Passive Aggression

- We examine the implications of the shift from active to passive management for liquidity in the investment grade and high yield markets. We estimate a modest 1.5-3.0% decline in bond turnover directly attributable to assets transitioning from active to passive vehicles, but a much more significant indirect effect in high yield from institutional usage of ETFs.

- Growing passive assets under management (AUM) in high yield reflect not only true retail investors who own the funds as part of an investment strategy, but also institutional investors who own them primarily for liquidity management. True retail investors transitioning from active to passive are not a meaningful drag on high yield liquidity, but we believe that institutional ownership leads to a much larger decline in bond turnover. We estimate that this indirect effect reduced high yield bond turnover by 20% in 2016, although it could have been as low as 10% or as high as 30%. This is significant relative to the approximately 140% turnover of high yield and could account for a substantial portion of the decline in turnover since the crisis. Investment grade is not affected by this indirect drag on liquidity, as institutional investors rarely use passive instruments to manage fund flows.

- We see limited room for further declines in turnover from shifts into passive strategies. Passive penetration remains low in high yield and could increase, as evidenced by an increasing variety or products, including rates-hedged high yield ETFs, fallen angel ETFs, and target maturity ETFs. However, we do not believe that high yield passive penetration will exceed that in investment grade. Even in that scenario, the turnover implications are limited.

- The size of secondary high yield ETF volumes is striking. The four largest high yield ETFs averaged secondary volumes of $1.6bn per day, on only $37bn of AUM. This compares with $12bn of daily volume in the high yield bond market (using TRACE data), which has a size of $1.3trn. Our analysis of retail flows suggests that only a small fraction of these flows can be attributed to retail. At the same time, the flows exceed the liquidity needs of fund managers by at least two-to-one, indicating that other institutions must be responsible for much of the secondary activity. We believe that some of this comes at the expense of secondary bond trading, but given what we know about the liquidity needs of the different owners of high yield, we believe the use of ETFs to substitute away from secondary bond trades is likely nearing saturation.

### FIGURE 1
Secondary Volumes in High Yield ETFs Are Striking Relative to Their Size

<table>
<thead>
<tr>
<th>Ownership of HY</th>
<th>Annual Secondary Market Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Yield ETFs</td>
<td>3%</td>
</tr>
<tr>
<td>Other Owners of High Yield</td>
<td>97%</td>
</tr>
</tbody>
</table>

Source: Bloomberg, MarketAxess, Barclays Research

This document is intended for institutional investors and is not subject to all of the independence and disclosure standards applicable to debt research reports prepared for retail investors under U.S. FINRA Rule 2242. Barclays trades the securities covered in this report for its own account and on a discretionary basis on behalf of certain clients. Such trading interests may be contrary to the recommendations offered in this report. PLEASE SEE ANALYST CERTIFICATIONS AND IMPORTANT DISCLOSURES STARTING AFTER PAGE 11
The Ascent of Passive Management

The shift from active to passive management has been a long-simmering issue in financial markets. It has obvious implications for asset managers, who face heightened fee compression and competition for AUM as money flows into passive strategies. We believe it also has implications for the underlying financial markets, along two separate but related dimensions. First, as money shifts into passive strategies, the remaining active managers should face less competition, improving their chances of outperforming their benchmarks. If true, this would help establish an equilibrium split between the two investment styles. On the other hand, passive investing generally involves lower turnover (Figure 2), and an increasing share of passive therefore likely reduces available liquidity. If this second effect dominates, it would limit the ability of active managers to capture opportunities for outperformance; it could even make the shift into passive self-reinforcing.

We quantify this second effect of the shift from active to passive in the corporate credit markets. There are different implications for investment grade than for high yield. We estimate that the direct effect of the transition from active to passive is a 2.8% drop in investment grade turnover, compared with 1.7% in high yield. Passive has had a larger effect on turnover in investment grade owing primarily to higher penetration of passive funds in that market. That said, the turnover implications are limited because retail has a small presence in the investment grade market and, more important, because passive instruments are not typically used by institutional funds\(^1\) to manage liquidity needs.

![FIGURE 2](image)

**Average Portfolio Turnover for Top 20 Funds by AUM (%)**

In high yield, the use of passive vehicles by fund managers to manage flows leads to significant indirect effects on turnover. We estimate that this behavior reduced annual turnover by 20% in 2016. The liquidity implications of reduced turnover are likely more severe for high yield, where some securities are already difficult to trade, and institutional managers have taken steps to manage liquidity risk more actively.

