How Do We Measure Leverage? Let Us Count the Ways

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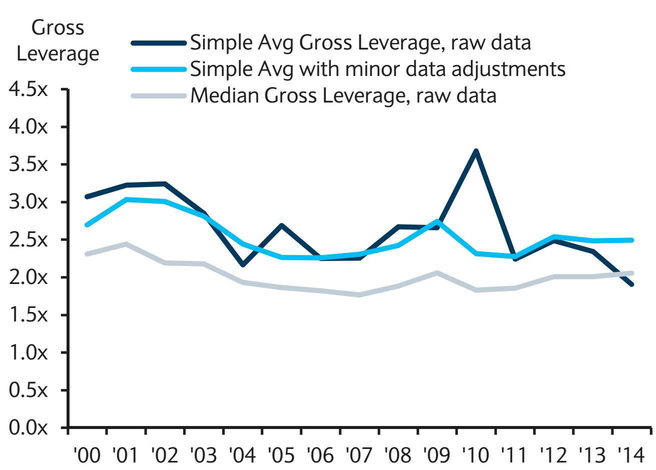
In the recently published report, *U.S. Credit Focus: A Great Deleveraging: Why It Is Happening and What It Means for Equities*, April 24, 2015, the equity and credit strategy research teams determined that, contrary to conventional wisdom, leverage should decline during periods of lower interest rates. The most common objection we have heard to that conclusion was that the measure of leverage highlighted as evidence – debt to book equity – was not the best metric, and that other methods in fact show leverage to be rising. We think that measuring leverage for an index or portfolio is more complex than is normally appreciated (for example, see the *U.S. Credit Alpha: Leveraging Complexity*, April 2014), so we thought it would be timely to examine what different measures of leverage tell us (and the trade-offs between them).

No matter how we measure leverage, though, our underlying conclusion remains the same: non-financial leverage in the U.S. Corporate Index is significantly lower than it was in the early 2000s and only modestly above a post-crisis trough. And none of our measures shows leverage rising anything close to proportionately to the fall in interest rates.

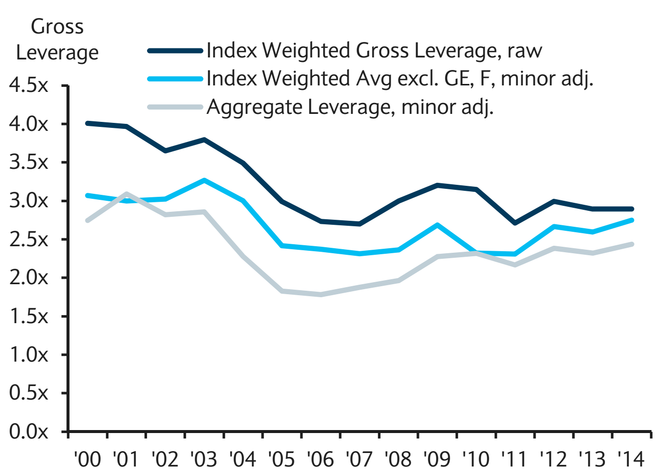
- It is undeniable that leverage has increased since the 2010 trough. Of the 16 measures of leverage we discuss in this article, 13 have risen since 2010.
- But it seems just as clear that the leverage increase has been a matter of picking the measurement period. All 16 measures are below their 2002 levels, three are below their 2007 levels, and 10 are below 2009 levels.
- Finally, because companies tend to build their optimal capital structures based on future operating performance, much of the difference in high and low leverage occurs when EBITDA surprises to the upside or downside. In 2010, for example – a post-crisis trough in leverage – EBITDA surprised to the upside; meanwhile, in 2014, realized EBITDA missed expectations significantly. Adjusting for this difference, leverage between 2010 and 2014 was essentially flat.

