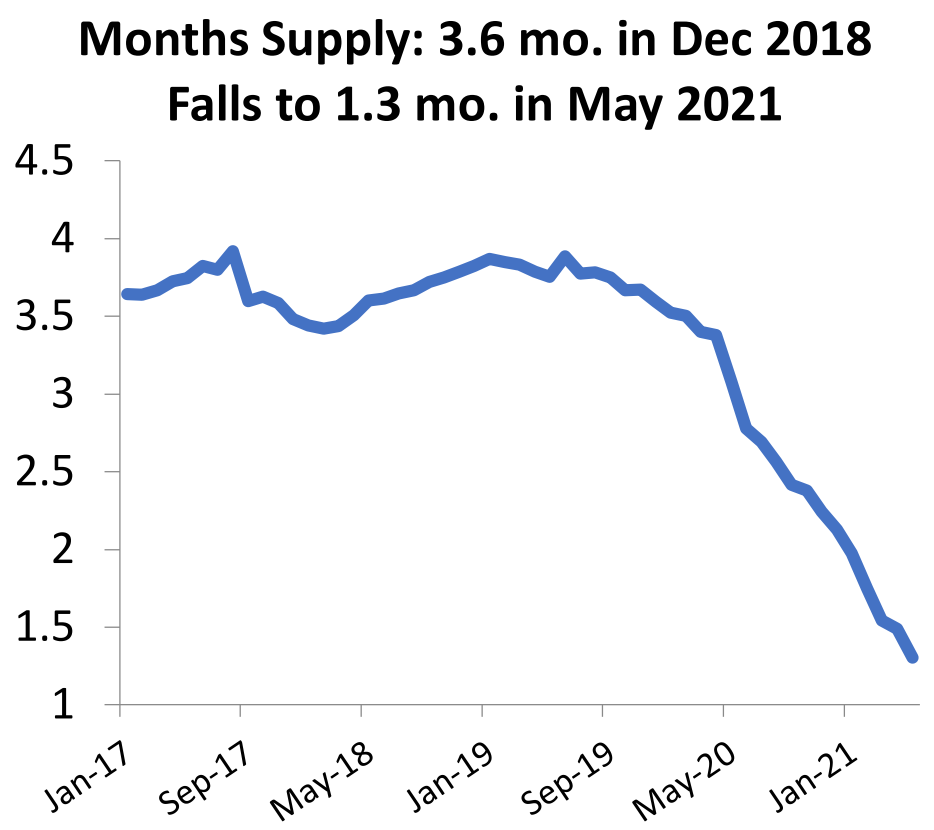
(Houston MLS sales, s.a.)

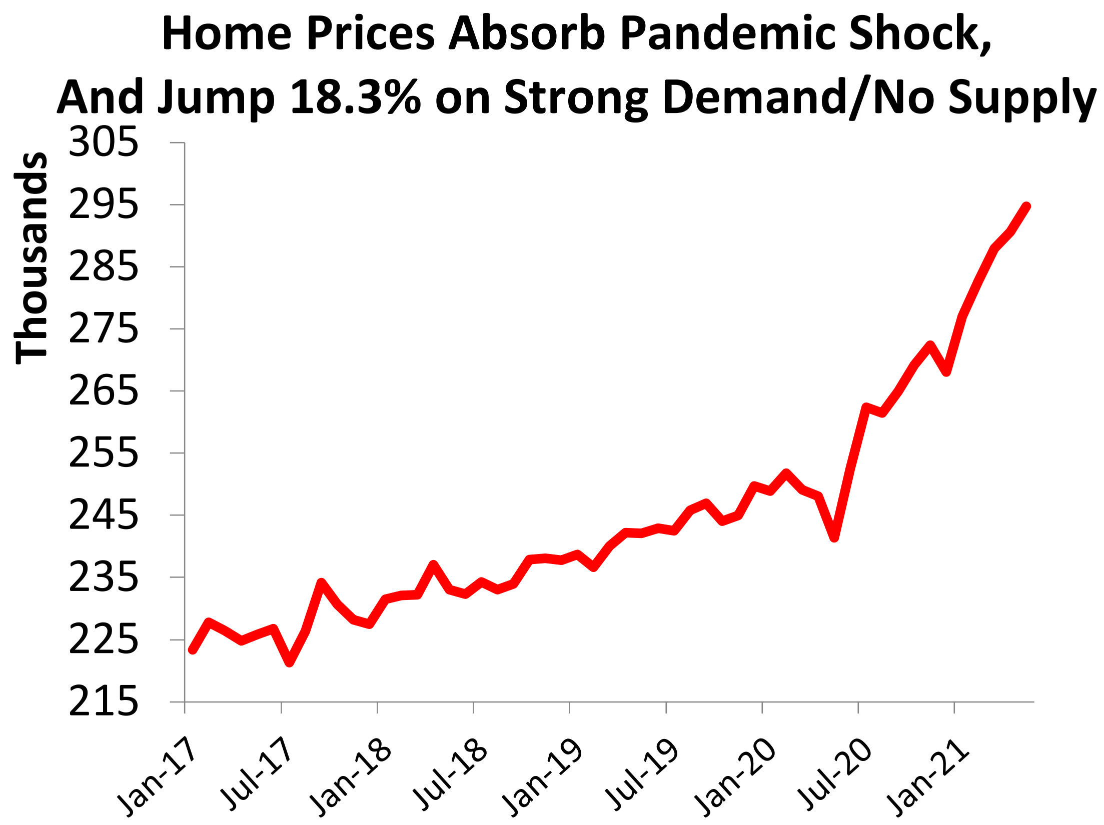


Source: Texas A&M Real Estate Center, seasonally adjusted by IRF

- Houston existing home sales had picked up a little in 2019 as the Fed paused in its push to raise interest rates
- The initial response to the pandemic was a sharp pull-back in sales due to the stay-home orders and nonessential business closings
- Then a sharp drop in interest rates and a check from the federal government ignited a sharp increase in sales
- Sales through May were still strong and up 15% from pre-pandemic levels despite a lack of inventory. The Cold snap hit in February

Houston Existing Home Sales:
Pandemic Shrinks Inventory and Raises Prices





Source: Texas A&M Real Estate Center, seasonal adjustment by IRF

COVID Housing Recovery Was Shared Across the Metro Area: Suburban Early Gains then Gave Way to Close-In Properties

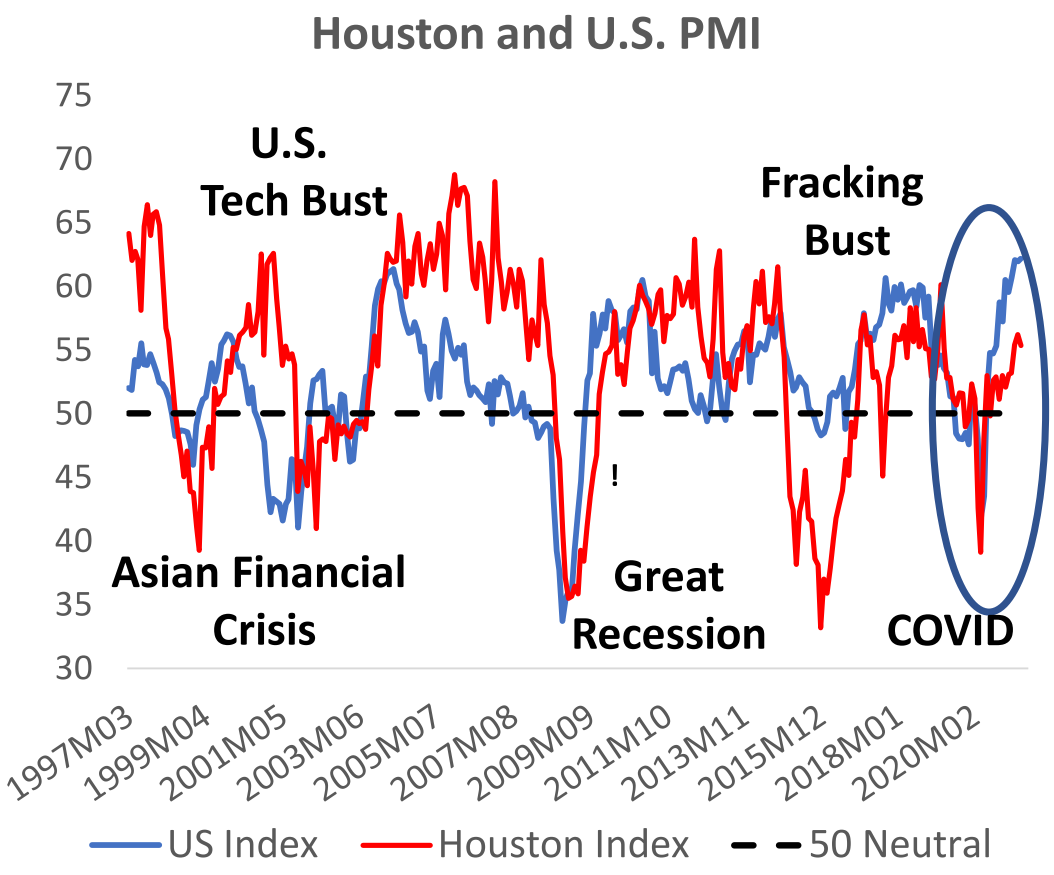
	Sales (#)		Price (000)		Inventory (months)	
Close-In Locations	**Feb 20**	**Apr 21**	**Feb 20**	**Apr 21**	**Feb 20**	**Apr 21**
Rice-Mil/Wash Ave	63	73	455.8	446.6	4.7	3.1
Energy Corridor	74	77	334.4	354.8	4.9	2.2
Memorial West	64	89	408.9	501.1	5.0	3.2
Heights	117	173	509.2	537.3	3.8	2.2
Galleria	47	59	287.1	272.5	8.3	7.0
Far Suburbs						
Katy	460	509	297.3	341.0	2.6	0.8
Kingwood	114	127	286.9	304.7	3.5	0.8
Pearland	180	179	303.5	314.2	2.2	0.8
Sugar Land	156	186	412.5	437.9	4.0	1.1
Cypress	305	325	314.1	338.9	2.4	0.8

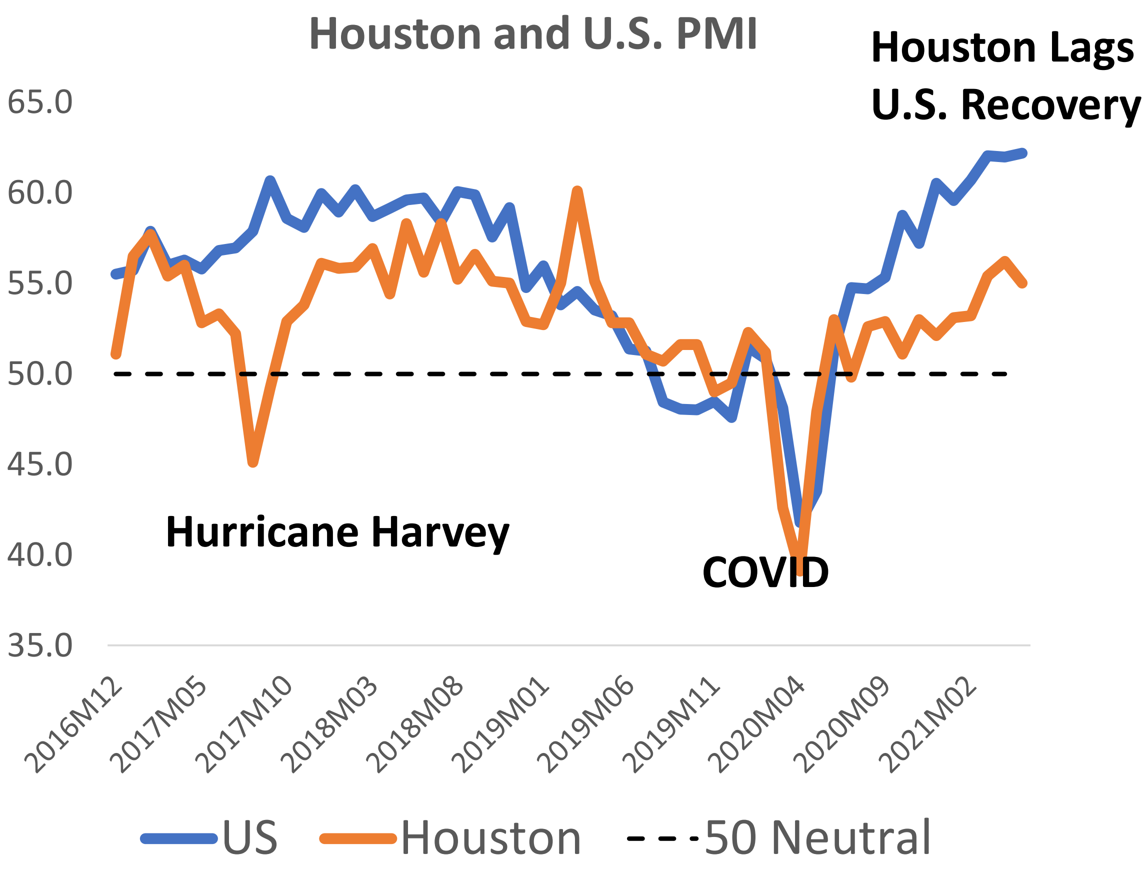
- Suburban sales dominated early in the COVID recovery in housing, but as inventories tightened properties inside the Beltway now lead in rising sales rates and price increases
- The jump in price and fall in inventory has become the dominant feature of the market
- Suburban inventories are down less than a 30-day supply
- Price takes up the slack where demand soars and inventories disappear
- Homeowners, builders, and developers are left in the driver’s seat. Builders are rationing lots and the number of homes on the market

Source: Texas A&M Real Estate Center, seasonally adjusted by IRF

How Bad Was This Downturn?
It Was Very Bad ... Maybe Just Not as Bad As Advertised

