FOCUS

Trading the ETF Technicals

Reprint from 24 February 2012 *U.S. Credit Alpha*.

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As credit market liquidity has gradually deteriorated (see *Liquidity Preference*, November 18, 2011), demand for more liquid credits has increased substantially. Indeed, a significant liquidity premium has developed, and the incremental compensation for less liquid bonds has grown despite the predictable increase in volatility in more liquid names (see "Liquidity-Volatility Tug of War" in *U.S. Credit Alpha*, January 6, 2012). Simultaneously, the combination of generically strong demand for credit and the perceived equity-like liquidity of exchange-traded funds (ETFs) has led to tremendous growth in high yield ETF assets. Furthermore, in this low liquidity environment, investors have prized ETFs not only for being traded on an exchange, but also for being benchmarked to liquid sub-indices within the credit market. While the changing landscape of liquidity demands that credit investors – especially those requiring daily liquidity – adapt, we find that the mechanics of ETF investing and rebalancing can lead to somewhat arbitrary dislocations between bonds inside and outside their benchmarks. Given the extraordinary recent strength in ETF flows and the inconsistent nature of retail demand, we recommend that liquidity-conscious investors look to bonds outside of ETF benchmarks to pick up spread and avoid negative technicals on potential outflows.

Extraordinary ETF Growth Despite an Illiquid Credit Market

Credit ETF assets are highly concentrated, with fewer than ten ETFs having $1bn or more under management (Figure 1). On the investment grade side, LQD is the dominant fund for pure credit exposure. While BND and AGG come relatively close to LQD in terms of total assets, their benchmarks have low 21% and 20% corporate bond weightings, respectively, and these ETFs therefore rank fourth and fifth in total corporate credit assets. On the high yield side, HYG and JNK are roughly equal in size and represent nearly 95% of ETF assets. Despite the high concentration thus far, major credit ETF administrators believe demand for differentiated credit ETFs will be strong, as attested by the recent launch of four new sector and ratings-based investment grade ETFs (tickers ENGN, MONY, AMPS, and QLTA) and the planned launch of crossover (Baa-Ba rated) and lower-rated high yield (B-Ca rated) ETFs.[1]

[1] *ETF Daily News*, February 15 2012, "iShares Files for iShares B-Ca Rated Corporate Bond Fund ETF."

Figure 1: Top-10 Fixed Income ETFs by Credit Assets

Ticker	Fund Share Class	IG/HY	Total Assets ($mn)	% Credit	Credit Assets ($mn)	Benchmark	Inception Date
LQD	iShares: iBoxx $IG Corp	IG	19,185	100	19,185	iBoxx $ Liquid Investment Grade Index	7/26/2002
HYG	iShares: iBoxx $HY Corp	HY	13,690	100	13,690	iBoxx $ Liquid High Yield Index	4/11/2007
JNK	SPDR Barclays Hi Yld Bd	HY	11,587	100	11,587	Barclays Capital High Yield Very Liquid Bond Index	11/28/2007
CSJ	iShares: Barc 1-3 Cr Bd	IG	9,109	73	6,650	Barclays Capital 1-3 Year U.S. Credit Index	1/11/2007
CIU	iShares: Barc Int Crd Bd	IG	4,288	79	3,388	Barclays Intermediate U.S. Credit Index	1/11/2007
BND	Vanguard Tot Bd; ETF	IG	14,876	21	3,124	Barclays Capital U.S. Aggregate Float Adjusted Index	4/10/2007
AGG	iShares: Barc Aggreg Bond	IG	14,603	20	2,921	Barclays Capital U.S. Aggregate Index	9/26/2003
VCSH	Vanguard ShTm Crp Bd; ETF	IG	2,404	72	1,731	Barclays Capital US 1-5 Year Corporate Bond Index	11/23/2009
BSV	Vanguard Sh-Tm Bd; ETF	IG	7,593	21	1,595	Barclays Capital 1-5 Year Government/Credit Index	4/10/2007
BIV	Vanguard Int-Tm Bd; ETF	IG	2,925	39	1,141	Barclays Capital 5-10 Year Government/Credit Index	4/10/2007

Note: Credit assets estimated based on approximate credit weight in benchmark. Source: Lipper, Bloomberg, BlackRock, State Street, Vanguard, Barclays Capital

While investment grade ETFs have generally kept pace with the broader market in terms of asset growth, high yield ETFs have grown at a spectacular rate (Figure 2). Furthermore, the growth in high yield ETFs has surged in recent months, while credit market liquidity has weakened. Indeed, the annualized growth rate of high yield ETFs has increased from 68% in the past 12 months to 244% in the past three.

