OFFICE OF FINANCIAL RESEARCH

MARKETS MONITOR

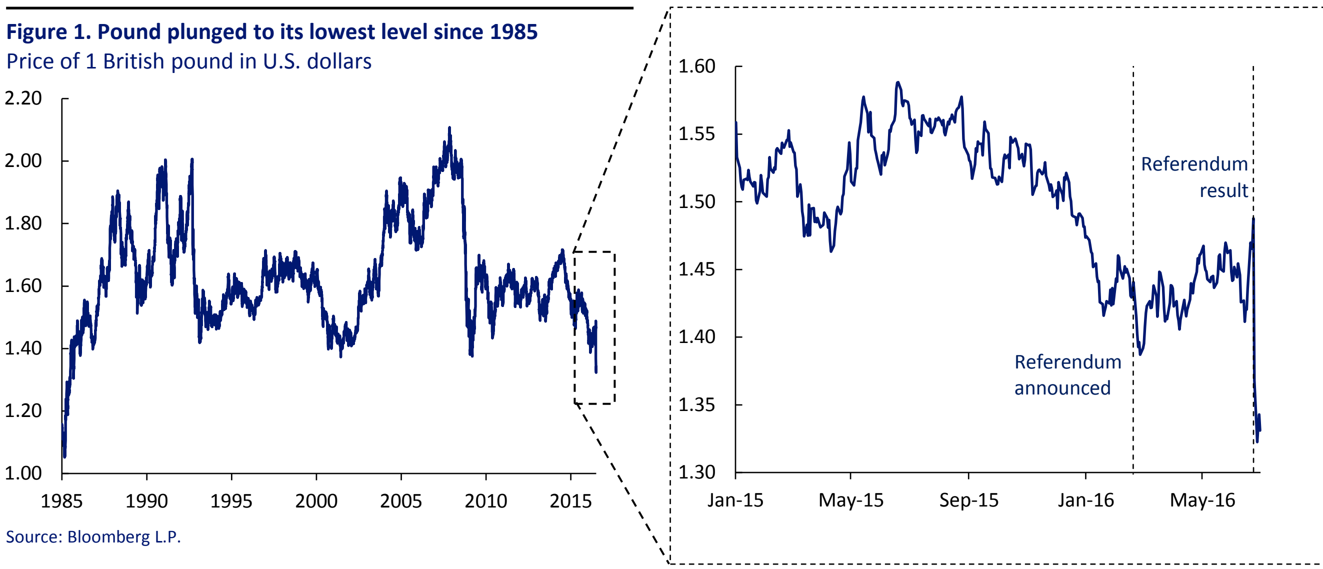
Second Quarter 2016
(data as of June 30)

A review of financial market themes and developments

United Kingdom Referendum Roils Markets

The vote in the United Kingdom (U.K.) to leave the European Union (EU) was the defining focus of financial markets in the second quarter. The unexpected outcome was a shock to market confidence. It introduced considerable uncertainty about the rules governing the United Kingdom's financial and economic transactions with the outside world. Although the immediate market volatility has subsided, the policy uncertainty and the ultimate financial and political spillovers may last for months or years, leaving markets vulnerable to further confidence shocks.

Figure 1. Pound plunged to its lowest level since 1985
Price of 1 British pound in U.S. dollars



Source: Bloomberg L.P.

Key developments in the second quarter of 2016

- The U.K. voted to leave the EU in a June 23 referendum. Although the referendum is non-binding, the U.K. government is expected to respect the result and formally move to exit the EU, commonly referred to as Brexit.
- Uncertainty remains about if, how, and when Brexit will be implemented. Its full effects on U.K. and European economies and financial systems will depend on those policy decisions, unfolding over the coming months and years.
- Global risk assets sold off sharply in response to the vote. The U.K. currency and European financial stocks were hit hardest and they remain much weaker than before the vote (see Figure 1). The flow of investments to safe havens pushed long-term interest rates to historic lows in the United States, U.K., and Germany in late June and early July. On net, U.S. risk assets have since rebounded sharply, and equities in Europe recovered more than half their declines.
- Expectations of policies aimed at countering any post-referendum fallout and at shoring up the Japanese economy provided strong support for risk assets in the past two weeks. The yen in particular has retraced all of its post-referendum safe-haven rally.

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The U.K. referendum result was a shock to market confidence.

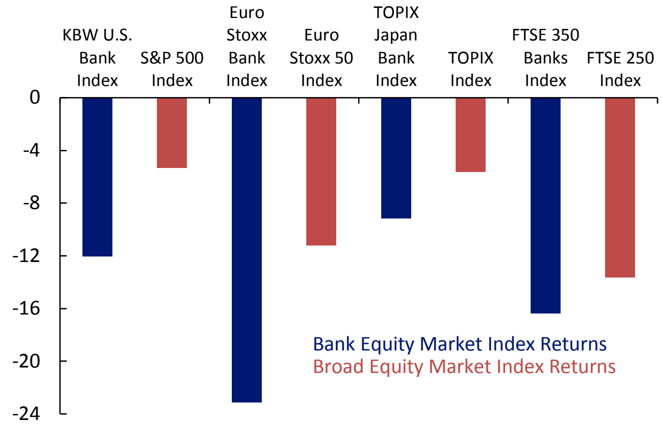
To markets' surprise, the "leave" option won nearly 52 percent of the vote. Global equity prices fell sharply on the news. Safe-haven flows pushed U.S., U.K., and German long-term yields to historic lows. The British pound fell to its lowest level in more than 30 years. Despite heavy trading and large price moves, global markets functioned largely without disruptions.

Banks and other financial institutions were very hard hit in the market sell-offs (see Figure 2). The United Kingdom's FTSE 350 Banks Index declined 16 percent over two trading days. Some U.K. banks, such as Barclays, Lloyds, and the Royal Bank of Scotland, declined by as much as 30 percent. Stocks of other European financial firms also fell sharply, and their credit default swap (CDS) spreads rose (see Figure 3). U.S. bank stocks also fell sharply, though less than their European counterparts did. The S&P 500 financials index decreased 8 percent and the KBW bank index dropped 12 percent.

Secured funding rates in the United States increased before and after the referendum. The overnight Treasury General Collateral Funding (GCF) repo rate, an indicator of dealer funding, spiked to more than 85 basis points on the day after the referendum. That compared with 44 basis points at the end of May. The rate finished the quarter at just under 88 basis points (see Figure 4). GCF repo rates typically rise at the end of each quarter when large banks, which lend cash in the GCF repo market, reduce their lending activities around quarter-end reporting dates. However, the spike in June was larger than usual.

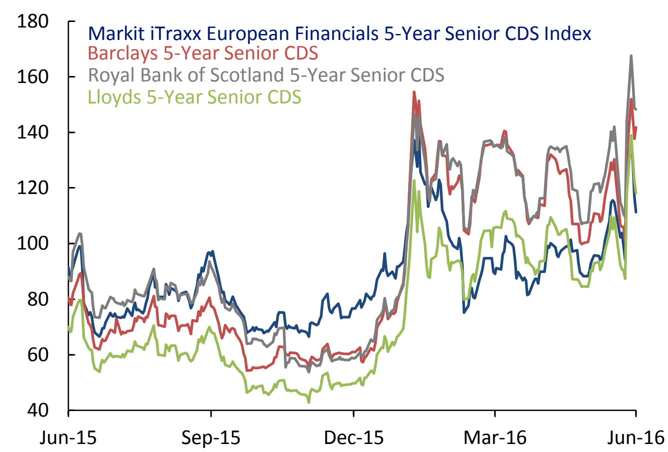
In the week after the referendum, global equities, bonds, and emerging market currencies mostly retraced losses sustained in the two trading days after the vote. Many investors were reportedly reassured by the absence of dislocations in major markets or financial institutions after the vote, and by the willingness of the Bank of England and European Central Bank to provide liquidity support as needed. Still, some of the larger price moves persisted. The U.K. currency remained 10 percent weaker than before the vote. European financial stock prices remained much lower. German, U.S., and U.K. sovereign yields remained 20-to-50 basis points below pre-referendum levels.

Figure 2. Global stocks sold off in the two days after Brexit vote
Global bank and equity index returns (percent)



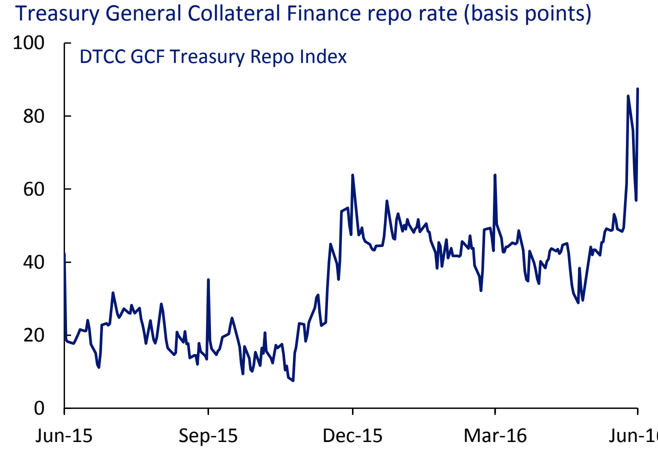
Note: Local currency returns, index 100 = June 23, 2016
Source: Bloomberg L.P.

Figure 3. Bank CDS spreads widened sharply on credit worries
Credit default swap spreads (basis points)



Source: Bloomberg L.P.

Figure 4. Funding rates spiked
Treasury General Collateral Finance repo rate (basis points)



Source: Bloomberg L.P.

The uncertainty may persist for months or years.

The unprecedented vote to exit the EU signals an extended period of uncertainty. Negotiations will not begin immediately. Once they do, the U.K. and EU have two years to negotiate an exit under the Lisbon Treaty, which sets the procedures. The time period can be extended only by a unanimous vote of EU members. The policy deliberations and negotiations may have far-reaching legal and economic implications for the large U.K. cross-border financial industry and for foreign investment in the U.K.

The vote has already led to political turmoil in the U.K. and affected the political landscape in other EU member countries. Uncertainty is expected to lead to slower growth as consumers and businesses in the U.K. and EU postpone spending and investment. After the vote, many economists lowered growth forecasts for the U.K. and broader EU. Some predicted a U.K. recession by early 2017. Economists surveyed by Bloomberg after the referendum estimated the probability of a U.K. recession over the next 12 months at about 71 percent, up from less than 20 percent before the vote.