FIGURE 1
Debt/EBITDA Simple Average and Median



Note: Non-financial issuers only in the U.S. Corporate Index.
Source: FactSet, Barclays Research

FIGURE 2
Debt/EBITDA Index-Weighted Average and Aggregated



Note: Non-financial issuers only in the U.S. Corporate Index.
Source: FactSet, Barclays Research

Sensible Aggregate Leverage Starts with Minor Adjustments

The starting point for aggregate measures of leverage is understanding the basic adjustments that need to be made to raw leverage data to develop a sensible and informative series. In our view, debt to EBITDA is the preferred measure of credit investors. But the nature of those data creates difficulties in aggregation:

- A simple average of all companies has the benefit of simplicity. But there is significant downside because debt/EBITDA is unbounded in any particular period. If an issuer realizes a one-time loss that results in very low EBITDA, leverage can be high enough to move the entire average – for example, the large spike in 2010 was driven primarily by one company, among nearly 400 data points, that showed over 500x leverage because of very low EBITDA in that year. Even worse is when EBITDA goes negative – leverage will also be negative. As a result, the series is much more volatile than the reality of the underlying corporate behavior and performance (Figure 1).
  - One option is to smooth the series by doing some pre-processing on the data. We make two simple adjustments throughout the rest of this report, excluding firms that have leverage higher than 30x and that have negative EBITDA. These simple adjustments exclude no more than 10 firms in any year (fewer than 2% of the universe), but remove a substantial amount of volatility (Figure 1)
- Using a median rather than an average smoothes the data significantly (Figure 1), but can mask the very changes that most investors would consider most important. We can show this with a stylized example. Let's say an index has 10 issuers, of which six are A-rated firms with stable financial policies in stable markets, but four are more flexible or facing operating challenges. In one year, the stable firms have 2x leverage and the challenged firms have 3x; the median is 2x. Let's say that the following year, the challenges come home to roost – some of the less stable firms see poor operating results, and others actively choose to pursue higher leverage – with the result that the four weaker firms see leverage rise to 6x on average. Because the stable firms have not moved, the median remains 2x, even though investors would clearly see higher risk in owning the whole group.
- An aggregate measure, adding up all the debt and all the EBITDA and then taking the ratio, is also smoother than the simple average and captures the tails more accurately than the median (Figure 2). But it puts more weight on very large firms, which pulls the average toward their degree of leverage. For example, when Apple (AAPL) entered the U.S. Corporate Index in 2013, it had about $60bn of EBITDA, but only about $16bn of debt in the index. So if, for example, the aggregate index prior to AAPL had $4trn of debt and $2trn of EBITDA for an aggregate leverage of 2x, after AAPL joined, leverage would have fallen to 1.95x. As a result, a relatively small number of firms can skew the overall results away from what investors are actually exposed to in their holdings. This effect is compounded for measures of net leverage because some firms hold a disproportionate amount of cash.
- Finally, a full distribution measure, such as index-weighted leverage, reflects the actual exposures that investors benchmarked to the U.S. Corporate Index face. While, like the aggregate measure above, these measures are difficult to calculate and can be skewed in the direction of firms with a disproportionate share of the index bonds outstanding, we believe they are the most closely matched to what credit investors actually face in their portfolios, are smoother than simple averages, and, unlike medians, capture a proportionate effect from shifts in the tails (Figure 2).

Many Different Measures, Mostly Pointing in the Same Direction

Even once we make the necessary adjustments needed to make sense of a given series, different measure of leverage can suggest different trends. We look at what five measures – total debt/EBITDA, net debt/EBITDA, total debt/EV, total debt/total assets, and total debt/1y forward consensus EBITDA – are telling us about trends and discuss the trade-offs of each series.

