Strategy Matters

The Great Rate Debate

Sharon Bell, CFA
+44(20)7552-1341 | sharon.bell@gs.com
Goldman Sachs International

Lilia Peytavin
+44(20)7774-8340 |
lilia.peytavin@gs.com
Goldman Sachs International

Peter Oppenheimer
+44(20)7552-5782 |
peter.oppenheimer@gs.com
Goldman Sachs International

Guillaume Jaisson
+44(20)7552-3000 |
guillaume.jaisson@gs.com
Goldman Sachs International

"The risk of higher inflation creeping into the system after several years of uninterrupted global economic growth is making equity investors nervous." Strategy Matters: Inflation risks to sectors and margins, July 12, 2007.

Some concerns keep coming around. **The foremost question we hear currently is 'will rising bond yields damage equities'?** A number of factors matter for the reaction of stocks, in our view:

- The point of the **cycle:** equities tend to be more immune earlier in the cycle. We are not early-cycle, so for equities to rise as bond yields rise, we find EPS needs to be the driver, not P/E.
- The **speed** of adjustment: slower is better: hence the difficulty in digesting the recent move. Our Rates strategists expect a continued sell-off but the pace to slow, with UST 10-year yields at 3.25% and German Bunds at 1.0% at end-2018.
- The **level** of yields at the time: historically, UST 10Y at 5% or more has been definitively 'bad' for equities; but the crossing point is likely earlier this cycle, at 3% or 4%, and we are close to that level.
- **Valuation** of equities: the gap between equity and bond valuation still favours equities, particularly in Europe, where bond yields remain low and 80% of companies offer a better dividend yield than the yield on corporate debt.
- The **drivers** of the yield rise: real or nominal; inflation-led rises are often easier for equities to digest.

We conclude that the growth/rates mix has deteriorated, which will mean lower returns on equities. These returns will need to be driven by EPS, not P/E. But we are not expecting a Bear market (see *Global Equity Strategy: Correction Detection; the risks of a drawdown within a bull market*, Jan. 29, 2018) – the shifts up in yields are likely to slow from here and high levels of global growth should continue to boost profits. The **sector implications** of rising yields (nominal or real) are clear, in our view: we prefer Banks (SX7P) and are Underweight Consumer Staples (SX3P and SXQP). We also have a tilt towards Cyclicals and Value stocks in our European allocation. We see value in some defensives, especially Utilities (SX6P).

Goldman Sachs does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html. Analysts employed by non-US affiliates are not registered/qualified as research analysts with FINRA in the U.S.

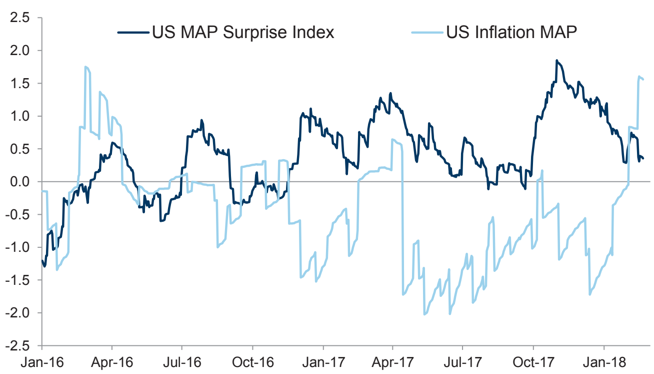
For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Equities in a time of rising yields

The growth/inflation mix is starting to deteriorate

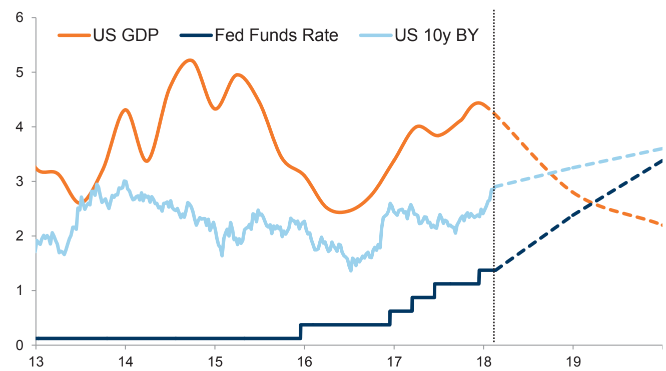
We described the environment for most of last year as 'Goldilocks' – robust and rising growth with low inflation. Our US economists' MAP scores for data surprises show that throughout 2017 inflation surprised on the downside, while growth surprised on the upside (Exhibit 1). But **there has been a clear change since the start of this year: while growth remains strong, surprises in inflation have been upwards and bond yields have risen globally.** See *US Daily: The 2018 Inflation Rebound*, February 12, 2018 for a detailed discussion on inflation. Also, rates of growth are likely to peak this year, both in the US and globally (see our forecasts in Exhibit 2).

Exhibit 1: Goldilocks has lost her way, for now
MAP Index of surprise in US economic data



Source: Goldman Sachs Global Investment Research

Exhibit 2: Strong growth, but poised to slow, meets rising yields and inflation
(%), GS forecasts for 2018 and 2019



Source: Haver, Datastream, Goldman Sachs Global Investment Research

Our Rates strategists expect the bond sell-off to continue. They have brought forward their 10-year bond yield forecasts for end-Q1 2019 to end-Q4 2018, leaving peak rates in this cycle unchanged. Our year-end 2018 forecasts are now 3.25% for US Treasuries (previously 3%), 1.0% for Bunds (previously 0.8%), 2.0% for Gilts (previously 1.8%) and 10bp for JGBs. They continue to expect a steeper Treasury curve than is priced in the forwards. The main catalyst to this move has been stronger growth and slightly higher inflation expectations. But there are other drivers as well. US Treasury yields are around 1 standard deviation below 'fair value' based on our Rates strategists' *'Sudoku'* framework. Also, central bank policy is starting to shift and the explicit subsidy for duration will slowly start to disappear, increasing the term premium (which remains at historical lows). For more details, see Macro Rates Views: How Much Further Can Bond Yields Go?, February 16, 2018.

Bonds and equities: the great rate debate

The foremost question we hear from investors is 'will rising yields be damaging to equities and, if so, when'? One problem with answering this question, at least empirically, is that the development of equities when bond yields rise differ markedly depending on a number of factors:

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

- The point of the **cycle** – equities tend to be more immune earlier in the cycle.
- The **speed** of adjustment – slower is better for equities.
- The **level** of yields at the time – historically, UST 10-year yields at 5% or more have been definitively 'bad' for equities; but the crossing point is likely earlier this cycle.
- The **valuation** of equities – this relates to the cycle, and clearly equities are less vulnerable when they are cheap.
- The **drivers** of the yield rise – real or nominal; inflation-led rises are often easier for equities to digest.

The tables below show the performance of the S&P 500 (Exhibit 3) and Europe STOXX (Exhibit 4) during periods when US bond yields have risen. What is clear is that the relationship is not clear. Occasionally equities do well, as in the 1998-2000 period when, although US 10-year Treasury yields rose from 4.2% to 6.8%, the US market rose 46% with a 29% rise in P/E (the European market was up 72%). But, other times, most notably in 1994, equities fell despite reasonably good earnings growth at the time.

Exhibit 3: US equity performance during periods of rising US 10-year bond yields

US 10y BY						S&P 500		
Date		Level		Change	Length	Change		
Trough	Peak	Start	End	(bp)	(m)	Price	NTM PE	NTM EPS
Dec-91	Mar-92	6.7	7.7	98	2	-3%	-3%	1%
Oct-93	Nov-94	5.2	8.0	288	13	-1%	-14%	12%
Jan-96	Jul-96	5.5	7.0	153	6	7%	4%	3%
Nov-96	Apr-97	6.0	7.0	93	4	-2%	-5%	3%
Oct-98	Jan-00	4.2	6.8	262	16	46%	29%	17%
Nov-01	Apr-02	4.2	5.4	124	5	3%	-1%	4%
Jun-03	Sep-03	3.1	4.6	149	3	3%	0%	4%
Mar-04	Jun-04	3.7	4.9	119	3	1%	-6%	7%
Jun-05	Jun-06	3.9	5.2	136	13	4%	-10%	14%
Dec-06	Jun-07	4.4	5.3	86	6	6%	2%	4%
Dec-08	Jun-09	2.1	3.9	188	5	5%	22%	-16%
Oct-09	Apr-10	3.2	4.0	81	6	15%	-3%	19%
Oct-10	Feb-11	2.4	3.7	135	4	14%	7%	7%
Jul-12	Sep-13	1.4	3.0	161	13	24%	15%	8%
Jul-16	Feb-18	1.4	2.9	151	19	28%	7%	21%
Average		**3.8**	**5.3**	**148**	**8**	**10%**	**3%**	**7%**

Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Exhibit 4: European equity performance during periods of rising US 10-year bond yields

US 10y BY						STOXX Europe 600		
Date		Level		Change	Length	Change		
Trough	Peak	Start	End	(bp)	(m)	Price	NTM PE	NTM EPS
Dec-91	Mar-92	6.7	7.7	98	2	4%	6%	-2%
Oct-93	Nov-94	5.2	8.0	288	13	-1%	-15%	15%
Jan-96	Jul-96	5.5	7.0	153	6	6%	6%	-1%
Nov-96	Apr-97	6.0	7.0	93	4	13%	11%	2%
Oct-98	Jan-00	4.2	6.8	262	16	72%	29%	43%
Nov-01	Apr-02	4.2	5.4	124	5	5%	9%	-4%
Jun-03	Sep-03	3.1	4.6	149	3	7%	6%	2%
Mar-04	Jun-04	3.7	4.9	119	3	2%	-4%	5%
Jun-05	Jun-06	3.9	5.2	136	13	15%	-6%	21%
Dec-06	Jun-07	4.4	5.3	86	6	10%	7%	3%
Dec-08	Jun-09	2.1	3.9	188	5	8%	41%	-33%
Oct-09	Apr-10	3.2	4.0	81	6	12%	-8%	20%
Oct-10	Feb-11	2.4	3.7	135	4	10%	4%	6%
Jul-12	Sep-13	1.4	3.0	161	13	22%	30%	-8%
Jul-16	Feb-18	1.4	2.9	151	19	16%	0%	17%
Average		**3.8**	**5.3**	**148**	**8**	**13%**	**8%**	**6%**

Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

1. The point of the cycle – equities are more immune earlier in the cycle

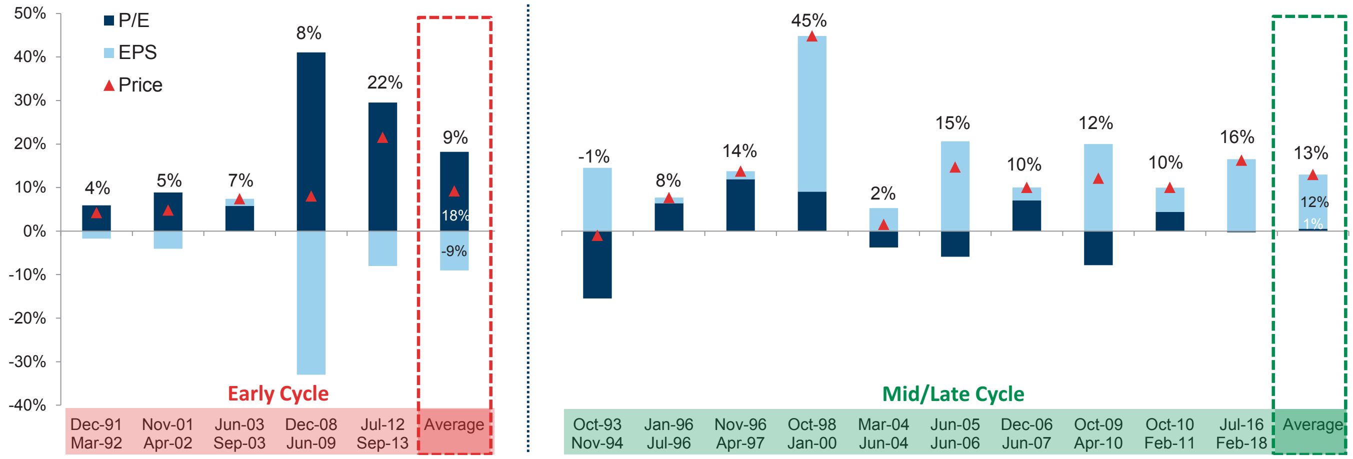
The reason it is tricky to divine the impact of higher bond yields on equities is that higher yields can happen at different points in the equity cycle – and for different reasons. Quite often the sharpest rise in bond yields is from the trough of the economic cycle. This is typically a constructive time for equity investment and it is usually when equities have a cheap starting point as well. We are clearly not at this point today. Exhibit 5 shows periods with rising bond yields and European equity returns broken down between EPS and valuation (the same data as in Exhibit 4). Some of these periods are early-cycle: 1991, 2001-2003, 2008 and 2012. While 2012 was not so much early-cycle in the US, it certainly was in Europe given the downturn after the sovereign crisis.

We find these early-cycle rises in bond yields are accompanied by sharp rises in valuation, and that EPS is not the main driver of returns – indeed, EPS is often times still falling. These are very different from mid- and later-cycle rises in bond yields, when there may be more worries about inflation, yields are starting from a higher point and equity valuations are already stretched.

Looking at the average bars on the right of the chart, these mid- or late-cycle periods of rising yields are still perfectly consistent with positive equity returns. But we find far less of the return is driven by valuation, and that more is driven by EPS improvement. We think this will be the case again this time: returns are likely to be weaker and driven by EPS, not P/E.

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Exhibit 5: Market performance during periods of rising bond yields can be split between early cycle and mid/late cycle
SXXP performance split by earnings growth and valuation during periods of rising bond yields (1996-2000 data, ex-TMT)



Source: Datastream, I/B/E/S, Worldscope, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

2. The speed of adjustment - slower is better

The speed of bond yield rises since the start of the year has been difficult to digest – hence the higher equity price volatility and recent market correction. Our Asset Allocation team discussed this relation in detail in _GOAL: Reflation, equity/bond correlation and diversification desperation_, November 14, 2016. **They showed that since the global financial crisis, if US 10-year yields increase by more than 2 standard deviations in a 3-month period, equities have sold off alongside bonds (Exhibit 6). When rates rise too quickly, they can weigh on growth expectations and valuations for risky assets and rate volatility can spill over to equity volatility.**

Another simple way to look at this is via the move in equities for a given absolute change in bond yields in any one-week period (Exhibit 7). When bond yields move by 20bp or more (up or down), the average move in SXXE has been -1.5%. In contrast, periods with a small move in bond yields (in either direction) are normally positive for equity performance.

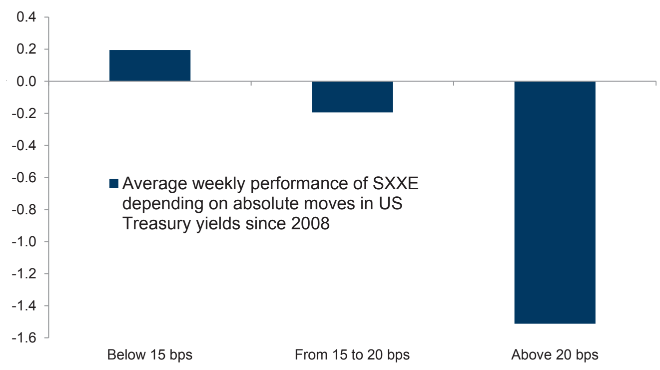
Exhibit 6: Equity might struggle if yields rise more than 2 standard deviations

Number of standard deviations US 10y yields move in a 3m period and S&P 500 / US 10y bond return correlation (3m window)

Source: Goldman Sachs Global Investment Research

Exhibit 7: Sharp bond yield moves have coincided with negative equity returns

Average SXXE returns depending on absolute moves in US 10-year yields (weekly changes)



Source: Datastream, Goldman Sachs Global Investment Research

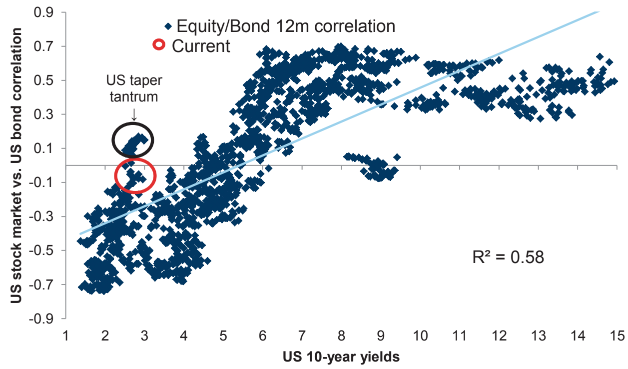
For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

3. The level of yields matters

In most of the last 15 years equities have been negatively correlated to bond prices; falling bond prices (rising bond yields), have been coincident with strong equity performance. This has been especially helpful for balanced and multi-asset investors, where not only have returns over time been strong on both equities and bonds, but the negative correlation has allowed these investors to reduce overall risk and volatility in balanced portfolios. This is discussed in detail in The Balanced Bear - Part 1: Low(er) returns and latent drawdown risk, November 28, 2017.

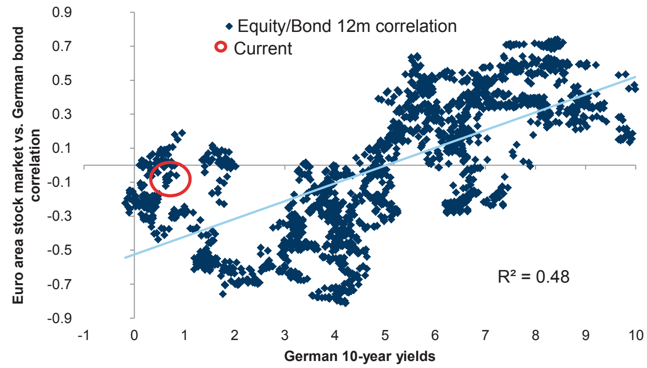
As we show below for the US and Europe, the correlation of equities with bond yields is loosely dependent on the level of yields. If yields are very low – as they have been in recent years – then equities will tend to be negatively correlated with bond prices. **Equities do well as bond yields rise from low levels. Similarly, they will do poorly as bond yields fall.** For example, the period when investors worried about persistent deflation risks in early 2016 was not a good time for European equities. In contrast, once bond yields started to rise in mid-2016, equities enjoyed stellar performance. This is also shown in the last row in Exhibits 3 and 4. Bond yields are up over 150bp since July 2016 and European equities have rise 16% (US equities are up 28%).

Exhibit 8: Equity/bond correlation can turn positive with higher yields
12m rolling US equity correlation with US 10-year bonds since 1981, weekly



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 9: Equity/bond correlations tend to remain negative at current low levels of bond yields
12m rolling Euro area equity correlation with German 10-year bonds since 1981, weekly



Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

When might the turning point come? Reading from the historical scatter plots above, it looks as if bond yields at around 5% is when higher yields become a clear problem for equities – that is the point where the correlation with bond prices is no longer decisively negative. At this point, further falls in bond prices (rising yields) start to hit equities as well. This is consistent with what occurred in 1993/94. Bond yields were at 5.2% at the start of the Fed tightening cycle and rose to 8% by end-1994; equities fared better then bonds but nonetheless found the rate and yield rises difficult to digest, and this was despite strong earnings growth at the time.

Could it be earlier this time? Yes, we think this is likely. The more recent data points show the equity-bond correlation is now close to zero (see annotation in the charts). Last year really was a 'Goldilocks' year: not only did we have the positive combination of accelerating growth and low inflation but volatility in equities and bonds was low. So risk-adjusted returns were especially strong, particularly for US equities. We think this year will be characterised by slightly higher volatility – given the uncertainty around inflation and interest rates – and lower returns. This is not necessarily a negative environment for stocks – our Asset Allocation team continues to prefer equities as an asset class – but we expect returns to be lower from here.

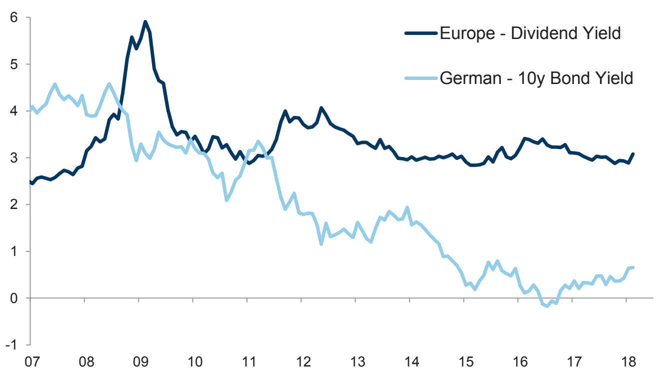
4. The valuation of equities (vs. bonds) provides a cushion

We tend to think of equities as expensive. After all, we have had a long bull market (certainly in the US). But it is worth noting that equities are not as expensive as bonds versus their own respective histories, and a substantial part of the bull market in the US was driven by earnings expansion. Indeed, we pointed out that at the trough of the recent correction that equities in Europe traded on a 14.1x 12-month forward P/E (SXXP) and this is the average valuation since 1995 (and US equity valuations were also at 20-year averages). In contrast, German 10-year Bund yields have been 3.5% on average since 1995, compared with 67bp today.

