Innealta
CAPITAL

COMMENTARY: DECEMBER 4, 2012

A CLOSER LOOK AT ETF PRIMARY MARKET LIQUIDITY

- Exchange Traded Funds (ETFs), the building blocks of our portfolios, constitute one of the most important recent innovations in the financial industry. ETFs are low-cost, liquid vehicles for achieving targeted, passive exposures to specific asset classes. The innovation of the ETF has opened exciting opportunities to investors, extending liquid, intraday trading vehicles for gaining ever-more granular investment exposures.
- From time to time, we take advantage of the monthly commentary to present highlights of our ongoing research on ETFs. These research efforts are designed to ensure that we are knowledge leaders in this product space, identifying potential opportunities and pitfalls presented by its ongoing evolution. Specifically, our past research highlighted the tracking performance of ETFs, focusing on the extent to which these funds provide daily exposures closely resembling those of the target benchmark index. This month, we highlight recent research efforts focusing on the creation/redemption mechanism.

In a sense, ETFs combine the most desirable features of both closed-end and open-end funds (mutual funds). Closed-end funds offer investors the ability to transact at any time during the day, compared to once-daily liquidity offered by mutual funds. This 'feature' can present a problem for investors like us who are seeking passive exposures to specific asset classes; the virtue of intraday trading also allows the price of the close-end fund to drift away from the underlying value of the fund's holdings, which constitute its net asset value (NAV). As investor demand and the supply of available shares determine the secondary market prices, in fact, the price of traditional closed-end funds frequently differ meaningfully from the fund NAV. Such differences are detrimental to the ability of a fund to provide return exposures to investors that closely resemble those of the target benchmark index.

ETFs to some extent circumvent this potential failing through their additional layer of liquidity in the primary market. In the primary market for ETFs, Authorized Participants (APs) can create or redeem shares of the ETF at NAV. If secondary market prices differ sufficiently from the prevailing NAV, an arbitrage opportunity may exist that the APs can exploit. To illustrate this process, consider the case where the ETF market price exceeds the NAV. The difference suggests the demand for the ETF shares in the secondary market outpaces the available supply, resulting in the shares trading at a premium to their presumed fair price, or NAV. The AP (or an ETF arbitrageur via the AP) acts opportunistically by selling short ETF shares and purchasing the basket of securities needed to back those shares. The AP then delivers the basket of securities to the trust in exchange for new shares of the ETF (i.e. new shares of the ETF are created) and the AP closes out (settles) their short ETF position with the new ETF shares received in the exchange. The process works in reverse should the ETF price be less than the intraday estimate of fair value (NAV), and the AP in this case buys the ETF shares, sells short the basket of securities, redeems shares of the ETF with the trust, receives the basket of shares, and settles the short sales by delivering the basket securities. The creation/redemption process illustrated above is referred to as "in-kind" and plays an important role in ETFs' tracking of the benchmark index and tax efficiency.

There are certain frictions, however, that can bog down the in-kind creation/redemption process. Primary market liquidity depends critically on APs' ability to transact in the basket securities. In certain cases, this is difficult or nearly impossible, such as ETFs tracking non-U.S. benchmark indexes when the constituent securities are restricted from foreign ownership or when currency transactions taxes may be large. A work-around is thus required and comes in the form of cash creations. Additionally, in the case of leveraged ETFs, for which the leverage is obtained through the use of total return swaps, cash creations are the only option, since the fund holdings are over-the-counter derivatives contracts.

In light of the fact that our portfolios make use of several ETFs having "cash" as opposed to "in-kind" creation/redemption processes, naturally we sought to test this mechanism, applying empirical analyses to ascertain whether the cash creation/redemption process functions as efficiently as the in-kind process.

WHY MIGHT THE CREATION PROCESS IMPACT PERFORMANCE?