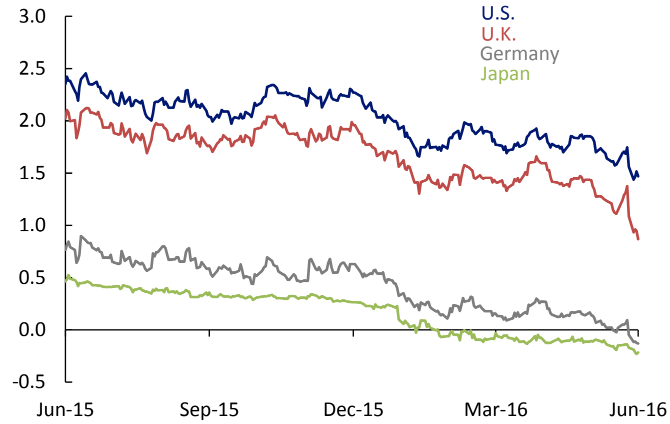
In a severe scenario, shocks from the U.K. and Europe could affect U.S. growth and financial stability through trade linkages, large direct financial exposures, or confidence and indirect effects.

Brexit pushed interest rates to new historic lows.

The safe-haven flows after the referendum sent U.S., U.K., and German long-term interest rates to historic lows. Yields on these government bonds had been in decline well before Brexit (see Figure 5), and yields in much of Europe and Japan had been close to zero or negative. At the end of June, more than $9 trillion of sovereign debt globally was trading with negative yields, including about 40 percent of European government bonds and about 80 percent of Japanese government bonds. Negative interest rates in Europe and Japan are an intended outcome of quantitative easing programs and negative monetary policy rates (Figure 6). Spillovers from falling and negative interest rates in Europe have been key drivers of declining long-term U.S. interest rates, as discussed in the [OFR's 2015 Financial Stability Report]. For more detail on market concerns about negative interest rates, see the [Markets Monitor for the first quarter of 2016].

Figure 5. Long-term interest rates are at or near historic lows

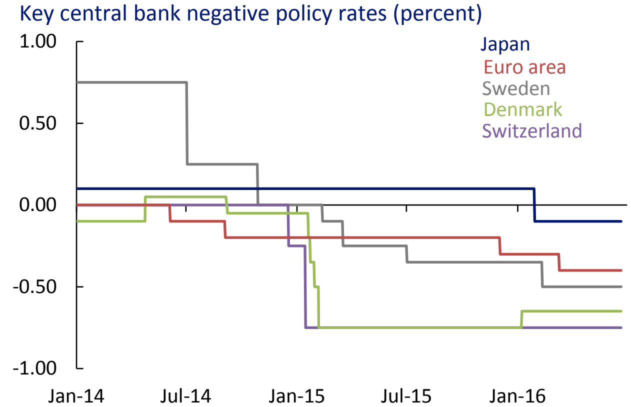
10-year sovereign bond yields (percent)



Source: Bloomberg L.P.

Figure 6. Negative central bank rates continued

Key central bank negative policy rates (percent)



Note: Rates in Japan represent the macro add-on balance on new excess reserves; in the euro area, the overnight deposit facility rate; in Sweden, the central bank repo rate; in Denmark, the one-week CD; in Switzerland, the overnight sight deposit rate.

Source: Bloomberg L.P.

Risk assets came under pressure before staging a late-quarter recovery.

Global equity indexes decreased sharply after the U.K. referendum. During the two trading days after the referendum, global equities lost an estimated $3 trillion in market value. Part of this decline reversed a sharp run-up in stock prices that occurred across global markets during the week leading up to the U.K. referendum vote. This rally had been fueled by anticipation of a "remain" outcome.

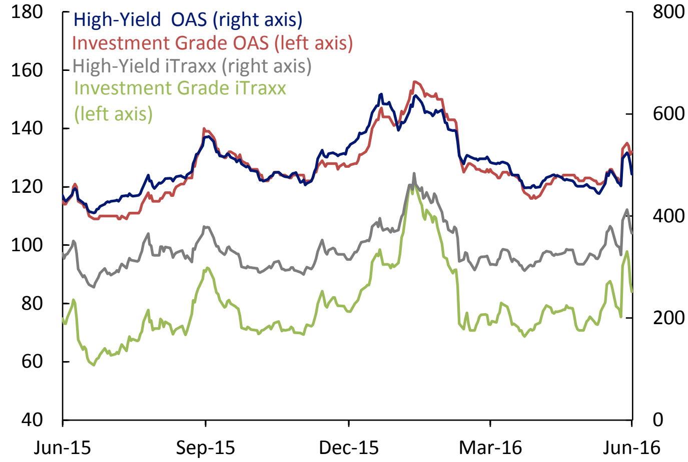
After the dust settled, global equities staged a significant rally, partially or fully retracing post-referendum losses by the end of the quarter. This recovery may have been driven in part by investor perceptions that Brexit risks may not lead to global contagion and by expectations for additional central bank accommodation.

Corporate bond spreads widened moderately in the United States and Europe. Both CDS spreads and cash bond spreads (the difference between corporate bond yields and government-backed securities with similar maturity) initially widened after the referendum. As risk assets rallied during the final days of the quarter, spreads reversed course and narrowed to end the quarter slightly wider than before the referendum (see Figures 7 and 8). As in equity markets, trading remained orderly in credit markets during the days immediately after the referendum.

Corporate bond issuance paused during the four days leading up to the U.K. referendum and immediately afterward, while the U.S. market re-opened on June 28, with Molson Coors selling $5.3 billion in bonds.

Figure 7. European corporate bond spreads initially widened

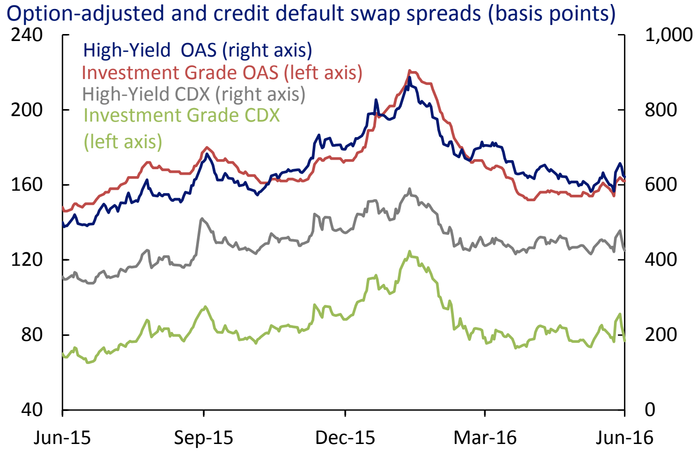
Option-adjusted and credit default swap spreads (basis points)



Source: Bloomberg L.P.

Figure 8. U.S. corporate bond spreads widened less than in Europe

Option-adjusted and credit default swap spreads (basis points)



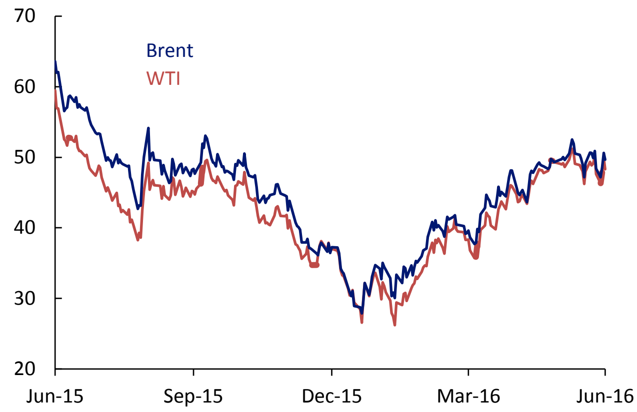
Source: Bloomberg L.P.

Brexit halted the rebound in oil prices.

As with other risk assets, oil sold off in the immediate aftermath of the U.K. referendum results. West Texas Intermediate (WTI) and Brent futures prices each decreased by more than 7 percent over two days before partially recovering late in the quarter. Although oil prices are significantly above their February lows (see Figure 9), they remain more than 50 percent lower than their 2014 peak levels, which were more than $108 per barrel.

Figure 9. Brexit halted oil's rebound

Oil futures price per barrel



Source: Bloomberg L.P.

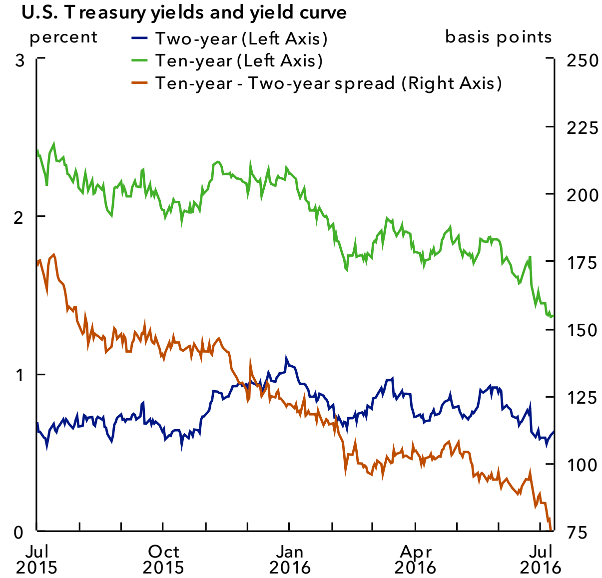
Selected Global Asset Price Developments