State of Passive Strategies across Asset Classes

The flows into passive strategies have not been uniform across asset classes (Figure 3). In equities, US government, and US investment grade, passive strategies have a significant share of retail assets. While already over 40%, the passive share continues to increase in both equity and government funds. In loans and municipals, the passive share has remained small, likely

---

\(^1\) We use the term “institutional” to distinguish between individuals and professional investment managers. Thus, “institutional” includes not only pensions, endowments, and foundations, but also fund managers whose end users may be retail investors.
for structural reasons. US high yield and emerging markets currently sit between those two extremes. They have seen some growth in passive strategies since the onset of the credit crisis, with the introduction of ETFs a likely catalyst. However, the shift has been small, and we may be overstating the extent of true retail passive investing, as institutional investors use ETFs to help manage cash needs. Clearly, in absolute terms, high yield has the potential for a substantial further shift into passive, given the gap to the high penetration asset classes mentioned above.

![Figure 3](image)

**FIGURE 3**

Share of Mutual Fund and ETF Assets in Passively Managed Vehicles

The Effect of Passive on Investment Grade Turnover

There are three components to this calculation: the ownership share of mutual funds in the investment grade market, the share of passive in the funds universe, and the difference in turnover between active and passive funds.

1. **Ownership of Mutual Funds**

   We estimate the ownership share of each of the major holders of corporate bonds each year in our *Outlook*. The most recent estimate was a 16-18% share for mutual funds, a slight increase from previous years. This is computed by summing the investment grade corporate holdings of the investment grade funds database from EPFR. This category is really investment grade core funds, and many of those included own more than just corporates – the investment grade aggregate fund is a common benchmark, and it also includes Treasuries and mortgages. Therefore, we aggregate the underlying corporate holdings at the fund level to arrive at our estimate.

2. **Passive Share**

   Next, we estimate the share of passive among this group, at 37%. The high passive penetration rate reflects the relatively mature nature of the passive industry in investment grade; the passive share has also been quite stable over the post-crisis period. Again, this analysis goes beyond the EPFR investment grade classification, which includes non-corporates, to specifically reflect the share of investment grade corporate bonds held in passive vehicles. We arrive at this estimate using the active or passive categorization at the fund level and then aggregate up the corporate holdings for that fund.²

² In both investment grade and high yield, we identified a small group of funds that are categorized as active, but have management fees and turnover statistics that are more akin to passive. While the prospectuses for these funds confirm that they can exercise discretion similar to active managers, we believe the funds are effectively passive. As a result, we consider funds with management fees less than 30bp and turnover less than 40% as passive.
3. Turnover

Finally, we compare turnover for active and passive funds. These statistics are reported at the fund level. As mentioned above, investment grade core funds often include more than just corporate bonds, and assets such as Treasuries would likely have higher turnover than corporate bonds. Since we cannot apportion turnover by security type, we estimate the corporate turnover by looking only at dedicated corporate funds.\(^3\) We then assume that the broader funds have turnover in their corporate positions similar to the dedicated funds.\(^4\)

In addition, the turnover rates reported are calculated as the percent of the portfolio that is replaced in a given year. For example, a fund that sells 50% of its bonds and replaces them through market purchases would report a turnover of 50%. However, the associated trading volume could be as high as 100% (it could be lower than 100% if some of the purchases were done through the primary market). Therefore, we need to gross up the reported turnover statistics to translate them into secondary volumes. We double the reported numbers, recognizing that this is likely biased slightly upward (although this, too, is likely mitigated by our focus on the difference between active and passive funds, which participate in the primary market to a similar extent).

We estimate that active funds trade 112% of their AUM per year and passive funds trade 67%. In other words, a shift from active to passive reduces secondary volume by 45%.

**Effect of Passive on Turnover**

We estimate the total effect of passive management on volumes in investment grade corporate bonds as the product of ownership, passive penetration, and the difference in turnover (Figure 4). The result of 2.8% is relatively small for an asset class with approximately 70% annual turnover. This is despite the high level of passive penetration, which is balanced by the relatively low ownership of retail.

**FIGURE 4**

*Estimating the Direct Effect of a Shift to Passive on Investment Grade Bond Turnover*

\[
\text{Turnover Impact of Shift to Passive} = \frac{17\% \times 37\%}{45\%} \times 2.8\% = 2.8\% 
\]

Source: EPFR, Bloomberg, Barclays Research

**Other Considerations**

It is possible that our retail category misses some passive vehicles – such as third-party money managed by institutional managers that is not in fund form. This would show up in our “other” category of ownership, which is roughly 20% of the market. Even if the majority of this category is third-party money (and assuming a similar split between active and passive), we would estimate the total effect of passive at around 5% in turnover terms.

---

\(^3\) We classify investment grade core funds as corporate funds if their portfolios are at least 75% corporate, based on Bloomberg data.

\(^4\) Many “Agg” funds are sub-managed by different teams by product type (ie, Treasuries, securitized, and corporates).
While more meaningful, that is still a small effect relative to the size of the decline in investment grade turnover.

The Effect of Passive on High Yield Turnover

Our first pass at high yield is to run the same calculation:

- Retail fund ownership, at approximately 35%, is higher than in investment grade.
- The passive share of funds is 15% – smaller than investment grade and mostly in the form of ETFs. The vast majority of the growth in passive has come since the credit crisis.
- The active-passive turnover difference is 32%. We estimate active turnover at 102% and passive turnover at 70%.