Equity yields (unlike bond yields) have been remarkably flat in recent years. The European dividend yield has been around 3-3.5% since 2009. This is despite bond yields falling from 3% to below zero at one point. Of course, this is not a fair comparison: equities are a real asset, whereas bonds are nominal. Given that inflation was falling, real yields were falling less fast than nominal yields. Nonetheless, **even as yields rise, equities in our view offer a significant valuation buffer.**

We find that 80% of European companies offer a higher dividend yield than the yield on corporate bonds. This is basically almost every company that pays a dividend, and is the case even though dividends should grow over time and are a real asset (Exhibit 11).

Exhibit 10: Equities have a substantial yield 'cushion'
% yield



Source: Datastream, Worldscope, Goldman Sachs Global Investment Research

Exhibit 11: Almost all companies paying a dividend have a dividend yield higher than the yield on corporate bonds
% of SXXP companies with div. yields > corp. bond yield

Source: Datastream, Factset, Goldman Sachs Global Investment Research

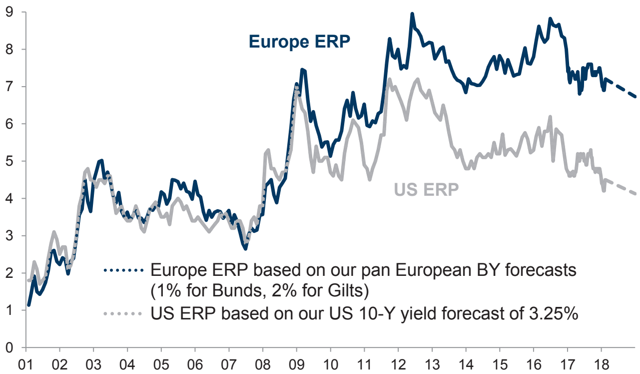
The implied equity risk premium (ERP) remains high in most regions and should provide some buffer to rising rates. Indeed, that is exactly what has been occurring: the ERP has been falling as bond yields have risen, so the net effect has been little or no move in the cost of equity. **Assuming that P/E stays at current levels and bond yields rise, as in our forecasts, this would push the ERP down to 6.7% in Europe and 4.1% in the US. In the US this would be close to the long-term average of 4.7%. For further discussion on the interplay between rates, growth and the ERP**, see Global Strategy Paper - The Equity Risk Premium when growth meets rates, November 13, 2017.

We also find that valuations play a role in equity/bond performance over the subsequent period, and we believe this is part of the reason why equities have done well since mid-2016 as yields have risen. The yield gap at the moment continues to support further outperformance of equities, but only just, and there is a range of experience historically (Exhibit 13).

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

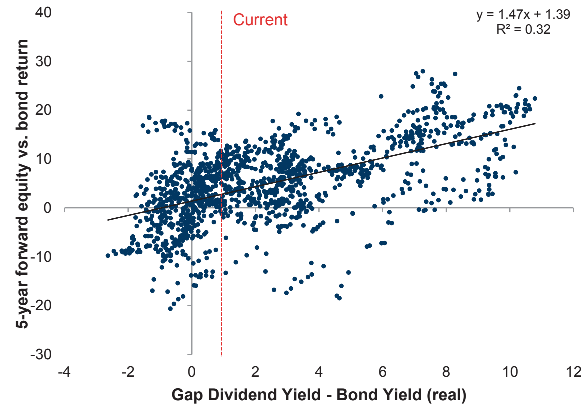
Exhibit 12: The ERP is still high and is providing a cushion as bond yields rise

Implied ERPs are calculated by each regional strategy team. While specific assumptions differ between regions, all are calculated using similar frameworks.



Source: Goldman Sachs Global Investment Research

Exhibit 13: US equities' performance relative to bonds depends in part on the valuation gap with bonds



Source: Robert Shiller, Goldman Sachs Global Investment Research

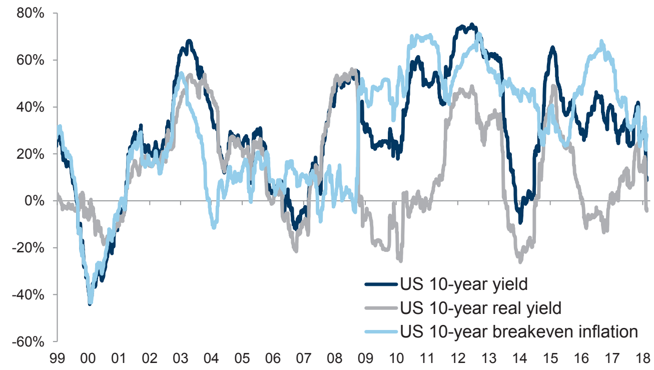
For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

5. Does it matter if it is real yields or inflation rising?

Since the start of the year, it has mainly been a rise in *real yields* which has pushed up nominal rates (although breakeven inflation has also risen). We find that equities over time have a more positive relationship with changes in breakeven inflation than with real yields. This makes sense as equities provide inflation protection and are most damaged in deflationary environments. In this case, rising inflation – from low levels – is unequivocally 'good' for equities.

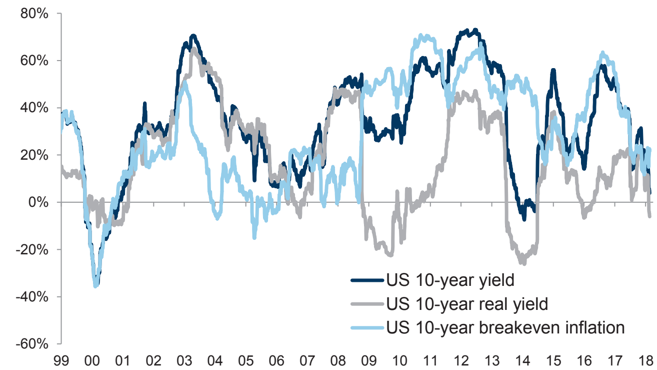
The relationship with real yields is not strong (over any time period) but it does tend to be slightly positive still (see exhibits below for US and Europe). **At the moment, the correlation has declined and is now around zero with real yields.** We think this is reassuring, as higher real yields are not damaging for equities in general. Indeed, higher real yields are normally accompanied by higher real growth. But, as we showed in Exhibit 2, it may be that the term premium on bonds is rebuilt just as growth is moderating. In which case the modest positive relationship between real yields and equity performance could become a small negative one. See also *GOAL Kickstart: What's real(ly) moving in recent yield changes?* March 20, 2017. While this is plausible, we think much depends on earnings for medium-term equity market performance. Provided earning growth is positive, then slow and modest rises in real yields should be digestible, in our view.

Exhibit 14: S&P 500 returns have a slight positive correlation with inflation and zero correlation with real yields ...
SPX returns with US yields / inflation (1yr rolling weekly correlations)



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 15: ... And the same is true for Europe STOXX (SXXP)
SXXP returns with US yields / inflation (1yr rolling weekly correlations)

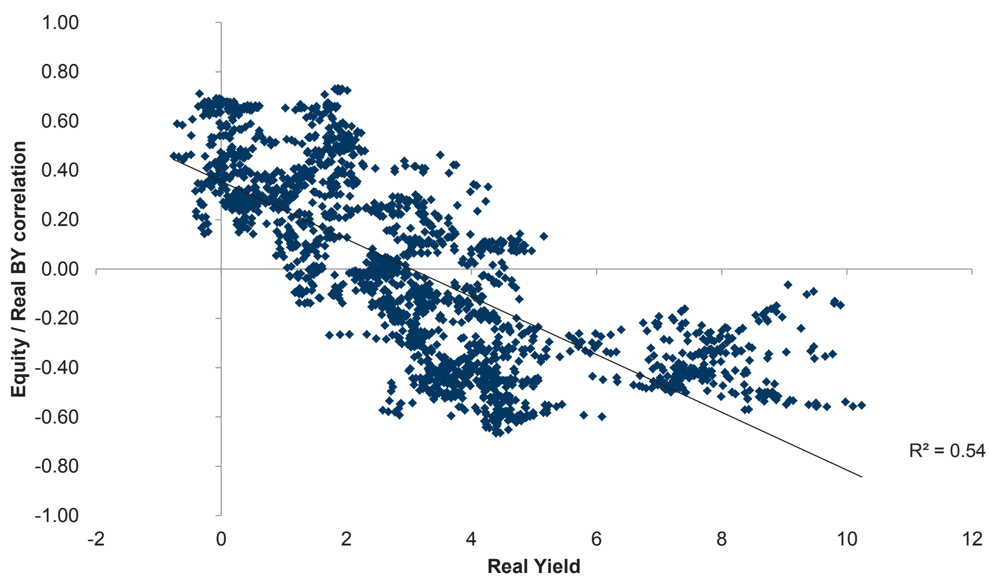


Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Is there a level effect with real yields as well? When do they become risky? We find that a real yield above 2% in the US (the current TIPS yield is 0.8%) would historically be associated with a negative relationship between real yields and equities – i.e., higher real yields at this point becomes damaging.

Exhibit 16: Equities can still do well while real yields rise, as long as they remain below approximately 2%
1y rolling correlation of S&P weekly returns with weekly changes in Real Bond Yield - Real Bond Yield = US 10y Bond Yield minus 1y fwd inflation - Weekly data since 1981

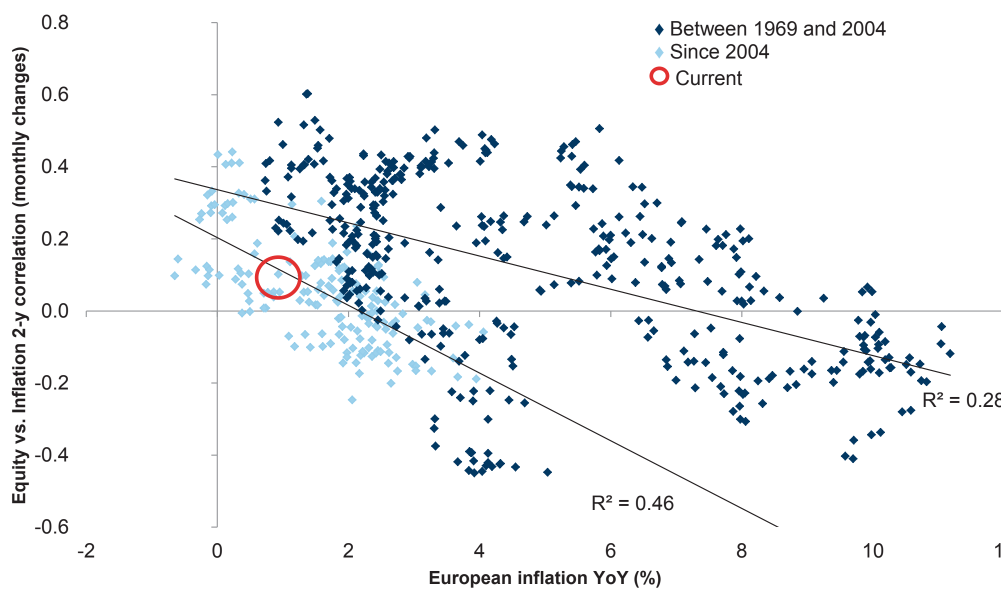


Source: Datastream, Goldman Sachs Global Investment Research

How about inflation? Is it really likely to stay 'good' for equities? For many years after the global financial crisis (GFC), inflation stayed resolutely low. We have argued that the GFC was not really one event but rather came in waves: the first one was the housing market collapse in the US, followed by the sovereign crisis in Europe and then finishing with the EM wave in late 2015/early 2016, see *Global Strategy Paper: The Third Wave*, October 7, 2015. These waves of crisis and slow global recovery, combined with other factors such as new technology and additional oil supply from shale, have conspired to keep inflation low this cycle. Indeed, higher inflation has been precisely what most central banks have been trying to achieve with extraordinary monetary policy.

