CHAO & COMPANY
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October 5, 2018

- The American economy is on fire, and there is no sign of retreat. We expect the third and fourth quarter to continue the above trend growth, and the U.S. will end 2018 closer to 3.5% real GDP than years of 2% growth. A meaningful slowdown is not anticipated until mid or late 2019, thanks to the deficit fueled animal spirit.
- The labor economy continues to be the bright spot. With new jobs creation remaining robust and quit rate on the rise, job prospect has not been this good for decades. There are more jobs opening than there are unemployed. The base case suggests that sooner or later, real wages will rise along with productivity.
- Chairman Powell laments that the neutral unemployment rate, the neutral inflation rate, and, thus, the neutral interest rate is unobservable. In fact, it is not at all certain which historical neutral rates the FMOC should refer to in setting today's r*. By definition, all data are backward looking and FOMC's role is to look forward. With uncertainty, Chairman Powell affirms that monetary policy should be applied moderately. This means a slow and steady (well broadcast) normalization process. The FOMC is expected to hike rates once more in December, and we expect two more next year. FOMC is mindful of rate hikes could invert the yield curve, thus placing constraints on the number of hikes in 2019.
- Chairman Powell is sensitive to not reacting to inflation concerns too early thereby cooling a good economy or acting too late and overheat the economy.
- The core PCE is now at 2%. From all indicators (market and survey-based), inflation remains in check and the long-term inflation expectation remains close to FOMC's 2% target. With continuing US economic strength, the USD should remain strong which checks inflation. In the longer-run we are biased towards higher inflation.
- Trump's trade policies may not have short-term negative impacts domestically, but, these policies, if sustained, could drive global growth slower and further exacerbate populism, tribalism, nationalism and deglobalization. The deck of cards is being reshuffled, and, if sustained, its impact remains uncertain to all parties.
- The U.S. economy is expected to grow at an above trend rate in 2018 and possibly 2019 (divergence), but as the rest of the world's economy is showing signs of slowing and the effects of the fiscal stimulus runs their course, it is inevitable that we will slow as well (more synchronized.) We are not predicting a recession through 2019.
- With the world's major central banks moving from accommodative to normalization policies in full force over the next two years, the global liquidity drain will add significant uncertainty to asset prices and risk taking.

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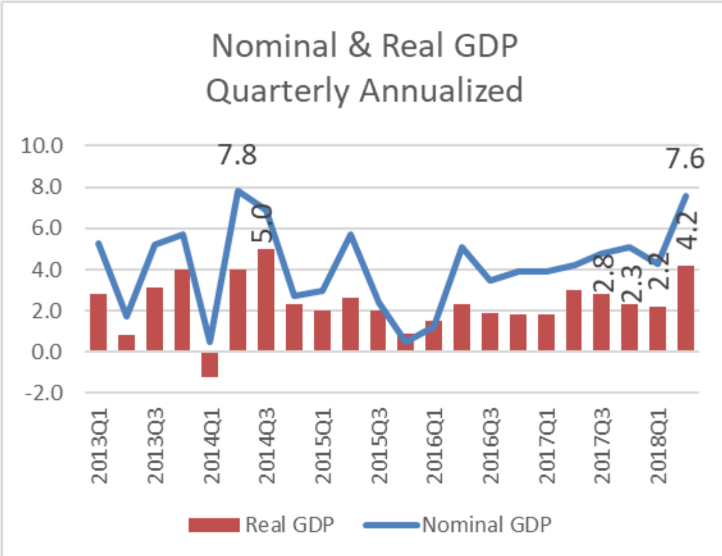
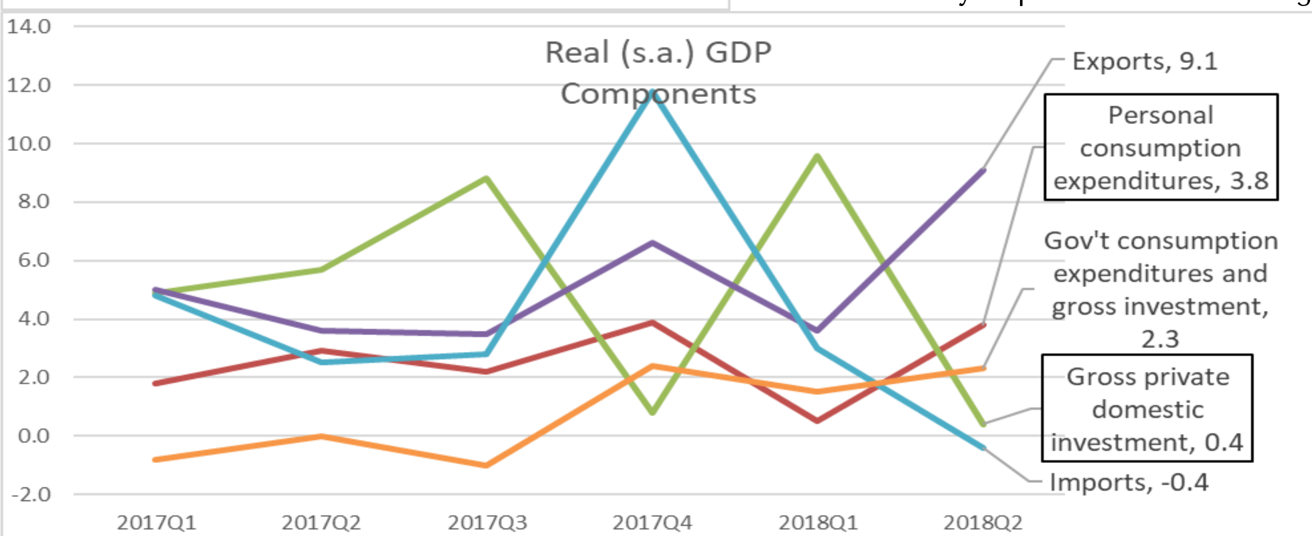
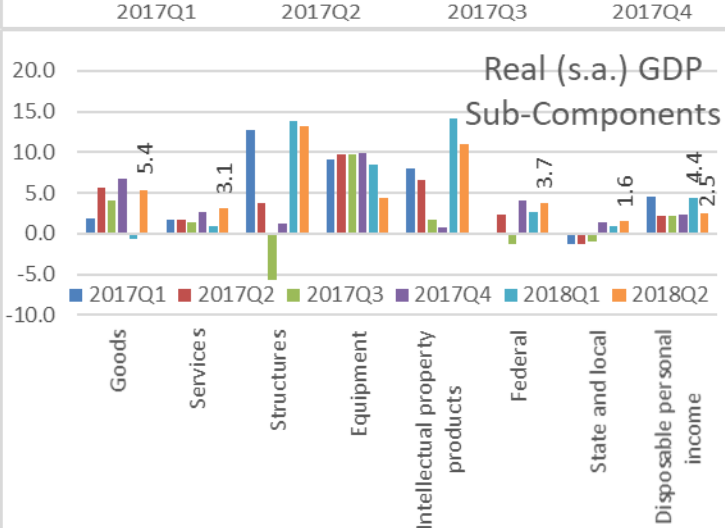
The American Economy — On Fire



The U.S. economy is truly benefiting from the Tax Cuts and Jobs Act that became effective this year. The third estimate for the second quarter GDP affirmed the second estimate of a 4.2% annualized rate. The normal growth rate was at 7.6%

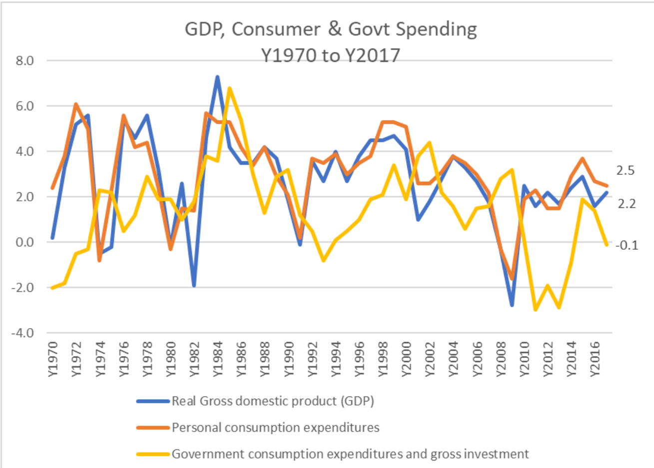
The robust economy in the second quarter (see chart below) was supported by strong consumer spending from 0.5% to 3.8% and positive government spending from 1.5% to 2.3%. Imports spiked (from 3.6% to 9.1%). This is likely to be caused by importers front-running

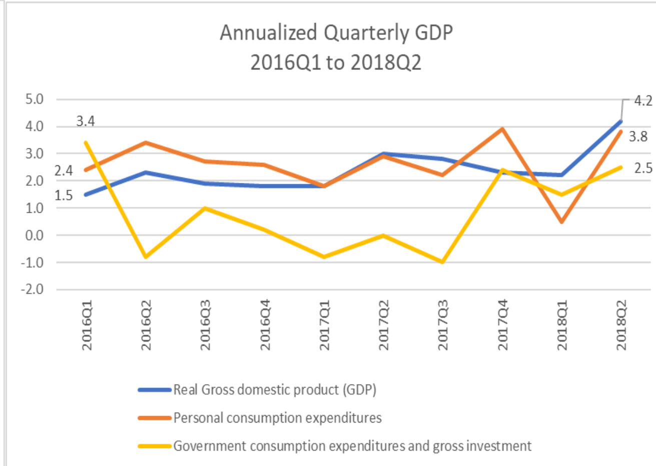


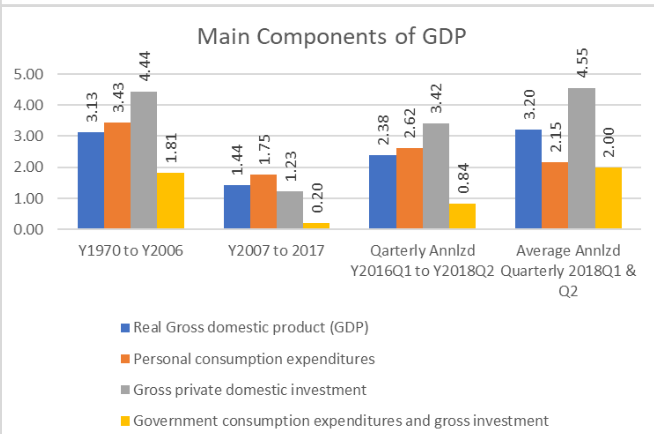


tariffs.

