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Long Cycles in the Bond-Equity Correlation: Where Next?

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TWO VERY DISTINCT REGIMES OF BOND-EQUITY RETURNS CORRELATION.

We focus on bond-equity return correlations since the mid-1960s, as bond return volatility prior to that was essentially zero.[1] Since the mid 1960s there have been two very distinct regimes in the correlation (see Figure 1).

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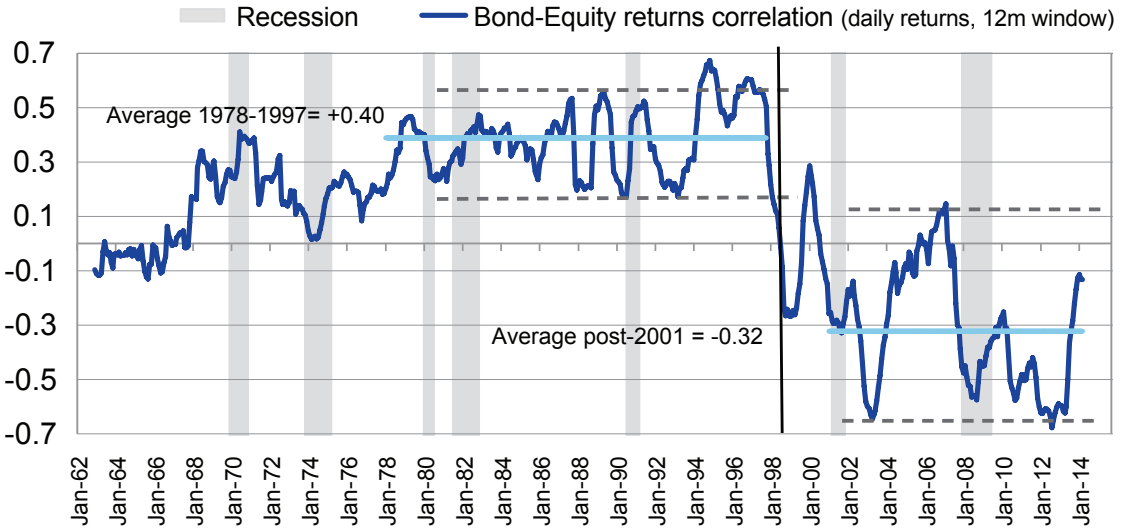
•Regime I: Consistently and strongly positive correlation from 1966-1997. From near zero, the correlation began to rise in the mid 1960s, but dipped back to zero for a brief period around the 1974 oil price shock and recession. It then rose into a +0.2 to +0.6 band where it stayed for 20 years. It is notable that this consistently positive and relatively high average correlation of +0.4 endured through a number of recession and recovery cycles.

- Regime II: Strongly negative correlation since 1998, but also more volatile. In the late 1990s, the bond-equity correlation fell off sharply, turning negative in 1998. It has been predominantly negative since, averaging -0.3, but also varied more widely than in the first regime, ranging between -0.7 and +0.1. Negative extremes in the correlation obtained in 2003 as the post tech bubble de-rating of equities continued, deflation fears ran high and the Fed moved to keep policy rates well below its past average behavior (Taylor rule). As the Fed dropped its easing bias, the correlation began to rise, turning less and less negative, then briefly positive late in the recovery cycle in 2006 and continued to rise before falling hard again in 2007 as the recession and financial crisis began.

Figure 1: Two regimes of bond-equity returns correlation



Correlation calculated using daily US 10y bond and S&P 500 total returns over a rolling 12m window

Source: Haver, Deutsche Bank

WHY THE BREAK: BIG MACRO-FINANCIAL MARKET CYCLES?

The two regimes in bond-equity returns correlation corresponded to two big macro-financial market cycles. This naturally suggests these cycles played a role in determining the correlation regimes. Regime I, over 1966-1997, coincided with the big long inflation cycle. The post 1998 regime has seen a long equity risk premium cycle, which continues. The break in regimes began just as the long cycle in inflation was ending and the late 1990s equity bubble was beginning. The view that the two regimes were importantly driven by macro-financial market cycles is reinforced by the read of the behavior of equity earnings and bond yields. Earnings and bond yields moved very closely together from the 1960s through the late 1990s, so they were positively correlated. Then beginning in the late 1990s, they began to move in opposite directions. The tight positive correlation between bond yields and earnings yields in regime I and the steadiness of the bond-equity returns correlation also points to the predominance of a common driver during this period. The wide range and volatility of the correlation in regime II since the late 1990s suggests the importance of various drivers.