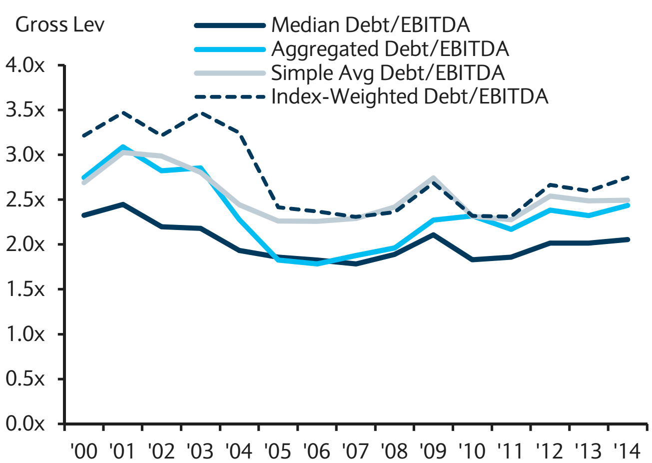
Total Debt/EBITDA and Net Debt/EBITDA

Gross and net leverage as measured by debt/LTM EBITDA show that non-financial leverage has been stable within a 0.3x range since the mid-2000s (Figures 3 and 4). While there has been an uptick more recently (median gross leverage has increased to 2.06x, from 2.02x in 2012 and 1.83x in 2006), both net and gross leverage are well below early-2000 levels, when rates were much higher than they are now. Net leverage has, if anything, been even more stable. The clearest uptick has come in the index-weighted series, which is still close to 2005-08 levels (and well below the early 2000s).

- **Total debt/EBITDA** benefits from measuring leverage relative to the ability to service that obligation. It also reflects a conservative measure from the creditor's perspective – it implicitly assumes that management will have disposed of any cash balances before they would have been useful to creditors. The measure reflects realized and recent operating results.
  - Considerations for using total debt/EBITDA include an overemphasis on results that could be transient (whether good or bad) – it will tend to move cyclically, even when corporate behavior and performance are relatively unchanged. Because it is backward-looking, it does not reflect the forward-looking perspective of both management and investors. It provides non-meaningful results for companies with negative EBITDA. Moreover, It fails to account for underlying assets (including cash), which could be important in downside cases.
- **Net debt/EBITDA** reflects the likelihood that cash would provide companies with a cushion that can benefit creditors – while less conservative, it is more likely to reflect how corporate behavior would evolve.
  - In aggregations, cash balances can skew the results of the entire index. In the example above of Apple entering the index, if the pre-existing constituents had an aggregate $1trn of cash for net leverage of 1.5x, AAPL's $150bn of cash would have moved the overall index's net leverage to 1.39x. That 0.11x move in the index would have been larger than half of the single-year moves since 2005.

FIGURE 3

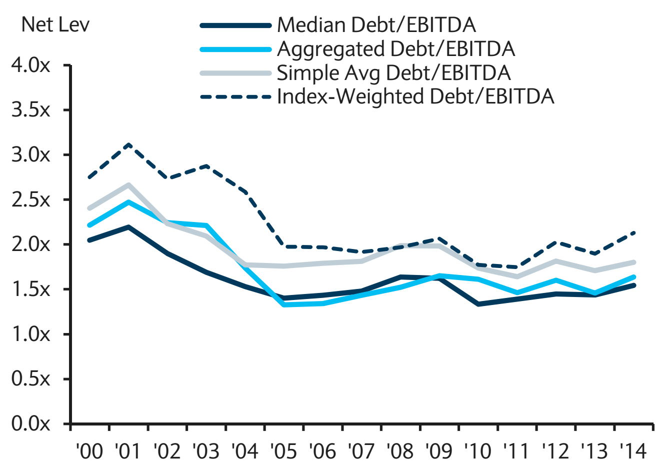
Total Debt/EBITDA since 2000



Note: Non-financial issuers only in the U.S. Corporate Index.
Source: FactSet, Barclays Research

