OFR MARKETS MONITOR
OFFICE OF FINANCIAL RESEARCH

May 2015
(data as of May 18)

A monthly review of financial market themes and developments

The Sell-off in Long-term Bonds

Over the last month, long-term euro area bonds experienced a sharp sell-off, leading to outsized moves in other major global bonds, including U.S. Treasuries. The sell-off reflects a partial unwinding of the euro area "QE trade," in which investors established sizable positions in euro area bonds, equities, and the euro in response to the European Central Bank (ECB) expanded asset-purchase program. The size and pace of the correction in euro area fixed income markets were disproportionate to any new economic or policy information, and trading became highly volatile. Like the 2013 sell-off in U.S. bonds and the October 2014 "flash rally" in Treasuries, this episode underlines the fragility of liquidity even in the world's largest bond markets.

Developments during the last month

- The unwinding of the euro area "QE trade" drove sizable price moves in the euro area: bonds and equities sold off sharply and the euro reversed more than half of its 2015 depreciation
- The rise in long-dated euro area bond yields triggered large, correlated moves in other major bond markets
- The broad U.S. dollar index depreciated as the euro regained ground
- Outside of Europe, major equity indices were generally range-bound; U.S. equities remain at record high levels
- Oil prices continue to rebound, but remain about 40 percent below their 2014 peaks
- Greece's government financing situation remains unresolved and a source of risk for broader euro area markets

The euro area QE trade unwound over the last month.

As discussed in the March Markets Monitor, the ECB's January announcement of an expanded asset purchase program sparked sizable rallies in euro area bonds and equities and a rapid depreciation of the euro. This QE trade began to unwind in mid-April (Figure 1). Since then, the euro has recovered 6 percent against the U.S. dollar and the Euro Stoxx 50 equity index has fallen 6 percent.

The sell-off in euro area bonds was especially sharp. Ten-year German government bond yields jumped 65 basis points from a historic low of 0.07 percent on April 20. Other euro area government bonds sold off in a highly correlated manner. The sell-off was concentrated in long-term bonds, with comparatively small moves in short-term yields. Trading in German bonds and futures was volatile; 10-year bonds traded in an intraday range of up to 20 basis points, four standard deviations above average (Figure 2).

Figure 1. Sharp reversal in euro area QE trade
Euro area equities, currency, and long-term bond yields

Source: Bloomberg L.P.

This monitor reflects the OFR staff's best interpretation of financial market developments and views. It does not necessarily reflect a consensus of market participants and does not necessarily represent official positions or policy of the OFR or the U.S. Treasury. **Contributors:** Viktoria Baklanova, Ted Berg, Daniel Bresler, Soumya Kalra, Daniel Maddy-Weitzman, Rebecca McCaughrin, Adam Minson, Thomas Piontek, Warren Reed, William Shi.

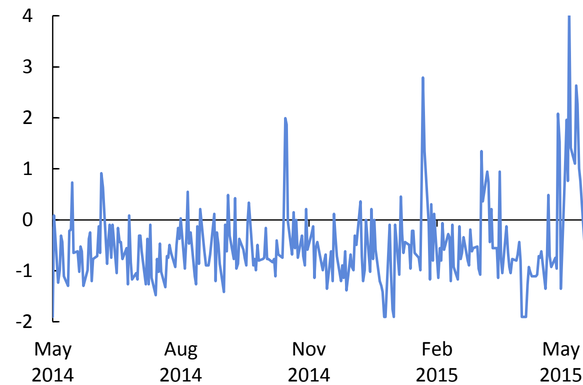
The QE trade reversal since April primarily reflects a technical market correction following months of large, one-way asset price moves. Market participants attributed the size and speed of the move to an unwinding of crowded positions and the evaporation of liquidity at key moments. Economic and inflation data since mid-April have continued to improve modestly, but neither those data nor the incremental information from the ECB would justify the magnitude of the changes in bond yields. Euro area inflation and inflation expectations continued to edge higher (Figure 3) while economic growth data was mixed across the region's major economies. During this period, ECB policymakers did not signal any changes to the asset purchase program, nor were there any signs of a material shift in risk sentiment or policy expectations.

