Callan | INSTITUTE

Fourth Quarter 2018

Capital Market Review

Change of Mind on the Global Outlook

ECONOMY

2 PAGE

Confidence in the global economy's strength evaporated suddenly last October. What changed? Signs of slower growth in the global economy outside the U.S., trade war concerns, and fears that continued U.S. interest rate increases will slow growth.

Investors Calm Amid Market Turmoil

FUND SPONSOR

4 PAGE

The median fund sponsor in Callan's database fell 7.5% in the fourth quarter, lagging a 60% U.S. stocks/40% U.S. fixed income index. Funds were affected by their exposure to non-U.S. stocks, which lagged U.S. stocks. Corporate plans fared best in a tough quarter.

Widespread Drops in Global Markets

EQUITY

6 PAGE

Equity markets fell drastically in the fourth quarter. In the U.S., all sectors, save Utilities (+1.4%), were in negative territory. Small cap stocks were hardest hit. Economic deceleration fueled by the global trade dispute and Brexit impasse drove non-U.S. markets down.

Safety Ruled as Risk Assets Sold Off

FIXED INCOME

8 PAGE

Safe-haven securities, such as U.S. Treasuries and other developed market sovereign bonds, rallied while risk assets sold off. Non-U.S. developed market sovereign bonds rallied, though the strength in the U.S. dollar proved to be a headwind for unhedged assets.

Real Estate Healthy, Real Assets Struggled

REAL ESTATE/REAL ASSETS

10 PAGE

Private real estate rose in the fourth quarter, with returns shifting toward income. The fundamentals of the U.S. real estate market remained healthy. REITs fell both in the U.S. and overseas. Most commodity indices dropped in the quarter, leaving few safe havens.

Downshifting Into a Tricky Corner

PRIVATE EQUITY

12 PAGE

The number of transactions across all metrics fell modestly for 2018 and in the fourth quarter, reflecting less certainty in trickier capital markets. However, dollar volumes associated primarily with fundraising, and venture capital investments and exits, increased.

Hedge Funds in Hot Mess; MACs Stumble

HEDGE FUNDS/MACs

13 PAGE

As the global capital markets reacted to the sharp risk-off environment, volatile prices and tightening liquidity inside these markets became a heated mess for hedge funds. The Callan MAC Style Groups tripped again in the fourth quarter's risk-off mode.

DC Index Tops Age 45 TDF in 3rd Quarter

DEFINED CONTRIBUTION

15 PAGE

The Callan DC Index™ gained 3.7% in the third quarter, outpacing the 3.5% rise of the Age 45 Target Date Fund (TDF). DC plan balances grew by 3.1%, driven completely by market performance. For the first time since the third quarter of 2016, flows into the Index were negative.

Broad Market Quarterly Returns

U.S. Equity Russell 3000	Non-U.S. Equity MSCI ACWI ex USA	U.S. Fixed Income Bloomberg Barclays Agg	Non-U.S. Fixed Income Bloomberg Barclays Gbl ex US
-14.3%	-11.5%	1.6%	0.9%

Sources: Bloomberg Barclays, MSCI, FTSE Russell

Change of Mind

ECONOMY | Jay Kloepfer

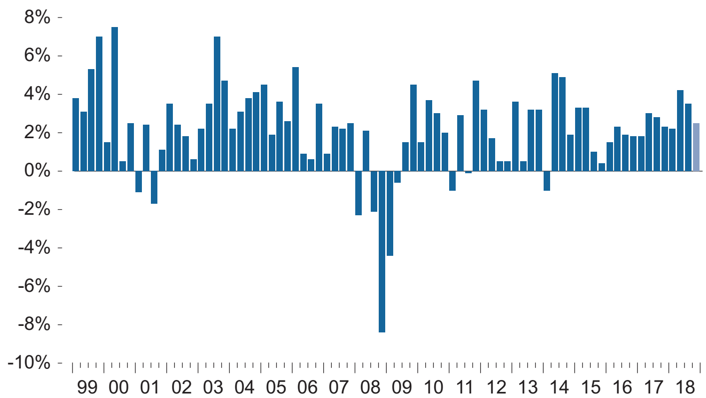
Confidence in the strength of the global economy evaporated suddenly in October 2018, leading to sharp declines in equity and commodity prices, widening interest rate spreads, and an appreciation of the U.S. dollar. Little in the underlying fundamentals of the U.S. economy had changed: GDP enjoyed solid gains of 4.2% and 3.4% in the second and third quarters of 2018, the robust labor market continued to create jobs at a rate of over 200,000 per month, and consumer spending was strong, fueled by rising wages. After two hiccups in the equity markets in February and March, confidence returned and equity markets steamrolled to a new peak in September.

So what changed? Emerging signs of slower growth in the global economy outside the U.S., rising concerns over a trade war, and fears that continued U.S. interest rate increases will slow growth both here and abroad eroded confidence. A slowdown in U.S. and global growth suddenly seemed inevitable as waning fiscal stimulus and rising interest rates weaken demand.

Despite the loss of confidence, data on U.S. economic growth largely remained solid through the fourth quarter, led by the labor market. The U.S. economy added over 2.6 million new jobs in 2018, up from 2.3 million in 2017. The unemployment rate fell to a generational low of 3.7% in September. The rate rose to 3.9% in December, but not because of weakening job growth—the tight labor market finally spurred an increase in the labor force participation rate. Fourth quarter GDP growth is projected to come in close to 2.5%, resulting in an annual rate of growth for 2018 of 3.0%. (The government shutdown delayed reporting of GDP; estimate provided by IHS Markit.) GDP growth of 3.0% for the year would mark the high point in the current expansion that began in 2009 after the Global Financial Crisis.

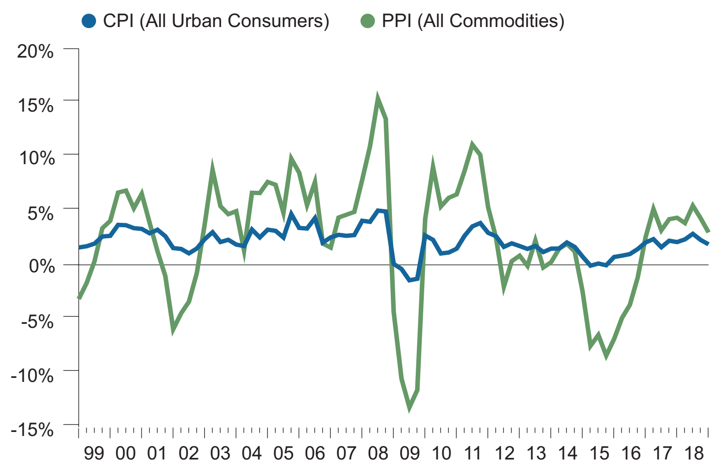
Not all of the economic data were positive. One of the biggest contributors to GDP growth in the third quarter was investment in inventory. Imports surged, likely ahead of the imposition of tariffs on Chinese goods, and much of these imports landed in

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis
Note: 4Q18 GDP not available at time of publication, estimate provided by IHS Markit

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

inventories. Building inventories adds to GDP, while the working down of inventories in the coming months will subtract from GDP. Growth in business fixed investment—capital expenditures—stalled in the second half of the year, possibly discouraged by uncertainty over trade policy. Residential investment declined in each quarter during the year, as the housing market continues to sputter.

Housing has been a persistent disappointment. While demographic trends may appear to be favorable—the emergence of the millennial generation into prime home-buying age—housing faces several headwinds: strong prices and rising mortgage rates have made homes less affordable, several provisions of the 2017 Tax Act are unfriendly to housing, and builders complain about the scarcity of lots and skilled labor to build homes.

Inflation risks seemed to increase throughout the year. Average hourly earnings reached a 3% growth rate in January, igniting fears of the arrival, finally, of inflationary pressures. This wage report in fact was cited as one of the key instigators in the market sell-off in February. Growth in the CPI reached 3% by mid-year, and the long, mysterious absence of inflation after all that monetary and fiscal stimulus was thought to be over. Oil prices reached $84 in early October. But the risk of inflation lessened in the fourth quarter. Confidence in global growth collapsed and one of the first casualties was oil, whose price dropped to $52 in December. As a result, the broad consumer price index (CPI) dropped below 2% growth, and the landscape for inflation going forward changed.