Naturally, significantly higher ETF growth rates are a by-product of outsized fund inflows and relatively low starting asset size (Figure 3). Indeed, despite accounting for only 11% of the assets for funds reporting to Lipper on a weekly or monthly basis, ETF fund flows represent about 38% of inflows in the past 11 weeks, or 3.4x their "fair share" based on assets; over the past three years, ETF fund flows have averaged approximately 4.1x their asset-based share.

Figure 2: Annualized Fund Asset Growth Rates and Percent of Broader Market

	HY Funds		IG Funds	
	ETF	Non-ETF	ETF	Non-ETF
% of Market	2.4%	19.4%	1.2%	27.8%
Growth Period				
3m	244%	50%	36%	19%
6m	187%	37%	22%	17%
1y	68%	12%	20%	15%
3y	101%	30%	50%	30%

Note: Weekly and monthly reporters. Source: Lipper

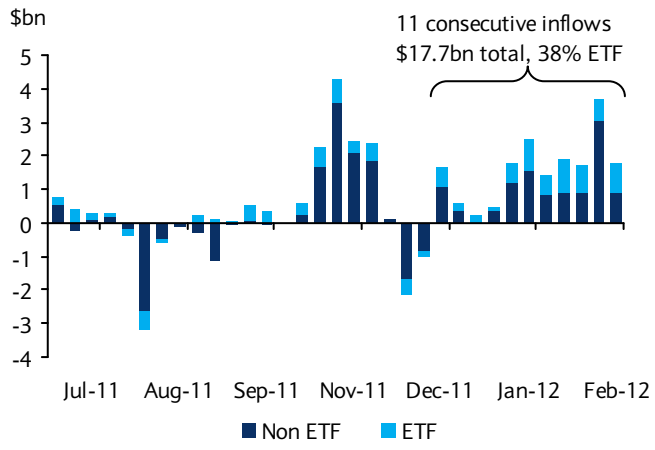
Massive flows into ETFs have also translated into significant secondary volumes in certain high yield bonds. The total net daily flow into an ETF is identical to the change in shares outstanding times the ETF net asset value (NAV). Furthermore, changes in shares outstanding are a consequence of shares being created and redeemed, which both require trading in a subset of the bonds in the ETF benchmark (see Appendix for further details on the creation/redemption of shares). Thus, one way to gauge how much ETF flows have affected the trading of bonds is to compare those flows directly with TRACE volumes. As Figure 4 illustrates, high yield ETF flows accounted for 1-2% of total TRACE volumes in the first half of 2011 and have since jumped to 3-5% of the TRACE total in the past four months. Moreover, this measure is certain to understate the actual influence of ETFs on secondary bond volumes, because daily fund flows represent a net number. For instance, if 2mn shares were created and 1mn shares redeemed in one day, the net inflow (and, thus, bond volume) would appear to be 1mn times the fund NAV, while in fact, a total bond value equal to the sum, or 3mn times the fund NAV, would have to trade hands. Unfortunately, without visibility into the total (rather than the net) number of created and redeemed shares, we cannot estimate the true share of secondary bond volumes driven by ETF flows. However, anecdotal evidence suggests that it is closer to 6-10%.

Outperformance on Higher Vol and Unpredictable Flows Warrants Caution

Consistently large fund inflows, combined with declining credit market liquidity, have led to an increase in the liquidity premium for liquid bonds. While bonds in the U.S. High Yield Very Liquid Index (VLI) were nearly 60bp wide of high yield bonds outside this benchmark in summer 2010, they are now approximately 22bp rich (Figure 5). Moreover, a substantial portion of this relative tightening has occurred since the summer 2011 sell-off, as dealer inventories have halved.

