Institutional investor preferences: Evidence from exchange-traded notes

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Abstract

We use the introduction of exchange-traded notes (ETNs) as a way to examine which characteristics of institutional investors' preferences are generalizable across new types of security design, as well as to infer which of the novel characteristics of ETN are in demand from institutions. As with equities, we find that institutions are drawn to ETNs with higher levels capitalization, liquidity, and risk. Unlike in equity markets, we find no association between past returns, representing either momentum of contrarian patterns, and institutional preferences for ETNs. Instead, institutions engage in contrarian behavior by chasing underpriced ETNs. Lastly, we find changes in institutional holdings to be positively associated with future ETN returns. Overall, our results suggest that preferences of institutional investors are robust across security types, but that inferences made only with regard to equities can be incomplete.

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1. Introduction

Institutional investors dominate the markets for many traded securities. Blume and Keim (2012) show that institutional investors continue to grow in terms of total assets and market share; they accounted for 67% of equity ownership in 2010. With the introduction of Exchange Traded Notes (ETNs), institutional investors are provided with a new security design. ETNs are long-term unsecured notes where the return on the note is tied to an index. Like Exchange Traded Funds (ETFs), ETNs are traded on exchanges and can be redeemed at the investor's discretion. ETNs were introduced to the market in 2006 by Barclays Bank PLC with the listing of two iPath ETNs. Since then, the number of listed ETNs continues to increase, as does their share of the exchange traded products market.

This study examines institutional preferences for ETNs and how institutional holdings affect the underlying characteristics of these recent financial innovations. Tests of institutional preferences in the ETN market can provide insights as to what extent the characteristics found to be significant for institutional investors in equities markets are generalizable to the ETN market, or if those preferences are the result of the unique characteristics of equity securities. If institutional investors base ETN selection on established preferences, then ETNs may be perceived as an additional security design that may enable savings on transaction costs in appropriate settings. However, if institutional investors value ETN characteristics that differ from other holdings, this suggests that the proliferation of ETNs may be best explained by the contention that ETNs meet a previously unfulfilled niche need of institutional investors.

We find that institutional preferences for ETNs are positively associated with the ETN's liquidity (standardized volume) and risk (price volatility). This finding is consistent with

evidence from equity markets; institutional investors prefer more liquid, albeit riskier, equity securities (Bennett, Sias, and Starks 2003). Academics have interpreted the shift in preferences for riskier securities as stemming from institutional investors' desire to achieve higher returns by shifting investments to "greener pastures" (Bennett, Sias, and Starks 2003).

In addition to liquidity and risk preferences for ETNs, we also examine if institutions select ETNs based on past return patterns. Gompers and Metrick (2001) document that institutional investors follow contrarian strategies, while other researchers suggest that institutions follow momentum strategies (Nofsinger and Sias 1999; Wermers 1999). We find support for neither notion. Prior ETN returns in our sample do not appear to be related to the level of institutional investment in ETNs.

In addition to studying the preferences of institutional investors for ETNs, we also examine the impact of institutional ownership on ETN characteristics and how the impact of institutional ownership on ETNS differs from other securities. Prior research suggests institutional turnover significantly influences equity securities' characteristics. For example, Bennet, Sias and Starks (2003) find that increases in institutional ownership lead to increases in the liquidity and the firm-specific risk of the underlying security. Further, Blume and Keim (2012) show that institutional ownership is significantly related to equity illiquidity. Accordingly, we examine whether changes in institutional investor's ownership impact the characteristics of ETNs. We focus on ETN liquidity, returns, and observed discounts (premiums).

In contrast to published studies of equity securities, we find that changes in institutional ownership are not significantly associated with changes in ETN liquidity or the observed price discounts (premiums). The insignificant relationship between institutional turnover and ETN

volume suggests institutional trading does not determine ETN liquidity. The lack of a relationship between changes in institutional holdings and ETN discounts (premiums) suggest institutional trades do not convey the same information, nor influence trading in the same manner, as for equities. However, we do find that institutional turnover is positively related to changes in future returns.

