
THE CARLYLE GROUP

GLOBAL ALTERNATIVE ASSET MANAGEMENT

Asset Pricing Review

Q2-2015



Illuminate

ANALYSIS THAT REVEALS

U.S. Rates: The Boy Who Cried Wolf

By Jason M. Thomas

For the last five years, investors and corporate managers have worked to prepare their portfolios and businesses for a rising interest rate environment that never seems to arrive. The time devoted to planning for rising rates appears to have been poorly spent and interest rate hedges have generally proven costly and unnecessary. Once a hot topic on public companies' quarterly earnings calls, interest rates have received progressively less attention as analysts and managers become more comfortable with the idea that low rates are here to stay.

This complacency could prove dangerous. When a consensus emerges, markets can become one-sided, leaving risk underpriced. The underpricing of risk tends to bias economic decisions, including portfolio allocations, which can exacerbate the initial mispricing. Balance sheets become less prepared for the unanticipated move, which makes the eventual adjustment larger and more disruptive. It is no coincidence that the largest spikes in credit spreads and implied volatility indexes like the VIX tend to be immediately preceded by their cyclical lows. Consensus breeds unpreparedness, which can result in huge losses.

The market for foreign exchange (FX) provides a recent – and glaring – example of this phenomenon. As of June 30, 2014 the option-implied volatility of the euro-U.S. dollar (EUR/USD) exchange rate reached an all-time low of 5.3% (annualized). The spot exchange rate of 1.36 seemed “about right” given recent behavior and forward-looking option prices suggested EUR/USD was likely to remain between 1.30 and 1.40. Instead, the euro depreciated by over 20% over the next 9 months, the largest downward move in the history of the exchange rate.¹

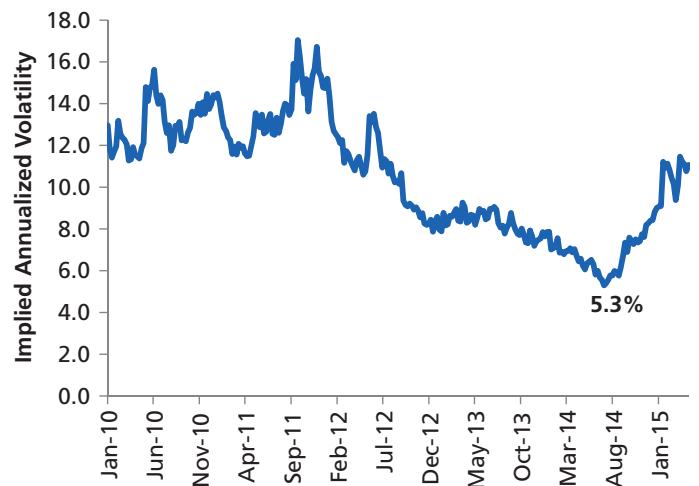
Forecasts derived from asset prices provide information about what market participants expect, not what's actually likely to happen. Option-implied volatility measures the variation in the underlying asset necessary to “justify” current prices. When hedging demand is low, option prices fall, which implies that market participants ascribe a low probability to large moves in the underlying asset (otherwise demand for the option would be higher). This was true in June 2014 when the price of insuring against a large move in EUR/USD was lower than at any time in history.

When the price of insurance is low, it's generally because so few people are insured, which, somewhat ironically, makes a large move more likely. As the EUR/USD rate dropped,

market participants had to scramble to hedge against a further decline by “shorting” the euro and placing additional downward pressure on the exchange rate. These dynamics are similar to those at the top of a credit market, when the first wave of defaults signals that credit spreads are too tight, which leads market participants to buy credit protection, sell down gross exposures, and otherwise take actions that accentuate the market reversal.

FIGURE 1

Implied Volatility, EUR/USD Exchange Rate²



Was April the Bottom in the Interest Rate Cycle?

Investors should keep these dynamics in mind when assessing the risks presented by higher interest rates in the U.S. April 2015 interest rates resemble the June 2014 foreign exchange market in many respects. Entering Q2-2015, the “consensus” forecast that U.S. policy rates would remain low indefinitely. That expectation was certainly well-founded. The Federal Open Market Committee (FOMC) has repeatedly backed away from rate increases at the first sign of weakness in the economy. The FOMC has also cited a stronger currency as a reason to delay hikes, which favors stasis given the likelihood that a rate hike would send the dollar higher.³ And as market expectations for policy rates declined, the Fed did nothing to suggest that forward rates were too low.⁴ Atlanta Fed President Jeffrey Lockhart recently suggested that April futures markets – which anticipated just three rate hikes before 2017 – had it about right.⁵

² Bloomberg, EURUSDV6M, April 18, 2015. (Six Month options).

³ FOMC Minutes, March 2015. If expectations of rate increases cause the FX value of the dollar to rise and the Fed will not raise rates until the dollar stabilizes, the Fed is in the paradoxical position of needing to reduce market expectations of a rate increase as a precondition for raising rates.

⁴ “Market Participants Win Tug of War with Fed,” Carlyle Comment, February 25, 2015.

⁵ “Federal Reserve official at odds with IMF rates warning” Financial Times, April 16, 2015.

¹ Federal Reserve Board of Governors, H.15. This was the largest downward move over a period of 9 months.

As a consequence, asset prices moved in ways that increasingly discounted the probability of deviations from the low-rate baseline. Table 1 compares future short-term interest rates implied by Eurodollar futures markets in April 2014 and April 2015. (We also include a forward rate model based on the term structure to account for differences in liquidity across contracts). Market participants in April 2015 expected five to six fewer rate hikes between 2015 and 2019 than they anticipated one year prior.⁶ More significantly, the implied probability that short-term interest rates will be 3% or greater by March 2018 dropped from nearly 60% in April 2014 to less than 8% in April 2015.