	LATEST LEVEL (6/30/2016)	CHANGE SINCE 6/23/2016	90-DAY CHANGE (bps or %)	90-DAY CHANGE (standard deviations)*	YTD CHANGE (bps or %)	12-MONTH RANGE**
EQUITIES						
S&P 500	2099	-0.7%	1.9%	0.0	3%	
U.S. KBW Bank Index	65	-5.3%	1.0%	-0.1	-11%	
Russell 2000	1152	-1.7%	3.4%	0.1	1%	
Nasdaq	4843	-1.4%	-0.6%	-0.3	-3%	
Euro Stoxx 50	2865	-5.7%	-4.7%	-0.6	-12%	
Shanghai Composite	2930	1.3%	-2.5%	-0.3	-17%	
Nikkei 225	15576	-4.1%	-7.1%	-0.7	-18%	
Hang Seng	20794	-0.4%	0.1%	-0.1	-5%	
FTSE All World	264	-2.1%	0.3%	-0.1	0%	
RATES						
U.S. 2-Year Yield	0.58%	-20	-14	-0.2	-47	
U.S. 2-Year Swap Rate	0.73%	-18	-11	-0.1	-44	
U.S. 10-Year Yield	1.47%	-28	-30	-0.5	-80	
U.S. 10-Year Swap Rate	1.36%	-26	-27	-0.4	-82	
U.S. 30-Year Yield	2.28%	-27	-33	-0.6	-73	
U.S. 2y10y Spread (bps)	88	-8	-16	-0.5	-33	
U.S. 5Y5Y Inflation Breakeven	1.51%	-13	-19	-0.5	-30	
U.S. 5Y5Y Forward Rate	2.00%	-29	-40	-0.6	-84	
Germany 10-Year Yield	-0.13%	-22	-28	-0.6	-76	
Japan 10-Year Yield	-0.22%	-8	-19	-0.5	-48	
U.K. 10-Year Yield	0.87%	-51	-55	-1.1	-109	
Euro area 5Y5Y Inflation Breakeven	1.32%	-10	-9	-0.4	-36	
FUNDING						
1M T-Bill Yield	0.17%	-10	0	0.1	5	
DTCC GCF Treasury Repo	0.88%	26	24	1.5	24	
3M Libor	0.65%	1	2	0.1	3	
Libor-OIS Spread (bps)	28	0	3	0.1	5	
EURUSD 3M CCY Basis Swap	-40	-4	-15	-0.3	-21	
U.S. MBS						
FNMA Current Coupon	2.31%	-21	-25	-0.4	-69	
FHLMC Primary Rate	3.48%	-8	-23	-0.4	-53	
CREDIT						
CDX Investment Grade 5-Year CDS Spread	81	3	3	0.1	-7	
CDX High Yield 5-Year CDS Spread	434	0	-8	0.0	-40	
CDX Itraxx Euro 5-Year CDS Spread	85	10	12	0.4	8	
U.S. 5-Year Sovereign CDS Spread	20	0	0	0.0	2	
IMPLIED VOLATILITY						
VIX Index	16	-9%	12%	0.3	-14%	
V2X Index	26	-19%	11%	0.2	18%	
VDAX Index	25	-2%	19%	0.5	17%	
MOVE Index	73	-2%	6%	0.2	7%	
3M2Y Swaption Volatility	52	-13%	-9%	-0.4	-8%	
3M10Y Swaption Volatility	76	0%	1%	0.0	3%	
DB G10 FX Volatility Index	11	3%	-3%	-0.2	16%	
JPM EMFX Volatility Index	10	5%	-10%	-0.5	-9%	
FOREIGN EXCHANGE & COMMODITIES						
U.S. Dollar Index***	96	2.8%	1.6%	0.4	-3%	
EUR/USD	1.11	-2.5%	-2.4%	-0.5	2%	
USD/JPY	103	-2.8%	-8.3%	-1.4	-14%	
GBP/USD	1.33	-10.5%	-7.3%	-1.7	-10%	
USD/CHF	0.98	1.9%	1.5%	0.4	-3%	
Brent Crude	50	-3.7%	19.1%	2.0	17%	
Gold	1322	5.2%	7.2%	0.9	25%	
S&P GSCI Commodities Index	374	-1.8%	15.6%	1.2	20%	
EMERGING MARKETS						
JPM EMFX Index	69	-0.1%	0.0%	0.1	4%	
MSCI Emerging Market Equity Index	834	-0.2%	-0.3%	-0.1	5%	
CDX EM 5-Year CDS Spread	272	-10	-12	-0.2	-85	

* 90-day change standard deviations based on quarterly 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

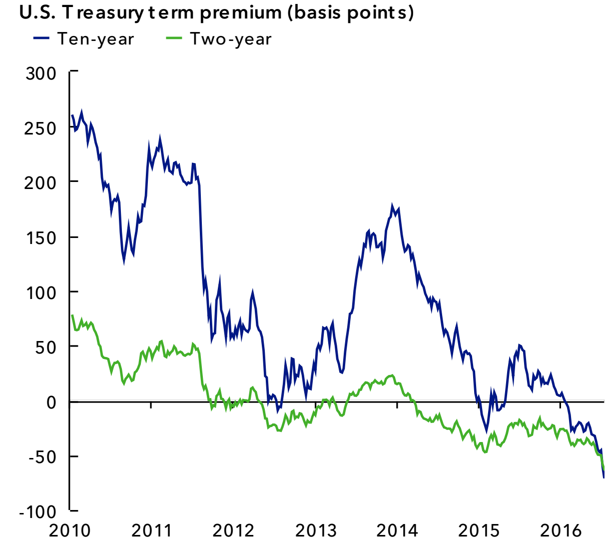
Select U.S. Interest Rates

U.S. Treasury yields and yield curve



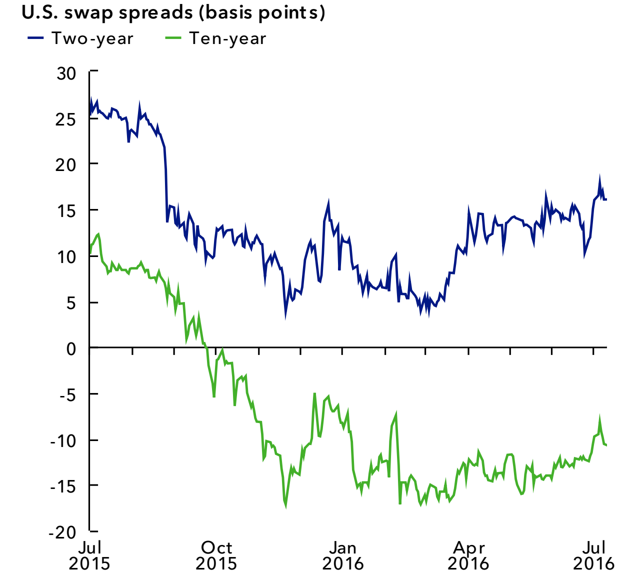
Source: Bloomberg L.P.

U.S. Treasury term premium (basis points)



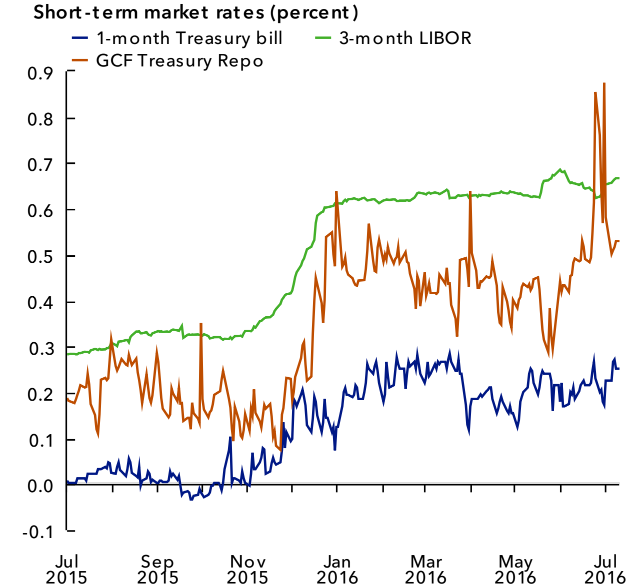
Notes: Adrian, Crump, & Moench model
Source: Bloomberg L.P.

U.S. swap spreads (basis points)



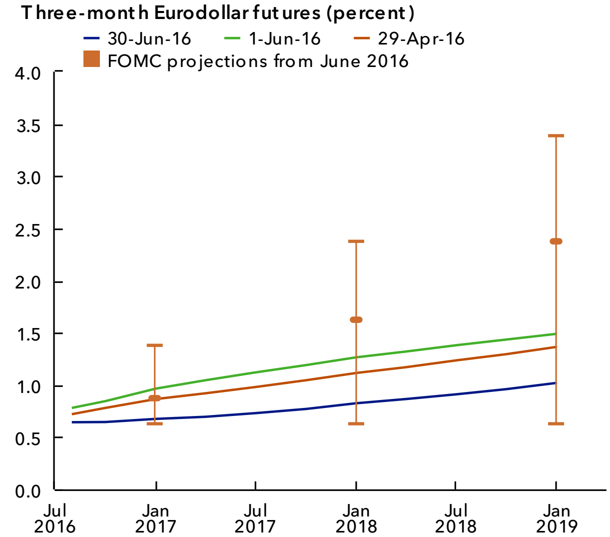
Source: Bloomberg L.P.

Short-term market rates (percent)



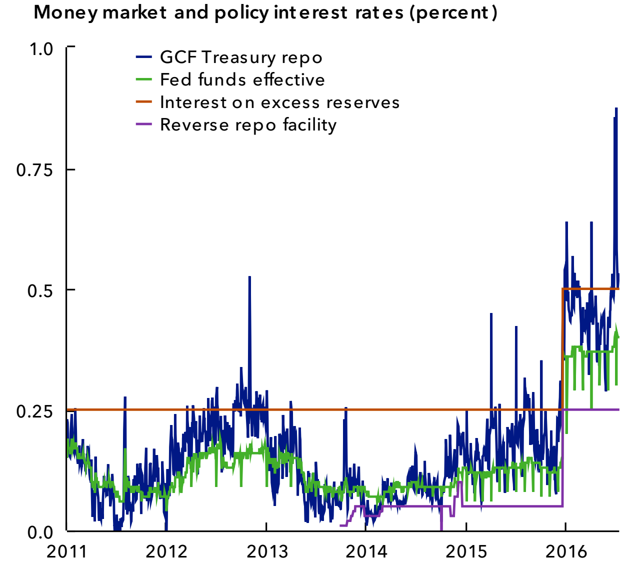
Source: Bloomberg L.P.