Rising German yields triggered large, correlated moves in other major long-term bonds…

Ten-year U.S. Treasury yields rose nearly 40 basis points over the past month, with similarly large yield moves in the United Kingdom, Sweden, and Canada. The run-up in Treasury yields was correlated with the move in German bonds (Figure 4), but smaller and less volatile. Granger causality analysis indicates that yield changes in Germany have been contributing to moves in U.S. Treasuries since ECB president Mario Draghi signaled plans for expanded asset purchases in Q3 2014. The mechanism for that, as explained in the April Markets Monitor, is the flow of investment from euro area bond markets – where yields were falling – into higher-yielding U.S. Treasuries. Thus the reversal in the euro area bond rally caused a similar reversal in long-term Treasury yields.

This latest episode of volatility underscores several vulnerabilities in global fixed income markets. First, it again illustrates the current fragility of liquidity in bond markets; even as traded volumes rise during a stress episode, trading depth decreases and yields can move in disorderly ways. Second, as interest rate volatility has trended at low levels and overall bond market duration has increased in recent years, fixed income markets have become more vulnerable to value-at-risk (VaR) shocks. Many financial institutions use VaR frameworks to calibrate their tolerance for risk. Periods of lower volatility generally allow these firms to take greater risk. Doing so increases the probability of a VaR-driven feedback

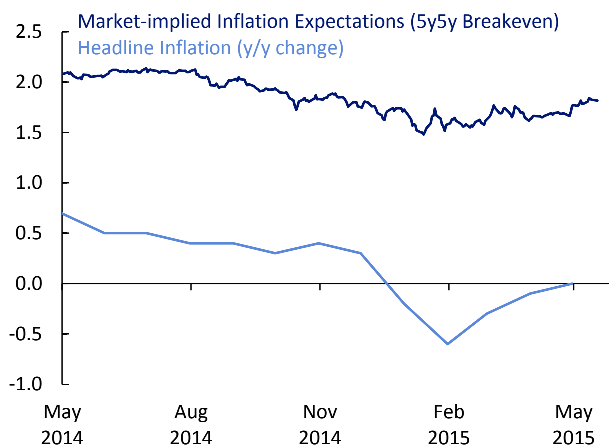
Figure 2. Highly volatile trading in German bunds
Intraday range for 10-year German bund yield (z-score)



Note: Intraday range measured as the difference between the high and low levels of yield within each trading day. Z-score represents the distance from the ten-year average, expressed in standard deviations.

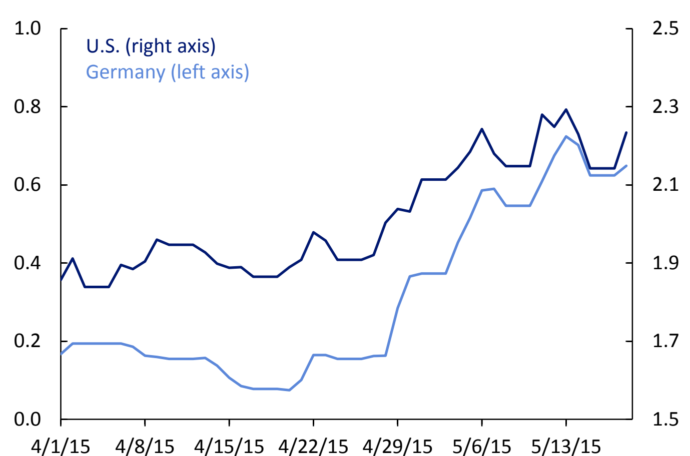
Source: Bloomberg L.P.

Figure 3. Euro area inflation and expectations improve modestly
Consumer price inflation and 5y5y breakeven rate (percent)



Source: Bloomberg L.P.