Purchasing Managers' Index Sees U.S. and Houston Briefly Contract and Quickly Move to Expansion

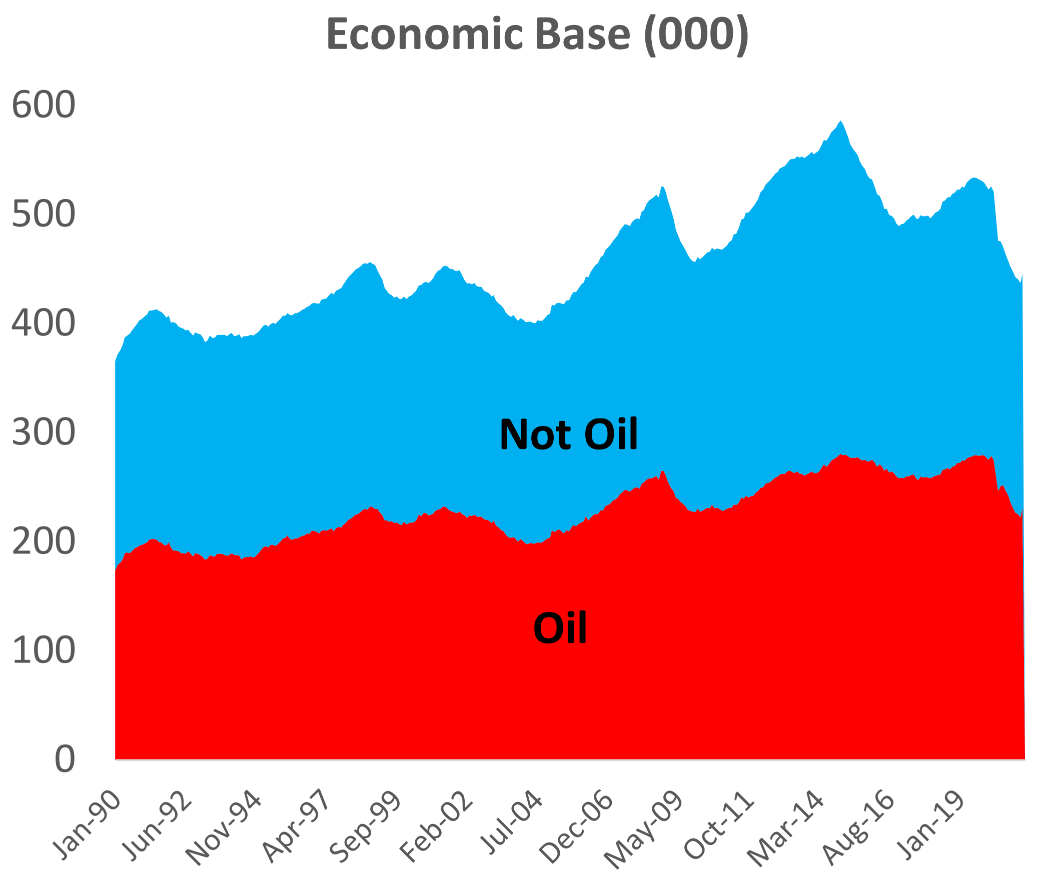


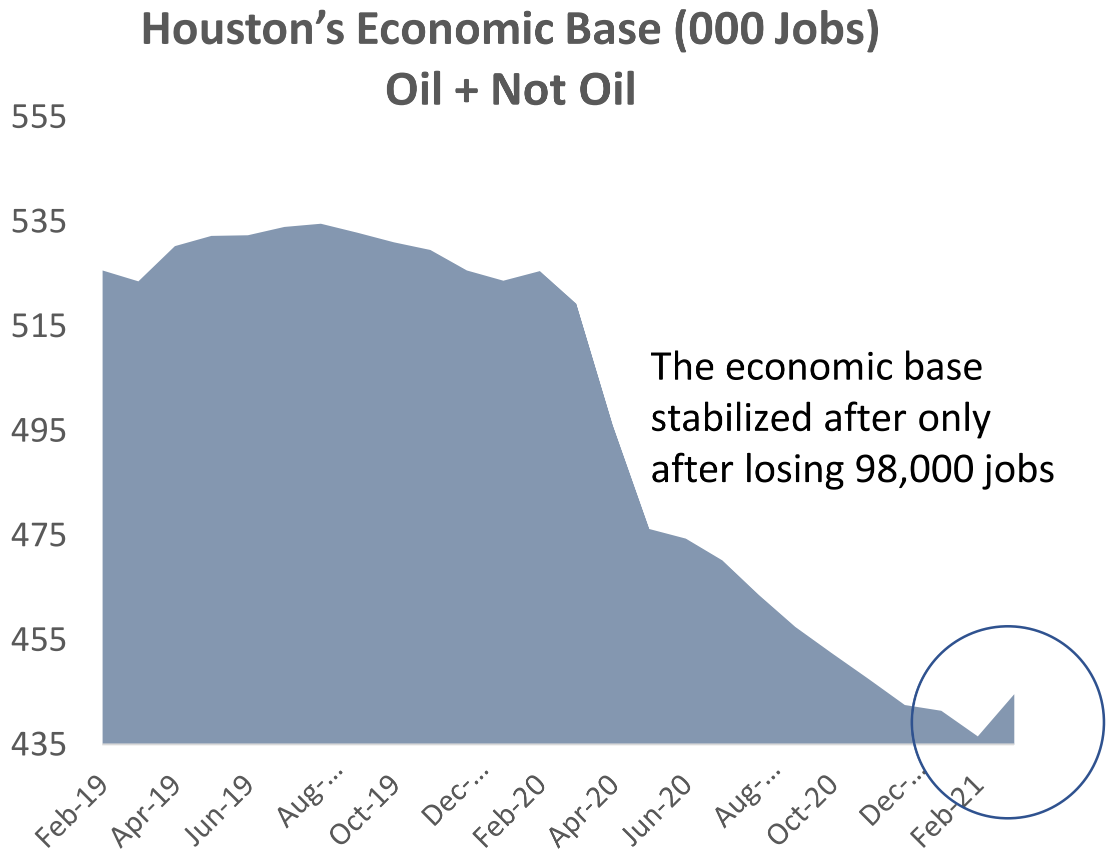


The Local Economic Base
Another Way to Think About Growth

- The economic base is a simple way to think about the key drivers of economic growth, the industries that drive growth, and the secondary industries that follow in its wake
- Growth is driven by the economic base: that set of industries that can sell their goods and services outside the region – to the rest of the state, nation, or world
  - Oil is the obvious example for Houston
  - But AIG, Men's Wearhouse, Sysco, and Waste Management are non-oil companies that also sell outside the region
- Secondary on non-basic industries simply follow the lead of driver industries and expand along with the broader economy. Local growth waits for help from oil and other basic industries
- Many of the best examples of non-basic industries are in COVID-sensitive industries: retail, food service, barbers and beauticians, entertainment, etc.

Revisions to Payroll Data Say Houston's Economic Base Has Fallen Further and Has Performed Much Worse than Previously Thought





Current Losses in Houston's Economic Base Point to a Serious Setback, But We Have Seen It Before

Houston's Economic Base in Five Recessions

	Downturn in Economic Base		Oil's Part of Base Losses
Years	Jobs Lost (000)	% Fall	%
1991-93	30.1	7.3	36.4
1998-99	34.0	7.4	51.8
2001-04	52.2	11.5	34.1
2008-09	68.8	13.1	44.9
2014-16	97.0	16.6	76.3
Average	56.4	11.2	48.7
2020-21	***98.0***	***16.8***	***32.1***

***The oil base losses stabilized in the fall, and non-oil base activity perhaps bottomed out in March. The non-oil base tied to U.S. growth includes non-oil manufacturing and parts of wholesale trade, air transportation, construction, and professional business services.**

- *1990-93:* A U.S. recession, Iraq invades Kuwait, First Gulf War and oil price collapse
- *1998-99: The* Asian Financial Crisis saw the global economy collapses along with oil prices, while the U.S. stayed strong
- *2001-04:* U.S. recession, 9/11 Attack, and the Second Gulf War
- *2008-09:* The Great Recession brought both economic and oil collapse
- *2015-2016:* The Fracking Bust was mix of a massive speculative collapse in oil and the U.S. economy staying very strong

What I Assume About Houston's Near-Term Economic Future?

- Large job losses in low-wage, contact-sensitive industries likely will be in place until September or probably into 2022
  - We remain well short of herd immunity and public fear of offices, elevators, stores, and public transportation is still in place
  - Many low-wage workers (especially women) will wait for school to start in September because of the cost of childcare
  - Larger federal unemployment benefits expire in September
- Even the large losses in contact-sensitive service industries fall behind us, *we still will have a hang-over of a moderate to serious recession and will see several quarters of recovery*
  - This recession was caused by losses in Houston's base industries – by our inability to sell goods and services outside the region – as every U.S. city coped with local COVID losses
  - We must wait for a broad national recovery to help Houston grow again
- *Oh, and don't forget our oil problem … current recovery is slow and partial, with the future bringing a smaller U.S. industry*

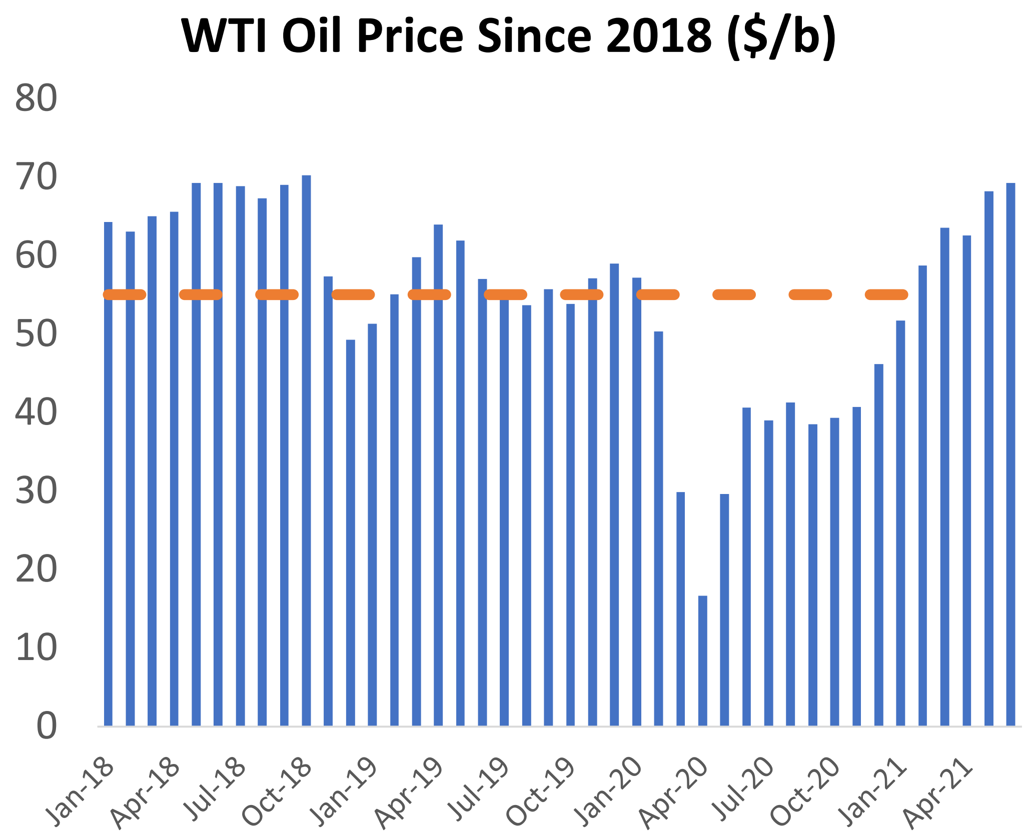
Oil Is Making a Slow and Tentative Recovery … But More Than COVID Is At Work

Oil and Houston: Difficult Times Since 2014

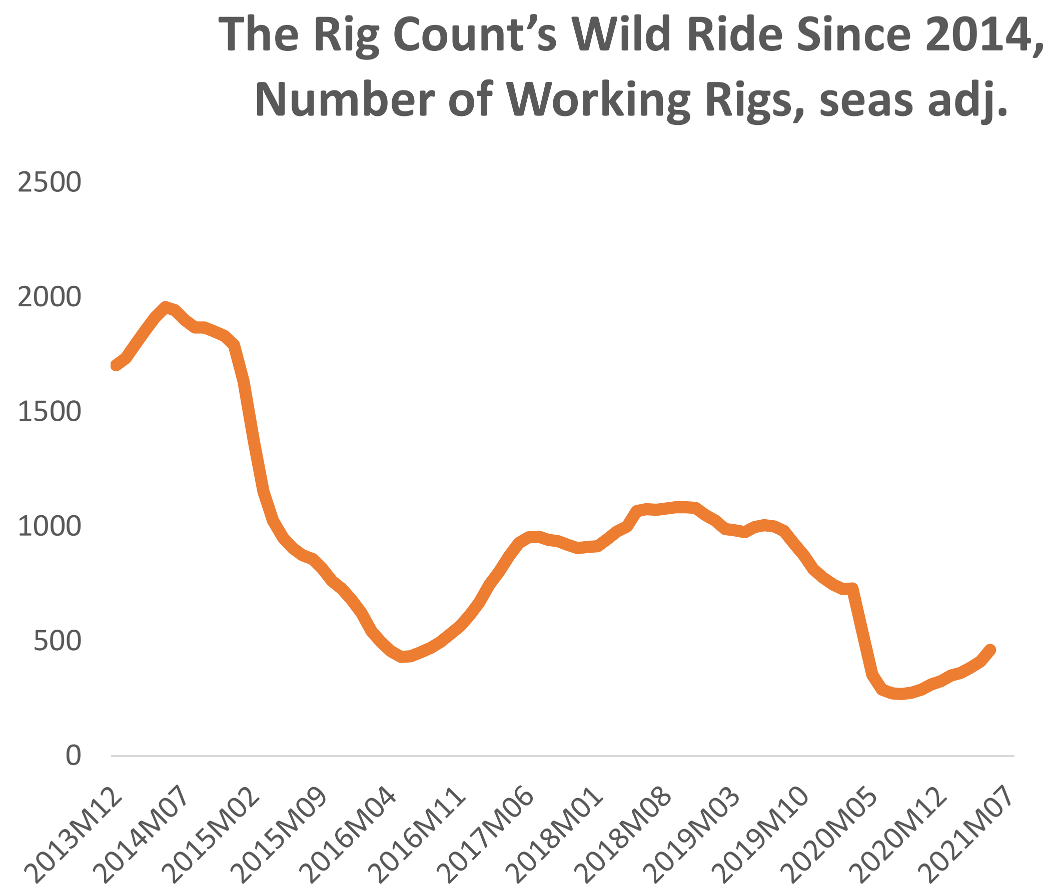
- From 2011-14, Houston enjoyed *an oil boom that rivaled the 1980's*, averaging 100,000 or more new payroll jobs each year
- But the *fracking bubble burst in November* 2014 when OPEC withdrew as swing producer and let the price of oil collapse. While the local alone oil sector lost 77,300 jobs
- A moderate recovery in oil prices in 2017-18 brought a partial recovery of local oil employment, but by 2018 *an industry-wide credit crunch had set in*. Oil jobs were in decline again in Houston by mid-2019
- Then comes the *COVID-19 pandemic and the Saudi-Russian oil war*, resulting in complete collapse in oil markets in May 2020 to all-time lows
- We now see a *nascent recovery underway but with the oil industry still operating at historically very low levels*

