CalPERS Trust Level Review
Economic and Market Overview

Period Ending December 31, 2018

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Investment Committee

February 19, 2019

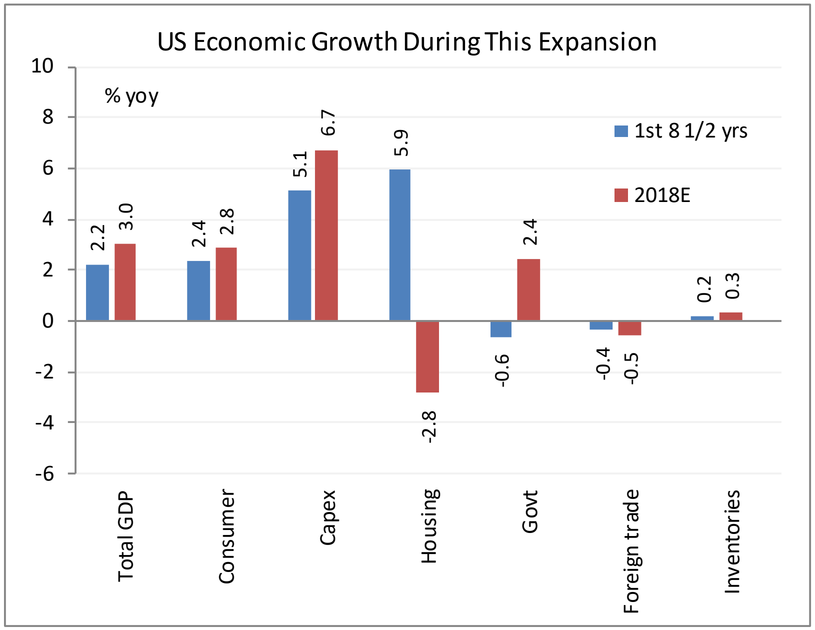
CalPERS

Trending

Positives tend to be more backward looking

Positive	Same Trend	Negative
- US jobs market 18: labor supply kept up with strong demand. Less involuntary part time and more quitting for better jobs. **- US GDP growth accelerated** 3.1%E during '18 vs expansion averaged of 2.2%, on fiscal and global impulses. **- Improved supply side** 2018 labor force +217K per month. In first 3 qtrs of '18, hours worked and productivity combined +3.8% saar. **- US consumer: spending, cushion, sentiment** Stable at 5% growth, with only small drop in savings ratio. Lower personal taxes gave one-time support. **- Small businesses remain determined to build** To expand and hire … despite difficulties in finding qualified workers. **- Resilient US corporate earnings and sales** 2018 saw +5% sales, +8% profits S&P500 ex Fin/Energy. Not too far below 8%/12% during 2017. **State and Local** 7 year high in state revenue growth supported improved S&L construction and hiring.	**- US leverage** US non financial debt is stable at ~250%/GDP, right through the expansion **- External imbalances** Stable US external deficit (2 to 2.5%/GDP) broadly matched by combined surplus of Euro area, Japan and	**- Soft US housing and credit, no capex uplift** Dip in US housing, mortgage and other credit markets, and no acceleration of aggregate business capex. **- Maturing business cycles meet demographics** US, Japan reaching expansion records. Demogrpahics worsening in Japan, China, Europe. **- World Trade, PMIs etc** World trade pre-tariff boost followed by sharp drop away; so have PMIs, truck tonnage etc. **- US debt trajectory and ceiling** Going into '20 election year, resolution of debt ceiling and mini fiscal cliff will be difficult. **- QEnd** QE unwind meets still rising debt, esp. in EM and some DM markets ($bloc, Scandi housing, US businesses). **- Negative sum game trade wars** Significant misunderstanding of trade imbalance drivers ignites policies where everybody loses. **- Heightened Political Uncertainty** Nationalism and bloc realignments create uncertainty that bleeds into the economic sphere.

2018 was a good year for the US



Consumer – one-time impact from lower personal taxes but possible bleed into 2019.

Capex – acceleration has been underwhelming.

Housing – reasons for its smaller role in this cycle.

Government – S&L/ defense lead the way and has momentum into 2019 (TCJA17 then BBA18).

Foreign trade – a drag due to desynchronized growth and pre-tariff goods flows.

US GDP grew by an estimated 3.1% during 2018, vs the expansion average of 2.2%.
The chart above shows the contributions to what is expected to be a temporary uptick in growth.

"So What" for Markets

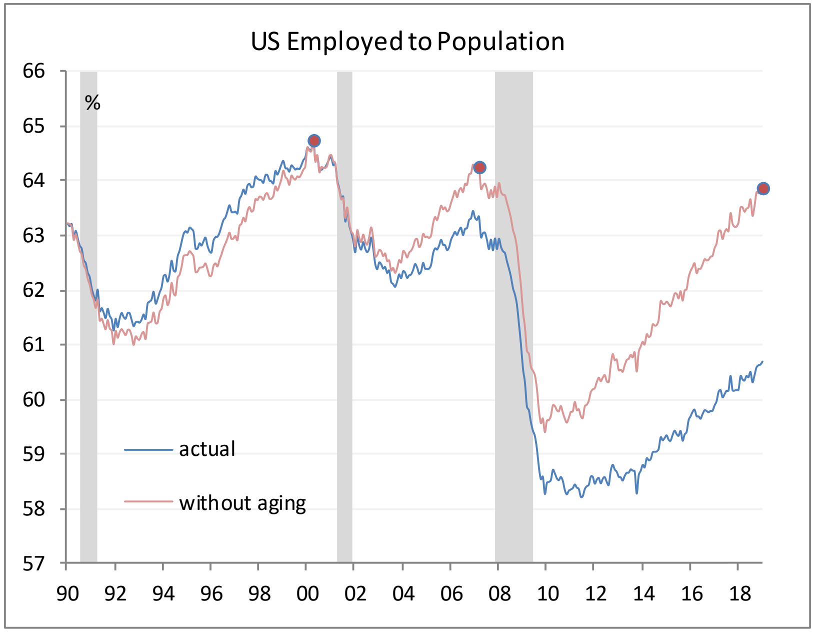
Why?

- ❑ Crowding Out
- ❑ CB takes away the Punchbowl
- ❑ Markets are forward looking
- ❑ Don't forget Rest of World
- ❑ "High-pressure" growth could compress business cycle

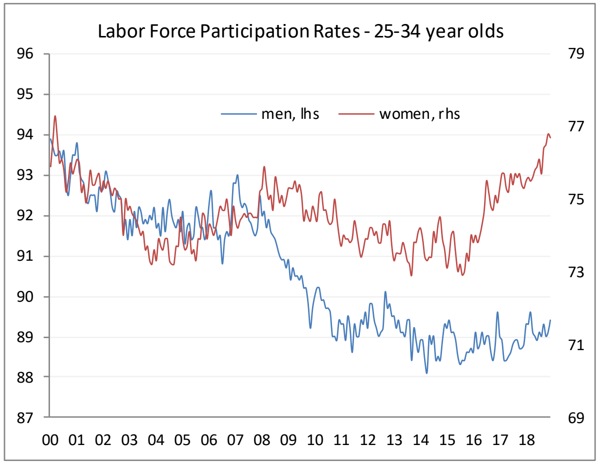
Topic: Have Administration policies compressed or extended the US expansion?

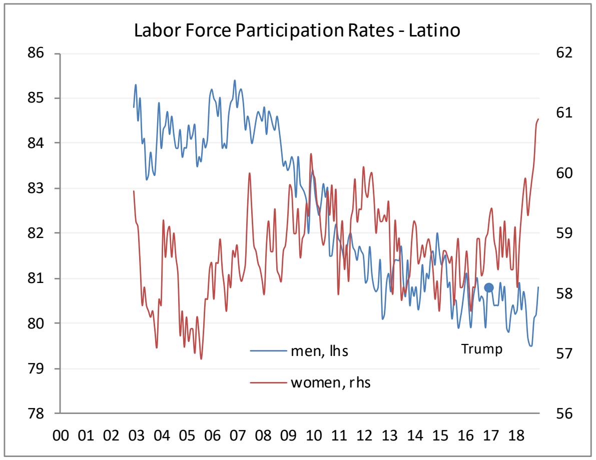
- ❑ Demand vs Supply.
- ❑ ‘Sugar high’ vs ‘Tax Reform’.
- ❑ 2018 was a good year for supply side.
- ❑ Watch …
    1. Labor force participation;
    2. Productivity;
    3. Fed “flexibility”.

(a) Labor force participation



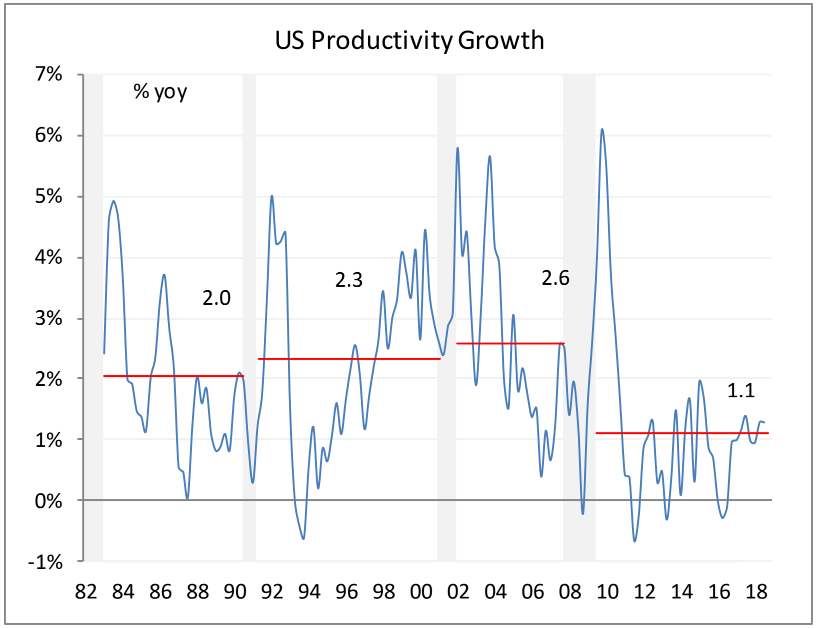
Adjusted for demographics, upside in US labor force may be limited

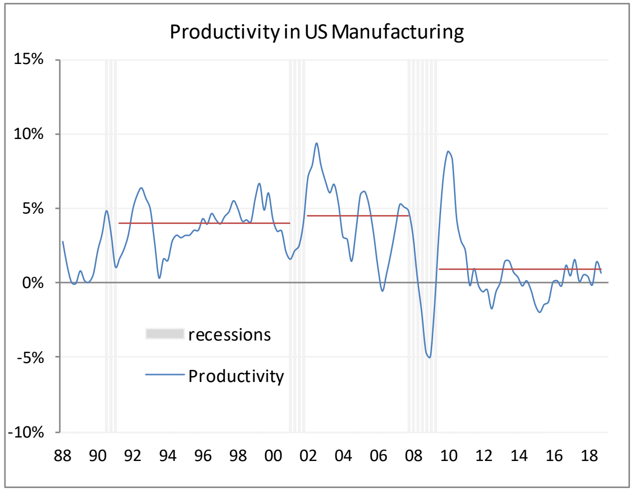




Participation by males continues to lag

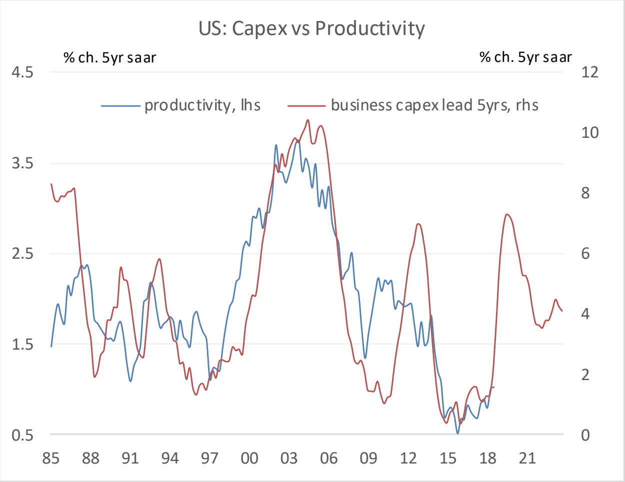
(b) Productivity





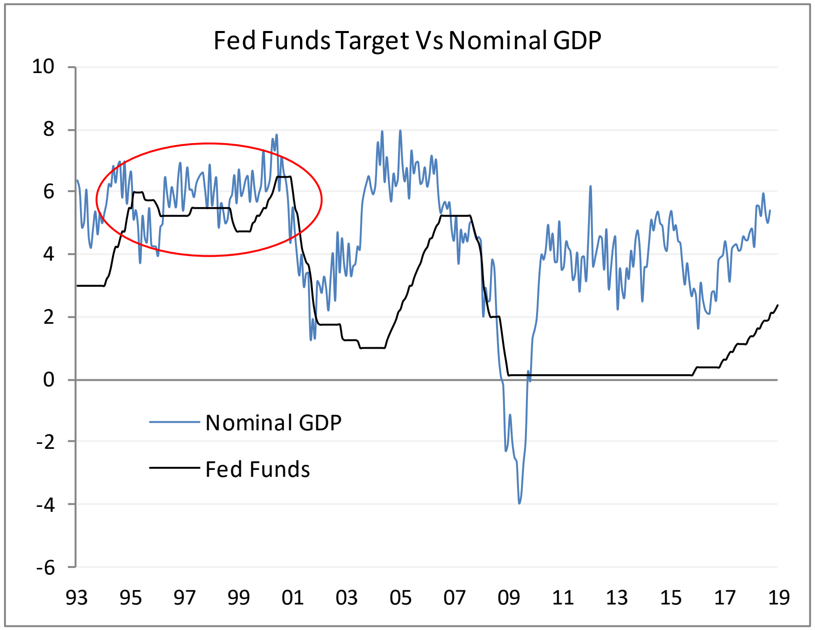
Early stage of manufacturing rebound has been hiring new workers.

The current economic expansion is characterized by low measured productivity growth.

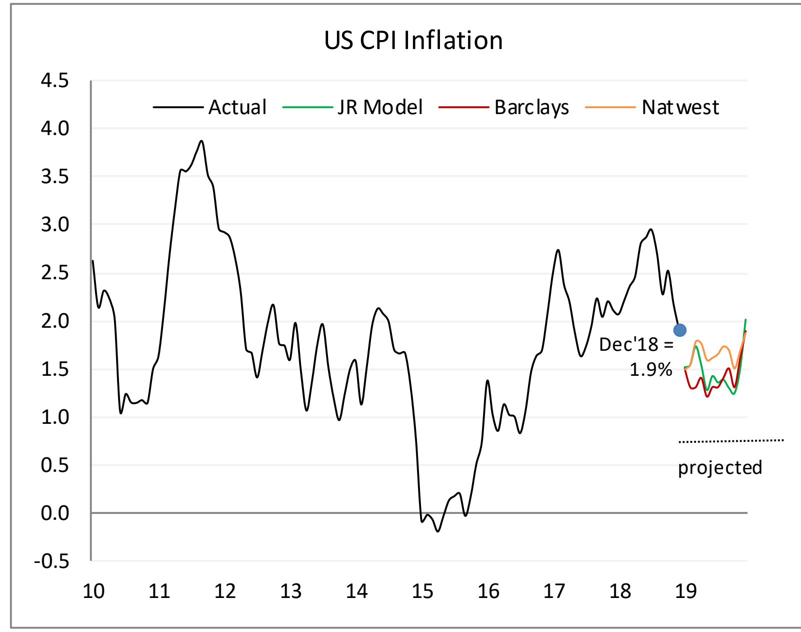


It's *possible* that past capex improvement will deliver a productivity boost

(c) Fed flexibility

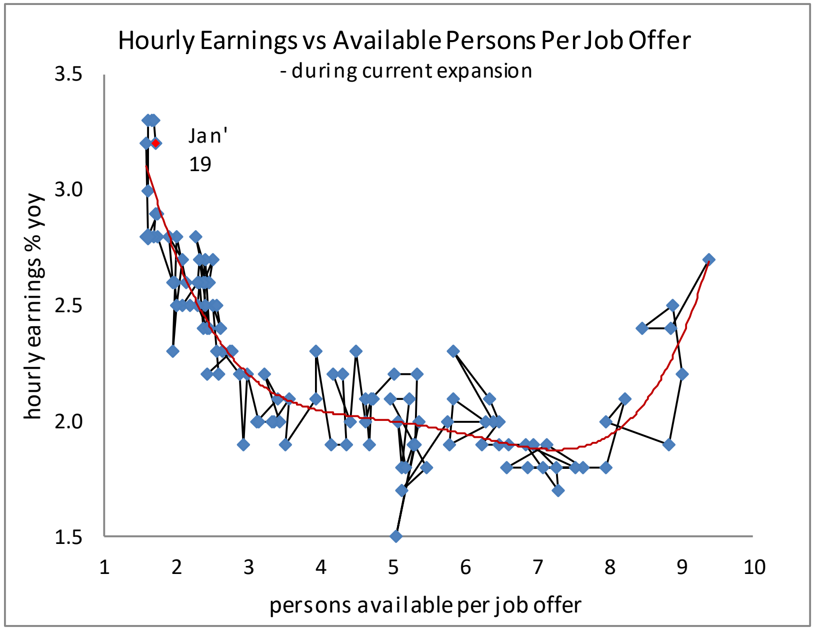


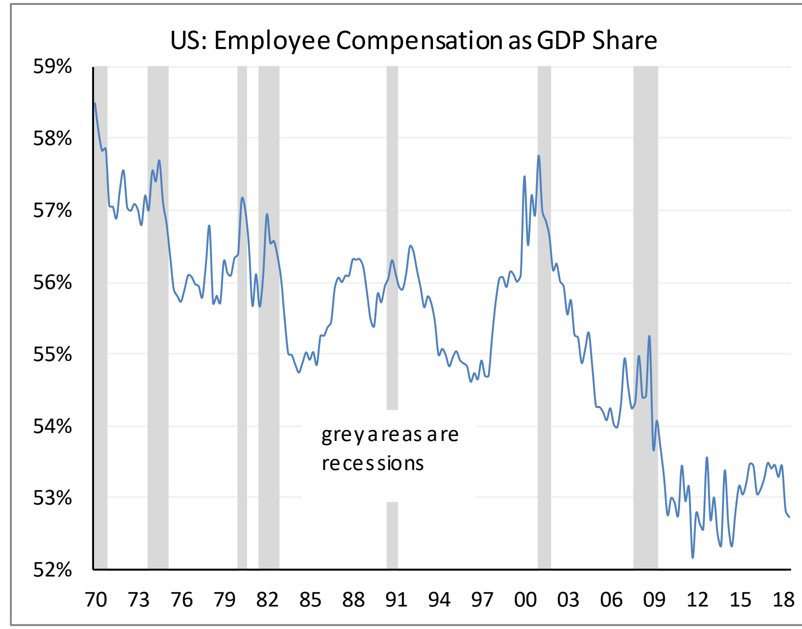
Greenspan's Fed was able to cut rates twice during the 1990s tightening cycle in both '95 and '98



Benign inflation, if realized, would help Fed's flexibility on rates

Wage inflation unlikely to 'alarm' Fed





Wages growth in the economy is finally accelerating as the jobs market tightens. That said, employee income as a share of the economy is still very low

Challenging backdrop for economies/ markets

Ageing business cycles

- US expansion is within months of a record 10 years.
- Japan's expansion just reached post-WW2 record 74 months.
- Euro Area's expansion is a relatively short six years to date. But the current slowdown is not in the PIGS, but the Big 3. Europe can no longer rely on US growth as a catalyst for its own growth.
- China growth slowdown appears deeper than the official data show.
- There is less runway for policy calibration

Trade engagement, US debt trajectory and pockets of leverage concern, QEnd policy errors, and European populism.

