The following article was originally a PowerPoint presentation that highlights several aspects of recent price movements across assets classes and within equity industry sectors. Many investors are unfamiliar with these relationships and their importance. While the current correction may prove only to be a speed bump on the way to higher prices, close inspection of asset class and security interactions often hold important clues about the future. The information contained in these pages argues for caution. Click on any table below for a full size image making them easier to read.

Nowhere to Hide

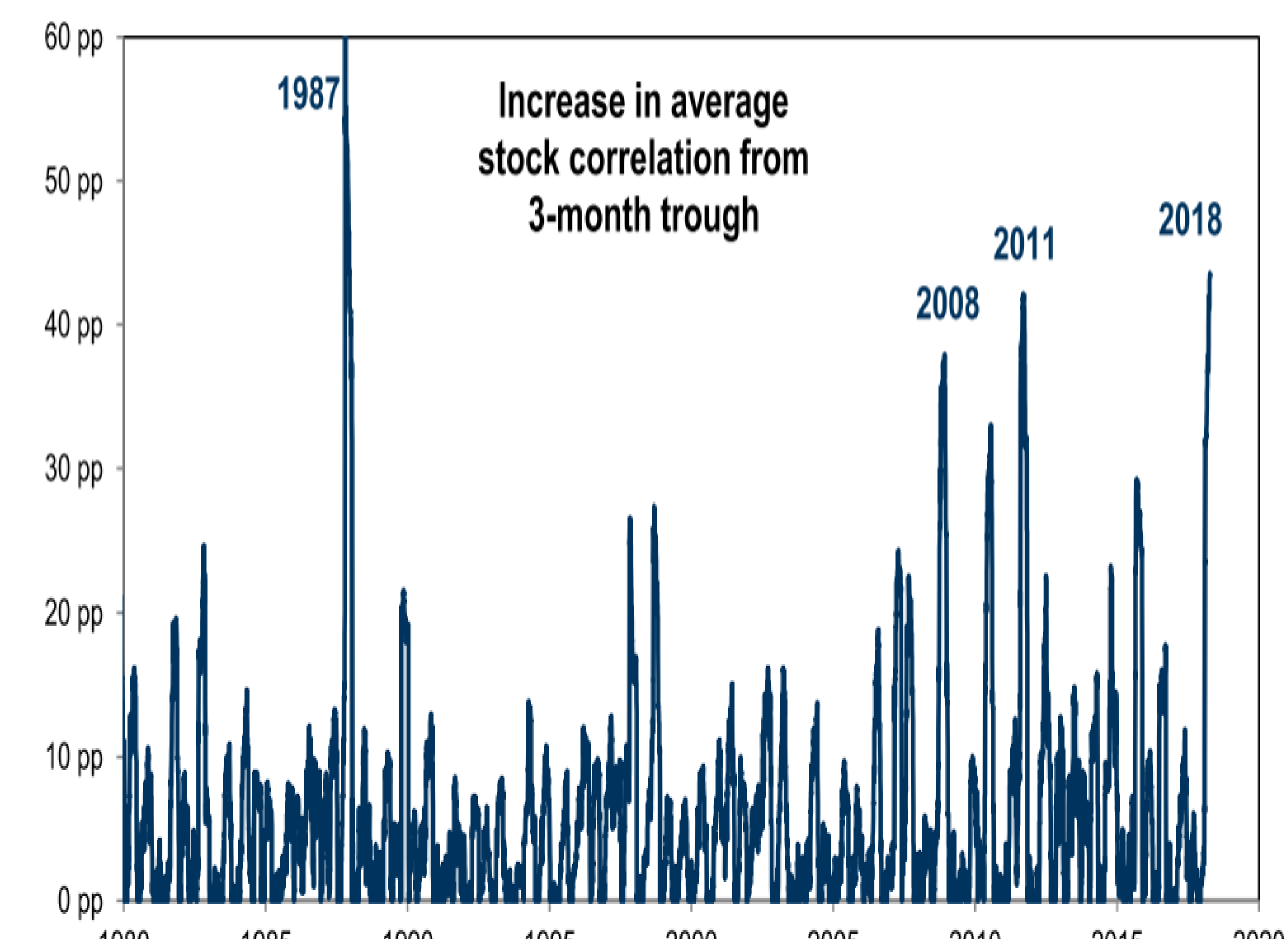
The messages from shifting cross asset and S&P 500 sector correlations