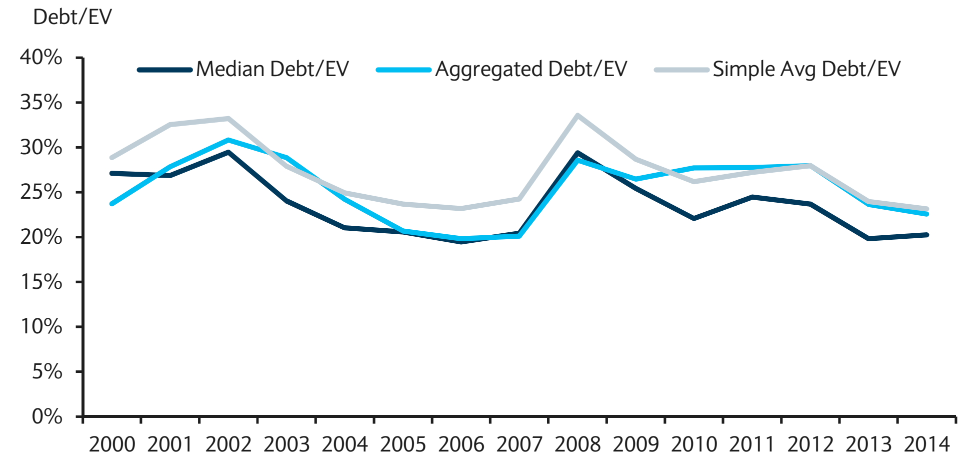
FIGURE 4

Net Debt/EBITDA since 2000



Note: Non-financial issuers only in the U.S. Corporate Index.
Source: FactSet, Barclays Research

FIGURE 5
Total Debt to Enterprise Value since 2000



Note: Non-financial issuers only in the U.S. Corporate Index. Source: FactSet, Barclays Research

Total Debt/Enterprise Value

Unlike debt/EBITDA, debt/EV (or debt/market capitalization) shows a significant decline in leverage post-crisis. While this is, in part, affected by higher equity valuations across the market, the decline has been meaningful. Median debt/EV has declined from 30% in 2008 to 20% (Figure 5). Moreover, leverage is significantly lower than early-2000 levels, and the aggregate series remains roughly in line with 2005-07 trough levels.

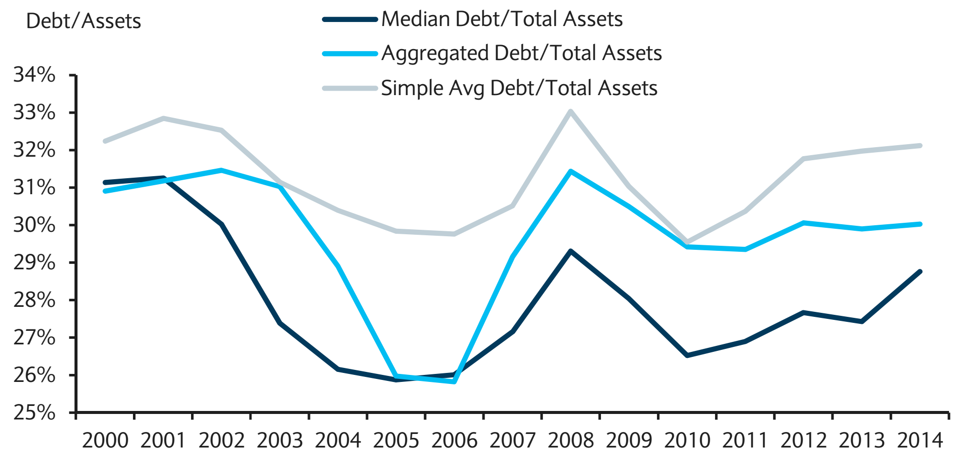
- **Debt/EV** benefits from being a forward-looking measure, given that the equity component captures the future value of the company. As such, it is likely to reflect policy decisions by management and changes in investor sentiment more quickly. It is also bounded between zero and one (except in unusual cases), which means it does not suffer from the scaling issues that require us to exclude some issuers from the simple averages.
  - On the downside, the sensitivity to equity valuations makes companies with overvalued stocks look stronger than they might really be. Conversely, companies with undervalued stocks will look misleadingly weak. It does not directly capture the capacity of the company to meet its obligations with cash flow – an issuer could be highly valued, but with relatively little flexibility to service debt in the case of some sort of shock, and this measure would not be able to fully capture that.

Total Debt/Total Assets

This metric shows a moderate increase in leverage since 2010. However, put in a historical context, a roughly 1-2% increase in debt/assets over four years is not a very large jump; there were several single years in which debt/assets moved by more than 2% (Figure 6). Furthermore, debt/assets is still below early-2000 and 2008 levels, showing that while leverage may have ticked up in the past few years, it is still structurally lower than in previous periods, which corroborates previous leverage measures.