In addition, with high yield ETF share creations and redemptions driving a larger proportion of traded volumes, the volatility of the VLI sub-component of the high yield market has spiked relative to non-VLI bonds (Figure 6). The sharp increase in volatility was especially pronounced in the August-September sell-off and has since abated somewhat, but VLI constituent volatility remains elevated. Should the currently very strong demand technical in high yield reverse, we would expect this relative volatility to surge once again.

Figure 3: Weekly High Yield Fund Flows

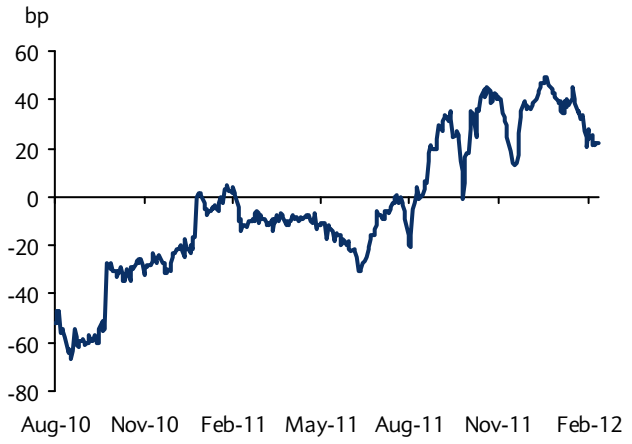


Note: Weekly and monthly reporters. Source: Lipper

Figure 4: High Yield ETF Net Fund Flows as a % of TRACE Volume

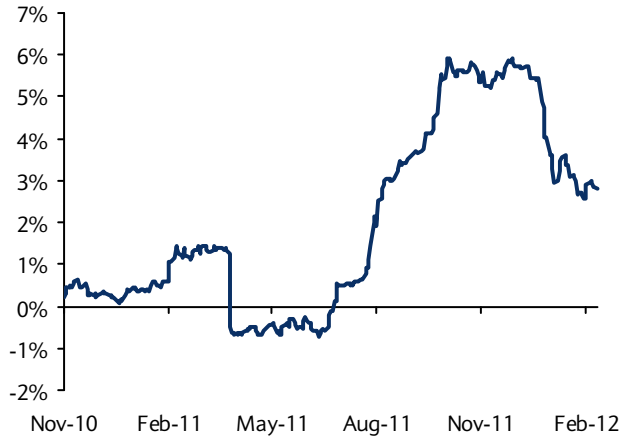
Note: 30d moving average. Analysis includes the absolute fund flows of HYG and JNK only. Source: Bloomberg

Figure 5: Yield Difference: Non-VLI versus VLI Bonds



Source: Barclays Capital

Figure 6: Volatility Difference: VLI Bonds Minus Non-VLI Bonds



Note: Annualized daily yield volatility, 3m window. Source: Barclays Capital

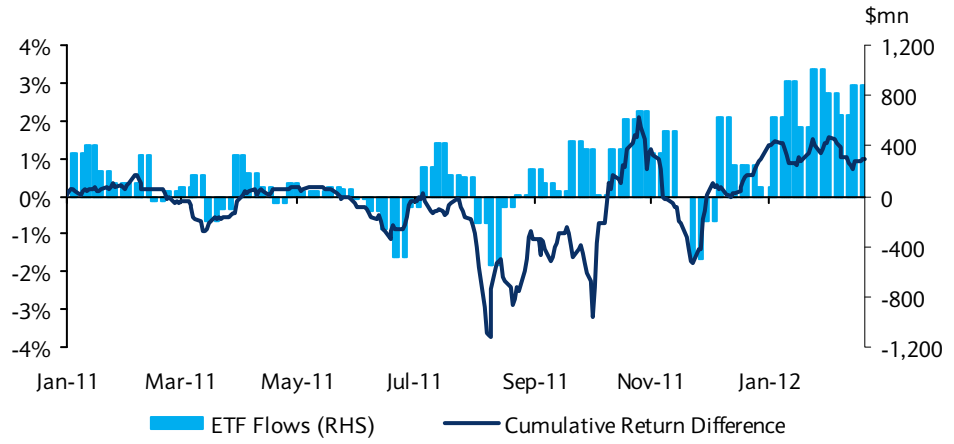
Thus, while we believe high yield investors must adapt to the changing liquidity landscape, we think they should also be cognizant of the potential valuation and volatility technical being driven by strong ETF demand. Specifically, we believe it is worthwhile to separate liquid bonds in ETF benchmarks from those outside of them to uncover potential dislocations driven by these technical effects. As an example, we compared bonds in the U.S. High Yield Very Liquid Index (VLI) – the benchmark index for the JNK ETF – with U.S. High Yield Index bonds that were not VLI constituents. At the same time, we wanted to control for factors such as size and time since issuance. To accomplish this, we further divided the bonds that were not in the ETF into two categories. The first, which we term "Liquid Non-VLI," contains bonds of issuers that would meet the minimum size ($600mn) and time since issuance (three-year maximum) constraints, but are not included in the VLI because they are not the largest bond from that issuer. The second group, which includes bonds that would never be eligible for the VLI, we term "Less Liquid Non-VLI."