Why Correlations Matter

Correlation is a statistical measure that quantifies the relationship between two financial assets or securities. A correlation of +1.0 is perfect, meaning the two securities or assets move one-for-one with each other. A correlation of -1.0 means they move exactly opposite of each other. As correlations move away from +/- 1.0 the relationship weakens. A correlation of zero quantitatively implies no relationship in the movement between the two instruments. Correlations between and within asset classes plays an integral role in portfolio management. From a big picture perspective, changing correlations can be a signal that broader market trends are changing. Investors may reduce risk during such periods. Also of importance, changing correlations may increase or decrease the value of ?hedges? within a portfolio. For instance, investors tend to assume they are taking a more defensive posture moving technology to utility stocks, or from stocks to bonds when they sense a downturn coming. While such trades have been effective in the past, correlations allow us to observe changes and develop opinions about the future. The following charts and notes provide recent and historical context on how correlations have changed since the equity market turned lower in late January. Whether these changes turn out to be a dependable warning of trend change, or a multi-month anomaly, is unknown. What is known is that the market is not behaving as it has for the last few years and investors should pay close attention to correlations for more market insight.

Under Appreciated Price Action

Exhibit 1: S&P 500 average stock correlations have surged since January



This graph, courtesy of Goldman Sachs, shows how correlations between S&P 500 stocks have increased at a rate greater than anytime in the last 40 years except 1987.

Cross Asset Correlations

Asset Class Correlation (Long Term vs Recent)

2003-Current

Asset	S&P 500 (SPY)	High Yield (HYG)	Invest. Grade (LQD)	Russel 2k (IWM)	NASDAQ (QQQ)	Long Term TSY (IEF)	Short Term TSY (SHY)	Gold (GLD)	CRB Index (CRY)	Volatility (VIX)	US Dollar (DXY)
S&P 500 (SPY)		0.70	0.09	0.91	0.90	(0.33)	(0.29)	0.00	0.39	(0.71)	(0.24)
High Yield (HYG)			0.47	0.67	0.60	(0.09)	(0.16)	0.01	0.38	(0.49)	(0.28)
Invest. Grade (LQD)				0.02	0.04	0.69	0.44	0.02	(0.00)	(0.05)	(0.18)
Russel 2k (IWM)					0.87	(0.35)	(0.29)	0.04	0.37	(0.65)	(0.22)
NASDAQ (QQQ)						(0.33)	(0.29)	(0.02)	0.31	(0.69)	(0.17)
Long Term TSY (IEF)							0.74	0.16	(0.18)	0.29	(0.15)
Short Term TSY (SHY)								0.17	(0.07)	0.25	(0.18)
Gold (GLD)									0.40	0.04	(0.48)
CRB Index (CRY)										(0.25)	(0.44)
Volatility (VIX)											0.05
US Dollar (DXY)											

1/26/18-Current

Asset	S&P 500 (SPY)	High Yield (HYG)	Invest. Grade (LQD)	Russel 2k (IWM)	NASDAQ (QQQ)	Long Term TSY (IEF)	Short Term TSY (SHY)	Gold (GLD)	CRB Index (CRY)	Volatility (VIX)	US Dollar (DXY)
S&P 500 (SPY)		0.92	0.64	0.99	0.98	(0.28)	(0.68)	0.05	0.58	(0.96)	(0.24)
High Yield (HYG)			0.74	0.89	0.87	(0.11)	(0.67)	0.27	0.70	(0.89)	(0.48)
Invest. Grade (LQD)				0.59	0.55	0.42	(0.22)	(0.13)	0.36	(0.70)	(0.13)
Russel 2k (IWM)					0.98	(0.32)	(0.73)	0.11	0.61	(0.95)	(0.30)
NASDAQ (QQQ)						(0.32)	(0.70)	0.01	0.58	(0.94)	(0.21)
Long Term TSY (IEF)							0.67	(0.30)	0.02	0.17	0.17
Short Term TSY (SHY)								(0.47)	(0.52)	0.66	0.61
Gold (GLD)									0.55	-	(0.92)
CRB Index (CRY)										(0.65)	(0.72)
Volatility (VIX)											0.24
US Dollar (DXY)											

