Investing either side of the Zero Lower Bound rate

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Central bank policies continue to dominate asset performance, which makes it critical to value them properly, especially when investing either side of the zero lower bound (ZLB) of policy rates. The range in policy spans from expectations for higher rates from the Federal Reserve (Fed), to the European Central Bank (ECB) actions that are producing negative interest rates. Anticipating when and how quickly the Fed may increase interest rates has recently become more challenging, but this was by design. At the March Federal Open Market Committee meeting, the Fed switched communication strategies from calendar-based to data-based guidance and dropped their forecasts low enough to make it easier for the market to beat. On the other hand, the ECB's willingness to buy bonds with yields as low as -0.20% in their Quantitative Easing (QE) programme has produced negative yields across the front-end of many core country yield curves. While policy may be running in opposite directions, both central banks have a unified goal of increasing inflation expectations. The result is that both economies will be allowed to run a little hotter in order to close the output gap faster and reduce excesses more quickly.

Inevitably, this makes the market price for higher inflation expectations in the future and increases the "option value" of forward short-term interest rate expectations across global economies whose central bank policies are a dominant factor in asset performance. But their influence on the relative shapes of yield curves and currency will be different. Valuing this properly, and incorporating it into our decision-making process, may provide a source of alpha for us to capitalise upon. Here is how we are thinking about it.

The value of expectations

It is well known that the expectations of changes in the policy path of short-term interest rates can influence the performance of fixed income assets. However, what is less well-understood is how much greater that influence is when policy rates approach and fall below the ZLB. Short-term interest rate expectations take option-like values whose effects are amplified on the yield curve and currency.

Our analysis is based upon the work done by Fischer Black in a paper he wrote for *The Journal of Finance*[1] that provides a framework for us to value the current policy environment. In his paper, Black hypothesised that the nominal short rate theoretically cannot actually be negative because people have the option to hold currency with a 0% rate instead of buying assets with negative interest rates (this does not contradict the current environment, as we will explain). However, an "equilibrium", or "shadow" nominal and real interest rate can be negative. The nominal interest rate is thus the maximum of the "shadow real interest rate" plus the inflation rate, or zero, whichever is greater.

This gives the nominal interest rate a call-option-like feature and can be valued as such. From an investor's perspective, it is similar to owning a zero strike floor, with an option to switch into holding currency instead of holding a bond with a negative interest rate. When short rates approach the ZLB, as with any option near its strike, the option value is at a maximum. The usual term structure relationships can be significantly affected by the option-values in current and expected short rates.[2]

We can extrapolate this analysis to value the optionality in foreign exchange rates. If we use covered interest rate parity, a

process of valuing currency by applying the respective interest rate differentials between countries, we can evaluate the impact of future short-rate expectations when near the ZLB.

Intuitively, we can understand this by observing the US dollar (USD) versus the Swiss franc (CHF). The effective Fed policy rate is about 0.125% while the Swiss policy rate is -0.75%. Despite negative policy rates associated with the CHF, it still holds value against the USD because of expectations that negative rates in Switzerland are temporary and in the future they will rise. The observed future value of the CHF versus USD beyond what interest rate parity would otherwise suggest provides information about the option-like value of the currency, and, accordingly, the option-like value of future interest rate expectations.

No floor on rates

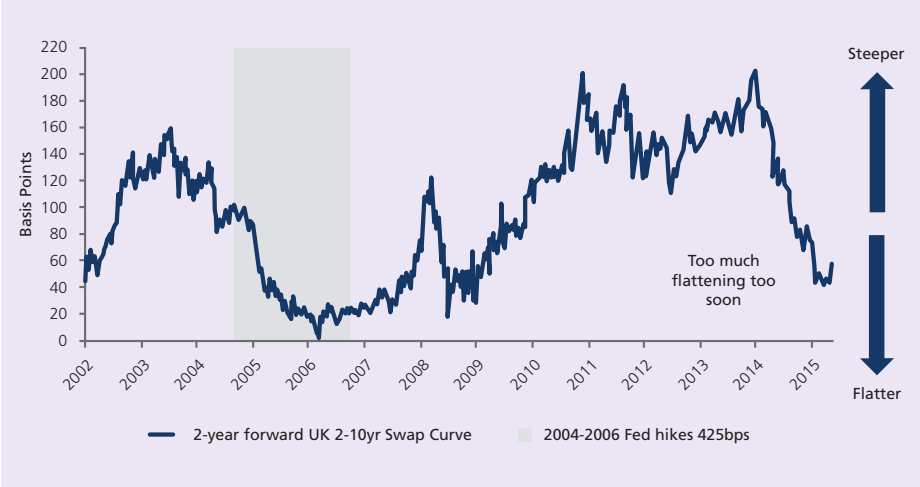
Central banks across the Eurozone have recently designed policy such that nominal short-term rates can fall below 0%, thus removing the floor on nominal rates. When applying this to the above option framework, it is the functional equivalent of creating an in-the-money floor for investors, which reduces demand to switch into the euro currency since bond yields can fall further to negative levels. Effectively, this weakens the euro currency. More importantly, as rates move away from the 0% strike to, say -20 basis points (bps) in the case of the ECB, the option-values embedded in forward rate expectations falls, therefore providing a flattening impetus to the euro yield curves.