Figure 4. Euro area bond sell-off drives Treasury yields higher
Ten-year government bond yields (percent)



Source: Bloomberg L.P.

loop when volatility rises: institutions are forced to shed assets to meet VaR limits, which adds to the volatility and forces more selling.

…but with limited spillover to other asset classes.

Risk assets outside of Europe were resilient through the government bond sell-off. Major equity indices outside the euro area broadly gained ground, with the S&P 500 index establishing a new record. U.S. corporate bond spreads held steady and emerging market bond spreads tightened as Treasury yields rose, a notable departure from the marked deterioration of these asset classes during the "taper tantrum" in mid-2013.

Likewise, the spike in volatility was largely confined to euro area assets and long-term global bonds. As shown in Figure 5, volatility in U.S. Treasuries jumped in early May, but implied volatilities in U.S. equities, oil prices, and foreign exchange markets were stable or fell during this period.

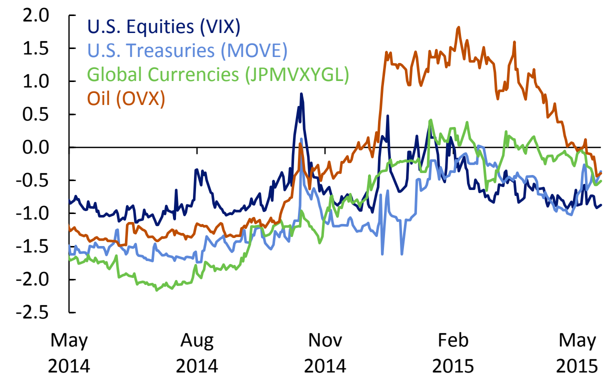
Amid Europe's sell-off, Greece's government financing remains unresolved.

Greece's negotiations with official creditors continue, delaying disbursement of needed government financing despite reportedly "urgent" cash needs. Since January, a new Greek government has sought to renegotiate existing agreements, sustaining market fears of a Greek government default or even an exit from the euro currency union. Greece has continued to service its debt obligations, but government cash is believed to be dwindling. Tensions between Greece and its official sector lenders severely disrupted other euro area markets in 2011-12, but have reverberated much less in recent years. Euro area peripheral government spreads saw brief pressure in April, but have since stabilized (Figure 6). However, the 2011-12 experience demonstrates that euro area markets can remain stable for some time before a disruptive re-pricing.

Meanwhile, oil prices have continued to rebound.

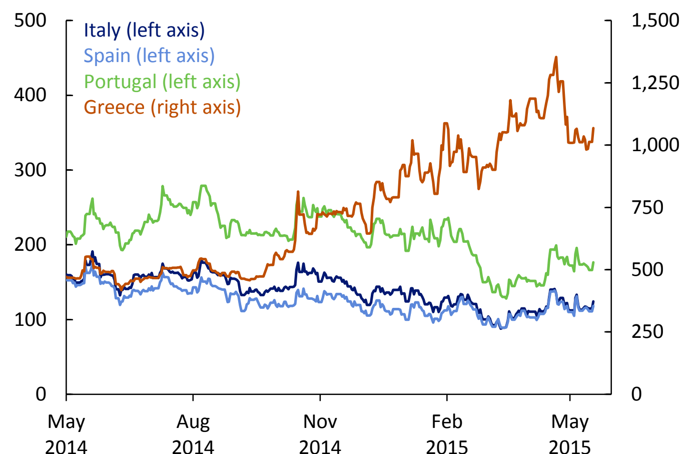
Oil prices continue to trade at the high end of their 2015 range. Brent and WTI crude oil contracts are trading 25-35 percent above their Q1 2015 lows, though they are still roughly 40 percent below their June 2014 peaks (Figure 2). Market participants

Figure 5. Volatility spillover largely confined to fixed income
Implied volatility by asset class (z-score)