Constructing a Correlation Change Heat Map

To better compare correlations over different periods, as shown on the prior page, we constructed a change in correlation heat map. The example below diagrams how the table is calculated. The correlation between

2003-Current

		High Yield	Invest. Grade

Asset Class Correlation Change (Long Term vs Recent)

Asset	S&P 500 (SPY)	High Yield (HYG)	Invest. Grade (LQD)	Russel 2k (IWM)	NASDAQ (QQQ)	Long Term TSY (IEF)	Short Term TSY (SHY)	Gold (GLD)	CRB Index (CRY)	Volatility (VIX)	US Dollar (DXY)
S&P 500 (SPY)		0.22	0.56	0.08	0.08	0.05	(0.39)	0.05	0.19	(0.26)	(0.01)
High Yield (HYG)			0.28	0.23	0.27	(0.02)	(0.51)	0.27	0.33	(0.40)	(0.20)
Invest. Grade (LQD)				0.57	0.51	(0.27)	(0.66)	(0.15)	0.37	(0.65)	0.05
Russel 2k (IWM)					0.12	0.02	(0.45)	0.07	0.23	(0.30)	(0.09)
NASDAQ (QQQ)						0.01	(0.41)	0.03	0.28	(0.26)	(0.04)
Long Term TSY (IEF)							(0.06)	(0.46)	0.20	(0.13)	0.32
Short Term TSY (SHY)								(0.64)	(0.44)	0.41	0.79
Gold (GLD)									0.15	(0.04)	(0.44)
CRB Index (CRY)										(0.41)	(0.29)
Volatility (VIX)											0.19
US Dollar (DXY)											

Takeaways

- The traditional equity market hedge, investment grade (LQD), has seen a marked increase in correlation to SPY +0.56 and reduced correlation to short term US Treasury Prices (SHY) -0.39 (Increased correlation to yields)
- Short-term Treasury yields (SHY) are being heavily influenced by expected Fed Funds rate hikes - current correlations less relevant
- The equity and commodity (CRB) relationship has increased
- Negative correlation of Gold (GLD) vs USD (DXY) increased sharply and is nearing -1.00 over the last two months
- VIX and SPY are more negatively correlated than in the past making VIX a good equity hedge thus far

Asset Class Correlation (Short Term vs Recent)

4/13/2017 -Current

Asset	S&P 500 (SPY)	High Yield (HYG)	Invest. Grade (LQD)	Russel 2k (IWM)	NASDAQ (QQQ)	Long Term TSY (IEF)	Short Term TSY (SHY)	Gold (GLD)	CRB Index (CRY)	Volatility (VIX)	US Dollar (DXY)
S&P 500 (SPY)		0.42	(0.06)	0.69	0.76	(0.24)	(0.32)	(0.01)	(0.05)	(0.54)	0.02
High Yield (HYG)			0.38	0.50	0.40	0.05	0.12	0.06	0.19	(0.68)	(0.11)
Invest. Grade (LQD)				(0.02)	0.12	0.79	0.57	0.33	0.05	(0.22)	(0.30)
Russel 2k (IWM)					0.45	(0.32)	(0.29)	(0.06)	(0.09)	(0.49)	0.08
NASDAQ (QQQ)						0.05	0.01	0.17	(0.08)	(0.56)	0.06
Long Term TSY (IEF)							0.71	0.57	(0.04)	0.07	(0.34)
Short Term TSY (SHY)								0.50	0.04	0.24	(0.34)
Gold (GLD)									0.40	0.31	(0.56)
CRB Index											

Asset Class Correlation Change (Short term vs Recent)