Given certain investment frictions, portfolio managers typically maintain small cash balances. In cases where the portfolio assets appreciate in value, cash balances are harmful to return performance as cash underperforms. To the contrary, when the portfolio assets decline in value, cash balances may boost return performance, since in this case cash outperforms the portfolio assets. In the case of mutual funds, research has exhibited a "smart money effect," which refers to the fact that investors typically buy shares of mutual funds just prior to positive returns to the funds' shares. In the event that these cash inflows are not deployed right away, the existing shareholders may experience a dilutive effect from these flows. The intuition is simple: Assume a mutual fund experiences inflows today, but is unable to invest that cash until the following day, resulting in a large overnight cash balance. If the market opens "up" the following day, the cash balances are invested at the

higher prices, meaning that the large cash balances experienced underperformance relative to existing fund shares. Similarly, if outflows are also "smart," funds' cash balances will be used to satisfy those redemptions, leading to "concentration" of the portfolio during times when the portfolios experience negative returns. Researchers have established this problem is relegated mainly to international mutual funds, which is attributable to the fact that many foreign markets are closed at the close of trading in New York, when mutual funds provide their daily liquidity.

The in-kind creation/redemption process should eliminate any underperformance related to investor flows since there is no need to reinvest cash from inflows or hold cash to meet the liquidity needs of outflows. In cases where ETFs allow cash creations/redemptions, however, it is plausible that ETF flows may lead to similar cash management issues as mutual funds. It is this question which we address in the current research exhibited in this monthly installment.

DEVELOPING A FRAMEWORK FOR ANALYSIS

Answering the question of whether or not cash creations/redemptions result in value loss for ETF investors can only be accomplished by quantitative analysis of ETF return data in conjunction with data on ETF share creations. We first analyze the data through simple sorting techniques to understand the relation between the index returns, creation/redemption activity in ETFs, and the ETF performance relative to the benchmark index. We then develop several models designed to capture the determinants of ETF returns and test these models using historical data.

We first investigate how ETF share creation and redemption activity relates to returns on the underlying benchmark index. Utilizing an extensive sample of U.S. ETFs, we compute for each ETF the daily benchmark index return, denoted as $r_{Index_i,t}$. Additionally, we compute the net daily magnitude of new shares created (redeemed) for each ETF. We define this variable as the percentage change in shares outstanding relative to the previous day, and denote it %ChgNOSH. For each ETF, we then sort all daily observations into five buckets (quintiles) based on the benchmark index return. Index Return Quintile 5 refers to the 20% of observations having the highest index returns, whereas Quintile 1 contains the lowest 20% of index returns. For each ETF, we compute the average %ChgNOSH (average percentage change in shares outstanding from the previous day) for each quintile of daily benchmark returns. We then average these quintile averages across the full sample, dividing the sample based on the creation-redemption process (in-kind and cash).

We conduct our analysis on the full universe of available ETFs, but restrict the sample to include only ETFs having at least $25 million of assets as of June 30, 2012. Additionally, we restrict the analysis to ETFs having at least 100 total sample days to ensure reasonable estimates for the models. The final sample includes 49 ETFs having cash creation/redemptions and a control sample of 230 ETFs having in-kind creations/redemptions.

Do net share creations tend to take place on days when the benchmark index return is the highest? Interestingly, the results presented in Figure 1 below suggest that on days when the index returns are the lowest are the days when new ETF shares tend to be created. This somewhat surprising result likely indicates that liquidity in the ETFs may be superior to that of the assets comprising some of the benchmark indexes. This also might have to do with ETF managers deploying cash opportunistically in an effort to manage exposures; or rebalancing opportunistically as well. The effect is slightly more pronounced for the cash create ETFs than in-kind.

Figure 1: Average Creations (Redemptions) By Benchmark Index Return

		Lowest Index Return				Highest Index Return
		1	2	3	4	5
In-Kind ETFs	% of shares	0.74%	0.39%	0.27%	0.13%	0.04%
	t-stat	12.33	10.79	9.70	6.90	3.02
Cash Create ETFs	% of shares	1.42%	0.51%	0.38%	0.18%	0.12%
	t-stat	5.77	4.39	3.36	2.47	2.93

SOURCE: Innealta Capital

Are net share creations (redemptions) predictive of next-day returns? This is to say, is there a "smart-money effect" over a short (one-day) horizon, where net flows into ETFs as reflected in net share creations tend to precede higher returns? Further, do net outflows as reflected in net share redemptions tend to precede lower returns? As a first-pass, we next sort the ETF data based on the %ChgNOSH variable in a similar manner as above. This time, however, we measure the next-day return to the benchmark index. The quintile averages presented in Figure 2 illustrate that among ETFs with in-kind creation/redemption processes, there appears to be some predictive ability. For example, the average benchmark index return following large net creations is positive and significant at conventional levels, as indicated by the t-statistics reported, for the quintiles of the largest creation days. The average index returns following the largest net redemptions tend to be slightly negative, although not statistically significant.