The Federal Reserve has played a large role in the evolving market sentiment. The Fed raised short-term interest rates four times during 2018, resulting in a federal funds rate of 2.25%-2.5% by year end. The Fed continued to point to solid growth, a strong labor market and potential inflationary pressures as justification for a path to a long-term federal funds rate that at mid-year 2018 was projected to reach 3.25%. While the Fed has been clear in communicating its intentions to tighten, concerns rose during 2018 that the U.S. rate increases were slowing growth both in the U.S. and around the globe. In addition, U.S. policy has deviated from that of central banks in the euro zone, which have yet to shift from easing to tightening. The Fed did reduce its projected long-term target for the fed funds rate to 2.75%-3%, but sentiment took a dive when it raised rates as promised for a fourth time in December.

The Long-Term View

Index	2018 4th Qtr	Periods ended Dec. 31, 2018 Year	5 Yrs	10 Yrs	25 Yrs
U.S. Equity					
Russell 3000	-14.30	-5.24	7.91	13.18	9.04
S&P 500	-13.52	-4.38	8.49	13.12	9.07
Russell 2000	-20.20	-11.01	4.41	11.97	8.28
Non-U.S. Equity					
MSCI ACWI ex USA	-11.46	-14.20	0.68	6.57	--
MSCI Emerging Markets	-7.47	-14.58	1.65	8.02	--
MSCI ACWI ex USA Small Cap	-14.43	-18.20	1.96	10.02	--
Fixed Income					
Bloomberg Barclays Agg	1.64	0.01	2.52	3.48	5.09
90-Day T-Bill	0.56	1.87	0.63	0.37	2.55
Bloomberg Barclays Long G/C	0.78	-4.68	5.37	5.88	6.82
Bloomberg Barclays Gl Agg ex US	0.91	-2.15	-0.01	1.73	4.39
Real Estate					
NCREIF Property	1.67	7.03	9.39	7.52	9.35
FTSE Nareit Equity	-6.32	-4.62	7.90	12.12	9.76
Alternatives					
CS Hedge Fund	-4.30	-3.19	1.66	5.10	7.27
Cambridge PE*	3.37	16.77	13.77	11.62	15.46
Bloomberg Commodity	-9.41	-11.25	-8.80	-3.78	2.03
Gold Spot Price	7.11	-2.14	1.28	3.78	4.85
Inflation – CPI-U	-0.48	1.91	1.51	1.80	2.20

*Data for most recent period lags by a quarter. Data as of September 30, 2018.
Sources: Bloomberg, Bloomberg Barclays, Bureau of Economic Analysis, Credit Suisse, FTSE Russell, MSCI, NCREIF, Standard & Poor's, Thomson Reuters/Cambridge

Recent Quarterly Economic Indicators

	4Q18	3Q18	2Q18	1Q18	4Q17	3Q17	2Q17	1Q17
Employment Cost–Total Compensation Growth	2.9%	2.8%	2.8%	2.7%	2.6%	2.5%	2.4%	2.4%
Nonfarm Business–Productivity Growth	--*	2.2%	3.0%	0.3%	-0.3%	2.3%	1.6%	0.4%
GDP Growth	2.5%*	3.4%	4.2%	2.2%	2.3%	2.8%	3.0%	1.8%
Manufacturing Capacity Utilization	76.1%	75.9%	75.5%	75.3%	75.2%	74.4%	74.9%	74.6%
Consumer Sentiment Index (1966=100)	98.2	98.1	98.3	98.9	98.4	95.1	96.4	97.2

Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve, IHS Economics, Reuters/University of Michigan

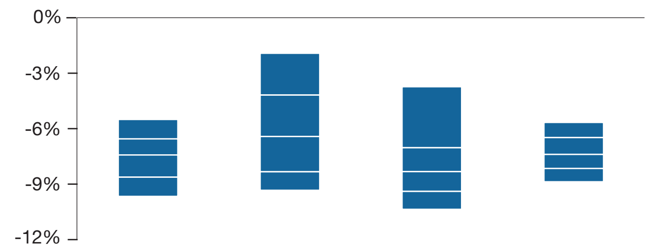
* 4Q18 data not available at time of publication; GDP estimate provided by IHS Markit

Investors Calm Amid Market Turmoil

FUND SPONSOR

- Corporate plans produced the highest returns on a relative basis in the fourth quarter, but still fell 6.4%. Taft-Hartley plans (-7.4%), public plans (-7.4%), and endowments/foundations (-8.3%) saw bigger losses. Callan's total plan database group dropped 7.5%.
- Public defined benefit (DB) funds showed stronger performance relative to corporate DB funds and endowments/foundations this past year as well as over the last 3 and 5 years. Over the last 15 years, all major fund types produced returns in a very narrow range, between 6.1% and 6.3%.
- A quarterly rebalanced 60% S&P 500/40% Bloomberg Barclays US Aggregate Bond Index portfolio fell 2.4% in 2018. All broad fund sponsor groups underperformed this benchmark over that time period.
- The MSCI ACWI ex USA Index underperformed U.S. equity markets over the past year. Funds that have taken steps to diversify away from home-country bias were not rewarded.
- As market events unfold, sponsors remain calm but are taking different approaches. Many sponsors' strategic positioning continues unchanged but is actively monitored. Those driven by higher return targets may seek opportunities in less-efficient markets. Others seeking increased risk mitigation want transparent risk controls, lower volatility, and downside protection.

Callan Fund Sponsor Returns for the Quarter

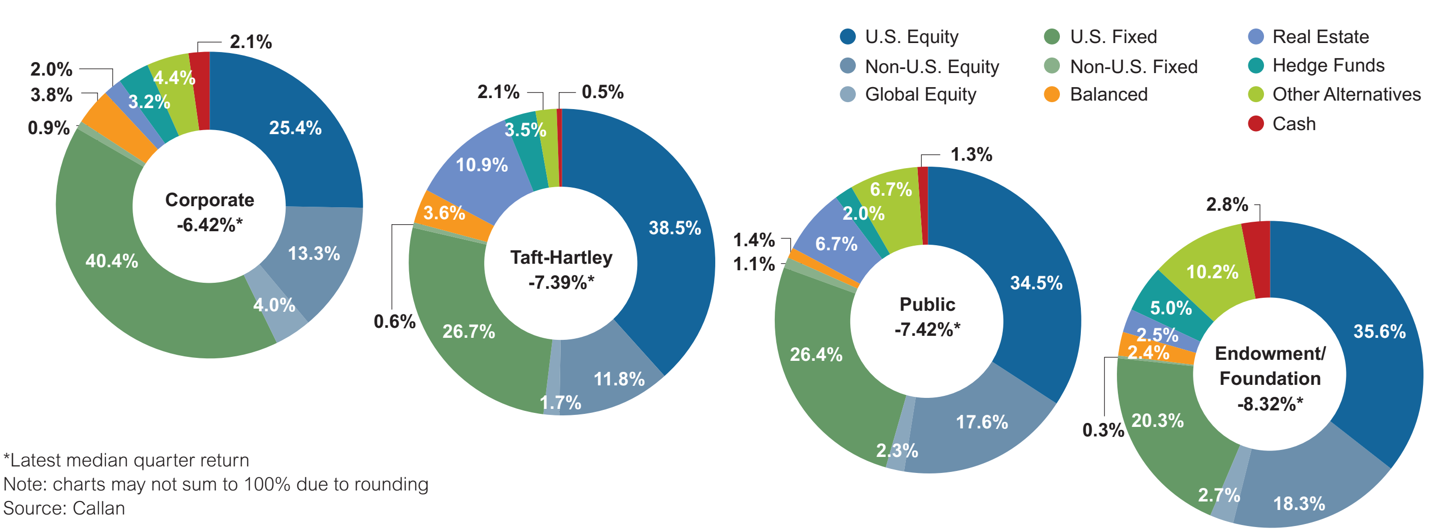


	Public Database	Corporate Database	Endow/Fndn Database	Taft-Hartley Database
10th Percentile	-5.50	-1.92	-3.73	-5.66
25th Percentile	-6.55	-4.18	-7.03	-6.48
Median	-7.42	-6.42	-8.32	-7.39
75th Percentile	-8.62	-8.33	-9.39	-8.15
90th Percentile	-9.66	-9.33	-10.36	-8.87

Source: Callan

- The recent sell-off in global equities raised concerns about the impact on the actuarial discount rate for public plans and the spending policy for endowments and foundations. Plans with high return targets may increase risk, so risk mitigation is an important area of focus.
- For fund sponsors, strategic allocation decisions are focused on rising interest rates, anticipation of a market correction, volatility, and continued low future return expectations.
- Fund sponsors continue examining the balance between active and passive investing. Active management strategies