The left graph breaks down the subcomponents of the GDP data. Consumers were spending on goods as well as services even though it is disappointing that business spending (cap ex) is down from the prior quarter (structure, equipment and intellectual properties). This may simply be a pause for businesses to wait for a clearer sign on trade and policies. Disposable personal income is also down from the prior quarter.





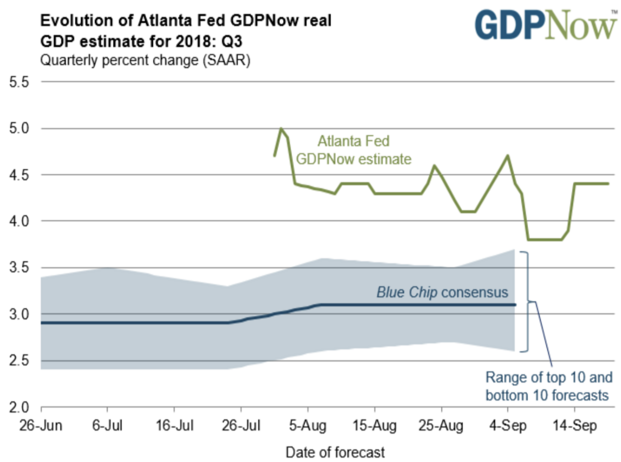


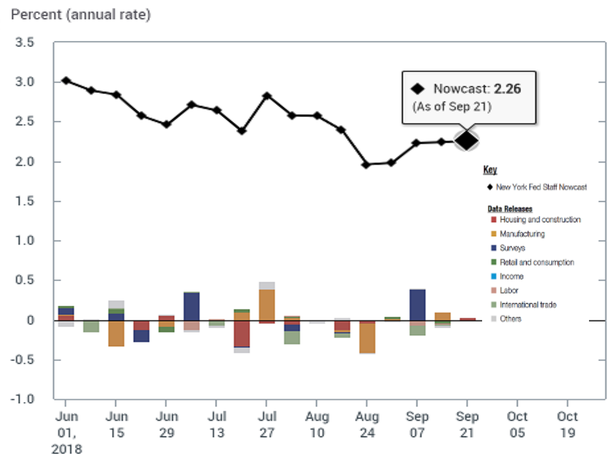
The four main components that make up the GDP are consumer spending, private domestic investment (capital expenditure), import/export and government consumption and investment. Due to the volatility of import/export and capital expenditure, they are excluded in two of the three graphs on this page. The upper left graph shows the real GDP since 1970 through last year, and the 2007-2008 Financial Crisis led Great Recession caused a substantial reduction in GDP (blue). With roughly 70% of the domestic economy represented by personal consumption, the drop in consumption was equally severe (red). Fiscal spending (government spending) spiked during the crisis (yellow) and then rapidly dropped off. Starting in Y2010, consumer spending recovered while government spending remained negative, on average, through 2016. The upper right graph summarizes the real GDP on an annualized quarterly basis since the first quarter of 2016. This shows that government spending and investment turned positive in 2017Q4 and capital expenditure also turned up from 1.5% annualized in 2016Q1 to 4.2% in 2018Q2. Finally, consumer spending is now at 3.8% when compared to 2.4% annualized in 2016Q1. The lower left graph above includes four blocks that capture Real GDP, Personal Consumption, Capital Expenditure and Government Spending:

(1) Average annual rate from Y1970 to Y2006 (prior to the GFC) – BLOCK ONE
(2) Average annual rate from Y2007 and Y2017 (i.e. GFC forward) – BLOCK TWO
(3) Average annualized quarterly rate from 2016Q1 to 2018Q2 – BLOCK THREE
(4) Average annualized quarterly rate for 2018 – BLOCK FOUR

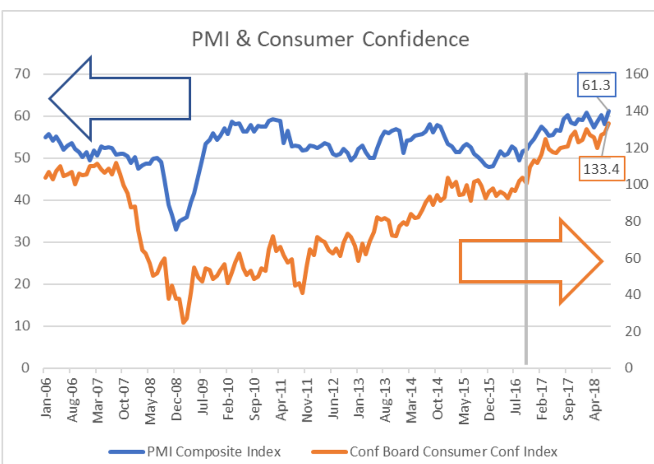
BLOCK ONE can be termed the old normal and BLOCK TWO the new normal, then BLOCK THREE is demonstrating a gradual return to the old normal through the first two quarters in 2018 and BLOCK FOUR suggests that the trend of growth and recovery since Y2007 is almost complete. The question now is how sustainable is the current rate of growth. We do not believe this is a new secular growth path.

Good Times to Continue — for now





Both the Atlanta Federal Reserve and the New York Federal Reserve intend to provide the public with real time, data-based assessments of where the U.S. GDP is expected for the current quarter, they have continued to diverge. Currently, the Atlanta GDPNow is projecting a 4.4% quarter. The consensus of the Blue Chip economists surveyed suggests a 3.1% growth rate, and the New York Nowcasting is projecting a 2.26% for the third quarter. We believe it is likely to be closer to 4% than to 2.5% for this quarter with the labor economy continuing to improve and surprise on the upside.



With the economy expanding for 112 consecutive months and picking up steam, the Institute for Supply Management Purchasing Manager Index[1] (PMI) has increased 3.1% in August to 61.2% (highest since 2005) from July's 58.1%. At the same time, the Conference Board's Consumer Confidence Index[2] has reached its highest level since October 2000 and is now at 172.2 from July's reading of 166.1. Consumers stating business conditions are "good" increased from 38.1% to 40.3%, while those saying business conditions are "bad" declined from 10.3% to 9.1%.

For the near term, the U.S. economy is expected to continue to grow at an above trend (more than 2.5% real rate) rate. This is resulting from the massive pro-cyclical fiscal policy of tax cuts. Even though trade disputes with our closest and biggest trading partners remain unresolved, for now the impact appears to be muted. Tax reform and its benefits to businesses and taxpayers will not likely lose their impact until mid-2019. For now, the U.S.

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[1] https://www.instituteforsupplymanagement.org/ISMReport/MfgROB.cfm?SSO=1
[2] https://www.conference-board.org/data/consumerconfidence.cfm

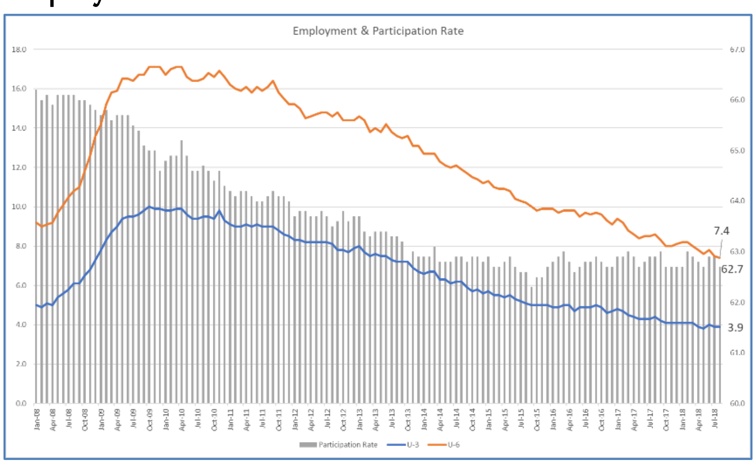
economy remains red hot. The question is has this stimulus altered the lower growth rate trend of the past and put us on a higher trajectory. With fiscal stimulus behind us, the market is substantially relying on sentiment, which is quite fickle. The following is the current U.S. economic forecast from the Conference Board[3].

THE CONFERENCE BOARD ECONOMIC OUTLOOK, 2017-2019
Percentage change, seasonally adjusted annual rates (except where noted)

	2017	2018				2019		2017	2018	2019
	2nd half	I Q*	II Q*	III Q	IV Q	1st half	2nd half	ANNUAL	ANNUAL	ANNUAL
Real GDP	2.6	2.2	4.2	3.9	3.5	2.9	2.4	2.2	3.0	3.1
Real Consumer Spending	3.1	0.5	3.8	3.3	2.9	2.6	2.5	2.5	2.6	2.8
Residential Investment	5.3	-3.4	-1.6	-1.0	2.0	2.0	2.0	3.3	0.4	1.4
Real Capital Spending	4.1	11.5	8.5	6.1	5.8	5.5	5.1	5.3	7.4	5.8
Exports	5.1	3.6	9.1	-1.0	4.1	4.0	4.0	3.0	4.6	3.7