Interestingly, among cash-create ETFs, large creations and large redemptions (quintiles 1 and 5) appear to precede negative returns to the benchmark index. Given that many of the cash-create ETFs tend to have smaller fund sizes and lower daily trading volumes, it is possible a trader trading on short-term information chooses to trade in larger in-kind ETFs as opposed to cash-create ETFs, suggesting the liquidity offered by in-kind ETFs likely outweighs the possible market timing benefit of cash-create ETFs.

Figure 2: Average Next-Day Benchmark Return Sorted By Creation (Redemption) Activity

		Largest net redemptions				Largest net Creations
		1	2	3	4	5
In-Kind ETFs	return	-0.00%	0.02%	0.05%	0.04%	0.01%
	t-stat	-0.03	3.00	10.16	11.35	3.11
Cash Create ETFs	return	-0.01%	0.03%	0.01%	0.03%	-0.03%
	t-stat	-0.46	1.60	0.74	1.50	-2.07

SOURCE: Innealta Capital

REGRESSION ANALYSIS

We continue the analysis by developing several regression models to further investigate the possible linkage between ETF share creation activity and returns. We begin with a very basic regression model, according to which the ETF return is explained by returns to the benchmark index and the net number of shares created on that day. We denote the day t return to an ETF as $r_{ETF_i,t}$, and the contemporaneous return to that ETF's benchmark index as $r_{Index_i,t}$. To capture creation and redemption activity, we construct the variable $\%ChgNOSH_{i,t}$, which equals the net change in shares outstanding relative to the preceding day (positive for

creations and negative for redemptions), normalized by the total shares outstanding on the previous trading day. This regression model may formally be written as:

$$r_{ETF_i,t} = \alpha + \beta_1 \cdot r_{Index_i,t} + \beta_2 \cdot \%CreateRedeem_{i,t} + \varepsilon_t. \quad (1)$$

The regression is estimated for each ETF in the sample using all available daily data for that ETF and the benchmark index. We expect the estimates of $\beta_1$to be close to one, indicating that the ETFs provide one unit of exposure to the benchmark index. If creation and redemption activity is related to the ETF return performance, then we expect β_2 will differ from zero. Under the hypothesis that cash creations suffer from underperformance due to the lag between the creations (redemptions) and when the fund deploys (raises) cash, we would expect $\beta_2 < 0$.

Although the above model is the baseline model for our analysis, we consider two alternative specifications. In the next specification, we consider creations and redemptions separately, taking account of potential asymmetries in underperformance. Specifically, we separate the potential impact for creations and redemptions.

$$r_{ETF_i,t} = \alpha + \beta_1 \cdot r_{Index_i,t} + \beta_3 \cdot \%Create_{i,t} + \beta_4 \cdot \%Redeem_{i,t} + \varepsilon_t. \quad (2)$$

Central to the hypothesis that cash creations lead to underperformance for ETF investors is the notion that flows in and out of ETFs that result in redemptions stem from "smart-money," which is to say creations (redemptions) precede positive (negative) returns. Under the hypothesis that creation and redemption activity hinders returns, we would expect $\beta_3 < 0$and $\beta_4 > 0$, indicating that both creations and redemptions are associated with incremental underperformance (recall %Redeem is less than zero in the case of net redemptions).

Additionally, we consider another specification designed to take account of the fact that the magnitude of any underperformance associated with creation/redemption activity should be associated with the conjunction of the magnitude of the index return and the magnitude of the creation or redemption activity. Thus, we estimate another regression model with a variable constructed as the product of the ETF return and the percentage change in ETF shares outstanding:

$$r_{ETF_i,t} = \alpha + \beta_1 \cdot r_{Index_i,t} + \beta_5 \cdot (r_{ETF_i,t} \cdot \%CreateRedeem_{i,t}) + \varepsilon_t. \quad (3)$$

Clearly, the potential ETF underperformance stemming from creation and redemptions applies to the cash creations only. This stems from the fact that timing of the cash flows is critical to the dilution story: the underperformance results when the fund manager is not able to invest flows immediately, but eventually transacts at less attractive prices. Thus, in-kind creations and redemptions do not suffer this timing mismatch. Further, among ETFs having cash creation/redemption processes, the hypothesis is more likely to pertain to international ETFs, or ETFs tracking the most illiquid and difficult to transact asset classes.