Callan Fund Sponsor Average Asset Allocation



*Latest median quarter return
Note: charts may not sum to 100% due to rounding
Source: Callan

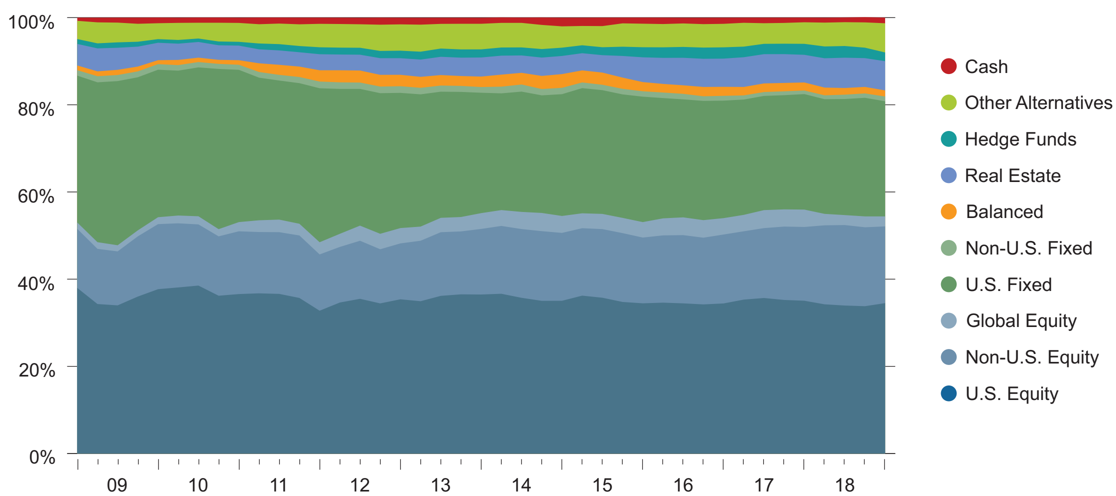
that limit the impact of market drawdowns and preserve capital during adverse circumstances are highly sought out.

- Fees and performance remain key factors in the active versus passive debate.
- The urge to engage in market timing is very great: there is a long-term benefit to higher equity, but investors (and Callan) are nervous about ramping up right now. Sponsors face competing fears: an equity market downturn vs. the fear of missing out (FOMO!).
- Setting capital market expectations is challenging in a volatile market environment. Where do you start? What is the time horizon? Does valuation matter? At what interest rate? Discipline in the face of uncertainty is difficult.

Plan-Level Concerns

- Public plans are focused on asset allocation strategies to reduce public equities and shift into a more diversified real assets portfolio. Return enhancement continues to be the focus of public plans and endowment/foundation funds. As endowments and foundations seek return sources and diversification to mitigate equity risk, less liquid asset classes may benefit.
- Most corporate DB clients embrace de-risking (increasing fixed income and extending duration). Callan expects fund sponsors to diversify existing long bond portfolios with a wider range of fixed income allocations. Callan anticipates allocations to riskier assets (e.g., equities and alternative investments) to decrease as rates rise and funds move forward with de-risking plans. Implementation of de-risking depends largely on interest rate movements this year.
- Public and corporate DB plans view risk control as their key priority. Corporate DB plans also view funded status as a high priority. Endowments/foundations and sovereign wealth funds are focused on evaluating a sustainable distribution rate to balance intergenerational equity.
- Larger public funds are investigating explicit factor strategies to combat concerns about concentration in passive exposures to U.S. equity.
- Defined contribution (DC) plans are increasingly reviewing recordkeepers, fees, and levels of service to better align with plan demographics and participants' outcomes and experiences.
- The desire for reduced fees in DC plans increased interest in institutional investment vehicles with notably lower fee structures, such as separate accounts, collective investment trusts, and white label funds.

Callan Public Fund Database Average Asset Allocation (10 Years)



Source: Callan. Callan's database includes the following groups: public defined benefit, corporate defined benefit, endowments/foundations, and Taft-Hartley plans. Approximately 10% to 15% of the database constituents are Callan's clients. All database group returns presented gross of fees. Past performance is no guarantee of future results. Reference to or inclusion in this report of any product, service, or entity should not be construed as a recommendation, approval, affiliation, or endorsement of such product, service, or entity by Callan.

Global Equity

U.S. Equities

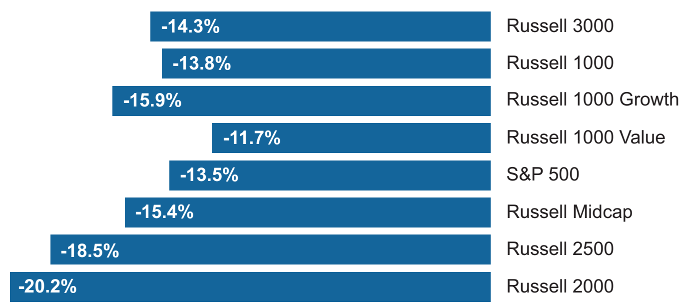
Large Cap ► *S&P 500: -13.5% | Russell 1000: -13.8%*

- Equity markets fell drastically in the fourth quarter, with all sectors in the **S&P 500 Index,** save Utilities (+1.4%), in negative territory.
- The decline was driven by broad-based de-risking.
- Contributing factors included escalated trade tensions, rising interest rates, concern over slowing GDP/earnings growth, low oil prices, and the U.S. government shutdown.
- Anecdotal evidence suggests there was increased selling pressure to fulfill year-end tax loss harvesting goals and to meet hedge funds' redemption requests.
- Markets nosedived following Fed Chairman Jerome Powell's October comments, which noted that monetary policy is a long way from neutral.
- Defensive sectors (Utilities: +1.4%; Real Estate: -3.8%; Consumer Staples: -5.2%) fared best.
- Cyclical sectors (Energy: -23.8%; Tech: -17.3%; Industrials: -17.3%) fared the worst on end-of-cycle fears.
- 2018 marked the first time in 70 years that the S&P 500 finished the year in the red after rising in the first three quarters; the Index fell nearly 20% from its September peak.
- On the positive side, volatility was welcomed by active managers seeking better valuation entry points; the S&P 500 forward P/E went from 16.8 on Sept. 30 to 14.4 on Dec. 31.

Small Cap ► *Russell 2000: -20.2% | Russell 2000 Growth: -21.7% | Russell 2000 Value: -18.7%*

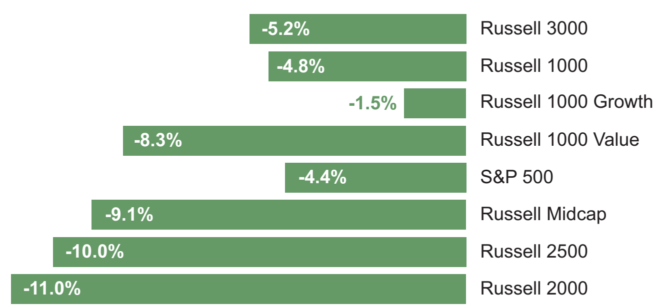
- Small cap stocks were hardest hit as margin pressure, excess leverage, slowing growth, and earnings expectations concerned investors.
- The **Russell 2000 Index** fell over 22% from its Aug. 31 peak.