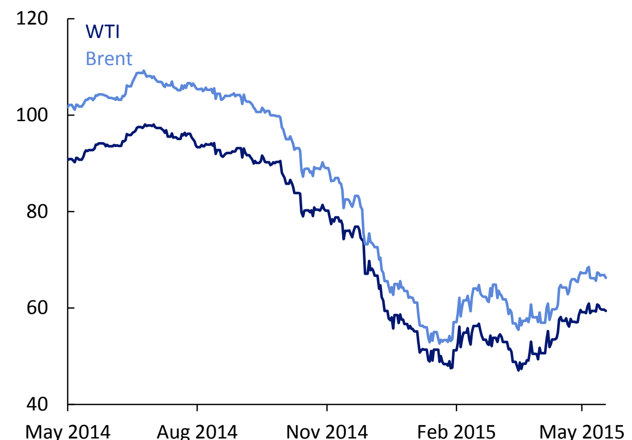
Note: Z-score represents the distance from the average, expressed in standard deviations. Averages for equity and interest rate volatility are based on data from 1991, currencies from 1992, and oil from 2007.
Source: Bloomberg L.P., OFR analysis

Figure 6. Euro periphery markets shrug off Greece risk
10-year government bond spreads over German Bunds (basis points)



Source: Bloomberg L.P.

Figure 7. Oil trading at high end of 2015 range
Crude oil prices ($US per barrel)



Source: Bloomberg L.P.

perceive the recent rebound in oil to be driven by financial flows and the U.S. dollar's recent decline, rather than a significant change in the market oversupply that drove the 2014-2015 sell-off.

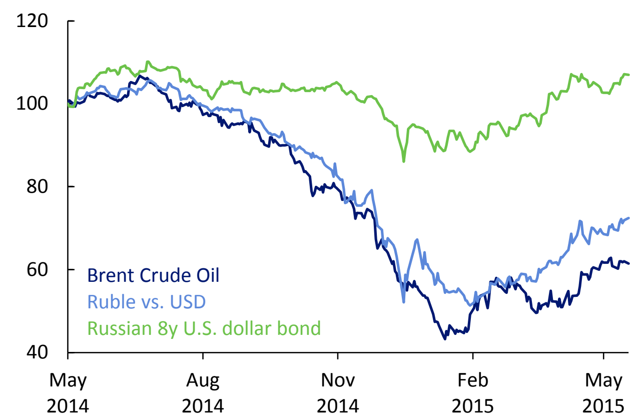
The rebound and stabilization in oil prices have supported U.S. high yield corporate bonds (Figure 8). High-yield bond spreads have recovered 100 bps from multi-year highs reached in late-2014. High-yield energy spreads have seen a larger recovery, down almost 250 bps. Oil and gas firms' debt issuance also picked up in the first quarter, following a fourth quarter slowdown as oil prices plunged. Recent issuance has been driven by higher-rated credits, suggesting that affordable funding is still closed to lower-rated credits. Although credit analysts expect a wave of energy sector restructurings and industry consolidation as certain companies come under stress, overall forecasts for high-yield defaults remain contained.

The oil rebound has also underpinned stabilization in other assets sensitive to oil prices. Russian markets have benefited considerably. Russia entered a financial crisis in 2014, as the combination of plunging oil prices and U.S.-European Union sanctions caused capital flight, triggering a sharp sell-off in the ruble and local asset prices. Since February, when oil prices began to recover and Russia and Ukraine reached a cease-fire, the ruble has regained 27 percent, Russian bonds and equities have stabilized, and FX reserves have increased (Figure 9). While the acute market pressures may have passed, Russia now faces a severe economic recession.

Figure 8. Oil rebound provides some relief to U.S. energy bonds
U.S. high-yield bond index and energy sub-index, yield (percent)

Source: Bloomberg L.P.

Figure 9. Oil also underpins Russian market stabilization
Crude oil, Russian ruble, and Russian government bond price
Index 100 = May 1, 2014



Source: Bloomberg L.P.