TABLE 1

Decline in Forward Interest Rates, April 2014-April 2015⁷

Eurodollar Futures				
	Mar-16	Mar-17	Mar-18	Mar-19
4/17/2014	1.42%	2.53%	3.28%	3.79%
4/17/2015	0.75%	1.43%	1.89%	2.18%
	-0.66%	-1.10%	-1.40%	-1.61%
Arbitrage-Free Term Structure Model				
	Mar-16	Mar-17	Mar-18	Mar-19
4/17/2014	1.62%	2.77%	3.18%	3.59%
4/17/2015	0.65%	1.33%	1.88%	2.11%
	-0.97%	-1.44%	-1.30%	-1.48%
Implied Volatility (Modeled Rate)				
	Mar-16	Mar-17	Mar-18	Mar-19
4/17/2014	0.96%	0.89%	0.91%	0.94%
4/17/2015	0.07%	0.22%	0.76%	0.74%
	-0.89%	-0.67%	-0.15%	-0.20%

Would 3% interest rates by March 2018 really be so improbable? The risk of deflation, which many cited to explain the decline in rates, seems to have receded. After dipping briefly at the close of 2014, the core inflation rate increased in each of the past three months and is now running at a 1.8% annual rate – the same as one year ago. The price of oil stabilized in April and has increased by over 25% from its lows.⁸ The dollar's meteoric rise subtracted 1.5% from GDP in Q1-2015 and appears to be the main impediment to rate hikes. But the drag on growth is likely to abate and the feared deflationary effects of the currency move have proven to be modest. Only a small share of

the dollar's 20% rise has been passed through to import prices,⁹ which is not surprising since most globally-traded goods are already priced in U.S. dollars.¹⁰ Taken together, core and headline inflation should, absent another shock, move towards (or above) the Fed's official 2% target by the second half of this year.

At the same time, recent labor market data suggest that signs of long-awaited wage increases may finally be manifesting themselves. Wages increased 2.2% faster than productivity in the six months ending March 2015.¹¹ In Q1-2015, the number of workers voluntarily leaving their jobs at fast food restaurants and similar establishments increased by over 20% relative to 2014.¹² Increases in voluntary quits at these occupations tend to be a signal of improved job prospects for less skilled workers. In the last cycle, voluntary quits at food service establishments peaked in Q4-2005, while wage growth reached its cyclical high five quarters later.¹³ Overall, the correlation between the growth rate of the two series peaks at a lag of eight quarters (a 30% decline in quits in 2009 preceded the wage stagnation of 2011-2012), suggesting that early-2015 quits would tend to presage a 2017 labor market peak. Retention issues may have already motivated the recent wage increases announced by McDonald's and its retail sector competitors WalMart, Target, and the TJX companies.¹⁴

Decline in Market Liquidity Makes Larger Price Declines More Likely

A sustained upward move in rates would be likely to trigger a global re-pricing that infects sovereign bonds, credit, emerging markets, and FX. The problem is that this re-pricing is likely to occur in the absence of the market liquidity necessary to facilitate the orderly transfer of assets across balance sheets. Hence, the elasticity of asset prices to a monetary policy shock may be significantly greater today than would be suggested by prior experience.

Over the past 30 years, the role of banks as the dominant suppliers of credit to the real economy has been gradually usurped by market-based institutions.¹⁵ Illiquid loans funded by deposits and held on bank balance sheets have gradually been replaced by tradable securities held by non-banks like mutual funds. Between 1990 and 2007, the net inventories of broker-dealers grew rapidly to make markets in bonds and facilitate the transition away from bank-centric finance (Figure 2). But since the crisis, net

6 This calculation divides the 1.6% decline in expected policy rates by an assumed rate hike increment of 0.25%.

7 Carlyle Analysis of Treasury Department yield curve data. The implied volatility of the forward interest rate is the standard deviation of a bootstrapped sample of forward interest rates.

8 U.S. Energy Information Administration, April 22, 2015.

9 Bureau of Labor Statistics, Import Price Index, April 2015. Almost all of the decline is attributable to the drop in imported fuel prices, which are mostly priced in dollars.

10 Most research finds that prices of internationally-traded goods priced in dollars tend to remain constant while the profits of exporters tend to adjust to FX changes. See: Gopinath, G., et al. (2010), "Currency Choice and Exchange Rate Pass-Through." American Economic Review. Marazzi, M. et al. (2005), "Exchange Rate Pass-through to U.S. Import Prices: Some New Evidence," Federal Reserve Board of Governors International Finance Discussion Paper No. 833.

11 Bureau of Labor Statistics, Labor Productivity and Costs, May 6, 2015

12 BLS, Job Openings and Labor Turnover Survey, April 2015.

13 BLS, Job Openings and Labor Turnover Survey and Average Hourly Wages, All Private Employees, April 2015.

14 <http://fortune.com/2015/03/23/retail-vs-fast-food-wages/>

15 Adrian, T. and Shin, H.S. (2009), "Money, Liquidity, and Monetary Policy," American Economic Review.

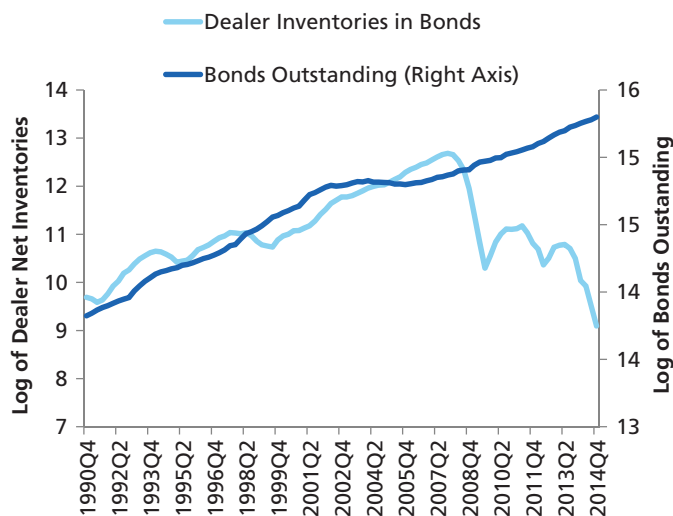
dealer inventories have declined by 63% at the same time that the stock of dealer-intermediated credit has nearly doubled.¹⁶ As a result, there is now nearly \$500 of corporate and foreign bonds outstanding for every \$1 of net dealer inventories, a 50x increase relative to 2008 (Figure 3).

sizable losses.²¹

European Union regulators have recently expressed concern about “runs” on government bond mutual funds when investors sell to avoid losses as the stance of monetary policy shifts. Consider that if the yield on a newly issued 30-year German bund (currently 1%) were to rise to 2.5% – still a historically low level for 30-year rates – the price of that bond would fall by 32% to €68 per €100 of face value.²² Even funds that target shorter duration securities are likely to face outflows. The yield on a typical fund investing in euro area government debt has fallen to 0.35%, which is less than the monthly standard deviation of the returns on these bonds (0.41%).²³ A single standard deviation move in a single month would wipe out interest income for an entire year. The sharp decline in market liquidity makes orderly exits from these markets improbable and increases the potential for further market tremors.