Three-month Eurodollar futures (percent)



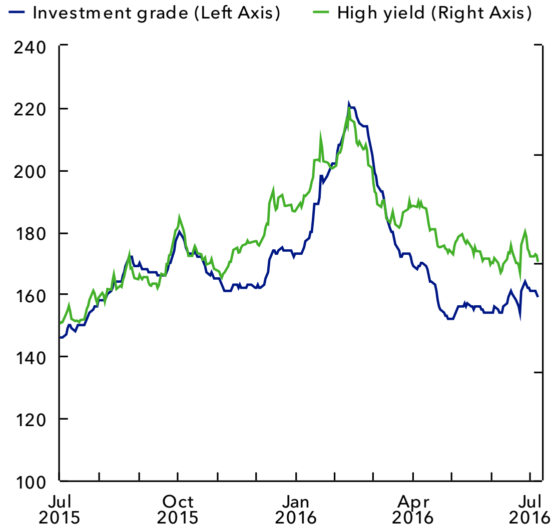
Notes: The high and low points of the June FOMC projections are the maximum and minimum forecasts. The rectangle represents the median.
Source: Bloomberg L.P.

Money market and policy interest rates (percent)



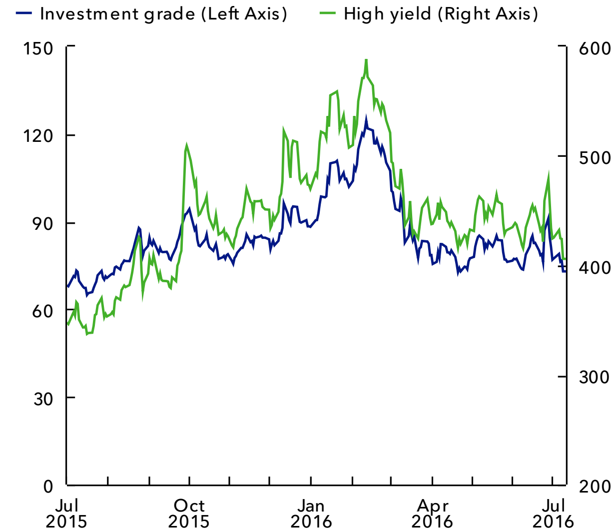
Source: Bloomberg L.P.

U.S. corporate bond option-adjusted spreads (basis points)



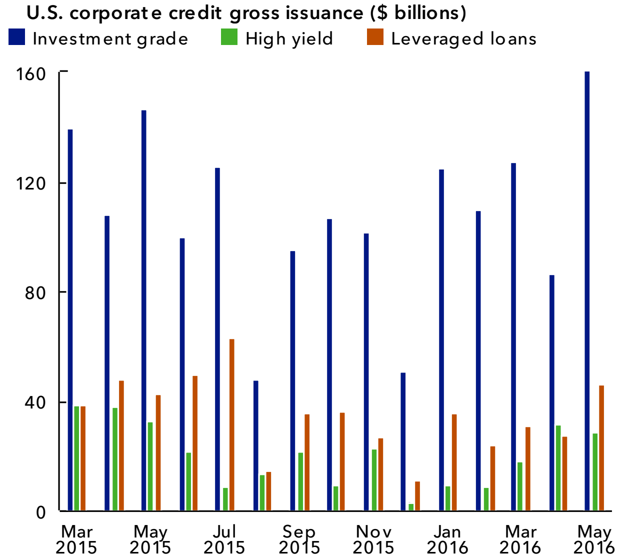
Source: Haver Analytics

U.S. corporate CDS indexes (basis points)



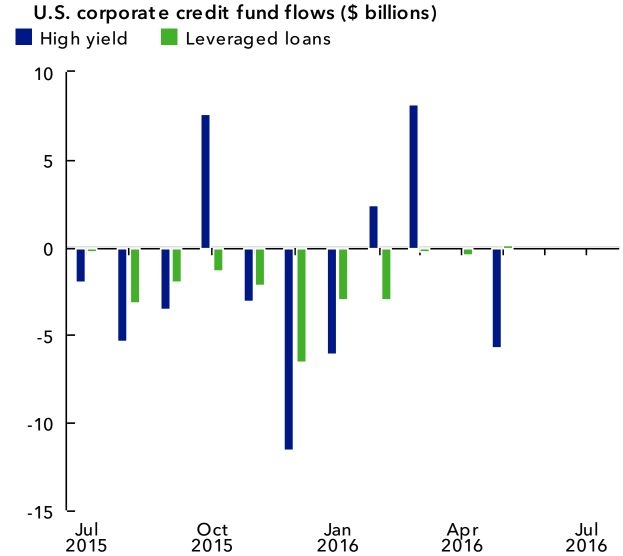
Notes: Five-year maturity CDS Index
Source: Bloomberg L.P.

U.S. corporate credit gross issuance ($ billions)



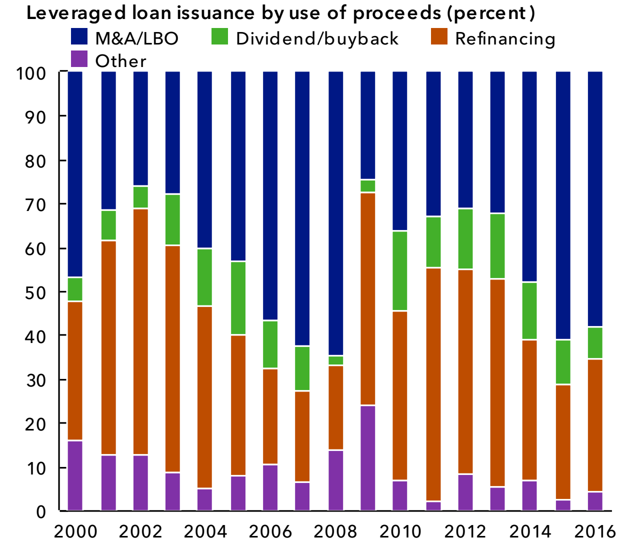
Source: Securities Industry and Financial Markets Association, Standard & Poor's Leveraged Commentary & Data

U.S. corporate credit fund flows ($ billions)



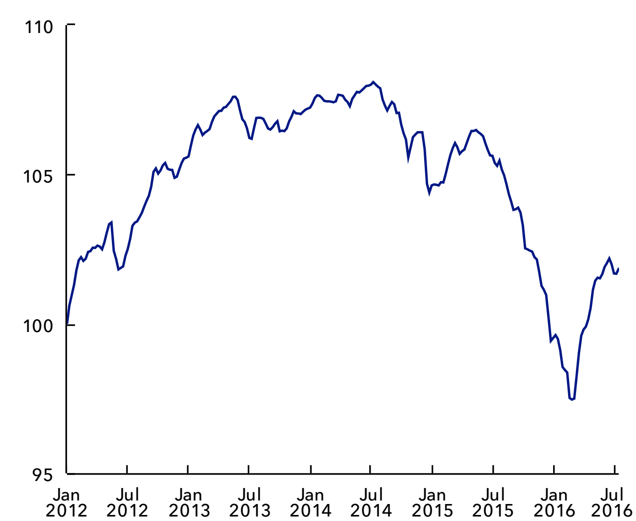
Notes: Flows data are released with one-month lag.
Source: Haver Analytics

Leveraged loan issuance by use of proceeds (percent)



Notes: Data for 2016 are year-to-date as of May.
Source: Standard & Poor's Leveraged Commentary & Data, OFR analysis

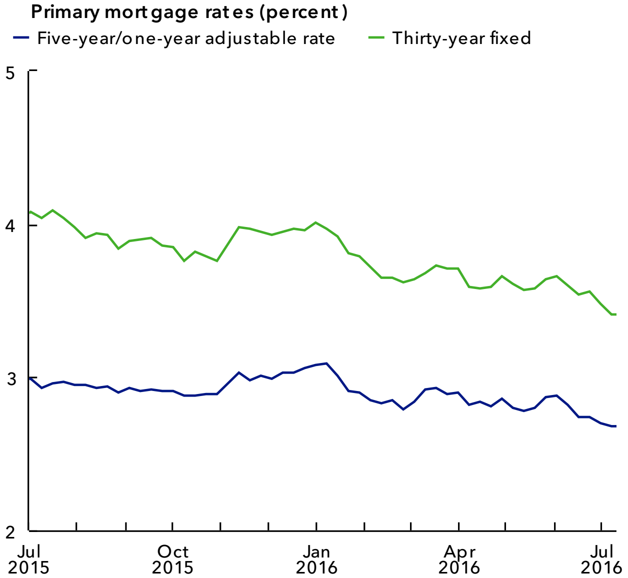
Leveraged loan price activity



Notes: S&P Leveraged Loan Index. Index 100=Jan. 1st 2012
Source: Bloomberg L.P.

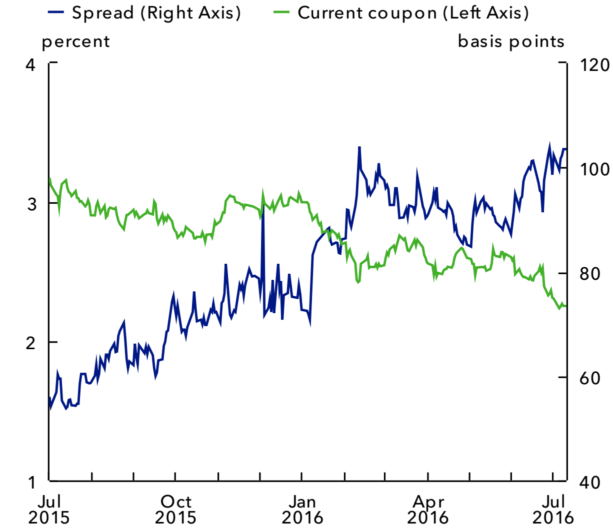
Primary and Secondary Mortgage Markets

Primary mortgage rates (percent)



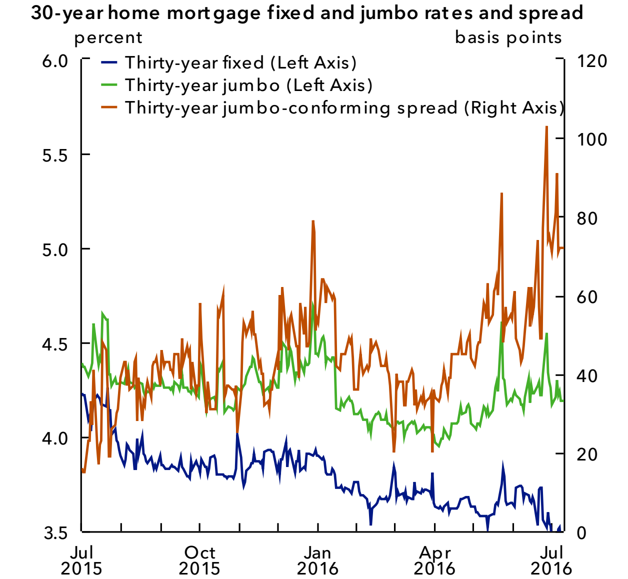
Source: Bloomberg L.P.