FIGURE 6

Total Debt/Total Assets since 2000



Note: Non-financial issuers only in the U.S. Corporate Index. Source: FactSet, Barclays Research

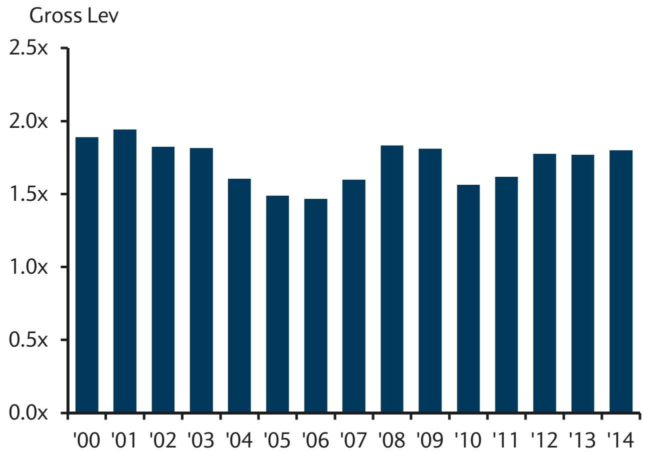
- **Total Debt/Assets** is a more stable measure of credit strength that is less subject to the fluctuations in operating performance or market value. Barring changes in asset markets, it directly captures the protection that creditors have in the worst case scenario where an issuer was liquidated. When aggregated, it does suggest the relative safety that a credit portfolio might have against an extreme macro swing.
  - Because it is based on book value the metric does not account fully for changing market perception/valuations of the company – book values can differ from the prices assets could be sold for in the market. Because it is backwards looking, it doesn't necessarily reflect changes in management policies.

Total Debt/1y Forward Consensus EBITDA

In our view, the metric that bests captures management policies is the ratio of total debt to one-year-forward consensus EBITDA. This is because companies tend to build their optimal capital structures based on expectations of future operating performance. In *U.S. Credit Focus: Weaker Fundamentals, Same Price*, October 25, 2013, we found that one of the best predictors of corporate debt issuance in the next year was expected growth in EBITDA. Our model suggested that investment grade corporate issuers move their leverage toward an average target of around 2x debt/EBITDA; they add debt when EBITDA is expected to grow and limit issuance when EBITDA is expected to shrink. Therefore, significant changes in leverage are more likely to come from either unexpectedly strong years (when leverage is low because operating performance exceeded EBITDA expectations) or unexpectedly weak years (when the opposite occurs). In Figures 2-5, for example, 2008-09 is when leverage spiked, in the wake of weaker-than-expected earnings results.

FIGURE 7

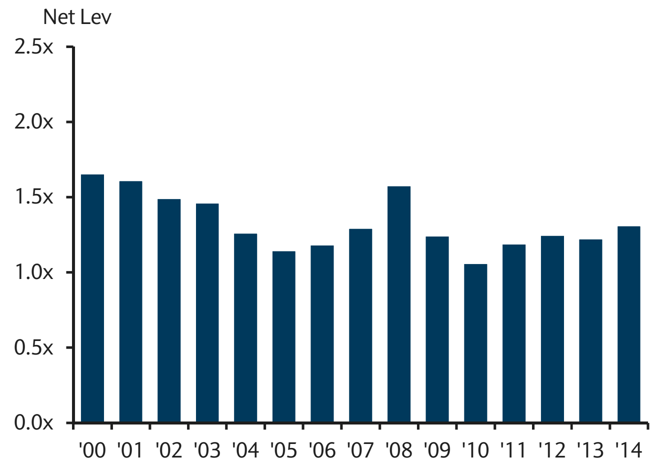
Median Total Debt/1y Forward EBITDA



Note: Non-financial issuers only in the U.S. Corporate Index. Source: FactSet, Barclays Research