Asset	S&P 500 (SPY)	High Yield (HYG)	Invest. Grade (LQD)	Russel 2k (IWM)	NASDAQ (QQQ)	Long Term TSY (IEF)	Short Term TSY (SHY)	Gold (GLD)	CRB Index (CRY)	Volatility (VIX)	US Dollar (DXY)
S&P 500 (SPY)		0.50	0.71	0.30	0.22	(0.03)	(0.36)	0.06	0.63	(0.43)	(0.26)
High Yield (HYG)			0.36	0.39	0.47	(0.16)	(0.79)	0.21	0.51	(0.21)	(0.37)
Invest. Grade (LQD)				0.61	0.43	(0.37)	(0.79)	(0.45)	0.31	(0.48)	0.17
Russel 2k (IWM)					0.53	(0.01)	(0.44)	0.17	0.69	(0.46)	(0.39)
NASDAQ (QQQ)						(0.37)	(0.71)	(0.16)	0.66	(0.38)	(0.27)
Long Term TSY (IEF)							(0.03)	(0.87)	0.06	0.10	0.51
Short Term TSY (SHY)								(0.97)	(0.56)	0.42	0.95
Gold (GLD)									0.15	(0.31)	(0.36)
CRB Index (CRY)										(0.81)	(0.30)
Volatility (VIX)											0.48
US Dollar (DXY)											

Takeaways

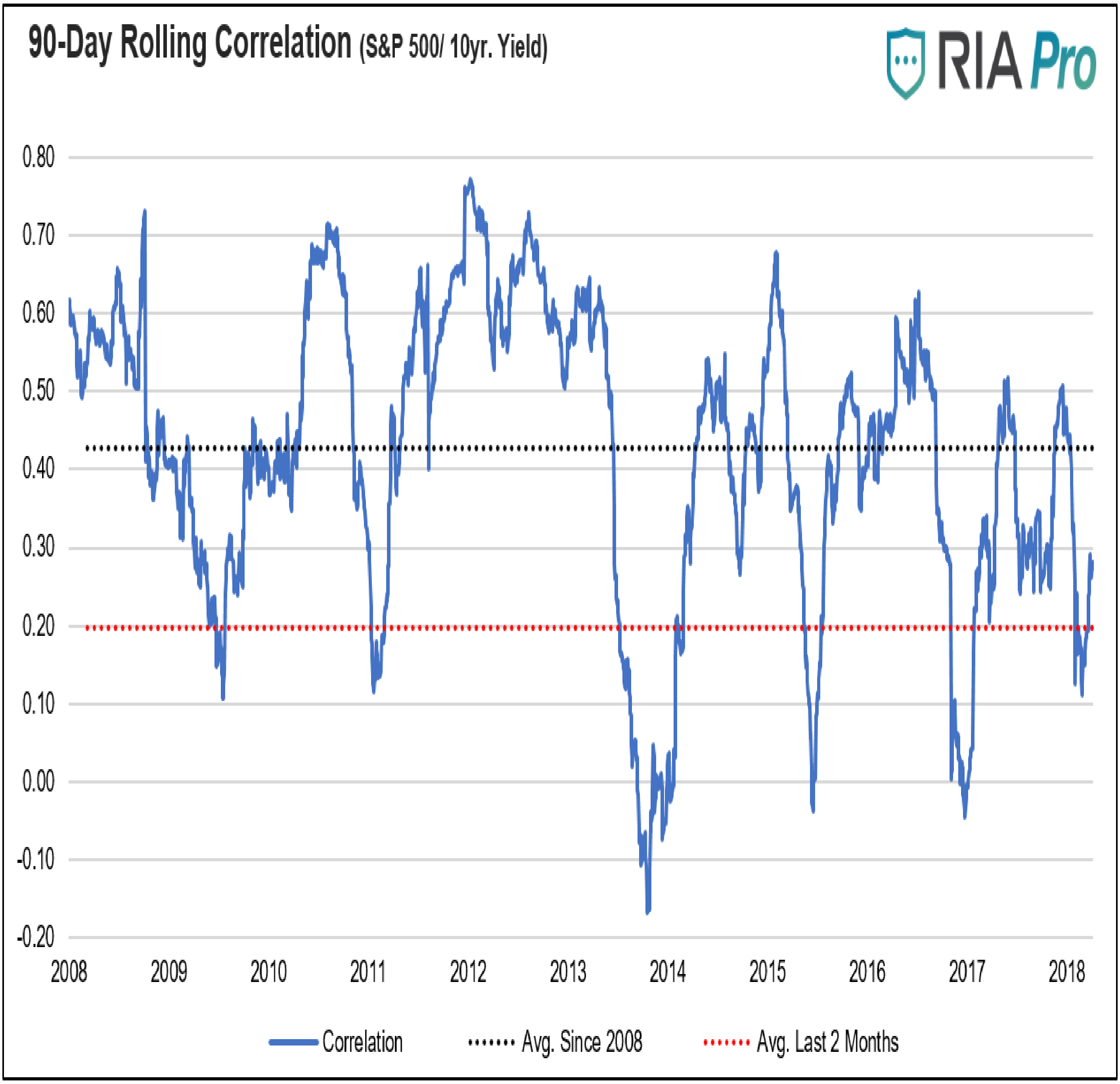
- Correlation between major equity indexes (SPY, IWM and QQQ) have increased sharply (+0.30 and +0.22) and are nearly 100%
- Negative correlation between volatility (VIX) and equities amplified (-0.54 to -0.96)
- Equities and Corporate bond prices are highly correlated in this recent downturn (SPY/LQD from -0.06 to +0.64) (SPY/HYG 0.42 to 0.92)
- Corporates (LQD and HYG) and Treasuries (IEF and SHY) are not as correlated as the prior year
- Volatility (VIX) has proven to be an effective hedge against Investment Grade and High Yield corporates
- Dollar (USD) / Gold (GLD) relationship has become significantly negatively correlated (-0.56 to -0.92)
- The relationship between USD (DXY) and short term rates (SHY -price) has become significant (-0.34 to +0.61) – Fed hikes should positive for USD!