Exhibit 17 shows levels of inflation on the x-axis and the correlation between equities and inflation on the y-axis: when inflation is low, correlations between equities and inflation tend to be positive. **When inflation is high, then we start to see more negative reactions to inflation from equities. The relationship used to be that inflation of around 6-8% became a problem (an impossibly high number given experience in recent years). Since 2004, inflation levels above just 2% have been associated with a negative correlation between inflation and equity performance. So, as for nominal yields, we think the tipping point is likely to be earlier now.**

Exhibit 17: Equities tend to do well as inflation picks up from a very low level
Euro area equities and inflation correlation since 1969, monthly changes, 2-year window



Source: Datastream, Goldman Sachs Global Investment Research

How about the yield curve? The relationship between equity performance and the yield curve has become negative recently (Exhibit 18). The very sharp rise in bond yields, pushing up the slope of the yield curve, and the speed of the move up in yields have pushed equities down. Over the past decade, this has been unusual as a steepening yield curve – given it typically signals stronger growth and modestly higher inflation – has been 'good' for equities. Indeed, until recently the main concern of investors has been a *flattening* yield curve given that an inversion of the yield curve often foretells a recession. Reflecting our views on the trajectory for Fed Fund rates (we expect four 25bp rate hikes in 2018, and another four in 2019), we expect the US term slope to continue to trend down, further flattening. But, unlike in 2017, our Rates strategists think a rebuild of the global term premium will likely result in a steeper (i.e., less flat) 10y-2y US slope than the forwards discount.

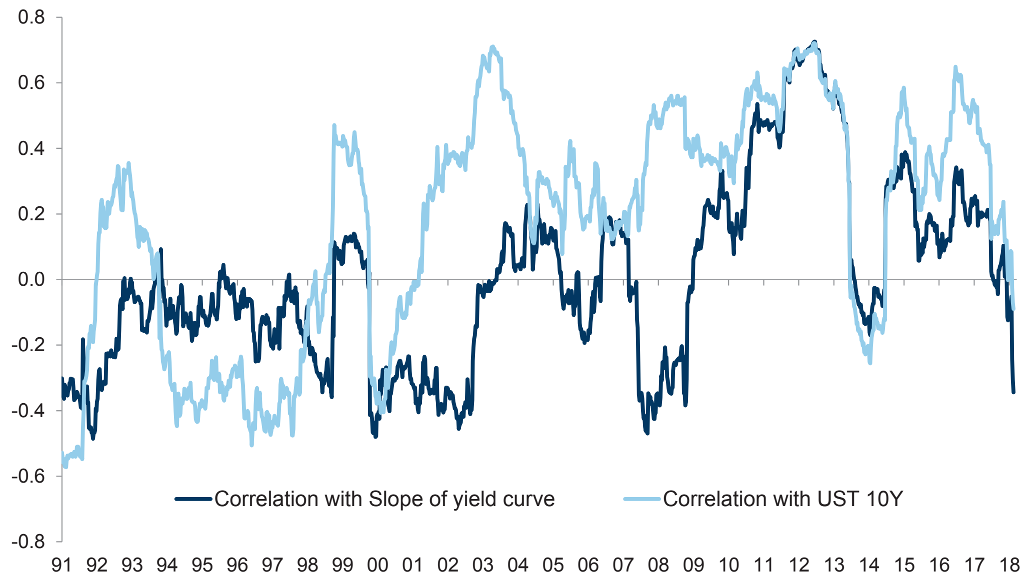
Our Asset Allocation team have shown that during flattening periods from current term slope levels equities have on average delivered positive returns. We believe the

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

sensitivity of equities to the slope of the yield curve will be similar to that to bond yields. Modestly rising bond yields, driven by slighter higher inflation and a rise in the term premium, combined with higher short rates, is a scenario consistent with more modest but positive returns on stocks, in our view. See *GOAL Post: Less aversion to yield curve inversion*, January 22, 2018.

We show the sensitivity of sectors to nominal rates, real rates, inflation and the SYC in the Appendix.

Exhibit 18: Equity performance with the slope of the yield curve has turned negative
12m correlation between SXXP and US Slope of yield curve (10Y - 2Y) and UST 10Y (weekly changes since 1990)



Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Two things are reassuring (for equities)

1. There has not been a huge reallocation towards equities in recent years

While the rotation from bonds to equities started in 2017, it is not yet as extreme as is usually the case ahead of bear markets. Compared with previous periods before equity bear markets, in the US the flows into equities in this cycle have been weak compared with flows into bonds, as shown in Exhibit 19. Even including ETF flows (a more significant part of equity investment in particular in recent years), we find flows into equities relative to bonds remain subdued this cycle. The same has been the case on a global basis.

Exhibit 19: This cycle has seen little rotation in mutual fund flows from bonds to equities, which has historically preceded a bear market
12m rolling net (equity-bond) inflows since 1984 (US mutual funds, U$bn, +ETFs from 2013)

Source: ICI, Bloomberg, Goldman Sachs Global Investment Research

European Pension & Insurance companies have largely ignored equities in this cycle, forced to do so owing to a combination of ageing beneficiaries, regulatory change, very high capital charges for equities and risk aversion after losses in previous cycles.

2. Leverage in Europe has not increased (it has in the US)

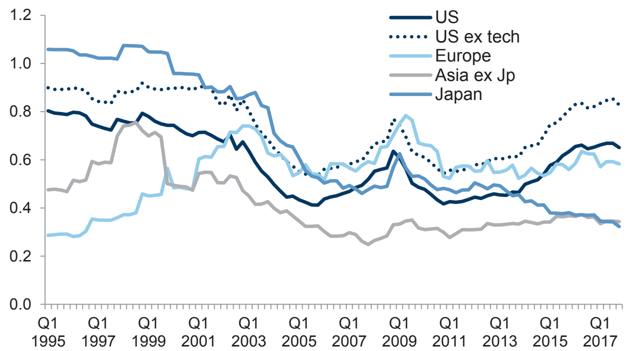
Rising yields raise the cost of borrowing for corporates. However, we are not too worried about this, especially in Europe, where a) debt ratios have not increased in recent years, and b) the cost of borrowing is still low and companies rolling over debt will (generally) be facing lower rates.

In the US there has been more active re-leveraging of balance sheets via high share buybacks in recent years and, outside of technology, debt ratios in the US are now higher than in other regions (Exhibits 20 and 21). Last year, US companies with strong balance sheets (GSTHSBAL) significantly outperformed (+11%) companies with weak

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

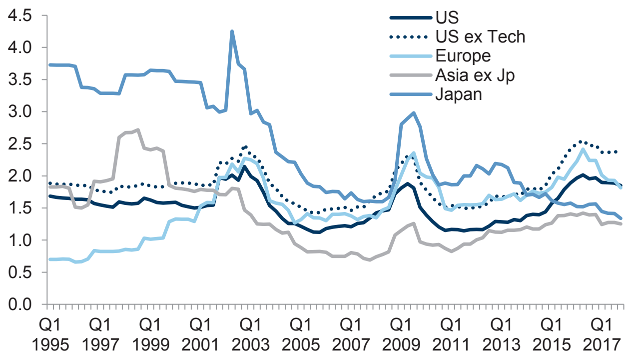
balance sheets (GSTHWBAL), despite interest rates having remained relatively anchored. Less surprisingly, given the rise in long-term rates we have seen since the beginning of the year, the outperformance of strong balance sheet companies continued, and they are now up 1.4% YTD vs. weak balance sheet companies. **Our US strategists have highlighted that the median S&P 500 stock carries nearly the highest leverage on record.** Although interest coverage remains healthy, rising rates and the potential passage of tax policies that penalise high leverage should offset the elevated valuations of strong balance sheet stocks (see *2018 US Equity Outlook: Rational Exuberance*, November 21, 2017). In the credit space, our Credit strategists are underweight HY vs. IG, both in the US and in Europe (see *The Credit Trader - The down in quality rally continues*, February 1, 2018).

Exhibit 20: Net debt to equity has risen in the US, while it is roughly flat in Europe
Net debt to equity



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 21: Net debt to EBITDA is also high in the US (despite strong EBITDA)
Net debt to EBITDA



Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Sectors/themes in a time of rising yields

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

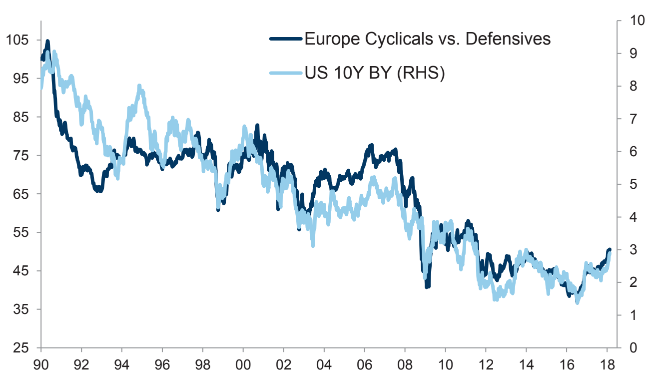
Cyclicals and Financials tend to outperform as yields rise

To the extent that higher yields reflect a positive growth signal, Cyclicals (and Financials in particular) and Value companies tend to perform best; bond proxies such as Consumer Staples tend to underperform. Companies with a high level of debt also tend to underperform (GSSTFNLV).