Figure 7: Statistics by VLI Inclusion and Eligibility

		Non-VLI Constituents	
	VLI Constituents	Liquid Non-VLI	Less Liquid Non-VLI
Count	204	174	1,506
Amount Outstanding ($bn)	209.0	180.2	572.2
Average Size ($mn)	1,024	1,036	380
Liquidity Cost Score	1.44	1.43	2.28
Price	$103.74	$103.15	$99.92
Yield to Worst (%)	7.12	6.87	7.35
OAS (bp)	581	565	613
% Trading above Next Call Price	45.0%	39.2%	32.4%
Years since Issuance	1.15	1.29	3.83
OAD (years)	4.40	4.25	3.96
Coupon (%)	8.38	8.10	8.23
Average Rating	B1/B2	B1/B2	B1/B2

Note: "Liquid Non-VLI" bonds are over $600mn in size and less than three years since issuance, but are not the largest bond in the issuer's capital structure and, thus, not in the VLI benchmark. "Less Liquid Non-VLI" bonds do not meet one or both of the size and time-since-issuance constraints. Source: Barclays Capital

Figure 8: Cumulative Return Difference (VLI minus Liquid Non-VLI) versus ETF Fund Flow



Note: Returns are cumulative but not compounded. Source: Lipper, Barclays Capital

Statistics for these three different groups (Figure 7) show that the Liquid Non-VLI bonds are not any less liquid than VLI constituents. They are about the same size, on average – slightly larger, in fact – $1,036mn versus $1,024mn. In addition, they are almost identical in terms of cost to trade, as measured by the Liquidity Cost Score[2] (1.43 versus 1.44), and only 50 days older, on average. However, while 45% of VLI constituents are trading at or above their next call price, a lower 39% of Liquid Non-VLI bonds trade that way, being nearly $0.60 cheaper, on average. While they are admittedly lower yielding and have a lower coupon in aggregate, we believe there are opportunities to pick up incremental compensation for equivalent credit and liquidity risk on a name-by-name basis.

The extent to which ETF flows have affected the valuation of VLI constituents relative to the Liquid Non-VLI subset is shown in Figure 8. In weeks of large inflows, the VLI constituent bonds tend to outperform Liquid Non-VLI bonds, whereas the opposite is generally the case on outflows. Thus, Liquid Non-VLI bonds as a broad group are less beholden to ETF fund flows, which are notoriously fickle and have been persistently volatile.

For investors with existing high yield credit exposure who would prefer less price volatility and do not need the maximum possible liquidity in every holding, we recommend swapping out of ETF benchmark bonds into less negatively convex, comparable-maturity bonds within the same capital structure. Specifically, we screened for non-VLI bonds from VLI issuers with the following characteristics:

- Identical credit rating, issuing corporate entity, seniority, and security;
- Par amount of at least $500mn;
- Option-adjusted duration within one year of the VLI bond;
- Dollar price above $85 (to avoid distressed securities);
- OAS pickup of at least 20bp from swapping from VLI bond into Non-VLI bond; and
- Positive yield pickup from swapping from VLI bond into Non-VLI bond.