U.S. Equity: Quarterly Returns



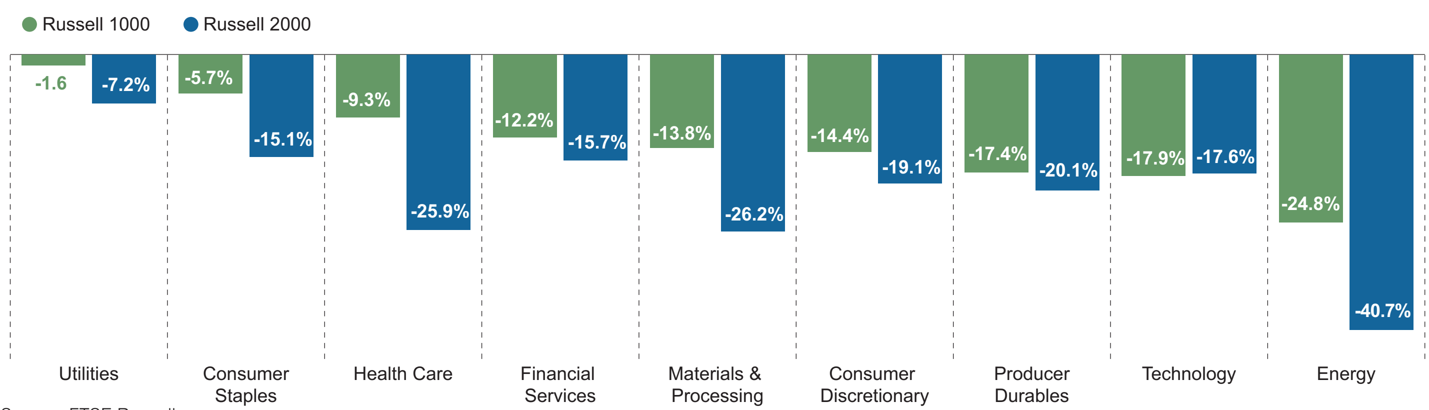
Sources: FTSE Russell and Standard & Poor's

U.S. Equity: One-Year Returns



Sources: FTSE Russell and Standard & Poor's

Quarterly Performance of Select Sectors



Source: FTSE Russell

Growth vs. Value ▶ *Russell 1000 Growth: -15.9% | Russell 1000 Value: -11.7%*

Growth fell further than value within both large and small cap due to its larger weightings in poor-performing sectors.

Non-U.S./Global Equity

Developed ▶ *MSCI EAFE: -12.5% | MSCI Europe: -12.7% | MSCI World ex USA: -12.8%*

- Economic deceleration fueled by the global trade dispute and Brexit impasse drove markets down.
- Global growth concerns and falling oil prices challenged economically sensitive sectors.
- All sectors were in negative territory. Defensive sectors fared better than cyclicals given the risk-off environment.
- Utilities, Real Estate, and Communication Services fared best.
- Energy, Information Technology, and Materials trailed.
- Value and quality outperformed growth and volatility factors as the market rewarded clear earners and stable businesses.
- The dollar rallied against the euro by 1.6% on weak growth and fears of euro zone economic contraction.
- The yen gained against the dollar by 3.5% as investors sought safe haven.

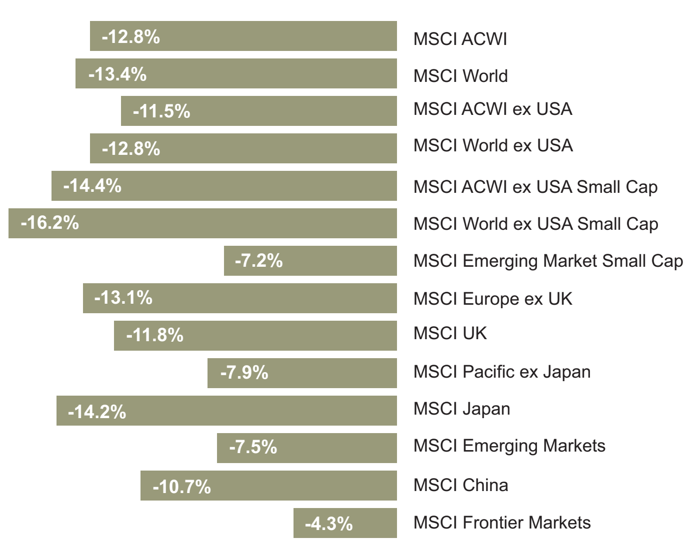
Emerging Markets ▶ *MSCI Emerging Markets Index: -7.5%*

- China (-10.7%) posted its worst quarter since 2015 on the rising dollar, U.S.-China trade tension, and the slowing economy.
- China reported GDP growth of 6.5%, the slowest since 2009.
- Brazil (+13.4%) was the best performer on shifting growth and pension reform sentiment after its presidential election.
- The Asian Tech sector faces heightened regulation and concerns of a consumption slowdown.
- Soft demand challenged Taiwan Semiconductor and Samsung Electronics.
- Defensively oriented Utilities fared best while Health Care, Discretionary, and Tech faltered on fears of a China slowdown.
- Value outpaced growth and volatility factors.

International Small Cap ▶ *MSCI World ex USA Small Cap: -16.2% | MSCI EM Small Cap: -7.2%*

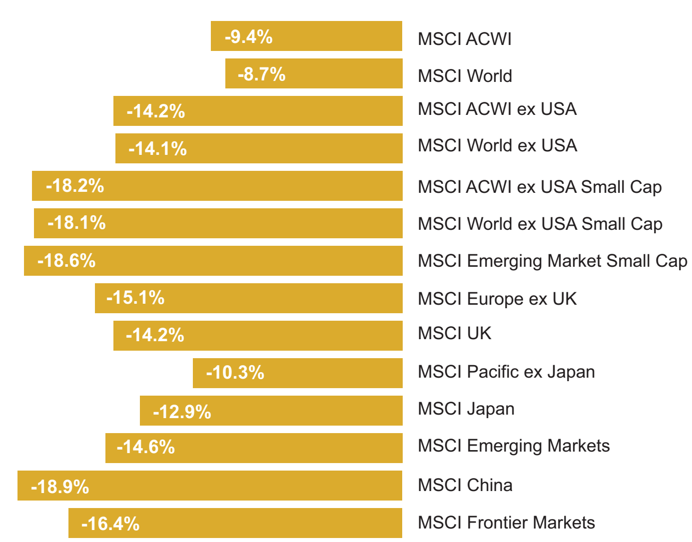
- Non-U.S. developed small cap was also negatively impacted by U.S.-China trade tension and global growth fears.
- All sectors declined, with Energy, Tech, and Industrials faring the worst on falling oil prices and the risk-off environment.
- Emerging market small cap slightly outperformed emerging markets large cap due to Utilities, coupled with the Asian large cap tech sell-off.
- Value outpaced growth.

Non-U.S. Equity: Quarterly Returns (U.S. Dollar)



Source: MSCI

Non-U.S. Equity: One-Year Returns (U.S. Dollar)



Source: MSCI

Global Fixed Income

U.S. Fixed Income

Market volatility rose in the last quarter of the year as investors grew increasingly concerned over slowing global economic growth, geo-political uncertainty, and hawkish Fed policy. Safe-haven securities, such as U.S. Treasuries and other developed market sovereign bonds, rallied while risk assets sold off.

U.S. Fixed Income ► *Bloomberg Barclays US Agg: +1.6%*

- A flight to quality lowered the bellwether 10-year Treasury yield to a level not seen since January 2018; the yield fell from a multi-year high of 3.24% in November to end the quarter at 2.69%.
- U.S. Treasuries returned 2.6%.
- TIPS underperformed nominal Treasuries as inflation expectations decreased.
- The yield curve continued to flatten with long-term rates declining faster than short-term rates; the spread between the 2-year and 10-year key rates remained positive though slightly tighter than a quarter ago.
- A portion of the yield curve (two year to five year) inverted for a few weeks during the quarter.

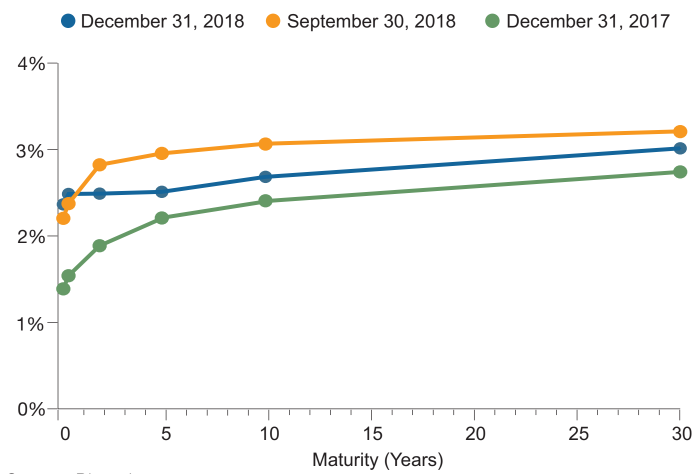
Investment-Grade Corporates ► *Bloomberg Barclays Corporate: -0.2%*

- Prices on investment-grade corporate bonds sank amid concerns over elevated debt leverage.
- Investment-grade spreads widened to +153 bps, a level not seen since July 2016, as a lack of new issuance supply could not offset a lack of demand.
- Headline risk increased on the growing size of the BBB-rated market and the potential implications from ratings downgrades should economic growth slow.
- More than 50% of new issuance came from BBB-rated issuers in 2018.