We combine these in the same fashion as above in Figure 5. The result is only modestly higher than in investment grade, at 1.7%. The direct effect remains limited because the lower passive share more than offsets the higher degree of retail ownership.

FIGURE 5

Estimating the Direct Effect of a Shift to Passive on High Yield Bond Turnover

![Diagram](image)

Source: EPFR, Bloomberg, Barclays Research

However, the effect of passive on high yield turnover is more complicated than this. We believe that a substantial portion of the assets reported as passive does not represent true retail passive investing, in contrast to investment grade. Instead, it represents institutional managers using passive vehicles, including ETFs, to manage their inflows and outflows. Managers trade ETFs to fund outflows or invest inflows, and it is likely that at least some of these flows replace trades in the secondary corporate bond market.

In Using ETFs to Mitigate Fund Flows, we showed that inflows and outflows are not perfectly correlated across funds. On average, 54% of fund flows are “diversifiable,” meaning that portfolio managers can reliably use ETFs instead of trading bonds to satisfy a significant share of their own fund flows. Indeed, an analysis of the magnitude of fund flows at the fund level suggests that approximately 25% of the outstanding float in high yield ETFs could be held by portfolio managers with daily liquidity needs.

Several pieces of evidence support this view (alongside anecdotal evidence from money managers and ETF traders). The first is the high concentration of assets among passive high yield funds. The top three passive funds represent 68% of passive high yield assets, while the top three passive government and equity funds represent 39% and 16% of passive assets, respectively. All of the large passive funds in high yield are ETFs, which have the
benefit of trading in the secondary market. High concentration leads to larger secondary flows, which is useful for institutional managers trying to use ETFs to manage inflows and outflows. Without sufficient secondary trading, selling of shares is more likely to lead to share destruction, which relies on the liquidity of the underlying market. ETFs mitigate liquidity needs only to the extent that their secondary trading volumes are large relative to primary volumes (i.e., share creation and redemption volumes). A large number of thinly traded ETFs would not be useful to institutional managers. Indeed, the largest four high yield ETFs have secondary volumes of 4-8x primary volumes.

The second piece of evidence is price. The active-passive cost difference for high yield is much lower than for asset classes with significant passive penetration (Figure 6). In fact, it is larger only than loans, where the passive share is de minimis. One of the draws of passive for retail investors is lower fees, and we would expect cost savings to be a key selling point for funds targeted at those investors. Given the high concentration, there appears to be room for funds to compete for retail share with lower fees. In contrast, an institution looking to ETFs to help manage liquidity is unlikely to be interested in a new, lower cost fund that has less secondary liquidity.

Finally, the largest high yield ETFs are benchmarked to either a liquid sub-index or a short duration sub-index, with very little style diversity. The close link to the benchmark is important for institutions looking to minimize tracking error, but less important for retail-oriented funds, which we would expect to target specific segments of the market. Although there has been some recent movement on this front (more on this below), the largest funds are surprisingly similar. The only differentiation has been the few funds focused on short-duration assets, which is particularly telling, given that short-duration bonds are commonly used as cash substitutes by high yield portfolio managers with daily liquidity needs.

### Estimating the Indirect Effect on Turnover of Institutions Using ETFs

The passive share of high yield fund AUM can therefore be thought of as comprising two different types of owners: retail investors that own ETFs as part of their investment strategy and institutions that use them primarily for liquidity management. Secondary flows from the first group are not replacing corporate bond trading—they are similar to gross flows for an open-end mutual fund, which are netted at NAV. Secondary flows from institutions, however, may be replacing trades in the underlying corporate bonds.
This is an important differentiation, because the overall flows for high yield ETFs are large relative to the size of the high yield market, despite the relatively small size of the funds. Daily TRACE volumes in high yield bonds averaged $12bn last year. Secondary trading in the four largest high yield ETFs, which represent only about 3% of total high yield assets, was $1.6bn daily in 2016. The contrast in turnover is striking: we estimate annual turnover of about 1.4x for high yield, while the ETF numbers imply annual turnover of 10.7x. Secondary ETF volumes are so significant that, if they were fully substituting away from secondary corporate activity, the implications for bond turnover would be substantial. Figure 7 divides total secondary ETF volume by the size of the high yield market to convert those volumes into a turnover-equivalent measure.

![Figure 7](image)

**FIGURE 7**

ETF Volumes Divided by High Yield Par Outstanding

Note: ETF flows are subtracted from secondary ETF volumes. Source: Bloomberg

In order to understand the size of the ETF volumes, we estimate the potential contribution from a few possible sources of activity. First, we estimate how much secondary volume could be coming from retail owners of ETFs. For the overall retail fund universe, average daily gross fund flows have been $731mn over the past 15 months. ETFs represent about 9% of retail, which would indicate that ETF gross flows from that investor base would be at most $65mn, per day (assuming that retail directly owned 100% of the ETFs outstanding, which we know not to be the case). Even if retail owners were more likely to trade ETFs than buy or sell open fund vehicles – which sounds sensible given the intraday tradability of ETFs – we think it is unlikely that retail owners make up more than 10% of total secondary volumes in ETFs.