FIGURE 8

Median Net Debt/1y Forward EBITDA



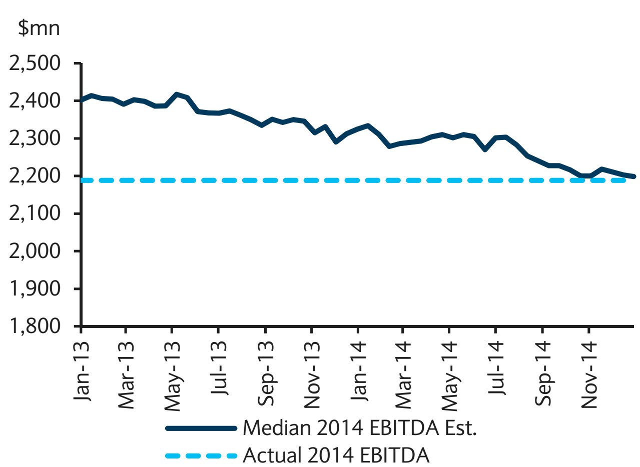
Note: Non-financial issuers only in the U.S. Corporate Index. Source: FactSet, Barclays Research

Figure 7 supports our leverage-target thesis, with median gross leverage numbers stable around 1.7-1.8x, showing that companies seem to aim for a leverage of just below 2x based on consensus EBITDA expectations. Median net leverage is also stable, but it shows a bit more of a decline over time (Figure 8). Although this measure suffers from some of the drawbacks of using debt/EBITDA, it does add a forward-looking component and does not penalize companies for one-time events that may have affected free cash flow generation only in the most recent period.

To quantify this effect, we looked at actual versus forecast EBITDA numbers for 2010 and 2014. As Figure 9 shows, 2014 actual EBITDA was well below the consensus estimate at YE 2013. This is likely behind the uptick in leverage; the actual 2014 number was about 6% lower than the estimated amount. Conversely, in 2010, actual EBITDA was 2% higher than YE 2009 consensus estimates, which means that actual leverage should have overshot expectations. By adjusting 2010 and 2014 median debt/EBITDA to reflect the consensus estimates (Figure 10), we find that the difference in leverage goes away almost entirely (only 0.06x apart).

FIGURE 9

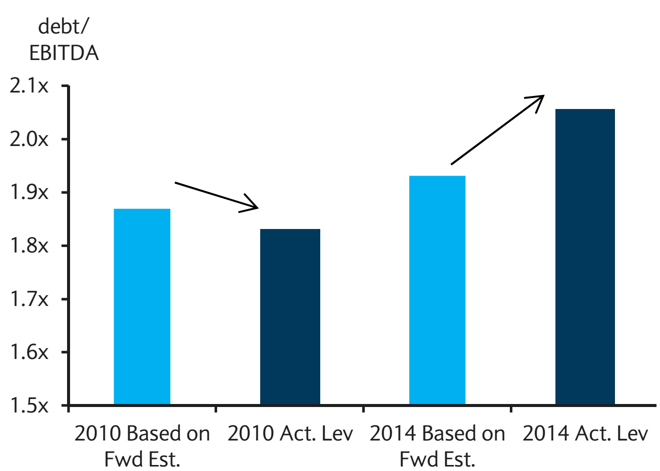
Aggregate 2014 EBITDA Was Lower Than Early Expectations



Note: Non-financial issuers only in the U.S. Corporate Index. Source: FactSet, Barclays Research

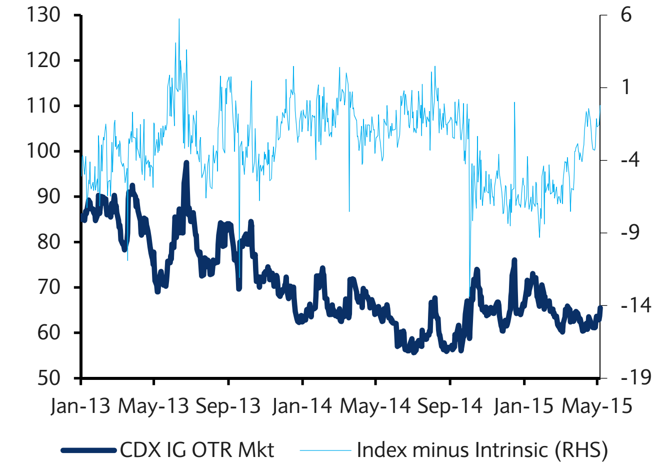
FIGURE 10

Leverage Tends to Fall in Years When Aggregate EBITDA Beats Expectations, but Rise When It Misses