Challenge: Ageing Business Cycles

US Business Cycle assessment

Labor Market	Early	Late	%
Want A Job per Job Offer			98%
Unemployment Rate			95%
Small Business Hard to Fill			100%
KC Fed Labor Market Conditions			12%
Emp/Pop ex aging			83%
Activity	**Early**	**Late**	**%**
National Activity Index			34%
Personal Savings Ratio			61%
Consumer confidence			76%
Real Personal Disp. Income			35%
US Yield Curve (2yr vs 10yr)			82%
Quarterly	**Early**	**Late**	**%**
Profit share of GDP			25%
Current Account/GDP			40%
Leverage less core CPI YoY			31%
Net Worth/DI			100%
Housing affordability			57%

United States		
Mid	Late	Recession
Chicago Fed NAI	Fed tightening	
Real Disp. Income	Employed to Pop	
Personal Savings Ratio	Job Offers vs Pool	
Small Business Plans	Unemployment Rate	
Profit share	SBOI Hard to Fill	
Leverage + External	Consumer Confidence	
Household formation	Net Worth/ DI	
Late-mid	Output gap	
Housing Affordability	Yield Curve	
Labor Market Conditions		
Credit cycle		
Plans to Buy Home		

China	Japan	Europe
SOFT/ EASING	LATE	MID+
Elevated	Mid	Mid
Li Keqiang index	Economy Watchers	Credit growth
Steel output	Unemployment rate	Output gap
Cargo, rail, electricity	BoJ Policy	Consumption
Consumer confidence	Late	Employment
CNY TWI, SHIBOR	Output gap	U-rate
Decelerating	Tankan Factor Ut'n	ECB taper (Apr'17)
Fixed Asset Invest.	ESRI Leading Index	Late-mid
Exports, imports/ PMIs		Cap U
Monthly flows		H/H deposit growth
CPI, PPI		Unemployment
M2, TSF growth		Consumer Confidence
Flat to Neg.		Late
Residential		Markit PMIs
Car sales		Bus. Limiting factors
		EU ESI

External Manager Business Cycle assessment

US	EU	UK	JN	China
4	5	6	N/A	N/A
5	4	5	5	4
5	4	4	3	6
4	3	3 (4)	3	5 (4)
4	4	5 (4)	5 (4)	N/A
5 (4)	5	5	5	7
5	3	5	5	5
4	3	4	4	6

Early	1
	2
Mid	3
	4
Late	5
	6
Recession	7

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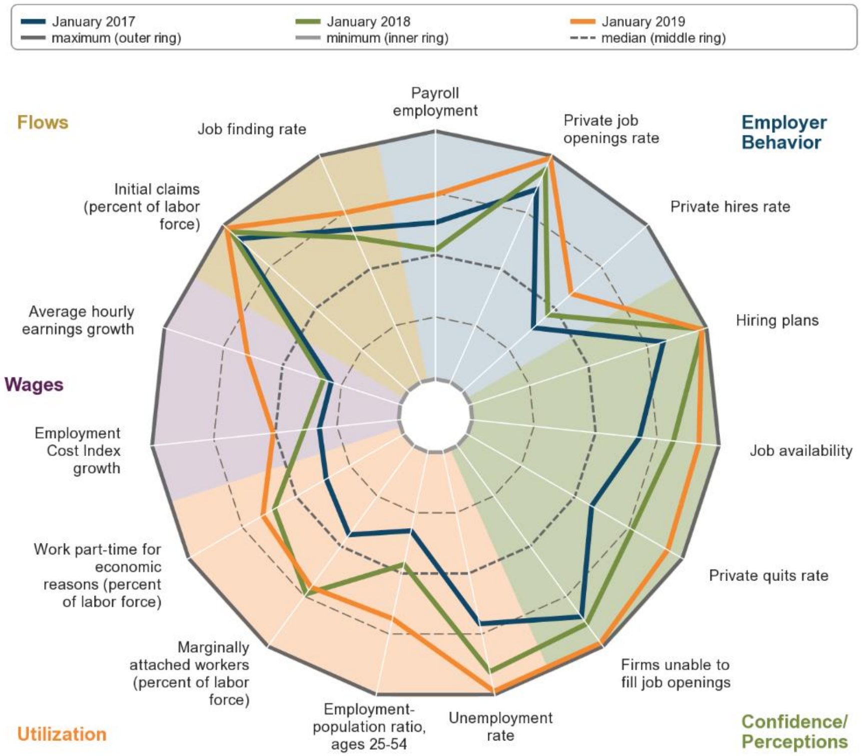
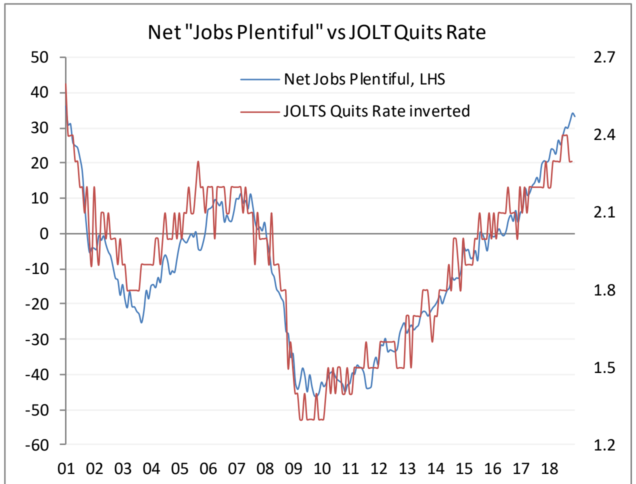
Challenge: US labor market constraints

Labor Market Distributions Spider Chart

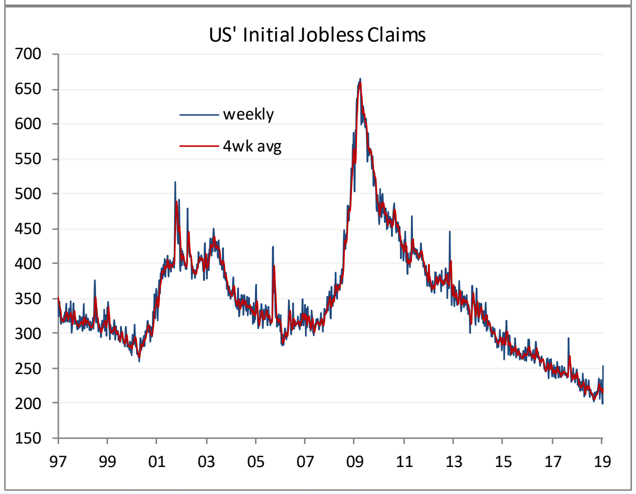
Data since March 1994



Some labor market indicators are pushing against post 1994 maximums.



Households see a strong sellers market for their labor.



Record low jobless claims

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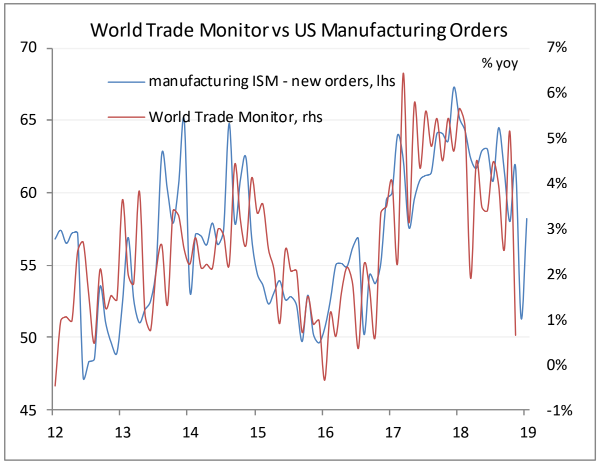
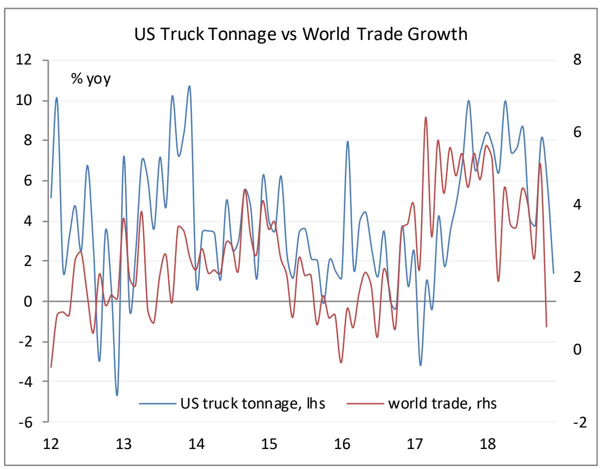
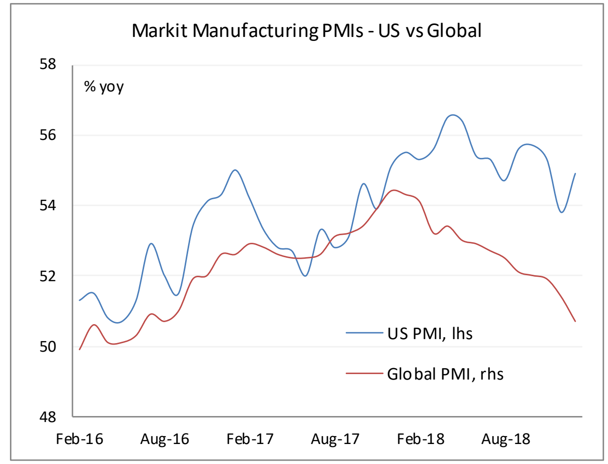
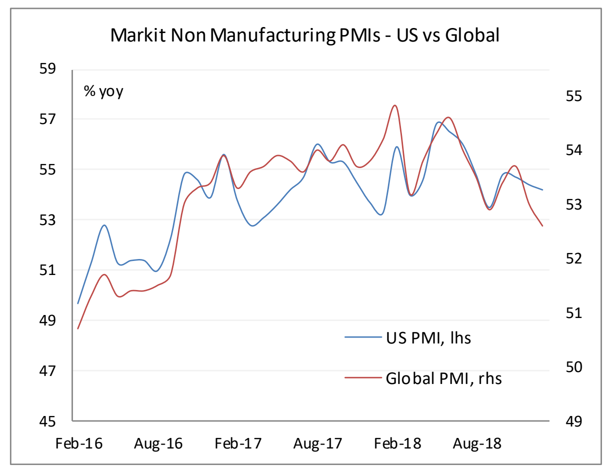
Challenge: Trade wars are a US own-goal





Boost to US from global trade faded into year end

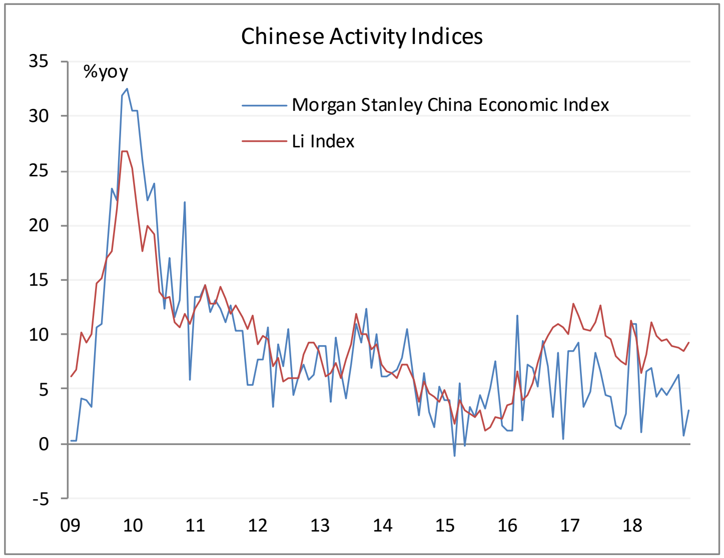




US divergence from rest of world has held up .. In manufacturing

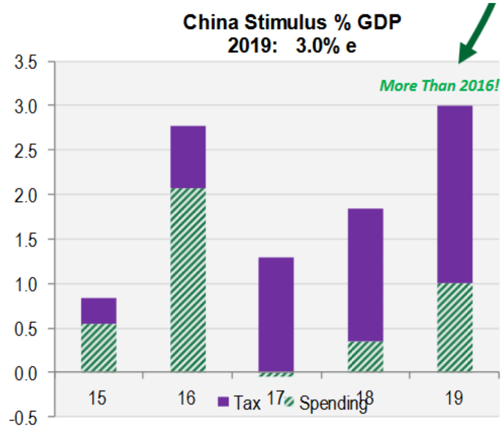
Challenge: China slowdown ….

Broad measures show pronounced slowing

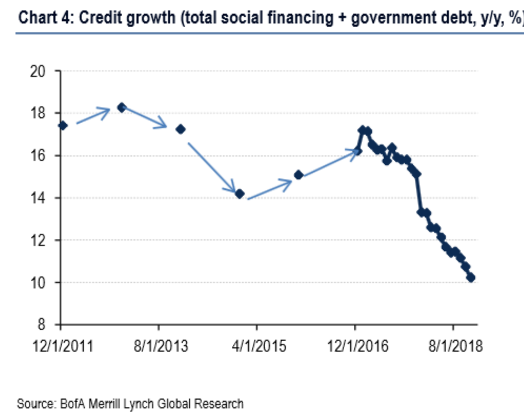


Official data show smooth soft landing to 6.4% but proprietary aggregations show much slower

Policy response has been incremental



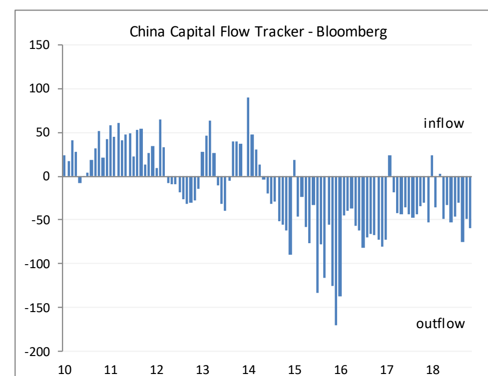
Fiscal expansion accelerates



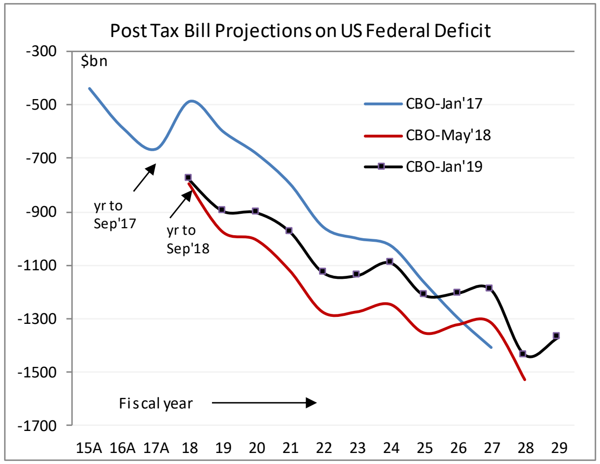
…and more room to accelerate credit

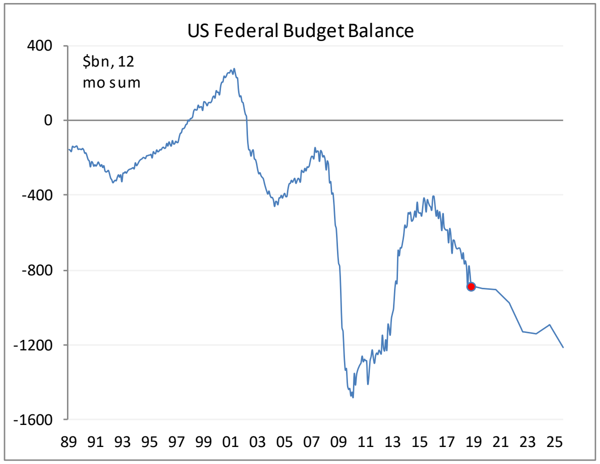
Impossible Trinity:

- Can China control capital outflows as it pulls policy levers?
- '14 reversal took two years

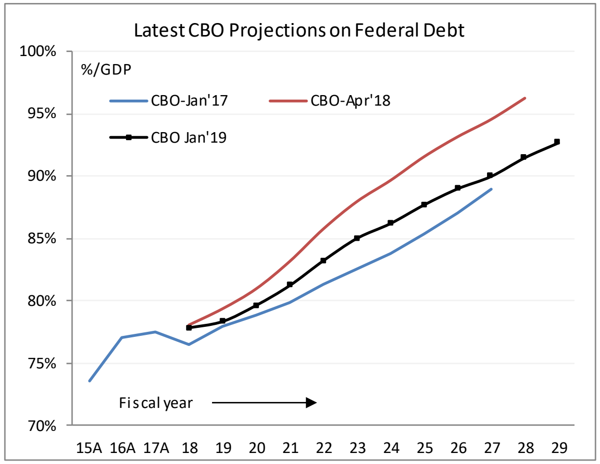


Challenge: US debt trajectory

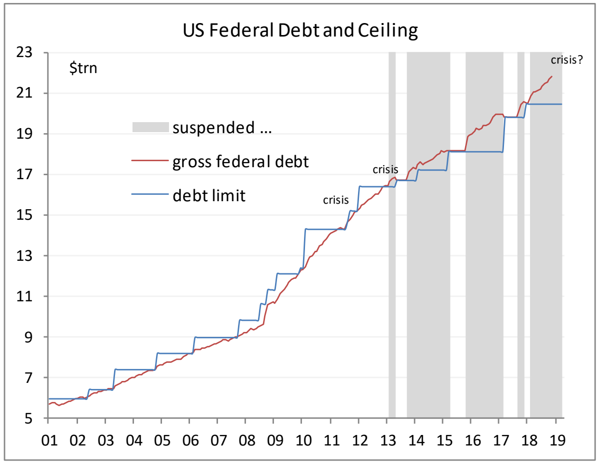




US tax packages (Tax Cuts and Jobs Act 2017 and Bipartisan Budget Act 2018 sharply increased prospective deficits



… although the January 2019 CBO update favorably modified future spending on emergencies and debt interest



Setting up focus this year on the US debt ceiling

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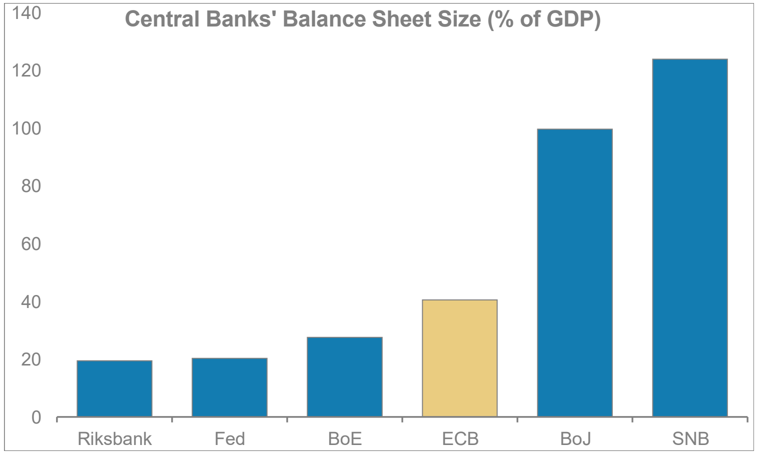
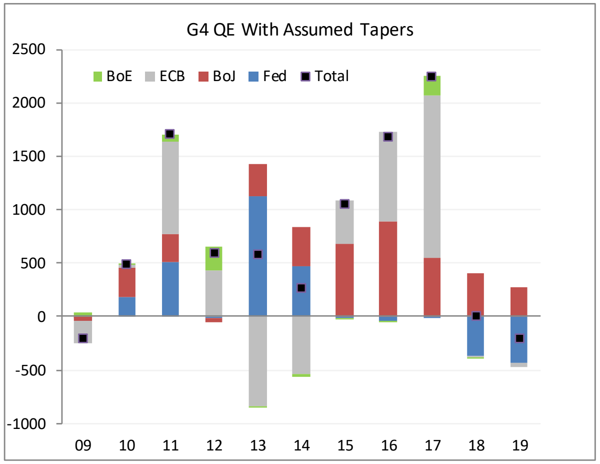
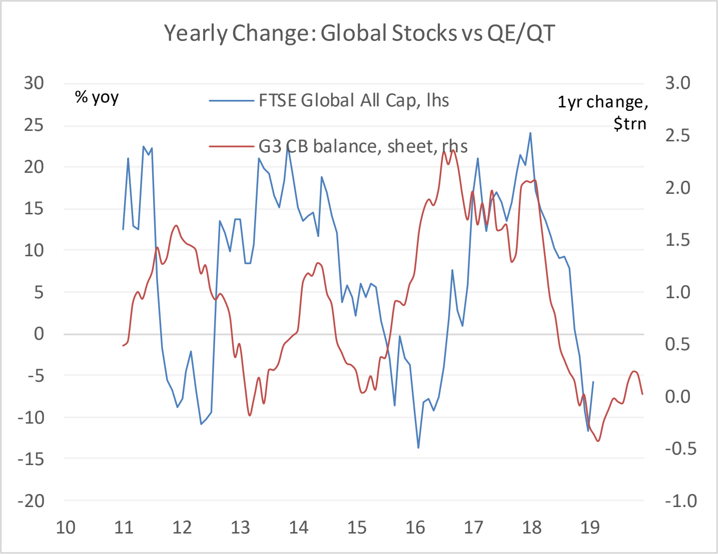
Challenge: Central bank liquidity withdrawal





Central banks have begun to end QE or to start QT

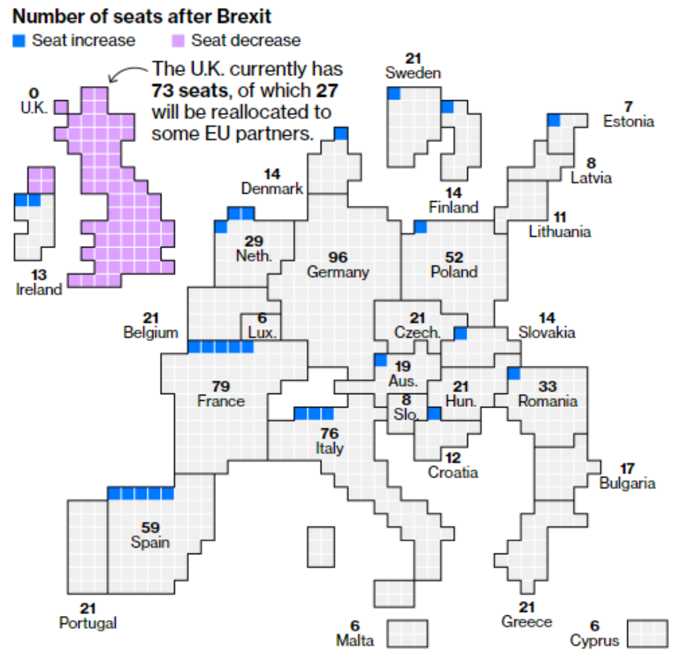


It may already have had some impact on global assets pricing.

Challenge: European populism

May EU Parliament Elections

- The EU Parliament traditionally has split center-left/ center-right and pro/anti-EU.
- The anti-EU faction has had little power and ability to maneuver.
- However, if the UK leaves the EU; France, Spain, and Italy gain seats in the next EU Parliament.
- All three countries have non-mainstream parties that are more skeptical of the EU-project.
- Germany, while does not gain seats, has a more anti-EU balance of power, with AfD now the third largest party in the Bundestag
- Risk for the elections: The elections become a vote around the future to Europe or its priorities.

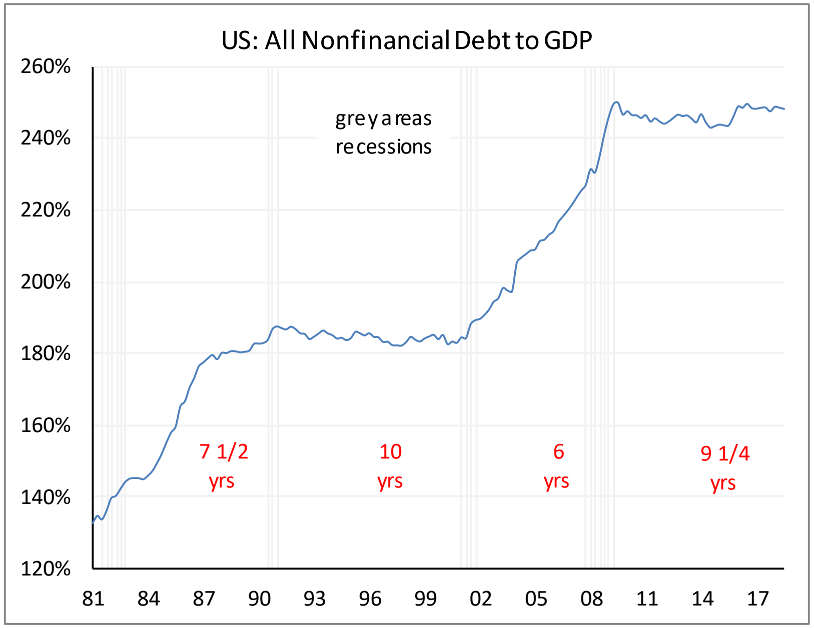


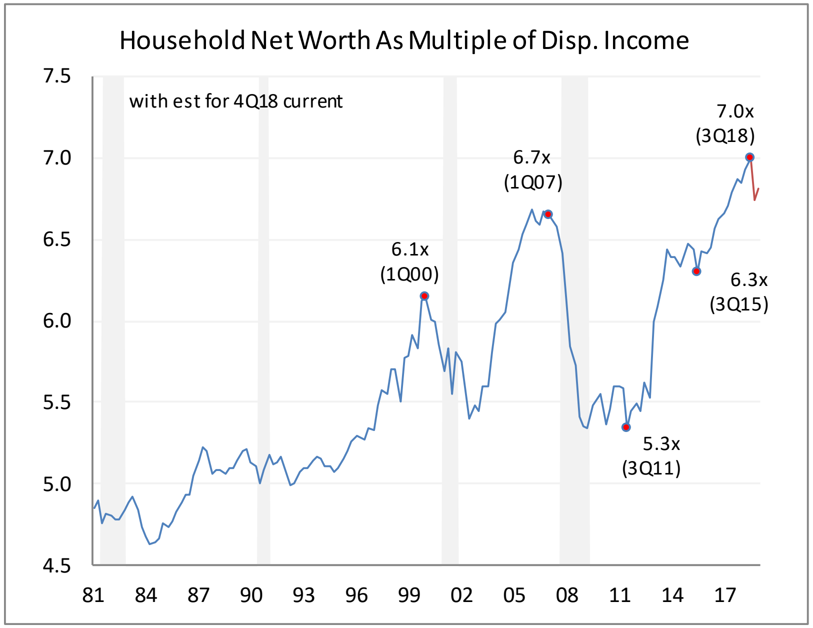
Risks

If anti-populist parties gain traction:

- Parliament becomes fragmented; policies are blocked (e.g. migration and the budget); and forward movement is curtailed.
- League of Leagues may emerge (anti-populist parties form a coalition).