FIGURE 2

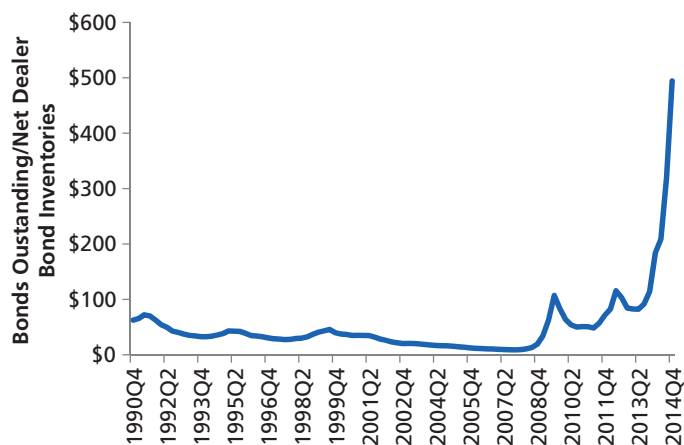
Dealer Net Inventories (Bonds) and Bond Market Outstanding¹⁷



The threat posed to asset prices by declining dealer inventories is indirect. If market participants become concerned that the Fed may raise rates at a faster pace than is implied by the current term structure, existing owners will likely sell interest-rate sensitive assets. When this happens, less market liquidity will result in larger price declines for a given volume of sales. During the “taper tantrum” of 2013, corporate bond yields were nearly 4x as sensitive to fund flows as in the period before the crisis¹⁸ and the bonds-to-inventory ratio has risen six-fold since then (Figure 3). Illiquidity will amplify the near-term asset price implications of the interest rate shock.

FIGURE 3

Corporate Bonds Outstanding Relative to Dealer Net Inventories²⁴



In its semiannual financial stability report,¹⁹ the IMF highlighted these risks and added an additional wrinkle: the daily cash redemption offered by mutual funds may create an expectations gap between what is promised to investors and what the funds can realistically deliver in a down market. The IMF finds evidence of a growing mismatch between the daily liquidity offered by many “vanilla” mutual funds and these funds’ increasingly illiquid credit market holdings.²⁰ As demonstrated during the financial crisis, liquidity transformation of this sort can create incentives for “runs” in down markets that generate “fire sales” and

Investors Should Get Paid for Risks, Not Try to Avoid Them

The goal of investors should not be to avoid risk, but to get paid adequately for bearing it. Traditional liquidity risk premiums across assets and fund structures need to be recalculated. In a stressed scenario triggered by a monetary policy shift, investors may discover little practical difference in the liquidity across fund structures, despite the sizable differences in these funds redemption terms. Assets traditionally valued for their liquidity may be overpriced, as sales pressure from higher rates may generate larger downward price adjustments than in prior episodes. A “barbell” portfolio with higher weights assigned to cash and riskier asset classes may better comport to current realities.

16 Federal Reserve Board of Governors, L. 129.

17 Federal Reserve, L. 219, March 2015.

18 IMF, 2014 Global Financial Stability Report. April 2014. The specific analysis was limited to emerging market bonds and fund flows into and out of corresponding bond funds.

19 IMF, 2015 Global Financial Stability Report, April 2015.

20 See Chapter 3 of the 2015 Global Financial Stability Report.

21 Adrian, T. and Shin, H.S. (2011), “Financial Intermediary Balance Sheet Management,” Federal Reserve Bank of New York Staff Report No. 232.

22 Bloomberg, GDBR30:IND, April 28, 2015.

23 Bank of America Merrill Lynch, Euro Area Bonds with Maturity of Between 1 and 10 years.

24 Federal Reserve, L. 219, March 2015. Net Inventories equal line 9 minus line 17.

Conclusion

Given recent history, it is no surprise that warnings of higher interest rates have been met mostly with yawns. It seems that the “wolf” of higher policy rates may have to appear before this latest alarm is taken seriously. Asset prices have fully internalized the consensus forecast for ultra-low U.S. policy interest rates; deviations from this baseline could generate large re-pricing across all asset classes.

To further complicate matters, a collapse in market liquidity since the financial crisis rises the probability that any such re-pricing could be quite disruptive. While not a risk to asset prices in isolation, market illiquidity will intensify the effects of any interest rate shock. This may be especially true for investors conditioned by fund terms to expect a degree of market liquidity in their fixed income portfolio that simply no longer exists.

Economic and market views and forecasts reflect our judgment as of the date of this presentation and are subject to change without notice. In particular, forecasts are estimated, based on assumptions, and may change materially as economic and market conditions change. The Carlyle Group has no obligation to provide updates or changes to these forecasts.

Certain information contained herein has been obtained from sources prepared by other parties, which in certain cases have not been updated through the date hereof. While such information is believed to be reliable for the purpose used herein, The Carlyle Group and its affiliates assume no responsibility for the accuracy, completeness or fairness of such information.

This material should not be construed as an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. We are not soliciting any action based on this material. It is for the general information of clients of The Carlyle Group. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual investors.

