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Market Insight

The End of Quantitative Easing:

Tapering and its Effect on Bonds and Equities

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Abstract:

The Federal Reserve recently kept its quantitative easing policy in place for now, but as the economy improves, the Fed will likely taper its stimulus program. How will investors prepare for this unprecedented event? In this paper, we demonstrate the MSCI Macroeconomic Model, exploring how economic conditions might change enough to motivate the Fed to commence tapering; we combine this analysis with the Barra Integrated Model to explore how economic improvements and tapering could affect stock and bond markets.

Why This Matters:

- Near-term economic conditions appear too uncertain for the Fed to begin tapering soon – but when?
- Under the assumptions of our study, MSCI models suggest that long-term yields and stock markets will rise when the Fed initiates tapering.
- Investors can combine insights from the macroeconomic models and risk models to help them prepare for such unprecedented events.

Introduction

In May and June of 2013, the Federal Reserve surprised many investors with suggestions that its quantitative easing program might be gradually reduced, or tapered, in the near future. With these announcements, the threat of reduced long-term bond purchases by the Fed drove long-term yields to rise by nearly 100 basis points. Since then, the Federal Reserve has expressed support for an extension of quantitative easing – and a delay of tapering – to offset continued economic weakness. As a result, investors today remain uncertain about the timing and effects of tapering.

In this paper, we demonstrate an application of the MSCI Macroeconomic Model by exploring the probability that economic conditions will improve enough to motivate the Fed to commence tapering. We then combine this macro model with MSCI's multi-asset-class risk model, the Barra Integrated Model, to assess the potential impact of economic improvements and QE tapering on bond and stock returns.

Based on certain assumptions, MSCI risk models suggest that the combined effects of tapering and the economic improvements required for tapering will be a 64 basis point rise in 10-year Treasury yields and a 1.6 percent rise in stock market valuations. In this scenario, equity portfolios that are highly sensitive to economic improvements, such as Small Cap, would rise by about 3.4 percent. Equity portfolios that are less sensitive to economic growth and more sensitive to yield changes, such as Utilities, would gain only about 0.4 percent.

While buying and selling Treasury securities is within the mandate of the Federal Reserve, the size and duration of the Fed's recent long-term bond purchases are without historical precedent. This also means that there is no precedent for the gradual end of this program: tapering. That makes it especially challenging to predict the timing, pace, and effects of tapering.

Along with purchasing long-term Treasury bonds, the Fed has also been purchasing mortgage-backed securities; this paper, however, does not consider these Fed purchases of mortgage-backed securities as part of our scope.

Plausible Scenarios for Tapering

The Federal Reserve has not laid out clear conditions for an end of quantitative easing – meaning, their purchases of long-maturity bonds. But they have said that they intend to maintain the exceptionally low Fed funds rates while unemployment remains above 6.5 percent and near-term inflation forecasts remain below 2.5 percent.[1]

Many investors now believe that the Federal Reserve will start tapering its purchases of long-maturity bonds *before* the economy reaches those thresholds. Choosing values half way between current levels and the criteria for higher Fed funds rates, for purposes of this paper we assume that the Federal Reserve will start reducing the pace of its longer-maturity bond purchases when two conditions are met:[2]

[1] See the September 18 Federal Reserve press release covering the July FOMC meeting: http://federalreserve.gov/newsevents/press/monetary/20130918a.htm.

[2] During a press conference following the June FOMC meeting, Chairman Bernanke stated that "the unemployment rate would likely be in the vicinity of 7 percent" when the Federal Reserve ends its program of long-term bond purchases. See http://www.federalreserve.gov/mediacenter/files/FOMCpresconf20130619.pdf.

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- Unemployment is less than 7 percent
- Inflation is greater than 2.3 percent

Table 1 shows the MSCI Macroeconomic Model[3] projections for US unemployment and inflation through the end of 2014. Although we expect unemployment to be close to the tapering threshold by the end of 2013, we project inflation to remain below the threshold. If both conditions must be met for tapering, our current projection is that tapering is nearly impossible by the end of 2013. However, as Table 1 also shows, our projections for the end of 2014 are such that relatively small positive surprises would push the economy across both thresholds. If the Federal Reserve will commence tapering once both thresholds are reached, we estimate a 14 percent probability of tapering by the end of 2014.