[2] "A bond's liquidity cost score measures the cost (in basis points) of immediately executing a round-trip transaction for a standard institutional trade." For more please see *Liquidity Cost Scores for US Credit Bonds*, October 6 2009

Figure 9: Non-VLI versus VLI Bond Swap Recommendations

		Non-VLI Bond (Buy)							VLI Bond (Sell)					Pickup		
Ticker	Description	Par ($mn)	Cpn (%)	Mat. Date	Price ($)	YTW (%)	OAS (bp)	Rtg	Cpn (%)	Mat. Date	Price ($)	YTW (%)	OAS (bp)	Price ($)	YTW (%)	OAS (bp)
CCO*	Clear Channel	500	9.250	Dec-17	109.50	5.57	501	B2	9.250	Dec-17	110.00	4.99	463	-0.50	0.58	38
CHTR	Charter Communications	750	7.375	Jun-20	108.75	5.58	404	BA3	6.500	Apr-21	105.38	5.46	363	3.38	0.12	41
FSL	Freescale Semiconductor	663	10.125	Mar-18	111.38	6.47	574	B2	9.250	Apr-18	110.00	6.24	535	1.38	0.23	39
LVLT	Level 3 Communications	500	9.375	Apr-19	107.75	7.52	622	B3	8.125	Jul-19	102.75	7.49	600	5.00	0.03	22
VRXCN	Valeant Pharmaceuticals	500	6.750	Oct-17	101.13	6.46	534	B1	6.875	Dec-18	101.75	6.44	505	-0.63	0.02	29
WSTC	West Corp	500	8.625	Oct-18	108.00	6.58	540	B3	7.875	Jan-19	107.00	6.14	488	1.00	0.44	52

Note: CCO 9.25% 2017 Series B is a VLI constituent with $2bn in par outstanding. The Series A bond has $500mn in par outstanding and is otherwise identical, but trades at a discount to the VLI bond. Source: Barclays Capital

The results are presented in Figure 9. Each of these swaps allows investors to pick up spread, shorten maturity, and avoid the price volatility associated with ETF fund flows.

More opportunities to pick up spread exist for investors that are prepared to sacrifice some liquidity in order to further reduce the potential negative ETF technical on the downside. For example, by relaxing the par outstanding constraint to $300mn – while remaining in bellwether high yield names – high yield managers can pick up spread by swapping out of ETF bonds and into Wynn 7.875s of 2020 (26bp pickup, take out 1pt in price) and Chesapeake Midstream 5.875s of 2021 (21bp pickup, take out 2pts in price).

Hedging and Short Interest

High yield ETF price returns are decently well correlated to the broader high yield market (using the Barclays Capital U.S. High Yield Index as a proxy) on a daily basis and extremely well correlated at the monthly horizon (Figure 10). While this could, theoretically, be useful for institutional clients looking to put cash balances to work tracking the market, the ETFs do not currently have the depth in terms of trade size to make this appropriate yet. While current typical trade sizes in HYCDX and IGCDX are $25-50mn and $50-100mn, respectively, typical trades in JNK and HYG are on the order of $1-5mn. Even as the credit ETF market grows, it may struggle to get broad institutional support.

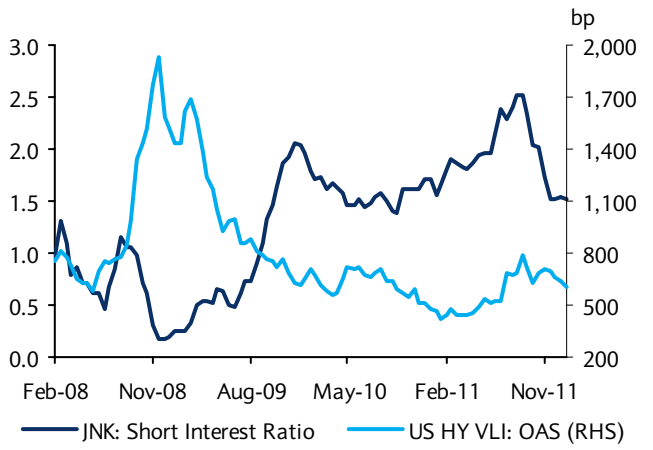
Figure 10: Price Returns Correlation Matrix