The charts below show the extent of the correlation between the performance of Cyclicals or Value companies over Defensives and bond yields. **We estimate that each 100bp rise in US 10-year yields means Cyclicals outperform Defensives by 3.5%.** Rising long rates particularly support Financials, assuming the rise involves some steepening in yield curves. Our Banks team estimates that each 10bp rise in either long or short rates adds about 2pp to Banks EPS. In addition, higher volatility in asset markets should help Investment banking businesses. We remain Overweight Banks (SX7P) and have a Cyclical and Value tilt overall in our recommended sector strategy (see *Europe Strategy 2018: Can we have some more please?* November 20, 2017).

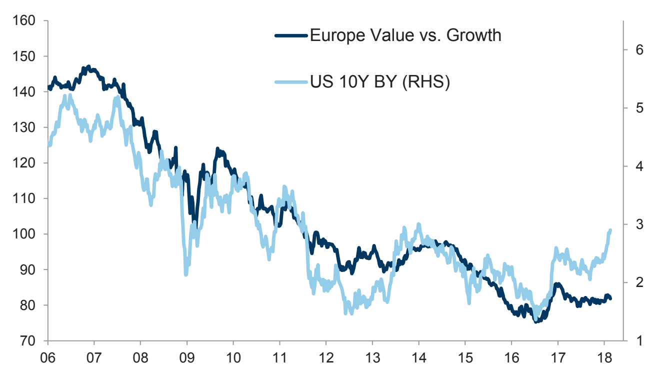
We find that recent sector performance has been closely aligned to past relationships with bond yields (see *Europe Weekly Kickstart Rising yields: strategy below the market surface*, February 16, 2018). See the Appendix for all sectors and their correlations with bond yields, real yields and inflation.

Exhibit 22: There is a close relationship between the relative performance of Cyclicals and moves in bond yields...
Cyclicals: Basic Res., Industrial Gds. & Svs., Autos, Media, Travel & Leis., Tech., Banks, Financial Svs. Defensives: Food & Bev., Pers. & HH Gds., Healthcare, Retail, Telcos, Utilities



Source: Datastream, Goldman Sachs Global Investment Research

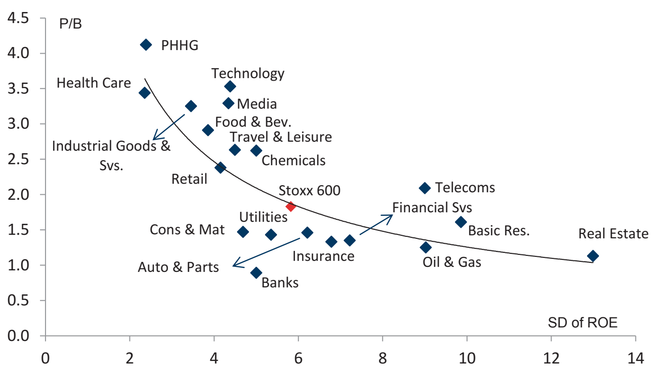
Exhibit 23: Value tends to outperform Growth as bond yields rise
MSCI Europe Indices



Source: Datastream, Goldman Sachs Global Investment Research

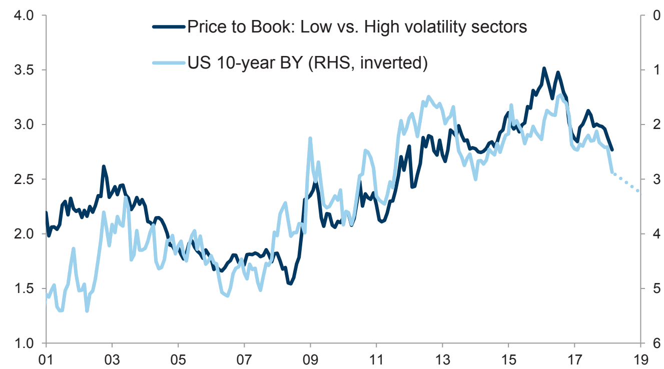
By contrast, stocks which are perceived as bond proxies, with high and stable cash flows, are typically hit by rising interest rates. Since the GFC, while growth has been scarce and bond yields have fallen, investors have rewarded stocks with stable ROE (Exhibit 24) and their multiples have risen considerably. Exhibit 25 below shows that the relative performance of stocks with low volatility characteristics is tightly linked to moves in bond yields. Also our Consumer team notes that the sector appears 2% overvalued vs. current bond yields, having not fully priced in the rise in yields over the last 18 months (see *Europe Consumer Staples - Addressing five key investor questions*, February 6, 2018). We remain Underweight in both Food & Beverages (SX3P) and Personal & Household Goods (SXQP) in our recommended sector allocation.

Exhibit 24: Stocks rewarded for low volatility of returns
Standard deviation of ROE since 2007



Source: Datastream, Goldman Sachs Global Investment Research

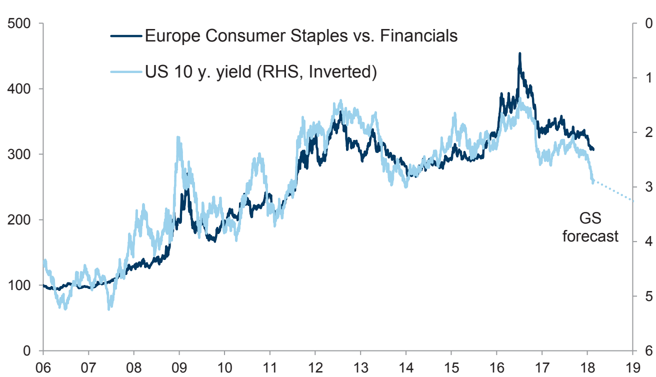
Exhibit 25: Low volatility stocks have been rewarded while bond yields were low
US 10-year yield (%), dotted line GS forecasts



Source: Datastream, Goldman Sachs Global Investment Research

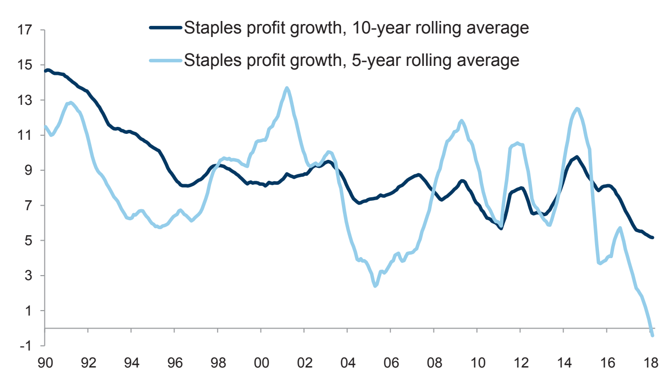
We think that these groups of stocks are vulnerable to rising bond yields, and particularly so given their rich valuation levels and the deterioration of their fundamentals. Indeed, profits generated by Consumer Staples have fallen considerably in Europe (see Exhibit 26), leaving these companies particularly vulnerable as bond yields start rising along with cost inflation. While input costs are starting to rise, European Staples face less pricing power than in the past, which will make it harder for them to pass rising costs on to consumers. The retail landscape is changing rapidly (more shelf space allocated to private label and fresh/organic produce) and new Consumer Packaged Goods entrants are emerging (both through online channels and in terms of local EM competition).

Exhibit 26: Consumer Staples underperform as bond yields rise and we think this can continue



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 27: Earnings growth of Staples is at a 20-year low and has particularly fallen over the past 5 years



Source: Datastream, Goldman Sachs Global Investment Research

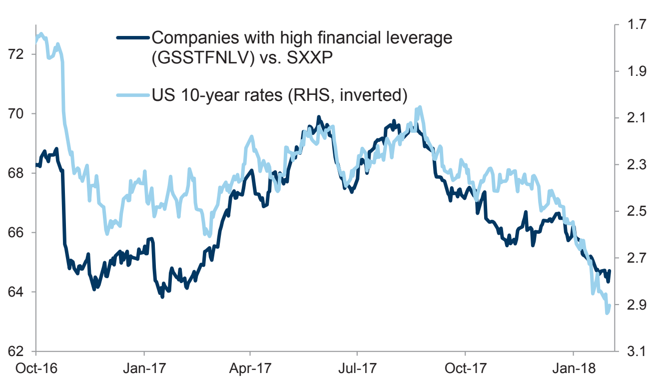
Another group of companies that we think are likely to be hit by rising interest rates are stocks with high financial leverage. Higher yields mean higher financing costs, a negative for highly levered sectors such as Utilities and Telecoms. These two sectors have a Net Debt to Equity of approximately 110% and 150%, respectively, vs. 60% for

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

the market. **Our basket of companies with high financial leverage (GSSTFNLV) is the second worst performing across our strategy baskets YTD and we think it is likely to underperform further as yields rise** (see Exhibit 28), and even more if credit spreads widen. While most of these companies will continue to roll over their debt at lower rates than for the debt currently on their balance sheet, rising yields will eventually have an impact on their borrowing costs, something that markets tend to price rapidly. Despite the fact that, historically, Utilities have a slight negative correlation with bond yields, we have an OW recommendation on the sector (SX6P). The sector has not outperformed as much as the fall in bond yields would have suggested for a bond proxy, which mitigates the risk that it underperfoms as much as historical relationships suggest when yields rise. In addition, fundamentals are improving in this sector and we think it can cease to be a 'value trap' (self help, strong earnings growth, infrastructure investments, releveraging potential, higher power prices). To reduce duration risk on our fundamental recommendation on Utilities, we recommend a long on our subsector basket of hybrid/integrated names – GSSBUTHY (e.g., E.ON or Enel) and a short on our subsector basket of regulated names – GSSBUTRE (e.g., National Grid).

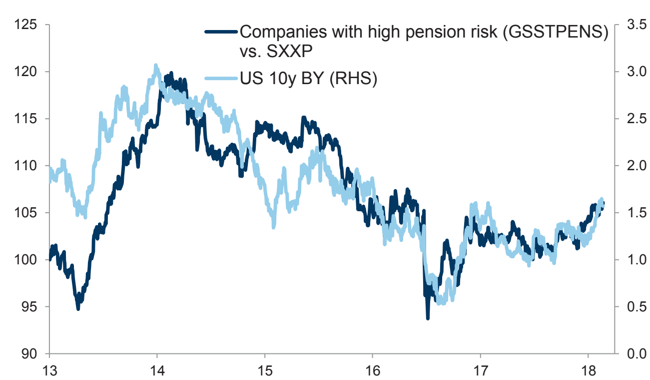
By contrast, companies with high pension risk, represented in our GSSTPENS basket, should outperform as yields rise (Exhibit 29). Indeed, higher yields should improve the solvency of many of these funds as they use the corporate bond yield as a discount rate for liabilities.