Overall, this analysis adds to the institutional preference literature by documenting how institutional investors apply their liquidity and risk preferences to the ETN market. The identification of institutional preferences in the ETN market can also be valuable for issuers looking to target ETNs specifically to institutional investors. Counter to the findings in the equity market, changes in institutional holdings do not result in subsequent changes in ETNs' liquidity or the observed discounts (premiums). The positive relationship between institutional turnover and changes in subsequent ETN returns suggests that, similar to the equities market, institutions may be able to implement profitable trading strategies in this market.

The paper proceeds as follows: Section 2 develops the hypotheses motivating this analysis, Section 3 describes the data and empirical methodology, Section 4 provides results, and Section 5 concludes.

2. Research Hypotheses

2.1 Hypothesis 1

Our first hypothesis concerns institutional liquidity preferences. Published research has shown that institutions prefer liquid stocks [Gompers and Metrick (2001), Bennet, Sias and Starks (2003), and Falkenstein (1996)]. ETN liquidity levels can vary dramatically. Thus, we use

the ETN market to further the understanding of institutional liquidity preferences and to see how this preference applies to the ETN market. The formal null hypothesis being tested is:

$H1_0$: An ETN's liquidity is not significantly related to the proportion of shares held by institutional investors.

If institutional investors have a preference for liquid securities, then ETN liquidity should be positively and significantly related to institutional ownership. Liquid ETNs provide institutional investors with fewer costs and risks when it comes to implementing trades. This aspect and the documentation of liquidity preferences for institutional equity holdings, motivate a positive and significant relationship is between ETN liquidity and institutional ownership.

2.2 Hypothesis 2

Recent studies have suggested that over time institutions shifted their preferences towards smaller, riskier securities [Bennet, Sias, and Starks (2003) and Blume and Kiem (2012)]. This transition in holdings reflects institutional investors' desire to hold securities with higher expected returns. If institutional investors are pursing riskier securities in hopes of "greener pastures" then institutional investors should have a preference for riskier ETNs. Thus, we test whether the institutional trend towards holding higher volatility stocks applies to the ETN market. The formal hypothesis being tested is:

$H2_0$: An ETN's price volatility is not significantly related to the proportion of shares held by institutional investors.

Since ETNs are a recent financial innovation, it is expected that the shift in institutional preferences for higher volatility securities applies to the entirety of the ETN market. As such, a positive and significant relationship is expected between ETN volatility and the proportion of shares held by institutional investors.

2.3 Hypothesis 3

Institutional investors may follow a trend-following (momentum) or contrarian investment strategy when it comes to security return preferences. Nofsinger and Sias (1999) finds that institutional investors implement momentum (feedback trading strategies) while Chen et al. (2012) find that institutions follow a contrarian investment strategy. Given the conflicting conclusions related to institutional return preferences, the ETN market provides a new opportunity to test whether institutional investors incorporate a return-based strategy when selecting securities. We test whether past ETN returns are significantly related to the proportion of shares held by institutional investors. The formal hypothesis being tested is as follows:

$H3_0$: An ETN's past return is not significantly related to the proportion of shares held by institutional investors over the following period.

Institutional investors have been found to incorporate return preferences. Thus, a significant relationship is expected between past returns and the number of institutional shares held. A positive and significant relationship would support that institutional investors follow momentum strategies while a negative and significant relationship supports a contrarian investment strategy.

2.4 Hypothesis 4

Changes in institutional ownership have been found to impact the underlying characteristics of various securities that are held or traded. Gompers and Metrick (2001) find that institutional demand for large stocks has increased security prices. ETNs may sell at a premium or discount from their indicative values. The occurrence of a discount/premium has yet to be significantly explained, but it may be a result of investor demand (Cerna et al. 2012) or a reflection of investor expectations. If changes in institutional ownership lead to better price

discovery or shifts in demand, as found in the equities market, then changes in institutional ownership may significantly impact an ETN's discount/premium.