That leaves institutional owners to make up the remainder of the secondary flows. We can estimate the possible trading from open-end mutual funds, starting with the gross flows statistic cited above. Even if retail fund managers exclusively used ETFs to manage flows, this activity would account for about 46% of secondary ETF volumes. This is surely an overestimate of those institutions’ activity, for two reasons. First, only about 54% of those flows are diversifiable, meaning that ETFs cannot reasonably be used to satisfy every inflow and outflow. Second, these managers do not exclusively use ETFs for liquidity management – they also use other portfolio products, such as CDX, and liquid bonds. Unless fund flow volatility picks up materially, we believe that any incremental liquidity effect of retail funds using ETFs would likely be small.

Other institutions (eg, institutional asset management mandates, pensions, endowments, foundations, and hedge funds) must therefore be driving a significant share of secondary flows.
ETF volume. Surveys have indeed shown\(^5\) that these institutions have consistently increased their use of fixed income ETFs in recent years. At least some of this activity likely comes at the expense of bond trading. Some is also likely from trading that is opportunistic, given the high liquidity of high yield ETFs, such that participants are taking shorter-term views on high yield that would not otherwise be implemented in bonds. Given the high daily ETF volumes and the limited proportion that could be assigned to investors with the most demand for liquidity, we believe the negative effect of passive management on high yield turnover is likely nearing saturation.

**Could Passive Have an Even Larger Effect in the Future?**

Although the indirect channel discussed above is responsible for most of the effects of passive strategies on turnover today, we believe there is relatively little room for it to grow. Institutional holdings are likely near saturation, based on our analysis of fund-level flow volatility – absent a change in the nature of fund flows.

However, the direct channel could grow, given the small share of high yield passive investments. The implications for high yield liquidity could increase if the share of passive management becomes more akin to that of other high-penetration asset classes. There are signs of potential growth in retail-oriented passive, as evidenced by a growing variety of products, including rates-hedged high yield ETFs, fallen angel ETFs, and target maturity ETFs, which are clearly intended to be used as investment strategies rather than liquidity vehicles. Sub-indices can be challenging to track because of low liquidity, but funds can alleviate this problem by judiciously choosing sub-indices with lower turnover, such as specific maturities or fallen angels.

To determine the likelihood of meaningful gains in passive share, we compare high yield with other asset classes along two dimensions that we believe contribute to the attractiveness of passive strategies:

- The potential for active alpha generation. The more sources of systematic and idiosyncratic risk an asset class is exposed to, the more avenues an active manager has to outperform. We stack up high yield versus the high-penetration asset classes.

- The existence of viable, investable passive instruments with limited tracking error and low transaction costs. We assess the potential attractiveness of passive high yield investments to retail investors.

**Potential Sources of Alpha**

The promise of outperforming a benchmark is increasingly plausible when active managers have many demonstrable paths to doing so. However, asset classes are not created equally with respect to alpha opportunities. Asset classes have different sources of systemic or idiosyncratic risk, and those with more sources of risk are more suitable for active management.

We assess the potential for active outperformance, incorporating dimensions of risk and liquidity and market structure (Figure 8). We score market structure and liquidity on a scale of one to five, with higher numbers representing higher liquidity and ease of settlement. A higher score in this section makes a passive instrument easier to create. We score potential sources of alpha, also from one to five. Higher scores in these areas improve the potential for alpha in that asset class, increasing the “active score.” We then compute an overall ratio as the total score for alpha divided by the total score for market structure and liquidity.

---

This approach is admittedly arbitrary, but it is telling that the asset classes with the highest scores have thus far had lower passive penetration, and vice versa, suggesting that market structure, liquidity, and opportunities for alpha are key determinants in the tug of war between active and passive strategies. For example, the US government asset class has a low active score, with very high liquidity and few sources of alpha, making it an ideal target for passive management.\textsuperscript{6} US equities have a few more sources of alpha, but they are also quite liquid, and some of the most commonly used equity indices have a limited number of securities relative to fixed income indices. At the other extreme, US loans and munipals have high active scores, with both structural impediments to passive management and significant sources of potential alpha.