High Yield ► *Bloomberg Barclays Corporate High Yield: -4.5%*

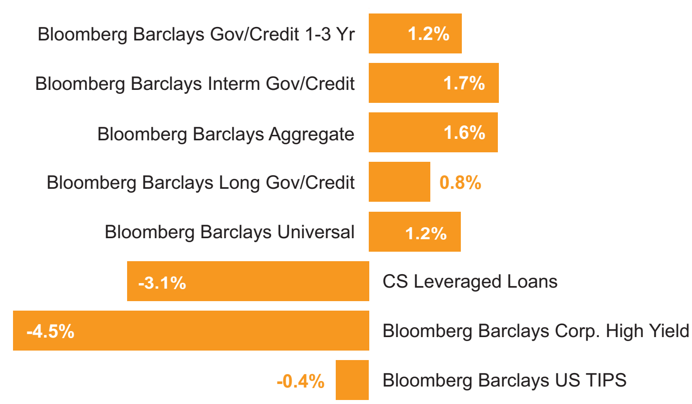
- High yield bond funds experienced $20 billion in outflows as market volatility increased.
- High yield's average yield-to-worst approached 8%.

U.S. Treasury Yield Curves



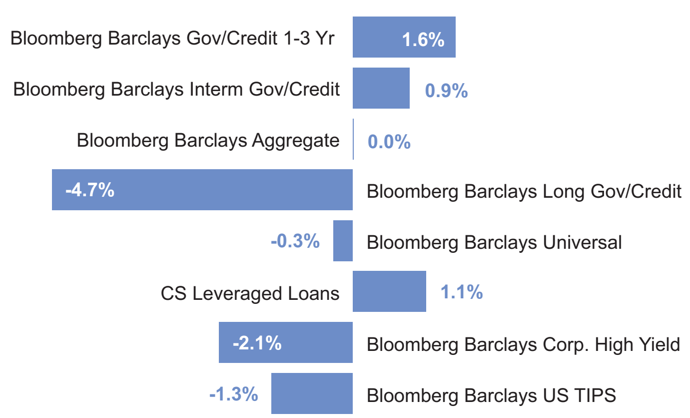
Source: Bloomberg

U.S. Fixed Income: Quarterly Returns



Sources: Bloomberg Barclays and Credit Suisse

U.S. Fixed Income: One-Year Returns



Sources: Bloomberg Barclays and Credit Suisse

- The Energy sector led the selloff amid volatile oil prices in the fourth quarter; the sector makes up approximately 15% of the Index.
- This was the first December in 10 years in which there was no high yield bond issuance; year-over-year, new issuance was down 40% in 2018.

Leveraged Loans ► *S&P/LSTA U.S. Leveraged Loan: -3.5%*

- Leveraged loans experienced retail outflows ($17 billion) as changing interest rate projections caused the floating rate feature to be less attractive.
- December was the worst monthly performance in seven years and worst December since 2008, with the Index falling 2.6%.
- Demand was weaker than earlier in the year as collateralized loan obligation formation decreased in December.

Non-U.S. Fixed Income

Global Fixed Income ► *Bloomberg Barclays Global Aggregate: +1.2% | Global Aggregate (hdg): +1.7%*

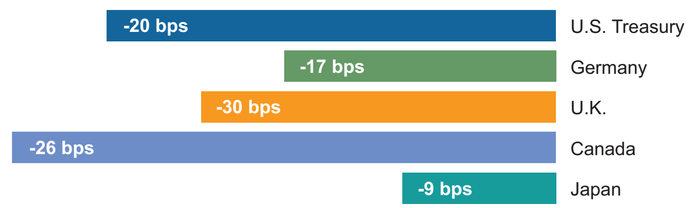
- Other developed market sovereign bonds rallied in tandem with the rally in Treasuries, though the strength in the U.S. dollar proved to be a headwind for unhedged non-U.S. developed assets.

Emerging market debt ($US) ► *JPM EMBI Global Diversified: -1.3%*, **(Local currency) ►** *JPM GBI-EM Global Diversified: +2.1%*

- Various higher-yielding emerging market currencies (Turkey, Argentina, Brazil) appreciated against the greenback, adding to a solid quarter for local emerging market debt.
- Performance was mixed across the EMBI's 60+ countries.

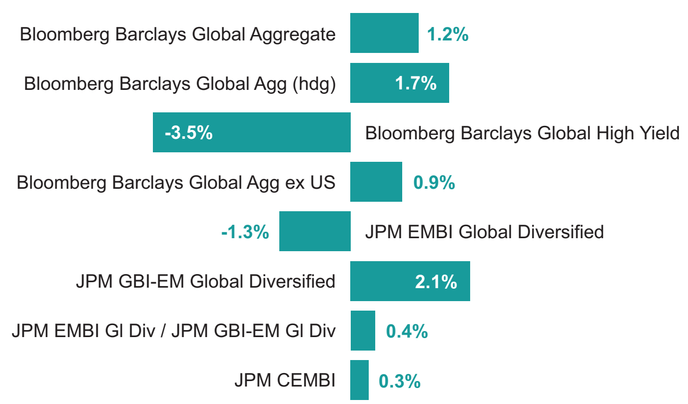
Change in 10-Year Global Government Bond Yields

3Q18 to 4Q18



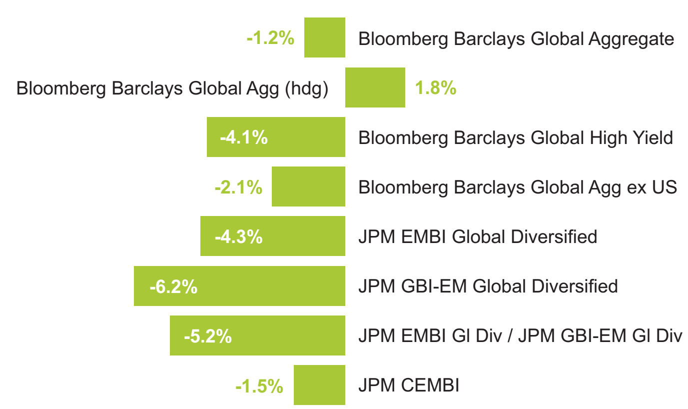
Source: Bloomberg Barclays

Non-U.S. Fixed Income: Quarterly Returns



Sources: Bloomberg Barclays and JPMorgan Chase

Non-U.S. Fixed Income: One-Year Returns



Sources: Bloomberg Barclays and JPMorgan Chase

Real Estate Healthy in the U.S.; Real Assets Struggled

REAL ESTATE/REAL ASSETS | Kevin Nagy, CAIA, & Kristin Bradbury, CFA

Returns Continue to Moderate

- The **Callan Real Estate ODCE Style Group** rose 1.5% in the fourth quarter and 7.4% for the year, in line with the returns for the **NFI-ODCE Index** over the same periods.
- The **NCREIF Property Index** climbed 1.4% in the quarter and 6.7% for the year.
- U.S. core real estate returns continue to shift toward income with limited appreciation.
- Appreciation is coming from net operating income growth rather than further cap rate compression.
- Industrial real estate remains the best performer.

U.S. Real Estate Fundamentals Remain Healthy

- Steady returns continued, driven by above inflation-level rent growth in many metros.
- Within the NCREIF Property Index, the vacancy rate for U.S. property was 6% in the fourth quarter, near the lowest level since 2001.
- Net operating income has been growing annually and is expected to be the primary return driver going forward.

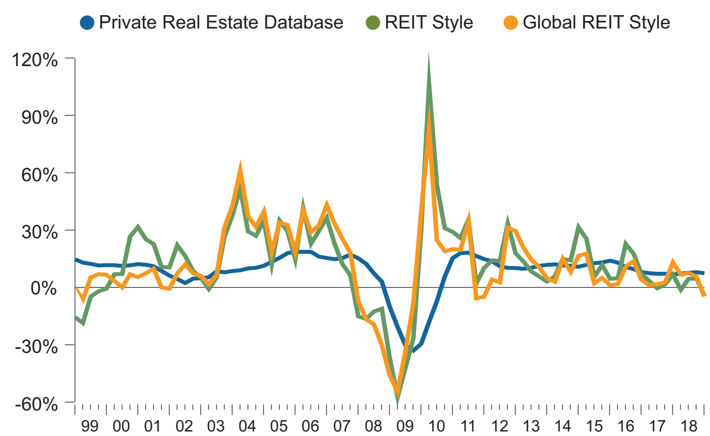
Pricing Remains Expensive in the U.S.