Bennet, Sias and Starks (2003) find that institutional ownership increases stocks turnover levels in the following quarter. In contrast, Blume and Keim (2012) find that institutional ownership is significantly related to equity illiquidity. If institutional holdings impacts the liquidity of security, then changes in institutional holdings should result in significant changes in ETN liquidity. The impact that institutional holdings has on ETNs is important especially if institutional holdings are resulting in ETN illiquidity; the institutional motivated illiquidity may restrict the security from attracting additional, particularly individual, investors.

When looking at changes in institutional ownership and subsequent returns, researchers have found a positive correlation between institutional turnover and security returns the following period (Lakonishok et al 1992, Nofsinger and Sias 1999, and Gompers and Metrick 2001). The positive correlation may be a result of informed trading by institutional investors or the change in returns may be a direct result of the institutional trades. If institutional investors are informed or impact subsequent returns, then changes in institutional holdings of ETNs may significantly impact subsequent ETN returns.

We test the impact that changes in institutional holdings have on ETN characteristics. Changes in ETN volatility and returns are of particular interest because of their emphasis in the equity-based institutional holdings literature. Changes in ETN discounts (premiums) are also considered in hopes of providing at least a partial explanation for the occurrence of ETN discounts (premiums). The formal null hypothesis being tested is as follows:

$H4_0$: Institutional turnover is not significantly related to changes in ETN liquidity, discounts (premiums), or returns over the following period.

Following the findings of Blume and Keim (2012), it is expected that when institutions increase their holdings of an ETN, the security becomes less liquid. Thus a negative relationship is expected between changes in institutional ownership and liquidity. If changes in institutional ownership have a positive and significant effect on equity returns then it is expected that a positive relationship is found with ETN returns. This relationship would suggest that institutional investors are either skilled or that their trades influence the future returns of the security. Lastly, a positive and significant relationship is expected between changes in institutional ownership and an ETN's discount/premium. If institutions increase (decrease) their position in an ETN, then there is increased (decreased) demand for that security and it is being conveyed that these institutions expect positive (negative) returns. These institutional influences are expected to translate to subsequently higher premiums (lower discounts) for ETNs.

3. Data and Methods

Using data obtained from Bloomberg, we complete several tests of institutional holdings, and changes in institutional ownership, using the ETN market. The analyses have two sides. First, we test institutional preferences in relation to the ETN market. Next, we test the impact that institutional turnover has on the underlying ETN characteristics.

3.1 Data

The Bloomberg database serves as the primary source of data for this analysis. Data are obtained from the first ETN introduction in June of 2006 until the end of December 2013. Of the 285 ETNs listed in Bloomberg that are listed on US exchanges and that are in United States Dollars, 259 of them have data in the Bloomberg database[1]. Of the 259 ETNs with Bloomberg

[1] Some of these ETNs are dropped because they are still pending listing and the remaining ETNs require further investigation

data, 18 of the ETNs do not have valid institutional holdings data. Thus, the analysis consists of 238 ETNs.

Bloomberg does not currently provide time series data on ETN institutional investors at the individual investor level. Instead, all of the institutional holdings are summed into one institutional holdings variable. Bloomberg documentation notes that "institutions include 13F filers, US and International Mutual Funds, Schedule D filers (US Insurance Companies) and institutional stakeholdings that appear on the aggregate level." All of the institutional data are based on the holdings filings that are collected by Bloomberg. The institutional holdings variables are available from 2010 until 2013. For ETN institutional holdings data from 2006 until 2010, the aggregate institutional holdings variable and number of institutional holders were hand-collected through historical files available on Bloomberg.