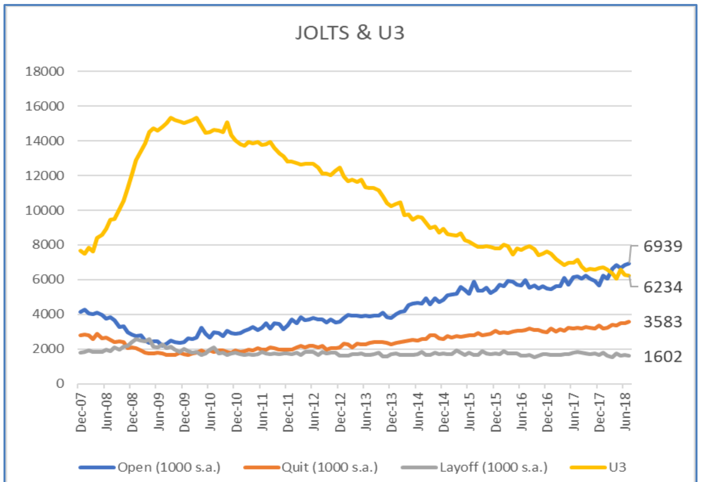
* Actual Value

Employment Continues to Shine

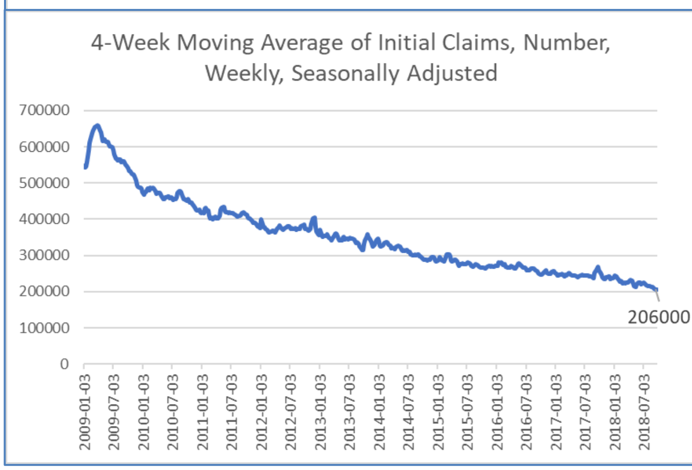


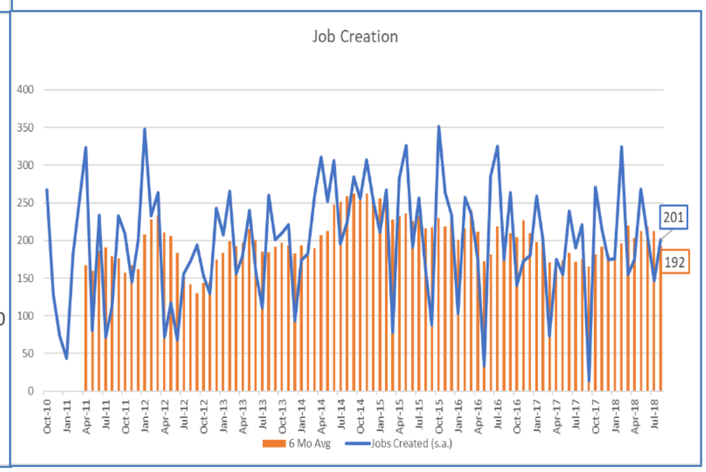
Just since January 2018, the official unemployment rate (U3) has dropped from 4.1% to 3.9% in August while the broadest measure for unemployment (U6: includes all persons marginally attached to the labor force plus total employed part-time for economic reasons, as a percentage of the civilian labor force, plus all persons marginally attached to the labor force) has remained at 62.7%. The fact that the U6 rate is stable during a period of time that the Baby Boomer generation is beginning to exit the workforce should be noted. The drop from 66.2% to 62.3% in September 2015 was significant, and since then, the U6 rate has stabilized.

[3] https://www.conference-board.org/data/usforecast.cfm

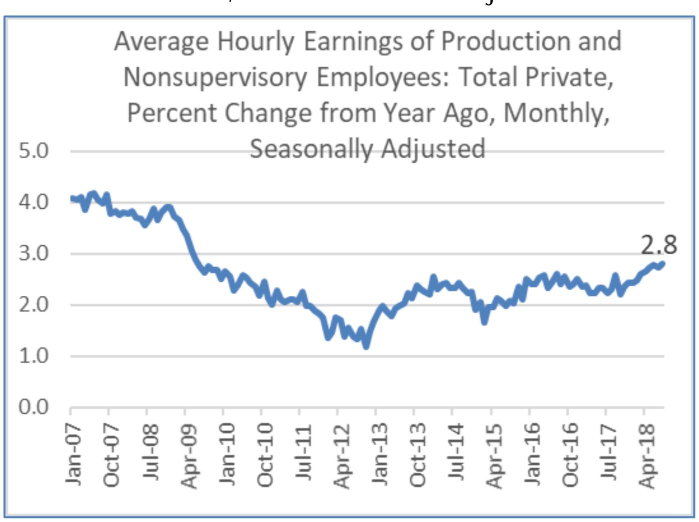


According to the latest (July) Job Openings and Labor Turnover Survey (JOLTS) from the Bureau of Labor Statistics, job openings are at 6.939 million against 6.234 million of unemployed (U3). As unemployment continues to drop, there is now more than one job opening for every person unemployed (skill mismatch not withstanding). 1.602 million were laid off and continue to drop while 3.583 million have reported quitting their jobs and the trend continues to increase.





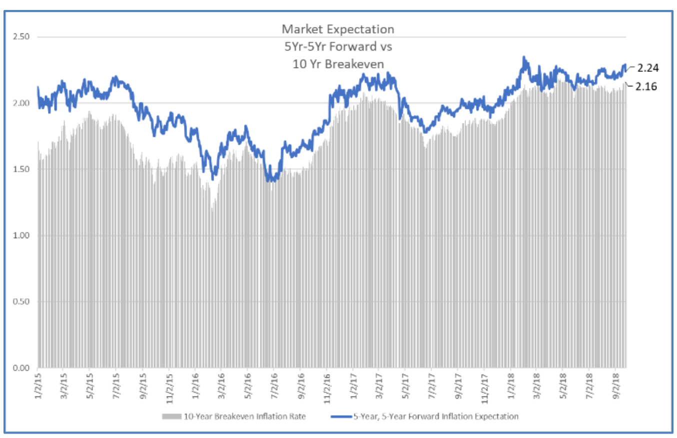
Workers' willingness to quit is a sign that alternative jobs are available and these workers feel secure to quit and be placed in a new job to equal or better pay. The above lower left chart shows that the weekly average initial jobless claims continue to drop. The latest average for the 4-weeks is 206,000 as of September 22. The above right chart shows August new jobs created was 201,000 at an average 6-month rate of 192,000. This level continues to surprise economists that, after 18.7 million jobs created since October 2010, this economy is still able to create almost 200,000 new jobs per month. What is obvious is that economists and policymakers have underestimated the slack in the labor economy since the Great Recession and that the neutral rate of unemployment or the non-accelerating inflation rate of unemployment (NAIRU) is lower to much lower than the past.



This left chart shows the average hourly wage increase since March 2007. For the month of August, the rate of increase was annualized at 2.8%. After adjusting for inflation, wages are almost flat.

For the quarter ending June 30th, the seasonally adjusted compensation costs for civilian workers increased 0.6% with wages and salaries making up about 70% of compensation costs. The Employment Cost Index for the private industry, which includes wages and benefits, increased 2.9% for the 12-month period ending in January 2018 and increased 2.4% in the 12-month period ending June 2017. By comparison, as illustrated in the bottom graph on the prior page, pure hourly wage rose 2.8% for the 12-month period ending in June 2018 and increased 2.2% in June 2017. Although the trend is up and continuing, the rate of change remains unimpressive. Yes, wages are on the rise, but economists and policy makers are expecting a higher rate of change in today's very low unemployment (or fully employed) environment. Perhaps this will be occurring from here forward as jobs become more plentiful with fewer available workers to fill them. Wages, logically must rise. For a period, workers were pleased to just get employment and were willing to accept a lower income. With the Baby Boomers retiring, they are replaced by lower wage, younger workers which also placed a dampener on wages. This may all change going forward as the economic expansion is reaching the late stage.

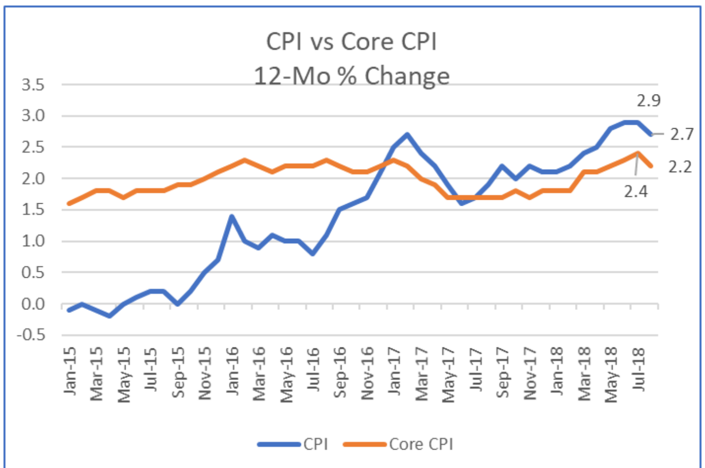
Anticipating Inflation

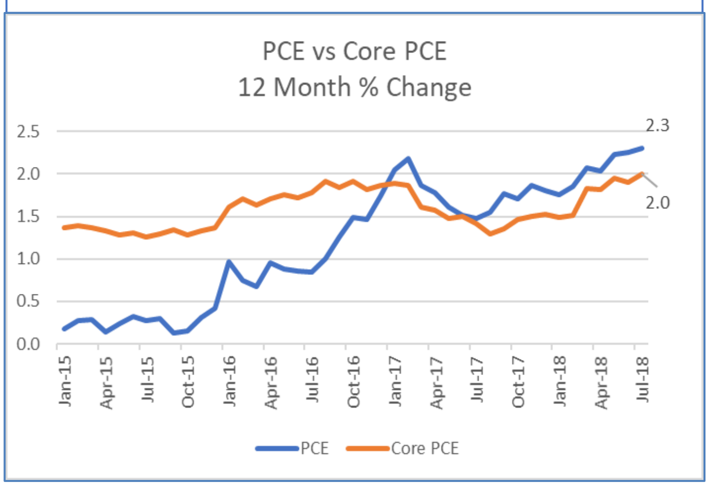


The left chart shows the market expectations for long-term inflation. The blue line represents market participants' views of what 5-year forward inflation is expected to be 5-years from today (i.e. 5-year-5-year forward contract). The bar graph shows the 10-year breakeven for 10-year U.S. treasury bond and TIPS of the same maturity. This means that market participants expect the inflation rate to be at 2.16% 10-years from now. This is close to the 2.24% 5-year forward rate.

The inflation rate has been on a downward trajectory since the high reached in the 1980s. This trend took a further step down during the Great Recession and the Global Financial Crisis. Low inflation has been a global phenomenon. Some of the reasons cited for the low inflation environment are over capacity, technology innovations over the past 25 years, which also reduced unit labor cost, the advent of the sharing economy, and the aging demographics. This aging trend is made up of falling fertility and rising longevity and creates fiscal strains while reducing output growth. Furthermore, it raises dependency and demand on family support systems and public safety nets. This change in demographics alters saving and investment behaviors, consumption patterns, the size of the workforce and, consequently, potential employment and output growth, the rate of productivity growth, and other key macroeconomic variables. Furthermore, the changing consumption patterns (as expressed in the Franco Modigliani life-cycle theory) and the loss of human capital are all disinflationary.

Although Japan has been the front runner of this mega shift, the rest of the world is not far behind, and we will continue to confront the impact of an aging population for the next fifty years. So, in the long run, these are unyielding macro factors that would likely place downward pressures on inflation. Of course, there are many factors that may counteract these forces during intervening periods.