- Transaction volumes fell slightly but are still robust.
- Cap rates continued to fall, indicating full valuations.

REITs Traded Off, Outperformed Global Equities

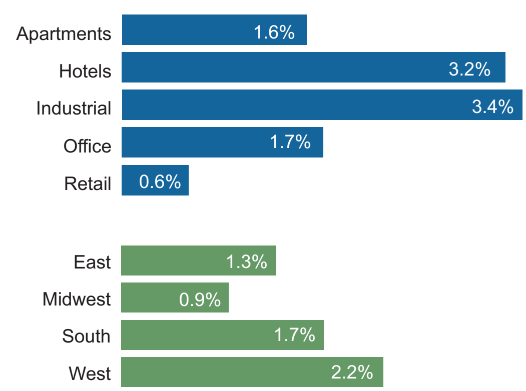
- The **Callan Global Real Estate Style Group** dropped 5.9% in the quarter and 4.7% for the full year, compared to the 5.7% and 5.6% declines for the **FTSE EPRA Nareit Global Developed Real Estate Index.**
- The **Callan Global ex-U.S. Real Estate Style Group** was off 5.5% and 5.1% for the quarter and the year; the **FTSE EPRA Nareit Developed ex US Index** fell 4.9% and 5.8% over the same periods.
- The losses for global REITS compared to the 12.8% plunge for the **MSCI ACWI Index** in the quarter.

Rolling One-Year Returns



Source: Callan

Sector Quarterly Returns by Property Type and Region



Source: NCREIF

- The **Callan REIT Style Group** saw higher losses in the quarter (-6.3%) but performed better than the other REIT indices over the year (-4.3%). Its returns roughly matched those of the **FTSE EPRA Nareit All Equity REITs Index.**
- Both U.S. and non-U.S. REITs are trading at discounts to net asset value.

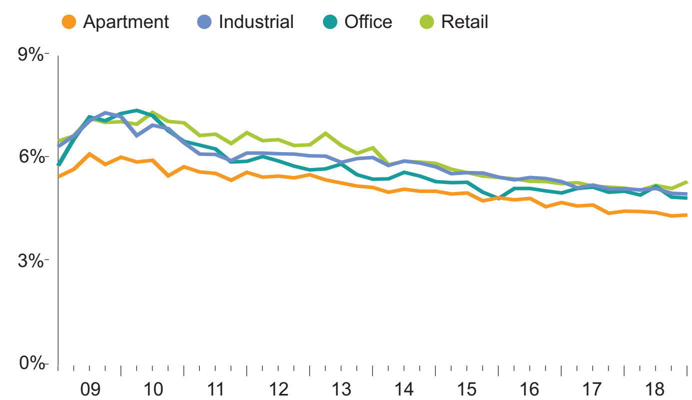
Non-U.S. Markets Seeing Increased Capital Flows

- European real estate markets (ex-U.K.) are gaining momentum due to strong fundamentals in major European cities.
- Asian real estate products are seeing strong fundraising momentum, with an increase in Asia-focused open-end funds.

Few Places to Hide in Real Assets

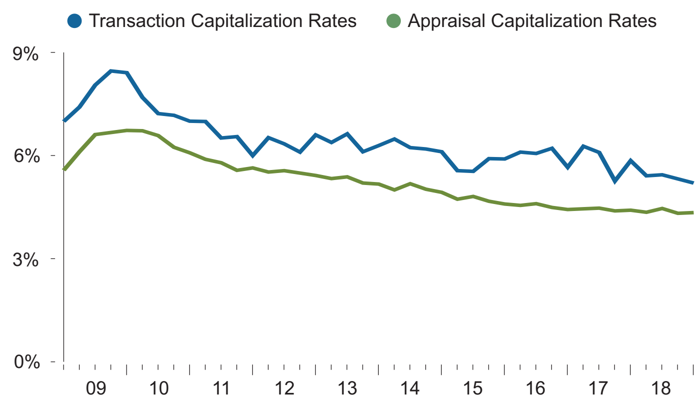
- Gold (**S&P Gold Spot Price Index**: +7.1%) was a rare bright spot amid broad losses for real assets.
- Commodities indices were off sharply. The **Bloomberg Commodity Index** lost 9.4% and the **S&P GSCI Commodity Index** plunged 22.9%; the deviation between the two indices was largely attributable to the plummeting price of oil (down 40%) from a four-year peak of $76/barrel in October to close at $45/barrel on concerns over both supply and waning demand.
- MLPs could not avoid the knock-on effects of lower oil prices (**Alerian MLP Index**: -17.3%).
- The **Dow Jones Brookfield Infrastructure Index** suffered a decline of 6%.
- TIPS also delivered a negative return as the 10-year break-even spread narrowed to 1.71% from 2.14% as of Sept. 30 on reduced expectations for inflation.

NCREIF Capitalization Rates by Property Type



Source: NCREIF
Note: Capitalization rates are appraisal-based.

NCREIF Transaction and Appraisal Capitalization Rates



Source: NCREIF
Note: Transaction capitalization rate is equal weighted.

Callan Database Median and Index Returns* for Periods ended December 31, 2018

Private Real Assets	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
Real Estate ODCE Style	1.45	7.41	7.41	7.76	9.69	6.00	7.09
NFI-ODCE (value wt net)	1.52	7.36	7.36	7.27	9.41	6.01	7.23
NCREIF Property	1.37	6.72	6.72	7.21	9.33	7.49	8.86
NCREIF Farmland	2.85	6.74	6.74	6.67	8.57	11.16	14.44
NCREIF Timberland	0.97	3.44	3.44	3.22	4.98	3.83	7.23
Public Real Estate							
Global Real Estate Style	-5.86	-4.74	-4.74	3.66	6.08	11.10	8.28
FTSE EPRA Nareit Developed	-5.69	-5.63	-5.63	2.72	4.34	9.65	--
Global ex-U.S. Real Estate Style	-5.53	-5.10	-5.10	4.50	4.99	10.49	7.95
FTSE EPRA Nareit Dev ex US	-4.87	-5.79	-5.79	5.09	3.00	9.24	7.22
U.S. REIT Style	-6.32	-4.32	-4.32	3.09	8.35	13.04	9.12
EPRA Nareit Equity REITs	-6.32	-4.62	-4.62	2.89	7.90	12.12	8.25

*Returns less than one year are not annualized.
Sources: Callan, FTSE Russell, NCREIF

Downshifting into a Tricky Corner

PRIVATE EQUITY | Gary Robertson

The number of transactions fell modestly for 2018 and in the fourth quarter, reflecting less certainty in more volatile—and trickier—capital markets. However, dollar volumes associated primarily with fundraising, and venture capital (VC) investments and exits, increased. Overall activity remains near record levels.

– **Fundraising** ► In 2018, private equity partnerships holding **final closes** raised $599 billion globally across 804 partnerships (unless otherwise noted, PitchBook provided all private equity data cited). The amount rose 6% from $566 billion in 2017, but the number of funds fell 19% from 995. Final closes accounted for $112 billion in the fourth quarter, down 27% from $154 billion in the third quarter. The number totaled 164, down 20% from 206.
– **Buyouts** ► New **buyout transactions** for 2018 totaled 7,402 investments, down 4% from 7,738 in 2017. Dollar volume fell to $630 billion, a 3% drop from $649 billion. The fourth quarter saw 1,571 new investments, dropping 16% from 1,868 in the third quarter, but dollar volume rose to $158 billion, a 3% uptick from $153 billion.
– **VC Investments** ► The year produced 20,632 rounds of **new investment in venture capital (VC) companies,** down 23% from 2017's 26,668. The announced volume of $253 billion is up 53% from $165 billion. The fourth quarter saw 3,654 new rounds, 24% down from 4,787 in the third quarter, and dollar volume fell to $51 billion, a 6% drop.

Funds Closed January 1 to December 31, 2018

Strategy	No. of Funds	Amt ($mm)	Share
Venture Capital	354	74,373	12%
Growth Equity	59	131,551	22%
Buyouts	190	237,399	40%
Mezzanine Debt	61	54,836	9%
Distressed	14	26,510	4%
Energy	24	21,097	4%
Secondary and Other	63	36,108	6%
Fund-of-funds	39	16,870	3%
Totals	**804**	**598,744**	**100%**

Source: PitchBook
Figures may not total due to rounding.