Selected Global Asset Price Developments

	LATEST LEVEL (5/18/2015)	1M CHANGE (bps or %)	1M CHANGE (standard deviations)*	YTD CHANGE (bps or %)	12-MONTH RANGE**
EQUITIES					
S&P 500	2129	2.3%	0.4	3%	
U.S. KBW Bank Index	76	4.5%	0.6	2%	
Russel 2000	1258	0.5%	-0.1	4%	
Nasdaq	5078	3.0%	0.3	7%	
Euro Stoxx 50	3589	-2.3%	-0.5	14%	
Shanghai Composite	4283	-0.1%	-0.1	32%	
Nikkei 225	19890	1.2%	0.2	14%	
Hang Seng	27591	-0.2%	-0.1	17%	
FTSE All World	292	2.0%	0.3	6%	
RATES					
U.S. 2-Year Yield	0.58%	7	0.3	-9	
U.S. 2-Year Swap Rate	0.84%	7	0.3	-6	
U.S. 10-Year Yield	2.23%	37	1.4	6	
U.S. 10-Year Swap Rate	2.29%	34	1.2	1	
U.S. 30-Year Yield	3.03%	51	2.2	28	
U.S. 2y10y Spread	165	30	1.7	15	
U.S. 5Y5Y Inflation Breakeven	2.15%	16	0.6	0	
U.S. 5Y5Y Forward Rate	3.01%	52	1.7	25	
Germany 10-Year Yield	0.65%	57	2.9	11	
Japan 10-Year Yield	0.39%	8	0.6	6	
U.K. 10-Year Yield	1.95%	37	1.6	20	
Germany 5Y5Y Inflation Breakeven	2.05%	18	0.8	19	
FUNDING					
1M T-Bill Yield	0.00%	-2	0.0	-1	
DTCC GCF Treasury Repo	0.11%	-11	-1.0	-14	
3M Libor	0.28%	0	0.1	2	
Libor-OIS Spread	14	0	0.0	1	
3M Eurodollar Sep 2016 Mid Yield	0.40%	-4	0.0	-26	
EURUSD 3M CCY Basis Swap	-19	5	0.2	-4	
U.S. MBS					
FNMA Current Coupon	2.89%	30	1.1	6	
FHLMC Primary Rate	3.85%	18	0.9	2	
CREDIT					
CDX Investment Grade 5-Year CDS Spread	63	1	0.1	-4	
CDX High Yield 5-Year CDS Spread	337	3	0.0	-20	
CDX Itraxx Euro 5-Year CDS Spread	62	1	0.0	-2	
U.S. 5-Year Sovereign CDS Spread	17	-1	-0.1	-1	
IMPLIED VOLATILITY					
VIX Index	13	-8%	-0.5	-34%	
V2X Index	21	-16%	-0.9	-20%	
VDAX Index	21	-5%	-0.4	6%	
MOVE Index	88	19%	1.1	28%	
3M2Y Swaption Volatility	58	5%	0.2	-15%	
3M10Y Swaption Volatility	87	9%	0.7	18%	
DB G10 FX Volatility Index	10	-10%	-1.0	1%	
JPM EMFX Volatility Index	9	-5%	-0.4	-13%	
FOREIGN EXCHANGE & COMMODITIES					
U.S. Dollar Index***	94	-3%	-1.5	4%	
EUR/USD	1.13	5%	1.6	-6%	
USD/JPY	120	1%	0.3	0%	
GBP/USD	1.57	5%	1.9	0%	
USD/CHF	0.93	-3%	-0.8	-7%	
Brent Crude	66	3%	0.6	7%	
Gold	1226	2%	0.3	3%	
S&P GSCI Commodities Index	449	4%	0.5	7%	
EMERGING MARKETS					
JPM EMFX Index	77	1.5%	0.7	-2%	
MSCI Emerging Market Equity Index	1041	-0.2%	-0.1	9%	
CDX EM 5-Year CDS Spread	289	-9	-0.2	-46	

* One month change standard deviations based on monthly data from January 1994 or earliest available thereafter.

** Trailing 12-month range. Latest (O); Mean (|).

*** Dollar index from Bloomberg (ticker: DXY); averages the exchange rates between the U.S. dollar and major world currencies.

Sources: Bloomberg L.P., OFR analysis