	JNK	HYG	US HY	HYCDX (OTR)
JNK	–	0.77	0.50	0.57
HYG	0.96	–	0.47	0.61
US HY	0.92	0.88	–	0.53
HYCDX (OTR)	0.82	0.83	0.78	–

Daily Data
Monthly Data

Source: Bloomberg, Barclays Capital

Figure 11: JNK Short Interest Ratio versus VLI Spread



Source: Bloomberg, Barclays Capital

Shorting the ETF may never be as cost effective as using CDX. Nonetheless, we were interested to see whether short interest in ETFs could potentially serve as a barometer of market sentiment, or even a leading indicator of market stress. While short interest and spreads are indeed negatively correlated (Figure 11), high yield ETF assets were very small in the period prior to 2009, making it difficult to gain confidence in that result. Furthermore, from 2010 to today, the correlation is essentially zero. Unfortunately it is also unclear whether an increase in short interest would be an indication of re-hypothecation of ETFs to clients looking to get long the market or client shorting.

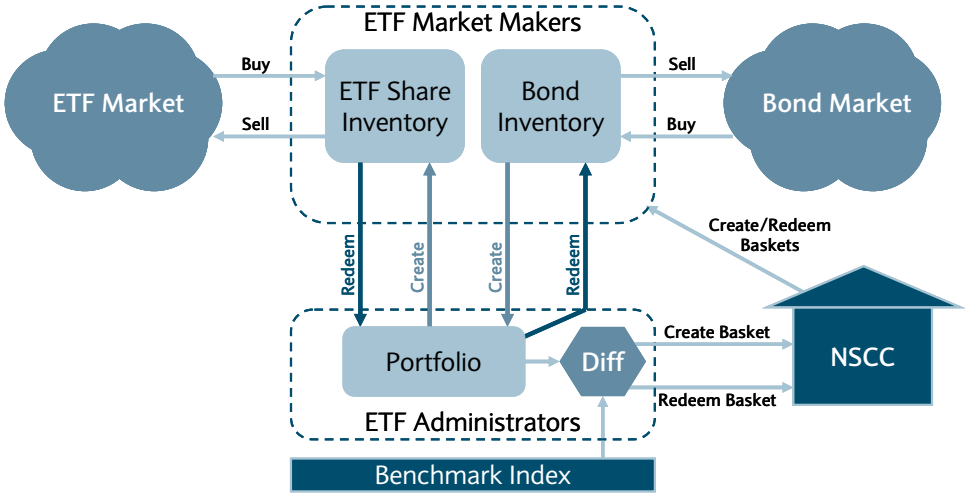
Appendix

ETF market makers, typically (but not always) broker/dealers, can supply liquidity in ETFs through three distinct sources. First, they can use their own inventory to supply shares to clients. Second, if they do not have sufficient capacity on their own, they can source more shares through the secondary ETF market. The last source, unique to ETFs, is to create or destroy shares through the "create" and "redeem" mechanisms.

Create/Redeem Mechanics

To create new shares of an ETF, the market maker must deliver bonds to the ETF administrator, who will, in turn, exchange those bonds for newly issued shares of the fund. However, while the ETF may be benchmarked to an index containing hundreds of bonds, the market maker does not need to assemble a comprehensive basket representing the entire benchmark. Indeed, a much smaller subset of bonds can be traded for a newly minted lot of shares called a "creation unit."[3] The reason for this apparent mismatch is simple: the ETF administrator's main objective, beyond providing a product that represents liquid access to different segments of the credit markets, is to minimize tracking error versus a benchmark. Thus, in an attempt to reduce tracking error while making the share creation process manageable for market makers, ETF administrators will typically accept for creation those bonds which they are underweight relative to their benchmark. This list of acceptable bonds, which can change daily, is called the "create basket" and is disseminated to market makers through the National Securities Clearing Corporation (NSCC), a subsidiary of the Depository Trust and Clearing Corporation (DTCC). However, the ETF administrator will not generally require the entire set of bonds in the create basket (currently on the order of 30-40 individual bonds for JNK/HYG. for example) to create shares. Instead, through a negotiated process, market makers and administrators can engage in share creation with far fewer bonds – often less than ten.

Figure 12: Credit ETF Share Creation and Redemption



Source: Barclays Capital

[3] An ETF creation unit is typically one hundred thousand shares.