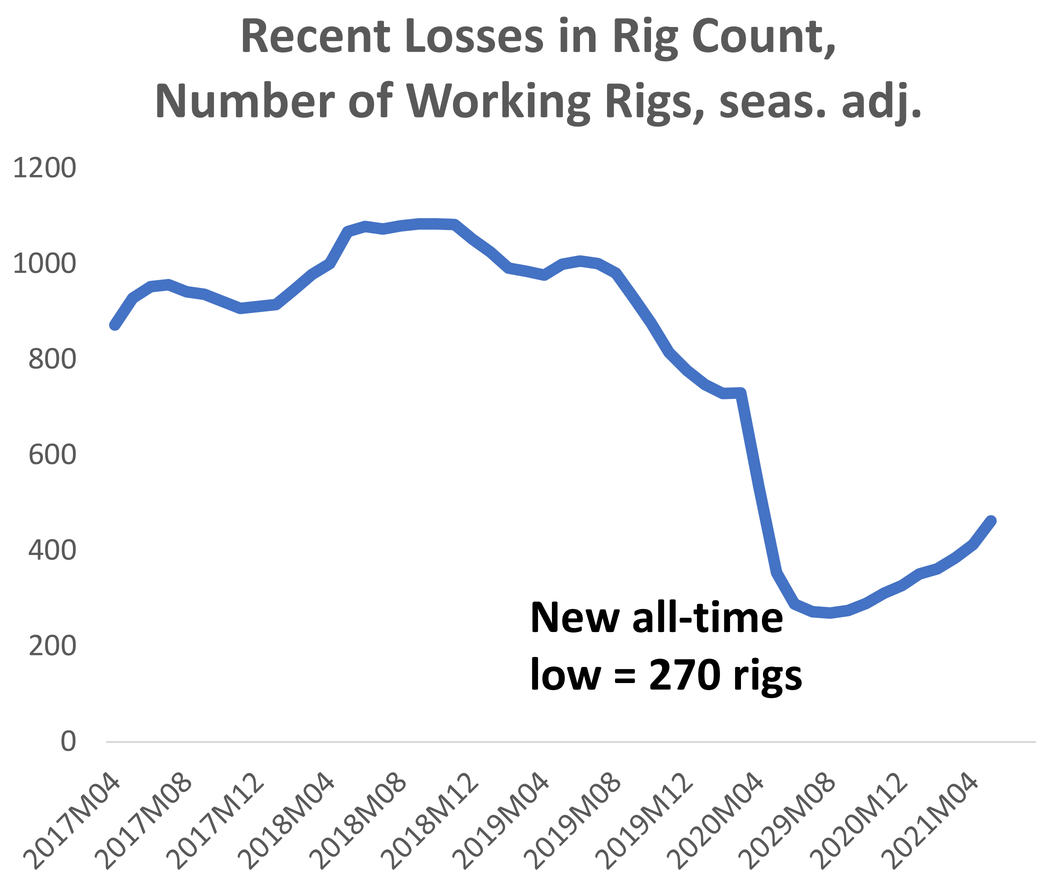
Higher Oil Prices Are Back
But They Mean Less for U.S. Oil Producers

- Higher oil prices are back … but they don't mean what they once did for U.S. oil
- This is the mostly work of substantial production cuts by OPEC+
- How stable is the OPEC+ outlook? COVID continues globally, Saudi vs Russia, Iran's pending return, …
- U.S. producers have not responded to higher prices:
  - (1) most companies hedged at $50-$55/b production in early 2021;
  - 2) they face serious financial problems and balance sheet repair that will be long-term issues



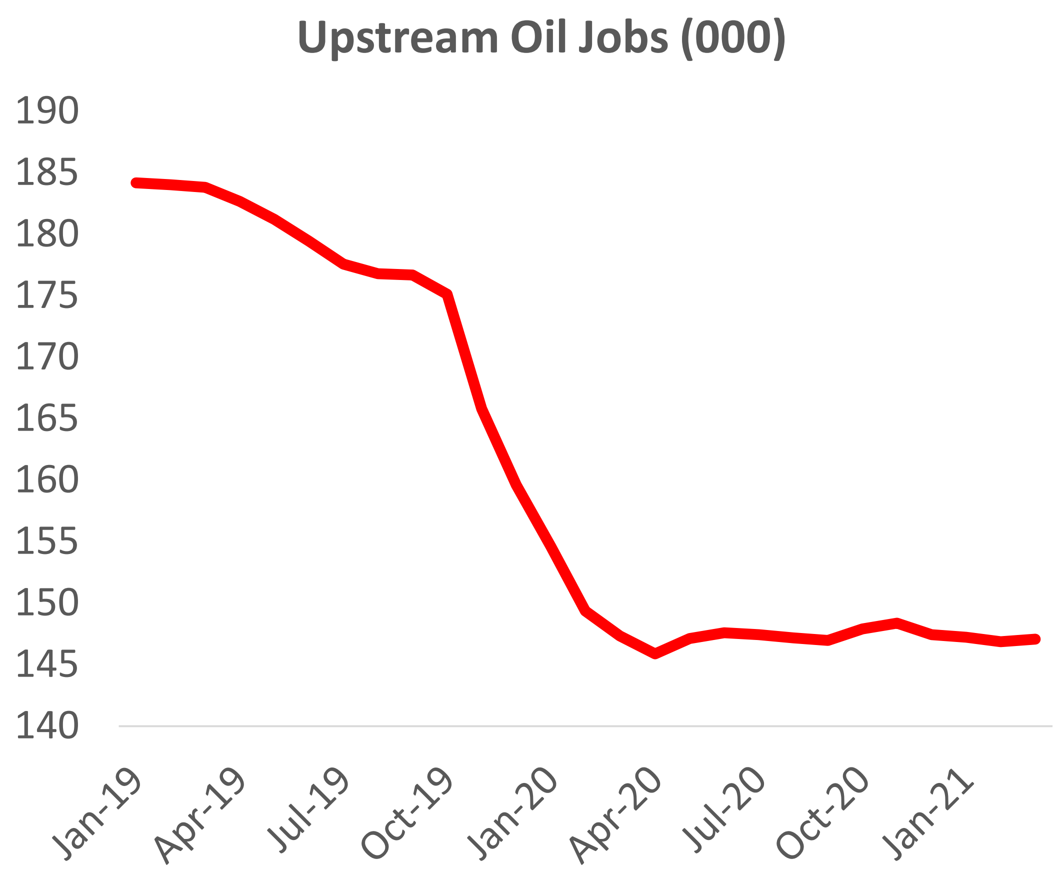
This Brief History of the Baker Hughes Rig Count Shows How Far We Have Fallen

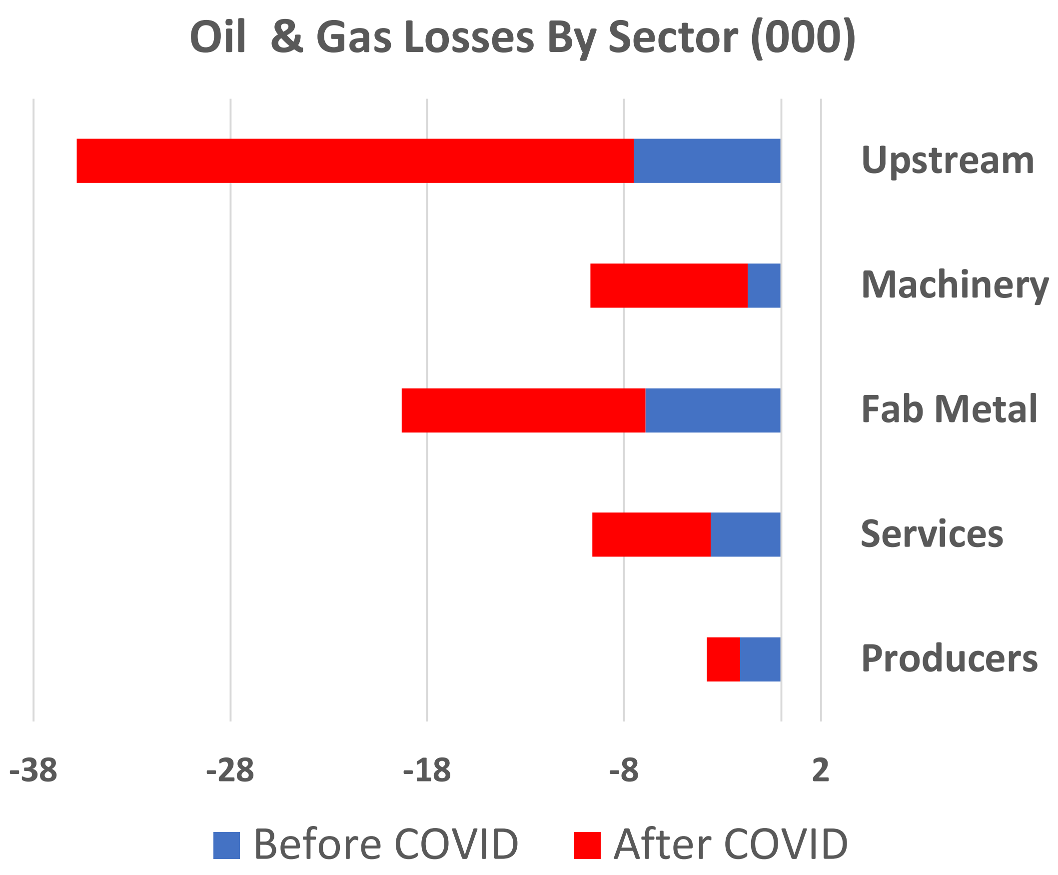




Baker Hughes Rig Count

Houston Has Lost 36,400 Upstream Jobs Since Peaking in June 2019, Or 47 Percent of Losses Seen in 2015-16





Texas Workforce Commission, calculations of IRF

A Smaller U.S. Oil Industry Going Forward

Boom and Bust for Fracking
Followed by Bust, Bust, Bust …

Fracking Is a New Model for Oil Production

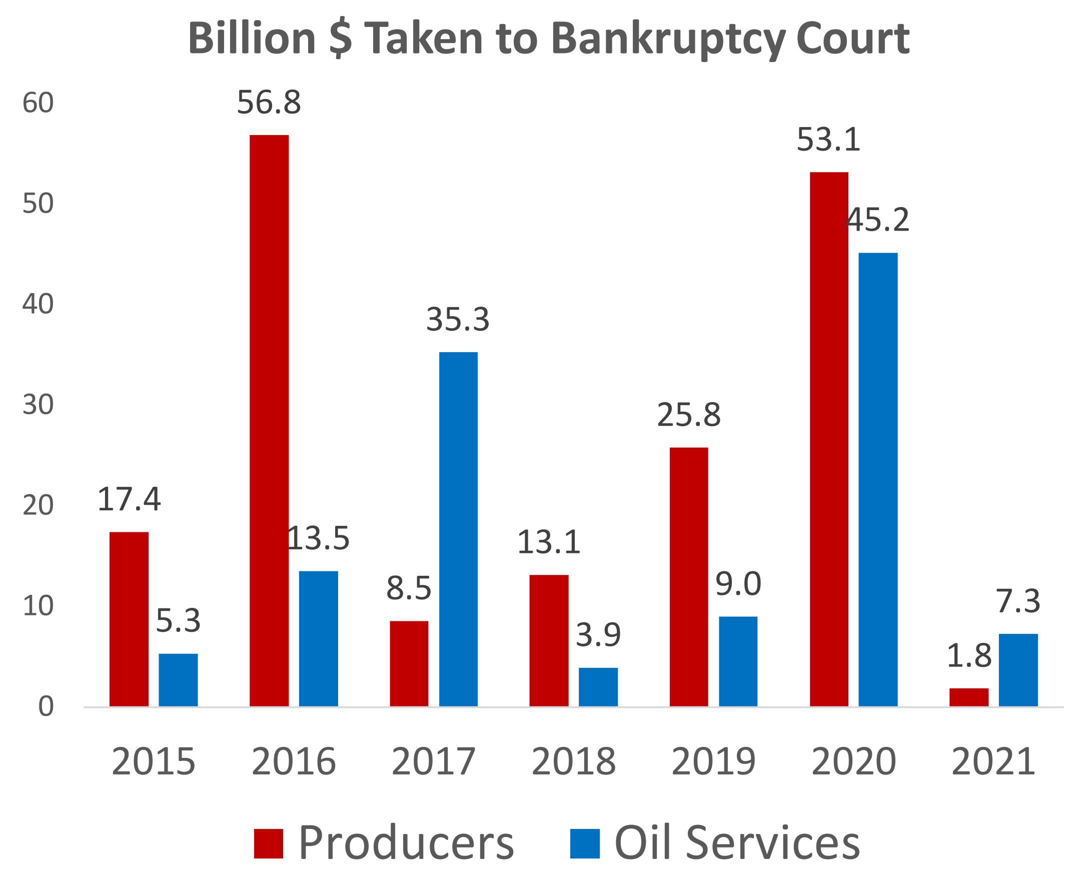
- Looks more like a competitive industry. Many small and medium-sized operators, price-takers, and assembly-line production
- Low barriers to entry for new producers, i.e., capital, some geology, leases, and a hire a service company. Today a hedge fund, tomorrow an oil producer
- Traditional exploration risk is gone, production costs are understood, and the oil is there
- Get a quick and certain rise or fall in oil production in response to changing oil price incentives
- The industry was born in an era of $100 oil and cheap money from the central bank, and tight oil production grew at 24% per year from 2005 to 2014. Investors sought the industry out …

Fracking's Problems Now?