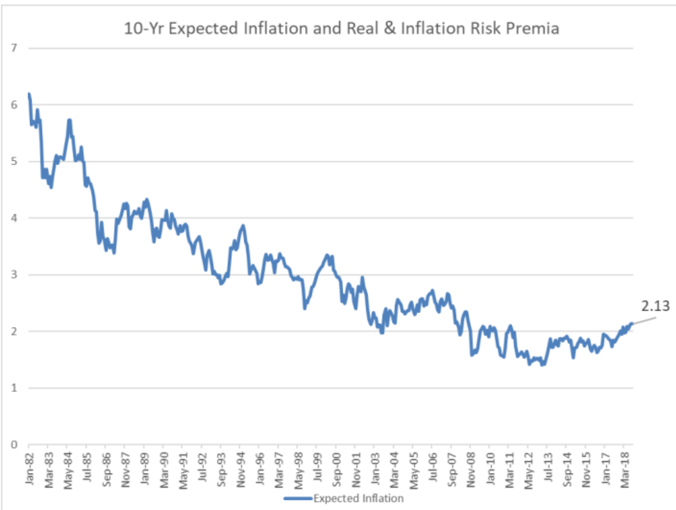
After 10-years of unprecedented support from monetary policies and the recent significant fiscal stimulus in the form of a 10-year tax cut, we have (thus far) observed little impact on inflation. The top left chart plots the Bureau of Labor Statistics produced headline Consumer Price Index (CPI) against the core Consumer Price Index (in red) which excludes volatile food and energy components (core CPI). Although headline inflation (which is used to adjust Social Security Payments and Treasury Inflation Protection Securities) has risen over the years, core CPI has stayed fairly constant. The August figures show that core CPI has dropped from July's 2.4% to 2.2%.

The alternative[4] inflation gauge published by the Bureau of Economic Analysis is the headline Personal Consumption Expenditure (PCE). The preferred inflation measure of the FOMC is the core Personal Consumption Expenditure which excludes volatile food and energy components (core CPE). The second chart shows the most recent values where the PCE (in blue) is at 2.3% from the prior month of 2.2% and the core PCE at 2.0% from the prior month of 1.9%. 2% core PCE happens to be the FOMC's long-term inflation expectation objective. Now, the question is will it be sustainable. Furthermore, FOMC has repeatedly expressed the tolerance for overshooting the 2% target and the

[4] https://www.clevelandfed.org/newsroom-and-events/publications/economic-trends/2014-economic-trends/et-20140417-pce-and-cpi-inflation-whats-the-difference.aspx

willingness to sustain a higher inflation rate for a period of time to make up for the shortfall suffered over the past years (FOMC symmetry.) This would allow the economy to run "hotter" for a period (within reason of course) to give greater assurance that the return to the 2% target is not transitory. So far, however, we have not seen inflation above 2%, yet the FOMC has been on a path of rate hikes. Perhaps the FOMC deems the current hikes as part of normalization and not increasing rates to fend off inflation.

The Cleveland Federal Reserve Bank[5] prepares a projection of future inflation expectations each month using the following data input: (1) Blue Chip forecast of CPI, (2) inflation swap data, (3) CPI numbers for the current month, (4) CPI data from vintage FRED, (5) 1-month to 6-month treasury bill yield at constant maturity, (6) 1-year to 15-year US treasury yield: continuously compounded zero-coupon, and (7) survey of Professional Forecasters median year-over-year CPI inflation rate for the next 10 years. The left chart shows the latest estimate for current expectations of the inflation rate over the next decade is on average at 2.1%. This closely represents the 2% long-term inflation target and is consistent with market-based and other survey-based projections. The Cleveland Fed also uses nowcasting to project the rate of inflation in the near term. The table below shows the projections[6].



Monthly Inflation Nowcasting

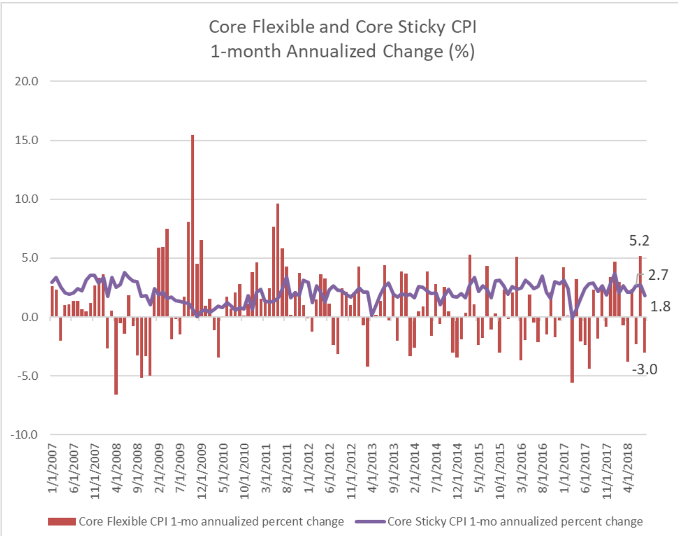
	Inflation, month-over-month percent change				
Month	**CPI**	**Core CPI**	**PCE**	**Core PCE**	**Updated**
October 2018	0.30	0.18	0.23	0.16	10/05
September 2018	0.16	0.18	0.14	0.16	10/05

	Inflation, year-over-year percent change				
Month	**CPI**	**Core CPI**	**PCE**	**Core PCE**	**Updated**
October 2018	2.61	2.23	2.07	1.87	10/05
September 2018	2.39	2.25	2.01	1.97	10/05

Inflation nowcasts are produced with a model that uses a small number of available data series at different frequencies, including daily oil prices, weekly gasoline prices, and monthly CPI and PCE inflation readings. The model generates nowcasts of monthly inflation.

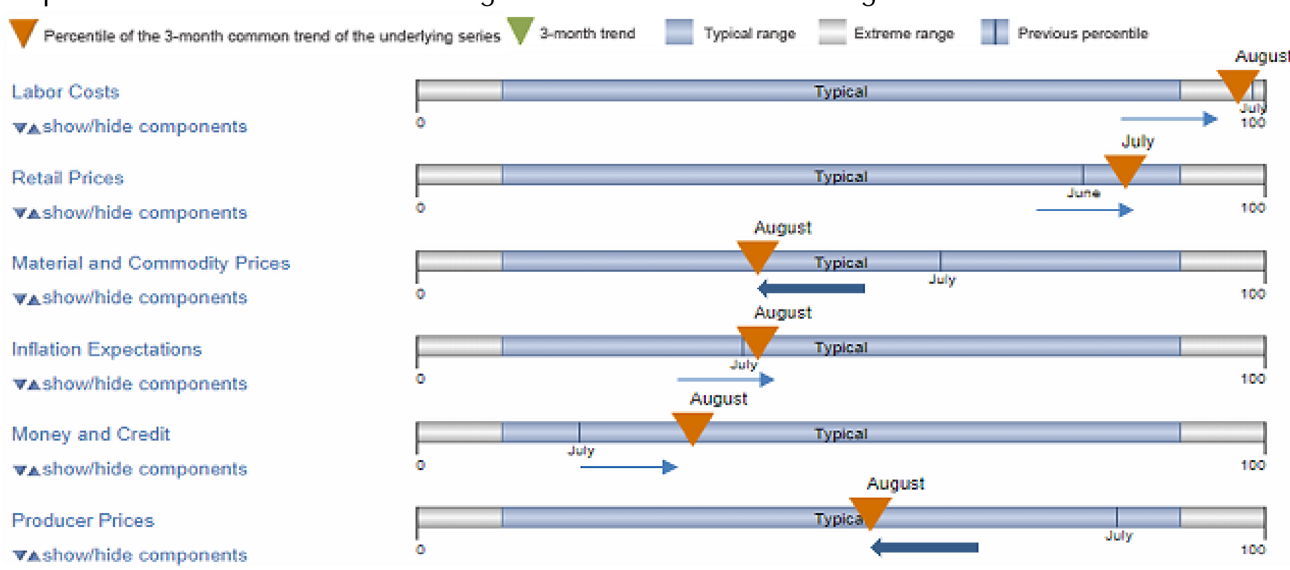
[5] https://www.clevelandfed.org/our-research/indicators-and-data/inflation-expectations.aspx
[6] https://www.clevelandfed.org/our-research/indicators-and-data/inflation-nowcasting.aspx

According to this latest nowcast, the projection is consistent with others that the Core CPI is a bit above 2%, whereas the core PCE is at 2% (rounded up).



For more current inflation measures, the Federal Reserve Bank of Atlanta approaches CPI inflation measures in a slightly different way. Their method breaks out the basket of goods in terms of prices being sticky or flexible. Some prices are "sticky" which means that they may not respond to changing market conditions as quickly as other more "flexible-price" goods. And because sticky prices are slow to change, it seems reasonable to assume that, when these prices are set, they incorporate expectations about future inflation to a greater degree than prices that change on a frequent basis. As expected, prices of core sticky goods are less volatile than the core flexible goods' prices. In August, the core sticky CPI was 1.8% annualized vis-à-vis 2.7% in July, whereas the core flexible CPI was at "negative" 3% vis-a-via 5.2%. A more detailed explanation of the two types of CPI can be found on the Atlanta Fed website[7]. In anticipating future inflation, we tend to place more emphasis on the core sticky CPI reading, which remains rangebound and in-check currently.

Finally, the Federal Reserve Bank of Atlanta offers an inflation dashboard[8] providing a quick snapshot of the most current changes and the vectors for longer-term trends.



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[7] https://www.frbatlanta.org/-/media/documents/research/inflationproject/stickyprice/sticky-price-cpi-supplemental-reading.pdf

[8] https://www.frbatlanta.org/research/inflationproject/dashboard/#

All of the 30 factors are grouped into six broader categories: labor costs, retail prices, material and commodity prices, inflation expectations, money and credit, and producer prices. They are basically data that help to inform us on supply push, demand pull and financial conditions impacting future inflation.

- Labor Costs continue to **move higher** and out of the "typical range". This is a weighted average of the following factors:
    - 3-month annualized change in Average Hourly earnings for Production and Nonsupervisory workers in private industries (Source; BLS)
    - 3 month moving average of Civilian Unemployment Rate – age 16 and older (source: BLS)
    - 3 months moving average NFIB Percent Rising Worker Compensation Net over the past 3-6 months
    - 3 month moving average of Initial Claims for Unemployment Insurance, State Programs, Weekly Average (source: DOL)

- Retail Prices have **moved higher** towards the upper part of the "typical range" and are a weighted average of Core CPI, Median CPI, Trimmed-mean CPI, PCE Price Index, Core PCE Price Index and Trimmed-mean PCE Price Index.