Asset Class Correlation Change (2008/2015/2016 vs Recent)

This table compares the past few months with three similar periods in which the S&P 500 fell 10-15%. Note the 2008 experience covers 10/2007 to 06/2008, the period before the market fell significantly.

Asset	S&P 500 (SPY)	High Yield (HYG)	Invest. Grade (LQD)	Russel 2k (IWM)	NASDAQ (QQQ)	Long Term TSY (IEF)	Short Term TSY (SHY)	Gold (GLD)	CRB Index (CRY)	Volatility (VIX)	US Dollar (DXY)
S&P 500 (SPY)		0.27	0.92	0.09	0.06	0.27	(0.32)	0.42	0.31	(0.06)	(0.34)
High Yield (HYG)			0.71	0.18	0.16	0.28	(0.31)	0.77	0.41	(0.27)	(0.71)
Invest. Grade (LQD)				0.65	0.80	(0.38)	(0.85)	(0.37)	0.65	(0.99)	(0.04)
Russel 2k											

S&P 500/UST Correlation



Given the popularity of formal and informal risk parity strategies, this graph showing the well below average correlation of the S&P 500 versus 10 year UST yields should be of vital concern if this equity sell-off continues and the correlation remains low.

S&P 500 Sector Correlations

S&P 500 Sector Cross Correlation (Long Term vs Recent)

Security	SPY	Info. Tech.	Energy	Financials	Con. Staple	Con. Discret.	Health Care	Utilities	Industrials	Telecoms	Real Estate	Materials
SPY		0.88	0.77	0.85	0.79	0.93	0.80	0.63	0.92	0.70	0.71	0.87
Info. Tech.			0.60	0.66	0.64	0.84	0.65	0.48	0.81	0.57	0.57	0.76
Energy				0.58	0.54	0.63	0.55	0.57	0.69	0.51	0.47	0.78
Financials					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