– **Exits** ► The year saw 145 **buyout-backed IPOs** in 2018, down 37% from 230 in 2017, with proceeds of $44 billion, down 19%. The fourth quarter saw 21 IPOs, down 16% from the third quarter, with proceeds of $9 billion, up 50%.
– Venture-backed M&A exits for the year totaled 1,375, down 16% from 1,646 in 2017. Announced dollar volume was $140 billion, up 43% from $98 billion in 2017. The quarter had 295 exits, down 9% from 325 in the third quarter. The fourth quarter's total announced value of $37 billion was down 8%.
– The year saw 190 venture-backed IPOs, down 3% from 2017, raising $44 billion, up 132% from 2017. The fourth quarter had 33 IPOs, down 40% from the third quarter. The fourth quarter float of $4 billion plunged 78% from $18 billion.

Private Equity Performance Database (%) (Pooled Horizon IRRs through September 30, 2018*)

Strategy	3 Months	Year	3 Years	5 Years	10 Years	15 Years	20 Years
All Venture	4.83	21.65	10.97	16.85	11.79	11.09	19.08
Growth Equity	3.65	20.89	15.16	14.39	12.56	13.54	14.14
All Buyouts	3.18	15.95	15.61	14.00	11.42	14.45	12.46
Mezzanine	2.56	11.38	10.99	10.31	9.79	9.72	8.63
Credit Opportunities	2.11	9.64	9.29	7.99	11.52	10.21	10.42
Control Distressed	0.85	7.03	10.75	9.31	10.55	10.96	10.85
All Private Equity	**3.37**	**16.80**	**13.87**	**13.79**	**11.54**	**13.16**	**12.96**
S&P 500	7.71	17.91	17.31	13.95	11.97	9.65	7.42
Russell 3000	7.12	17.58	17.07	13.46	12.01	9.86	7.82

Note: Private equity returns are net of fees. Sources: Standard & Poor's and Thomson Reuters/Cambridge
*Most recent data available at time of publication

Note: Transaction count and dollar volume figures across all private equity measures are preliminary figures and are subject to update in subsequent versions of *Capital Market Review* and other Callan publications.

Messy Quarter for Hedge Funds; MACs Struggle

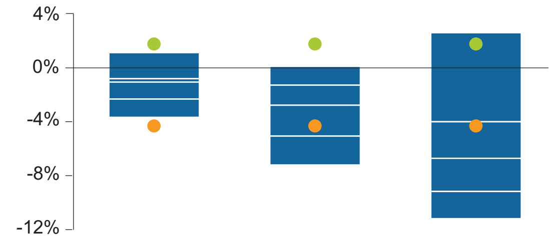
HEDGE FUNDS/MACs | Jim McKee

Hedge Funds: Hot Stuffing Meets Cold Turkey

As the global capital markets reacted to the sharp risk-off sentiment driven by the mounting trade war and slumping China growth, volatile prices and tightening liquidity inside these markets became a heated mess for hedge funds.

- With U.S. small caps and commodities leading markets down, most hedge funds long on risk lost ground, as the **Credit Suisse Hedge Fund Index** melted down 4.3%. For the year, the index finished with a 3.2% loss.
- Heavily exposed to equity beta, *Long/Short Equity* (-6.7%) and *Event-Driven Multi* (-7.7%) lost the most among CS hedge fund strategies.
- After suffering more-than-expected damage in the prior quarter, *Emerging Markets* (-3.3%) fared better with alpha.
- Relative value trades, particularly those further away from liquid stocks, like *Fixed-Income Arb* (-1.3%), were less impacted.

Hedge Fund-of-Funds Style Group Returns



	Absolute Return	Core Diversified	Long/Short Equity
10th Percentile	-0.5	-1.4	0.8
25th Percentile	-2.2	-2.6	-5.0
Median	-2.4	-3.9	-7.4
75th Percentile	-3.5	-5.9	-9.5
90th Percentile	-4.7	-7.8	-11.3
CS Hedge Fund ●	-4.3	-4.3	-4.3
90-Day T-Bill +5% ●	1.8	1.8	1.8

Sources: Callan, Credit Suisse, and Federal Reserve

Callan Database Median and Index Returns* for Periods ended December 31, 2018

Hedge Fund Universe	Quarter	Year	3 Years	5 Years	10 Years	15 Years
Callan Fund-of-Funds Database	**-4.87**	**-1.35**	**2.19**	**2.06**	**5.26**	**4.56**
Callan Absolute Return FOF Style	**-2.42**	**0.71**	**3.41**	**2.84**	**5.78**	**4.18**
Callan Core Diversified FOF Style	**-3.92**	**-1.36**	**2.08**	**1.75**	**5.44**	**4.80**
Callan Long/Short Equity FOF Style	**-7.36**	**-6.14**	**2.31**	**2.05**	**5.21**	**5.45**
Credit Suisse Hedge Fund	-4.30	-3.19	1.64	1.66	5.10	4.77
CS Convertible Arbitrage	-3.21	-2.26	3.04	1.64	7.44	3.50
CS Distressed	-3.20	-1.59	3.95	1.75	6.09	5.78
CS Emerging Markets	-3.25	-10.16	3.13	2.13	6.06	6.01
CS Equity Market Neutral	-4.86	-5.00	-0.57	-0.25	1.61	-0.26
CS Event-Driven Multi	-7.69	-5.19	0.54	-0.83	3.93	4.89
CS Fixed Income Arb	-1.29	1.10	3.94	3.35	7.39	3.84
CS Global Macro	-1.74	-0.11	1.86	1.77	4.84	6.06
CS Long/Short Equity	-6.67	-4.62	1.47	2.69	5.82	5.54
CS Managed Futures	-3.66	-6.67	-3.52	1.04	0.01	2.44
CS Multi-Strategy	-3.74	-1.05	3.34	3.99	7.63	5.78
CS Risk Arbitrage	-0.85	0.17	3.92	2.15	3.40	3.71
HFRI Asset Wtd Composite	-2.73	-1.03	2.77	2.54	5.46	–
90-Day T-Bill + 5%	1.77	6.87	6.02	5.63	5.38	6.33

*Gross of fees. Sources: Bloomberg Barclays, Callan, Credit Suisse, Hedge Fund Research, Societe Generale, and Standard & Poor's

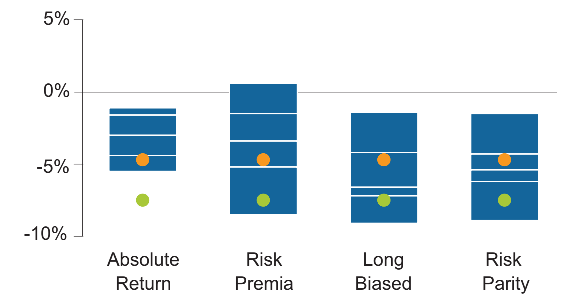
- Also, more process-driven or hard-catalyst strategies, like *Risk Arb* and even *Distressed* (-3.2%), held ground better.
- Reflecting live hedge fund portfolios, the **HFRI FOF Composite Index** (-4.8%) fell marginally more than its unmanaged CS HFI proxy. For the year, it lost 3.9%.
- Hedge fund portfolios with a long bias to U.S. equities and related risks suffered the most, while those with illiquid credits, conservative event-driven, or discretionary macro strategies performed relatively well.

Top-Down MAC Strategies Slump Together

Liquid alternatives to hedge funds have become popular among investors for their attractive risk-adjusted returns that are similarly uncorrelated with traditional stock and bond investments but constructed at a lower cost. The **Callan Multi-Asset Class (MAC) Style Groups** tripped again in the fourth quarter's risk-off mode, but different factors were to blame than in prior quarters. As value-oriented trades gained ground, particularly in equities, commodity momentum lost traction, particularly with heated oil markets suddenly cooling off. The commodity carry trade was also difficult, especially in November for natural gas.

- The **HFR Risk Parity Index** targeting 12% volatility slipped 8.0%, hurt by both commodity and equity exposures. Reflecting a material U.S. equity influence, a global balanced index of 60% stocks and 40% bonds fell 7.2%.
- **CS NB Multi Asset Risk Premia Index** (-4.7%) is an equal risk-weighted index of alternative risk factors (value, carry, momentum, and liquidity) across four capital markets (equity, fixed income, currency, and commodities) targeting 5% volatility.
- Within CS NB MARP, *Equity Value* (+4.6%) finally earned positive marks, but such gains were notably offset by both *Commodity Momentum* (-22.2%) and *Commodity Carry* (-25.3%) suffering massive reversals to end the year down deeply in red.