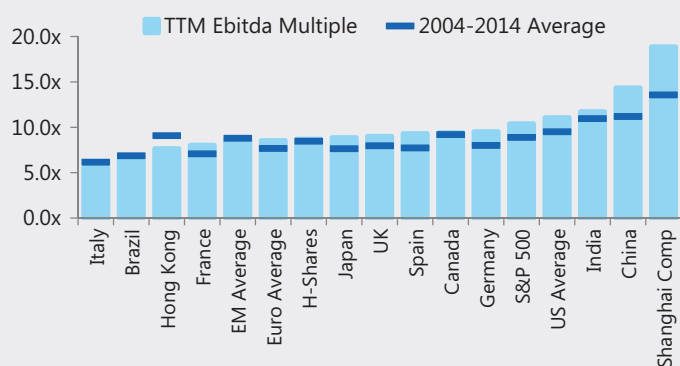
GLOBAL VALUATION RATIOS

The average price of corporate assets in the U.S. is about 16% above historic averages when measured relative to trailing twelve month’s (TTM) Ebitda and about 21% above average when measured relative to sales.²⁵ The difference is due to wide operating margins (Ebitda/Sales), which reached an all-time high of 17.7% at the end of Q1-2015. Assuming multiples revert to long-run averages and growth remains constant, current valuations amount to a 3% to 4% annual drag on average future returns relative to past averages for the overall U.S. market.

The variation in Ebitda multiples across economies is closely related to expected differences in Ebitda growth (80% correlation). Outside of the U.S., margins are generally below historic averages, suggesting that Ebitda growth may outpace sales growth in many of these economies. When calibrating multiples to growth rates, it appears as though the valuations of French, Spanish, and Japanese firms looks “too low” relative to analysts’ growth forecasts.

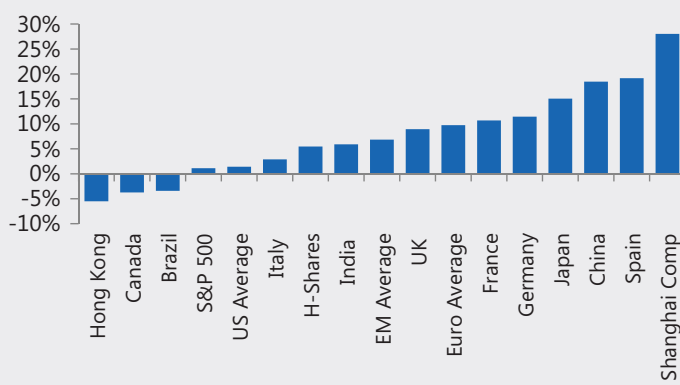
Overall, the data continue to support increased allocations to Europe despite the 10% average increase in multiples during the quarter. Europe is in a much earlier stage of the business cycle and much less likely to experience the cost pressures starting to manifest themselves in the U.S. A less flexible labor market means most of the downward adjustment during recessions is borne by operating profits; average euro area margins finished Q1-2015 10% below historic averages.

Average Enterprise Value to TTM Ebitda, Public Companies in Select Economies



Source: S&P Capital IQ Database, Accessed May 4, 2015.

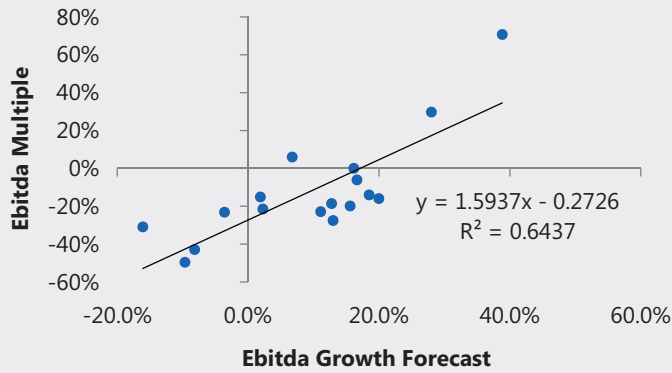
Percentage Change in Average Multiples in Q1-2015



Source: S&P Capital IQ Database, Accessed May 4, 2015.

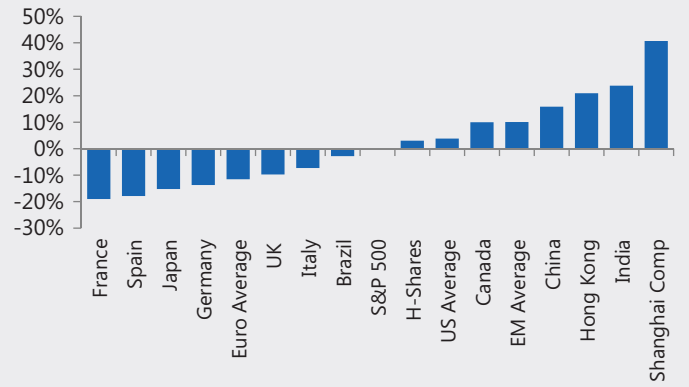
25 These ratios reflect the enterprise value as of March 31, 2015 measured relative to sales and Ebitda for the period from April 1, 2014 through March 31, 2015 as measured by S&P Capital IQ.

Variation in Multiples Across Economies 80% Correlated with Forecast Ebitda Growth



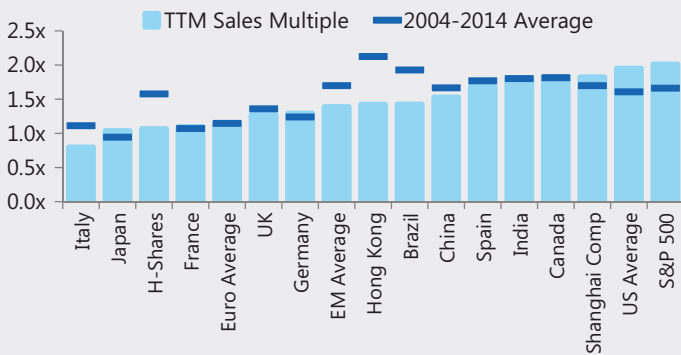
Source: S&P Capital IQ Database, Accessed May 4, 2015.

Valuations Relative to Growth Forecasts: Percent Over (+) or Under (-) Valued Relative to S&P 500



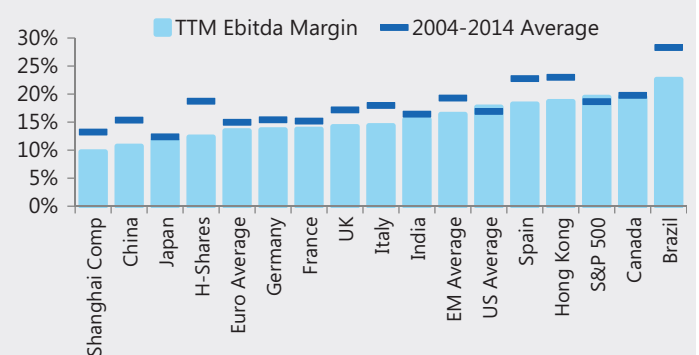
Source: S&P Capital IQ Database, Accessed May 4, 2015.