The Results

The results presented in Figure 3 include the average coefficient estimates and the t-statistics for the baseline regression model. The intercept, or α, simply indicates whether or not the average ETF exhibits positive return relative to the portion of the return explained by the other factors. β_1 indicates the ETFs' exposures to their benchmark indexes. We expect this exposure to be close to 1.0. Our analysis focusses on β_2, which captures the relation between changes in the ETF shares outstanding (reflecting net creation and redemption activity) and the respective daily ETF returns. Referring to the full sample of 49 cash create/redeem funds, we see no statistically significant evidence of such underperformance related to redemption activity. However, the point estimates are negative, implying that the economic dynamic matches our hypothesis that ETF returns are related to creation/redemption activity for the 49 sample ETFs having cash creations. This result is consistent for both domestic and international cash create ETFs.

We compare these results to a control group of ETFs offering in-kind creations. For these funds, the results are similar: although the point estimates are slightly negative, they are not significantly different from zero. The results are consistent with the creation/redemption process taking place during days when intraday ETF prices deviate from the estimated fair value, the NAV.

Figure 3: Regression Estimates for Equation (1)

	Geography		α	β_1	β_2
Cash Create/Redeem	All	value	0.001	0.897	-0.004
		t-stat	4.50	37.71	-1.05
	Domestic US	value	0.001	0.882	-0.007
		t-stat	2.74	16.45	-1.04
	International	value	0.001	0.905	-0.002
		t-stat	4.15	36.86	-0.53
In-Kind Create/Redeem	All	value	0.001	0.891	-0.002
		t-stat	2.86	50.19	-1.38
	Domestic US	value	0.001	0.931	-0.002
		t-stat	2.45	79.26	-1.85
	International	value	0.001	0.808	-0.002
		t-stat	2.50	17.00	-0.46

SOURCE: Innealta Capital

We continue the analysis by reviewing the second model specification, which considers separately creations and redemptions activity. The analysis, which we show in Figure 4, is identical as that presented above in Figure 3, except that it separates creations and redemptions into two variables. Specifically, β_3 captures the impact of creations on the ETF return and β_4 the impact of redemptions. Since creations are positive changes in shares outstanding, if larger creations lead to worse ETF return performance, we would expect $\beta_3 < 0$. Additionally, since redemptions are negative changes in shares outstanding, if larger redemptions are associated with worse ETF return performance, we would expect $\beta_4 > 0$.

The results indicate that there is no statistically significant evidence that cash creations or redemptions impact ETF returns. However, similar to the aforementioned results, the direction of the return dynamics suggest that an economic relationship along the lines described above does indeed exist as illustrated by the fact that the estimates of β_3 and β_4 are of the correct sign. Of course, these results must be taken in the context of the fact the sample of ETFs having cash creations is small, since the vast majority of ETF creations are done in-kind.

Figure 4: Regression Estimates for Equation (2)

	Geography		α	β_1	β_3	β_4
Cash Create/Redeem	All	value	0.001	0.898	-0.002	0.007
		t-stat	4.51	37.84	-0.91	0.30
	Domestic US	value	0.001	0.883	-0.001	0.004
		t-stat	2.92	16.67	-1.00	0.88
	International	value	0.001	0.905	-0.003	0.008
		t-stat	3.83	36.59	-0.82	0.24
In-Kind Create/Redeem	All	value	0.001	0.891	-0.001	-0.008
		t-stat	2.22	50.15	-0.84	-1.98
	Domestic US	value	0.001	0.931	-0.002	-0.001
		t-stat	2.94	79.22	-1.88	-0.35
	International	value	0.001	0.809	0.000	-0.023
		t-stat	1.69	16.99	0.09	-2.08

SOURCE: Innealta Capital

Additionally, it is worth noting that the average β_1 is significantly lower than one. Initially this may seem puzzling, and even troubling, since one would expect the beta exposure to the benchmark index to be close to one. Given that we are using daily data, it is not surprising to see betas below one as there are a number of factors that introduce noise into daily data. For example, the international indexes are likely non-synchronous with the closing ETF prices each day. When we re-estimate the regressions using weekly data, the betas become much closer to one.