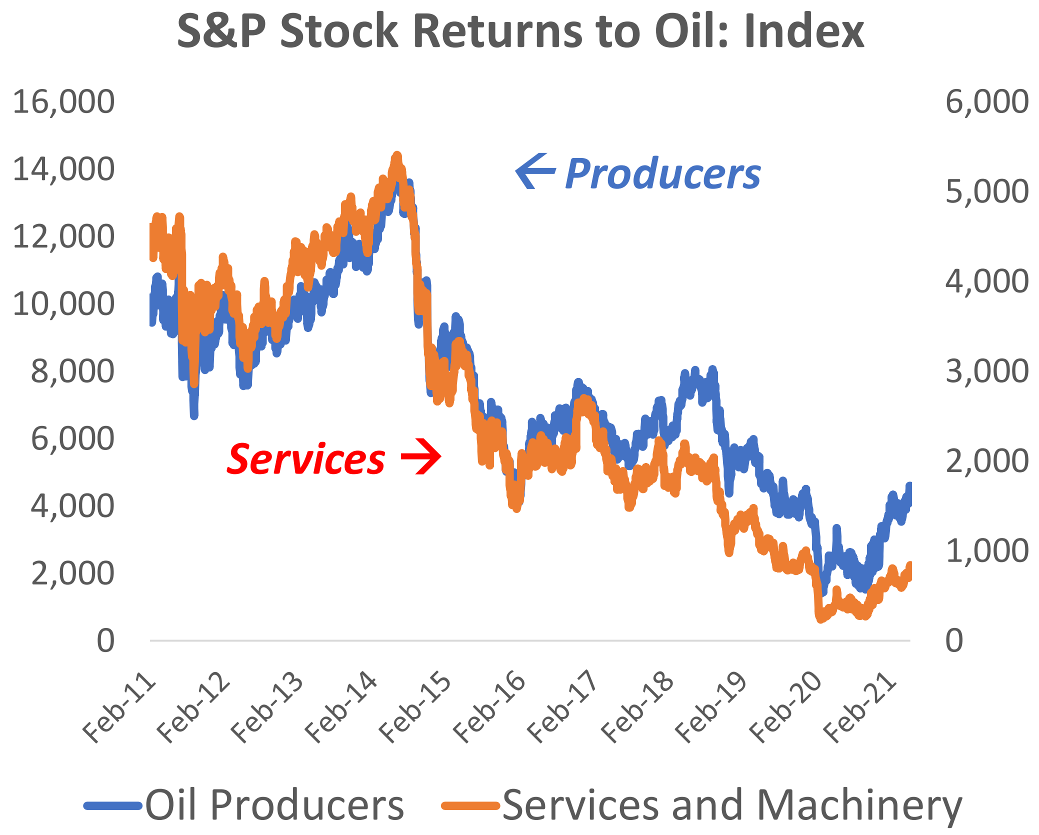
- Fracking is a high-cost source of oil and needs $65 to thrive. Even $55 oil hurts many companies, and $2 natural gas is lethal for others
- Too many companies used low interest rates and a rising stock market to try for a quick killing – instead of building a viable oil business
- Many producers struggled in 2019 to deliver steady income and growth to impress the stock market, which has now turned its back on the industry
- A first wave of bankruptcies hit in 2015-16, followed by wave of bankruptcies, delistings, forbearance, etc. hit hard in 2018-19, then COVID
- Investors are hard to find after $295 billion in assets went through the bankruptcy courts. Producers are diverting cash flows from the oil fields to potential investors back

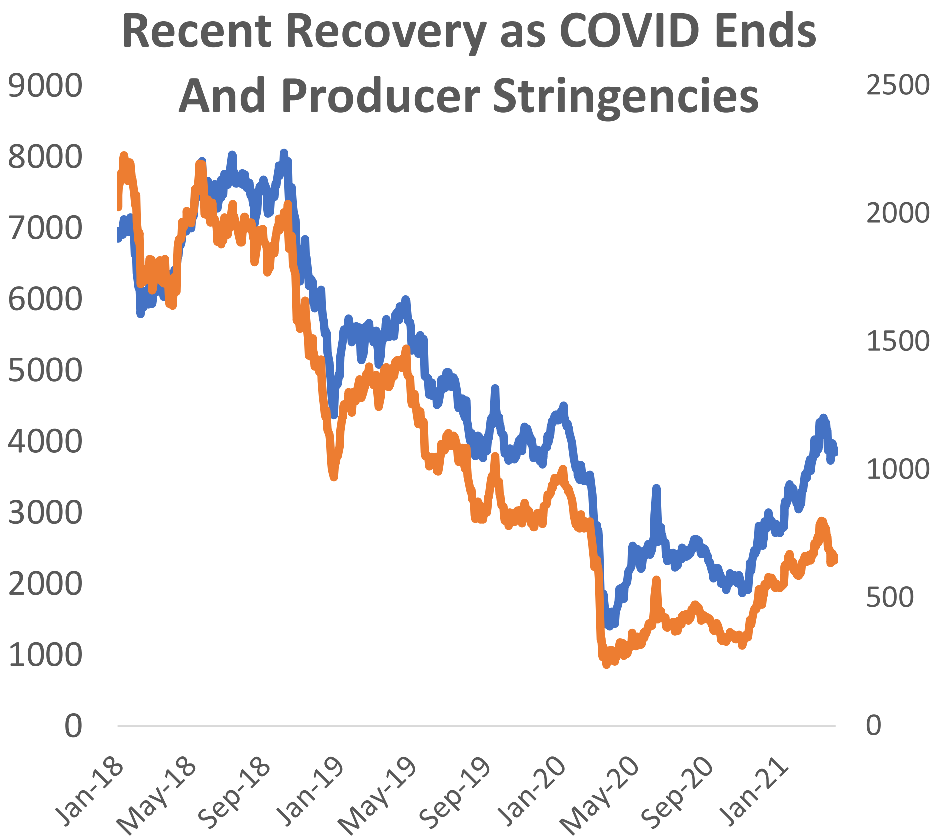
Since 2015 the U.S. Fracking Industry Has Taken Nearly $300 Billion in Assets Through Bankruptcy

- This is billions of dollars of secured and unsecured assets taken to bankruptcy court by the fracking industry
- Bankruptcies have come in three waves: Oil Bust of 2015-16, Credit Crunch of 2018-19, and the COVID Crisis.
- *From 2015 to 2021, bankruptcies totaled $295 billion*, 59.9 percent from producers and 40.1 percent for oil services



Lower Oil Prices and Poor Performance Pressures Fracking Profits, Leads to Lower Stock Prices and a Credit Squeeze

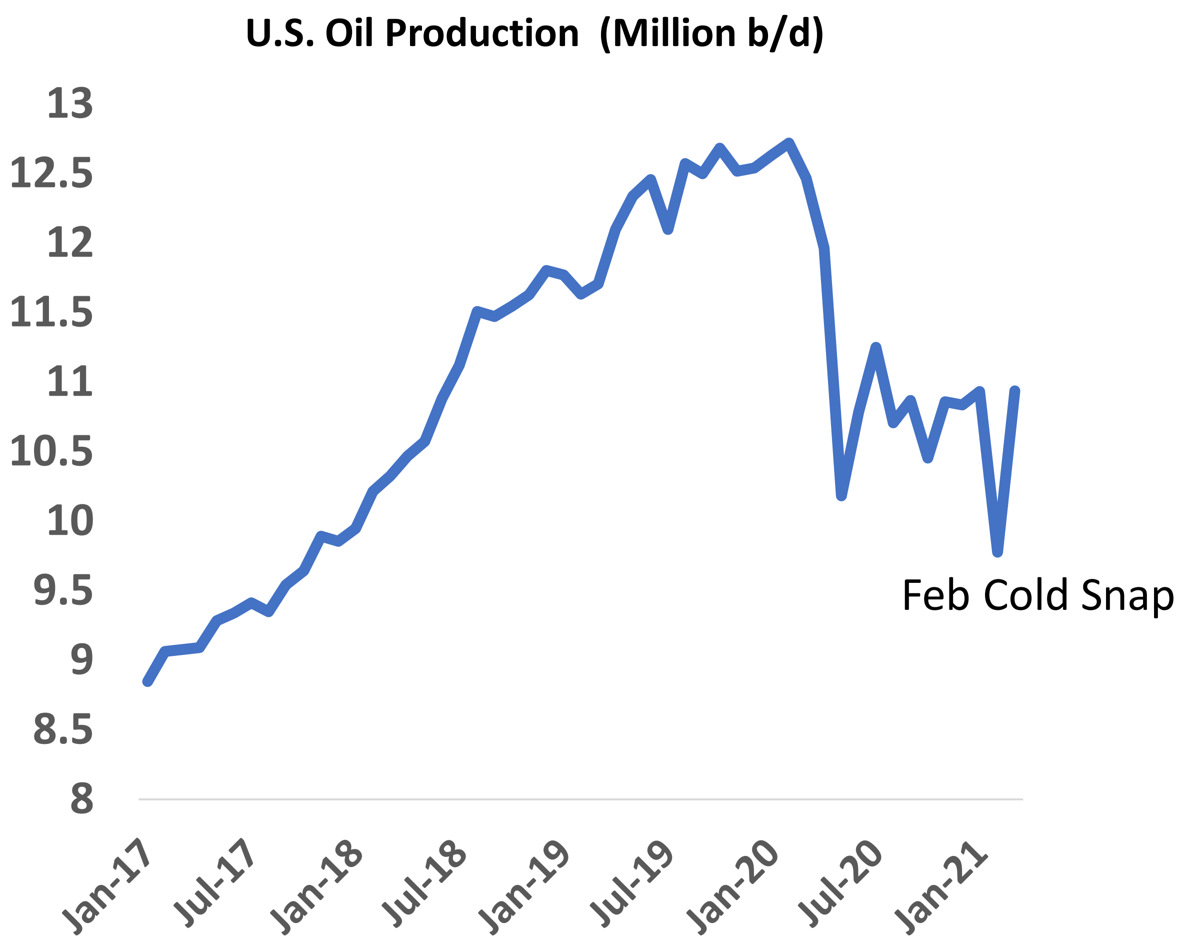




S&P Dow Jones Producer and Oil Service Indexes to June 6, 2021

U.S. Producers Respond to Financial Needs By Diverting Cash Flows and Cutting Production

- U.S. producers have committed to rewarding investors by diverting up to 30% of free cash flows to dividends
- The first quarter earnings reports saw companies meet these commitments by providing record levels of free cash flows
- This means holding down U.S. production to about 11 million barrels per day. The peak was 12.8 million in March 2020



DOE/EIA, Seasonally adjusted by IRF

Summary Impact of a New Financial Model for Fracking: It Will Be Smaller Industry Doing Less in the Oil Fields and Houston

	Percent Cut to Cash Flow			
	10%	**20%**	**30%**	**40%**
Rig Count				
$65	25	60	92	120
$55	80	140	165	188
Local Oil Jobs				
$65	2,000	4,400	6,400	8,700
$55	4,200	8,200	10,000	12,000
Houston Payrolls				
$65	6,000	14,300	20,600	28,600
$55	11,600	24,000	30,100	37,000

For each variable, the number is the reduction required by a percentage cut to industry cash flow relative to no cuts being necessary. Losses measured in 2024Q4. March 2021 estimates