Challenge: Leverage and Valuation





<u>Specialized risk</u>

FOMC (Nov 7-8): “vulnerabilities from leverage in the nonfinancial business sector elevated and … a pickup in the issuance of risky debt and the continued deterioration in underwriting standards on leveraged loans.”

<u>Higher risk</u>

FOMC (Nov 7-8): “vulnerabilities associated with asset valuation pressures continued to be elevated”

Opportunities

- Each “challenge” to the global business cycle outlined earlier could either have less impact on the business cycle than feared, or be resolved in a favorable manner.
    - It’s possible that China-US trade and UK/European Union engagement over Brexit could be resolved with short term stability in mind;
    - China has plenty of levers to pull (budget, credit, property, autos etc) and its steel sector had held up surprisingly well.
- Risk skew to the Fed’s 2.3% call on US growth is a bifurcation between a virtuous and vicious cycle.
    - At one point financial markets were arguably pricing in negligible US growth this year.
    - 2018 was a good year for supply siders and we should not discount that it’s possible for 2019.
- The US consumer is in good shape: the cushion of the high household savings rate, resilience of their optimism and balance sheets. Consumers may have over-withheld last year and will like their refunds.
- Another key is central bank communication to financial markets that there is policy flexibility, should catalysts to a growth rebound not be evident.

Scenarios

DOWNSIDE (45%)	CENTRAL (40%)	UPSIDE (15%)
"Valuation and policy risks"	"Shaking off distractions"	"Positive Synchronicity"
US' disruptive engagement threatens global upswing and balance of payments recycling.	Modest rise in US potential growth sustains expansion for now.	Self reinforcing acceleration in US productivity, helping tax reform to partly 'pay for itself'.
'Virtuous' cycle of balance sheet repair and spending unwinds.	Momentum in global economy levels out but does not fall away.	US and China realize mutual interest in backing off confrontation
China's kitchen sink approach to stimulus fails to rally that economy.	China and US corporates can manage the downside from trade disruptions.	
"Free lunch" in early stage of fiscal stimulus gives way to pre-election tactical chaos.	Well signaled (and flexible) removal of stimulus here and abroad.	

Macro: Supporting Charts

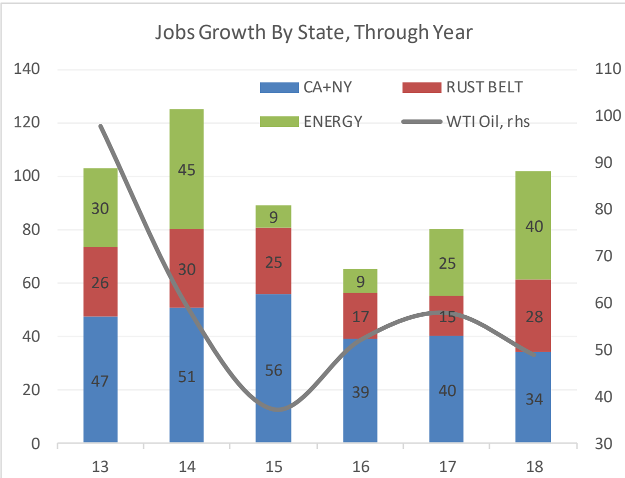
February 2019

John Rothfield, Lauren Rosborough Watt

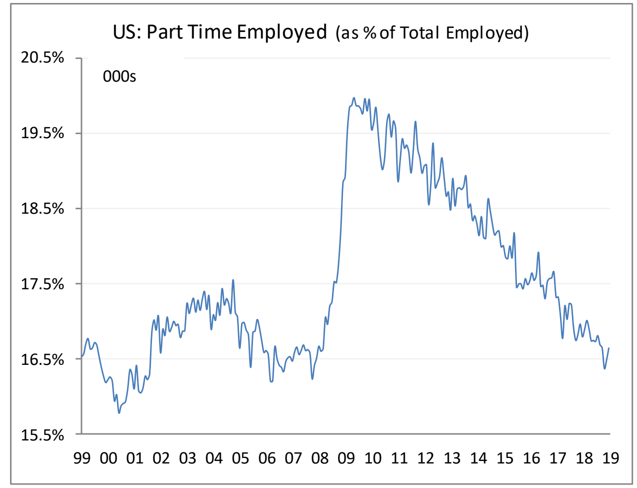
Investment Office

CalPERS

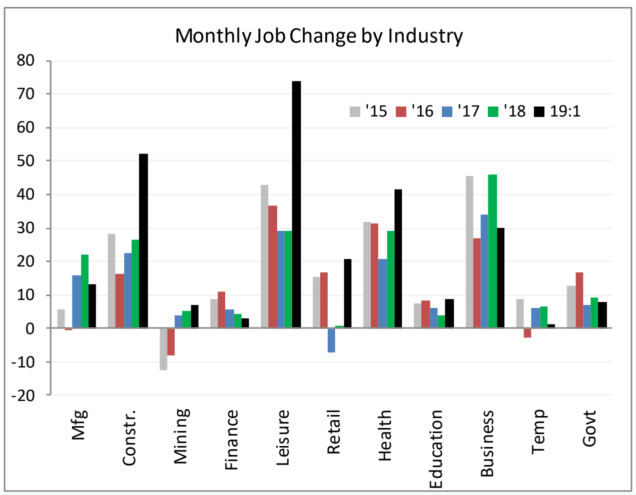
US jobs market – onward and upward



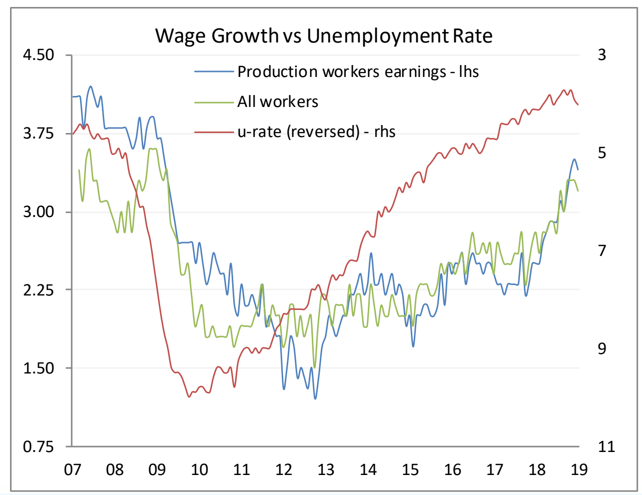
Energy and rust belt states outperform



Shrinking pool of those still on involuntary part time



Strongest jobs categories includes business services



Wage growth starts to catch up with tight labor market

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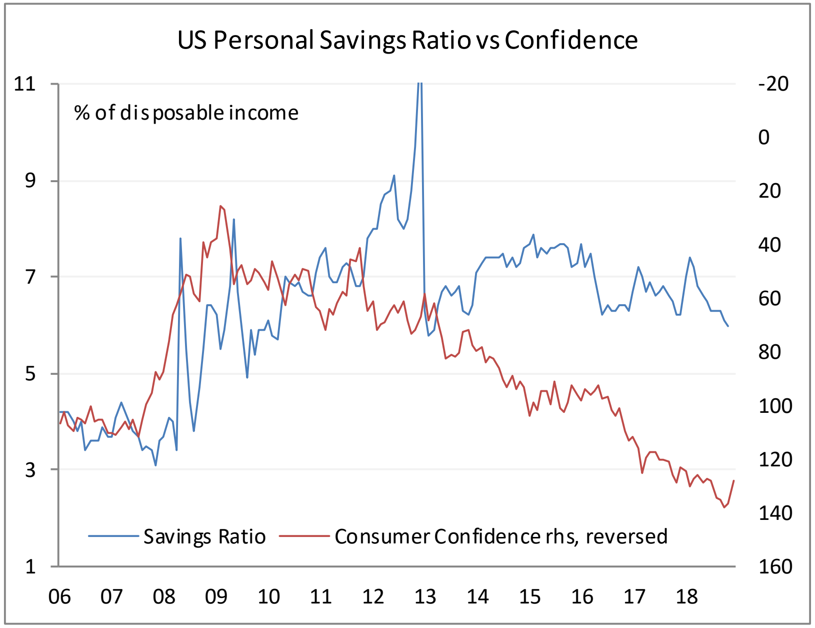
Consumer – robust spending

US Personal Income and Outlays		
Year to	Nov'17	Nov'18
Private Sector Wages	5.0%	4.5%
Total Wages	4.7%	4.2%
Proprietor Income	6.2%	5.3%
Interest Income	8.4%	3.2%
Dividends	1.9%	3.8%
Benefits	2.7%	5.2%
Total Gross Income	4.6%	4.2%
Taxes	4.5%	0.4%
Disposable Income	4.6%	4.7%
Ch. Savings Ratio	-0.2	-0.2
Spending	4.9%	4.9%



Consumer spending has stabilized at close to a 5% run rate

Despite buoyant economic conditions, consumers did not reduce their savings out of income to the degree they did in the 00s

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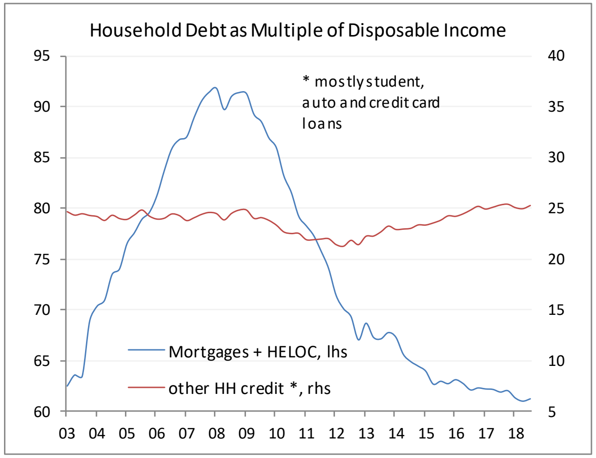
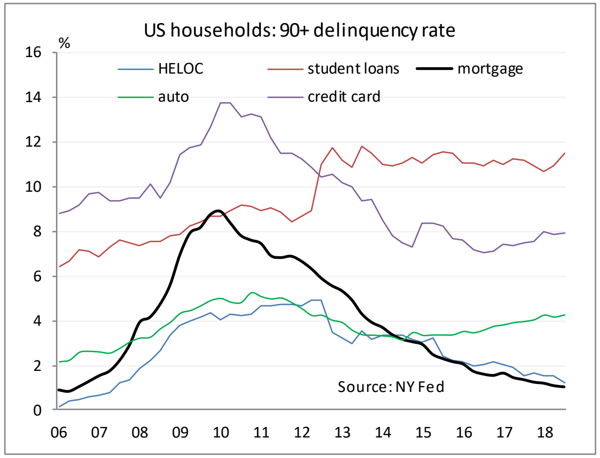
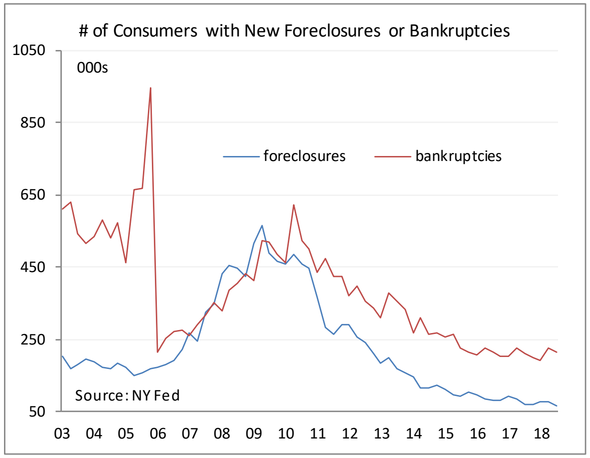
Consumer debt: little stress



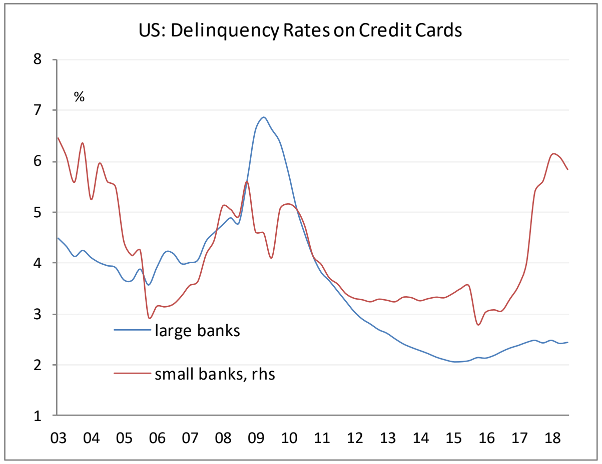
Rebound in non housing related debt only



Moderate pick up in delinquency rates

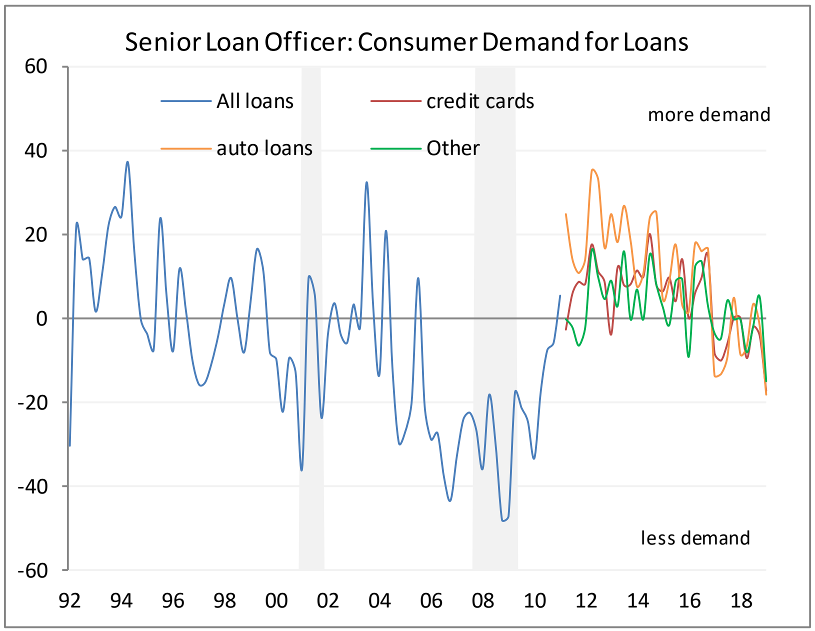


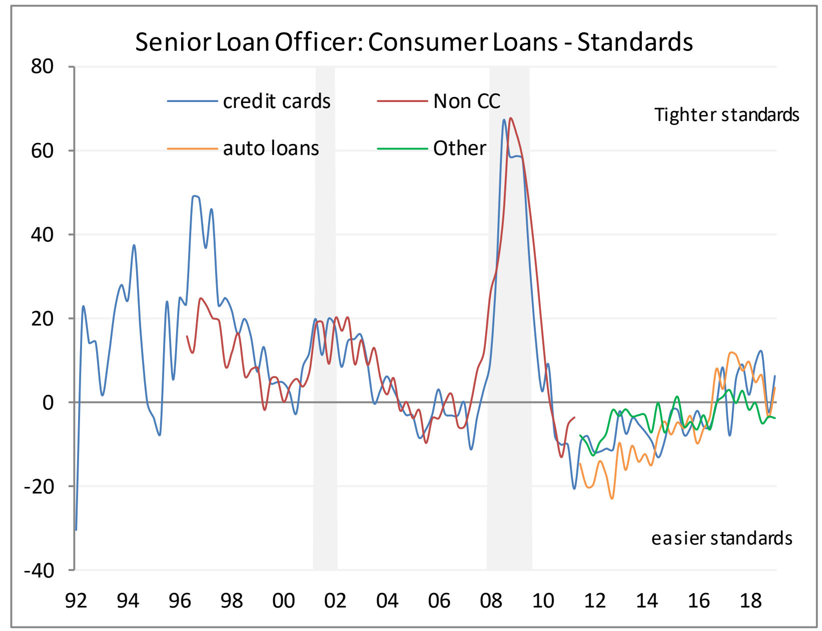
Low levels of failure



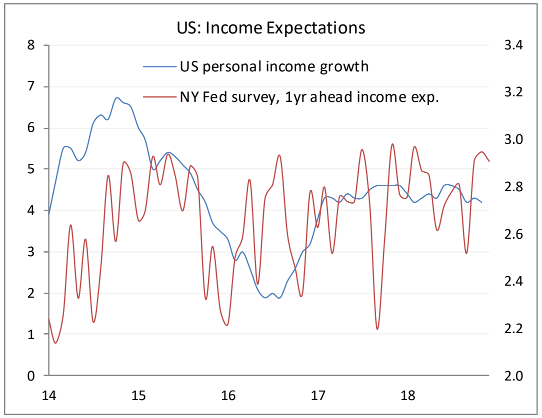
Small banks seeing a spike in credit card delinquencies.

Consumer credit – modest deterioration

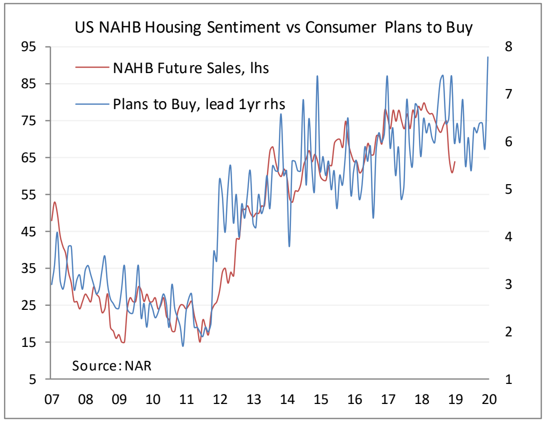




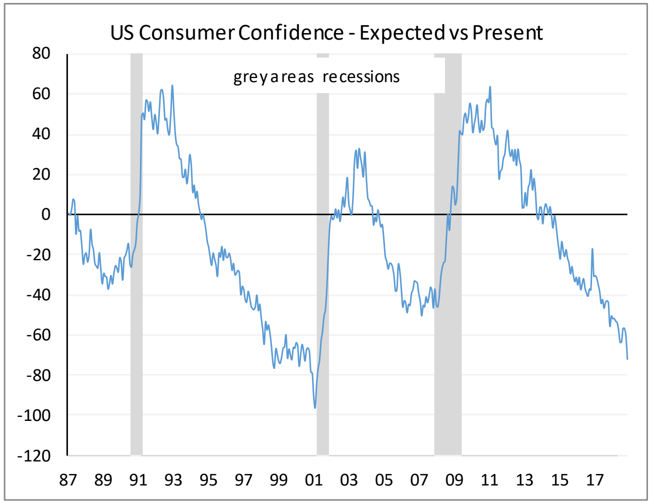
Consumer - resilient sentiment … but watch expectations



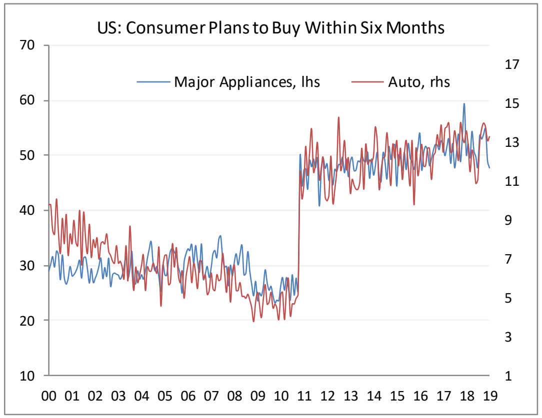
Steady expectations for income growth



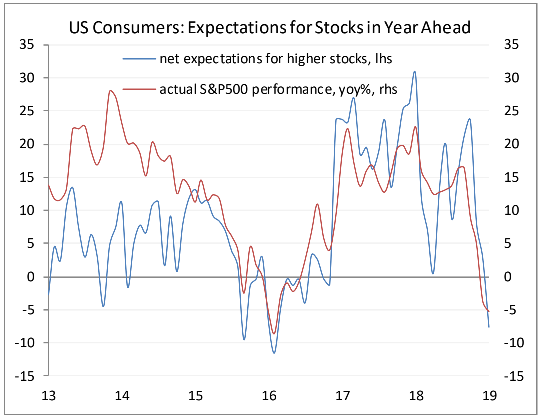
Jump in plans to buy a home



Gap between present and expected sentiment is getting late cycle.