Average Enterprise Value to TTM Sales, Public Companies in Select Economies



Source: S&P Capital IQ Database, Accessed May 4, 2015.

Average Ebitda Margins, Public Companies in Select Economies



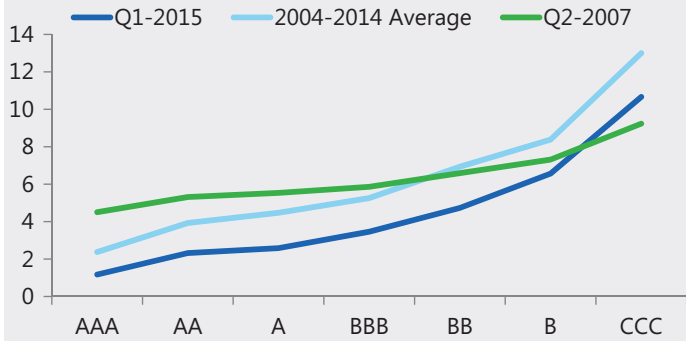
Source: S&P Capital IQ Database, Accessed May 4, 2015.

CREDIT CURVE - RISK STRUCTURE OF INTEREST RATES

Corporate yields in the U.S. remain well below historic averages, but this is almost entirely explained by the low equivalent duration Treasury rate. Credit spreads remain very close to the 2004-2014 average and well above the lows observed in Q2-2007. The situation in Europe is roughly the same, although a bit of a gap has opened between current BB spreads and their long-run average. The bigger story is the equivalent duration risk-free rate in Europe, which fell below zero and depressed euro-denominated yields relative to their U.S. dollar equivalents by an average of more than 100bp. The drop in euro yields spurred a huge increase in euro-denominated speculative grade debt issuance, which grew at a 40% annual rate in Q1-2015.

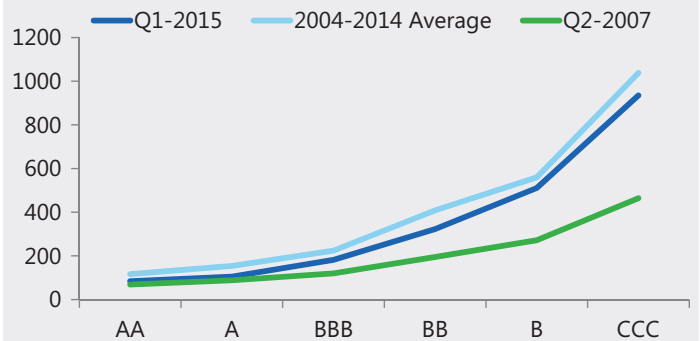
Credit spreads remain new historic norms in the U.S. largely because of elevated yields in the energy sector, which accounts for 14% of the market. The stabilization in the price of oil resulted in 125bp downward move in the yields on energy-linked corporate bonds during Q1-2015. It is interesting to note that the jump in the per-barrel oil price also coincided with a substantial decline in the ratio of short positions in oil futures by "money managers," a category that includes investment funds with exposure to energy-linked bonds and loans. As the price of oil falls, the probability of default on energy-linked loans and bonds increases and it is likely that many investors hedged their energy credit exposure via short positions in oil futures. The likely effect of these hedges is to place downward pressure on the price of oil, which necessitates more hedging. As the price of oil increases, the same process works in reverse: price increases reduce hedging demand and result in further increases in the market price. The procyclicality introduced by hedging demand could be a major contributor to recent oil price volatility.

Effective Yield on U.S. Corporate Credit by Credit Rating (Percent)



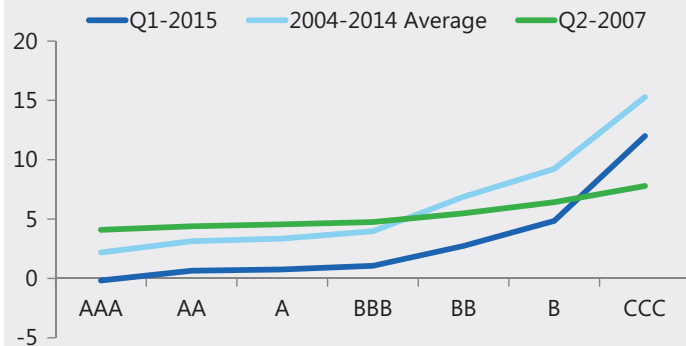
Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

U.S. Corporate Credit Spreads Relative to Swaps Rates by Credit Rating (Basis Points)



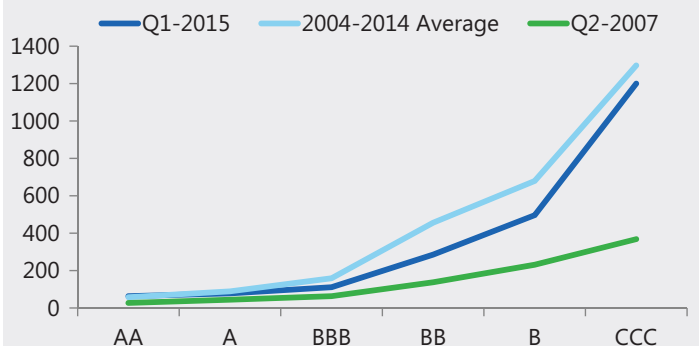
Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

Effective Yield on Euro Area Corporate Credit by Credit Rating (Percent)



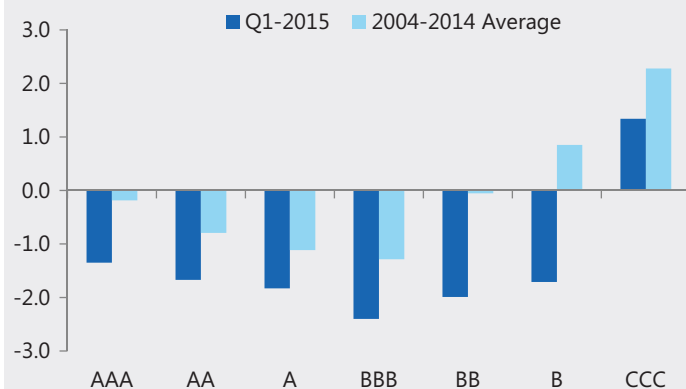
Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