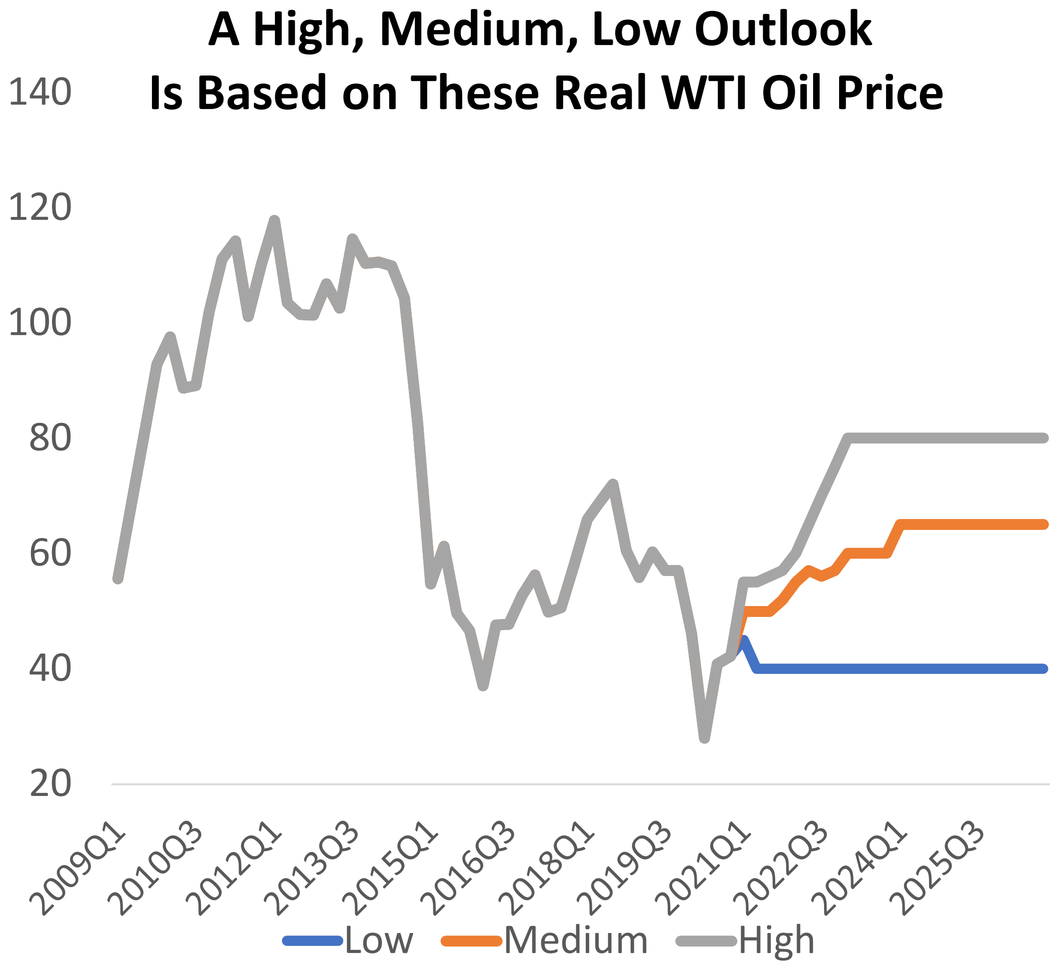
What It Means for Houston

- It is surprising that a change in the financial model for one industry could influence the growth of a metro area of 7.1 million people and 3.3 million workers
- But oil has a special place in Houston. For the last 30 years, Houston has seen jobs grow at 2.0 percent per year, with 1.2 percentage points from shared national growth, 0.6% from oil, and 0.2% from demographic advantages and the Texas Growth Formula
- The cuts to fracking mean a loss of one-third to half of the growth contribution from oil for the next five years … and probably longer
- It is the first cut to Houston's long-term rate I have made in 32 years of studying the Houston economy. *Houston's growth is still much stronger than the U.S. and still impressive at 1.7% versus 1.1% -- but now slower*

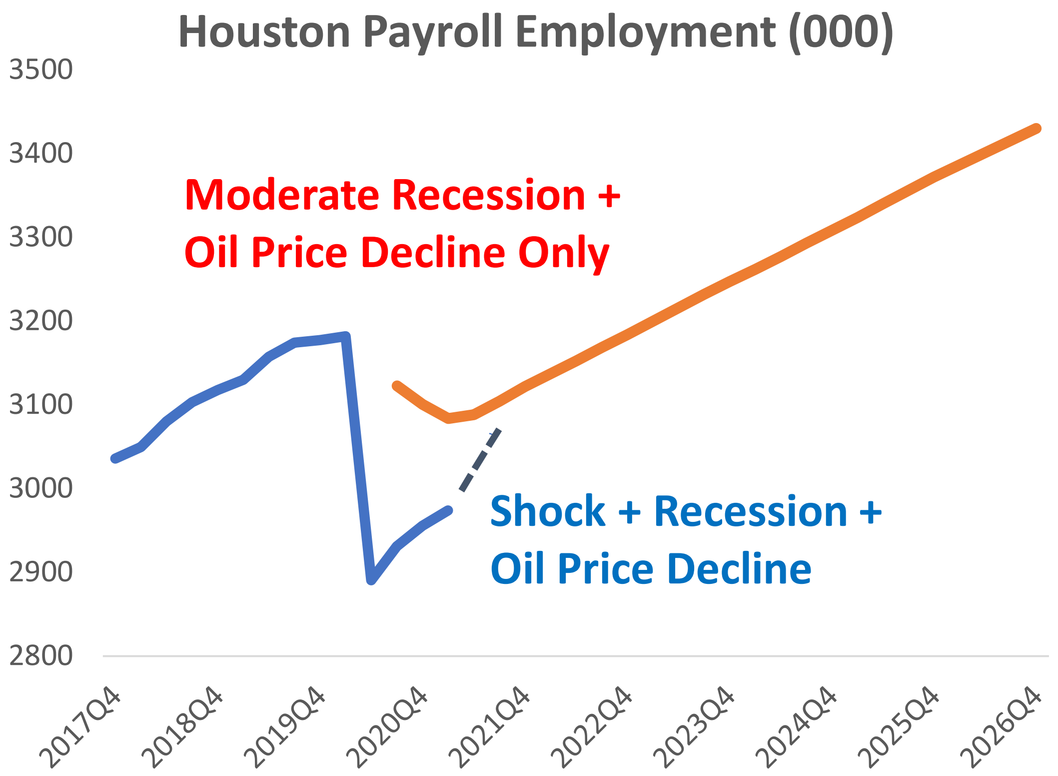
Outlook for Houston:
All the Guesswork Pulled Together

Houston's Turnaround Comes from Three Sources: The Return of COVID Jobs, U.S. Improvement, and Oil's Return

- The local economic turnaround will be driven by the return of COVID contact-sensitive jobs, broad U.S. growth, and an improved oil industry
- COVID jobs should accelerate by the fall and return quickly late this year and in early 2022
- The U.S. forecast is for 2022 employment to match pre-COVID levels by the third or fourth quarter
- US oil producers are committed to no production gains until world growth stabilizes and OPEC spare capacity is absorbed. *Slower and lower for oil …*



Fitting the Timing and Pieces of the Recovery Together: Some Things We Really Cannot Know

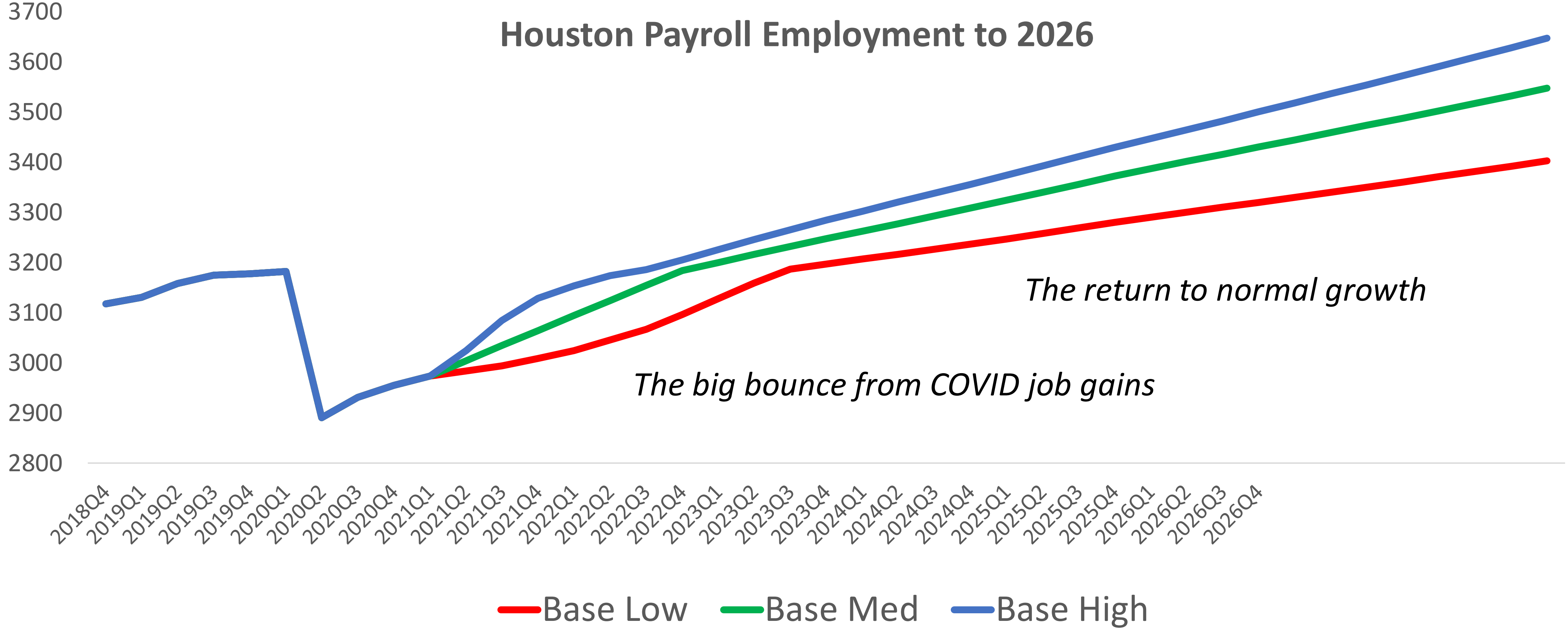


- The 2020Q2 shock to Houston's payroll employment from COVID and the oil war pushed it down by 291,100 jobs in 2020Q2 and it was still down 207,*600* jobs in 2021Q1 (Blue Line)
- Employment collapsed, *but a moderate U.S. recession and oil fundamentals alone would* account for only 97,700 lost jobs 2021Q1. The difference – again -- is the COVID shock
- At some point, business cycle fundamentals (including oil, the U.S. economy, and the retreat of COVID) reassert themselves and we return to the Red Line. Where? When?

How The End Game for COVID-19 Might Look As Houston Moves to 2022 and 2023

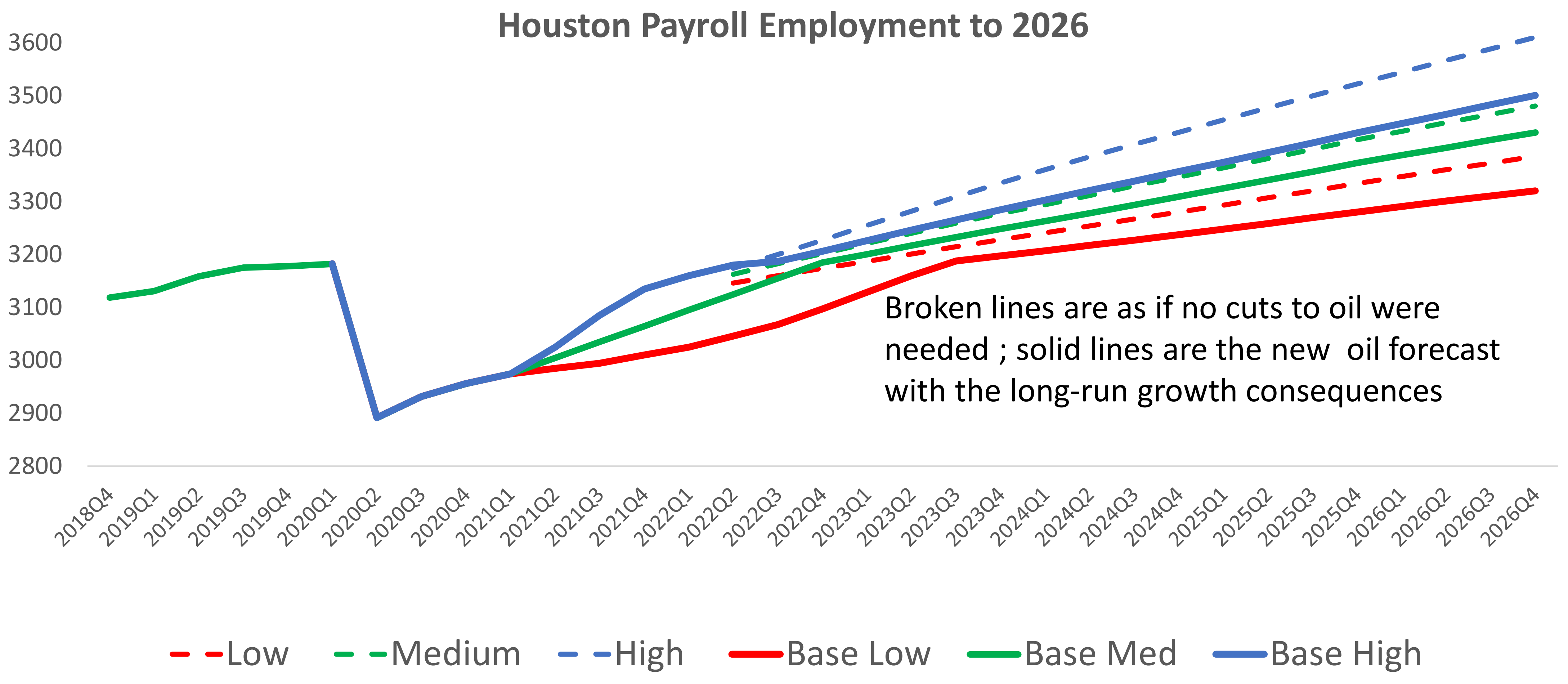
- I can provide nothing specific – just assumptions for a high, medium, and low outlook for the next few quarters
- Houston should see full recovery from COVID damage by next year, except for the low forecast in early 2023
- We know where we are today and where full recovery brings us … but little about the in between period of this year and early 2022
- Will we see renewed COVID outbreaks? How will the authorities react? Or perhaps it comes fast with maybe few problems and fast recovery….