Our primary liquidity variable is an ETN's standardized volume. The average spread of an ETN is also used as robustness. ETN risk (volatility) is captured through the standard deviation of an ETN's returns.

Table 1 presents descriptive statistics of the institutional holdings variables for the entire sample period. The number of shares held and the number of institutional holders are obtained at quarterly frequencies resulting in 3,330 ETN-quarter observations. For the entire analysis, quarters are based on calendar quarters; March 31, June 30, September 30, and December 31. The calendar-based quarters follow those implemented by most institutions in their SEC holdings filings.

An important distinction about the accuracy of the institutional holdings data must be made. The inconsistency of the Bloomberg institutional holdings data can be seen by looking at the *Bloomberg Inst. Holdings* variable and the *Inst. Holdings* variable in Table 1. Bloomberg

provides their own calculation (*Bloomberg Inst. Holdings*) which is meant to capture the percent of ETN shares held by institutions. The data associated with this Bloomberg variable at a given quarter-end will incorporate all filings that have occurred up until a given date (based on the filling date, not the report date). Since the data is based on the filing date, the institutional ownership data is stale, most often by 45 days. Even when correcting for the error in dating the institutional holdings, an exact quarter-end value is not possible since the data is only provided at the aggregate level. We provide our own calculation of institutional ownership (*Inst. Holdings*) which is calculated in the same manner as the Bloomberg variable; by taking the percentage of shares held by institutions at quarter end divided by total shares outstanding at quarter end. However, the *Inst. Holdings* variable incorporates the hand collected data and is winsorized. Neither variable is perfect in capturing the percent of shares held by institutions because of the errors with Bloomberg's institutional shares held variable. If shares are redeemed or if the issuer decides to create new shares, then shares outstanding at the end of the quarter will not accurately match to the shares outstanding when the institutional holdings are filed. It is because of this occurrence that it is possible for the percent outstanding to be greater than 100%. To account for this estimation error, we set the maximum value for the *Inst. Holdings* variables to be 100%.[2]

3.2 Regression Analysis

Institutional investors, as classified through Bloomberg, include banks, insurance companies, mutual funds, and investment advisors. The first analysis tests for an association between institutional preferences and certain ETN characteristics. As such, the dependent

[2] Future versions of this paper hope to incorporate Thomson Reuters data which will provide data at the individual institution level as well as specific filing and report dates for each institution. This will provide additional clarity and allow for more accurate estimates of the percent of ETN shares held by institutions and an overall more accurate and complete analysis.

variable is the number of ETN shares outstanding that are held by institutional investors (*Inst. Holdings*) at the end of a given quarter divided by shares outstanding. Explanatory variables are lagged one period to capture the characteristics that influenced the institutions' investment decisions. The primary ETN liquidity variable used in the testing of Hypothesis 1 is ($volume_{i,t-1}$), which is the mean volume standardized by the shares outstanding. ETN volatility characteristics are captured through ($volatility_{i,t-1}$) which is the standard deviation of returns over the prior quarter and allows for the testing of the Hypothesis 2. Mean monthly returns ($returns_{i,t-1}$) is the primary variable of interest in testing Hypothesis 3.

The log of the ETN's average market capitalization, calculated as price times shares outstanding ($mktcap_{i,t-1}$), is included to control for the size of an ETN. The log of an ETN's average price is included to control for ETN prices ($price_{i,t-1}$). Security prices are often classified as small (less than $5) or large (greater than $5). Therefore, robustness tests control for small price stock preferences by substituting an indicator variable ($price_ind_{i,t-1}$) for the ETN price. This indicator variable equals 1 if the ETN is priced over $5 and 0 otherwise. The ETN's discount/premium standardized by the average ETN price the quarter ($premium_{i,t-1}$) is also included to control for variations in ETN pricing from indicative values. An ETN's fees ($fees_{i,t-1}$) and age ($age_{i,t-1}$) are also included as controls. Year fixed-effects, objective fixed-effects, and issuer fixed-effects are also included in the full model.