Exhibit 28: Companies with high financial leverage (GSSTFNLV) tend to underperform as interest rates climb higher



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 29: Companies with high pension liabilities outperform as bond yields rise



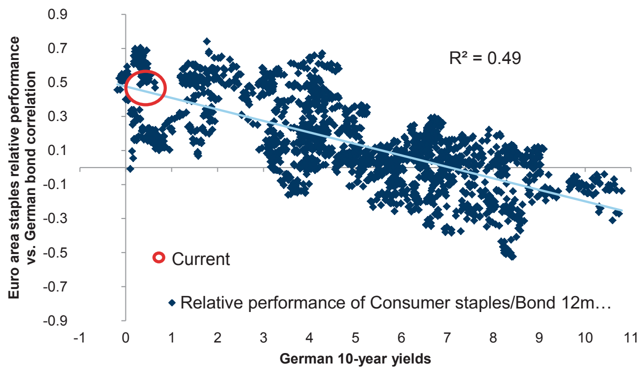
Source: Datastream, Goldman Sachs Global Investment Research

Are these sector relationships stable? No, they depend on the level of yields too

It is only when bond yields rise in a context where investors are worried about the economic growth outlook that we find that Defensives, and Consumer staples in particular, tend to outperform. The charts below show that past a certain level of German 10-year yields (about 5%), Consumer Staples outperform and Banks underperform as interest rates rise. But we are considerably away from that territory.

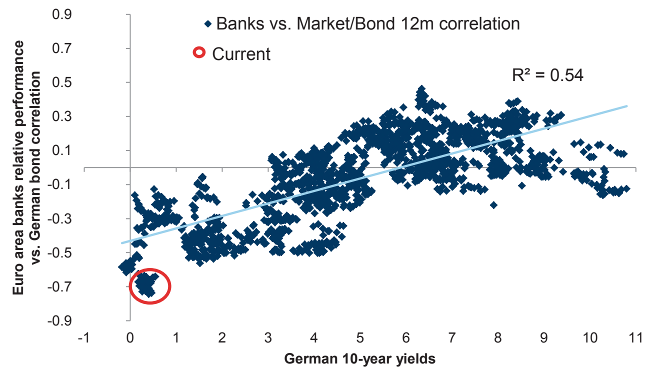
For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Exhibit 30: Consumer Staples tend to outperform only when bond yields rise above a certain level



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 31: Banks tend to benefit from rising yields as long as they do not rise past a certain level



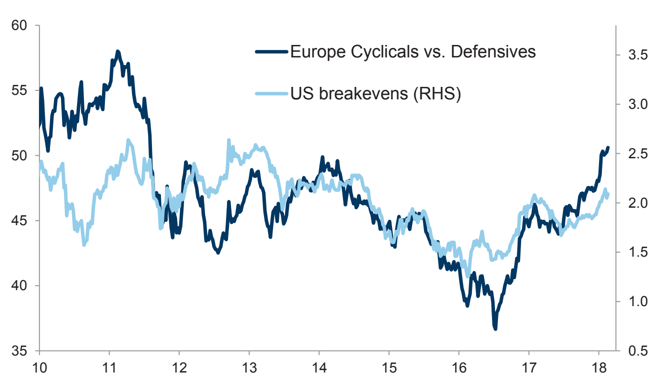
Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

What if it is real yields which are rising; does this change the pattern of sector performance?

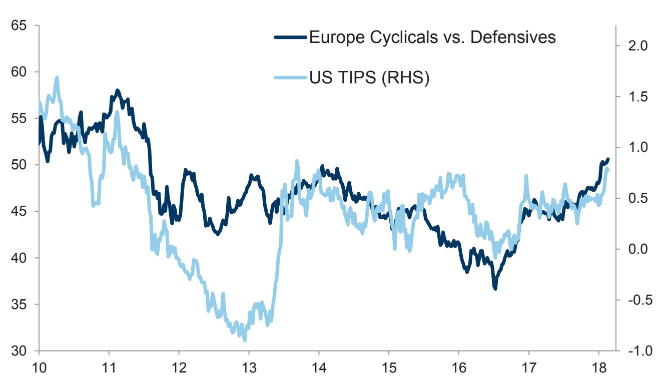
A question we have been asked frequently of late is whether it matters if real yields rise along with nominal yields. First, historically, it is common to see real yields rising in reflationary environments, when economic growth is strong. Hence, Cyclicals tend to outperform in such environments. The chart below shows a strong relationship between inflation-adjusted bond yields in the US (that we use as a measure of real yields) and the relative performance of Cyclicals and Defensives. The correlation charts we see in the Appendix (Exhibit 34 and 36) shows that sectors that tend to outperform when real yields rise are similar to when nominal yields rise; the difference is not noticeable.

Exhibit 32: Cyclicals also tend to outperform when inflation expectations rise...



Source: Datastream, Goldman Sachs Global Investment Research

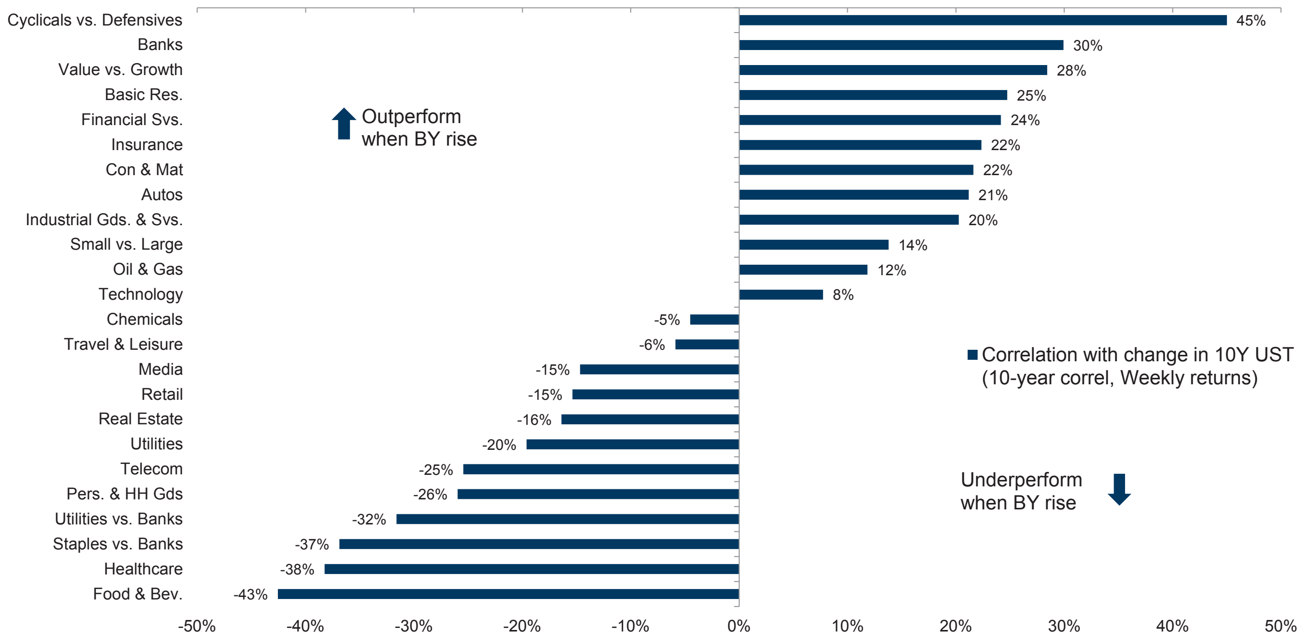
Exhibit 33: ... and when real yields rise



Source: Datastream, Goldman Sachs Global Investment Research

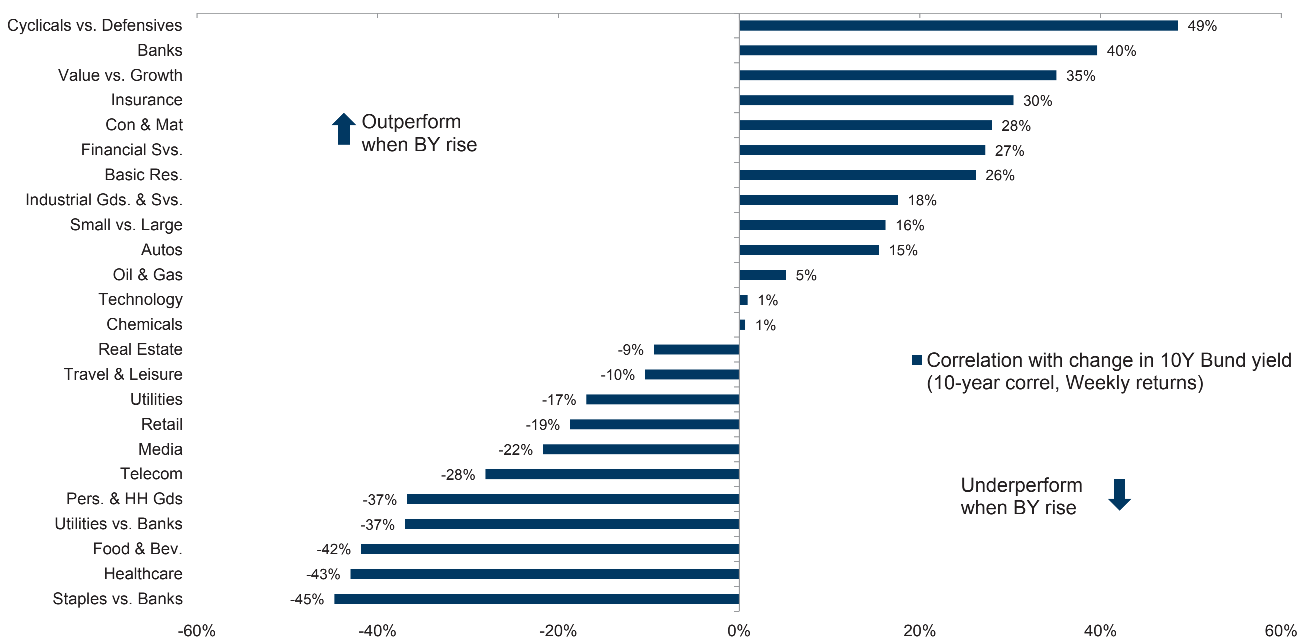
Appendix

Exhibit 34: Cyclicals, Financials and Value stocks tend to outperform when nominal yields rise, while Consumer Staples underperform
10-year correlations between relative performance of European sectors and style with US 10-year bond yields (weekly changes)