Houston Payroll Employment to 2026 Including the Last of Social Distancing: *With Adjustment for Oil*



The Low, Medium, and High with a new oil financial model

Houston Payroll Employment to 2026 Including the Last of Social Distancing: Without and With Adjustment for Oil



Contributions to Houston Job Growth 2020 to 2027: Payroll Employment

(‘000 Q4/Q4)

	Change in Payrolls			Business Cycle Change			Social Distancing			Payroll Growth Rate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
2019	59.6	**59.6**	59.6	59.6	**59.6**	59.6				1.9	**1.9**	1.9
2020	-221.8	**-221.8**	-221.8	-76.7	**-76.7**	-76.7	-145.1	**-145.1**	-145.1	-7.0	**-7.0**	-7.0
2021	53.8	**108.3**	173.5	16.4	**21.5**	28.4	37.4	**87.3**	145.1	1.8	**3.7**	5.9
2022	87.6	**120.1**	76.6	40.5	**62.3**	76.6	47.1	**57.8**	0	2.9	**3.9**	2.5
2023	100.2	**63.1**	78.6	39.6	**63.1**	78.6	60.7	**0**	0	3.2	**2.0**	2.5
2024	39.7	**61.3**	71.9	39.7	**61.3**	71.9				1.2	**1.9**	2.2
2025	43.3	**63.4**	73.2	43.3	**63.4**	73.5				1.3	**1.9**	2.2
2026	39.9	**57.9**	70.7	39.9	**57.9**	70.7				1.2	**1.7**	2.1
												2.1
2027	40.7	**57.9**	72.5	40.7	**57.9**	72.5				1.2	**1.7**	

Contributions to Houston Job Growth 2020 to 2027: Payroll Employment

(‘000 Q4/Q4)

	Change in Payrolls			Business Cycle Change			Social Distancing			Payroll Growth Rate		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
2019		**59.6**			**59.6**						**1.9%**	
2020		**-221.8**			**-76.7**			**-145.1**			**-7.0%**	
2021		**108.3**			**21.5**			**87.3**			**3.7%**	
2022		**120.1**			**62.3**			**57.8**			**3.9%**	
2023		**63.1**			**63.1**			**0**			**2.0%**	
2024		**61.3**			**61.3**						**1.9%**	
2025		**63.4**			**63.4**						**1.9%**	
2026		**57.9**			**57.9**						**1.7%**	
2027		**57.9**			**57.9**						**1.7%**	

These Gains Are Large and Exciting: But We Are Only Returning to an Earlier Starting Point

- It is the second half of next year before we move past the 2020Q1 COVID peak in economic activity and see economic expansion. We have lost 2+ years of growth to COVID
- Fracking has now accepted that it is high-cost source of oil and will be a smaller industry moving forward. The U.S. oil industry should become a more stable source of local growth
- Lower oil production and slower growth in U.S. oil means slower growth for Houston's total employment. It is a moderate but permanent and long-term slowdown so far (1.7%/y versus 2.0%) and still leaves Houston growing much faster than the rest of the U.S.
- The broader questions about oil's future (global warming, peak demand, ESG) are mostly issues that are still years in the future … but that weigh on the present

The Global Economy?
It Is Mostly About COVID, Too

IMF Says World GDP Growth Fell 3.5% in 2020 With Recovery of 6.0%/4.4% in 2021/22

Percent GDP Growth, Year-Over-Year

	2018	2019	2020	2021	2022
World	3.5	2.8	-3.3	6.0	4.4
Advanced Economies	2.2	1.7	-4.7	5.1	3.6
U.S.	2.9	2.2	-3.5	6.4	3.5
Euro Area	1.8	1.3	-6.6	4.4	3.8
Germany	1.3	0.6	-4.9	3.6	3.4
France	1.8	1.5	-8.2	5.8	4.2
Italy	0.8	0.3	-8.9	4.2	3.6
United Kingdom	1.3	1.5	-11.0	5.3	5.1
Japan	0.3	0.7	-9.9	3.3	2.5
Emerging/Developing	4.5	3.7	-4.8	4.4	3.9
Brazil	1.3	1.1	-2.0	3.7	2.6
Russia	2.3	1.3	-3.1	3.8	3.8
India	6.8	4.2	-8.0	12.5	6.9
China	6.6	6.1	2.3	8.4	5.6

IMF, *World Economic Outlook*, update as of April 2021

The Global Economy: COVID-19 Still Dominates the Outlook

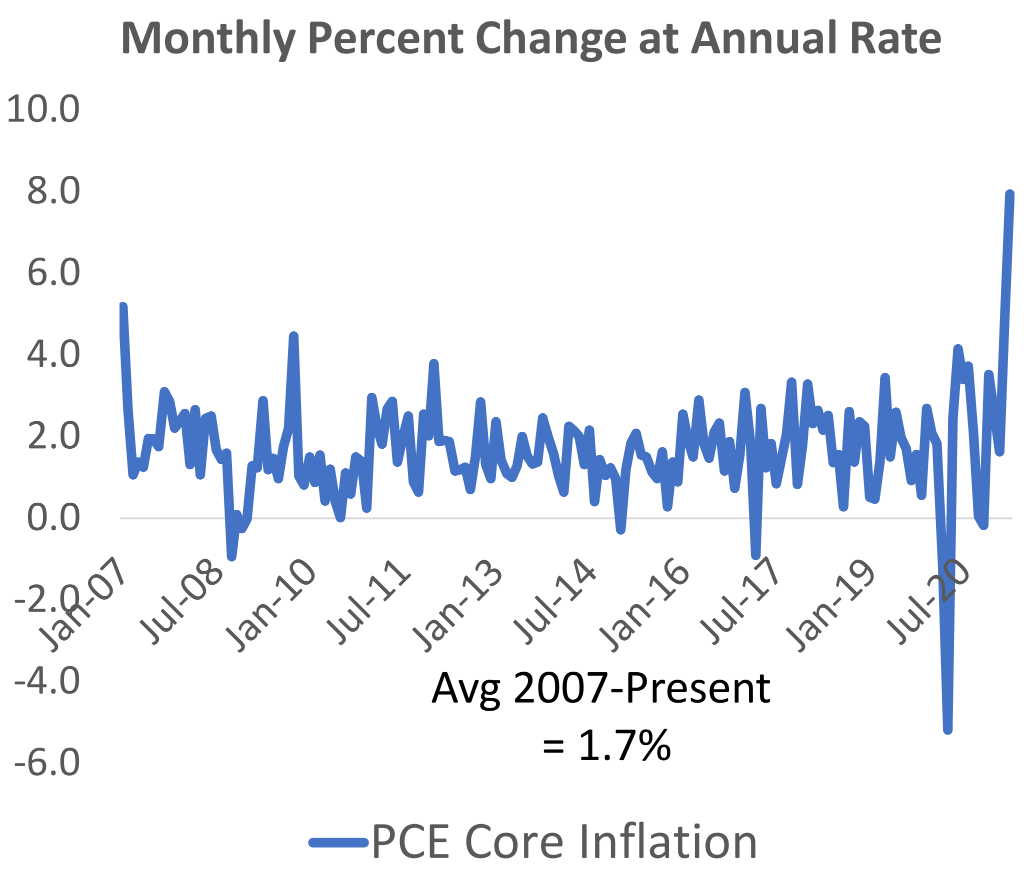
- Economic fundamentals still matter much less than COVID. Country-to-country differences in economic performance mostly reflect COVID and the timing and duration of outbreaks, the public health response, and uneven vaccine distribution.
- The IMF forecasts a global GDP growth turnaround of 6.0 percent in 2021 and 4.4 percent in 2022
    - On the IMF's list of economies shown earlier, China stands alone in 2020 with growth in 2.3 percent, followed by a strong 8.4 percent next year
    - As bad as was, the -3.5% decline for the U.S. is among the among the smallest for developed countries, and the projected recovery is among the best at 6.4%.
    - Developing and emerging economies are a mixed bag: Brazil and India are still in the grip of a bad virus outbreak; China, South Korea, and Indonesia defeated the virus early and lead recovery; the poor countries with limited or no access to a vaccine and poor public health systems will continue to suffer and see slow global growth
- The initial global fiscal response was $12 trillion dollars and a near-universal monetary response with deep rate cuts, massive liquidity injections, and central bank asset purchases. The U.S., Japan, and other countries have continued to add to the total fiscal response

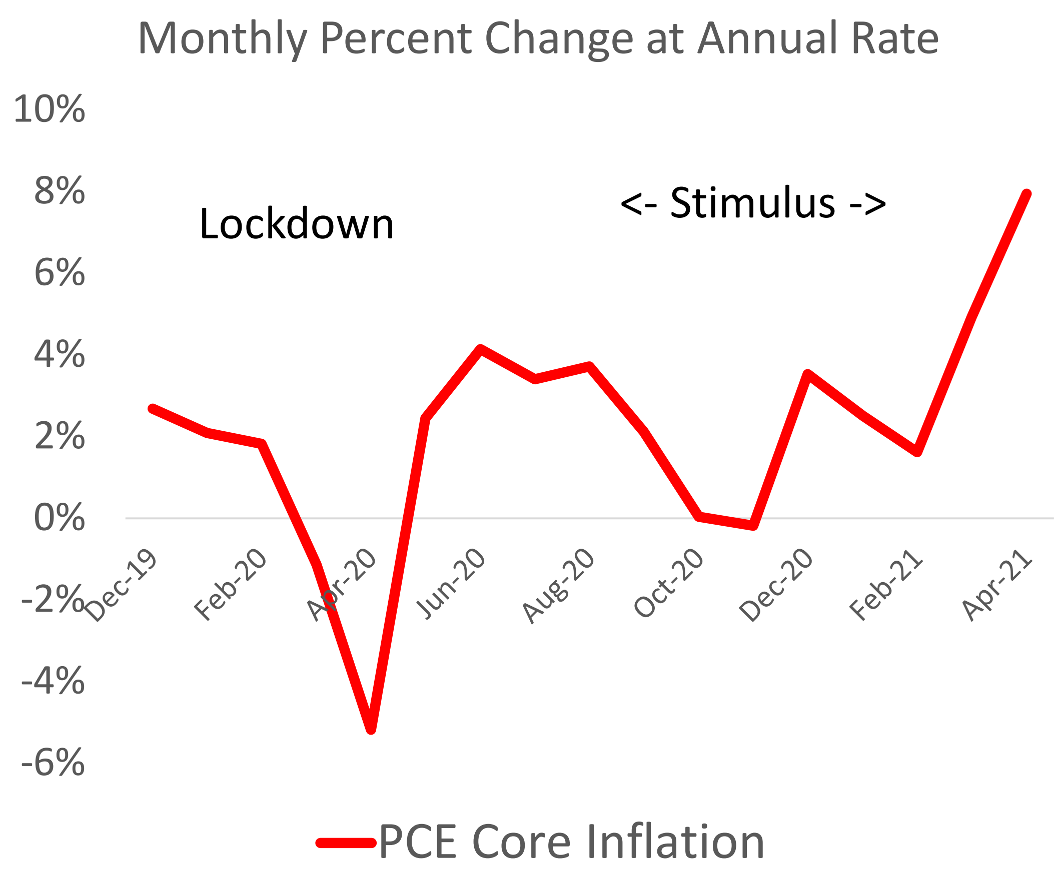
Is Inflation On the Horizon?
Too Much Money Chasing Too Few Goods?

Will the Current Short-Run Surge in Prices Become Durable Inflation?

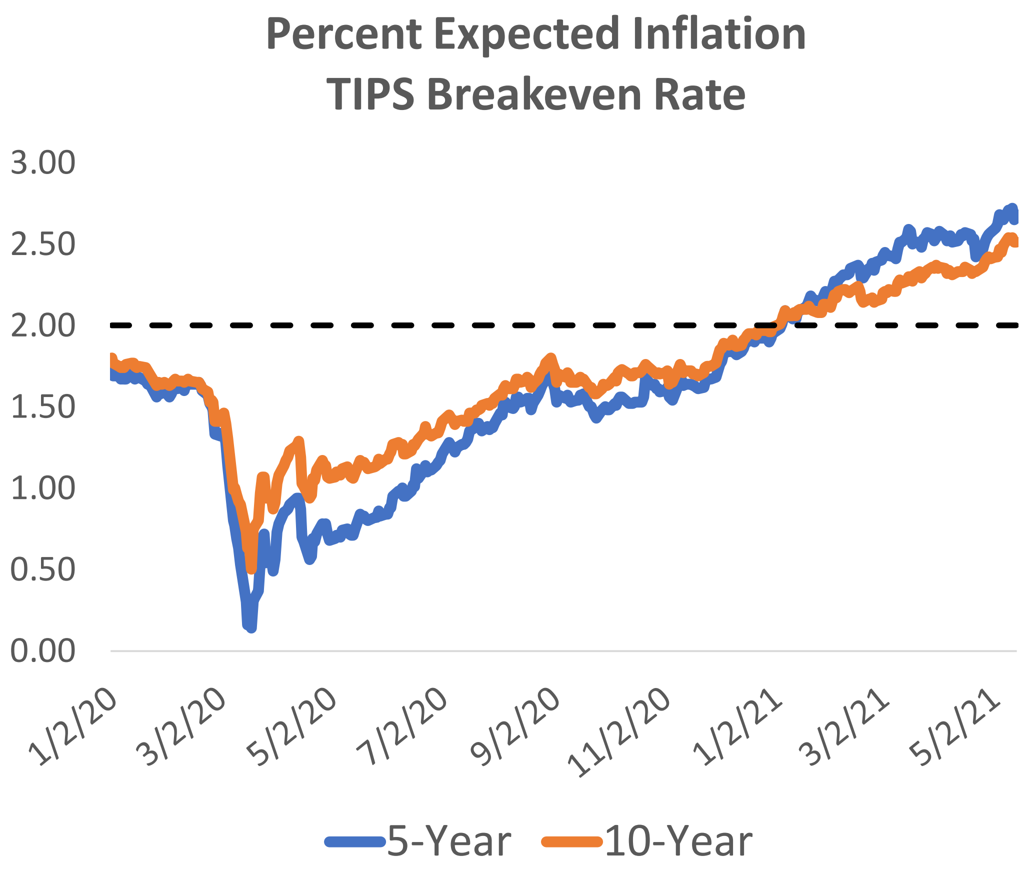
- There is already \$5.4 trillion (\$2.7+\$0.9+\$1.8) in federal stimulus in the pipeline. How many trillion more to come in infrastructure or social spending?
- With COVID recovery we are seeing a strong short-term surge in price increases as the economy recovers and stimulus: copper, soybeans, semiconductors, oil, chemicals, household rents, …
- Inflation is a general rise in prices *that is embedded and sustained over time*. Consumer *price increases lead to wage demand increases, wage increases force business to increase prices, … and a wage-price spiral is underway*

Since January, the Prospect of Recovery Has Seen Inflation Surge: 7.9% Annual Rates for PCE in April





Where Does Inflation Go From Here?