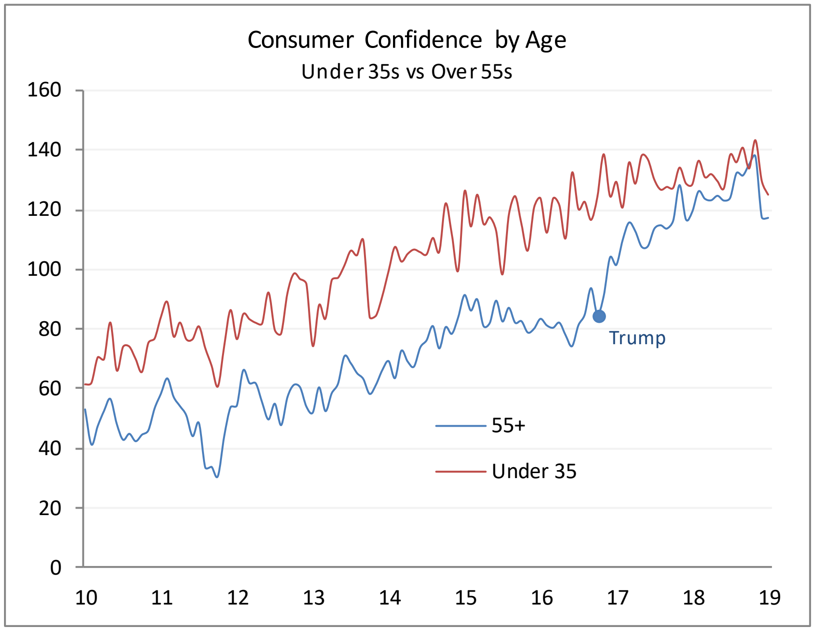


Resilient plans to buy

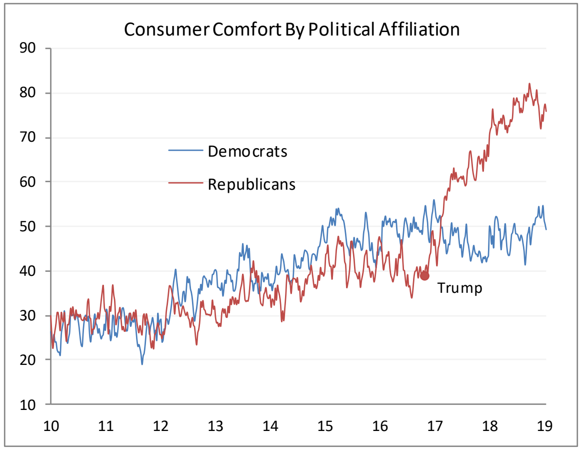


Stock market expectations related to past performance

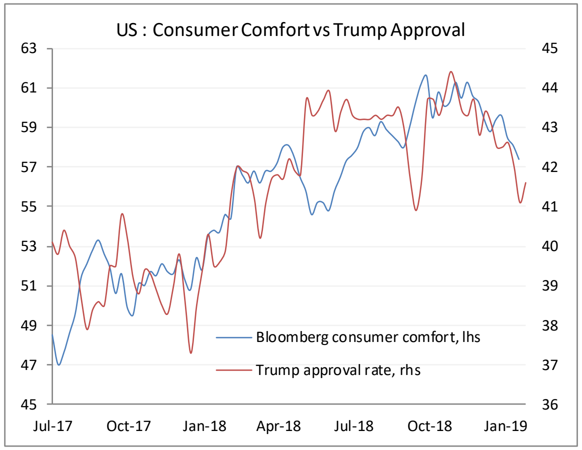
Consumer – mild political feedback loop in spite of disruptive policies



Older cohorts have benefited most since US Presidential election

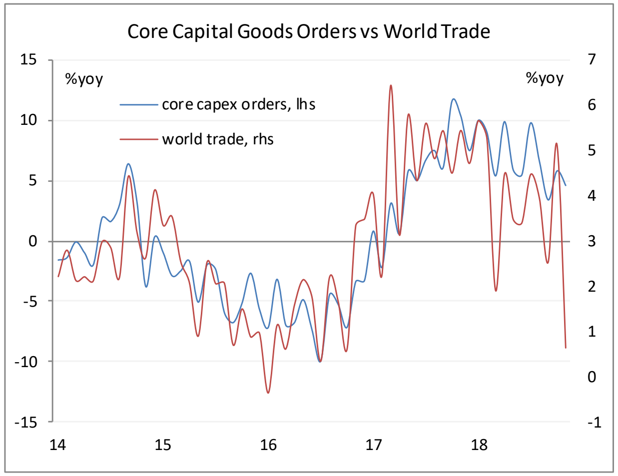


Identified REPUBS feel more comfort than DEMS in this cycle

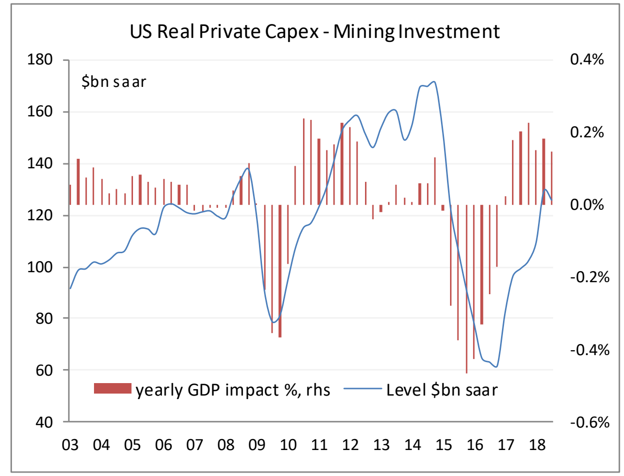


Disruptive policies have caused mild reversal in comfort

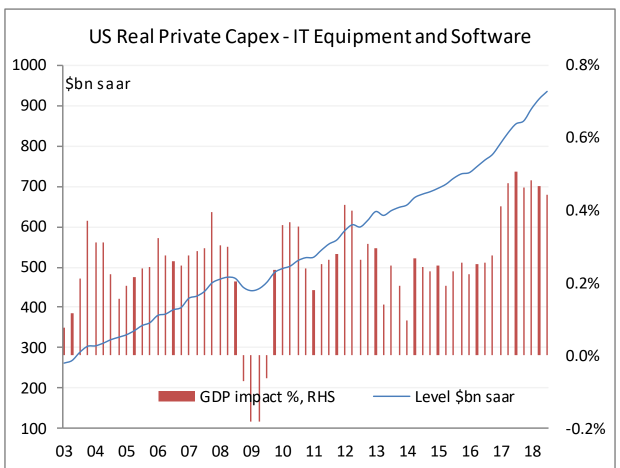
Business capex is tapering



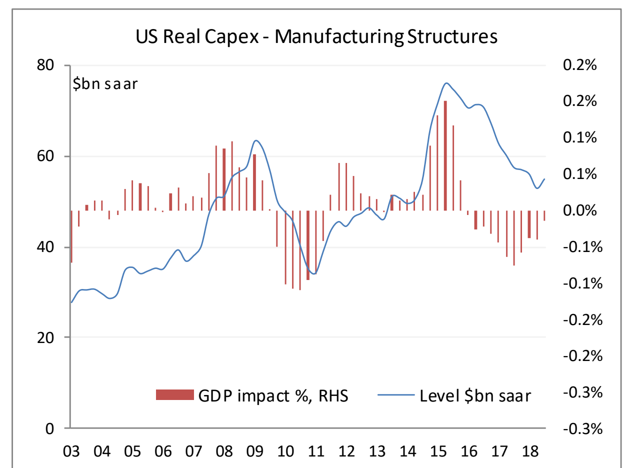
Will trade slowdown hit capex orders?



Mining investment rebound has leveled out

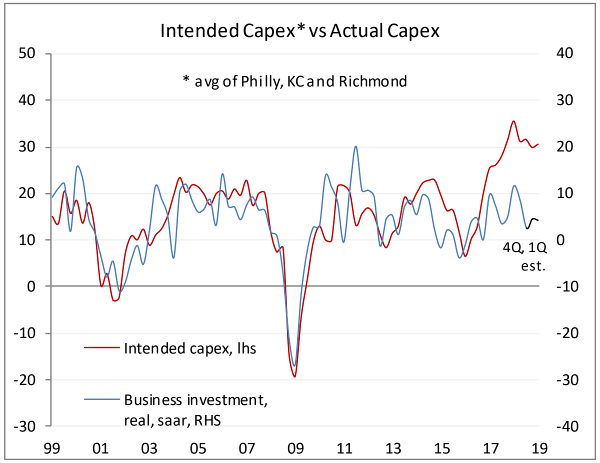


IT uplift since 2016

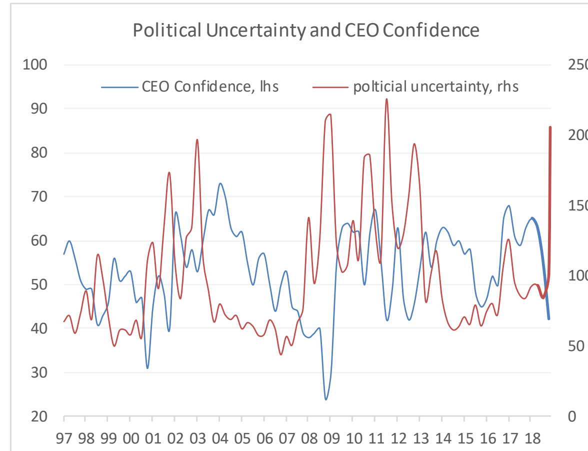


Manufacturers have so far relied on higher use of existing capacity, and more hires

Potential uplift is less than advertised

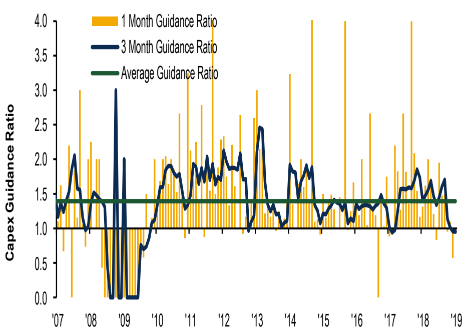


Strong capex intentions, have yet to ignite actual capex.

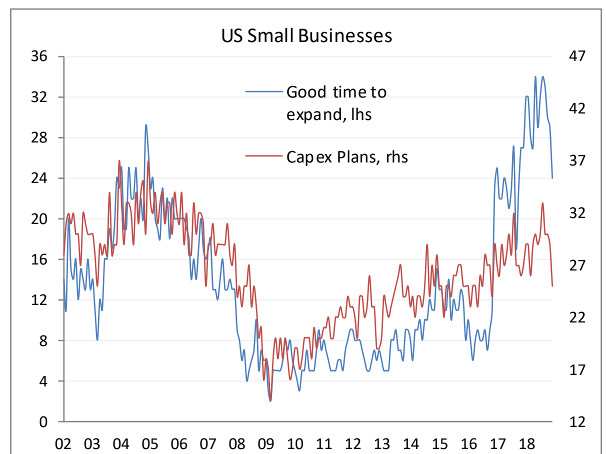


CEO confidence hit by DC headline risk

S&P 500 capex guidance ratio (# above- vs. below-consensus), as of 1/25/19



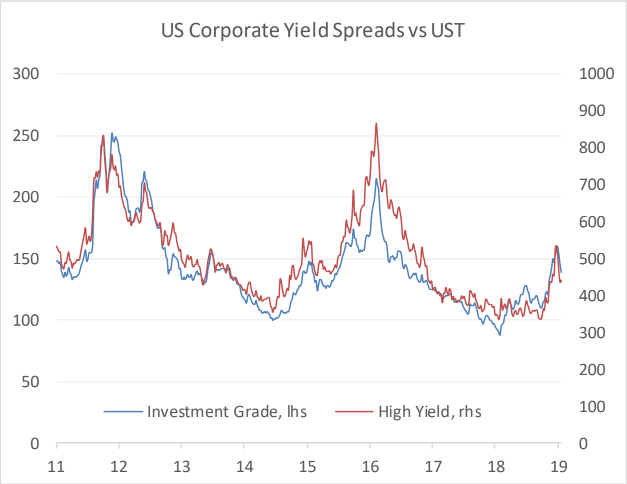
Fall-off in capex intentions



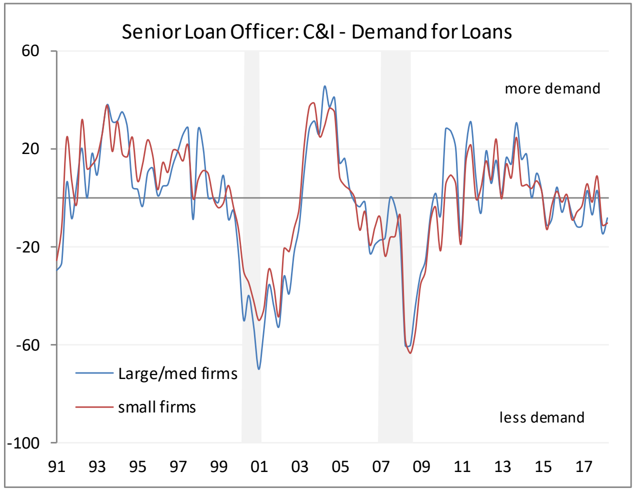
Variety of factors cooling off small business plans

Investment Office
Global Fixed Income

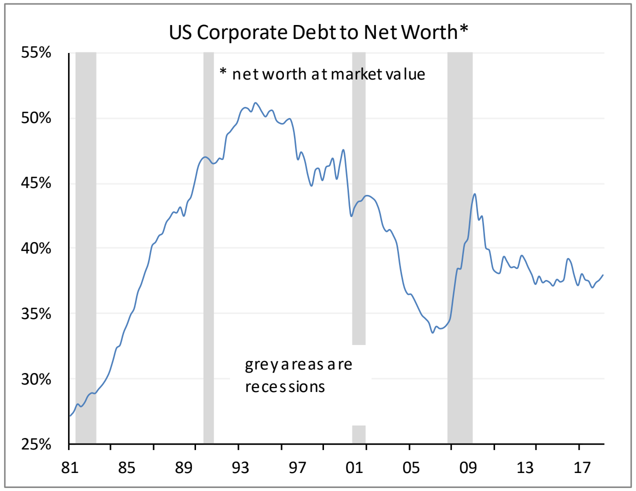
Corporates not unduly stressed



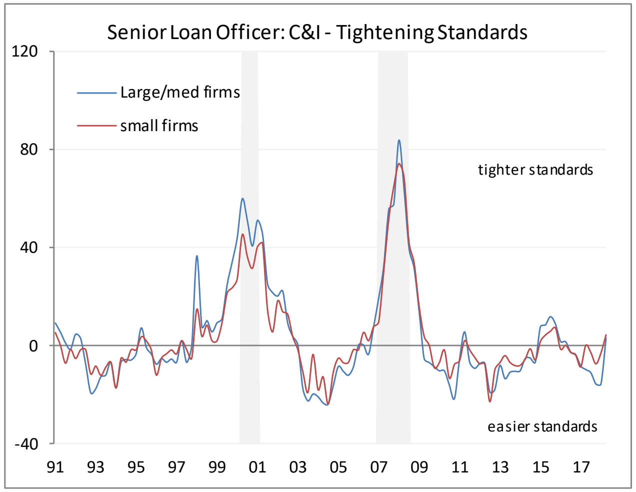
Corporate spread widening materially less than 2011, 2015



Commercial and industrial loans – softer demand and tighter lender standards

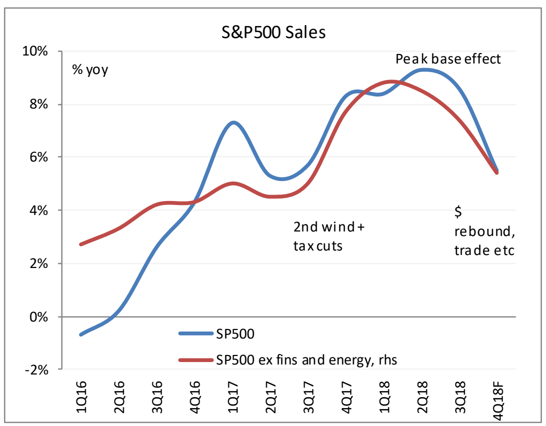


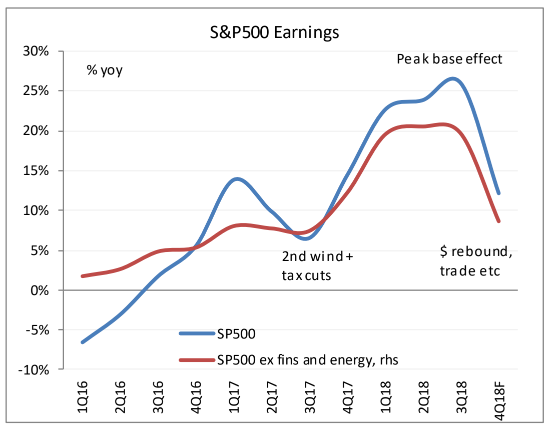
Corporate debt is stable relative to estimated net worth

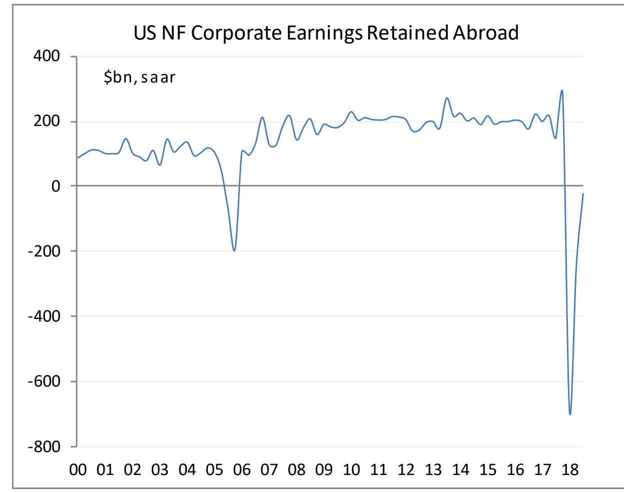


Corporate earnings: base effect erosion was expected

	Sales YoY%					Earnings YoY%				
Sector	4Q17	1Q18	2Q18	3Q18	4Q18	4Q17	1Q18	2Q18	3Q18	4Q18
Consumer Disc	6.2%	8.4%	8.2%	8.2%	5.0%	5.0%	11.9%	18.2%	22.7%	13.0%
Consumer Staples	4.7%	4.5%	5.0%	2.6%	2.0%	8.2%	10.0%	10.5%	9.1%	2.4%
Energy	22.1%	11.5%	20.3%	20.3%	11.2%	117%	94.2%	124.0%	114.9%	62.7%
Financials	3.6%	4.5%	7.0%	8.4%	1.7%	14.0%	24.5%	22.9%	38.2%	18.3%
Health Care	6.3%	7.3%	6.8%	7.1%	8.2%	7.4%	14.6%	16.3%	14.7%	10.7%
Industrials	8.8%	10.4%	9.3%	6.8%	6.4%	5.8%	23.3%	17.8%	16.7%	18.0%
Technology	12.5%	14.8%	13.6%	10.8%	1.4%	22.3%	28.1%	30.4%	24.5%	4.9%
Materials	19.6%	21.3%	25.4%	10.4%	8.0%	39.8%	43.6%	49.8%	36.2%	1.6%
Real Estate	7.0%	13.9%	14.3%	13.4%	11.2%	1.1%	7.4%	5.1%	6.9%	4.5%
Telecom	3.8%	3.3%	3.5%	12.5%	12.6%	7.9%	17.0%	21.7%	29.1%	13.7%
Utilities	7.4%	3.1%	0.8%	2.1%	-4.1%	9.2%	18.4%	8.2%	14.0%	-9.1%
S&P 500	8.3%	8.4%	9.3%	8.6%	5.5%	14.4%	22.6%	23.8%	25.9%	12.1%
ex. Fins & Energy	7.7%	8.8%	8.5%	7.4%	5.4%	12.2%	19.5%	20.5%	19.6%	8.6%



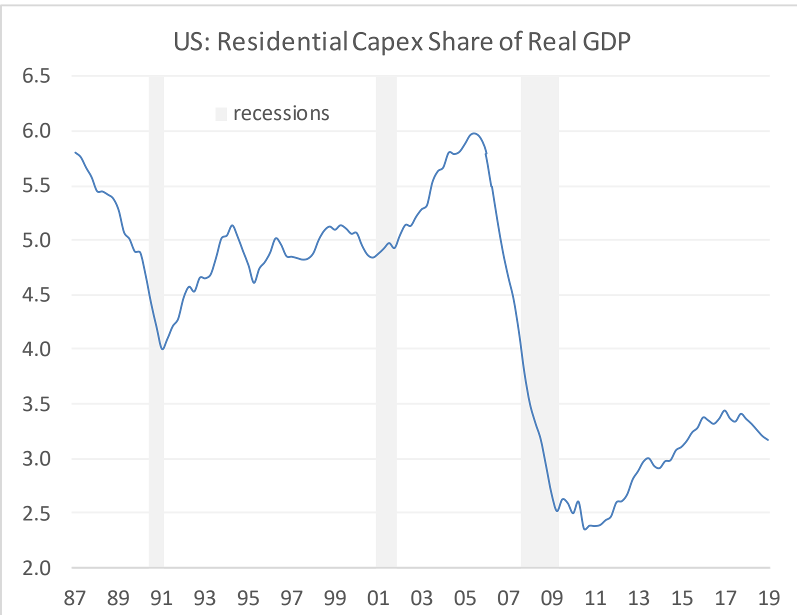




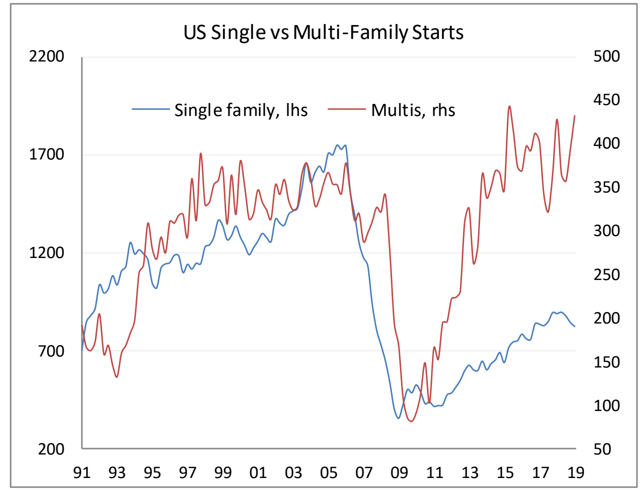
Tax induced earnings repatriation cools off