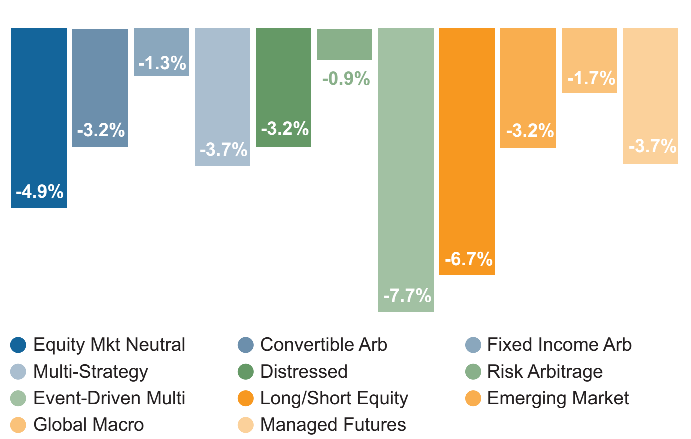
MAC Style Group Returns



	Absolute Return	Risk Premia	Long Biased	Risk Parity
10th Percentile	-1.1	0.6	-1.4	-1.5
25th Percentile	-1.6	-1.5	-4.2	-4.3
Median	-3.0	-3.4	-6.6	-5.4
75th Percentile	-4.4	-5.2	-7.2	-6.2
90th Percentile	-5.5	-8.5	-9.1	-8.9
CS NB MARP (5%v) ●	-4.7	-4.7	-4.7	-4.7
60% S&P 500/ 40% BB Barclays Agg ●	-7.5	-7.5	-7.5	-7.5

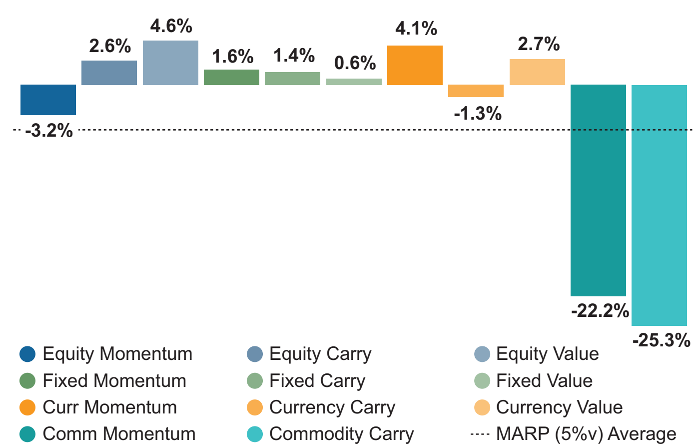
Sources: Bloomberg Barclays, Callan, Credit Suisse, Neuberger Berman, Standard & Poor's

Credit Suisse Hedge Fund Strategy Returns



Source: Credit Suisse

Alternative Risk Factor Breakdown



Source: Credit Suisse Neuberger Berman

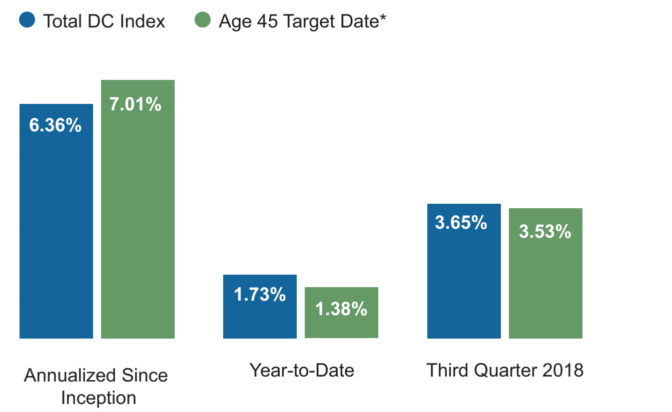
DC Index Tops Age 45 TDF in 3rd Quarter

DEFINED CONTRIBUTION | James Veneruso, CFA, CAIA

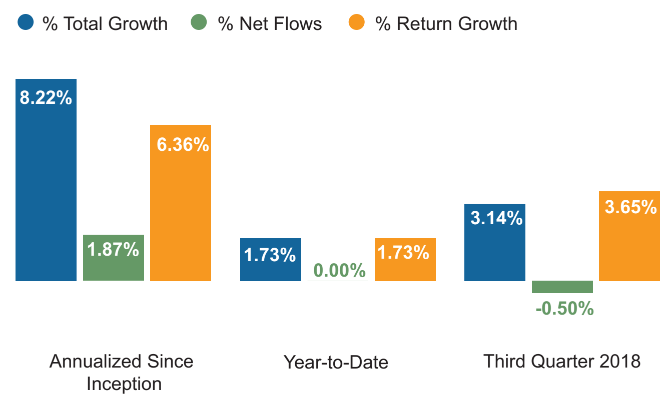
- The Callan DC Index™ gained 3.7% in the third quarter, outpacing the 3.5% rise of the Age 45 Target Date Fund (TDF).
- Some of this outperformance stemmed from gains of U.S. equities in the quarter compared to their overseas counterparts. The average DC plan has a 5.3% allocation to non-U.S. equity and emerging markets, while the Age 45 TDF has an allocation of 25.9%.
- But since inception the DC Index's annual return of 6.4% has trailed the Age 45 TDF by 65 basis points.
- The DC Fee Analysis, showing average total investment management fees, reveals that fees fell across all plan sizes. This was driven by increased use of passive mandates, lower breakpoints, and new lower-fee vehicles and share classes for active options.
- DC plan balances grew by 3.1%, driven completely by market performance. For the first time since the third quarter of 2016, flows into the DC Index were negative.
- TDFs attracted the majority of assets in the quarter, approximately 64 cents of every dollar that flowed into DC funds.
- U.S. large cap, U.S./global balanced, and non-U.S. equities saw material net outflows. Small/mid-cap equity and money market saw sizable inflows.
- Turnover (i.e., net transfer activity levels within DC plans) decreased to 0.1% from 0.4% the previous quarter, well below the historical average at 0.6%.
- The Index's equity allocation hit 71%, modestly above the historical average (68%).
- TDFs maintained their lead with the largest share of DC Index assets (31.7%).
- The share of plans offering a brokerage window increased from 34% a year ago to 42%. The share offering a money market option dropped from 51% to 43%, while stable value rose from 69% to 73%.

The Callan DC Index is an equally weighted index tracking the cash flows and performance of nearly 90 plans, representing more than one million DC participants and over $135 billion in assets. The Index is updated quarterly and is available on Callan's website, as is the quarterly DC Observer newsletter.

Investment Performance



Growth Sources



Net Cash Flow Analysis (Third Quarter 2018)
(Top Two and Bottom Two Asset Gatherers)

Asset Class	Flows as % of Total Net Flows
Target Date Funds	64.39%
Money Market	14.12%
Company Stock	-17.44%
U.S. Large Cap	-22.50%
Total Turnover**	**0.13%**

Data provided here is the most recent available at time of publication.
Source: Callan DC Index
Note: DC Index inception date is January 2006.

* The Age 45 Fund transitioned from the average 2035 TDF to the 2040 TDF in June 2018.

** Total Index "turnover" measures the percentage of total invested assets (transfers only, excluding contributions and withdrawals) that moved between asset classes.

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The *Capital Market Review* is a quarterly macroeconomic indicator newsletter that provides thoughtful insights on the economy and recent performance in the equity, fixed income, alternatives, real estate, and other capital markets.

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About Callan

Callan was founded as an employee-owned investment consulting firm in 1973. Ever since, we have empowered institutional clients with creative, customized investment solutions that are backed by proprietary research, exclusive data, and ongoing education. Today, Callan advises on more than $2 trillion in total fund sponsor assets, which makes it among the largest independently owned investment consulting firms in the U.S. Callan uses a client-focused consulting model to serve pension and defined contribution plan sponsors, endowments, foundations, independent investment advisers, investment managers, and other asset owners. Callan has six offices throughout the U.S. For more information, please visit www.callan.com.

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