- June expected inflation by consumers according to the U of Michigan consumer survey is 4.0% over the next 12 months
- Survey of Professional Forecasters says 2.8% this year, 2.2% in 2022 and 2023
- Breakeven TIPS rates say 2.5 percent annually over the next 5 years and 2.4 percent over 10 years
- Measure this against a two percent *average* Fed target rate

We Have Seen Inflation in Modern U.S. Economic History … And It Was Ugly

- 1965 = 1.6%; 1970 = 5.7%; 1974 = 11.0%; 1980 = 13.5%, 1983 = 3.2%
- What caused this outbreak? It was a classic wage-price spiral …
  - 1960's deficit spending on the Viet Nam War and the Great Society – both guns and butter
  - Two oil price shocks in 1973 and 1980 hit consumer's pocketbooks hard
  - Nixon wage-price controls tried to break the spiral and failed
  - The Federal Reserve ends the spiral by raising interest rates – the 10-year treasury hit 13.5% -- and inducing the sharp and deep 1982 recession
- Today the Fed has committed to letting prices run moderately above two percent for a period, but also committed to intervene with higher interest rates if inflation rises far or for long above two percent

Inflation Coming or Not? Economists Need to Be Humble

- The 15 years before the pandemic saw inflation run at an average of 1.7 percent. *Technology and globalization* brought downward wage pressure and lower prices
- Demographics works might work to tighten domestic labor supplies now? Tightening due to surge in COVID retirements of Baby Boomers and an on-going baby bust. Could it set up a wage-price spiral?
- Larry Summers is the famous face of potential problems ahead. But he is hardly certain about the outlook: *a one-third chance* nothing happens, *a one-third chance* stagflation or a combination of 5-6 percent inflation and limited growth; or *a one-third chance* the Fed must intervene seriously in the economy

Infrastructure Spending is Less About Growth and Economic Impact, And More About Careful About Taxing and Spending Federal Money

The American Jobs Plan Is Billed as An Infrastructure Program

- The original proposal $2.3 trillion over 8 years to 2030. Mos*tly funded by corporate tax increases*
- Maybe $1 trillion is directed to building projects and traditional infrastructure, with the rest a hodge-podge of objectives
- As of last weekend, senators advanced a bipartisan proposal to spend $974 billion, 40% paid for from repurposed COVID funds. No word on how to pay for the rest of it. Presumably, it is mostly traditional infrastructure

What Is In the Proposal?	
Roads/Bridges/Public Transport/EV Charging	$621 B
Home/institutional care for aged and disabled	$400 B
Expand domestic manufacturing/business	$300 B
Build and Retrofit Existing Buildings	$241 B
R&D (NSF, Clean Energy)	$180 B
Education and Childcare	$137 B
Water Infrastructure	$111 B
Broadband	$100 B
Workforce Development	$100 B

Thinking About Federal Spending More Generally: It Has a Limited Impact on Growth

- *Short-Run Impacts on Growth*
  - Only about $1 trillion of this proposal is devoted to buildings and infrastructure. But even infrastructure is rarely hammer ready. The rest of the proposal (R&D, education, etc.) is spread over a decade and few short-run impacts
  - For most federal spending, state and local governments will cut their spending as soon as they see the federal dollars directed their way, immediately cutting the impact of the new federal dollars by one-third (Congressional Budget Office 2016)
- *Long-Run Growth = Productivity times Labor Force*
  - Overall federal investment spending has a rate of return about half that of the private sector. Much of it is devoted (as it should be in many cases) to noneconomic quality of life, distributional, and other social targets (CBO again)
  - There are obvious infrastructure needs like crumbling bridges and air traffic control systems, ***but choosing the objectives need to be highly selective and directed carefully for economic benefit***

Tax and Spend? How You Tax Matters

- There are three ways to finance the projects: deficit financing, raising taxes, or cutting less productive federal programs
  - Running at or near economic capacity, the only path to positive economic impacts from federal investment is to cut (wasteful) federal spending
  - The cost of financing the debt from deficit spending will typically swamp any growth effects
  - Raising taxes is typically a diversion of private sector funds to the less productive public sector
- The choice of the corporate income tax is widely viewed as a bad one by most public finance economists
  - Original Biden proposal would raise the corporate income tax from 21% to 28% while closing many loopholes
  - It is a double tax on the owners of the company that have already paid taxes on dividends and capital gains
- Short-run GDP from the original Biden proposal in 2022-23 might grow 0.8% to 0.9% at best (Oxford Economics)
- Long-run GDP in various future periods of 10 to 30 years is modestly negative over all time periods (Penn Wharton model)

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REGIONAL FORECASTING

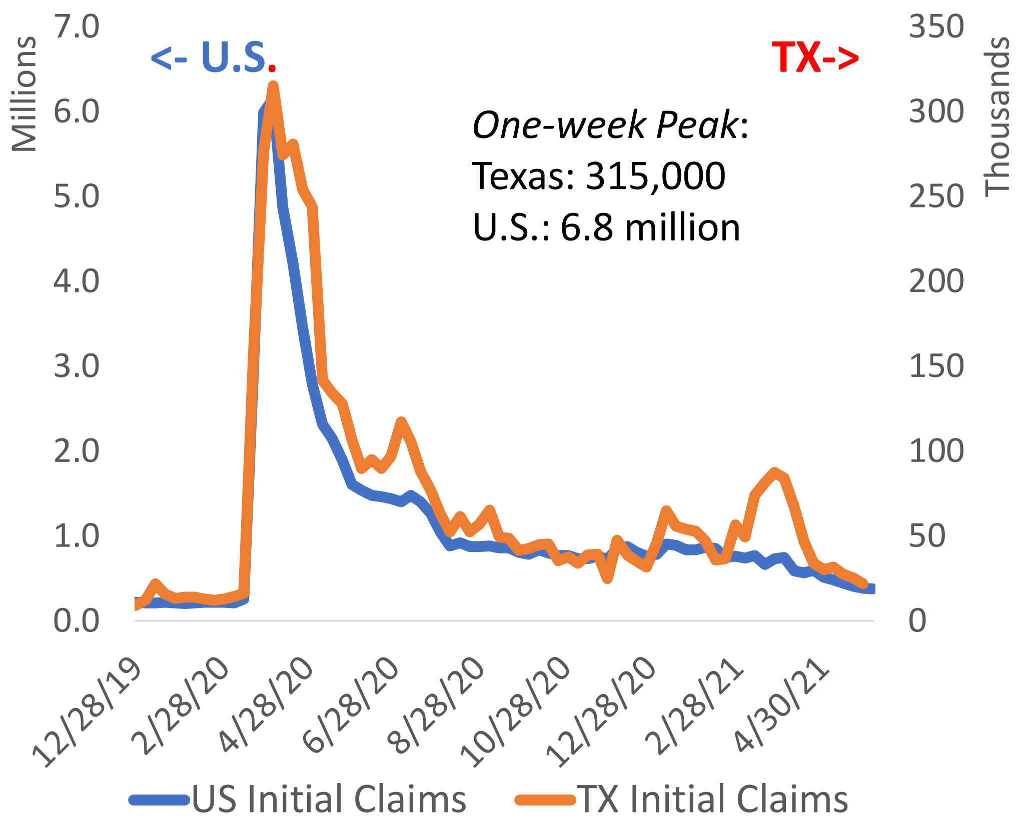
Houston After COVID-19:
Taking Stock And Looking Forward

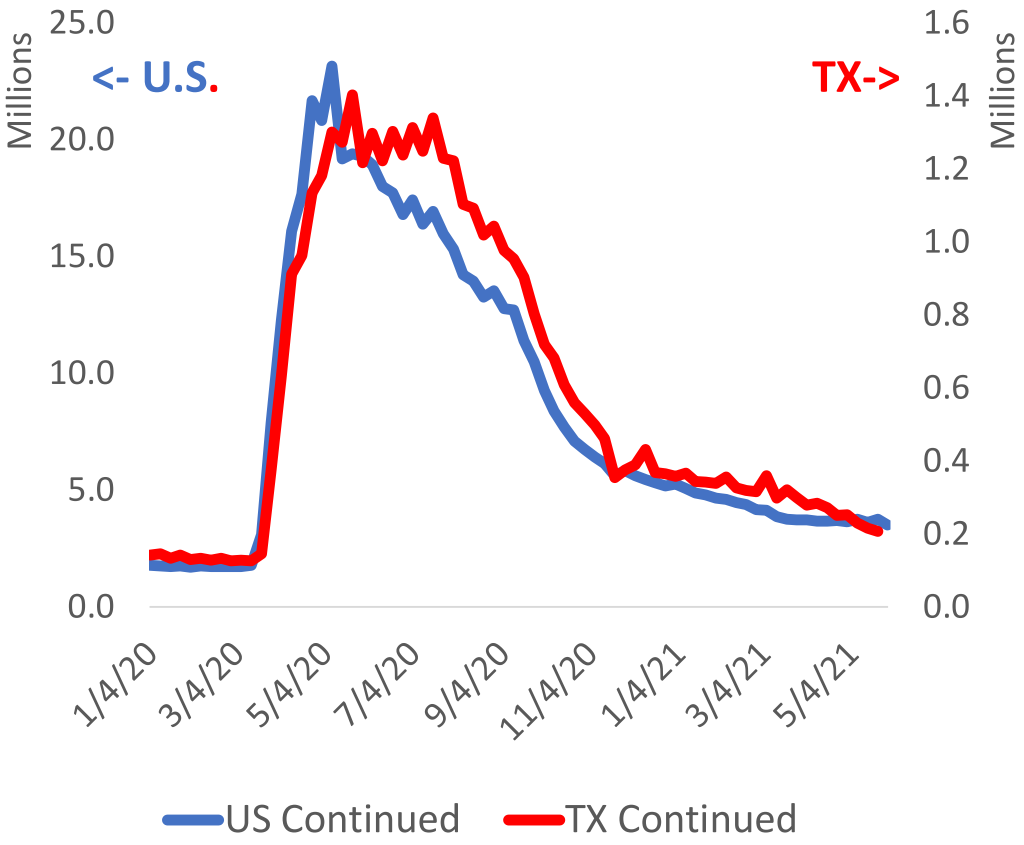
Robert W. Gilmer, Ph.D.
C.T. Bauer College of Business
June 2021

Taking Stock

- ***There is much to celebrate***
  - The vaccine works and is amazingly effective
  - We expect coming months to see rapid economic recovery with millions of Americans returning to work, hundreds of thousands in Houston
  - There is a promise of a normal life for all of us on the immediate horizon
- ***BUT …***
  - We have already lost 15 months of economic growth, and we are still struggling to return to the March 2020 starting point
  - It will be 2022 before the U.S. or Houston recovery in jobs and other economic measures can be complete
  - Once renewed economic expansion begins, the oil industry presents Houston with big problems that were set aside by the pandemic. These problems mean slower *long-term* growth for Houston's economy

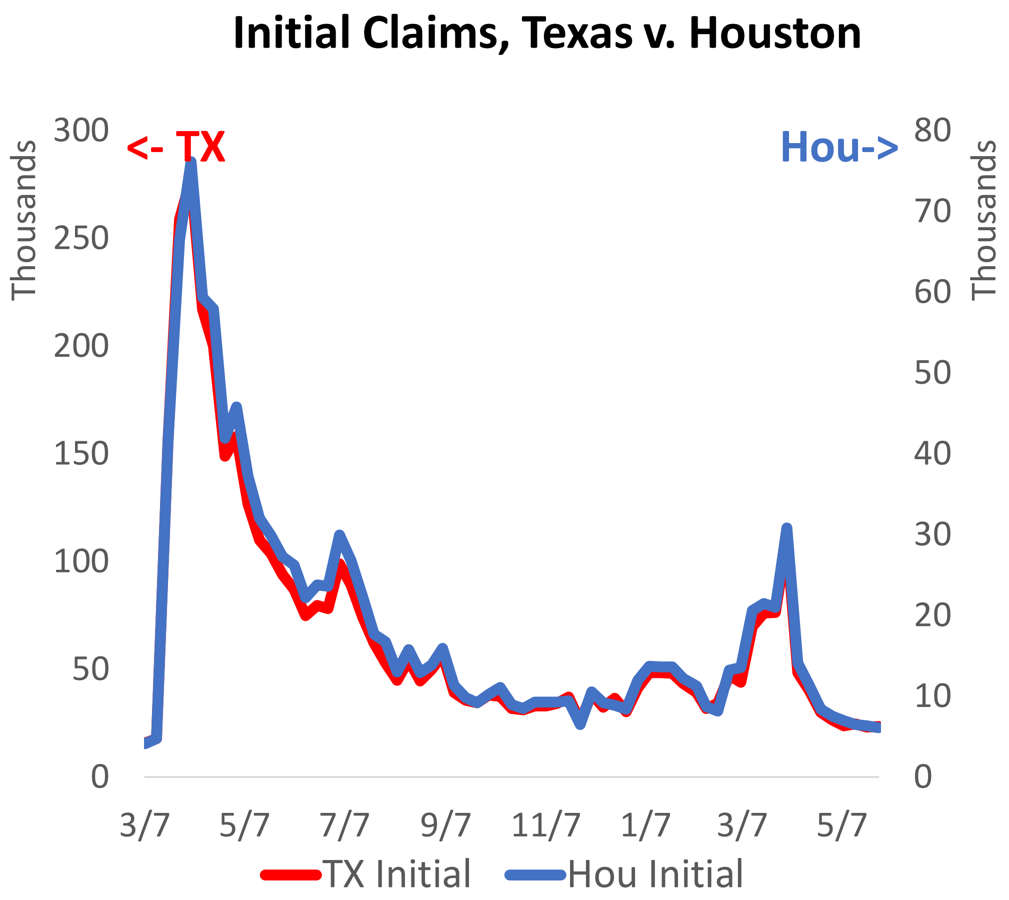
Initial and Continued Claims for Unemployment: A Similar Pandemic Response in Texas and U.S.