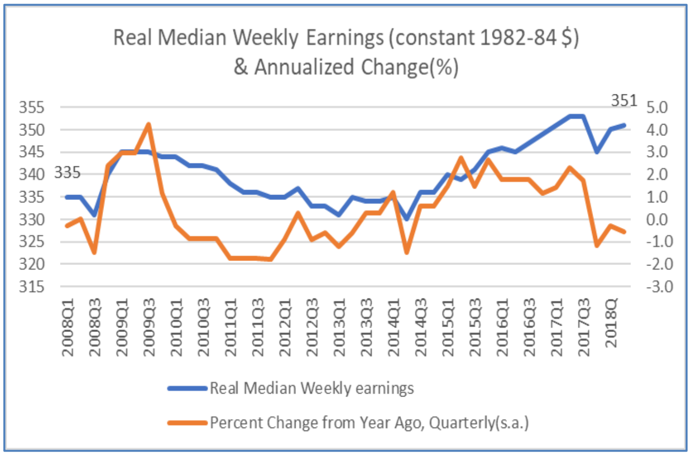
- Material and commodity prices have **moved lower** based on the four weighted indexes of crude PPI, core crude PPI, raw industrial material prices (CRB Spot Index), and ISM Manufacturing Price Index.

- Inflation expectations have **nudged higher** a bit based on the weighted factors of TIPS 10-year, University of Michigan Household Inflation Expectations 1-year ahead, and Sticky Price CPI.

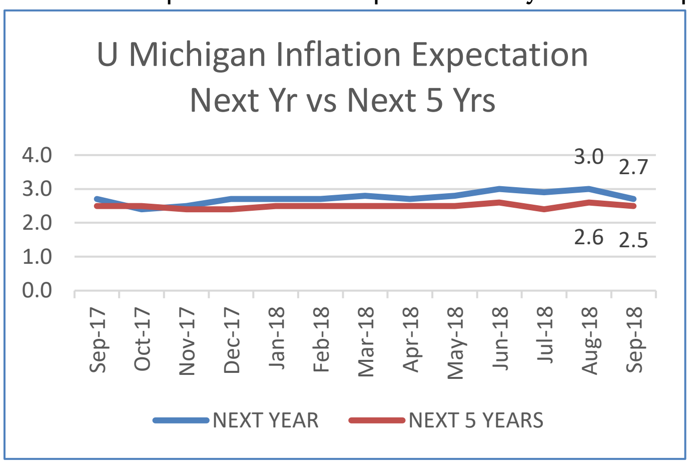
- Money and credit moved higher and remain in the lower 1/3rd range based on the weighted average of the Monetary Base, M1, M2, and Bank credit.

- Producer prices have **moved down** significantly from the top to the mid-range based on the weighted factors of Core PPI, Intermediate PPI, Core Intermediate PPI, manufacturing PPI and capacity utilization.

There are certainly signs of elements that would likely push inflation higher, but not all the cylinders are firing in the same direction yet. Four of the six broad categories are moving higher with Labor Cost being the one moving in the "extreme range". Materials and Producer Prices are the two categories moving in reverse. This suggests that input prices (supply push) remain in check for now. If the global ex-U.S. economy slows meaningfully (not our base case) to slow, it will assert further pressure on materials and commodity prices (with the exception of geopolitical-factors-driven oil price increases.) However, other input prices such as the now entrenched global supply chain may be disrupted by global trade tensions and tariffs. This could cause disruptions and push input prices higher.



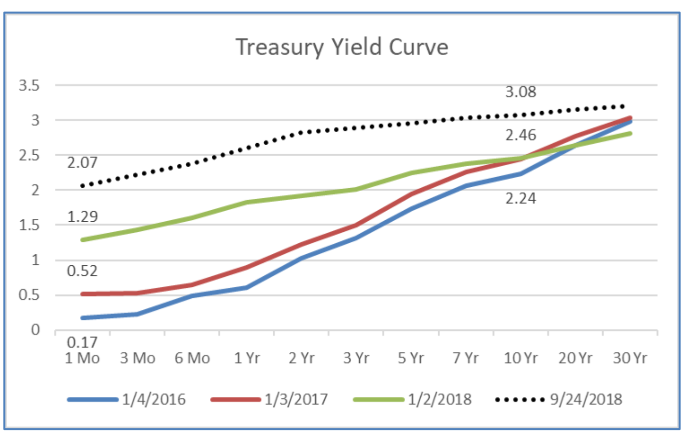
For now, inflation remains contained. The drivers for higher inflation may come from continuing tightness in the labor market with the labor participation rate topping out (i.e. no more slack) which would place pressure on wages. The left top graphs (data from FRED/BLS) show the real median weekly earnings for full-time workers age 16 and older since 2008. Although the weekly earnings (blue line on top graph) have moved up decidedly from the low in 2014 on an annualized basis, the rise has been slow. However, after adjusting for inflation, (orange line) wages have still not really moved. The U.S. economy may begin to slow somewhat in 2019 and more in 2020. What we really are waiting for is an improve in labor productivity which requires the "right" types of capital expenditures by the private sector and the "right" type of policies from the public sector.



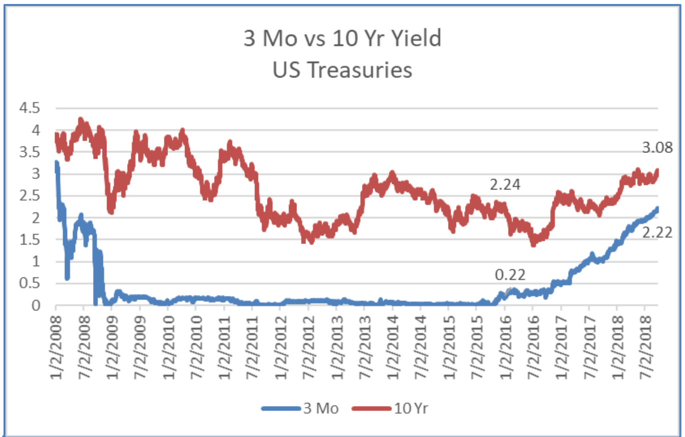
The second graph shows the University of Michigan's September survey results which demonstrate consumers expect the CPI next year at 2.7% (from 3% in August), which matches the August CPI of 2.7%, and the next 5-years at 2.5% (from 2.6% in August).

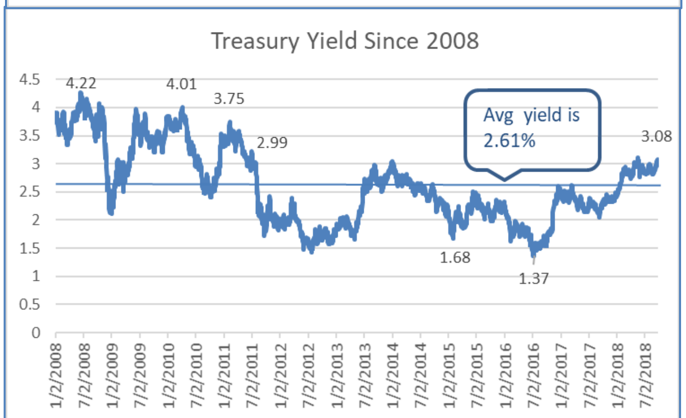
The bottom line is that inflation may be coming but is not here yet.

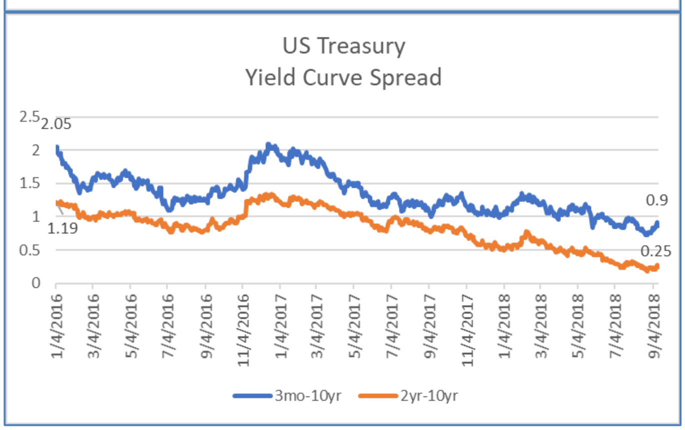
Interest Rate - Normalizing or Tightening?



The front end of the treasury yield curve (1-month to 2-years) has moved up. The left graph shows the 1-month rate moved from 17bp on January 4, 2016, to 207bp on September 24, 2018. This is primarily due to FOMC normalizing interest rates (8-times as of the latest FOMC meeting in September). At the same time, the 2- to 30-year portion of the curve continues to flatten. Although the 10-year yield has moved up from 224bp at the beginning of 2016 to 308bp this week, the increase has been much less.







This left graph shows a rapid and steep increase of the 3-month rates. The short rates are now back to July 2008 levels. In the case of the 10-year, we can see the definitive trend of moving to a higher rate regime since the low reached in the middle of 2016. However, it also appears that the increases are range bound. We are now seeing rates comparable to 2013 and that are still much lower than the highs reached in 2008 through 2011, during the beginning of the economic recovery period.

There remains more pressure on the front end of the yield curve as the FOMC continues its "gradual" but steady move at 25bp each time. Also, much of the treasury new issuance is on the front end of the yield curve to finance the ballooning budget deficit pushing a sustaining higher interest rate environment. On the longer end of the yield curve, the yields remain attractive, thus far, to foreign investors as well as non-economic actors seeking safety (e.g. sovereign wealth fund) and risk reduction (e.g. LDI). The middle left chart shows the 10-year treasury yield currently at 3.08% as compared to an average yield of 2.61% since January 2008. The movement away and upward from the average was last seen in mid-2013.

This last graph shows the spread between 3-months and 10-year treasuries at 90bp whereas the spread is 25bp between 2-year and 10-year treasuries. This is a clear indication that term premium is still missing. In other words, investors seeking higher yield are not justly rewarded by extending maturity risk. The upside reward does not compensate for the downside risk for investors to extend duration in their fixed income portfolio. However, the center graph shows that, during periods of financial or geopolitical stress, 10-year treasury yields have dropped significantly. This benefit resulting from flight to safety (bond prices up, driving interest rates down) remains significant for diversified portfolios to allocate to longer term, high quality, fixed income for portfolio stability and diversification benefits.