The economic conditions for tapering require a persistent increase in both real growth and inflation. These economic changes by themselves should drive up bond yields and stock prices. Based on our Macroeconomic Asset Pricing Model,[4] we project that the economic improvements considered necessary for tapering will raise long-term bond yields by 34 bps.

Table 1: Economic Forecasts and the Likelihood of Reaching Thresholds for Tapering.

	Unemployment	Inflation	Tapering Probability
Current	7.3%	1.5%	NA
2013 Year-End Projection	7.2%	1.7%	3%
2014 Year-End Projection	7.1%	1.9%	14%

The table shows forecasts for US unemployment and inflation from the MSCI Macroeconomic Model. The probability of tapering is the model's estimate of the joint probability of reaching unemployment less than 7 percent and inflation greater than 2.3 percent by year-end 2013 or 2014, respectively. Many market participants have mentioned these thresholds as triggers for tapering, but they are not official Federal Reserve policy targets.

If, in response to these economic improvements, the Federal Reserve commences to taper its long-maturity bond purchases, this will further raise long-maturity bond yields. Because tapering is the reversal of an unprecedented monetary policy, macroeconomic forecasting models like the MSCI Macroeconomic Model do not naturally include the likely effects of this policy change. Hence, we need to separately estimate the potential direct impact of tapering.

Recently, variations in the US zero-coupon yield curve have been driven mainly by a single slope factor. The short-end has remained fixed near zero and the remainder of the curve has steepened. Figure 1 shows the shape of this factor by comparing the yield curves in June and September 2013, a period when tapering was a prominent consideration. During this period, the 10-year yield rose roughly 75 bps. In our analysis, we assume that actual tapering would move the yield curve in similar ways: the yield

[3] The MSCI Macroeconomic Model is a Bayesian Vector Autoregressive (BVAR) Model; BVARs are statistical tools for multivariate time series analysis with widespread applications in Macroeconomics and Finance. One attractive feature of BVARs is their ability to make projections over many periods, and to calculate confidence bands around the projections. Our BVAR model builds on the long-run risk model for real GDP growth described in our previous paper ("Macroeconomic Risk and Asset Cash Flows"). While some macroeconomic variables such as real GDP is only measured on a quarterly basis, and with a lag, our "mixed-frequency" methodology makes efficient use of both quarterly, and more timely, monthly variables. Finally, we impose restrictions (Bayesian priors) based on observed empirical regularities in the macroeconomic time series we model.

[4] See our previous paper, "Macro-Sensitive Portfolio Strategies: Pricing and Analyzing Macroeconomic Risk" (MSCI Market Insight, April 2013).

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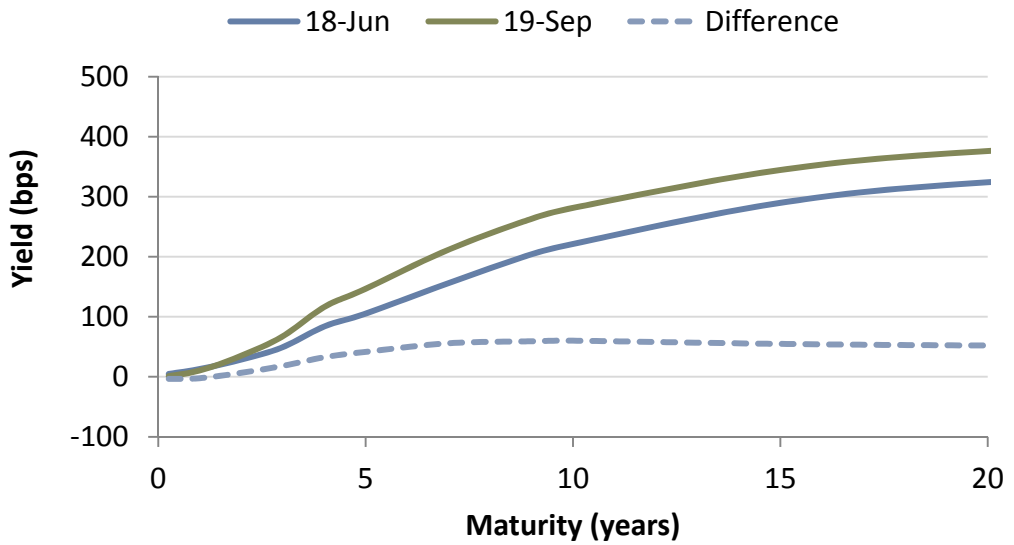
curve would steepen further by adding a fraction or multiple of the difference to today's curve (the dashed blue line shown in Figure 1).