Source: Datastream, Goldman Sachs Global Investment Research

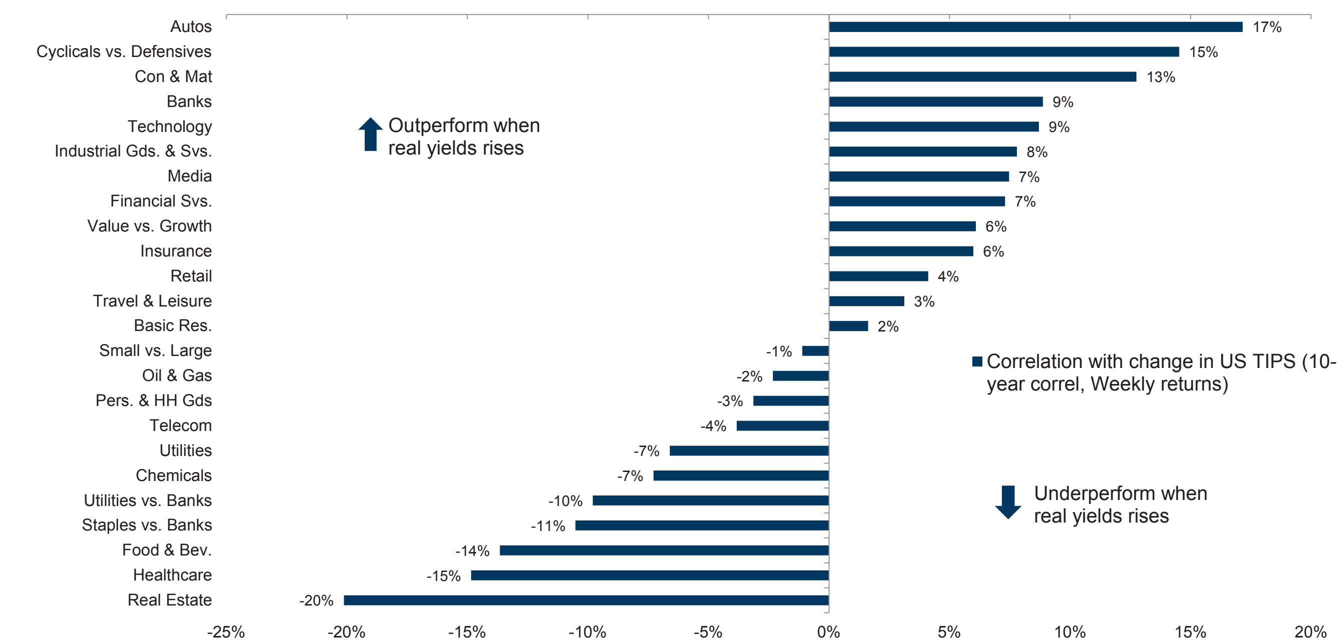
Exhibit 35: The same relationships apply, whether it is US or German bond yields...
10-year correlations between relative performance of European sectors and style with German 10-year bond yields (weekly changes)



Source: Datastream, Goldman Sachs Global Investment Research

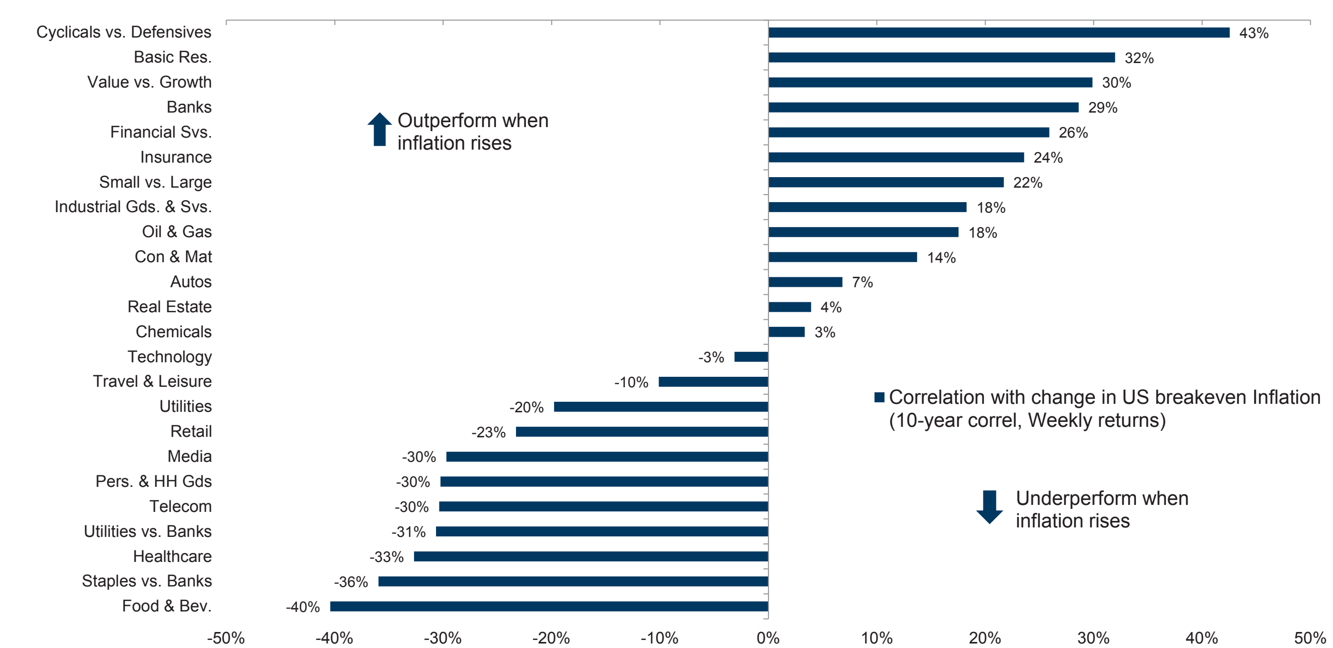
For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Exhibit 36: ... whether it is nominal or real yields rising...
10-year correlations between relative performance of European sectors and style with US TIPS (weekly changes)



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 37: ... when inflation is rising...
10-year correlations between relative performance of European sectors and style with US breakevens (weekly changes)

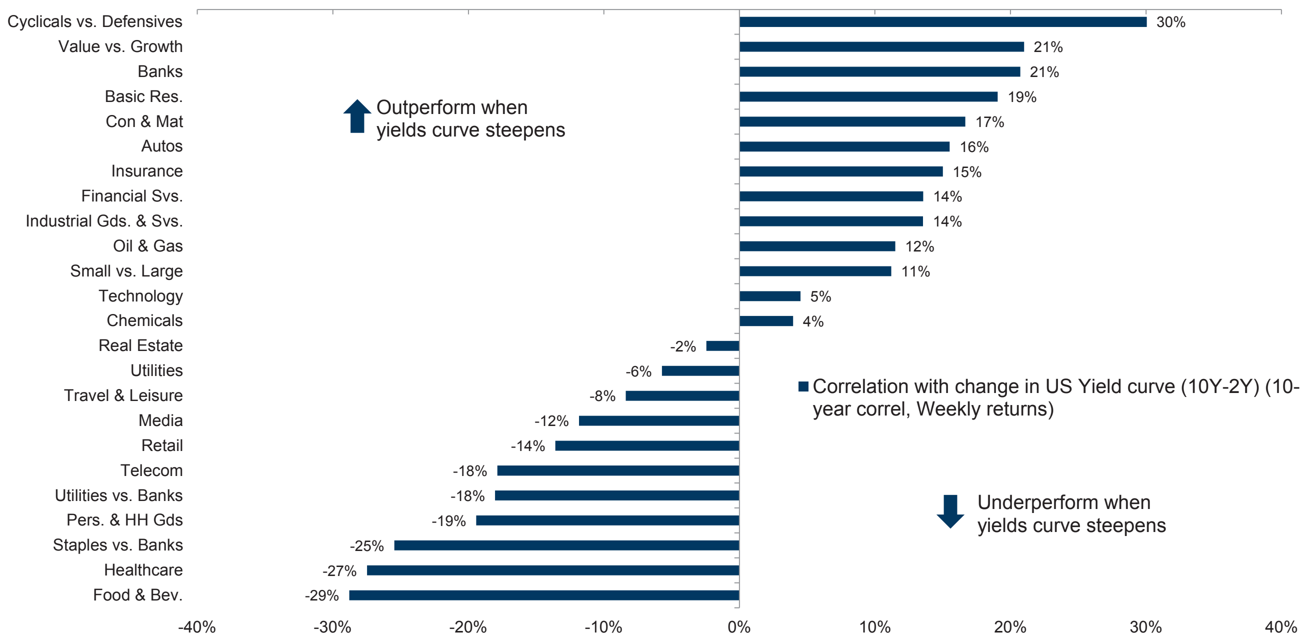


Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Exhibit 38: ... and when the yield curve steepens

10-year correlations between relative performance of European sectors and style with the US yield curve (weekly changes)



Source: Datastream, Goldman Sachs Global Investment Research

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Other disclosures

Equity basket disclosure

The ability to trade the basket(s) discussed in this research will depend upon market conditions, including liquidity and borrow constraints at the time of trade.

MSCI disclosure

All MSCI data used in this report is the exclusive property of MSCI, Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced or redisseminated in any form and may not be used to create any financial instruments or products or any indices. This information is provided on an "as is" basis, and the user of this information assumes the entire risk of any use made of this information. Neither MSCI, any of its affiliates nor any third party involved in, or related to, computing or compiling the data makes any express or implied warranties or representations with respect to this information (or the results to be obtained by the use thereof), and MSCI, its affiliates and any such third party hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the data have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages. MSCI and the MSCI indexes are service marks of MSCI and its affiliates. The Global Industry Classification Standard (GICS) were developed by and is the exclusive property of MSCI and Standard & Poor's. GICS is a service mark of MSCI and S&P and has been licensed for use by The Goldman Sachs Group.

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

Disclosure Appendix

Reg AC

We, Sharon Bell, CFA, Lilia Peytavin, Peter Oppenheimer and Guillaume Jaisson, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

Disclosures

Distribution of ratings/investment banking relationships

Goldman Sachs Investment Research global Equity coverage universe

	Rating Distribution			Investment Banking Relationships		
	Buy	Hold	Sell	Buy	Hold	Sell
Global	33%	54%	13%	63%	57%	52%

As of January 1, 2018, Goldman Sachs Global Investment Research had investment ratings on 2,867 equity securities. Goldman Sachs assigns stocks as Buys and Sells on various regional Investment Lists; stocks not so assigned are deemed Neutral. Such assignments equate to Buy, Hold and Sell for the purposes of the above disclosure required by the FINRA Rules. See 'Ratings, Coverage groups and views and related definitions' below. The Investment Banking Relationships chart reflects the percentage of subject companies within each rating category for whom Goldman Sachs has provided investment banking services within the previous twelve months.