Fed Chairman Star Gazing
Chairman Powell's speech at the annual Jackson Hole symposium in August was sobering. Chairman Powell recognizes the long-term structural challenges of the U.S. economy are beyond the reach of monetary policy:

- Medium and low-income workers' real wages have grown slowly.
- Economic mobility has declined[9]. (Intergenerational mobility between parent and child income is declining in the U.S.)
- Federal budget deficit is on an unsustainable path and increasingly so with a larger share of the population retiring.
- We need to break out of the low productivity mode in order to see meaningful rise in income.

The FOMC is always seeking a balance between (1) moving too fast and shortening the economic expansion and (2) moving too slow and risking overheating and destabilizing the economy, but this economy has been changing in ways that are difficult to detect and measure in real time.

Chairman Powell referenced the 2003 Jackson Hole symposium theme of "Monetary Policy and Uncertainty: Adapting to a Changing Economy". Then chairman Greenspan's opening remark[10] stated:
"*Uncertainty is not just an important feature of the monetary policy landscape; it is the defining characteristic of that landscape. As a consequence, the conduct of monetary policy in the United States at its core involves crucial elements of risk and uncertainty that policymakers face and the quantifying of those risks when possible. It also entails devising, in light of those risks, a strategy for policy directed at maximizing the probabilities of achieving over time our goal of price stability and the maximum sustainable economic growth that we associate with it.*"

Then, Federal Reserve Bank of Kansas City President, Thomas Hoenig[11], supported the uncertainty theme:
"*One of the most difficult challenges facing central banks is how to conduct monetary policy in an uncertain economic environment. This challenge is magnified when ongoing changes in the structure of the economy make economic models and forecasts less reliable. How should policymakers act in an environment of increased uncertainty? Should they be more cautious and wait for additional information about the economy that might reduce uncertainty? Or, should they react more aggressively in an attempt to keep the economy on course? In designing monetary policy in an uncertain world, how much should policymakers depend on formal rules, and how much should they rely on judgement?*"

[9] https://eml.berkeley.edu/~saez/chettyetalAERPP2014.pdf
[10] https://www.kansascityfed.org/publicat/sympos/2003/pdf/Greenspan2003.pdf
[11] https://www.kansascityfed.org/publicat/sympos/2003/pdf/Foreward2003.pdf

In conventional economic models, normal inflation rate, natural unemployment rate (u star or **u***) and the desired growth rate of the GDP fluctuate. Setting the neutral rate of interest (r star or **r***) and establishing a target inflation (pi star or **π***) are parts of the FOMC's monetary policy toolset in an effort to meet the FOMC dual mandates of price stability and full employment.

For FOMC to make policy decisions, it require its best assessment of where the "stars" are, and their locations have been changing significantly. As such, a rule-based approach in setting the federal funds rate based on where inflation and unemployment stand in relation to the "stars", such as the Taylor Rule, has not been helpful. For example, the projections for u* and r* have both fallen by roughly 1% while the estimate for potential growth rate for GDP has fallen by 0.5%. This means that the r* was much closer to the neutral rate than once thought, and u* was still a ways off and delayed the return of inflation in the economy. All this leads to the question of if this is a new normal or if the projection shortfalls are temporary.

It is obvious that overemphasizing the reliance on "shifting stars" or imprecise estimates of the stars could lead to real time policymaking errors. First, the stars are sometimes far from where they are perceived, and second, inflation may no longer be the first or best indicator of a tight labor market and rising pressures on resource utilization. With the understanding of the power of managing long run inflation expectations, looking beyond inflation for signs of excesses is appropriate.

As referenced in Chairman Powell's speech, the bank of Canada's 2017 November paper "Monetary Policy under Uncertainty: Practice Versus Theory" refers to the "spirit of Heisenbergís seminal uncertainty principle". The Werner Heisenberg 1927 paper proposed the "uncertainty principle" that we cannot measure the position and the momentum of a particle with absolute precision.

Chair Powell: "The risk from misperceiving the stars is now playing a prominent role in the FOMC's deliberations. No one single, simple approach to monetary policy is likely to be appropriate across a broad range of plausible scenarios." He concludes by stating that one should move conservatively when there is uncertainty about the effects of one's actions. Thus, without certainty about the star positions and, "if the strong growth in income and jobs continues, further gradual increases in the target range for the federal funds rate will likely be appropriate."

It appears that the FOMC under Chairman Powell will be less reliant on formulas or rules and focus more on contemporaneous economic data and adjust outlook from meeting to meeting. The FOMC is on a set path of rate hikes and will continue to broadcast its rate intentions to minimize surprises which would be disruptive.

September 26th FOMC Meeting

The September 26th FOMC meeting raised the target range for the federal funds rate to 2 to 2-1/4 percent as expected. There was almost no change to the press release[12] language when compared with that of the August 1st meeting[13]. The press release recognized the general robustness of the U.S. economic activities and the significant strength in the labor market. Household and business spending remain strong, and the current inflation (core PCE) and the long-term inflation expectation are both at 2%. Also, the risks to the economic outlook appear roughly balanced. However, the "stance of monetary policy remains accommodative" was removed. At the eighth-rate hike from the 0%-0.25% to 2.00%-2.25%, forward guidance for monetary policy has changed.

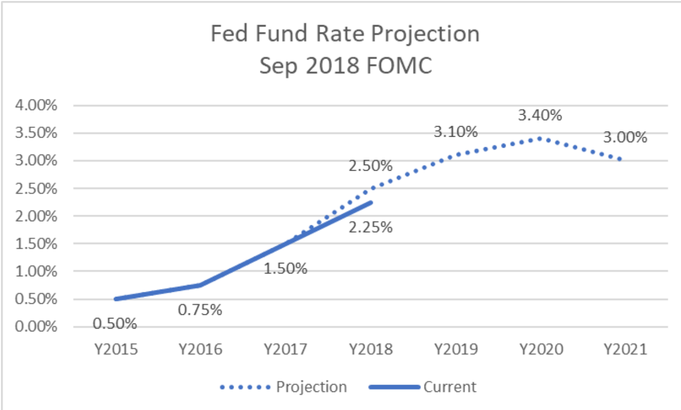
Even though Chairman Powell is uncertain where the current r* or neutral interest rate as compared to historical neutral rates is, it remains below the revised (median value) long-term 3% projection by the FOMC members (full range of 2.5% to 3.5%) provided in the FOMC's latest Economic Projections[14]. One could suggest that the projected r* is 1% above the projected PCE inflation rate of 2% (same as the inflation target rate).

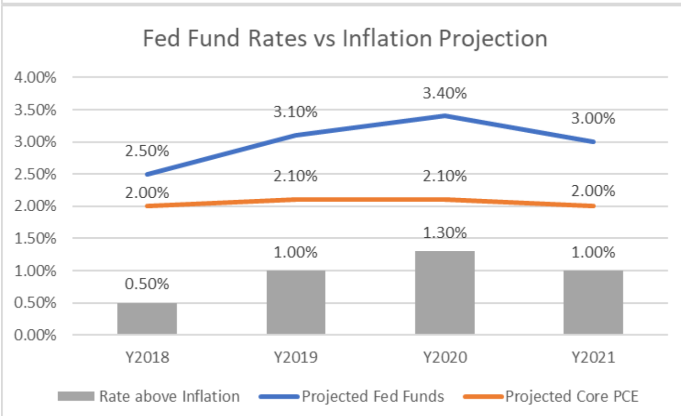
The median projections[15] from the Economic Projections of the Federal Reserve Board members and Federal Reserve Bank presidents are provided below:

Median Projections	2018	2019	2020	2021	Longer run
Change in real GDP	3.1	2.5	2	1.8	1.8
June projection	2.8	2.4	2	n.a.	1.8
Unemployment rate	3.7	3.5	3.5	3.7	4.5
June projection	3.6	3.5	3.5	n.a.	4.5
PCE inflation	2.1	2.0	2.1	2.1	2
June projection	2.1	2.1	2.1	n.a.	2
Core PCE inflation	2	2.1	2.1	2.1	
June projection	2	2.1	2.1	n.a.	
Memo: Projected appropriate policy path					
Federal funds rate	2.4	3.1	3.4	3.4	3
June projection	2.4	3.1	3.4	n.a.	2.9

Projections that were revised up are highlighted in yellow, and the one projection that was revised down is highlighted in blue. Based on this latest median projection table, the individual members are reflecting the current robust economy. For the first half of this year, the economy was growing at a real rate of 3.2%. This means that the members are expecting

[12] https://www.federalreserve.gov/newsevents/pressreleases/monetary20180926a.htm
[13] https://chaoco.com/fomc-september-2018-press-release-language-change/
[14] https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20180926.pdf
[15] The median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections





a slower but still very strong economy for the remaining two quarters growing at a real rate of 3.1% average per quarter in 2018. The members also moved the economy up by 0.1% for 2019 without changing the longer-run real GDP at 1.8% beginning in 2021. The left charts plot the hiking cycle and projected future Fed Funds Rate projections based on the latest FOMC Economic Projections.

As stated previously, if the longer run Core PCE is projected or targeted at 2% and the longer run projection for real GDP is at 2%, this means that the neutral rate or r* is implicit to be 1% above inflation rate. The bottom left graph shows that the member projection for core PCE is within range of 1% below the projected fed funds rate, with the exception of Y2020. We suspect the projected inflation rate for Y2019 and Y2020 may be a bit low.