AT A FUNDAMENTAL LEVEL, THE BOND-EQUITY CORRELATION DEPENDS ON TRENDS AND SHOCKS TO THE COMMON DRIVERS OF BOND AND EQUITY RETURNS, COMBINED WITH THEIR RESPECTIVE SENSITIVITIES TO EACH OF THEM.

We identify four top-down drivers of the bond-equity correlation:

- **Growth concerns.** We proxy these by the gap between the unemployment rate and the natural

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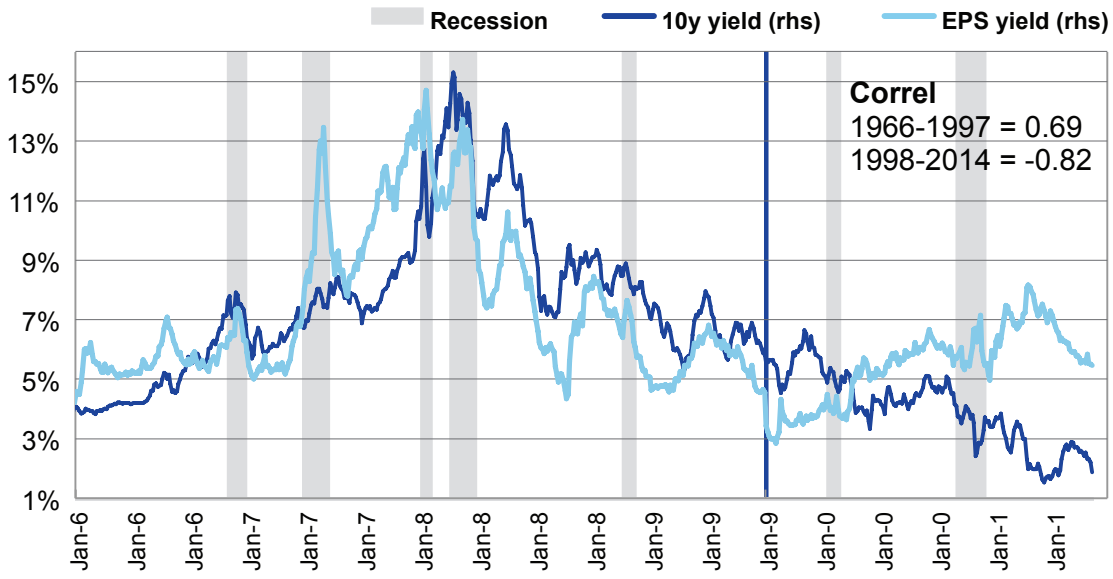
Figure 2: Earnings and bond yields



Source: Bloomberg Finance LP, Haver, Deutsche Bank

rate. Growth concerns should be associated with lower equities and lower bond yields implying a negative returns correlation;

- **Inflation concerns.** We proxy these by the deviation of core PCE inflation from 2 percent, the Fed's target. Higher inflation concerns should be associated with higher bond yields and lower equities implying a positive returns correlation;

- **The Fed's reaction function.** We proxy this by the deviation of the Fed funds target rate from a Taylor rule. A market perceived bias to easing beyond the Fed's average historical behavior should lead for example to a bigger decline in rates on negative data surprises and a more negative correlation;

- **Equity-bond risk premium.** We proxy this by the spread between earnings and bond yields. Medium term cycles in the relative risk premium (equity love or bond love) will create a negative correlation as movements in the relative risk premiums drive relative returns.

POSITIVE BOND-EQUITY RETURNS CORRELATION REGIME DURING 1966-1997 PREDOMINANTLY DRIVEN BY THE INFLATION CYCLE.