The implied yield volatility from options on 10-year Treasury Note futures provides information about plausible yield changes. Recently, the implied volatility measured from the at-the-money option with three months to maturity has been around 30 bps. This implied volatility indicates that market participants consider a further steepening by 75 bps, or more, unlikely in the near term.

Figure 1: Recent Changes in the US Treasury Zero-Coupon Yield Curve.



The figure shows MSCI estimates of zero-coupon yield curves for US Treasury bonds on June 18, 2013 and on September 19, 2013. The dashed line shows the change in yields. Over this three-month period, the possibility of tapering was an important topic of market conversation and news. We conjecture that the effects of actual tapering would steepen the yield curve in similar ways: leave short rates unchanged and raise long-maturity yields.

Our macroeconomic model suggests that tapering would be a surprise even a year from now. In our model, the 14 percent probability of reaching or exceeding the thresholds corresponds to a one standard deviation surprise in a normal distribution. If market participants have similar forecasts, we can use the implied volatility from the options to calibrate the change in the 10-year yield. In that case, a one standard deviation surprise corresponds to a 30 bps increase in 10-year yields.

Table 2 summarizes our models' predictions of 10-year yield changes. The models predict that the improvement in economic conditions and the direct effects of tapering will combine for a yield increase of 64 bps, with each source contributing roughly half of the total. For our subsequent analysis, we assume that the entire yield curve will steepen in a manner consistent with the shape shown in Figure 1 and a 10-year yield increase of 64 bps.

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Table 2: Tapering and Long-Maturity Bond Yields.

	Current Yield	Impact of Macro Shocks	Impact of Tapering	Overall Impact
10-Year Treasury Bond Yield	281 bps	34bps	30bps	64bps

The table shows forecasts for changes in US 10-year zero-coupon Treasury bond yields due to two events: (i) improvements in macroeconomic conditions in order to reach economic thresholds of 7 percent unemployment and 2.3 percent inflation, which we treat as requirements for tapering, and (ii) tapering of the Federal Reserve's long-maturity bond purchases. Because the unprecedented long-term bond purchases and their potential reduction are outside our macroeconomic model, we add these effects to estimate an overall impact on yields. For reference, the "Current Yield" column reports the 10-year zero-coupon Treasury bond yield on September 19, 2013.

Effect of Tapering on Bond and Stock Returns

We can now combine the predictions of MSCI's Macroeconomic Model with the correlations captured by MSCI's multi-asset-class risk model, the Barra Integrated Model (BIM). This combination allows us to trace our predicted changes in the major assets classes to additional markets.

Our models forecast that the effects of economic improvements on asset returns will play out gradually, over long horizons. For present purposes we focus on a one-year window. In particular, we do not predict that the full effect on equity prices occurs at the time the Federal Reserve announces or commences tapering. Some of the impact will precede tapering due to improvements in economic conditions. Some of the impact will lag tapering because investors will likely remain uncertain about the strength of the recovery. By contrast, the direct effect of tapering on bond returns is likely to be more immediate.

The Impact of Tapering on Bond Portfolios

For investment-grade bond portfolios, the predicted returns are dominated by changes in the yield curve that are driven by the combination of improved economic conditions and tapering. For such bonds, we expect losses around 2.2 percent.

For high-yield bonds, however, the direct effects of improved economic conditions and higher inflation make repayment more likely and materially offset the effects of higher US Treasury yields. Our models predict that high-yield bonds would lose only 0.2 percent. This small overall loss can be decomposed into a 140 bps loss due to higher Treasury yields and a 120 bps gain due to narrower credit spreads.

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Table 3: Tapering and Bond Markets.

Index	P&L	Duration
US Treasury Master	-2.2%	5.4
US Domestic Master	-2.4%	5.2
US Corporate Master	-2.2%	6.2
US High Yield Master II	-0.2%	4.0
U.S. Treasuries Inflation linked	-2.3%	8.3
Global Government Bond Index II	-1.9%	6.5
Global Emerging Market Sovereign Plus	-1.7%	6.4

The table shows estimated bond returns from the combined effects of tapering and the economic improvements required for tapering. For the Federal Reserve to begin tapering its bond purchases, we assume that unemployment has to fall below 7 percent and inflation has to rise above 2.3 percent. Our models suggest that this is unlikely to occur before the end of 2014.