The Chicago Mercantile Exchange (CME)[16] developed the Fedwatch Tool which assesses the latest probabilities of FOMC rate actions. The tool uses 30-Day Federal Funds Futures which tracks the market expectations of average daily Federal Funds Effective Rate levels during futures contract months. As of the end of September, the following are the probability of rate hikes for each of the upcoming FOMC meetings:

	175 to 200	200 to 225	225-250	250-275	275-300	300-325	325-350
8-Nov-18	1.30%	98.70%					
19-Dec-18	0.30%	23.20%	76.50%				
30-Jan-19	0.30%	21.50%	72.50%	5.70%			
20-Mar-19	0.10%	11.10%	47.50%	38.50%	2.80%		
1-May-19	0.10%	9.50%	42.40%	39.80%	7.80%	0.40%	
19-Jun-19	0.10%	5.60%	28.70%	40.80%	21.10%	3.50%	0.20%
31-Jul-19	0.10%	5.00%	26.30%	39.60%	23.20%	5.30%	0.50%
18-Sep-19	3.60%	19.90%	35.60%	28.10%	10.70%	1.90%	0.20%
30-Oct-19	3.40%	19.20%	34.90%	28.40%	11.40%	2.30%	0.20%

Currently the fed fund rates range is 200bp to 225bp. There is 76.5% probability that the FOMC will hike another 25bp in its December 19th meeting. Thereafter, the futures market is

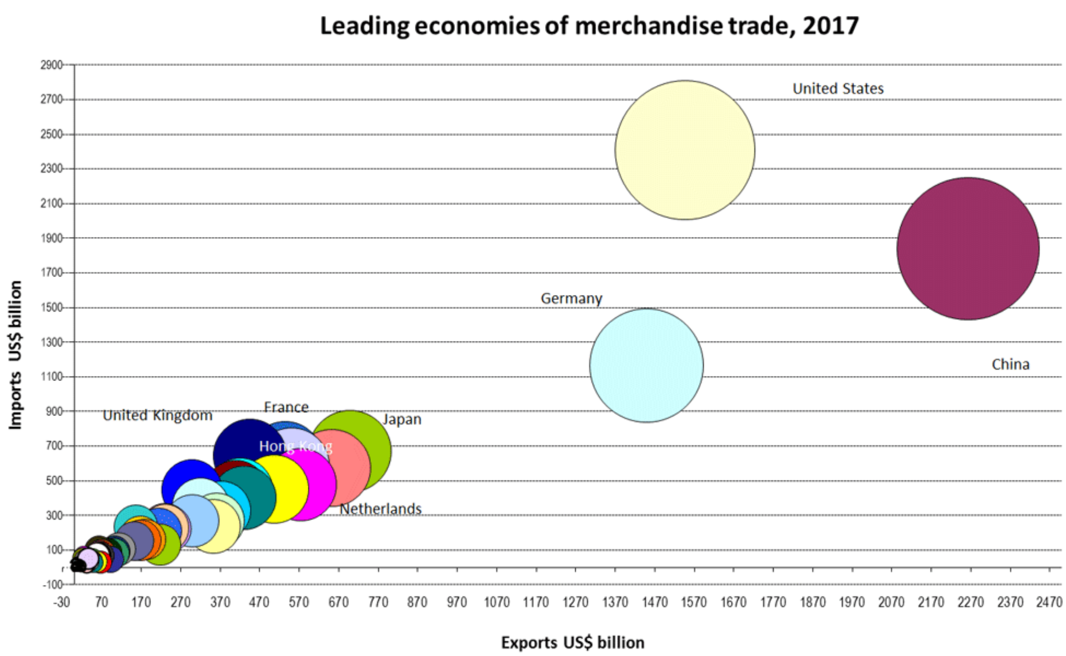
[16] https://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html

far less certain. It has the highest probability of 40.8% that another 25bp rate hike will happen in the June 19, 2019, meeting and then followed by another 25bp hike at a 23.2% probability in the July 31, 2019, meeting. Many market observers suggest that there will be four more rate hikes in 2019. Assuming the FOMC will hike rates by 25bp this December, the fed fund rates would be in the 225-250 range. An additional four rate hikes would end 2019 in the 325bp to 350bp range. That would see the yield curve inverse if the longer end of the yield curve remains in the current range. We do not agree with this view, and our base case is that, after the December rate increase, there may be two more 25bp hikes in 2019. This would be consistent with r* being 100bp above the 2% longer run inflation target rate.

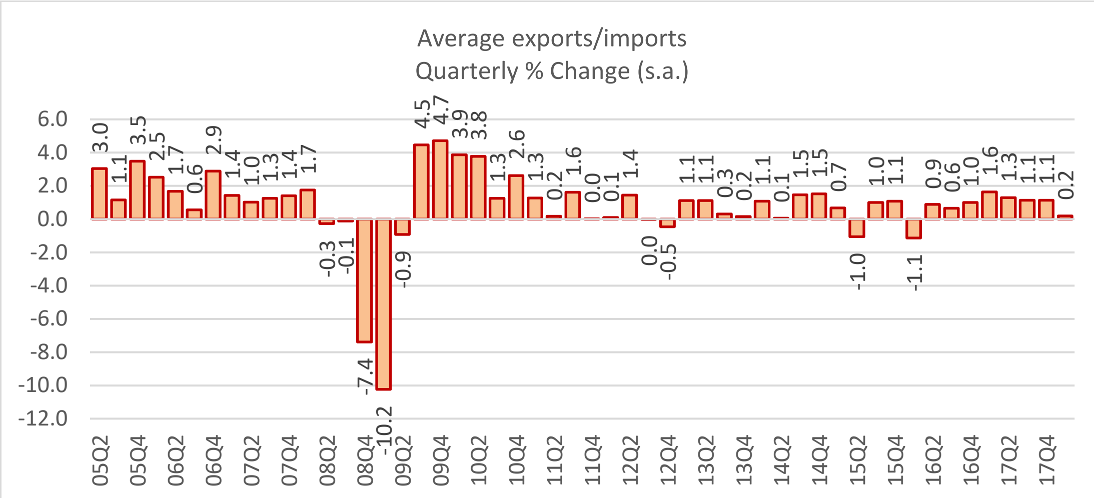
Sharing Globalization with Populism

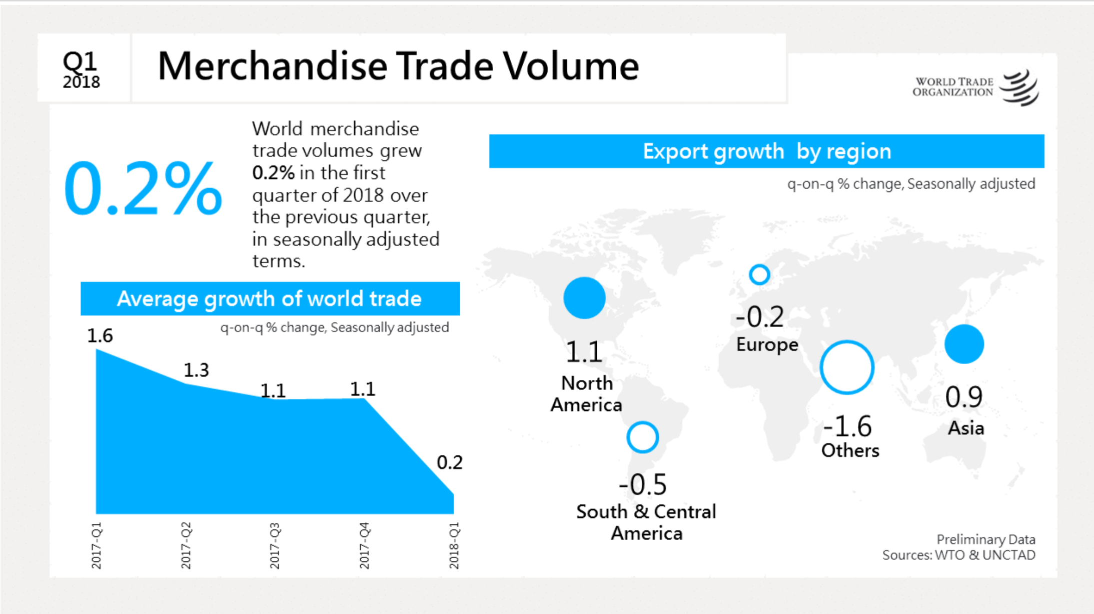
The previous globalization happened in the first half of the 19th century in continental Europe as a result of technological innovation and liberal trade policies. This came to an end with protectionism born out of the Great Depression. The latest globalization came about also with technological innovation and trade liberalizations but also the creation of the global supply chain (vertical integration and specialization.) Now, at the decennial of the Great Recession in the U.S. and the Global Financial Crisis being followed by the European Debt Crisis, globalization is again threatened. The uneven-handedness of income and wealth distribution as a part of multi-decade of advancement and creative destruction and the subsequent unconventional policies to prevent economic depression are bringing us to question opportunity and distribution fairness.

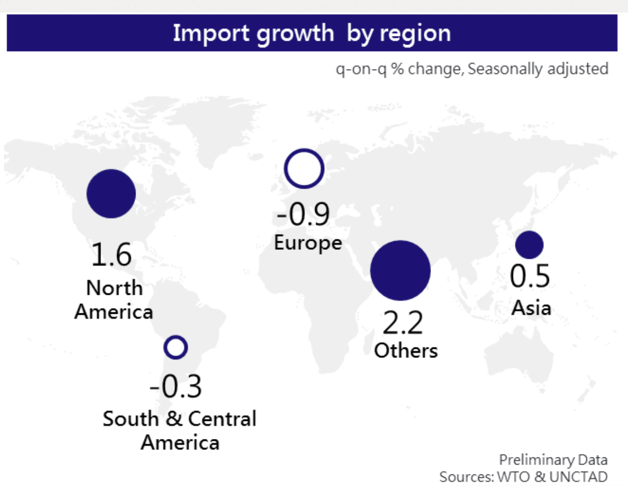
According to the World Trade Organization (WTO), China, U.S. and Germany are the three largest importers and exporters. The Trump Administration's trade dispute with German/EU and China, if sustained, will clearly affect global growth.



WTO data since 2005 second quarter through 2018 first quarter is shown in the graph below. Since 2016 second quarter, global trade flows have recovered until the end of last year.