The process of destroying, or "redeeming," shares follows the same mechanism in reverse. ETF market makers supply the ETF administrators with shares in the fund and, in exchange, receive a negotiated subset of bonds in the ETF's "redeem basket," which, similar to the create basket, can change daily and is disseminated to market makers by the NSCC. Equivalently, bonds in the redeem basket are typically bonds that the ETF is overweight relative to its benchmark index.

Timing and Pricing

ETF market makers can engage in share creation and redemption from the moment they know which bonds are in the "create" and "redeem" baskets. However, the final exchange of bonds for shares (and vice versa) occurs based on bid-side bond prices set by a third-party pricing source at 3pm EST. The pricing source generally corresponds to that used for benchmark pricing. For instance, the JNK ETF and its benchmark, the Barclays Capital U.S. High Yield Very Liquid Index, use Interactive Data Corporation (IDC) as a pricing source. Meanwhile, HYG and LQD, which are each benchmarked to Markit iBoxx indices, use Markit as a pricing source.

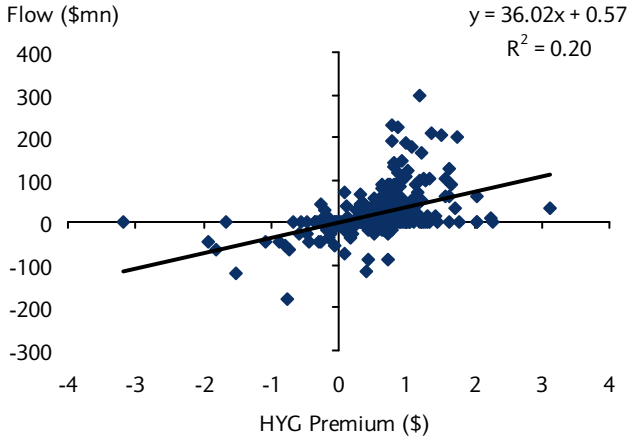
The exchange of bonds for shares is, therefore, done at 3pm NAV. The transaction is not TRACE reportable and does not constitute a taxable event for the fund. as it is considered an "in-kind" exchange. The avoidance of taxable events makes the create/redeem process the preferred method of buying/selling bonds for the ETF administrator.

Primary versus Secondary Volumes

While share creation and redemption occurs at NAV, the ETF market price can fluctuate away from NAV. Thus, the ETF market maker can use the share creation process to arbitrage any premium in the market price relative to NAV. Similarly, a discount to NAV will encourage market makers to redeem shares for bonds to collect that differential. Importantly, the bid side nature of bond pricing will affect the ETF-NAV arbitrage, since the ETF market maker will be purchasing bonds at the offered side. A larger premium to NAV will, therefore, have to exist to compensate the market maker for the immediate loss of bid-ask spread in the share creation process.

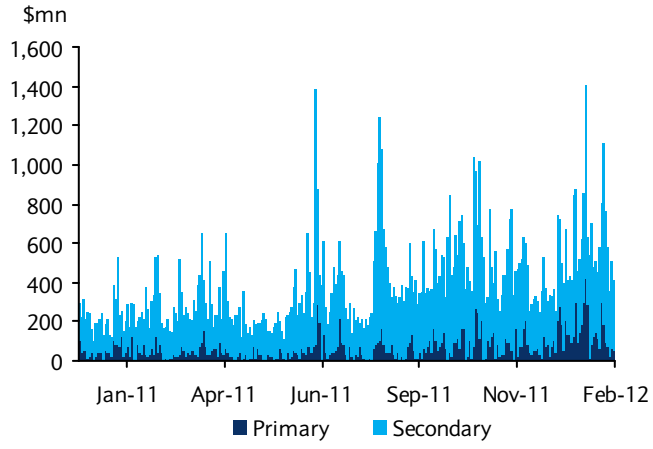
Two main factors should, therefore, drive the market maker's willingness to create or redeem shares, rather than trading them in the secondary market: premium/discount to NAV and the

Figure 13: HYG Net Creation versus Premium/Discount to NAV



Source: Bloomberg

Figure 14: Daily Market Value Traded in High Yield ETFs



Note: JNK and HYG only. Source: Bloomberg

size of client orders. While the second factor is difficult to test empirically, Figure 13 demonstrates that share creation and redemption volumes are positively related with the premium or discount to NAV. We also find that primary and secondary volumes are correlated (12m correlation of ~0.5). However, as Figure 14 shows, secondary volumes are significantly larger (~5x, on average) than primary volumes. This makes intuitive sense, since share creation and redemption volumes should only occur when a large premium/discount – which is constantly being arbitraged away – exists, or as a result of very large orders. In contrast, a large float of existing shares may trade hands daily under more "normal" circumstances.