### FIGURE 8

Asset Class Scores for Liquidity and Sources of Alpha (1 = Low, 5 = High)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>East of Settlement</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Exchange/OTC</td>
<td>OTC</td>
<td>OTC</td>
<td>OTC</td>
<td>OTC</td>
<td>OTC</td>
<td>OTC</td>
<td>OTC</td>
</tr>
</tbody>
</table>

| Systematic Alpha              |         |             |       |       |           |          |          |
| Market Risk                   | 1       | 5           | 2     | 4     | 5         | 4        | 2        |
| Rates/Term Risk               | 5       | 1           | 4     | 2     | 4         | 1        | 5        |
| New Issue                     | 1       | 2           | 4     | 4     | 4         | 4        | 3        |

| Idiosyncratic Alpha           |         |             |       |       |           |          |          |
| Dispersion of Security Returns| 1       | 5           | 3     | 5     | 5         | 4        | 2        |
| Number of Securities          | 1       | 3           | 4     | 3     | 3         | 2        | 5        |
| Number of Issuers             | 1       | 3           | 2     | 2     | 2         | 2        | 5        |
| Number of Sectors             | 1       | 3           | 3     | 3     | 5         | 3        | 5        |
| Security Features\textsuperscript{1} | 1     | 1           | 3     | 5     | 3         | 5        | 5        |

| Active Score                  | 1.2     | 2.6         | 3.1   | 3.5   | 4.4       | 5.0      | 5.3      |

Note: Security features include collateral, seniority, covenants, and embedded options. Source: Barclays Research

The active score for US high yield is in the middle; it appears somewhat more amenable to active management than equities and investment grade credit, but less so than other asset classes with a low passive share. This speaks to the possibility of continued gains in passive – certainly, this scenario does not appear to be precluded by the nature of the asset class, despite the high level of alpha potential.

### The Viability of Passive High Yield

In liquid asset classes, full index replication is a viable passive strategy. However, there are enough small issues in high yield with irregular trading that implementing this strategy is not practical. Instead, passive high yield funds are benchmarked against liquid sub-indices, such as the Bloomberg Barclays US HY Very Liquid Index (VLI). These sub-indices are almost liquid enough to replicate, but the funds still utilize sampling: US high yield ETFs typically own about 90% of the members of their liquid sub-index benchmarks. This level of sampling limits tracking error while allowing passive managers to avoid incurring excessive transaction costs from being forced to trade the least liquid securities.

\textsuperscript{6} The gap to the other asset classes is likely overstated somewhat, as government funds likely have sources of alpha (eg, though securities lending) that we do not account for.
The potential downside of using a sub-index is if the characteristics of the sub-index differ in some material way from the broader index, such that the passive funds are structurally set up to underperform active funds that can invest in the full universe. While this was true to a certain extent at one time, changes to the way the VLI and similar indices are constructed have limited the differences (Figure 9).

<table>
<thead>
<tr>
<th></th>
<th>Yield (%)</th>
<th>OAS (bp)</th>
<th>Duration (yrs)</th>
<th>Average Rating</th>
<th>Liquidity Cost Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US High Yield Index</td>
<td>5.75</td>
<td>380</td>
<td>4.02</td>
<td>B1/B2</td>
<td>1.1</td>
</tr>
<tr>
<td>US HY Very Liquid Index (VLI)</td>
<td>5.65</td>
<td>363</td>
<td>4.01</td>
<td>B1/B2</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Source: Bloomberg

We do not believe that the VLI is likely to systematically underperform or outperform the overall high yield market, and the distribution of liquidity in the underlying bonds is sufficient for managers to track the performance of the sub-index closely enough. As a result, we do not believe that viability poses an impediment to gains in passive share.

US high yield does have characteristics that make it amenable to passive management. Furthermore, a liquid sub-index can be a viable proxy for the overall market, giving passive managers a solid foothold. While the asset class has good potential sources of alpha, its “active score” is only marginally better than that of investment grade, where 37% of funds are passively managed, compared with 15% in high yield, apparently leaving considerable room for passive strategies to grow.

More recent products stand out because of their much lower costs and focus on a broad-market index rather than a liquid sub-index. Those choices imply that these products are meant for cost-sensitive retail investors rather than liquidity-sensitive institutional managers. Lower costs are indeed a key feature for retail investors. Morningstar data show that funds in the lowest fee quintile have attracted the lion’s share of inflows for a long time and that the other 80% of funds have, in aggregate, experienced net outflows over the past decade (Figure 10). This trend has driven continued fee compression across the entire fund landscape. The average management fee for active funds in 2000 was 101bp, according to Morningstar; that average had dropped to 78bp by the end of 2015. Even passive funds are responding to the demand for lower costs, with the average fee dropping from 26bp to 18bp over the same period (Figure 11).

Note: Data as of December 31, 2015. Source: Morningstar
The Future of Passive High Yield

We believe not only that passive is viable in high yield, but also that its penetration rate is likely to increase. Assuming that half of the current 15% passive share actually represents institutions using the ETFs for their liquidity and simplicity, the true retail passive share of high yield could increase about 29% before it matches investment grade, where passive is almost entirely a true retail product; that scenario would put the passive share of high yield at about 45%. We see that as a cap, given that high yield passive should be no more viable than investment grade passive. However, the associated decline in high yield turnover under even a 45% passive penetration rate is only an additional 3.6%. As shown above, most of the adverse effects of passive management on high yield liquidity do not come from true retail substitution, but rather from institutional usage.