The Impact of Tapering on Equity Portfolios

Long-term equity returns are influenced by changes in macroeconomic conditions. Although current unemployment and inflation are close to the thresholds many investors consider requirements for tapering, further economic improvements are necessary to reach these thresholds. An increase in GDP growth associated with the required decline in unemployment would be good news for stock returns.

If such improvements were to trigger tapering, however, the associated increase in long-term yields would partially offset the equity market gains.

Table 4 shows our projections of the combined effects of the economic growth required for tapering and tapering on equity returns. Our model predicts that tapering would be accompanied by a 1.6 percent rise in the US stock market. The table also shows that not all market segments are equally sensitive to improving economic conditions and tapering. Our model predicts that Small Cap and Value portfolios, for example, are more sensitive. We project that they will gain about 3.3 and 2.6 percent, respectively.[5]

[5] In our previous paper, "Macroeconomic Risk and Asset Cash-Flows", we have shown that portfolios with strong momentum exposures are more sensitive to GDP growth shocks than the market overall – over the long run. This is true for the MSCI USA Momentum index in table 4. Over shorter horizons, like the 1-year window we consider in table 4, this sensitivity is muted.

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Table 4: Tapering and Equity Markets.

Index	P&L
MSCI US IMI	1.6%
MSCI USA Growth	0.7%
MSCI USA Value	2.6%
MSCI US IMI Value-Weighted	2.4%
MSCI USA Small Cap	3.3%
MSCI USA IMI High Dividend Yield	2.4%
MSCI USA Momentum	1.3%
MSCI USA Minimum Volatility	1.6%
MSCI USA Quality	1.3%
MSCI ACWI IMI	1.0%
MSCI EM	2.3%

This table shows the estimated stock returns from the combined effects of tapering and the economic improvements required for tapering. For the Federal Reserve to begin tapering its bond purchases, we assume that unemployment has to fall below 7 percent and inflation has to rise above 2.3 percent. Our models suggest that this is unlikely to occur before the end of 2014.

Table 5 shows that US equity market sectors also exhibit important dispersion in their sensitivity to improved economic conditions and tapering. Defensive sectors such as Utilities, Health Care, and Consumer Staples are at the lower end of the return range while Cyclical sectors such as Financials and Materials are at the upper end.

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Table 5: Tapering and Equity Sectors.

Index	P&L
MSCI USA/CONSUMER DISCR	2.3%
MSCI USA/CONSUMER STAPLES	0.4%
MSCI USA/FINANCIALS	3.5%
MSCI USA/ENERGY	1.2%
MSCI USA/INDUSTRIALS	1.9%
MSCI USA/INFORMATION TECH	1.3%
MSCI USA/HEALTH CARE	1.1%
MSCI USA/MATERIALS	2.9%
MSCI USA/TELECOM SVC	0.5%
MSCI USA/UTILITIES	0.4%

The table shows the estimated stock market sector returns from the combined effects of tapering and the economic improvements required for tapering. For the Federal Reserve to begin tapering its bond purchases, we assume that unemployment has to fall below 7 percent and inflation has to rise above 2.3 percent. Our models suggest that this is unlikely to occur before the end of 2014.

Conclusion

We use MSCI's Macroeconomic Model to assess the likelihood that the Federal Reserve will taper its purchases of long-term bonds based on certain assumptions. The model would produce different results based on different assumptions regarding the conditions necessary to end quantitative easing and commence tapering. If tapering requires that US unemployment fall below 7 percent and that US inflation rise above 2.3 percent, the model implies that tapering is extremely unlikely by the end of 2013. By the end of 2014, however, the model implies that only a moderate surprise in economic conditions is required to reach the thresholds and commence tapering.

Because the Fed has repeatedly stated that tapering will require improved economic conditions, we assess the joint impact of the improved economic conditions and tapering on stock and bond markets. Our models predict that economic improvements and tapering would equally contribute to a 64 bps increase in long-term yields.

A 64 bps increase in 10-year yields translates to losses of roughly 2.2 percent for the major US bond market indexes. Conversely, the Macroeconomic Model predicts that the improved economic conditions will lead the major US market indexes to gain roughly 1.6 percent. Style and sectors that are more sensitive to economic conditions, such as Small Cap, Value, Financials, and Materials should gain more.

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[1] *As of September 30, 2012, as published by eVestment, Lipper and Bloomberg on January 31, 2013*

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