We next extend the analysis to consider an additional specification, which accounts for the interaction of the creation (redemption) activity and the return. The motivation for using this "interaction" of the two variables, which are the percentage of net creations (redemptions) and the daily ETF return, accounts for the fact that any underperformance suffered from creations should be larger on days with larger daily returns, and vice-versa. Under the null-hypothesis that there is no relation, we expect $\beta_5 = 0$. Alternatively, under the hypothesis that cash creations are costly for ETF investors, we expect $\beta_5 > 0$.

Referring to the results presented in Figure 5, we see that the point estimates for β_5 among the cash create (redeem) ETFs are positive, which is consistent with the hypothesis that cash creations are costly. The estimates, however, are not statistically significant. Interestingly, the results appear to be concentrated among ETFs tracking benchmark indexes comprising international (non-U.S.) securities. This pattern is entirely consistent with the view that cash creations result in some amount of underperformance as the international funds are those that may find difficulty reinvesting flows immediately, most likely due to time differences between the trading day in New York and the foreign markets.

We compare the estimates to those obtained in the sample of ETFs offering in-kind exchanges. Among these funds, there is no evidence of underperformance associated with creation/redemption activity. In fact, the point estimates are generally negative, which are inconsistent with the hypothesis of underperformance stemming from creation/redemption activity.

Figure 5: Regression Estimates for Equation (3)

	Geography		α	β_1	β_5
Cash Create/Redeem	All	value	0.001	0.898	0.416
		t-stat	4.73	38.01	0.87
	Domestic US	value	0.001	0.883	-0.372
		t-stat	2.94	16.77	-0.77
	International	value	0.001	0.906	0.798
		t-stat	4.03	36.72	1.20
In-Kind Create/Redeem	All	value	0.001	0.911	-0.107
		t-stat	0.35	72.52	-0.41
	Domestic US	value	0.001	0.938	-0.285
		t-stat	1.37	59.43	-0.80
	International	value	0.001	0.855	0.261
		t-stat	-0.74	44.82	0.87

SOURCE: Innealta Capital

CONCLUSION

In summary, research conducted by the investment team at Innealta put to test a key feature of ETF liquidity: the structure of the ETF primary market liquidity mechanism. ETFs, unlike traditional closed-end funds or mutual funds, offer two layers of liquidity: the secondary market, where investors transact existing shares, and the primary market, where Authorized Participants create and redeem shares when imbalances in supply and demand in the secondary market cause the ETF price to differ meaningfully from estimated fair value. Our analysis finds that both mechanisms appear to be efficient, though some performance impact is evident, providing further evidence that the ETF structure provides a valuable vehicle for gaining ever-more-granular exposures.

The majority of ETFs have in-kind exchanges, while a smaller number of ETFs have cash exchanges. Cash exchange processes are similar to the process for mutual funds, where the respective fund provides liquidity at the NAV. Research has demonstrated that, particularly among international mutual funds, the delay between the fund flows and when the fund transacts in the portfolio securities creates return drag suffered by all investors in that fund. Thus, we examine the saliency of the ETF cash creations process, focusing on a possible link between creation and redemption activity and returns. We do not find any concrete evidence of underperformance related to creation or redemption activity. We do note, that among international ETFs having cash exchange processes, the estimates, although not statistically significant, suggest a possible link between exchanges and performance. Most notably, that same relation does not present in the control sample of international ETFs featuring in-kind exchanges.

In conclusion, our research results confirm the efficacy of the ETF transmission process in offering investors vehicles for gaining targeted investment exposure.