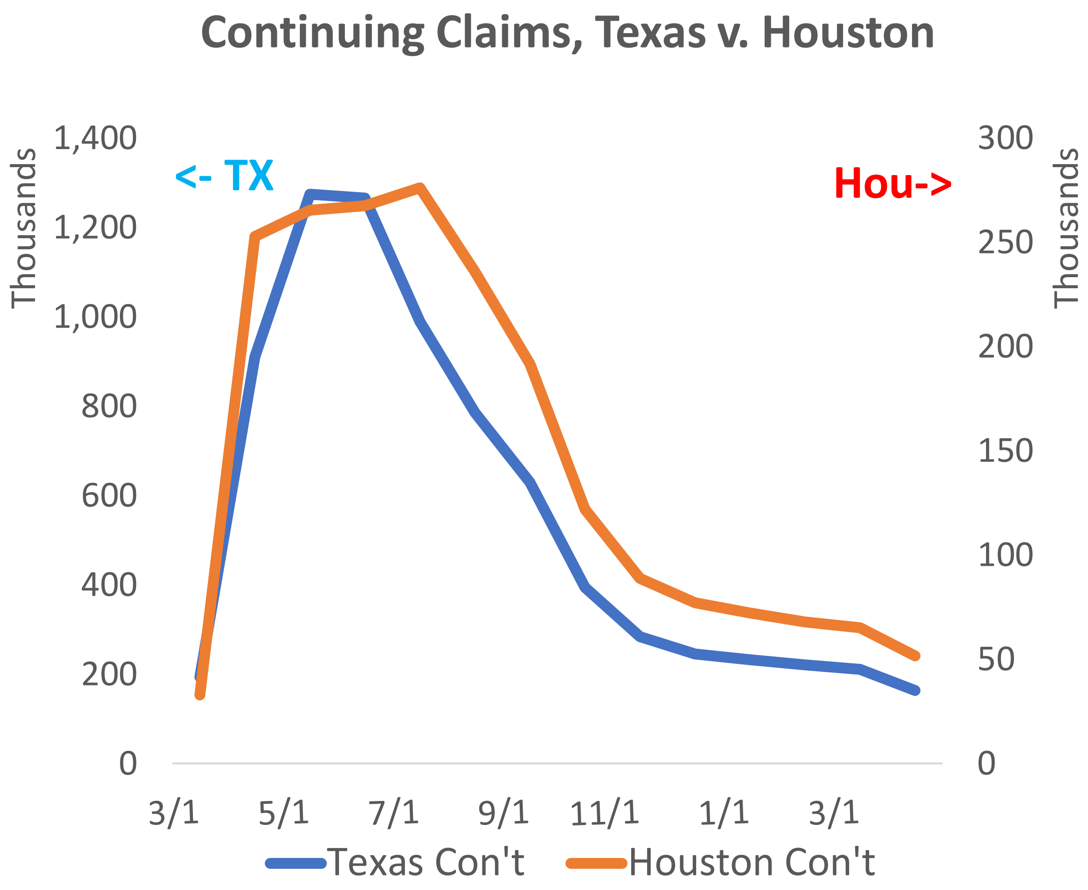




FRED, St Louis Federal Reserve Bank. State unemployment programs under the Unemployment Compensation Program

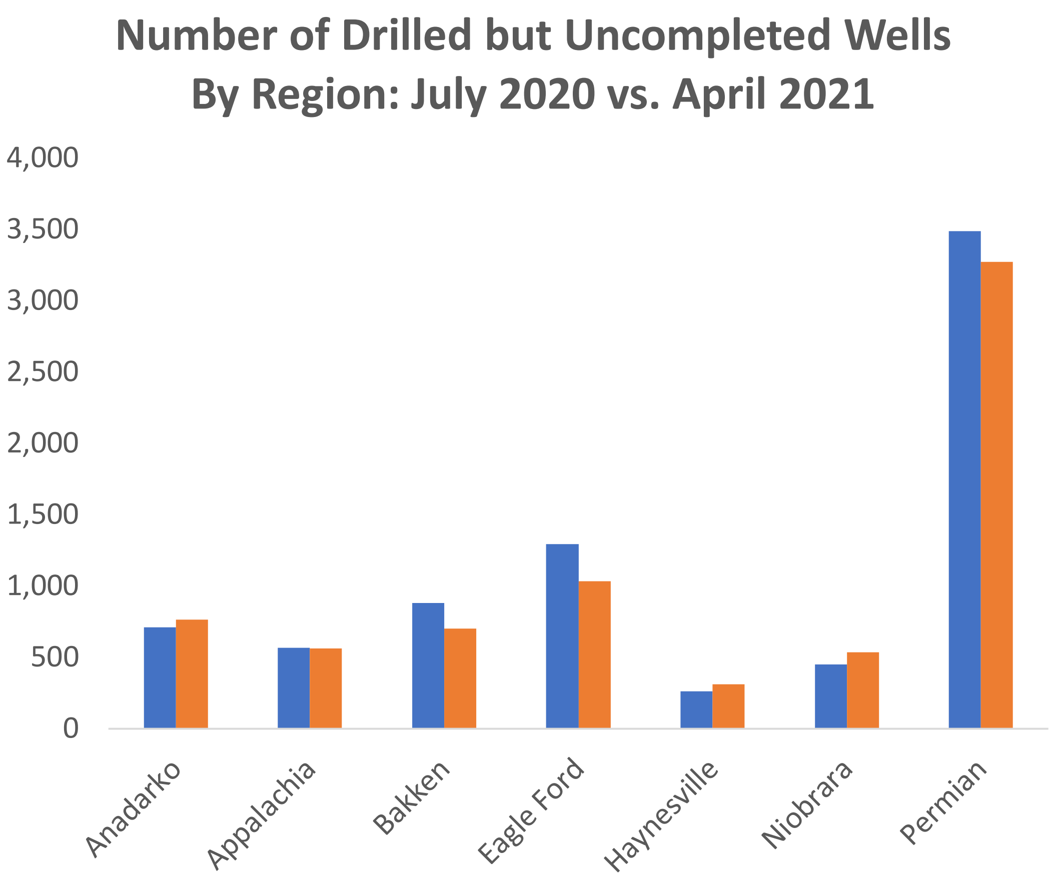
Initial Claims Behaved the Same in Texas and Houston: Local Continued Claims Lag the State By a Month

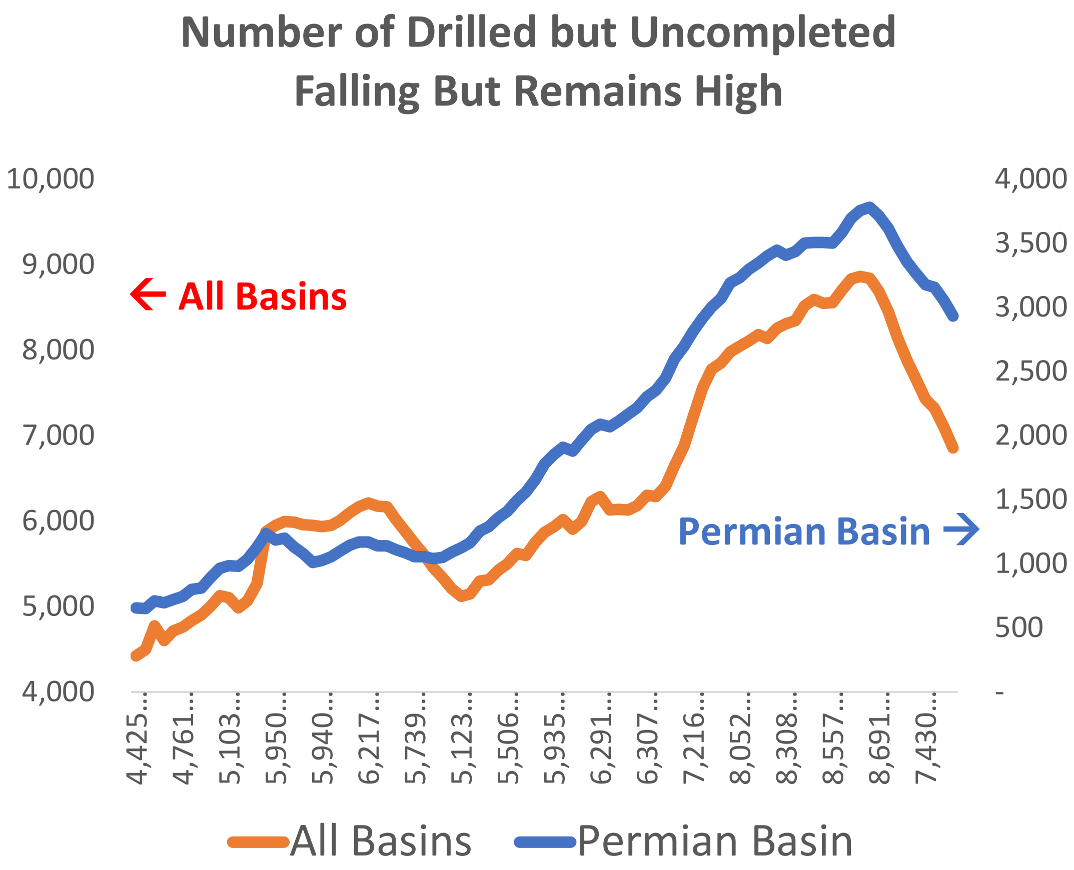




TWC Initial claims for Houston are the 9-county metropolitan area; continued claims for Houston are for the 13-county Gulf Coast Workforce Development Board, including the metro area plus four small counties with less than 2% of 13-county claims

Drilled But Uncompleted Well Inventory Falling, But Still Leading the Early Recovery in the Oil Fields

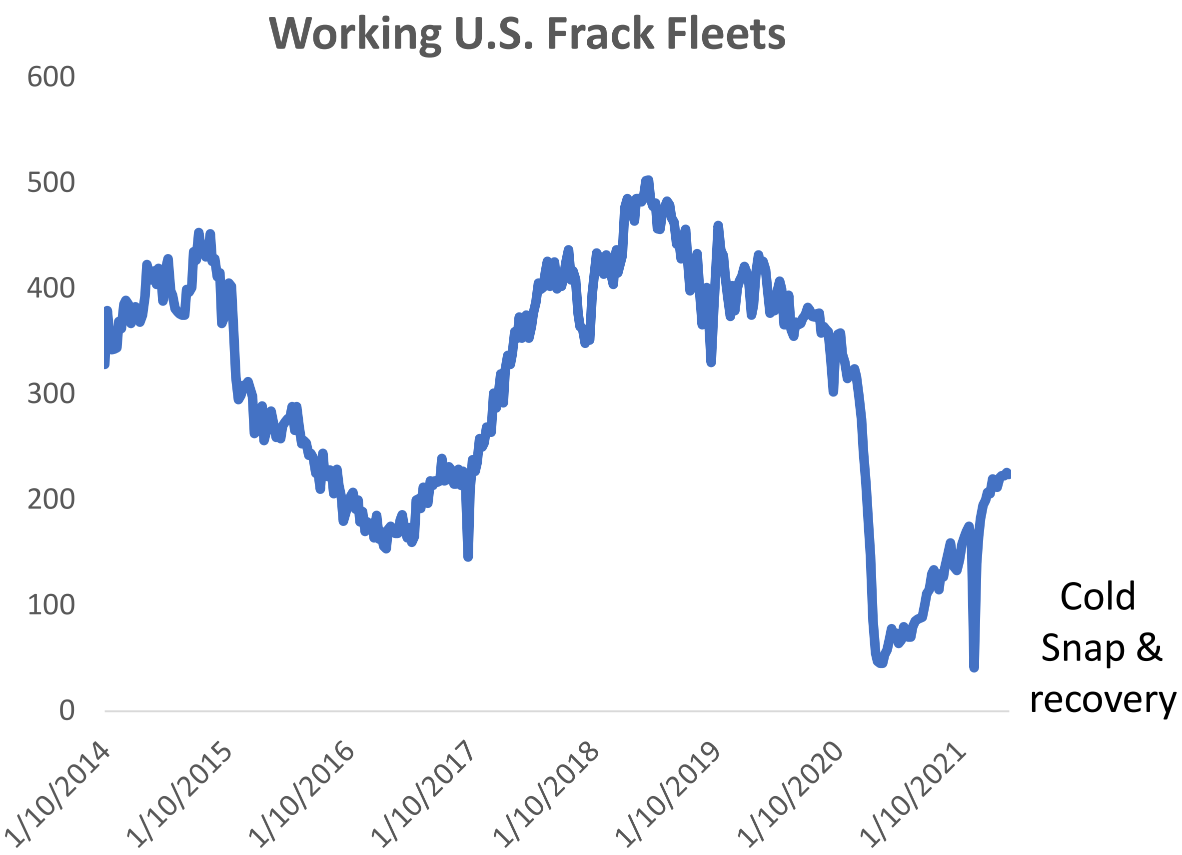




DOE/EIA, *Drilling Productivity Report*, May 17, 2021

Fracturing and Completion Is the Quickest Way to Replace Reserves and Earn Cash

- To the right, you see the number of fracking fleets at work to fracture and complete wells that have already been drilled
- The first meaningful signs of oil-field recovery were in early June as the number of fracking fleets rose from 45 to 187 by March of this year
- Drilling is a separate process from fracking and completion and incurs costs that are like drilling
- Sunk cost of drilling makes this the quickest and least costly avenue for producers to replace reserves and earn cash



Primary Vision data through May 28, 2021