MBS yield and option-adjusted spread to U.S. Treasury securities



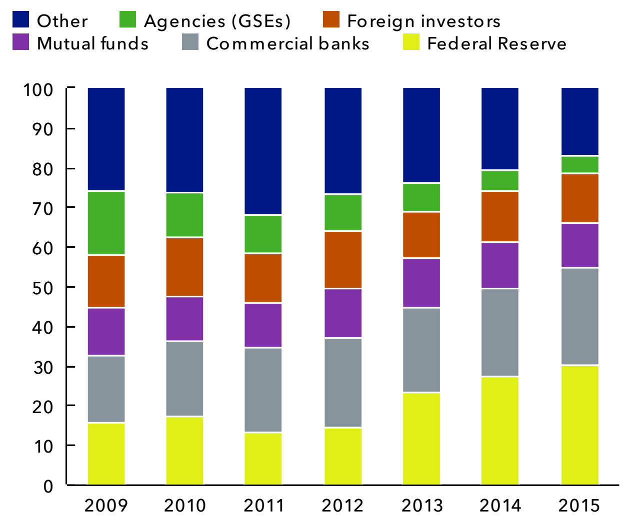
Source: Bloomberg L.P.

30-year home mortgage fixed and jumbo rates and spread



Source: Bloomberg L.P.

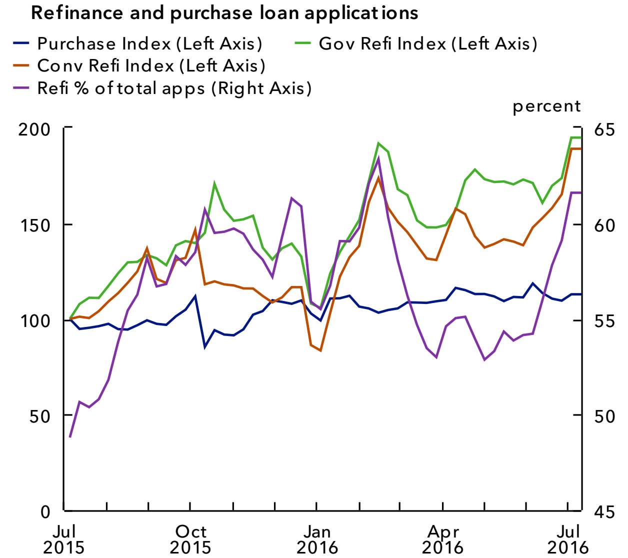
Agency MBS holdings by investor



Notes: Data for 2015 is as of fourth quarter 2015

Source: Inside Mortgage Finance

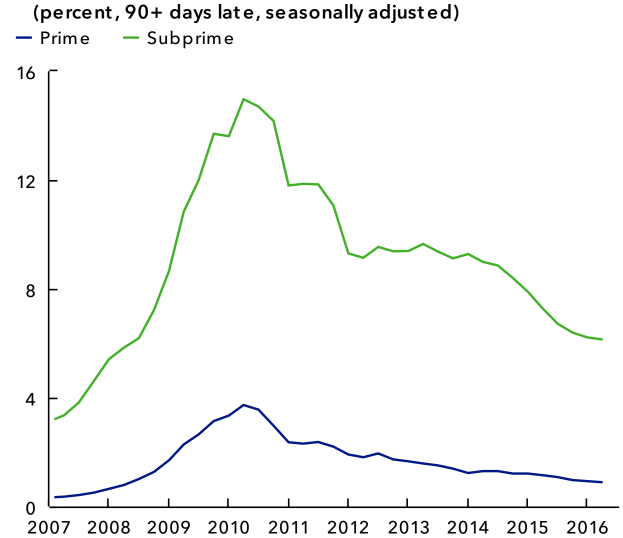
Refinance and purchase loan applications



Notes: Index 100 = July 01, 2015

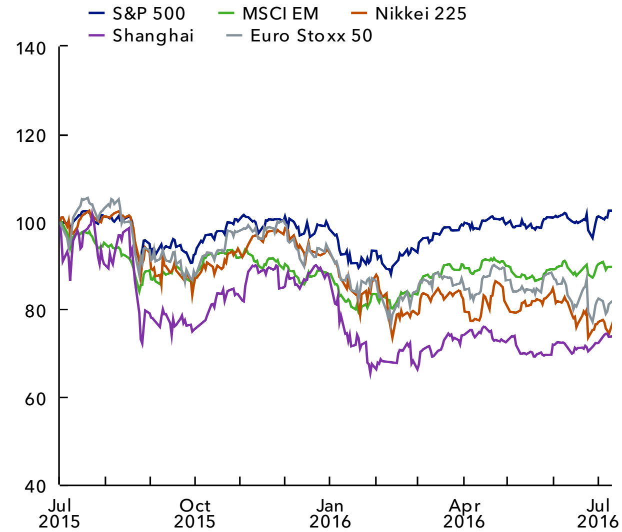
Source: Bloomberg L.P.

Conventional mortgage severe delinquencies (percent, 90+ days late, seasonally adjusted)



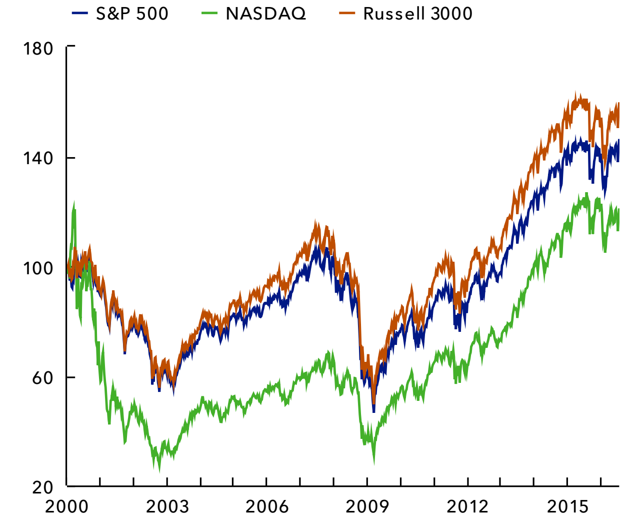
Source: Haver Analytics

Global equity indices



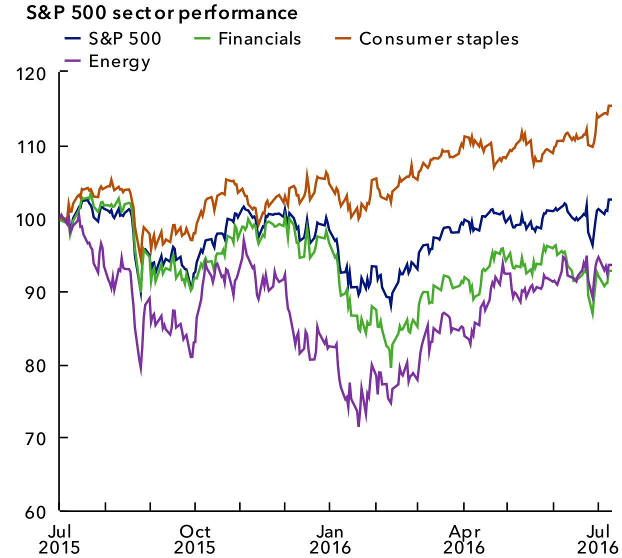
Notes: Index = July 01, 2015.
Source: Bloomberg L.P.

U.S. equity indexes



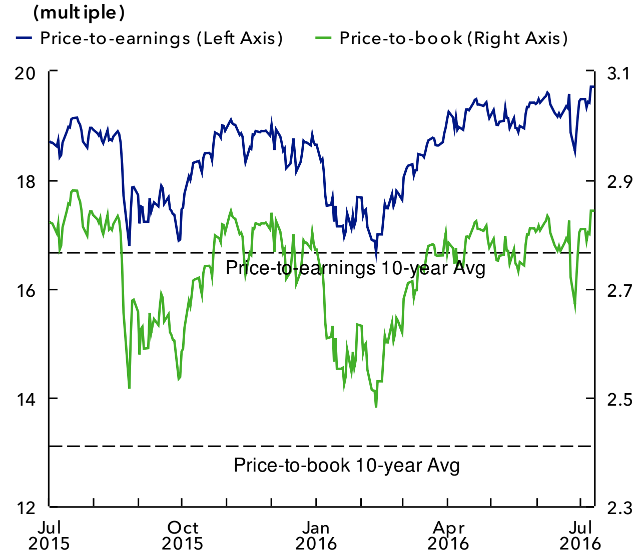
Notes: Index 100 = Jan 01, 2000.
Source: Bloomberg L.P.

S&P 500 sector performance



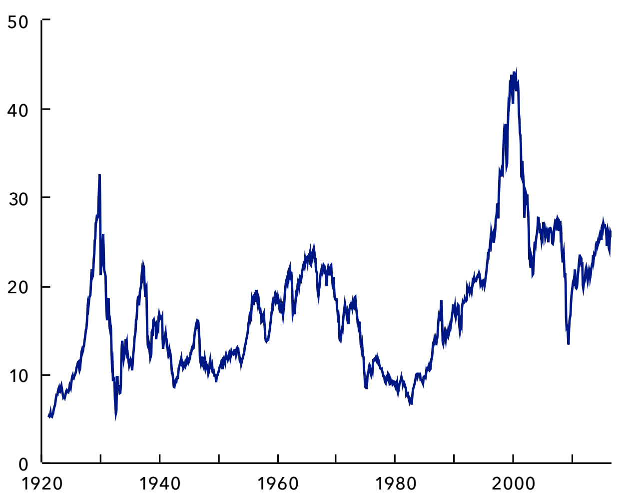
Notes: Index 100 = July 01, 2015.
Source: Bloomberg L. P.