Euro Area Corporate Credit Spreads Relative to Swaps Rates by Credit Rating (Basis Points)



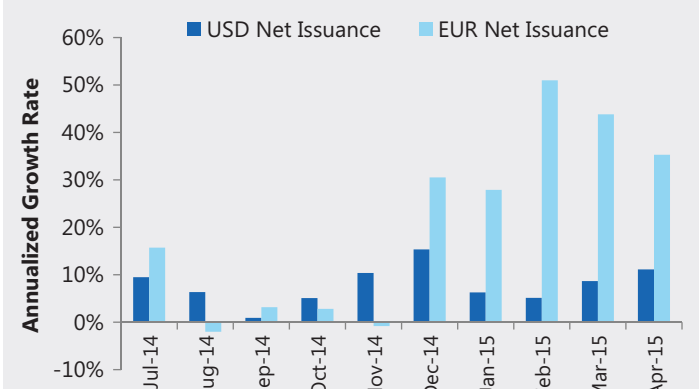
Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

Euro-USD Yield Differential by Credit Rating



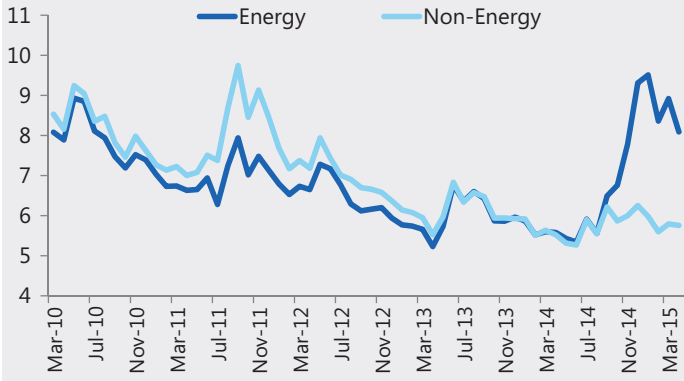
Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

Speculative Grade Bond Issuance by Currency, Annualized Growth over Prior 3 Months



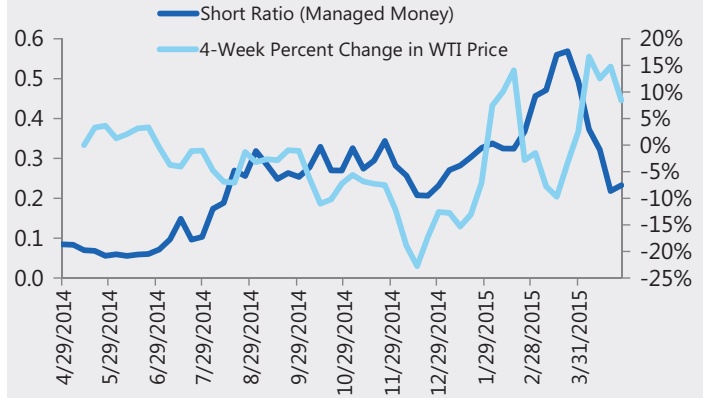
Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

Average USD Speculative Grade Yields: Energy vs Non-Energy



Source: Bank of America Merrill Lynch Global Index System Database, Accessed May 4, 2015.

Stabilization in the Oil Price Reduces Net Hedging Demand Among Energy Investors



Source: Bloomberg, CFTC Positions Data, Accessed May 4, 2015.

U.S. INTEREST RATES

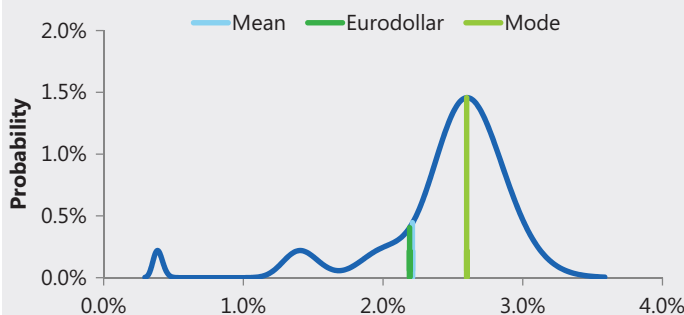
Since the end of April, U.S. rates have moved up by about 10bp in the front end of the yield curve and by 20-30 basis points on the back-end. As of the first week of May, 90-day LIBOR in March 2018 is expected to be 2.2%. However, the left skew of the implied distribution of March 2018 LIBOR suggests the 2.2% rate is really a weighted average between those expecting about four rate hikes per year in 2016 and 2017 (a 2.6% March 2018 rate) and those who expect rates to remain stuck below 2%. As the Fed raises policy rates, there is some risk that more of the probability density moves towards 2.6% and forward rates adjust more than proportionally.

What is the likely impact on broader interest rates if the Fed does hike rates? Historical analysis suggests that yields on Treasury notes and the highest grade corporate credit will increase. However, the further one goes out on the credit spectrum, the more likely higher policy rates are to be associated with a decline in yields. For BB-rated credit, past experience suggests yields would fall by over 100bp over the course of the tightening cycle, as a decline in credit spreads would be expected to offset the increase in Treasury yields.

It is important to note that past results may not be applicable to the current situation. There is no mechanical linkage between an increase in the fed funds rate and a drop in BB yields. The relationship exists in past data because the Fed has tended to increase rates at the same time the economy is improving and default risk is falling. This may not be the case in 2015-2018. Indeed, the shaded blue area, which captures the 80% confidence interval calculated from past data, includes the possibility that BB yields could increase by more than 2% in response to tightening.