Active or Passive?

While the vast majority of ETFs are passive, ETF portfolio managers typically have some discretion. A few examples include:

- **Bond substitutions:** A perfect match between the ETF portfolio and the ETF benchmark index will certainly minimize tracking error, but is not always feasible. Thus, when the create/redeem process does not yield enough of a particular benchmark bond, administrators will occasionally accept bonds with similar characteristics as a substitute. While the substitute will likely be imperfect, it will generally be preferable – from a tracking error standpoint – to remaining underweight.

- **New benchmark bond for an existing credit:** If a corporate event (e.g., new issue, redemption) leads to a change in the benchmark bond for a member credit, the administrator for that ETF is likely at low risk of experiencing significant tracking error. Swapping the old for the new bond will therefore be less urgent and may occur over a longer period to avoid unnecessary transaction costs.

- **New issue and other foreseeable events:** ETF benchmarks generally rebalance on a monthly basis. However, at any point before month-end, the rules governing the benchmarks (Figure 15) will allow administrators to project bond turnover. To the extent that administrators can foresee changes in their benchmark, they can and do manage their portfolios in advance of the month-end changes. For instance, if a corporate issuer comes to the primary market for a new bond that will ultimately enter an ETF benchmark, that ETF's administrator will likely seek to participate in the primary issuance of the bond.

  Indeed, ETF support for a new issue can be meaningful. For example, if a new $1bn high yield bond were to be eligible for the JNK and HYG ETFs, they would eventually need to purchase about 9.5% of the bond.[4] Furthermore, if the ETF is unable to get a sufficient allocation in the primary market to meet its weighting target, it will likely seek to purchase the remaining amount in the secondary market. Thus, ETF demand can provide incremental support to new issue when it qualifies for benchmark inclusion.

Figure 15: Selected ETF Benchmark Index Eligibility Rules

Ticker	Benchmark	Eligibility Rules
LQD	iBoxx $ Liquid Investment Grade Index	▪ USD fixed-rate corporate securities from specific geographies ▪ Excluded: perpetual, putable, callable, preferred shares, other equity features, PIKs, Reg S ▪ Rated investment grade (average of agencies) ▪ Min $750mn issue size, and min $3bn in USD debt outstanding from the issuer ▪ Min 3 years (3.5 years for new issue)

[4] A $1bn issue would be approximately a 50bp weight in the JNK benchmark and a 25bp weight in the HYG benchmark. Given the size of the ETFs, their allocation to match those weights would add up to about $95mn, or 9.5% of the proceeds.

Ticker	Benchmark	Eligibility Rules
HYG	iBoxx $ Liquid High Yield Index	▪ USD fixed-rate corporate securities from specific geographies ▪ Excluded: yankees, zeros, perpetual or putable, preferred shares, other equity features, PIKs, Reg S ▪ Rated high yield (average of agencies, but none can have an IG rating) ▪ Min $400mn issue size, and min $1bn in USD debt outstanding from the issuer ▪ Max of 5 years since issuance ▪ Min 3 years (3.5 years for new issue) and max 15 years until final maturity
JNK	Barclays Capital High Yield VLI	▪ USD fixed rate (or currently fixed rate) corporate securities ▪ Excluded: Reg S, emerging market bonds, bonds with equity features ▪ Rated high yield (median of three agencies, minimum of two) ▪ Min $600mn issue size. Largest bond for that issuer. ▪ Max of 3 years since issuance ▪ Min 12 months until final maturity

Source: Markit, Barclays Capital

Analyst Certification(s)

We, Eric Gross, Mike Kessler and Bradley Rogoff, CFA, 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.

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