The first regime of positive correlation was dominated by the long up and down cycle in inflation. Core PCE inflation rose from 2 percent in 1966 to 10 percent by 1980 then fell back to 2 percent by 1997. The equity earnings yield (correlation of 0.85) and bond yields (0.58) closely followed inflation through both the up and down phases, with bond yields lagging inflation slightly in some periods. It follows that the positive correlation between bond and equity returns was driven in part by the inflation cycle. But how important was the inflation cycle in driving the positive bond-equity returns correlation? A decomposition of the bond-equity returns correlation over the period based on relative volatilities and the betas of earnings and bond yields to inflation indicates that the bulk (70 percent) of the correlation reflected the inflation cycle. The other drivers also had an impact, but much less so (30 percent).

NEGATIVE CORRELATIONS SINCE 1998 REFLECT A COMBINATION OF THE FOUR FUNDAMENTAL FACTORS.

Empirically, each of the four drivers played a role in driving the level and variation in the bond-equity returns correlation.

- **Diminished but significant role of inflation.** Compared to the 1966-1997 regime inflation has been range bound between 1 percent and 2.5 percent since 1998. As the volatility of inflation has diminished, its relative importance in driving the bond-equity correlation has diminished, while the importance of the other drivers has risen. It is notable that the correlation is tightly tied to inflation in some periods but less so in others.

- **Closely tied to unemployment.** The bond-equity returns correlation has been closely tied to the unemployment gap. In the 2003-2007 recovery cycle, the peak and trough in the unemployment gap in 2003 and in 2007, respectively, marked the turning points in the bond-equity returns correlation. The bond-equity returns correlation has been closely tied to the unemployment gap (-0.63) over the period. In this cycle, though the unemployment gap peaked in late 2009 and has shrunk steadily since, the bond-equity returns correlation ratcheted down in the summers of 2010 and 2011, and stayed there until the Fed's taper communication last summer, implying other factors were at play, and suggesting in particular a role for Fed policies in driving the bond-equity returns correlation.

- **Fed reaction function added to negative correlations.** Fed policy looks to have been an important driver of the bond-equity correlation since the early 1980s. Since the Fed raised interest rates in 1982 to fight inflation, all the way through the beginning of QE1 in December 2008, the relationship between the deviation of policy rates from the Taylor rule and the bond-equity returns correlation was strong (0.6). Using the same measure of the Fed's policy bias, the Taylor rule gap, the relationship looks to have weakened (0.27) since December 2008 when QE1 was implemented. But in our view, the Fed's

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reaction function has continued to be an important driver of the bond-equity returns correlation. Since December 2008, as policy rates remained at the zero floor and the Fed adopted a number of nontraditional measures (QEs, calendar rate guidance and data-dependent forward guidance), these announcements introduced additional gyrations in the correlation over and above those captured by the Taylor rule gap. So Fed policy was a driver just not as measured by the Taylor rule gap. In the summer of 2010 for example, as the market began to anticipate QE2 the bond-equity returns correlation, which had remained tied to the Taylor rule gap, plunged below as the market priced in QE2, then as QE2 was announced and implemented, the correlation rose. So in our reading the impact of the Fed's reaction function since September 2008 has been stronger than it looks.

- **Equity-bond risk premium cycle key to persistently negative correlations since 1998.** Equity and bond yields have moved in opposite directions through most of the last 15 years as the equity risk premium cycle unfolded. The equity-bond risk premium fell to a low in the late 1990s as the equity bubble saw earnings yields fall to historic lows while 10y yields had been rising late in the economic cycle. Then the prolonged de-rating as the bubble burst, followed by the financial crisis saw equities de-rate while 10y yields fell to historic lows. The equity-bond risk premium has been normalizing since its lows in the fall of 2011, initially as equities re-rated from their lows after the U.S. debt downgrade and more recently as bond yields rose following the Fed's taper comments last summer.

THE FOUR DRIVERS TOGETHER EXPLAIN MUCH OF THE VARIATION IN THE EQUITY-BONDS RETURNS CORRELATION, CAPTURING THE MAJOR TRENDS AND KEY TURNING POINTS.

Each of the drivers is significant in explaining the correlation since 1998. The estimates imply a fair value for the correlation of -0.35 currently. The fitted or fair value correlation has been trending up from its lows in August 2011, rising from -0.6 in September 2011 to -0.35 presently. This relatively steady rise reflects the continued decline in the unemployment rate (+12 pps in correlation), smaller easing Fed bias (+11 pps), a decline in the equity-bond risk premium (+9 pps), while inflation has fallen (-6 pps).