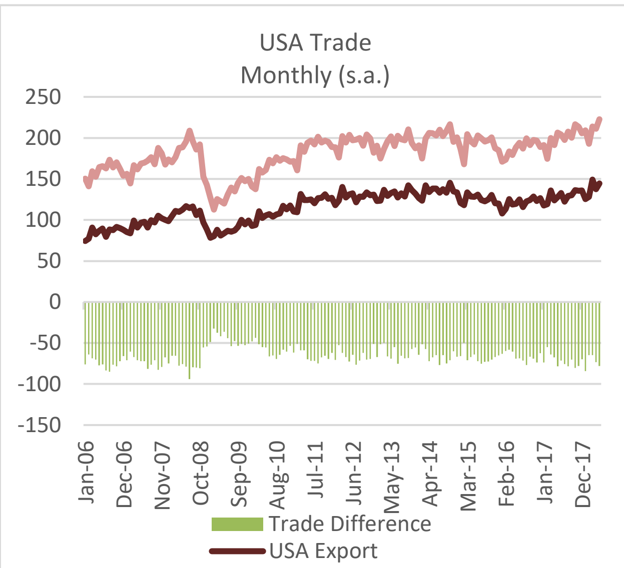


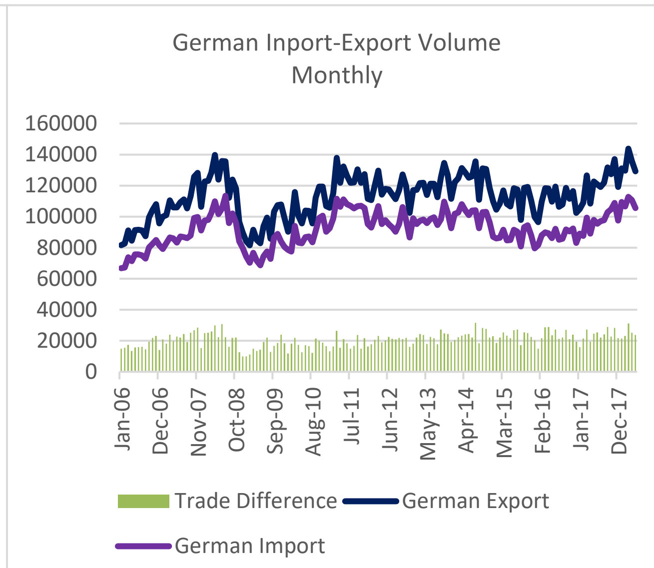
The first quarter merchandise trade volume around the globe shows a slowdown in Europe and South & Central America as well as Asia.

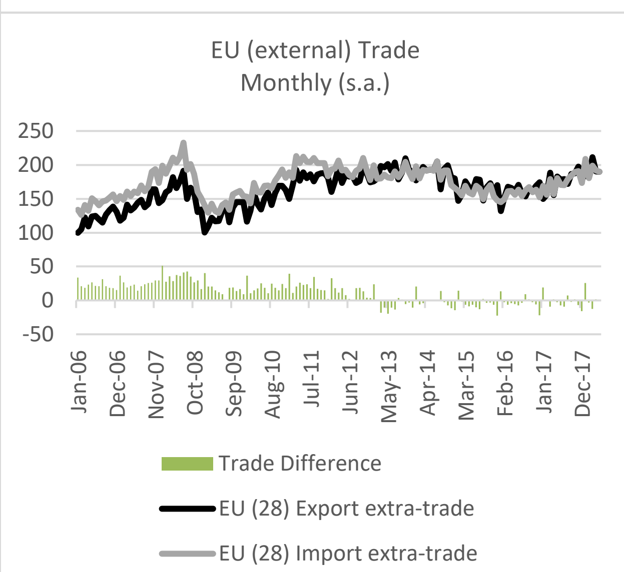
The average growth in world trade has significantly slowed since the first quarter in 2017 at 1.6% to the first quarter in 2018 at 0.2%. We expect this slowing trend to continue at a more accelerated pace with the rolling implementation of bilateral trade sanctions and tariffs.

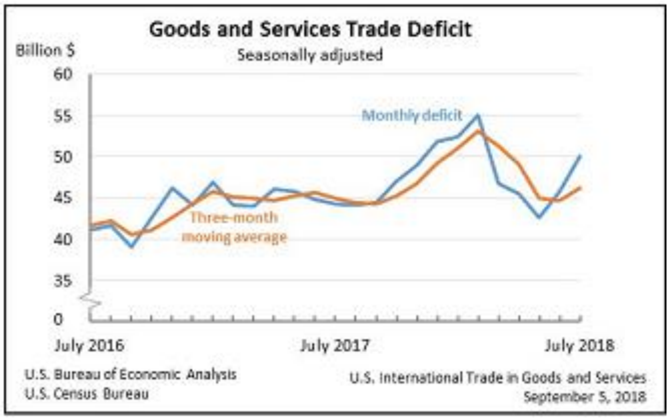
On July 25, 2018, President Trump announced, in a joint press conference with the European commission president, Jean-Claude Juncker, that the US-EU relations have entered a "new phase" marked by "zero tariffs, zero non-tariff barriers and zero subsidies on non-auto industrial goods". Both parties agreed to no further escalation of trade dispute with no new tariffs. This means the proposed 20% tariff on German and EU autos is now on the back burner. Both parties also agreed to resolve the U.S. imposed steel and aluminum tariffs. As a token gesture, Mr. Juncker agreed to continue EU's escalation to buy more U.S. soybeans and also to build more terminals to import U.S. liquefied natural gas.

According to the WTO data, the import-export volume for China, U.S., EU and Germany is quite illustrative. It is clear that the U.S. imports a lot more merchandize than it exports. The U.S. has operated with a trade deficit for a very time.









The BEA/Census Department July Monthly U.S. International Trade Report[17], goods and services deficit were $50.1 billion in July, up $4.3 billion from $45.7 billion in June. Trade deficit was up 9.5% with exports down 1% and imports up 0.9% in July. Now, with Canada agreeing to join Mexico and the U.S. to revise NAFTA, this reduces a large uncertainty, even though it will take months for all three countries to approve the new agreement.

The current WTO dashboard[18] on trade suggests world trade in the third quarter remains on trend.

Drivers of trade	Level of index	Direction of change
Merchandise trade volume (Q1)	102.0	
Export orders	97.2	
International air freight (IATA)	100.9	
Container port throughput	102.2	
Automobile production and sales	98.1	
Electronic components	102.2	
Agricultural raw materials	100.1	

As an update to last quarter's trade dispute actions, the following are the follow up main events: for the third quarter:

July 6, 2018	U.S. tariffs on $34 billion of Chinese imports go into effect, the first phase of its June 15 $50 billion list. Contemporaneously, China's tariffs on the first $34 billion of its $50 billion list of U.S. imports also go into effect.
July 24, 2018	The U.S. administration announces it will subsidize American farmers for up to $12 billion for their lost export sales resulting from all of the President's tariff actions (including steel and aluminum tariffs) using a law that supported farmers during the Great Depression. A total of $27 billion of American agriculture exports are being affected, such as soybeans, corn, nuts, fruit, and beef.
August 3, 2018	China warns it could add duties of 5 to 25 percent on $60 billion of U.S. goods.
August 7, 2018	The Trump administration releases a revision to the second phase of its $50 billion list, announcing that $16 billion of imports from China will be subject to a higher 25 percent tariff rate, went into effect on August 23.

[17] https://www.census.gov/foreign-trade/Press-Release/current_press_release/ft900.pdf
[18] https://www.wto.org/english/res_e/statis_e/wtoi_e.htm

August 23, 2018	The Trump administration followed through with imposing tariffs on $16 billion of imports from China, the second phase of the revised $50 billion list released June 15. China immediately responded with its own revised tariffs on $16 billion of US exports, also announced on June 15. These actions complete each country's first $50 billion of tariffs that were originally announced in early April.
August 27, 2018	President Trump and President Enrique Peña Nieto of Mexico announce a preliminary U.S.-Mexico trade agreement that would potentially replace the North American Free Trade Agreement (NAFTA). News sources report that a side deal accompanies the trade agreement to give Mexico "insurance" against future potential U.S. national security tariffs on autos. Mexico would still have duty-free access for cars that comply with new rules of origin by voluntarily limiting its auto exports to the United States. During the Oval Office announcement, Trump also threatened to impose tariffs on Canada's cars.
September 24, 2018	U.S. tariffs on $200 billion of Chinese imports announced on September 17 take effect, along with retaliatory tariffs by China on $60 billion of U.S. imports announced on September 18. The U.S. now has tariffs on 12 percent of its total imports during 2018, while the combined trading partner retaliation covers 8 percent of total U.S. exports.

Conclusion

The Federal Reserve leads the world in normalizing monetary policies by hiking rates and shrinking central bank balance sheets. President Mario Draghi of the European Central Bank announced that the ECB would continue its net asset purchases (QE) at a monthly pace of €30 bn until September 2018, then cut them by half and end QE at year-end, while continuing to reinvest. The ECB is not expected to raise key interest rates until after summer 2019. Bank of Japan is also looking to begin its efforts in policy normalization in some fashion. This means that the short rates (front end of the yield curve) will continue to rise while the buyers pull back for longer dated sovereign debts pushing interest rates higher (back end of the yield curve) as well. The situation for the U.S. is more complex. Since our central bank was the first to normalize, this created an interest rate divergence that made our bond yields more attractive (even after adjusting for currency disparity.) Additionally, with the pro-cyclical fiscal policy, U.S. economy growth has shot up and is making U.S. assets more attractive as well. These and other factors have contributed to a stronger dollar. We believe that these trends will persist if our economy continues to be stronger while the rest of the world slows. This would also slow non-U.S. policy normalization.

It is expected that central banks will change their policy stances as the world recovers from the Global Financial Crisis. The extraordinary and unconventional monetary policies' support should no longer be expected. However, after living 10-years with a "we will do whatever it takes" safety net, the reversal of global policy can be equally difficult for central banks and the investing public to navigate. The distribution unevenness during decades of globalism and the unintended beneficiaries of wealth and income, resulting from policy fixes during the last decade, are challenging asset holders and labor dynamics. There are clear indications of shifting from a globalization regime to a more regional or national preference laced with populism and tribalism. We are moving from a multi-lateral to a bilateral trading framework. These trends, if sustained, can shrink economic growth in the long run (a shrinking pie.)

Although data thus far has shown no wage inflation in a multi-decade law unemployment economy, it is reasonable to assume real wages will rise along with productivity. This will contribute to a demand-pull inflation. If 25% tariffs will be applied to all imports from China in 2019 and sustained, this will cause a supply (or input) push inflation. Although core PCE and inflation expectation are both in check currently, the future is biased towards a higher inflation regime. So, we should be aware of upside inflation surprise.

For now, financial conditions remain accommodative globally, and the US is living in a Goldilocks economy of strong growth, low unemployment, and stable inflation. However, this state of homeostasis is fragile. Although, on paper, the impact of Trump's global "trade reorg" may give the U.S. some temporary advantage and little net impact, the rippling effects of trade disputes and the consequences of rerouting the global supply chain could create long-term challenges to the global economy, to which America is a party. Then again, we have something more immediate — November mid-term elections await. If both houses of Congress change hands, it would signal displeasure of the Trump Administration and that a check by the people is preferred. Otherwise, and rightfully so, it would embolden Trump, and he will have consolidated power for at least two more years, if not six.

Sincerely yours,
CHAO & COMPANY, LTD.
Philip Chao
Principal & CIO