Thus, understanding the growth in institutional usage is the key to determining potential future liquidity impairment. Retail funds already use ETFs for liquidity management, and we believe that barring a meaningful change in fund flow volatility, that channel may be saturated. That said, institutions such as pensions and endowments could certainly continue to increase their usage, some of which would substitute for bond trading. Importantly, this continued shift could lead to a self-reinforcing decline in high yield liquidity. More passive strategies should theoretically make it easier for active managers to outperform as competition declines. However, liquidity also deteriorates with more passive investment, making it more difficult to convert alpha opportunities into actual outperformance. If the latter effect dominates, the shift to passive could become self-reinforcing. We believe active investors will be grappling with this trade-off for the foreseeable future, particularly in years of low idiosyncratic volatility.
Analyst Certification
We, Eric Gross and Jeffrey Meli, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

Important Disclosures:
Barclays Research is a part of the Investment Bank of Barclays Bank PLC and its affiliates (collectively and each individually, "Barclays")
All authors contributing to this research report are Research Analysts unless otherwise indicated. The publication date at the top of the report reflects the local time where the report was produced and may differ from the release date provided in GMT.

Availability of Disclosures:
For current important disclosures regarding any issuers which are the subject of this research report please refer to https://publicresearch.barclays.com or alternatively send a written request to: Barclays Research Compliance, 745 Seventh Avenue, 13th Floor, New York, NY 10019 or call +1-212-526-1072.

Barclays Capital Inc. and/or one of its affiliates does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that Barclays may have a conflict of interest that could affect the objectivity of this report. Barclays Capital Inc. and/or one of its affiliates regularly trades, generally deals as principal and generally provides liquidity (as market maker or otherwise) in the debt securities that are the subject of this research report (and related derivatives thereof). Barclays trading desks may have either a long and/or short position in such securities, other financial instruments and/or derivatives, which may pose a conflict with the interests of investing customers. Where permitted and subject to appropriate information barrier restrictions, Barclays fixed income research analysts regularly interact with its trading desk personnel regarding current market conditions and prices. Barclays fixed income research analysts receive compensation based on various factors including, but not limited to, the quality of their work, the overall performance of the firm (including the profitability of the Investment Banking Department), the profitability and revenues of the Markets business and the potential interest of the firm's investing clients in research with respect to the asset class covered by the analyst. To the extent that any historical pricing information was obtained from Barclays trading desks, the firm makes no representation that it is accurate or complete. All levels, prices and spreads are historical and do not represent current market levels, prices or spreads, some or all of which may have changed since the publication of this document. The Investment Bank's Research Department produces various types of research including, but not limited to, fundamental analysis, equity-linked analysis, quantitative analysis, and trade ideas. Recommendations contained in one type of research may differ from recommendations contained in other types of research, whether as a result of differing time horizons, methodologies, or otherwise. In order to access Barclays Statement Regarding Research Dissemination Policies and Procedures, please refer to https://publicresearch.barclays.com/static/S_ResearchDissemination.html. In order to access Barclays Research Conflict Management Policy Statement, please refer to: https://publicresearch.barclays.com/static/S_ConflictManagement.html.

All pricing information is indicative only. Prices are sourced from Thomson Reuters as of the last available closing price at the time of production of the research report, unless another time and source is indicated.

Explanation of other types of investment recommendations produced by Barclays FICC Research:
Trade ideas contained herein that have been produced by the Credit teams within Barclays Research are valid at current market conditions and may not be otherwise relied upon.
Trade ideas contained herein that have been produced by other research teams within Barclays FICC Research shall remain open until they are subsequently amended or closed in a future research report.

Disclosure of previous investment recommendations produced by Barclays FICC Research:
Barclays FICC Research may have published other investment recommendations in respect of the same securities/instruments recommended in this research report during the preceding 12 months. To view previous investment recommendations published by Barclays FICC Research in the preceding 12 months please refer to https://live.barclays.com/go/research/ResearchInvestmentRecommendations.

Barclays legal entities involved in publishing research:
Barclays Bank PLC (Barclays, UK)
Barclays Capital Inc. (BCI, US)
Barclays Securities Japan Limited (BSIL, Japan)
Barclays Bank PLC,Hong Kong branch (Barclays Bank, Hong Kong)
Barclays Capital Canada Inc. (BCCI, Canada)
Absa Bank Limited (Absa, South Africa)
Barclays Bank Mexico, S.A. (BBMX, Mexico)
Barclays Securities (India) Private Limited (BSIPL, India)
Barclays Bank PLC, India branch (Barclays Bank, India)
Barclays Bank PLC, Singapore branch (Barclays Bank, Singapore)