WHERE NEXT FOR THE BOND-EQUITY RETURNS CORRELATION?

Over the medium term, the outlook for each of the four drivers point to the bond-equities returns correlation moving higher (+30pp) and becoming less negative, close to zero but still slightly negative (-0.05) by the end of 2015. This pattern would be very similar to that observed in the last cycle.

- Unemployment should continue to fall in line with the trend of 0.7pp per year, in place since its recovery began, with recent data points suggesting the pace may in fact have quickened. Unemployment falling to its natural rate of around 5.5 percent should raise the bond-equity returns correlation by +5pp;
- Continued strength in core services inflation and an unwinding of idiosyncratic factors points to an inflation reset higher sooner rather than later. A rise in core inflation to 2 percent should raise correlation by +10pp;
- Unemployment approaching its natural rate and an inflation reset higher should increase pressure on the Fed to raise its guidance for the path of Fed rates and bring it closer to the traditional Taylor rule, pushing correlation up by +5pp;
- Finally, as the still large equity-bond risk premium continues to normalize, it will keep the returns correlation negative but less and less so as the magnitude declines. Every 1pp decline in the risk premium should see correlation +3pp higher, and a complete normalization by the end of next year would push correlation up by 10pp.

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SMALL CHANGES IN THE CORRELATION CAN MAKE LARGE DIFFERENCES TO ASSET ALLOCATION.

Changes in the bond-equity returns correlation impact the vol of a portfolio and hence risk adjusted returns for all equity-bond allocations. While asset allocation does not depend only on maximum risk-reward given constraints of risk tolerance, maturity, liquidity, etc., changes in the correlation will influence the optimal bond/equity allocation at the margin. We use long run historical (1928-2013) equity and bond excess returns (relative to cash) and vol to calibrate the impact of correlation on bond/equity allocations that maximize risk adjusted returns in a stylized portfolio. The change in allocations is not linear, with the bond portfolio share falling in favor of equities slowly for correlation shifts from very negative levels to zero but very rapidly as correlation turns increasingly positive.

- From regime I to regime II. A decline in the correlation from the average 1978-1997 level of +0.4 to the post 1998 average of -0.3 would raise the allocation in favor of to bonds away from equities by 25 percentage points.
- To the top of the regime II range. An increase in the correlation from -0.3 to zero would lower the share of bonds in favor of equities by 10 percentage points.
- Looking forward. The impact of changes in the correlation on desired asset allocation depends, in general, on the differential in expected risk adjusted returns. Looking forward, we expect risk adjusted returns for equities to be significantly higher than those for bonds. Median ex-recession S&P 500 returns are 17 percent historically, while bond returns should be constrained to about 1.4 percent by already low yields in a rising rates environment. Equity vol should remain close to its ex-recession average of 13 percent, while bond vol which has been kept near historic lows by various Fed policies and low inflation should rise.

IN THE VA HEDGING SPACE, BOND-EQUITY CORRELATION IS ALSO AN IMPORTANT CONSIDERATION.

Several insurance products, especially the VA, have the exposure to joint shocks (lower interest rates and drop of equity). Therefore, bond-equity correlation is an important factor for many advanced VA writers. 2015 witnessed some VA writers put on bond-equity correlation hedges when the price was attractive. It's probably helpful for the insurance companies to analyze the long trends and cycles of the bond-equity correlation when designing the correlation hedge.

BUY RATES-EQUITIES CORRELATION ON PULLBACK IN EQUITIES ON HIGHER RATES

Despite the upturn in U.S. growth, markets remain concerned about global growth and have focused on the dollar's sharp rise and the collapse in oil and commodity prices. Bond equity 3m returns correlations are back to a recession-like -0.6. However, an increased focus on a Fed rates reset could see the market again price in a higher/positive bond-equity correlation, i.e., pricing in an equities sell-off on higher rates, much as we saw after the taper communication. If implied bond-equity correlations rise or turn positive we recommend positioning for a reversal outright through swaps or use it to cheapen directional equity and rates views using knock-in options. ■

ENDNOTES

[1] For other analyses of the drivers and prospects for the correlation see PIMCO (The Stock-Bond Correlation, November 2, 2013) and Lingfeng Li (Macroeconomic Factors and the Correlation of stock and Bond Returns, Yale November 2002).