When the nominal rate has no floor, the shadow real rate plays two roles: it helps balance the willingness to save and invest against opportunities to save and invest. Those who have a higher tolerance for risk borrow at low real rates versus those with a lower risk tolerance who lend at low and even negative real rates.[3] QE influences the equilibrium clearing price for this risk, which ultimately pushes investors further along the risk spectrum, in terms of lengthening duration or increasing credit exposure. Incorporating this option-valuation framework helps explain how seemingly expensive assets in Europe could still further increase in value. Monitoring these conditions, and as long as they remain consistent, informs us about the weighting of our asset allocation decisions across the Eurozone.

Conversely, the Fed is moving in an opposite direction from the ECB. Fed communications, instead of reducing them, are increasing the uncertainty of short-term rates. The Fed is attempting to allow nominal rates to rise in response to what they expect will be improving economic conditions, while keeping real rates at low and at stimulative levels by increasing inflation expectations. This means that the option-values embedded in the expectations of the path of short-term rates should rise, thus increasing forward expectations of longer-term rates.

The implication is that the US forward yield curve is likely too flat relative to the spot curve. Figure 1 illustrates that the 2-year forward 2-10yr segment of the yield curve has already flattened substantially and is approaching levels seen in the 2004 to 2006 period when the Fed hiked rates over 400 bps. We believe the forward-curve flattening is premature and may not be properly pricing the induced option-value of short-term rates that suggests a steeper curve. As a result, a spot curve steepening exposure has a higher expected payout than a flattening

Figure 1: US interest rates may have priced in too much flattening while also mispricing the Fed's intentions to hike slowly and increase inflation expectations



Source: Bloomberg, MSIM. Data as of April 14, 2015. Note: 2-year forward 2-10yr curve is the difference between the 10yr swap rate minus the 2yr swap rate in two years' time, as measured by forward rate market prices.

exposure after adjusting for option-valuation and positive carry. From an asset allocation perspective this argues for an underweight duration exposure in the US Long-end versus Europe. We are reducing curve flattening exposure in favour of steepeners. Additionally, we have shifted some of our nominal bond exposure towards owning real rates and linkers, since real rates are most aligned with central bank policy to increase inflation expectations and thus will have their support.

Conclusion

In an effort to support the financial system since the crisis, central banks have made valuing the market more complex, albeit unintentionally. We have illustrated one of these complexities in this article and explaind how we resolve it by incorporating the option-value of short-term rate expectations driven by policy communications into our investment decision-making process. Traditional valuation models that mainly rely on econometric variables have fallen in significance to quantitative analysis that measures the influence of the policy reaction functions on asset prices. We have made this case repeatedly in our *Insights* series, and this is especially relevant when investing either side of the zero lower bound of policy rates.

1. "Interest Rates as Options", The Journal of Finance, Vol. 50, No. 5 (Dec., 1995), pp. 1371-1376, by Fischer Black. Note: Fischer Black was notoriously famous for his contribution to the Black-Scholes Option Model.
2. "Interest Rates as Options: Assessing the markets' view of the liquidity trap". Antulio Bonfim, Federal Reserve Board, July 7, 2003.
3. "Interest Rates as Options", The Journal of Finance, Vol. 50, No. 5 (Dec., 1995), pp. 1371-1376.