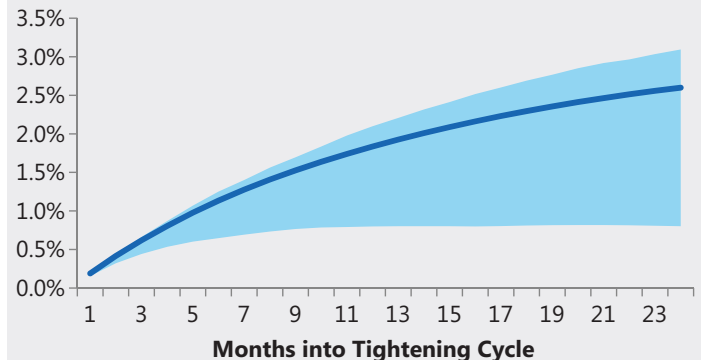
Overall, the effects of higher rates may depend on how the rate increases shape investors' risk perceptions. The effect of zero rates and QE has been to increase investors' risk tolerance, as is evidenced by the decline in term premia and the implied volatility on equities and bonds (a proxy for the price of risk). If higher rates cause risk premia to rise towards historic averages, the effect of the rate increase on asset prices could be more than twice as large as would be suggested by rates alone (1.4x instead of 0.6x).

Expected 90-Day LIBOR in March 2018



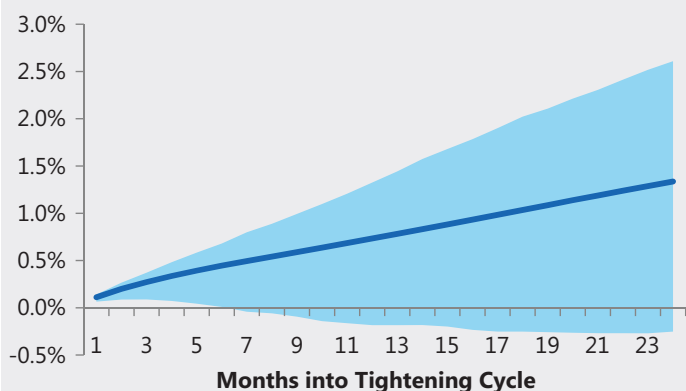
Source: Carlyle Analysis; Federal Reserve, H.15.

Response of 5-year Treasury Yields to Tightening



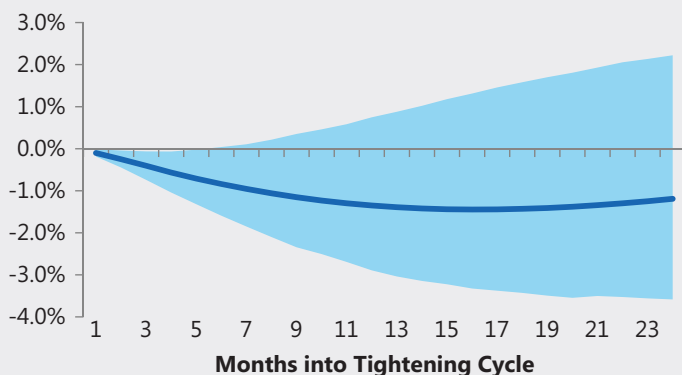
Source: Carlyle Analysis; Federal Reserve, H.15.

Response of A-Rated Corporate Yields to Tightening



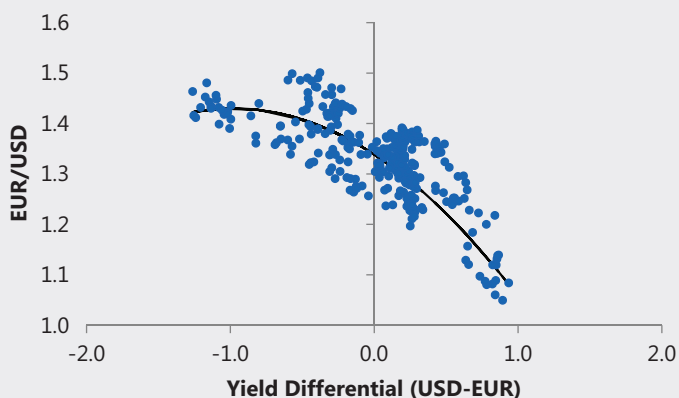
Source: Carlyle Analysis; Federal Reserve, H.15.

Response of BB-Rated Corporate Yields to Tightening



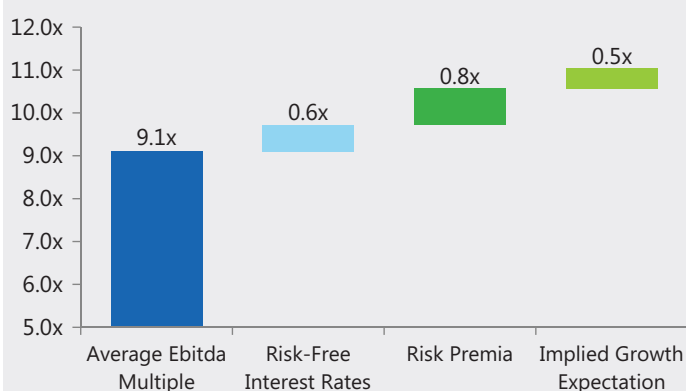
Source: Carlyle Analysis; Federal Reserve, H.15.

Response of EUR/USD to USD-EUR 2-Year Interest Rate Differential



Source: Carlyle Analysis, Federal Reserve, H.15 and H.10.

Decomposing U.S. Average Ebitda Multiple



Source: Carlyle Analysis, S&P Capital IQ Database, Accessed May 4, 2015

U.S. INDUSTRY VALUATION RATIOS

Broad-Based U.S. Market – Public Companies

Name	Constituents	EV to TTM Ebitda			EV to TTM Sales		
		Current	2004-2014 Average	Std Dev	Current	2004-2014 Average	Std Dev
Value-Weighted U.S. Market	2001	11.0x	9.5x	1.1x	2.0x	1.6x	0.2x
S&P 500	500	10.6x	9.3x	1.1x	2.0x	1.7x	0.2x
Small-to-Mid Cap	1000	10.8x	9.3x	1.1x	1.4x	1.2x	0.2x
Aerospace/Defense	35	10.7x	9.4x	1.8x	1.6x	1.1x	0.2x
Consumer Discretionary	237	11.6x	9.4x	1.2x	1.7x	1.3x	0.2x
Energy	99	6.0x	5.9x	0.9x	1.3x	1.2x	0.2x
Financials	299	12.0x	11.6x	2.7x	2.7x	2.3x	0.2x
Health Care	154	13.6x	10.0x	1.8x	2.0x	1.6x	0.3x
Industrials	221	11.3x	11.6x	1.4x	1.8x	1.7x	0.2x
Retailers	100	11.8x	9.1x	1.2x	0.9x	0.7x	0.1x
Technology	245	11.2x	10.9x	2.3x	2.7x	2.3x	0.3x
Telecom	15	8.0x	6.4x	0.9x	2.2x	2.2x	0.3x
Transportation	36	9.1x	8.6x	1.0x	1.7x	1.4x	0.2x

Source: S&P Capital IQ Database, Accessed May 4, 2015.