Disclaimer
This publication has been produced by the Investment Bank of Barclays Bank PLC and/or one or more of its affiliates (collectively and each individually, "Barclays"). It has been distributed by one or more Barclays legal entities that are a part of the Investment Bank as provided below. It is provided to our clients for information purposes only, and Barclays makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to any data included in this publication. To the extent that this publication states on the front page that it is intended for institutional investors and is not subject to all of the independence and disclosure standards applicable to debt research reports prepared for retail investors under U.S. FINRA Rule 2242, it is an "institutional debt research report" and distribution to retail investors is strictly prohibited. Barclays also distributes such institutional debt research reports to various issuers, regulatory and academic organisations for informational purposes and not for the purpose of making investment decisions regarding any debt securities. Any such recipients that do not want to continue receiving Barclays institutional debt

FINRA Rule 2242
research reports should contact debtresearch@barclays.com. Barclays will not treat unauthorized recipients of this report as its clients and accepts no liability for use by them of the contents which may not be suitable for their personal use. Prices shown are indicative and Barclays is not offering to buy or sell or soliciting offers to buy or sell any financial instrument. Without limiting any of the foregoing and to the extent permitted by law, in no event shall Barclays, nor any affiliate, nor any of their respective officers, directors, partners, or employees have any liability for (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified of the possibility of such damages, arising from any use of this publication or its contents.

Other than disclosures relating to Barclays, the information contained in this publication has been obtained from sources that Barclays Research believes to be reliable, but Barclays does not represent or warrant that it is accurate or complete. Barclays is not responsible for, and makes no warranties whatsoever as to, the information or opinions contained in any written, electronic, audio or video presentations of third parties that are accessible via a direct hyperlink in this publication or via a hyperlink to a third-party web site ('Third-Party Content'). Any such Third-Party Content has not been adopted or endorsed by Barclays, does not represent the views or opinions of Barclays, and is not incorporated by reference into this publication. Third-Party Content is provided for information purposes only and Barclays has not independently verified its accuracy or completeness. The views in this publication are those of the author(s) and are subject to change, and Barclays has no obligation to update its opinions or the information in this publication. If this publication contains recommendations, those recommendations reflect solely and exclusively those of the authoring analyst(s), and such opinions were prepared independently of any other interests, including those of Barclays and/or its affiliates. This publication does not constitute personal investment advice or take into account the individual financial circumstances or objectives of the clients who receive it. The securities discussed herein may not be suitable for all investors. Barclays recommends that investors independently evaluate each issuer, security or instrument discussed herein and consult any independent advisors they believe necessary. The value of and income from any investment may fluctuate from day to day as a result of changes in relevant economic markets (including changes in market liquidity). The information herein is not intended to predict actual results, which may differ substantially from those reflected. Past performance is not necessarily indicative of future results. This information reflects Barclays' current judgment at the date of publication, is based on various assumptions, and is subject to change without notice. Barclays reserves the right to modify these assumptions at any time without notice. Barclays may have positions and may purchase or sell the securities or other investments discussed in this publication. Barclays' research analysts may provide investment banking services to or act as underwriters for the companies that are the subject of a specific research report. Barclays carries no liability for (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified of the possibility of such damages, arising from any use of this publication or its contents.