S&P 500 price-to-earnings and price-to-book ratios (multiple)



Source: Bloomberg L.P.

S&P 500 cyclically adjusted price-to-earnings (CAPE) ratio

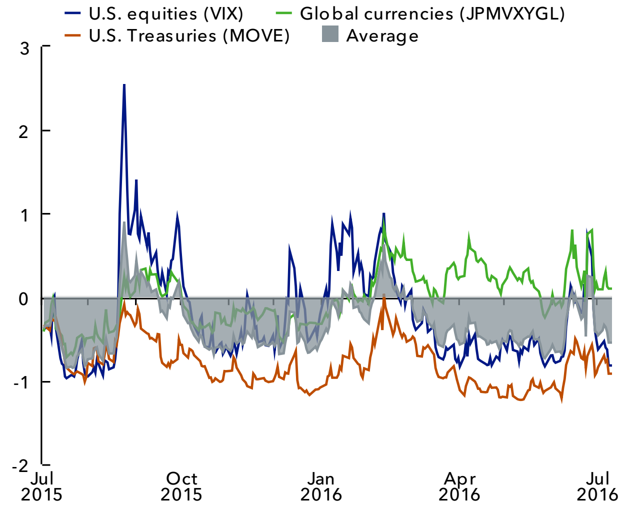


Notes: CAPE is the ratio of the monthly S&P 500 price level to trailing ten-year average earnings (inflation adjusted).
Source: Haver Analytics, OFR analysis

S&P 500 implied volatility and option skew (percent)

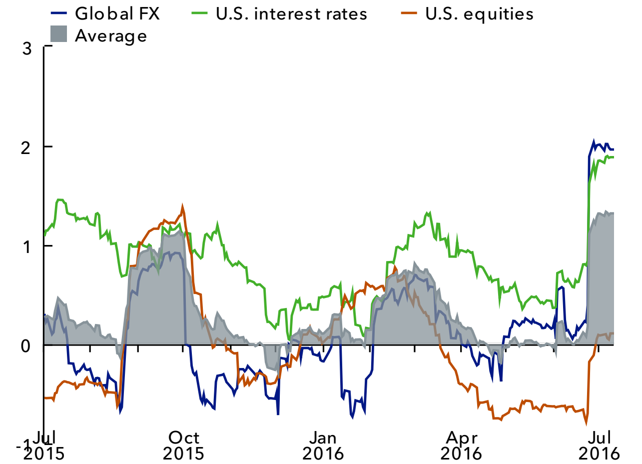
Notes: Option skew is the difference between three-month implied volatility of out of the money puts and calls with strikes equal distance from the spot price (+/- 20 percent). Higher values reflect greater demand for downside risk protection.
Source: Bloomberg L.P.

Implied volatility by asset class (Z-score)



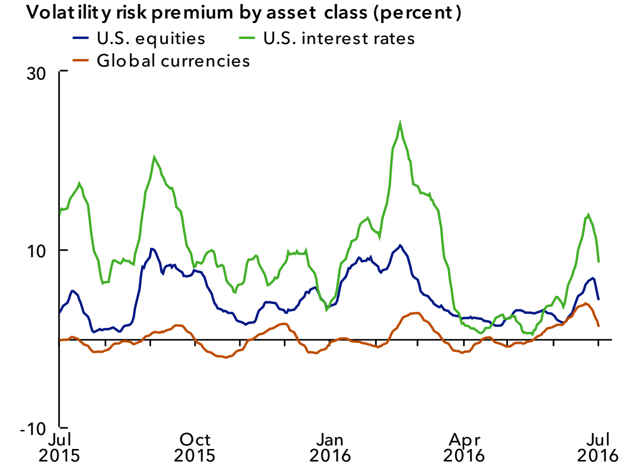
Notes: Z-score represents the distance from the average, expressed in standard deviations. Standardization uses data going back to Jan 1, 1993.
Source: Bloomberg L.P.

Realized volatility by asset class (Z-score)



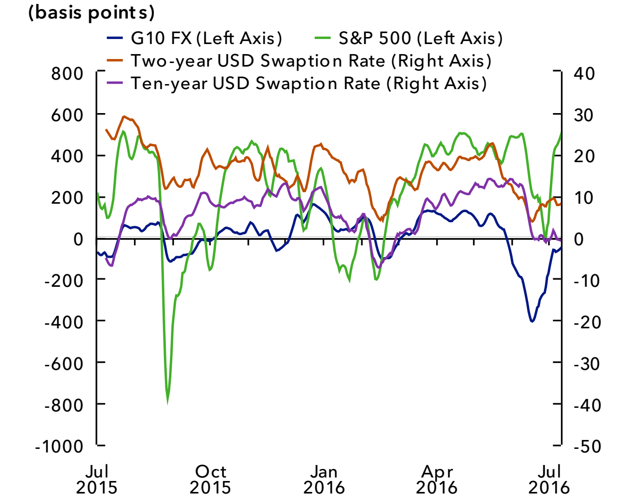
Notes: Thirty-day realized volatility. Equities based on S&P 500 index, interest rates based on weighted average of Treasury yield curve, FX based on weights from JPMVXY index. Standardization uses data going back to Jan 1, 1993.
Source: Bloomberg L.P., OFR analysis

Volatility risk premium by asset class (percent)



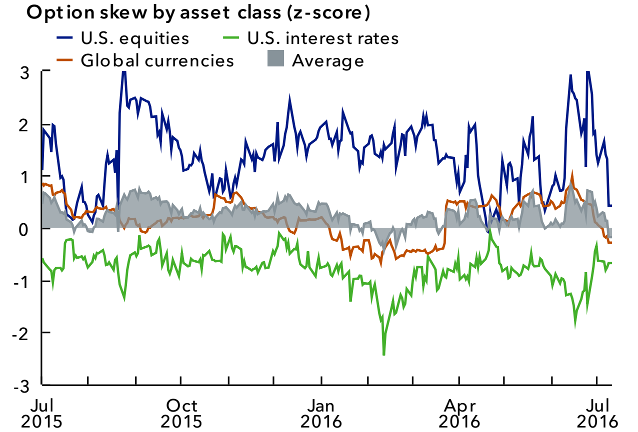
Notes: One-month option-implied volatility minus one-month model-predicted volatility. The latter is computed based on realized volatility, using a hetero-autoregressive model with 1, 5, and 22 day lags. U.S. Interest Rates represents the average volatility risk premium of two- and ten-year swap rates. Equities based on S&P 500 index. Currencies based on weights from JPMVXYGL Index.
Source: Bloomberg L.P., OFR analysis

Slopes of implied volatility curves (basis points)



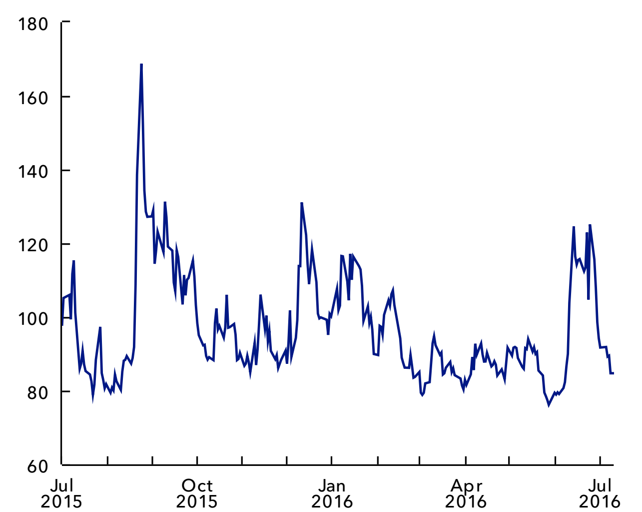
Notes: Seven-day moving average. Slope represents difference between one-year and one-month maturities. G10 FX based on weights from Deutsche Bank's CVIX index.
Source: Bloomberg L.P., OFR analysis

Option skew by asset class (z-score)



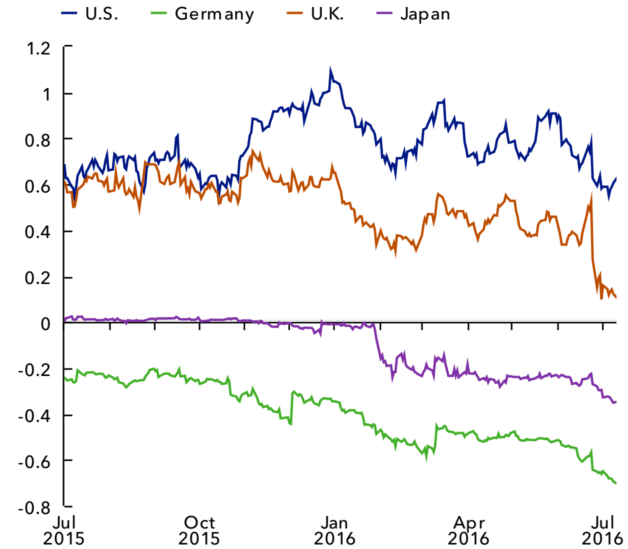
Notes: Option skew is the difference between three-month implied volatility of out of the money puts and calls with strikes equal distance from the spot price (+/- 10 percent). Higher values reflect greater demand for downside risk protection. Equities represents S&P500 index. Interest rates represent weighted average skew of Treasury futures curve. Currencies represent dollar skew against major currencies based on JPMVXY index weights. Z-score standardization uses data going back to Jan 1, 2006.
Source: Bloomberg L.P., OFR analysis

Volatility of equity volatility



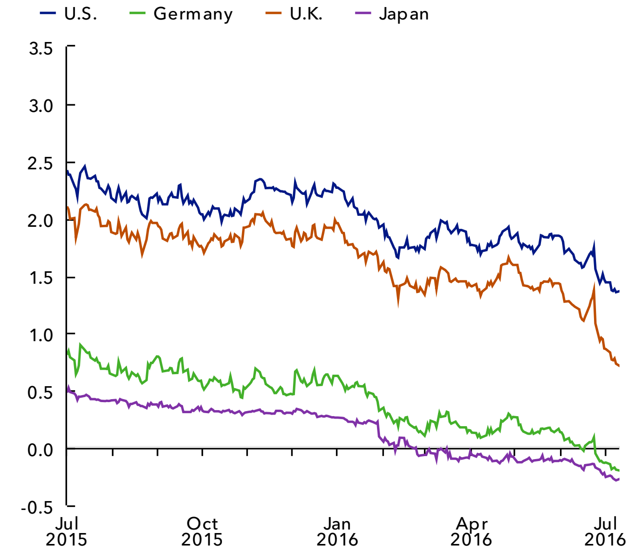
Notes: VVIX Index measures the expected volatility of the 30-day forward price of the CBOE VIX Index.
Source: Bloomberg L.P.