Disclosures required by United States laws and regulations

See company-specific regulatory disclosures above for any of the following disclosures required as to companies referred to in this report: manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/co-managed public offerings in prior periods; directorships; for equity securities, market making and/or specialist role. Goldman Sachs trades or may trade as a principal in debt securities (or in related derivatives) of issuers discussed in this report.

The following are additional required disclosures: **Ownership and material conflicts of interest:** Goldman Sachs policy prohibits its analysts, professionals reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage. **Analyst compensation:** Analysts are paid in part based on the profitability of Goldman Sachs, which includes investment banking revenues. **Analyst as officer or director:** Goldman Sachs policy generally prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director or advisor of any company in the analyst's area of coverage. **Non-U.S. Analysts:** Non-U.S. analysts may not be associated persons of Goldman Sachs & Co. LLC and therefore may not be subject to FINRA Rule 2241 or FINRA Rule 2242 restrictions on communications with subject company, public appearances and trading securities held by the analysts.

Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, except to the extent already made above pursuant to United States laws and regulations. **Australia:** Goldman Sachs Australia Pty Ltd and its affiliates are not authorised deposit-taking institutions (as that term is defined in the Banking Act 1959 (Cth)) in Australia and do not provide banking services, nor carry on a banking business, in Australia. This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act, unless otherwise agreed by Goldman Sachs. In producing research reports, members of the Global Investment Research Division of Goldman Sachs Australia may attend site visits and other meetings hosted by the companies and other entities which are the subject of its research reports. In some instances the costs of such site visits or meetings may be met in part or in whole by the issuers concerned if Goldman Sachs Australia considers it is appropriate and reasonable in the specific circumstances relating to the site visit or meeting. To the extent that the contents of this document contains any financial product advice, it is general advice only and has been prepared by Goldman Sachs without taking into account a client's objectives, financial situation or needs. A client should, before acting on any such advice, consider the appropriateness of the advice having regard to the client's own objectives, financial situation and needs. **Brazil:** Disclosure information in relation to CVM Instruction 483 is available at http://www.gs.com/worldwide/brazil/area/gir/index.html. Where applicable, the Brazil-registered analyst primarily responsible for the content of this research report, as defined in Article 16 of CVM Instruction 483, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** Goldman Sachs Canada Inc. is an affiliate of The Goldman Sachs Group Inc. and therefore is included in the company specific disclosures relating to Goldman Sachs (as defined above). Goldman Sachs Canada Inc. has approved of, and agreed to take responsibility for, this research report in Canada if and to the extent that Goldman Sachs Canada Inc. disseminates this research report to its clients. **Hong Kong:** Further information on the securities of covered companies referred to in this research may be obtained on request from Goldman Sachs (Asia) L.L.C. **India:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (India) Securities Private Limited, Research Analyst - SEBI Registration Number INH000001493, 951-A, Rational House, Appasaheb Marathe Marg, Prabhadevi, Mumbai 400 025, India, Corporate Identity Number U74140MH2006FTC160634, Phone +91 22 6616 9000, Fax +91 22 6616 9001. Goldman Sachs may beneficially own 1% or more of the securities (as such term is defined in clause 2 (h) the Indian Securities Contracts (Regulation) Act, 1956) of the subject company or companies referred to in this research report. **Japan:** See below. **Korea:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (Asia) L.L.C., Seoul Branch. **New Zealand:** Goldman Sachs New Zealand Limited and its affiliates are neither "registered banks" nor "deposit takers" (as defined in the Reserve Bank of New Zealand Act 1989) in New Zealand. This research, and any access to it, is intended for "wholesale clients" (as defined in the Financial Advisers Act 2008) unless otherwise agreed by Goldman Sachs. **Russia:** Research reports distributed in the Russian Federation are not advertising as defined in the Russian legislation, but are information and analysis not having product promotion as their main purpose and do not provide appraisal within the meaning of the Russian legislation on appraisal activity. **Singapore:** Further information on the covered companies referred to in this research may be obtained from Goldman Sachs (Singapore) Pte. (Company Number: 198602165W). **Taiwan:** This material is for reference only and must not be reprinted without permission. Investors should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Kingdom:** Persons who would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authority, should read this research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the risk warnings that have been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used in this report, are available from Goldman Sachs International on request.

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

European Union: Disclosure information in relation to Article 4 (1) (d) and Article 6 (2) of the European Commission Directive 2003/125/EC is available at http://www.gs.com/disclosures/europeanpolicy.html which states the European Policy for Managing Conflicts of Interest in Connection with Investment Research.

Japan: Goldman Sachs Japan Co., Ltd. is a Financial Instrument Dealer registered with the Kanto Financial Bureau under registration number Kinsho 69, and a member of Japan Securities Dealers Association, Financial Futures Association of Japan and Type II Financial Instruments Firms Association. Sales and purchase of equities are subject to commission pre-determined with clients plus consumption tax. See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

Ratings, coverage groups and views and related definitions

Buy (B), Neutral (N), Sell (S) -Analysts recommend stocks as Buys or Sells for inclusion on various regional Investment Lists. Being assigned a Buy or Sell on an Investment List is determined by a stock's total return potential relative to its coverage. Any stock not assigned as a Buy or a Sell on an Investment List with an active rating (i.e., a stock that is not Rating Suspended, Not Rated, Coverage Suspended or Not Covered), is deemed Neutral. Each regional Investment Review Committee manages various regional Investment Lists to a global guideline of 25%-35% of stocks as Buy and 10%-15% of stocks as Sell; however, the distribution of Buys and Sells in any particular analyst's coverage group may vary as determined by the regional Investment Review Committee. Additionally, each Investment Review Committee manages Regional Conviction lists, which represent investment recommendations focused on the size of the total return potential and/or the likelihood of the realization of the return across their respective areas of coverage. The addition or removal of stocks from such Conviction lists do not represent a change in the analysts' investment rating for such stocks.

Total return potential represents the upside or downside differential between the current share price and the price target, including all paid or anticipated dividends, expected during the time horizon associated with the price target. Price targets are required for all covered stocks. The total return potential, price target and associated time horizon are stated in each report adding or reiterating an Investment List membership.

Coverage groups and views: A list of all stocks in each coverage group is available by primary analyst, stock and coverage group at http://www.gs.com/research/hedge.html. The analyst assigns one of the following coverage views which represents the analyst's investment outlook on the coverage group relative to the group's historical fundamentals and/or valuation. **Attractive (A).** The investment outlook over the following 12 months is favorable relative to the coverage group's historical fundamentals and/or valuation. **Neutral (N).** The investment outlook over the following 12 months is neutral relative to the coverage group's historical fundamentals and/or valuation. **Cautious (C).** The investment outlook over the following 12 months is unfavorable relative to the coverage group's historical fundamentals and/or valuation.

Not Rated (NR). The investment rating and target price have been removed pursuant to Goldman Sachs policy when Goldman Sachs is acting in an advisory capacity in a merger or strategic transaction involving this company and in certain other circumstances. **Rating Suspended (RS).** Goldman Sachs Research has suspended the investment rating and price target for this stock, because there is not a sufficient fundamental basis for determining, or there are legal, regulatory or policy constraints around publishing, an investment rating or target. The previous investment rating and price target, if any, are no longer in effect for this stock and should not be relied upon. **Coverage Suspended (CS).** Goldman Sachs has suspended coverage of this company. **Not Covered (NC).** Goldman Sachs does not cover this company. **Not Available or Not Applicable (NA).** The information is not available for display or is not applicable. **Not Meaningful (NM).** The information is not meaningful and is therefore excluded.

Global product; distributing entities

The Global Investment Research Division of Goldman Sachs produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce equity research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; Ombudsman Goldman Sachs Brazil: 0800 727 5764 and / or ouvidoriagoldmansachs@gs.com. Available Weekdays (except holidays), from 9am to 6pm. Ouvidoria Goldman Sachs Brasil: 0800 727 5764 e/ou ouvidoriagoldmansachs@gs.com. Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by either Goldman Sachs Canada Inc. or Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman Sachs & Co. LLC. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom and European Union.

European Union: Goldman Sachs International authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority, has approved this research in connection with its distribution in the European Union and United Kingdom; Goldman Sachs AG and Goldman Sachs International Zweigniederlassung Frankfurt, regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht, may also distribute research in Germany.

General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. The information, opinions, estimates and forecasts contained herein are as of the date hereof and are subject to change without prior notification. We seek to update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of reports are published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business relationships with a substantial percentage of the companies covered by our Global Investment Research Division. Goldman Sachs & Co. LLC, the United States broker dealer, is a member of SIPC (http://www.sipc.org).

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and principal trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, principal trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

The analysts named in this report may have from time to time discussed with our clients, including Goldman Sachs salespersons and traders, or may discuss in this report, trading strategies that reference catalysts or events that may have a near-term impact on the market price of the equity securities discussed in this report, which impact may be directionally counter to the analyst's published price target expectations for such stocks. Any such trading strategies are distinct from and do not affect the analyst's fundamental equity rating for such stocks, which rating reflects a stock's return potential relative to its coverage group as described herein.

We and our affiliates, officers, directors, and employees, excluding equity and credit analysts, will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research.

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options disclosure documents which are available from Goldman Sachs sales representatives or at http://www.theocc.com/about/publications/character-risks.jsp. Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

Differing Levels of Service provided by Global Investment Research: The level and types of services provided to you by the Global Investment Research division of GS may vary as compared to that provided to internal and other external clients of GS, depending on various factors including your individual preferences as to the frequency and manner of receiving communication, your risk profile and investment focus and perspective (e.g., marketwide, sector specific, long term, short term), the size and scope of your overall client relationship with GS, and legal and regulatory constraints. As an example, certain clients may request to receive notifications when research on specific securities is published, and certain clients may request that specific data underlying analysts' fundamental analysis available on our internal client websites be delivered to them electronically through data feeds or otherwise. No change to an analyst's fundamental research views (e.g., ratings, price targets, or material changes to earnings estimates for equity securities), will be communicated to any client prior to inclusion of such information in a research report broadly disseminated through electronic publication to our internal client websites or through other means, as necessary, to all clients who are entitled to receive such reports.

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data related to one or more securities, markets or asset classes (including related services) that may be available to you, please contact your GS representative or go to http://360.gs.com.

Disclosure information is also available at http://www.gs.com/research/hedge.html or from Research Compliance, 200 West Street, New York, NY 10282.

© 2018 Goldman Sachs.

No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of The Goldman Sachs Group, Inc.

For the exclusive use of DONGHYEON.KIM@KIM.CO.KR