All research reports are distributed to institutional investors in Japan by Barclays Securities Japan Limited. Barclays Securities Japan Limited is a joint-stock company incorporated in Japan with registered office of 6-10-1 Roppongi, Minato-ku, Tokyo 106-6131, Japan. It is a subsidiary of Barclays Bank PLC and a registered financial instruments firm regulated by the Financial Services Agency of Japan. Registered Number: Kanto Zaimukyokucho (kinsho) No. 143. Barclays Bank PLC, Hong Kong Branch is distributing this material in Hong Kong as an authorised institution regulated by the Hong Kong Monetary Authority. Registered Office: 41/F, Cheung Kong Center, 2 Queen's Road Central, Hong Kong. All research reports are distributed to institutional investors in Japan by Barclays Securities Japan Limited. Barclays Securities Japan Limited is a joint-stock company incorporated in Japan with registered office of 6-10-1 Roppongi, Minato-ku, Tokyo 106-6131, Japan. It is a subsidiary of Barclays Bank PLC and a registered financial instruments firm regulated by the Financial Services Agency of Japan. Registered Number: Kanto Zaimukyokucho (kinsho) No. 143. Barclays Bank PLC, Hong Kong Branch is distributing this material in Hong Kong as an authorised institution regulated by the Hong Kong Monetary Authority. Registered Office: 41/F, Cheung Kong Center, 2 Queen's Road Central, Hong Kong. All Indian securities-related research and other equity research produced by the Investment Bank are distributed in India by Barclays Securities (India) Private Limited (BSIPL). BSIPL is a company incorporated under the Companies Act, 1956 having CIN U67120MH2006PTC161063. BSIPL is registered and regulated by the Securities and Exchange Board of India (SEBI) as a Research Analyst. INH000001519; Portfolio Manager INF0000022585; Stock Broker/Trading and Clearing Member: National Stock Exchange of India Limited (NSE) Capital Market INB231292732, NSE Futures & Options INF231292732, NSE Currency derivatives IINE2331450334, Bombay Stock Exchange Limited (BSE) Capital Market INB011292738, BSE Futures & Options INF011292738; Depository Participant (DP) with the National Securities Depositories Limited (NSDL): DP ID: IN-NSDL-299-2008; Investment Adviser: INA000000391. The registered office of BSIPL is at 208, Ceejay House, Shivsagar Estate, Dr. A. Besant Road, Worli, Mumbai – 400 018, India. Telephone No: +91 22 67196000. Fax number: +91 22 67196100. Any other reports produced by the Investment Bank are distributed in India by Barclays Bank PLC, India Branch, an associate of BSIPL in India that is registered with Reserve Bank of India (RBI) as a Banking Company under the provisions of The Banking Regulation Act, 1949 (Regn No BOM43) and registered with SEBI as Merchant Banker (Regn No INM000002129) and also as Banker to the Issue (Regn No INB000000950). Barclays Investments and Loans (India) Limited, registered with RBI as Non Banking Financial Company (Regn No RBI Co.07-00258), and Barclays Wealth Trustees (India) Private Limited, registered with Registrar of Companies (CIN U93000MH2008PTC189438), are associate of BSIPL in India that are not authorised to distribute any reports produced by the Investment Bank. Barclays Bank PLC Frankfurt Branch distributes this material in Germany under the supervision of Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). This material is distributed in Brazil by Banco Barclays S.A.
This material is distributed in Mexico by Barclays Bank Mexico, S.A.
Barclays Bank PLC in the Dubai International Financial Centre (Registered No. 0060) is regulated by the Dubai Financial Services Authority (DFSA). Principal place of business in the Dubai International Financial Centre: The Gate Village, Building 4, Level 4, PO Box 506504, Dubai, United Arab Emirates. Barclays Bank PLC-DIFC Branch, may only undertake the financial services activities that fall within the scope of its existing DFSA licence. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.
Barclays Bank PLC in the UAE is regulated by the Central Bank of the UAE and is licensed to conduct business activities as a branch of a commercial bank incorporated outside the UAE in Dubai (Licence No.: 13/1844/2008, Registered Office: Building No. 6, Burj Dubai Business Hub, Sheikh Zayed Road, Dubai City) and Abu Dhabi (Licence No.: 13/952/2008, Registered Office: Al Jazira Towers, Hamdan Street, PO Box 2734, Abu Dhabi).
Barclays Bank PLC in the Qatar Financial Centre (Registered No. 00018) is authorised by the Qatar Financial Centre Regulatory Authority (QFCRA). Barclays Bank PLC-QFC Branch may only undertake the regulated activities that fall within the scope of its existing QFCRA licence. Principal place of business in Qatar: Qatar Financial Centre, Office 1002, 10th Floor, QFC Tower, Diplomatic Area, West Bay, PO Box 15891, Doha, Qatar. Related financial products or services are only available to Business Customers as defined by the Qatar Financial Centre Regulatory Authority.
This material is distributed in the UAE (including the Dubai International Financial Centre) and Qatar by Barclays Bank PLC.
This material is not intended for investors who are not Qualified Investors according to the laws of the Russian Federation as it might contain information about or description of the features of financial instruments not admitted for public offering and/or circulation in the Russian Federation and thus not eligible for non-Qualified Investors. If you are not a Qualified Investor according to the laws of the Russian Federation, please dispose of any copy of this material in your possession.
This material is distributed in Singapore by the Singapore branch of Barclays Bank PLC, a bank licensed in Singapore by the Monetary Authority of Singapore. For matters in connection with this report, recipients in Singapore may contact the Singapore branch of Barclays Bank PLC, whose registered address is 10 Marina Boulevard, #23-01 Marina Bay Financial Centre Tower 2, Singapore 018983.
This material is distributed to persons in Australia by Barclays Bank plc. Barclays Bank plc does not hold an Australian financial services licence and instead relies on an exemption. This material is intended to only be distributed to “wholesale clients” as defined by the Australian Corporations Act 2001.
IRS Circular 230 Prepared Materials Disclaimer: Barclays does not provide tax advice and nothing contained herein should be construed to be tax advice. Please be advised that any discussion of U.S. tax matters contained herein (including any attachments) (i) is not intended or written to be used, and cannot be used, by you for the purpose of avoiding U.S. tax-related penalties; and (ii) was written to support the promotion or marketing of the transactions or other matters addressed herein. Accordingly, you should seek advice based on your particular circumstances from an independent tax advisor.
© Copyright Barclays Bank PLC (2017). All rights reserved. No part of this publication may be reproduced or redistributed in any manner without the prior written permission of Barclays. Barclays Bank PLC is registered in England No. 1026167. Registered office 1 Churchill Place, London, E14 5HP. Additional information regarding this publication will be furnished upon request.

BRCF2242