Two-year sovereign bond yields (percent)



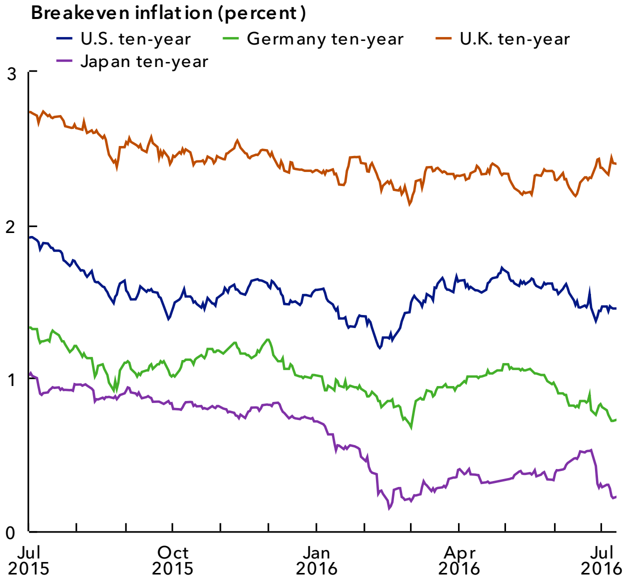
Source: Bloomberg L.P.

Ten-year sovereign bond yields (percent)



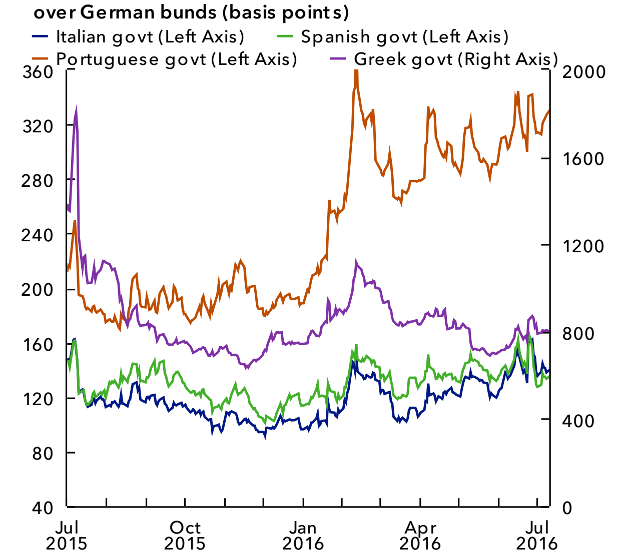
Source: Bloomberg L.P.

Breakeven inflation (percent)



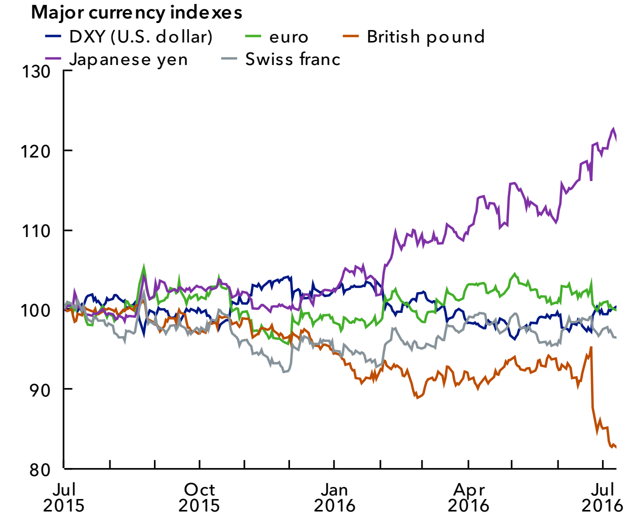
Source: Bloomberg L. P.

10-year euro area periphery government bond spreads over German bunds (basis points)



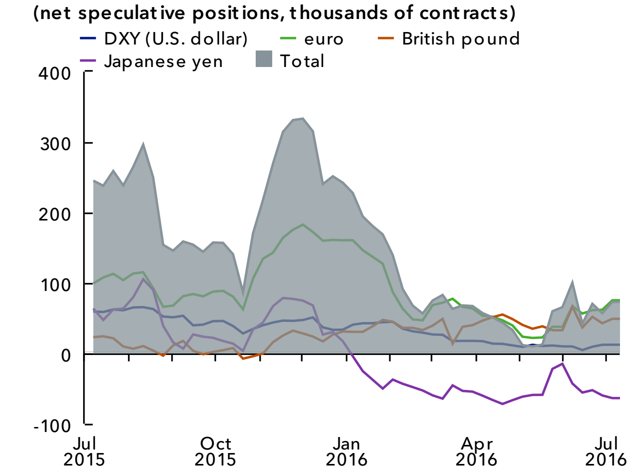
Source: Bloomberg L.P.

Major currency indexes



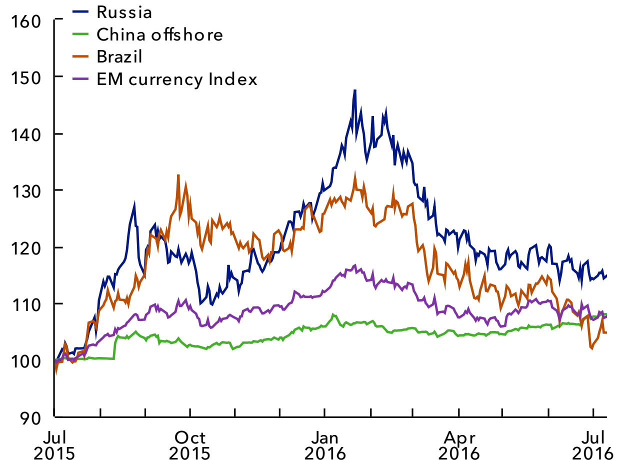
Notes: Foreign currency increases represent greater strength versus the U.S. dollar. DXY increases represent greater strength of the U.S. dollar versus a basket of major world currencies. Index 100 = July 01, 2015.
Source: Bloomberg L.P.

U.S. dollar long positioning vs. major currencies (net speculative positions, thousands of contracts)



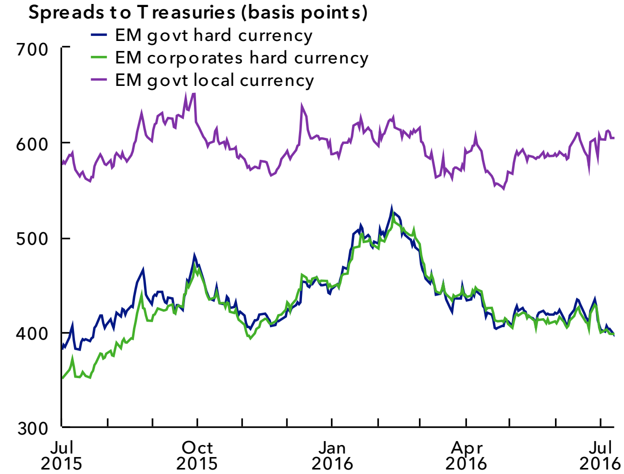
Notes: Positive values represent net U.S. dollar long positions. The Dollar Index (DXY) is a futures contract based on the U.S. dollar's value against a basket of major world currencies. To express a U.S. dollar long position in a non-U.S. dollar contract, the contract must be shorted.
Source: Bloomberg L.P.

Emerging market currencies
(foreign currency units per U.S. dollar)



Notes: Increasing values indicate weakening versus the U.S. dollar. The J.P. Morgan EM currency Index is inverted to show the same interpretation as other currency indexes. Index 100=July 01, 2015.
Source: Bloomberg L.P.

Spreads to Treasuries (basis points)

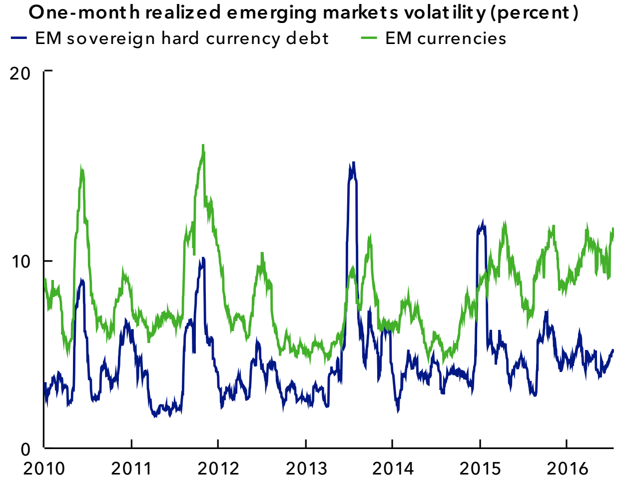


Notes: EM government and corporate hard currency spreads-to-worst are from the dollar-denominated J.P. Morgan Emerging Markets Bond Index Global and the J.P. Morgan Corporate Emerging Markets Bond Index. Government local currency spreads are the nominal yield difference between the J.P. Morgan Government Bond Index - Emerging Markets and the 5-year U.S. Treasury note.
Source: Bloomberg L.P.