CalPERS Investment Office Global Fixed Income

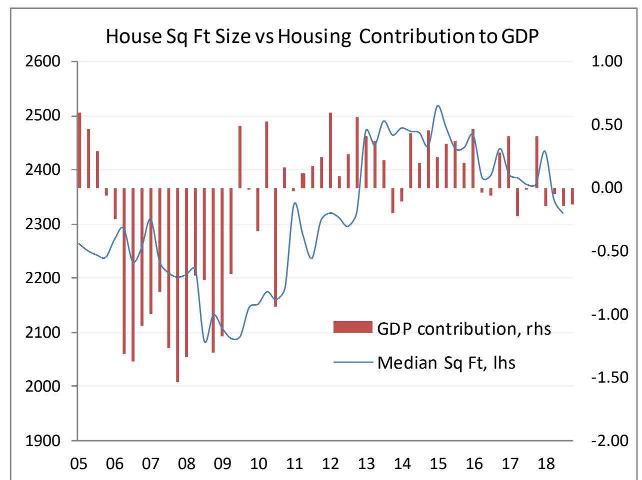
Housing playing a smaller role



We are unlikely to see again the same kind of cyclical impacts from residential



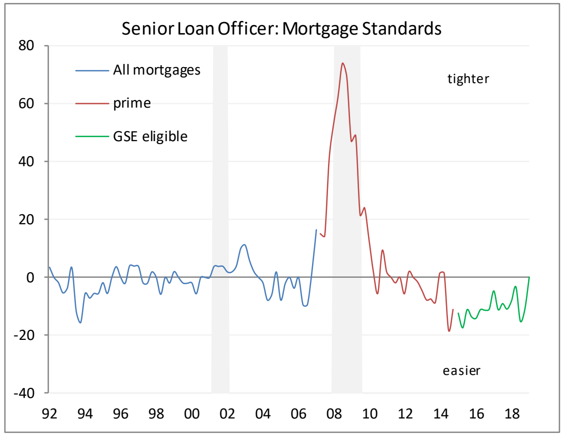
Build this cycle has been multi focused

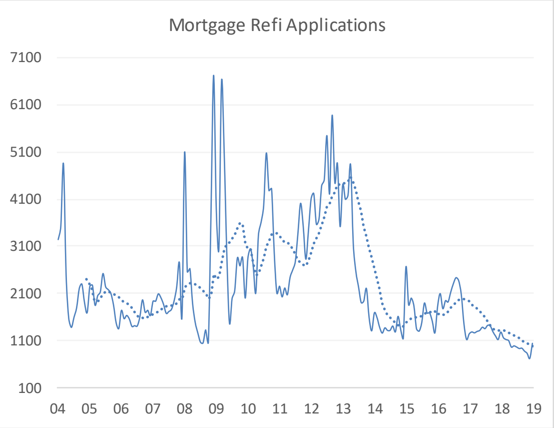


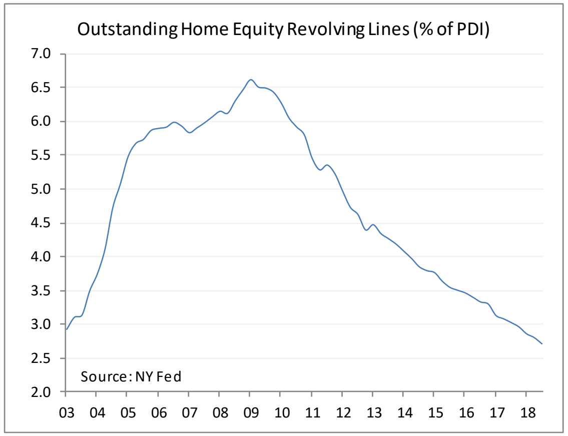
Square footages have peaked

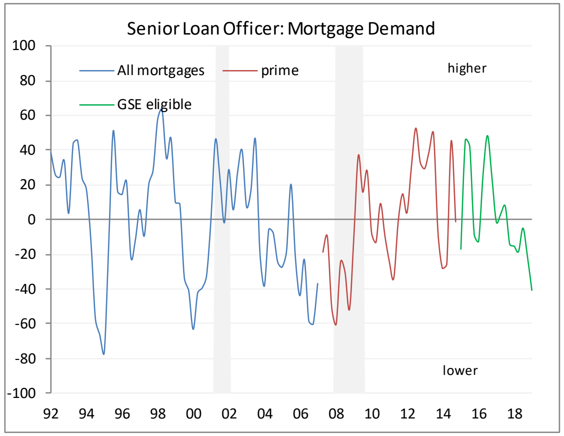
Investment Office
Global Fixed Income

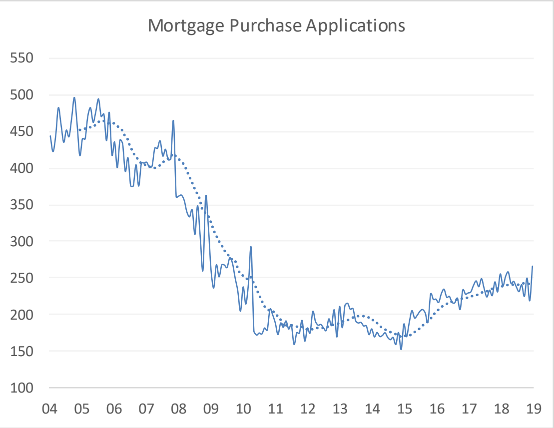
Housing is not a credit event this cycle

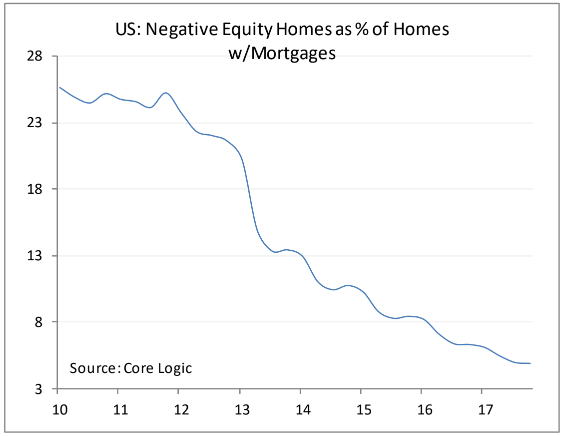






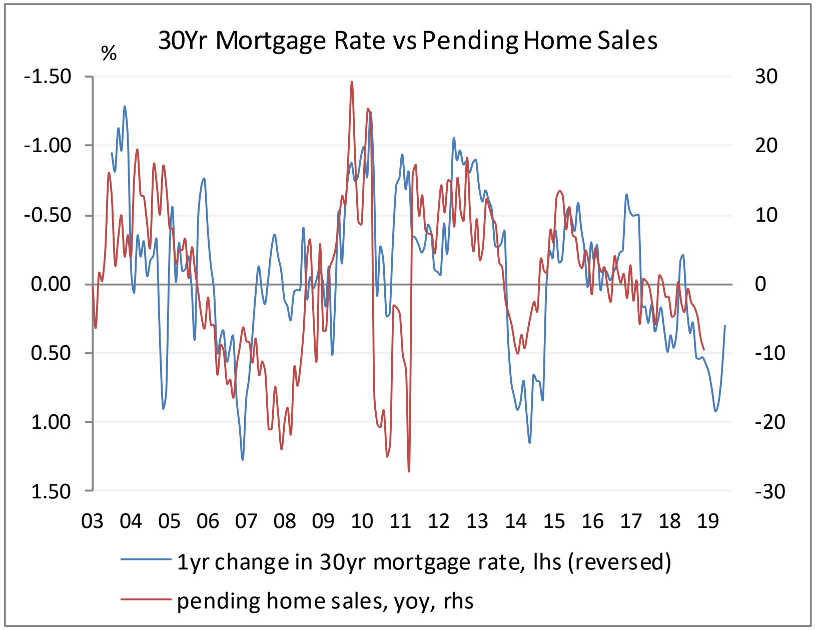




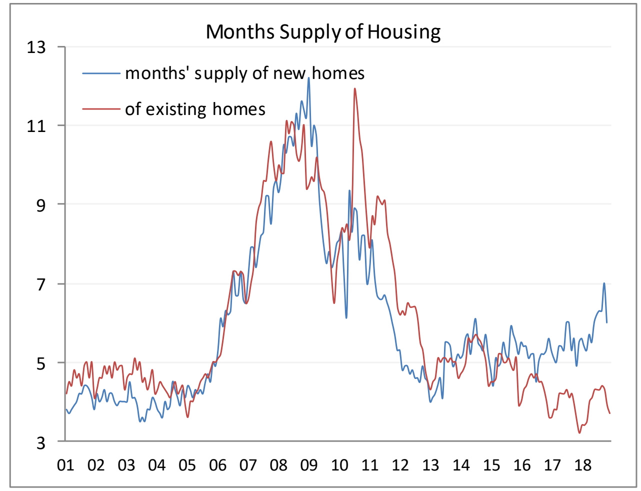


CalPERS Investment Office Global Fixed Income

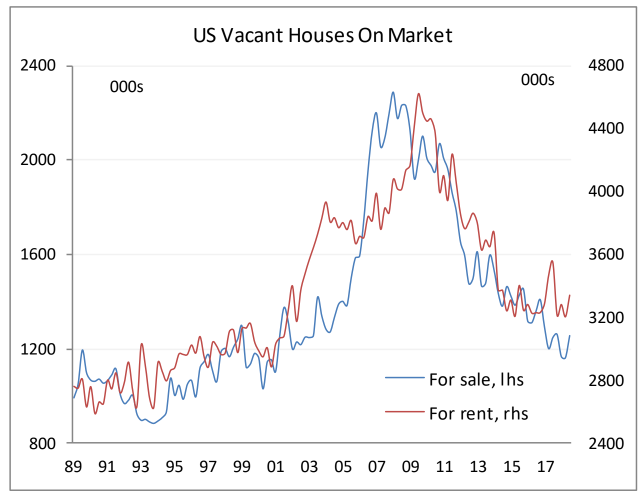
Housing – modest “crowding out”



Higher mortgage rates have put a dampener on home sales

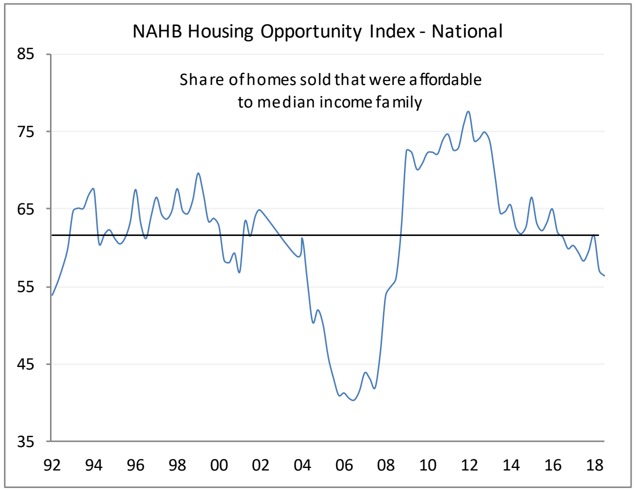


More new homes are on the market but existing stock is still low



Vacant house numbers still low

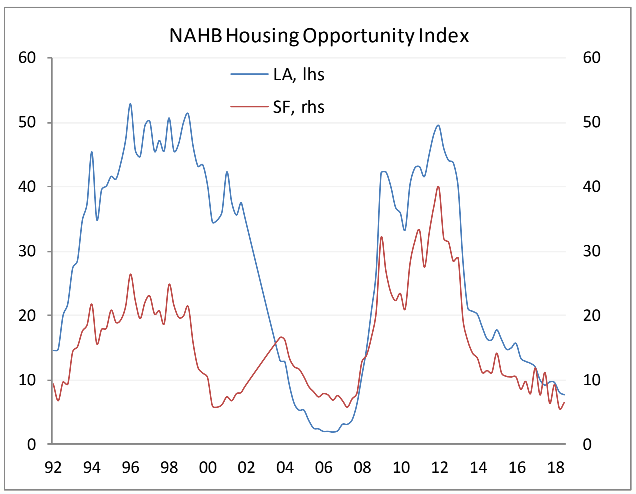
Housing – affordability

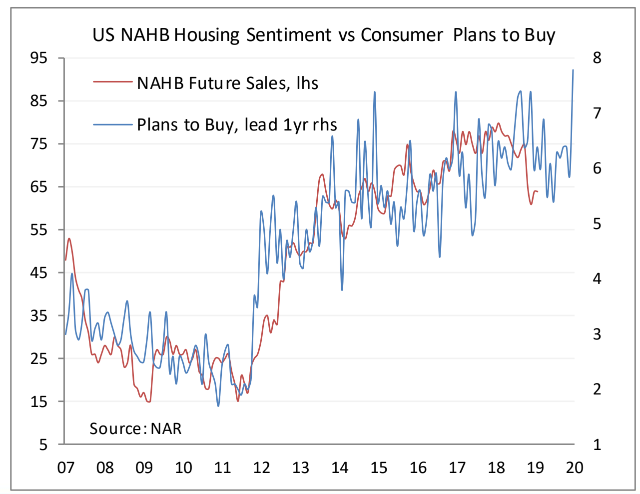


National Association of Realtors Affordability Index					
Averages …	Median Single Family	Mortgage rate	Monthly P&I	Family Income	Payment as % of Income
89-02	123,348	7.96	713	42,461	20.3
3Q06	**225,333**	**6.76**	**1,170**	**58,763**	**23.9**
1Q13	176,367	3.56	639	63,115	12.1
Nov'18	260,500	4.99	1,117	77,216	17.4

NAR measure affirms that affordability is much improved on the situation in 2006

National affordability is just below average but certain areas are stretched (eg SF, LA)

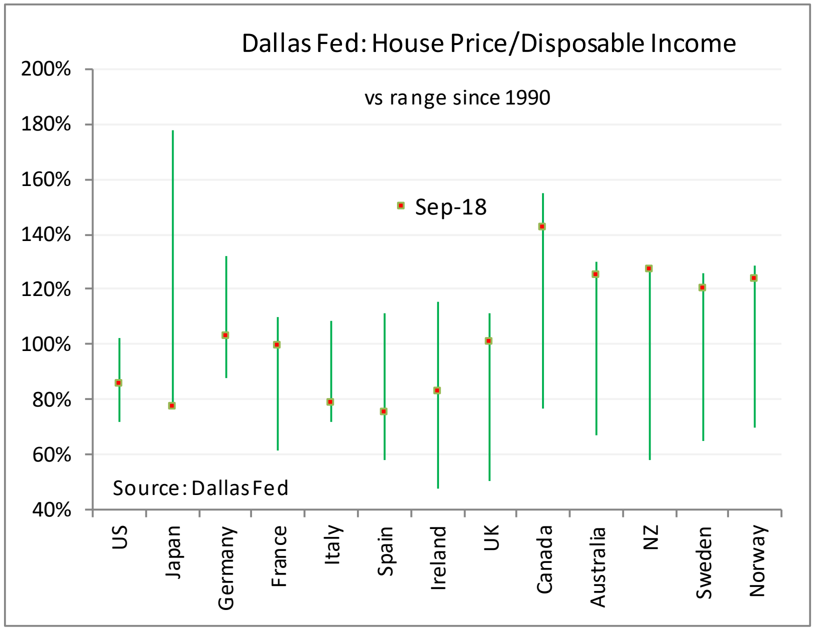


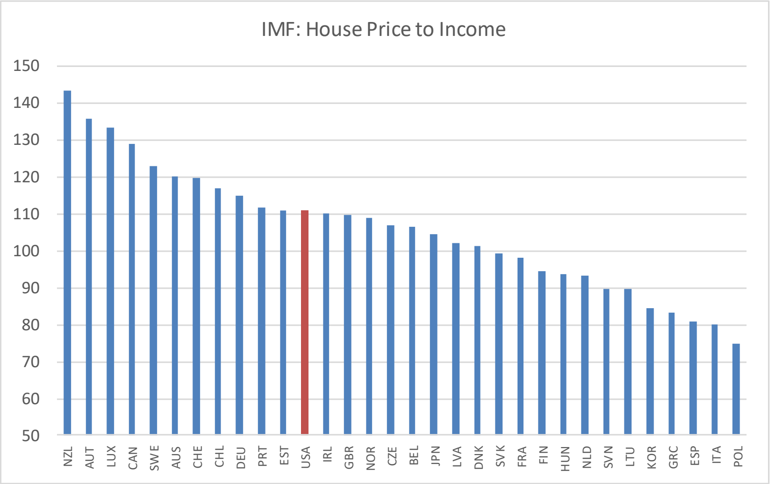


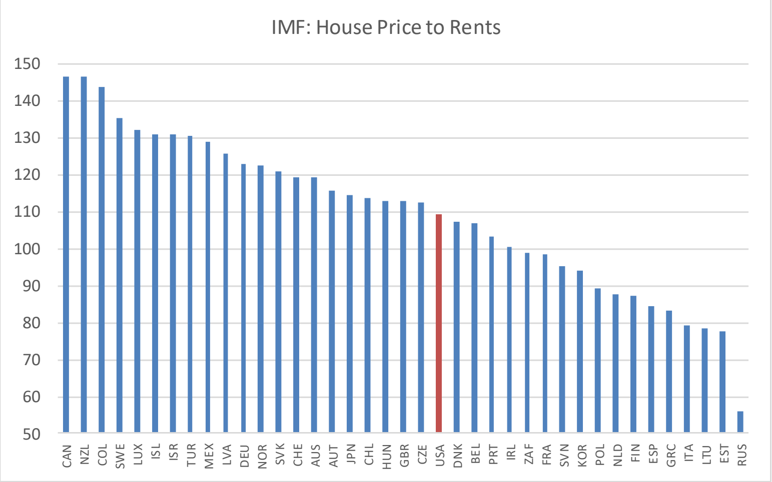
Spike in plans to buy house

CalPERS Investment Office Global Fixed Income

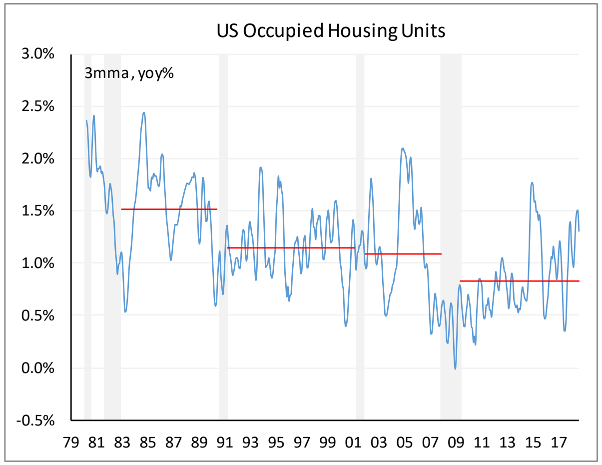
Housing - comfortable by international standards



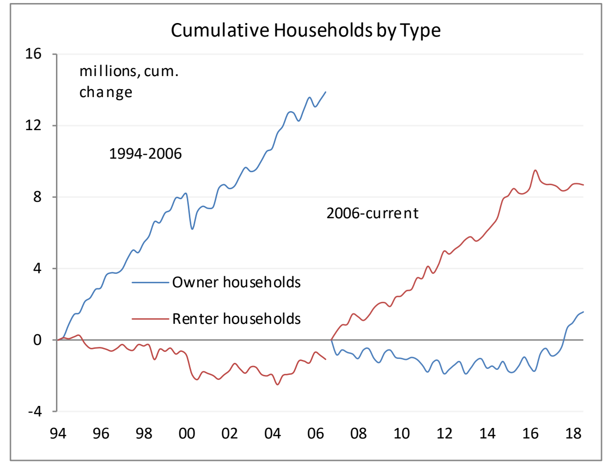




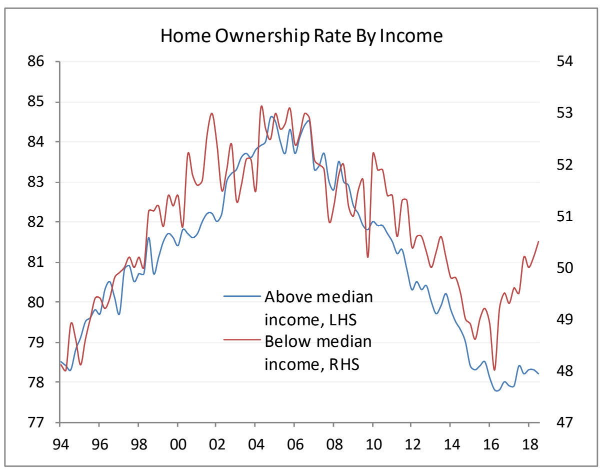
Housing formation is still on an improving trend



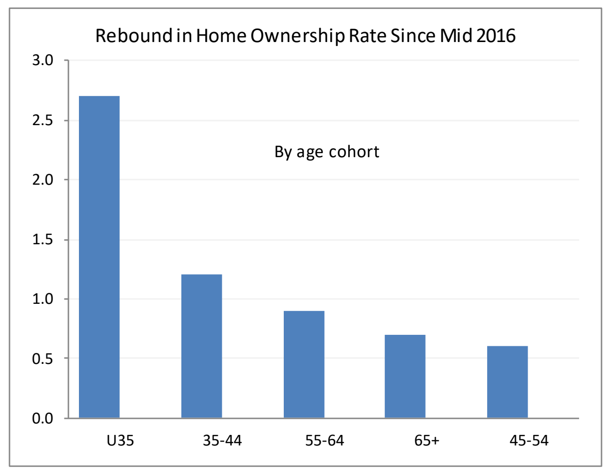
Overall household formation has improved



… and within the total, owner households cohort has improved

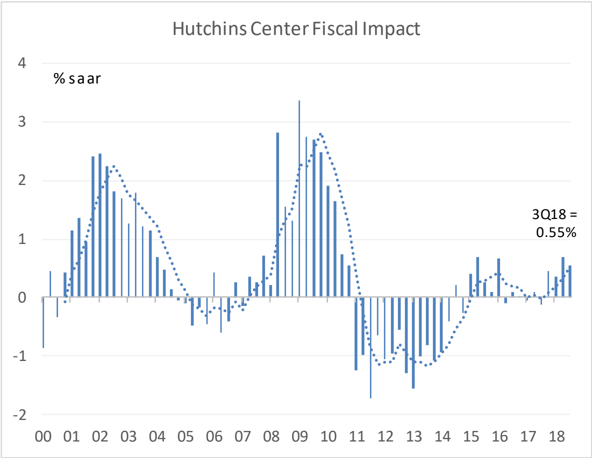


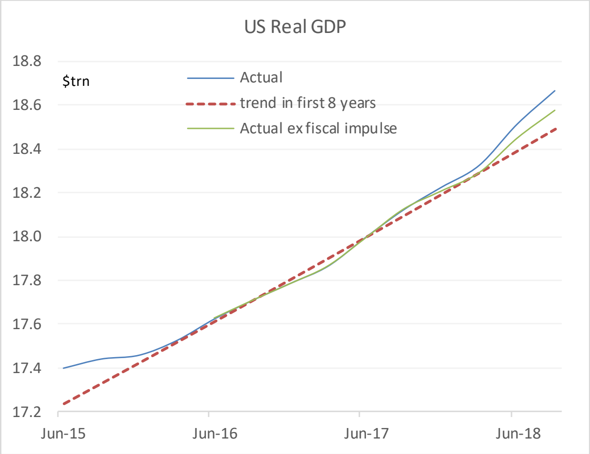
Ownership rate most improved for below median income earners

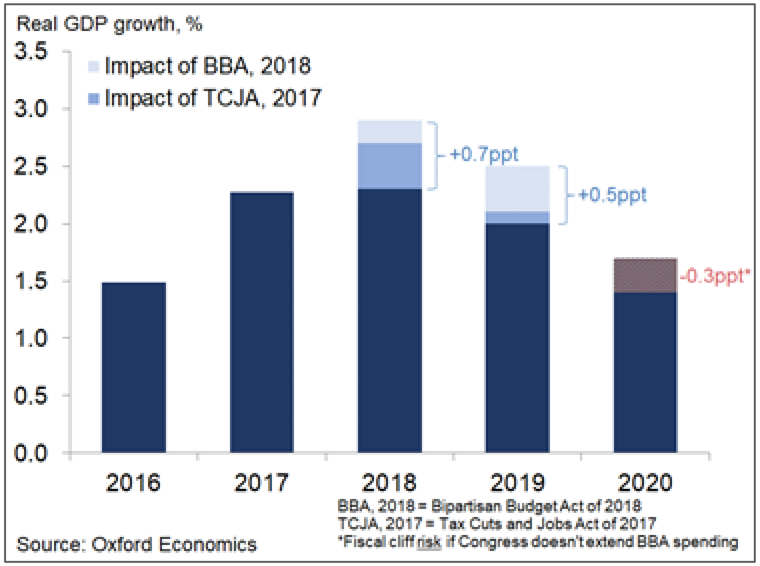


…. and for young age cohorts

Fiscal explains at least ½ growth acceleration in 2018





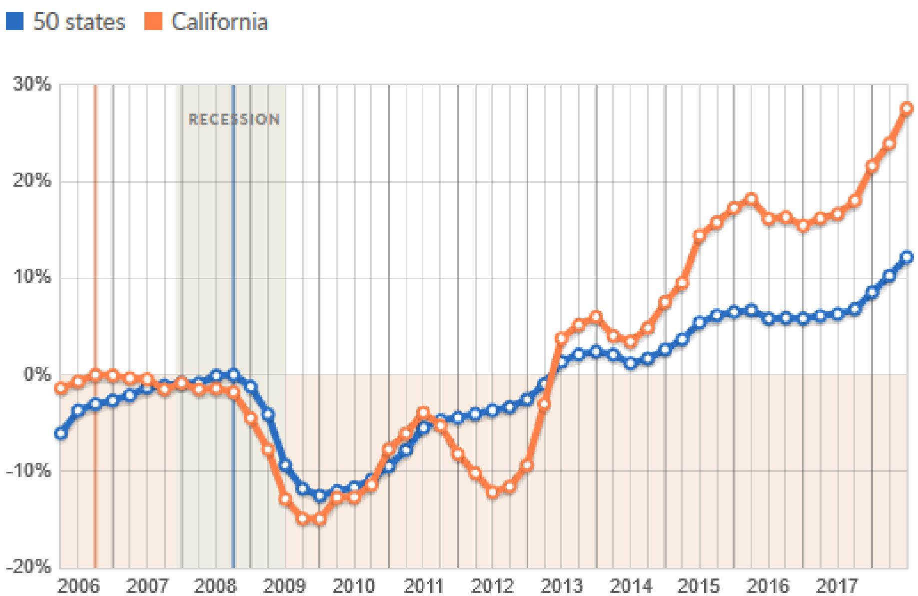


2019 should be similar fiscal impulse to 2018, because of likely spike in tax refunds.