S&P 500 Industry Groups

	EV to TTM Ebitda			EV to TTM Sales		
	Current	2004-2014 Average	Std Dev	Current	2004-2014 Average	Std Dev
Diversified Financials	11.7x	10.4x	1.7x	4.2x	3.5x	0.7x
Semiconductors	13.8x	12.2x	3.7x	2.4x	2.1x	0.5x
Transportation	9.0x	9.1x	1.4x	1.5x	1.1x	0.2x
Capital Goods	12.8x	13.4x	1.5x	2.2x	2.0x	0.2x
Materials	9.9x	8.4x	1.3x	1.9x	1.5x	0.2x
Retailers	13.8x	9.4x	1.7x	1.6x	1.0x	0.2x
Food/Beverage	13.6x	10.5x	1.1x	2.6x	2.1x	0.2x
Real Estate	20.4x	17.1x	2.5x	10.0x	8.1x	1.3x
Energy	6.0x	5.8x	0.9x	1.3x	1.2x	0.2x
Software	12.9x	11.9x	2.4x	3.9x	3.4x	0.5x
Health Care Providers	11.1x	8.5x	1.5x	0.7x	0.5x	0.1x
Health Care Equipment	13.8x	11.6x	2.6x	3.8x	3.1x	0.6x
Consumer Discretionary	12.5x	9.8x	1.3x	1.9x	1.4x	0.3x
Telecom	7.8x	6.2x	0.9x	2.1x	2.1x	0.2x

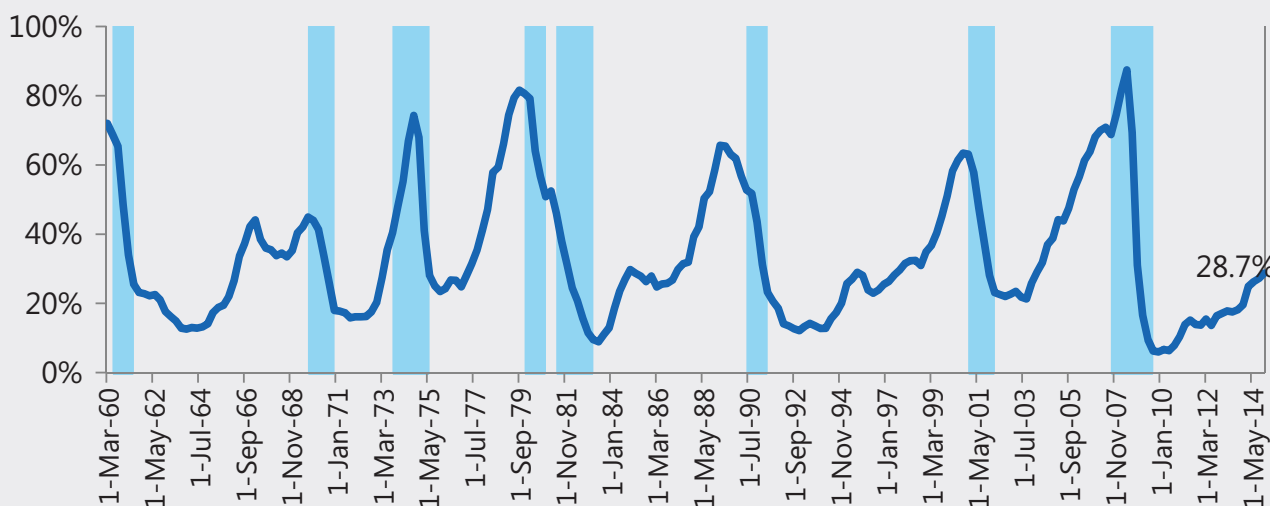
Source: S&P Capital IQ Database, Accessed May 4, 2015.

PROBABILITY OF U.S. RECESSION

Periods prior to recessions are typically characterized by the excessive accumulation of capital – durable goods, housing, business equipment, and structures. At some point during the investment cycle, businesses realize they have built more houses or factories than can be supported by final demand. Similarly situated businesses try to disinvest and shed payroll simultaneously, which triggers a recession.

Today, there is little evidence of excessive capital accumulation. In fact, the current expansion may last longer than historic averages precisely because business and household fixed investment has been so weak. The only notable exception is the accumulation of human capital. The 2.5% growth in business payrolls in 2014 coincided with a 2.5% increase in business output, which means implied productivity growth was essentially zero over that 12 month period. In past cycles, the decline in the output of the marginal employee has been a sign that businesses are overstaffed relative to sales growth. As a result, the probability of recession over the next 12 months looks to be close to 30%, which is still low historically but hardly trivial.

Probability of U.S. Recession, Next 12 Months – Capital Accumulation Rates



Source: Carlyle Analysis; Federal Reserve, Z.1..

Jason M. Thomas is a Managing Director and Director of Research at The Carlyle Group, focusing on economic and statistical analysis of the Carlyle portfolio, asset prices, and broader trends in the global economy. Mr. Thomas is based in Washington, D.C.

Mr. Thomas' research helps to identify new investment opportunities, advance strategic initiatives and corporate development, and support Carlyle investors.

Mr. Thomas received a B.A. from Claremont McKenna College and an M.S. and Ph.D. in finance from George Washington University where he was a Bank of America Foundation, Leo and Lillian Goodwin, and School of Business Fellow.

Mr. Thomas has earned the Chartered Financial Analyst (CFA) designation and is a financial risk manager (FRM) certified by the Global Association of Risk Professionals.

Contact Information

Jason Thomas

Director of Research

jason.thomas@carlyle.com

(202) 729-5420

THE CARLYLE GROUP

GLOBAL ALTERNATIVE ASSET MANAGEMENT