Equity price indexes

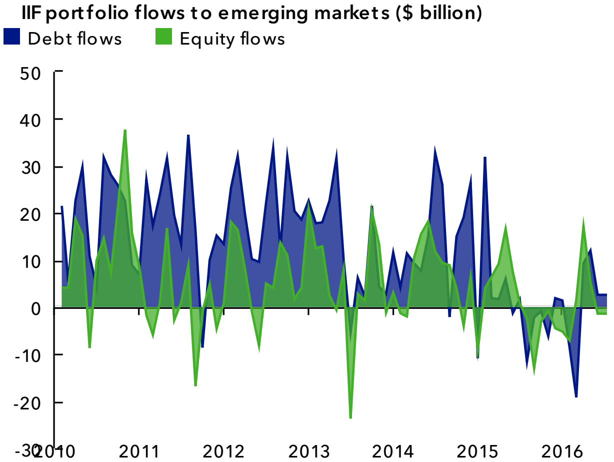
Notes: The US equity index is the S&P 500 Index. The Chinese equity index is the Shanghai Composite Index. The Developed Economies index is the MSCI World Index and the Emerging Markets index is the MSCI EM Index (both are in local terms). Index 100 = July 01, 2015.
Source: Bloomberg L.P.

One-month realized emerging markets volatility (percent)



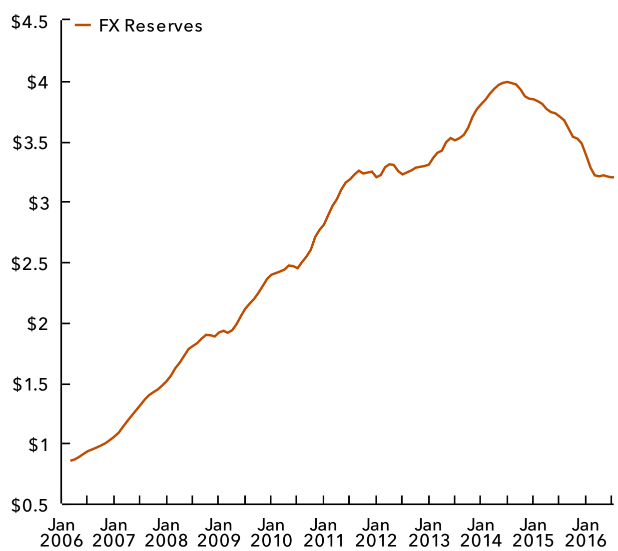
Notes: Realized volatility is the annualized standard deviation. Hard currency sovereign debt based on the J.P. Morgan Emerging Bonds - Global Price Index and currencies based on a weighted average of EM currency returns against the dollar using weights from J.P. Morgan VXY-EM currency volatility index.
Source: Bloomberg L.P., OFR analysis

IIF portfolio flows to emerging markets ($ billion)



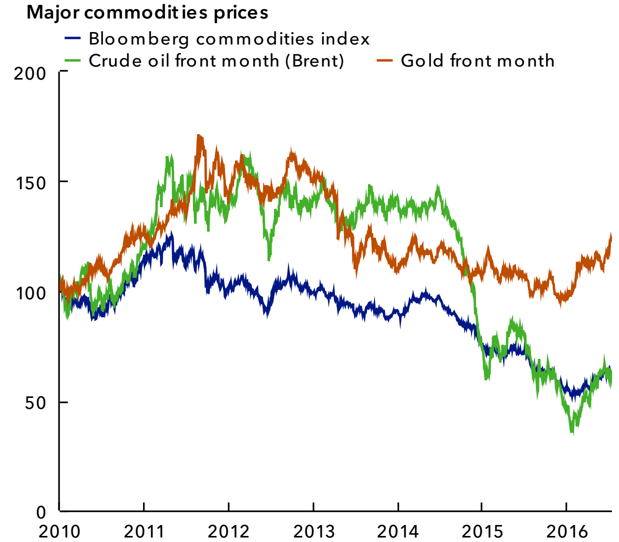
Notes: Data represent the Institute of International Finance's monthly estimates of non-resident flows into thirty EM countries. Data for latest observations are derived from IIF's empirical estimates using data from a smaller subset of countries, net issuance and other financial market indicators.
Source: Bloomberg

China's Foreign Exchange Reserves ($ trillion)



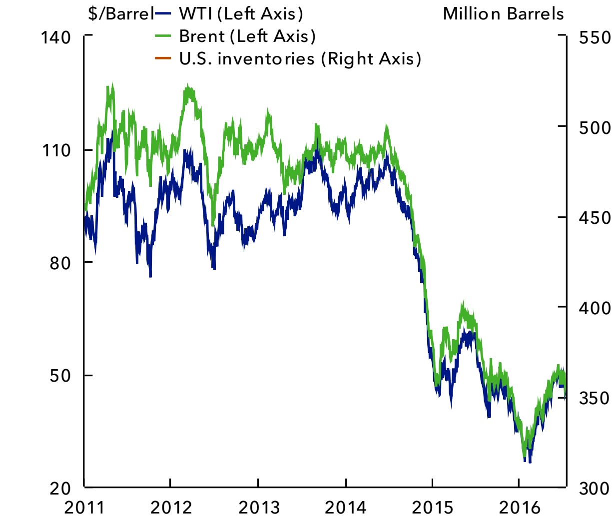
Source: Bloomberg

Major commodities prices



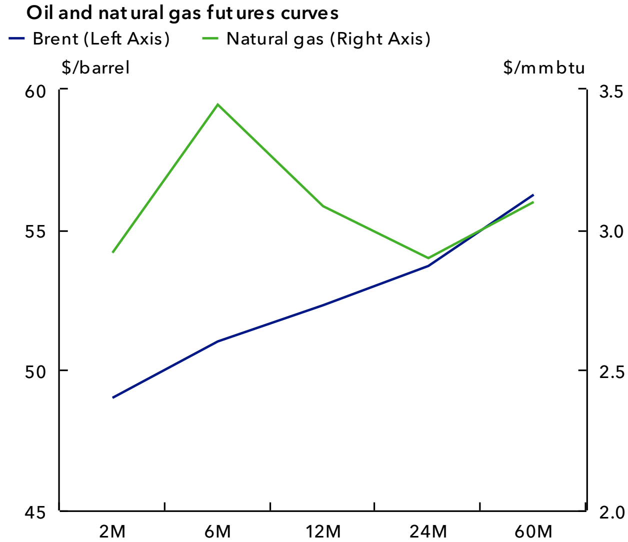
Notes: Index 100 = Jan 01, 2010
Source: Bloomberg L.P.

Crude oil



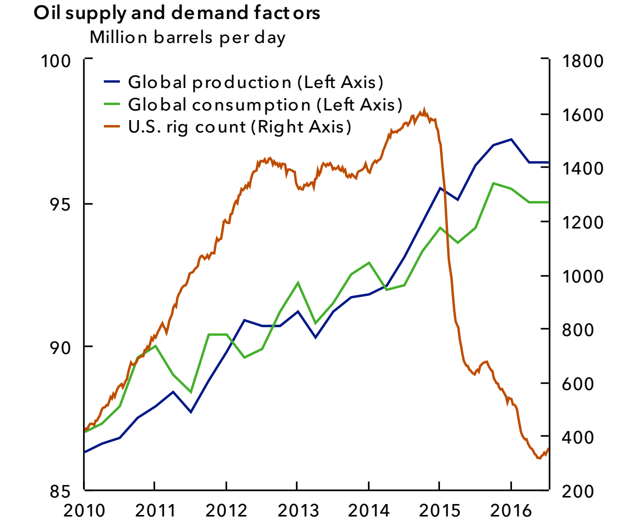
Notes: WTI and Brent are front-month contracts.
Source: Bloomberg L.P.

Oil and natural gas futures curves



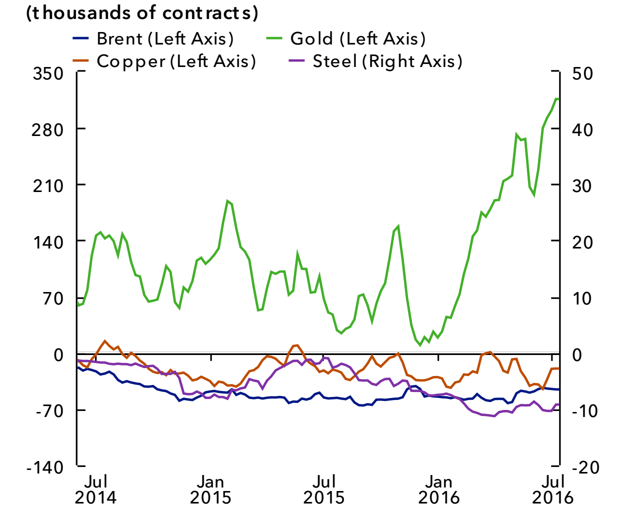
Notes: Data as of June 30, 2016.
Source: Bloomberg L.P., OFR analysis

Oil supply and demand factors



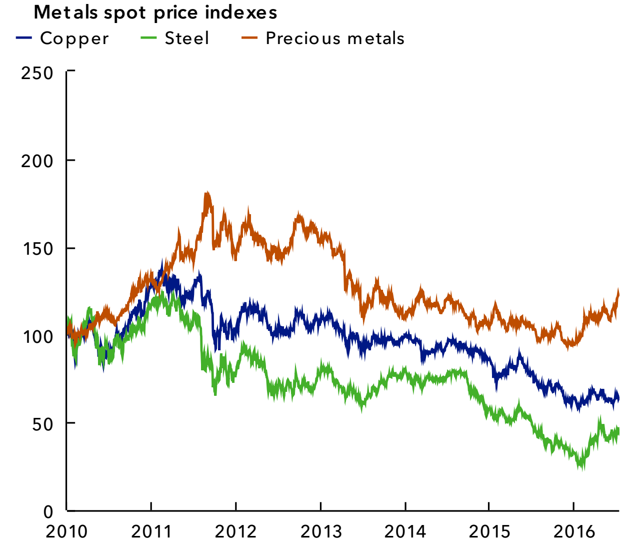
Notes: Global production and consumption are estimates by the International Energy Agency.
Source: Bloomberg L.P.

Speculative futures positioning (thousands of contracts)



Notes: Positive values represent net long positions. Negative values represent net short positions.
Source: Bloomberg L.P.

Metals spot price indexes



Notes: Index 100 = Jan 01, 2010.
Source: Bloomberg L.P.