Real fiscal cliff is in 2020.

State Governments' improved positions

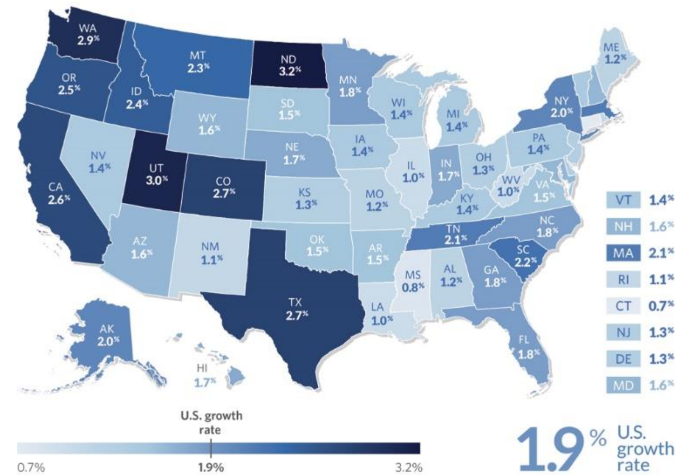
Change in Tax Revenue From Each State's Peak Quarter, Adjusted for Inflation



Source: Pew Charitable Trusts

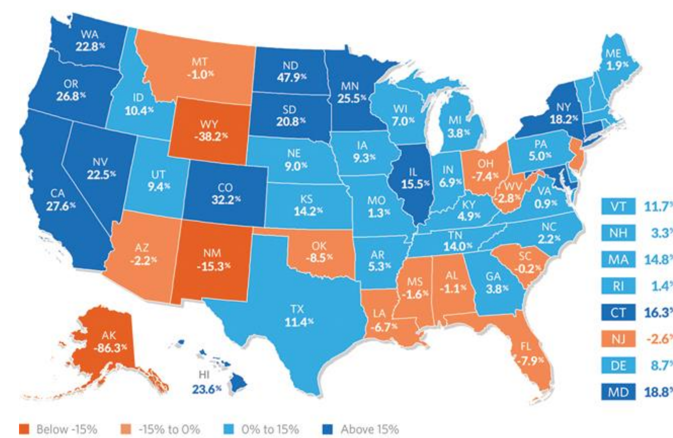
States' Personal Income Recovers Unevenly From Recession

Annual growth rate for inflation-adjusted personal income, Q4 2007 to Q3 2018

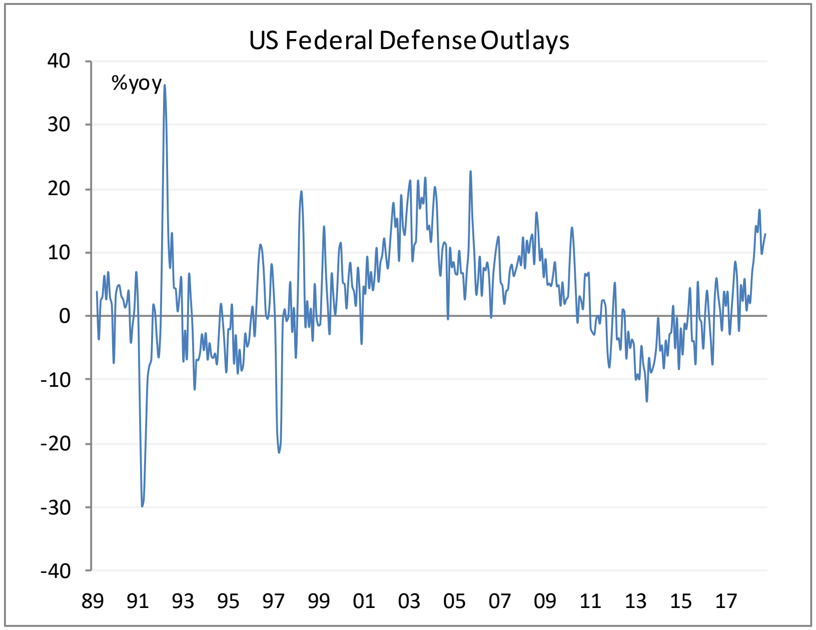


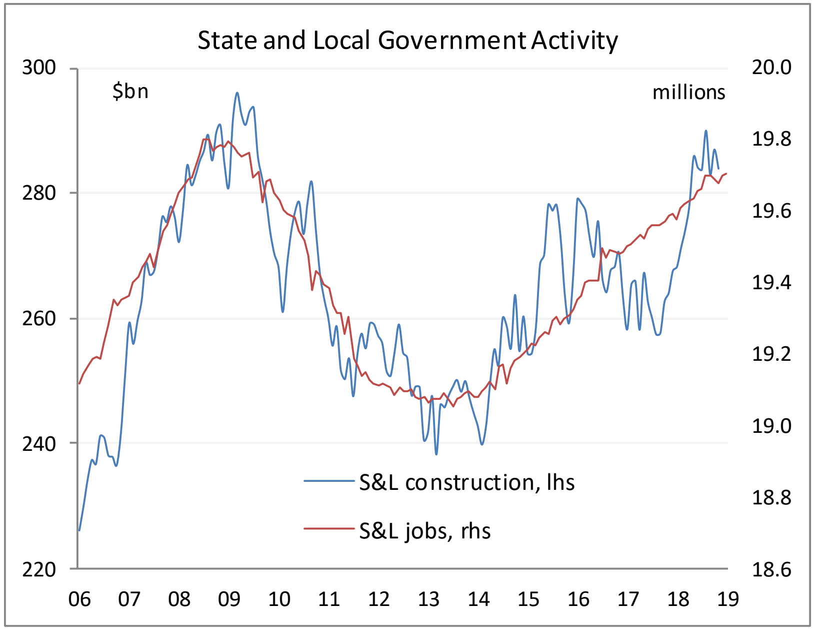
Real Tax Revenue in 36 States Has Recovered From Recession

Tax collections in Q2 2018 compared with each state's peak, adjusted for inflation



Government - spending





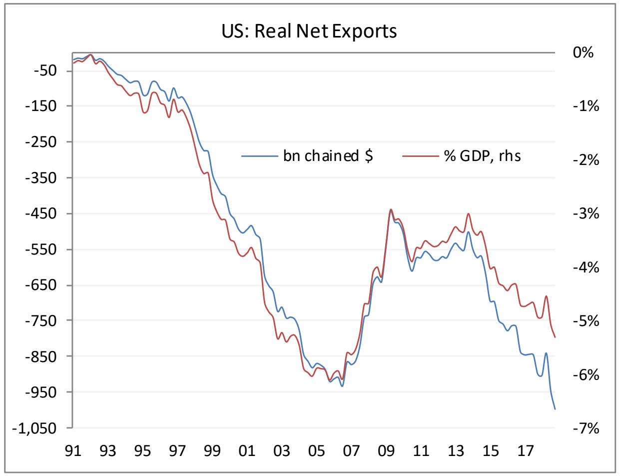
Public spending has been increasing for defense and at state and local level.

Foreign Trade

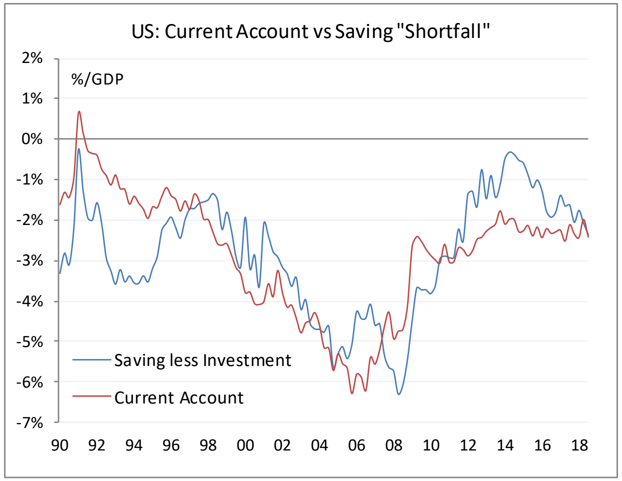
US Balance of Trade in Goods and Services with:

$bn	Total	Canada	Mexico	Japan	Korea	China	Germany	UK	Other EU	OPEC
2001	-362	-48	-26	-55	-12	-81	-31	2	-29	-34
2002	-419	-44	-33	-57	-12	-102	-40	-2	-32	-31
2003	-494	-47	-37	-54	-12	-123	-43	-4	-39	-50
2004	-610	-61	-42	-61	-18	-162	-50	-1	-45	-70
2005	-714	-72	-45	-67	-13	-201	-54	-2	-52	-90
2006	-762	-61	-59	-76	-10	-234	-55	2	-52	-100
2007	-705	-53	-69	-72	-9	-257	-51	11	-40	-119
2008	-709	-61	-59	-60	-7	-263	-50	9	-18	-169
2009	-384	-3	-42	-28	-5	-220	-32	10	-1	-52
2010	-495	-6	-58	-43	-4	-261	-39	9	-16	-86
2011	-550	-11	-57	-45	-5	-279	-53	15	-20	-114
2012	-537	-5	-54	-58	-8	-295	-66	12	-22	-81
2013	-461	-4	-48	-59	-9	-295	-73	5	-16	-47
2014	-490	-11	-51	-54	-15	-315	-80	11	-25	-27
2015	-499	4	-58	-55	-18	-334	-77	12	-38	31
2016	-502	7	-62	-56	-17	-308	-67	15	-40	17
2017	-552	3	-69	-57	-9	-336	-67	16	-50	9
18(ar)	-596	1	-76	-58	-5	-367	-67	20	-63	-1

Trade deals or tariffs are unlikely to narrow the US trade deficit.



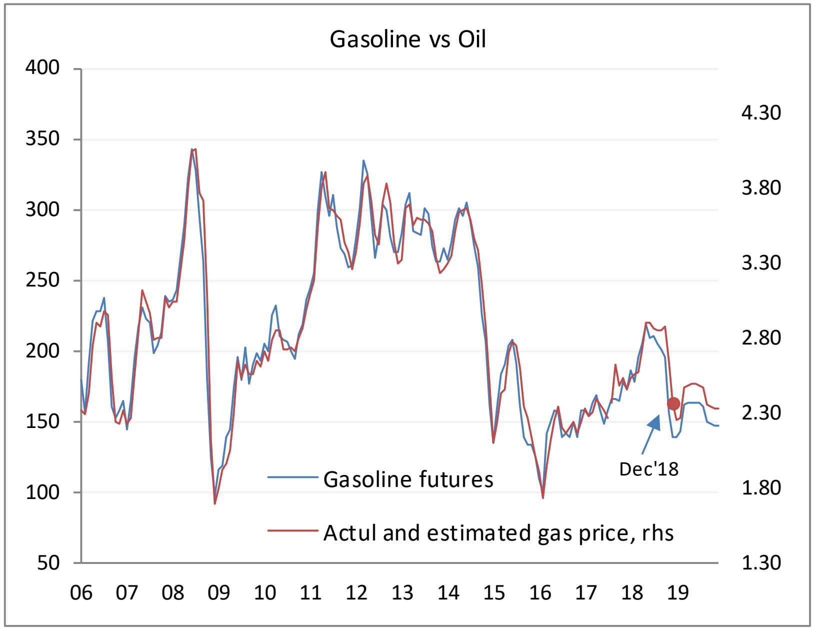
Exports will get temporary relief from strong shipments of soybeans etc ahead of retaliatory tariffs.

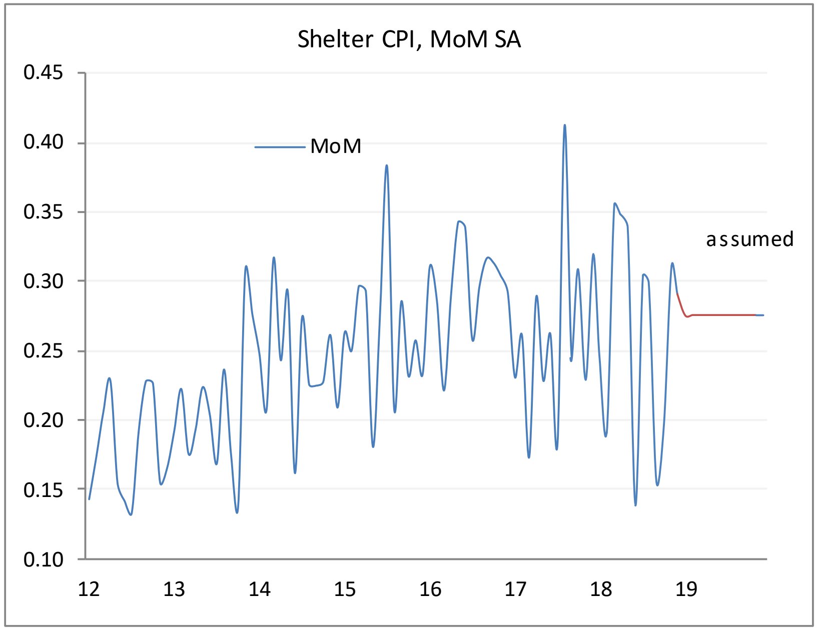


Ultimately the external imbalance reflects the US savings-investment gap.

Investment Office
Global Fixed Income

US inflation – benign year ahead





US gasoline prices set to be lower than last year (we put in a cushion for wider refining spread).

The important Shelter component of core CPI has arrested its downdraft but now we assume stability.

Global - IMF Outlook Update

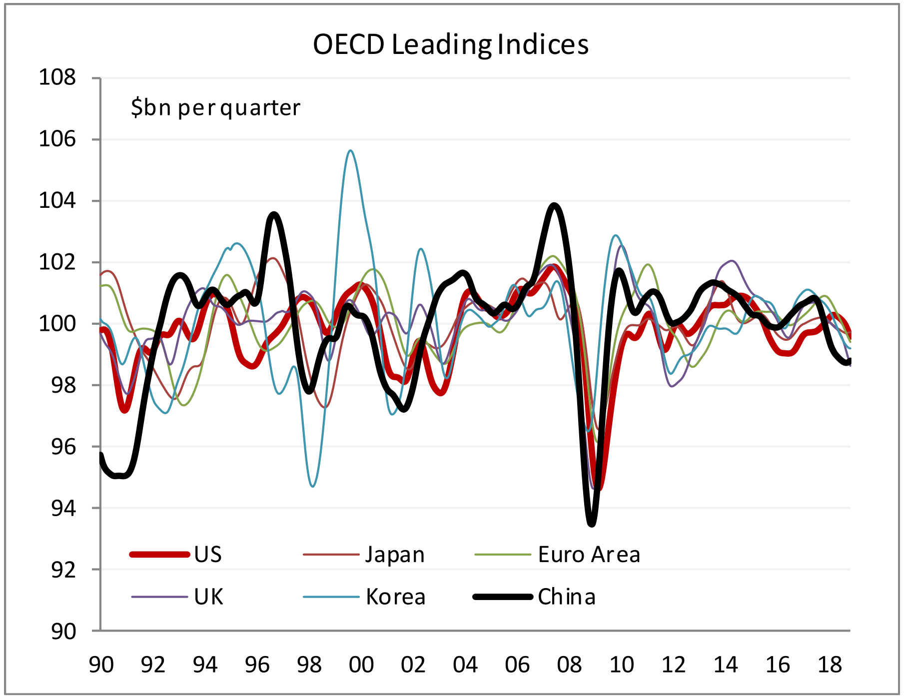
Table 1. Overview of the *World Economic Outlook* Projections
(Percent change, unless noted otherwise)

	Year over Year					
		Estimates	Projections		Difference from Oct 2018 WEO Projections 1/	
	2017	2018	2019	2020	2019	2020
World Output	**3.8**	**3.7**	**3.5**	**3.6**	**–0.2**	**–0.1**
Advanced Economies	**2.4**	**2.3**	**2.0**	**1.7**	**–0.1**	**0.0**
United States	2.2	2.9	2.5	1.8	0.0	0.0
Euro Area	2.4	1.8	1.6	1.7	–0.3	0.0
Germany	2.5	1.5	1.3	1.6	–0.6	0.0
France	2.3	1.5	1.5	1.6	–0.1	0.0
Italy	1.6	1.0	0.6	0.9	–0.4	0.0
Spain	3.0	2.5	2.2	1.9	0.0	0.0
Japan	1.9	0.9	1.1	0.5	0.2	0.2
United Kingdom	1.8	1.4	1.5	1.6	0.0	0.1
Canada	3.0	2.1	1.9	1.9	–0.1	0.1
Other Advanced Economies 3/	2.8	2.8	2.5	2.5	0.0	0.0
Emerging Market and Developing Economies	**4.7**	**4.6**	**4.5**	**4.9**	**–0.2**	**0.0**
Commonwealth of Independent States	2.1	2.4	2.2	2.3	–0.2	–0.1
Russia	1.5	1.7	1.6	1.7	–0.2	–0.1
Excluding Russia	3.6	3.9	3.7	3.7	0.1	0.0
Emerging and Developing Asia	6.5	6.5	6.3	6.4	0.0	0.0
China	6.9	6.6	6.2	6.2	0.0	0.0
India 4/	6.7	7.3	7.5	7.7	0.1	0.0
ASEAN-5 5/	5.3	5.2	5.1	5.2	–0.1	0.0
Emerging and Developing Europe	6.0	3.8	0.7	2.4	–1.3	–0.4
Latin America and the Caribbean	1.3	1.1	2.0	2.5	–0.2	–0.2
Brazil	1.1	1.3	2.5	2.2	0.1	–0.1
Mexico	2.1	2.1	2.1	2.2	–0.4	–0.5

<u>January 2019</u>

- Risks to global growth tilt to the downside. An escalation of trade tensions beyond those already incorporated in the forecast remains a key source of risk to the outlook.
- Financial conditions have already tightened since the fall. A range of triggers beyond escalating trade tensions could spark a further deterioration in risk sentiment with adverse growth implications, especially given the high levels of public and private debt.
- These potential triggers include a "no-deal" withdrawal of the United Kingdom from the European Union and a greater-than-envisaged slowdown in China.