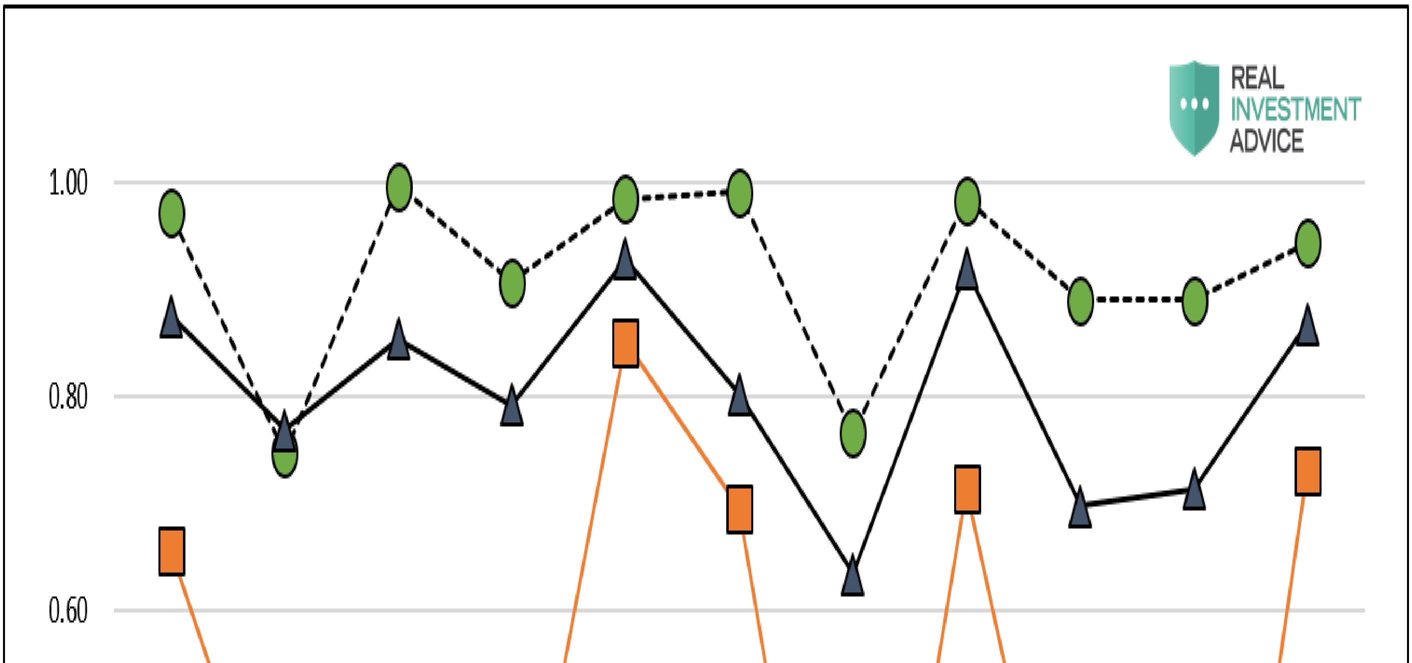
S&P 500 Sector Cross Correlation and Changes

The Left column shows the current correlations while the four to its right highlight the differences versus those respective time frames.