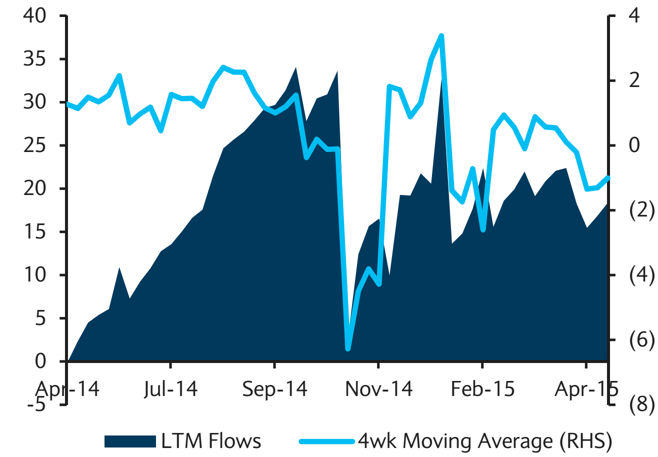
Note: Non-financial issuers only in the U.S. Corporate Index. Estimates based on YE 2009 and YE 2013, respectively. Source: FactSet, Barclays Research

CDX.IG OTR Market versus Intrinsic (bp)



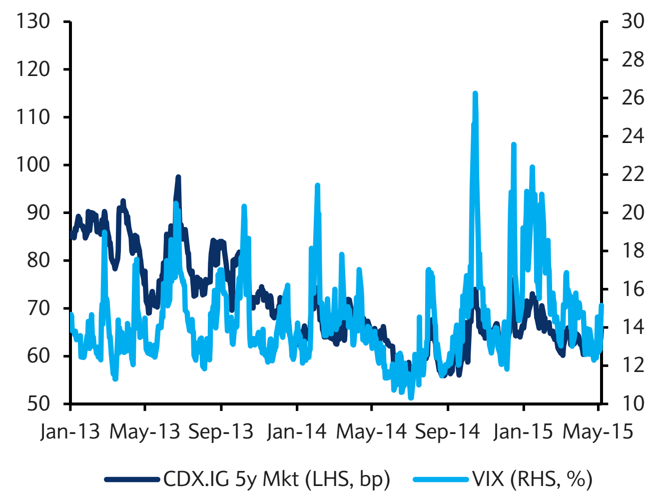
Source: Barclays Research

Investment Grade Fund Flows ($bn)



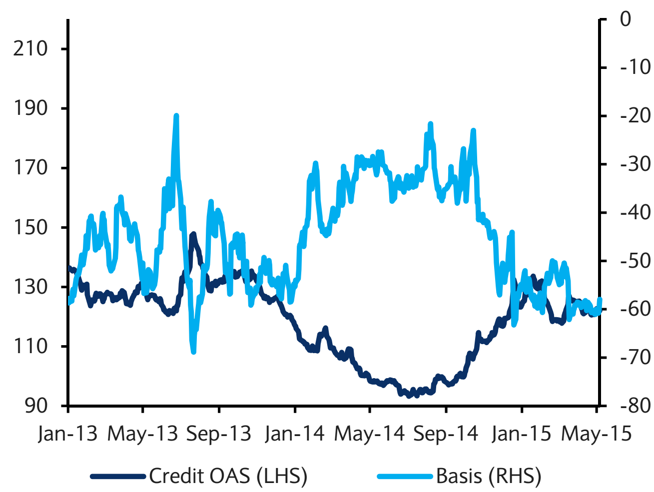
Source: Lipper/Thomson Reuters, Barclays Research

CDX.IG versus VIX



Source: Markit, Barclays Research

CDS-Cash Basis (bp)



Note: Basis defined as CDX.IG spread – Corporate Libor OAS.
Source: Barclays Research

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