Global slowdown is persistent



CalPERS Investment Office Global Fixed Income

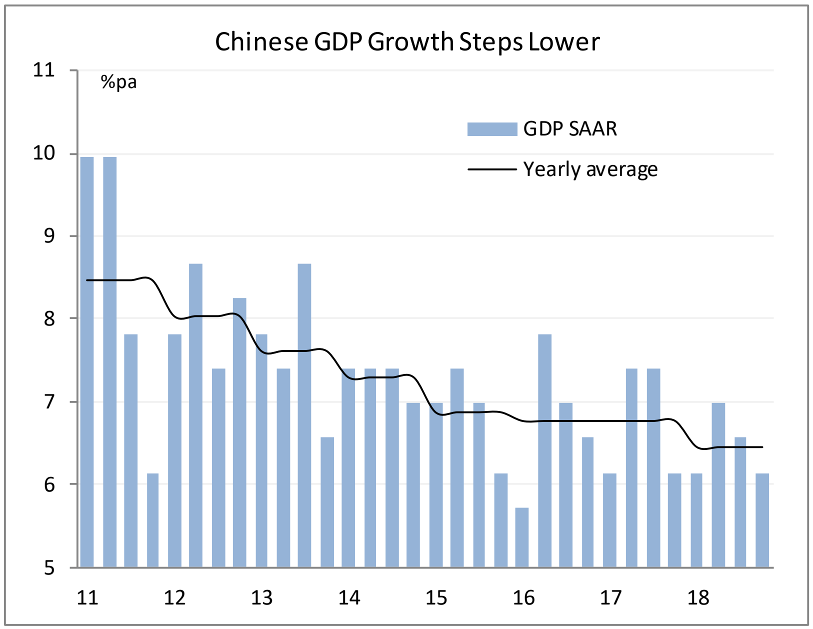
Scorecard shows weakness in Asia (and Italy)

2/5/19	MACRO SCORECARDS - DM									
	US	Canada	Japan	Australia	NZ	UK	Sweden	Norway	Israel	Eurozone
NOM GDP	5.5	4.7	-0.3	5.2	3.7	3.6	4.1	8.8	4.3	3.0
vs yr ago	1.3	-0.5	-2.6	-1.0	-2.9	-0.5	0.2	2.9	2.0	-1.1
Lead. Index	99.6	99.1	99.7	99.7	101.2	98.6	99.0	100.8	99.7	99.4
6-mo ch.	-0.7	-0.9	-0.1	0.0	0.1	-1.2	-0.7	-0.2	-0.7	-0.9
PMI	56.6	53.0	50.3	52.5	55.1	52.8	51.5	58.3	57.0	50.5
6-mo ch.	-1.8	-3.9	-2.0	0.0	2.3	-1.1	-5.4	10.2	4.4	-4.6
Core CPI	2.2	1.7	0.3	1.8	1.7	1.9	2.2	2.1	1.0	1.1
vs yr ago	0.4	0.5	0.0	0.0	0.3	-0.6	0.3	0.7	0.9	0.1
Credit	5.0%	4.6%	2.4%	4.3%	7.3%	3.7%	1.6%	5.4%	4.4%	1.9%
vs prior 12	1.4%	-2.2%	-0.1%	-0.5%	-0.6%	-0.7%	-1.8%	-1.0%	2.6%	0.1%
Surprise	17	42	11	-12	-27	-12	-84	25	--	-72
vs 6-mo avg	21	18	25	-24	-41	-4	-69	16	--	-26
FX vs 200d	0.2%	-0.1%	1.2%	-1.0%	1.7%	-0.2%	-1.0%	-1.3%	1.7%	-1.1%

2/5/19	MACRO SCORECARDS - Eurozone									
	Germany	France	Austria	Belgium	Nether.	Finland	Italy	Spain	Portugal	Ireland
NOM GDP	3.0	2.2	3.9	2.6	4.8	4.4	1.5	3.2	3.3	4.7
vs yr Ago	-1.2	-1.4	0.0	-0.2	0.5	1.5	-0.8	-1.7	-1.0	-9.3
Lead. Index	99.8	99.1	100.2	99.4	99.7	99.0	99.4	98.9	99.3	98.2
6-mo ch.	-0.6	-1.0	-0.8	-0.8	-0.8	-2.3	-1.0	-1.1	-0.6	-1.4
PMI	49.7	51.2	52.7	--	55.1	--	47.8	52.4	--	52.6
6-mo ch.	-7.2	-2.1	-4.1	--	-2.9	--	-3.7	-0.5	--	-3.7
Core CPI	1.4	0.6	1.4	1.4	1.5	0.8	0.5	1.1	0.5	0.5
vs yr ago	0.0	-0.4	-0.8	-0.1	0.7	0.5	0.0	0.2	-0.7	0.1
Credit	4.8%	5.8%	6.0%	8.6%	-0.5%	4.9%	-3.7%	-2.6%	-1.3%	6.8%
vs prior 12	1.3%	0.0%	2.2%	3.8%	0.5%	2.1%	-0.7%	-1.0%	1.4%	5.5%
Surprise	-54	-198					-54	83		
vs 6-mo avg	-34	-106					-36	82		

2/5/19	MACRO SCORECARD - EM etc											
	Brazil	Mexico	Russia	Turkey	Poland	Sth Afr.	China	HK	Taiwan	Korea	Sing	India
NOM GDP	4.7	7.9	12.8	21.8	6.9	7.8	9.1	6.7	0.7	2.0	4.5	12.0
vs yr Ago	0.7	0.2	6.4	-3.0	-1.2	0.3	-1.6	-0.2	-1.7	-5.5	-0.2	2.5
Lead. Index	102.1	99.5	100.0	95.4	98.8	99.2	98.8			99.2		101.0
6-mo ch.	-1.1	1.1	-1.0	-4.8	-1.0	-0.8	-0.1			-0.7		0.4
PMI	52.7	48.2	50.9	44.2	48.2	49.9	49.5	48.0	47.5	48.3	50.7	53.9
6-mo ch.	2.2	-1.4	2.8	-4.8	-4.7	0.0	-1.7	0.3	-5.6	0.0	-1.6	1.6
Core CPI	3.6	3.7	3.7	19.0	0.4	4.4	1.8	2.5	0.5	1.2	1.9	5.7
vs yr ago	0.0	-1.2	1.6	6.8	-0.4	0.2	-0.4	0.8	-1.1	0.1	0.6	0.8
Credit	5.5%	10.0%		29.8%	4.1%	5.1%	13.5%	4.4%	4.5%	6.7%	3.0%	
vs prior 12	5.9%	-2.1%		5.9%	-4.8%	-1.6%	0.8%	-11.7%	-0.5%	0.1%	-2.6%	
Surprise	-4	-18	42	-79	-5	46	-21	-67	-21	61	-51	-52
vs 6-mo avg	3	-18	25	-63	-15	55	-2	-57	-20	81	-47	-79
FX vs 200d	4.7%	2.0%	0.0%	0.0%	-0.5%	2.9%	-0.1%	0.2%	-0.7%	-0.2%	0.7%	-1.8%

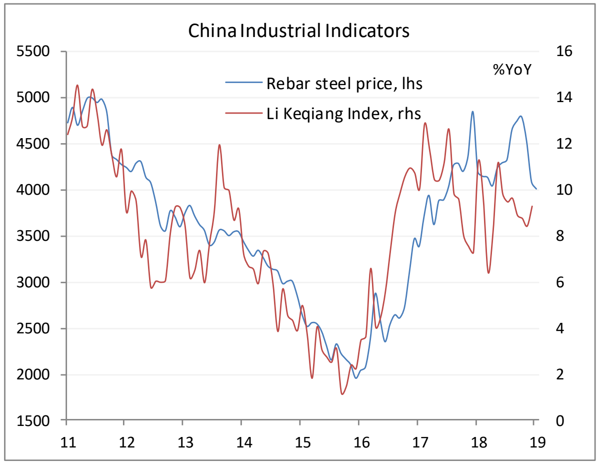
China: GDP and Current Account are stable

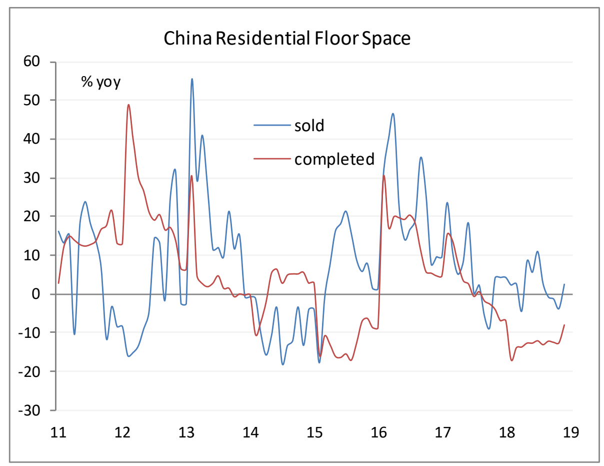


Official data shows a smooth step-down in Chinese GDP growth

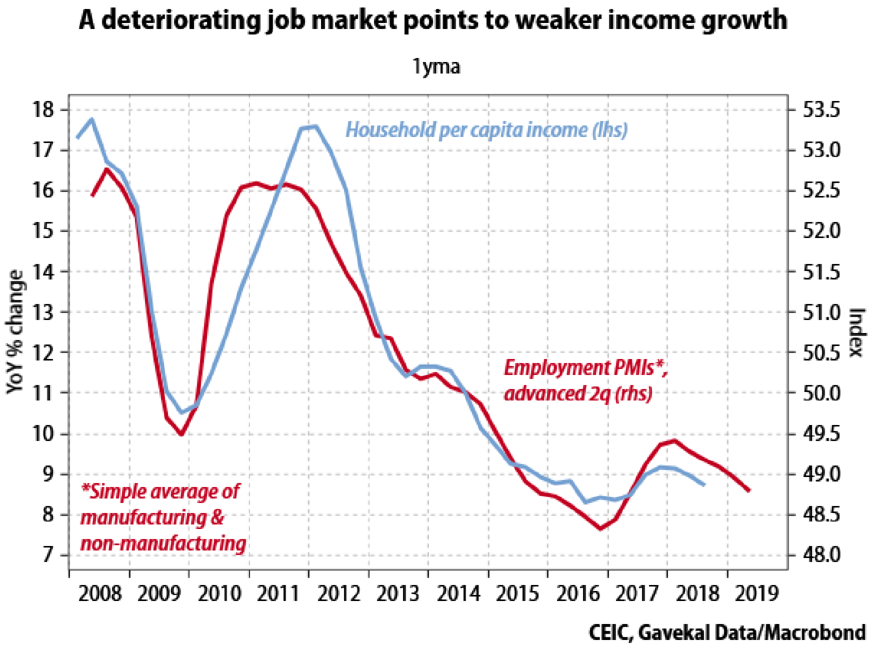
China has a persistent external surplus with the US but not the whole world

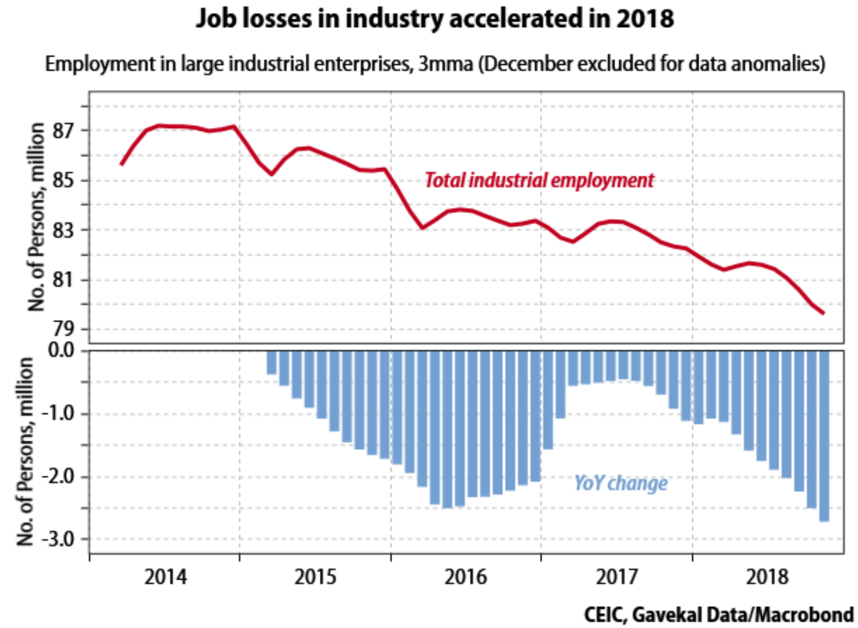
China: partial data are mixed





China: softer industrial jobs market

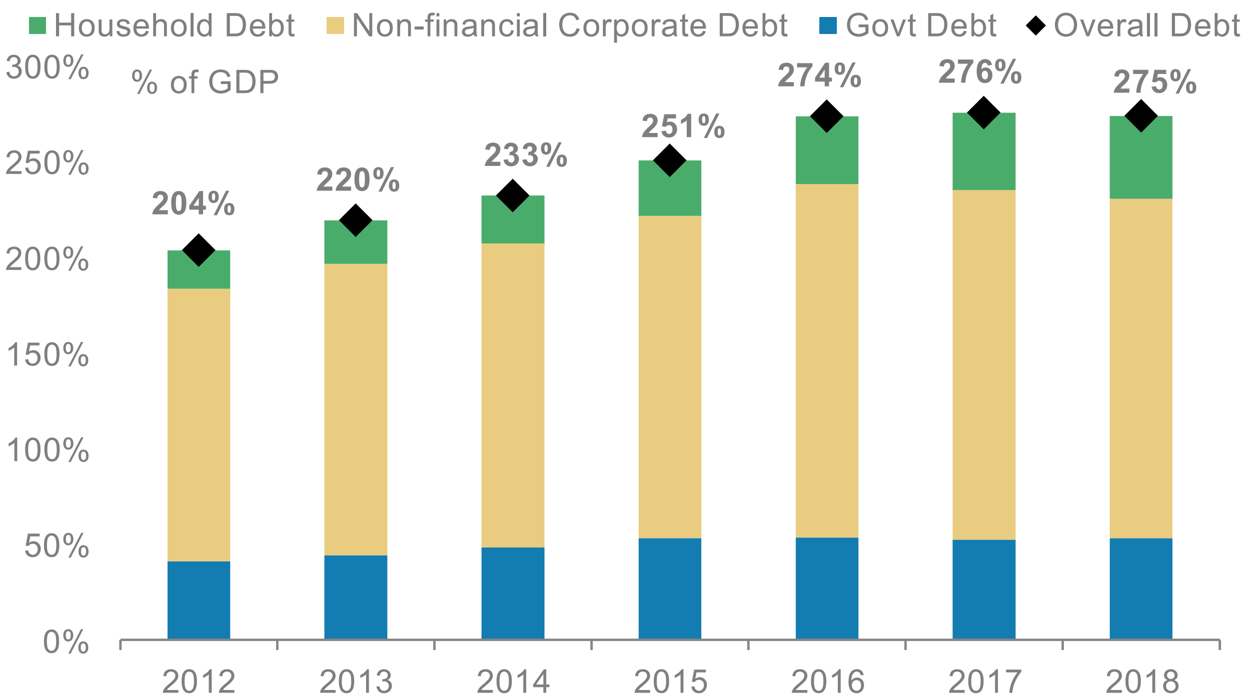




China industrial survey, which covers 374,000 large firms, shows that total employment had declined by about 2.8mn people over the 12 months to November. Export-focused light manufacturing sectors such as textiles, apparel and shoes had some of the biggest job losses, though jobs were also shed in domestically-focused heavy industry sectors.

China: Stabilizing debt is a conflicting objective

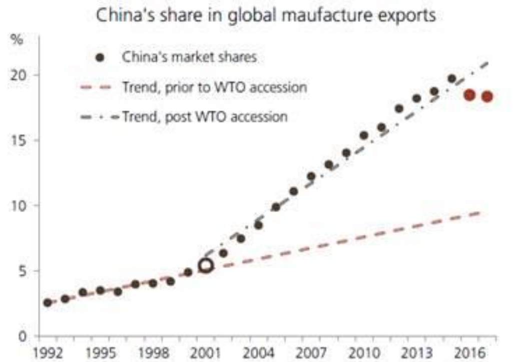
Debt to GDP in China has stabilized, led by corporate sector



Source: CEIC, WIND, Morgan Stanley Research

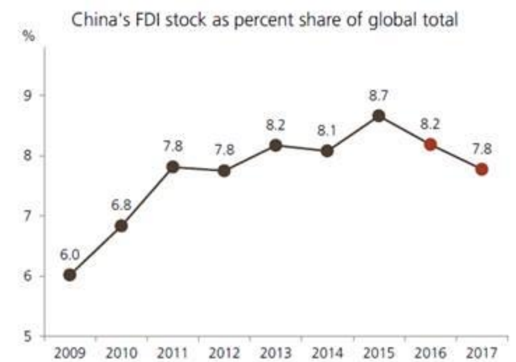
China: competitive edge already receding

Figure 1: After 20 years of rising, China's share in global manufacture exports started to fall in 2016



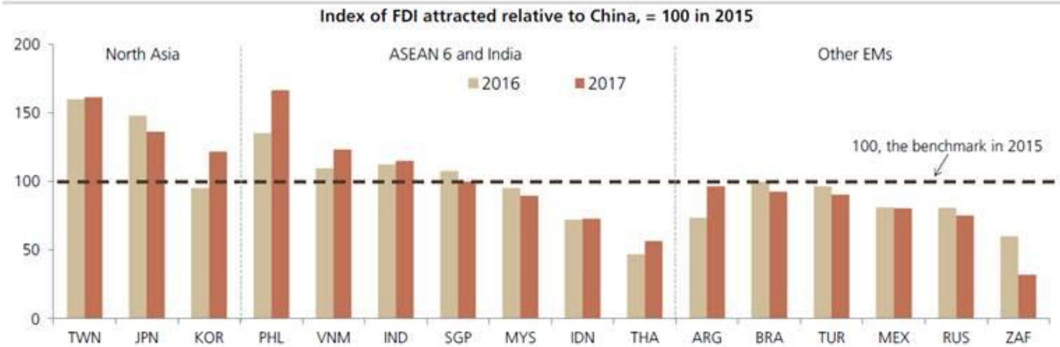
Source: UNCOMTRADE, UBS estimates Note: Based on exports excluding primary and resource-based products, covering SITC Rev.3 3-digit codes 511-899.

Figure 2: This turn also coincided with a decline of China's share in global FDI stock...



Source: IMF Coordinated Direct Investment Survey, UBS estimates

North Asia, Philippines, Vietnam & India have become more attractive to FDIs compared with China in recent years*



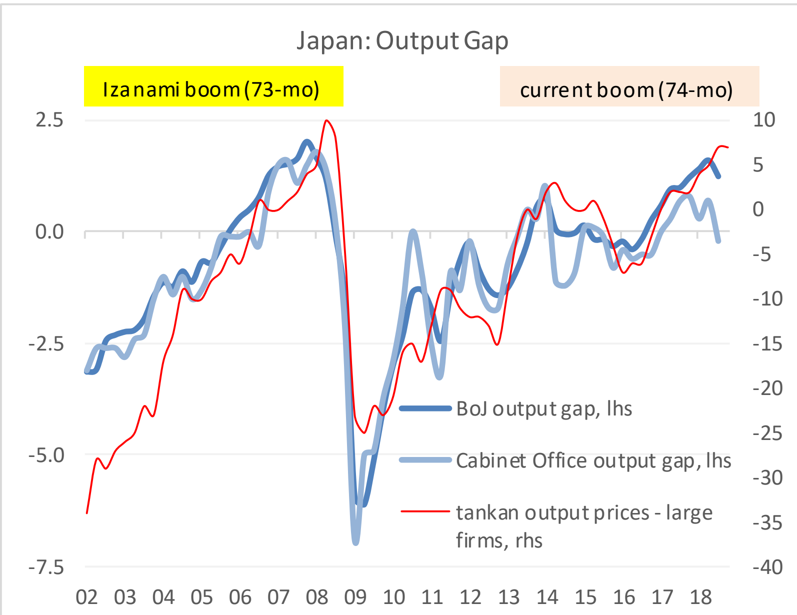
Source: UNCTAD, UBS * This chart compares FDI inflows attracted by each economy to China over time. The ratios (FDI inflows to the economy / FDI inflows to China) in 2015 are indexed to 100. Index values higher than 100 in 2016 and 2017 suggest that compared with 2015, the economy has become more attractive to investors relative to China. The calculations are based on 3-yr moving average of FDI inflows.

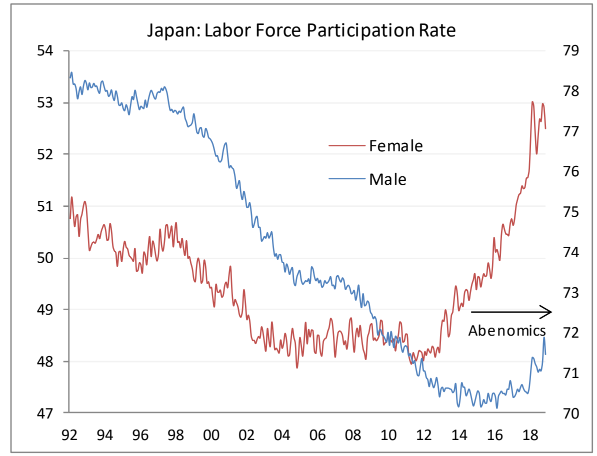
<u>UBS Report: "Away from China? To where? 1/15/19</u>

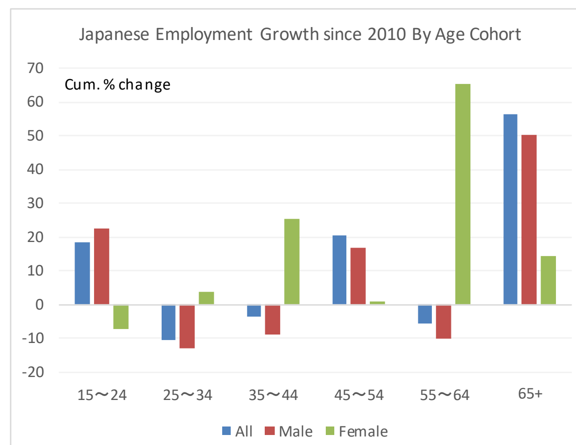
(i) We find FDI investors are indeed diversifying away from China, and the process seemed to have started well before the current US-China trade war.