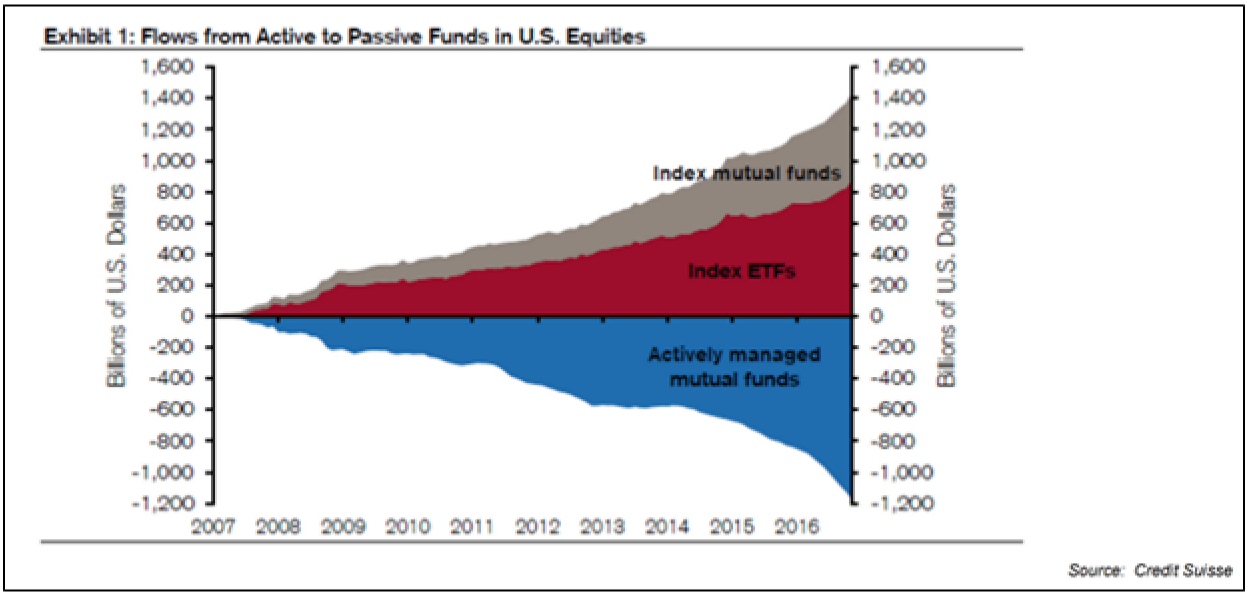
	Correlation	Changes in Correlation			
		Short Term		Long Term	
From:	1/26/2018	4/13/2017	4/13/2016	4/13/2010	4/13/2003
To:	Current	1/26/2018	1/26/2018	Current	Current
Info. Tech.	0.97	0.32	0.24	0.07	0.10
Energy	0.75	0.41	0.38	(0.06)	(0.02)
Financials	1.00	0.53	0.27	0.10	0.14
Con. Staple	0.91	0.62	0.50	0.15	0.12
Con. Discret.	0.99	0.13	0.11	0.05	0.06
Health Care	0.99	0.30	0.26	0.17	0.19
Utilities	0.77	0.70	0.66	0.27	0.13
Industrials	0.98	0.27	0.17	0.05	0.06
Telecoms	0.89	0.67	0.61	0.29	0.19
Real Estate	0.89	0.90	0.59	0.18	0.18
Materials	0.94	0.21	0.20	0.07	0.08
Average	**0.92**	**0.46**	**0.36**	**0.12**	**0.11**

Takeaways

- The average across all sectors as well as the individual sector correlations increased considerably versus last two years and moderately versus longer term
- Correlations over the last two years were the anomaly, not the norm. Unprecedented low volatility provides further evidence of that
- Energy is the only sector with a current correlation that is less than prior correlations in the table
- "**Nowhere to Hide**"- Safety sectors (Utilities, Health Care and Consumer Staples) have become highly correlated to the market



To further highlight the uniqueness of current sector correlations versus the S&P 500, this graph compares the current period (green dots) versus the prior year (orange squares) and the prior 15 years (gray triangles).



This graph serves as a reminder that passive investing has grown significantly over the past 10 years. In our opinion this popularity will play a role in making it more likely that correlations between asset classes and sectors will behave differently in the next downturn than they have in the past. As such alternative hedging strategies should be considered now.

Conclusions

- *Passive funds and strategies have increased the likelihood that future correlations between asset classes and the S&P 500 and its constituents are higher*
- *Equity and fixed income correlations have increased recently, rendering fixed income hedges for equities not as dependable*
- *Gold and commodities as measured by the CRB index have also not been as good an equity hedge as in the past*
- *Long equity volatility (VIX) has thus far proven a good ballast for stock and fixed income hedging*
- *Traditional safety, low beta, equity sectors have been well correlated to other sectors and the equity market as a whole*
- *Higher beta equity indexes (Russel 2k and the NASDAQ) have moved nearly perfectly in line with the S&P 500*
- *It is too early to tell if the market is topping or just taking a breather, but the signals discussed in this article and others we did not highlight, should be taken seriously*