PORTFOLIO UPDATE

As an additional component to the latest revision to the Fixed Income portfolio within our Rotation strategies, we further pared total holdings by one, consolidating the 5% formerly held in the SPDR Barclays Capital Emerging Markets Local Bond ETF (EBND) position into the Market Vectors Emerging Markets Local Currency Bond ETF (EMLC) allocation, bringing the latter to 10%. We originally had accepted the similarity of the exposures for want of diversification of provider and ETF (both were small and lightly liquid). Now that EMLC is substantially larger and more liquid than it had been, we felt the dual ownership no longer necessary.

The portfolio as it now is apportioned is as follows:

Ticker	Name	Weight (%)	Effective Duration	Yield to Maturity
MBB	iShares Barclays MBS Bond	10	1.37	0.85
EMHY	iShares Emerging Markets High Yield Bond	5	5.51	6.47
EMB	iShares JPMorgan USD Emerg Markets Bond	5	7.65	4.06
EMLC	Market Vectors EM Local Curr Bond ETF	10	4.88	5.49
IHY	Market Vectors Intl High Yield Bond ETF	5	3.88	7.23
JNK	SPDR Barclays Capital High Yield Bond	25	4.32	6.70
VCIT	Vanguard Interim-Tm Corp Bd Idx ETF	25	6.31	2.70
VCLT	Vanguard Long-Term Corp Bond Idx ETF	10	13.89	4.41
VCSH	Vanguard Short-Term Corp Bd Idx ETF	5	2.83	1.37
		weighted average	**5.67**	**4.38**

As of 12.02.12. SOURCE: Innealta Capital and Morningstar

ENVIRONMENT AND POSITIONING

Now that the election is behind us, the remainder of 2012 and the year 2013 should provide a constructive backdrop for our portfolios, no? Well, we suppose that depends on the specific emphasis of 'constructive.' We imagine that, given the philosophical impediments to progress (not to mention the time-related and other practical constraints) against the near-term irritant that's the fiscal cliff and the longer-term quagmire that's the evolving U.S. solvency scenario, investors should be well braced for a good bit of volatility from the former, while setting up their approaches to portfolio management to embrace the latter, which likely will provide many manners of pressures in regard to U.S. and global macroeconomic growth and, more practically, corporate fundamentals. This is true, in our view, under most all prospective scenarios we can conjure.

Much of that apprehension is supported by our quantitative framework, which continues to express mostly neutral views of much of the equity world, on both the risk and the fundamental ledgers. Meantime, the macroeconomic backdrop is weak and broadly weakening, even as monetary policy remains accommodative around the globe. For the kicker, the direction of recent momentum seems pretty obviously not so favorable toward equities.

As always, we'd like to believe that these reviews will change, through some mix of more reasonable valuations on top of more solid and positive-trending underlying fundamentals. We expect to see, however, a good bit of the former happening before the latter. But, that's not to say that there aren't a few pockets of potential surprise out there that we could tap into even against this milieu of discord and gloom.

Otherwise, remaining unconvinced of near-term inflation pressures, we expect the Federal Reserve to retain its very accommodative stance, just as it has said it will. We therefore remain well comfortable in the fixed income portfolio that we recently revamped to include greater diversity of non-dollar and non-U.S. exposures.

This likely coming as the final commentary for 2012, we wish everyone a safe, warm and festive holiday season. Well wishes, too, for a grand start to the New Year.

IMPORTANT INFORMATION

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Sector ETFs, such as Real Estate Investment Trusts ("REITs") are subject to industry concentration risk, which is the chance that stocks comprising the sector ETF will decline due to adverse developments in the respective industry.

The use of leverage (borrowed capital) by an exchange-traded fund increases the risk to the fund. The more a fund invests in leveraged instruments, the more the leverage will magnify gains or losses on those investments.

Country/Regional risk is the chance that world events such as political upheaval or natural disaster will adversely affect the value of securities issued by companies in foreign countries or regions. Country/Regional risk is especially high in emerging markets.

Emerging markets risk is that chance that stocks of companies located in emerging markets will be substantially more volatile, and substantially less liquid, than the stocks of companies located in more developed foreign markets.

Securities rated below investment grade, commonly referred to as "junk bonds", may involve greater risks than securities in higher rating categories. Junk bonds are regarded as speculative in nature, involve greater risk of default by the issuing entity, and may be subject to greater market fluctuations than higher rated fixed income securities.

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