(ii) Both macro evidence and UBS China CFO survey seem to suggest that the economies in Northeast Asia are investors' favored destinations for diversification

Japan's aging business cycle





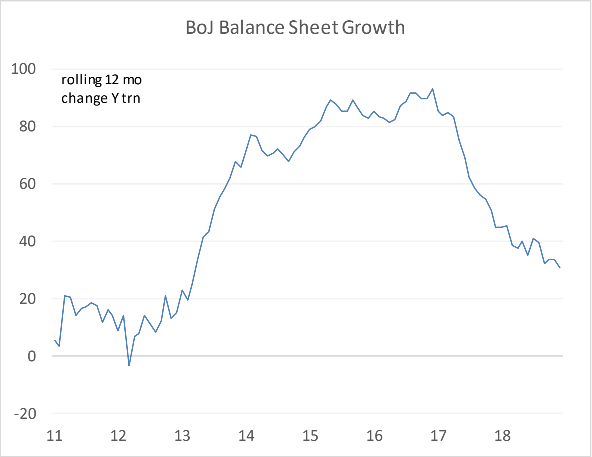


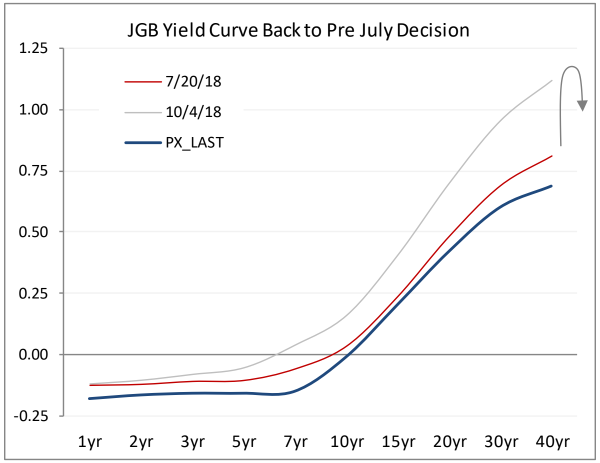
This expansion is supply side driven

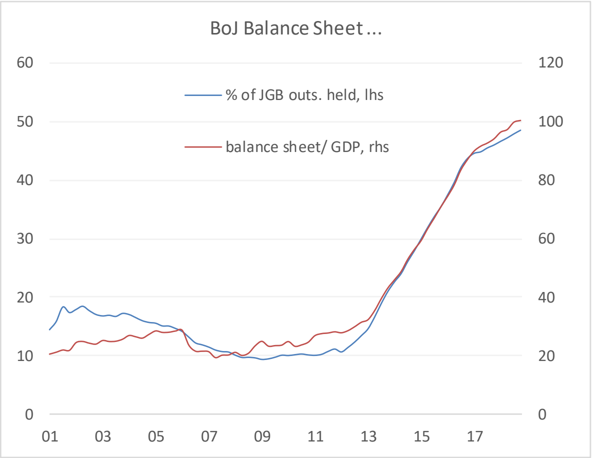
Current 'boom' reaches post WW2 record in length

Bank of Japan capitulates on outlook

BoJ Projections				
Real GDP growth				
	Jan 19	Oct'18	Jul'18	Apr'18
FY17	1.7	1.7	1.7	1.9
FY18	0.9	1.4	1.5	1.6
FY19	0.9	0.8	0.8	0.8
FY20	1.0	0.8	0.8	0.8
CPI ex fresh food, cn tax				
	Jan'19	Oct'18	Jul'18	Apr'18
FY17	0.7	0.7	0.7	0.7
FY18	0.8	0.9	1.1	1.3
FY19	0.9	1.4	1.5	1.8
FY20	1.4	1.5	1.6	1.8

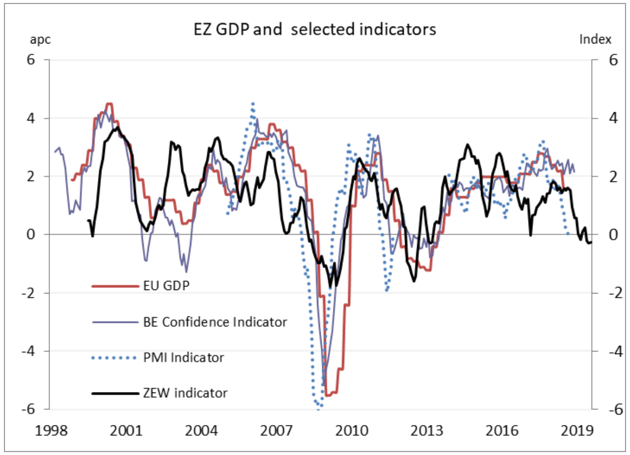






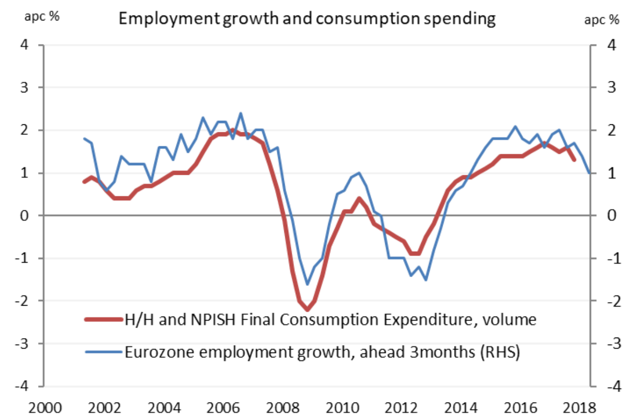
BoJ is saturated with JGBs

Euro Area - growth momentum slumps

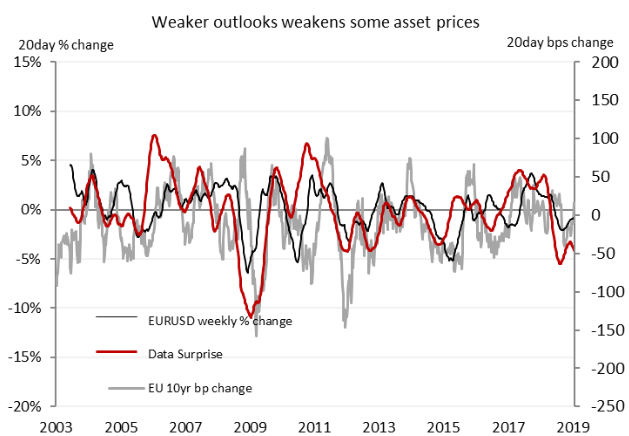


Growth is deteriorating.

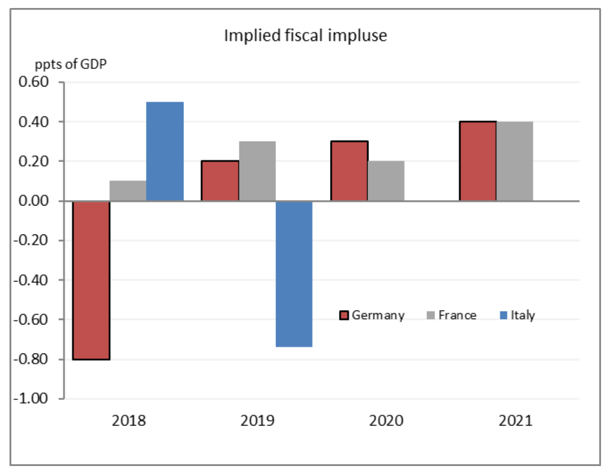
Predominately due to a lack of a second wind (leverage) and faltering China and global trade.



… and spending is weakening



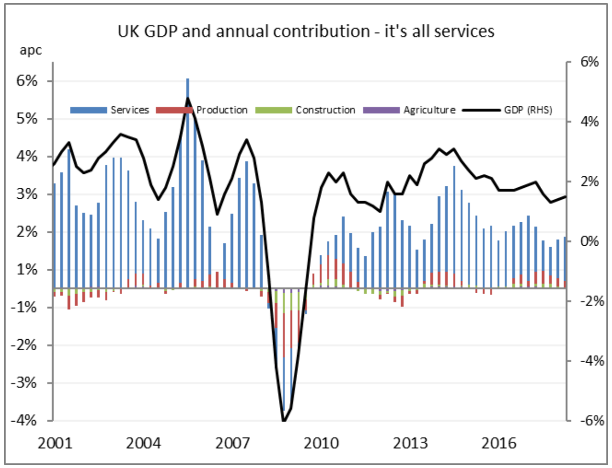
Asset prices are responding to surprise downside data prints



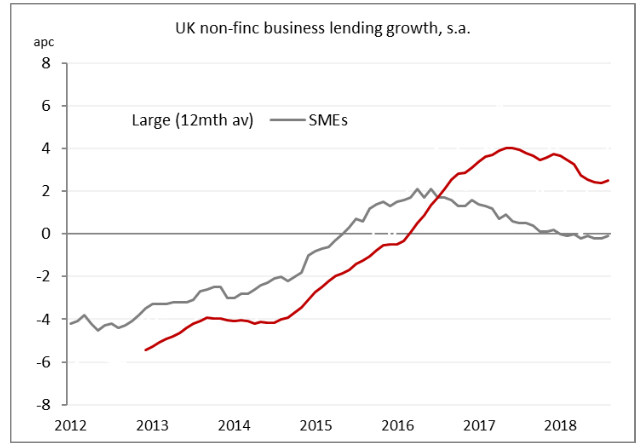
Government spending is limited, with Italy's fiscal boost at its limit without triggering a Excessive Deficit Procedure response by the EU.

CalPERS Investment Office Global Fixed Income

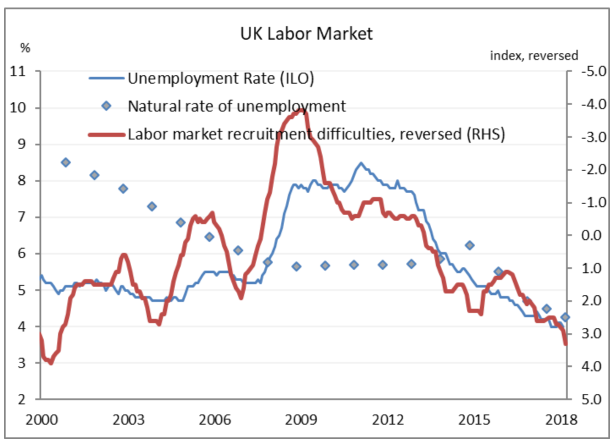
UK – tight jobs market keeps consumer spending, for now



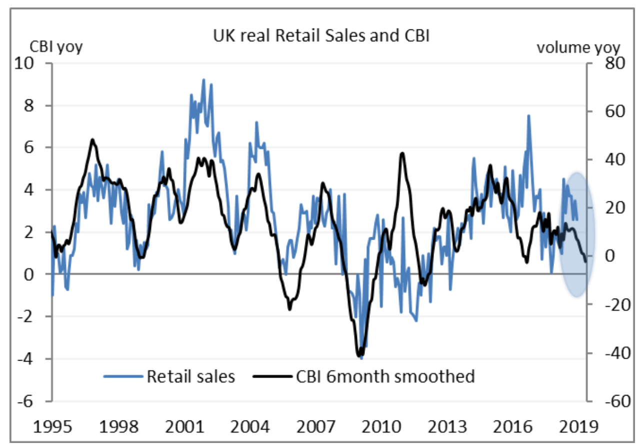
The consumer matters in the UK



Businesses are circumspect



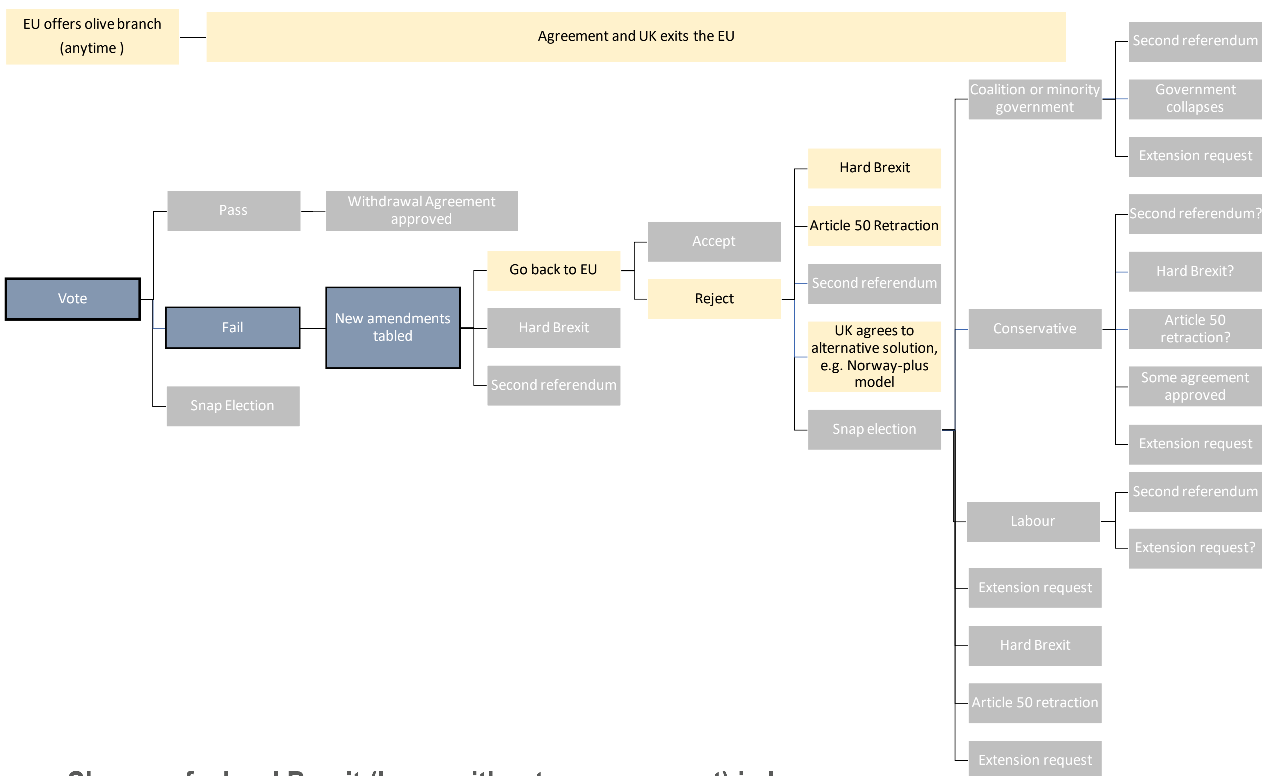
Labor market tightness remains but unemployment claims have turned

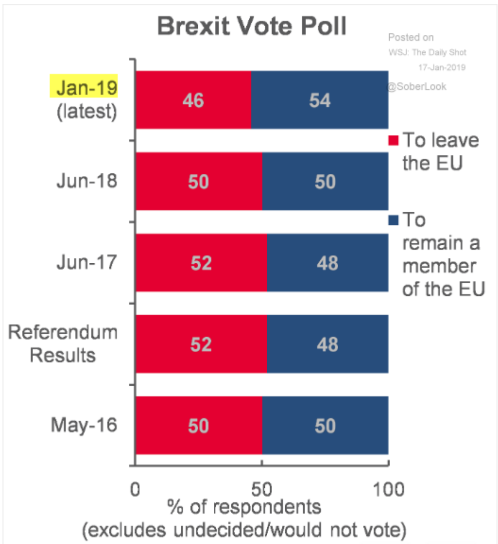


Forward indicators suggest slowing consumption into early 2019.

CalPERS Investment Office Global Fixed Income

UK risk – Brexit: Options remain wide open



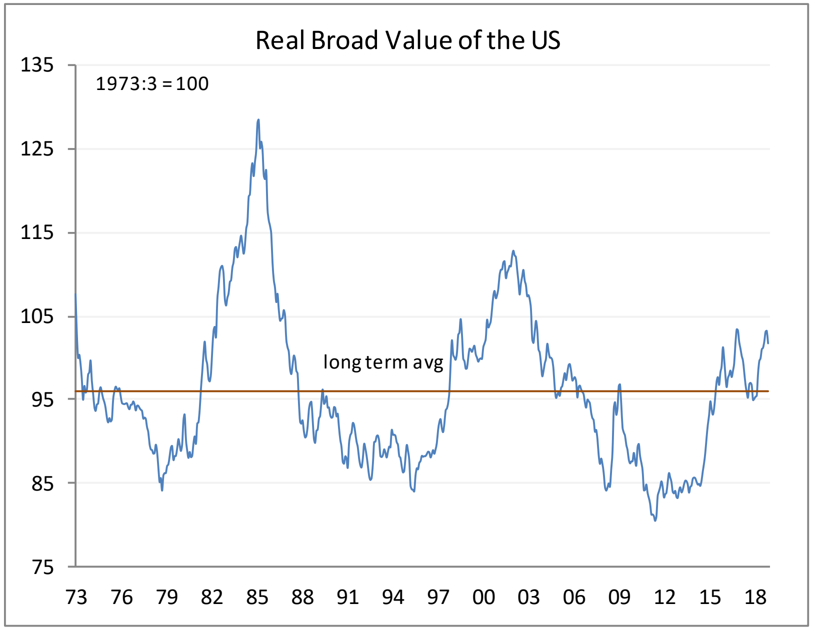


Sources: Scotiabank Economics, YouGov, Panelbase.

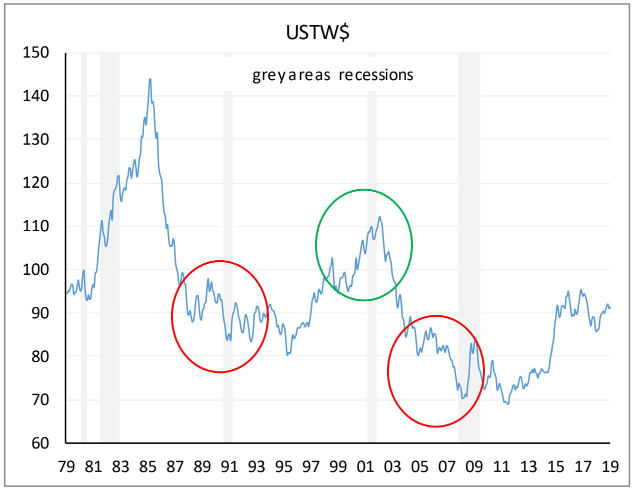
Chance of a hard Brexit (leave without an agreement) is low

- Fluidity remains; Parliament ruled out asking for an Extension but the EU welcomes it.
- Either the EU or the UK ‘red lines’ (refusal to move on a position) will need to budge to see a resolution.
- There is little political will for a second referendum.

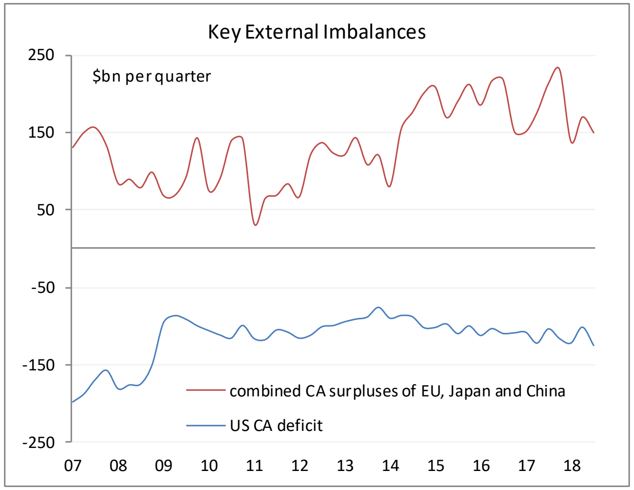
US dollar



Dollar is above its long term average

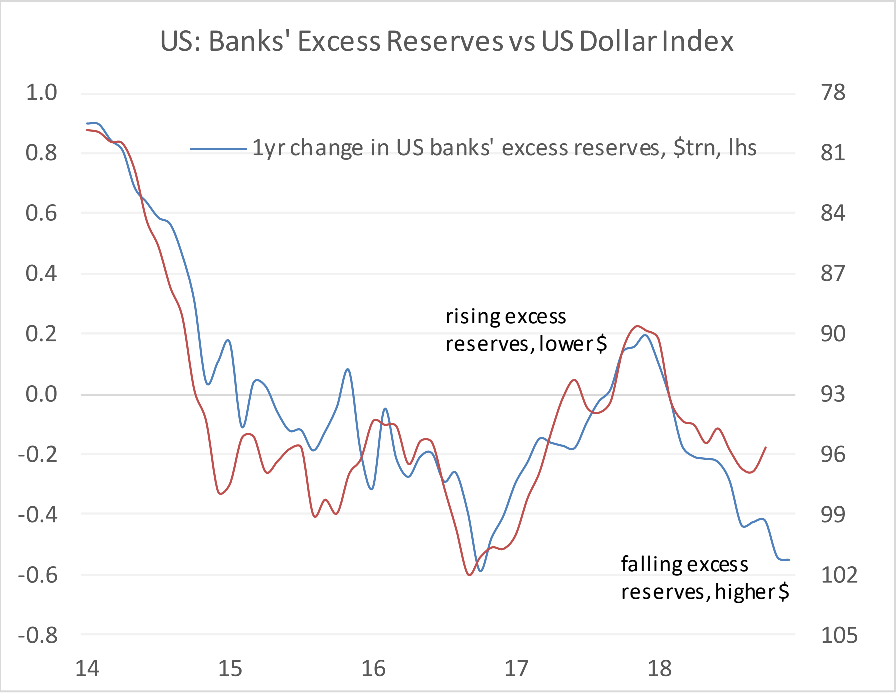


$ is not necessarily strong late cycle



Global imbalances are fairly stable = low FX vol

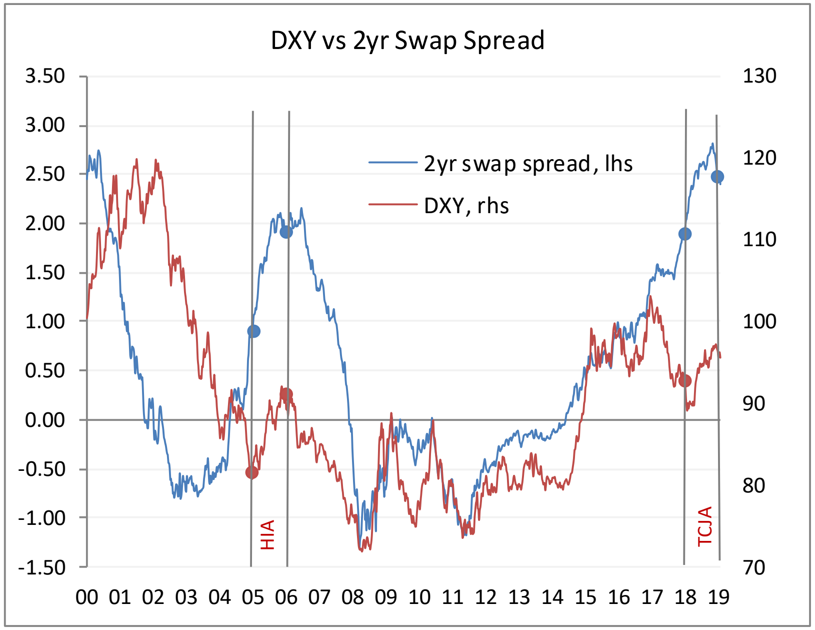
US dollar – benefit from tighter US liquidity may be waning

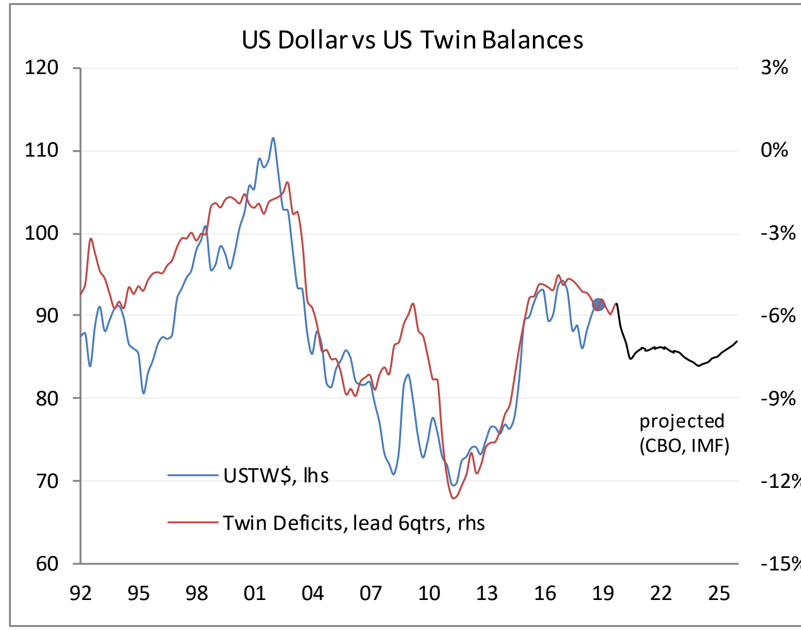


The US dollar appeared to benefit from less easy liquidity conditions in the US

… **but** less accommodative policy from the ECB – and a more wary Fed - may drive a wedge in that relationship

US dollar – may have reached peak support





Tepid USD response to attractive rates (and repatriation).

Rising twin deficits may compromise greenback