Spread is included in a variation of the equation. This variable can provide additional insight on liquidity, but is not a focus of this analysis because of the loss of observations associated with its inclusion. Given the panel dataset, the estimations may be biased from cross-correlation, autocorrelation, or both. Following Petersen (2008) and Thompson (2001), clustering of errors is used to ensure that the estimations are robust. Year fixed effects are included in the

full model. Robustness tests are also run that exclude the clustering of error and instead include objective fixed-effects and issuer fixed-effects. The full model used in the testing of the first three hypotheses is of the form:

$$Inst\ Holdings_{i,t} = \beta_0 + \beta_1 returns_{i,t-1} + \beta_2 volume_{i,t-1} + \beta_3 volatility_{i,t-1}$$
$$+\beta_4 mktcap_{i,t-1} + \beta_5 premium_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 age_{i,t-1}$$
$$+ \beta_7\ price_{i,t-1} + Year\ FE + \ e_{i,t} \quad (1)$$

where *i* indexes ETN and *t* indexes calendar quarters.

Hypothesis 1 examines institutional liquidity preferences. A positive value is expected for β_2 if institutional preferences for ETNs mirror the institutional preferences for liquid equities. Specifically, of the ETNs that institutional investors can choose from, they are expected to prefer those with higher standardized volume. These liquid ETNs provide the investors with benefits when it comes to trading and transaction costs. If institutions have begun to shift to more illiquid holdings, then the relationship may be reflected in the ETN holdings as well. This would result in negative coefficients for β_2.

The results related to the testing of hypothesis 2 are capture in β_3. Given that ETNs are a recent innovation, it is expected that institutional investors apply their shift in preference towards riskier securities to their holdings of ETNs. This would result in a positive and significant coefficient.

The return preferences presented in hypothesis 3, suggest that ETN returns should be related to the proportion of institutional ownership. If institutional investors implement a momentum-based investment strategy, a positive and significant β_1 would result. In contrast, a negative β_1 would suggest a contrarian investment strategy. Given the conflicting findings found

by researches in the equities market, either relationship may be incorporated into the ETN market.

Several variations of Equation (1) are implemented. Model 1 provides the full version as presented in equation (1). Model 2 adds the spread variable to Model 1 while model 3 substitutes the price indicator variable for the log of the ETN's average price. Additional robustness tests for equation (1) are discussed in Section 5.3.

A variation of the tests for institutional preferences can be captured by looking at the relationship between changes in ETN characteristics and changes in institutional ownership. Falkenstein (1996) finds that changes in the underlying security characteristics are related to institutional turnover. He notes that institutional investors will flock to a security once it obtains characteristics that are viewed as attractive; he refers to this tendency as characteristic-based herding. Therefore, we also test whether changes in ETN characters influence changes in institutional ownership the following period.

The dependent variable is the change in proportion of shares held by institutions from time period (t-1) to t ($\Delta Inst\ Holdings_{it}$). The primary explanatory variables will be the change-version of those variables emphasized in equation (1): ($\Delta volume_{i,t-1}$), ($\Delta returns_{i,t-1}$), and ($\Delta volatility_{i,t-1}$). The changes in the explanatory variables are calculated by looking at the difference in the values between period t-1 and the prior quarter (t-2). Control variables include changes in market size ($\Delta mktsize_{i,t-1}$), changes in premiums ($\Delta premium_{i,t-1}$), changes in prices ($\Delta price_{i,t-1}$) and changes in the spread ($\Delta spread_{i,t-1}$). Year fixed-effects are also included. Given the panel dataset, the estimations may be biased from cross-correlation, autocorrelation, or both. Robustness tests exclude the clustering of error and instead include objective fixed-effects and issuer fixed-effects. Therefore, the model is of the form:

$$\Delta Inst\ Holdings_{i,t} = \beta_0 + \beta_1 \Delta returns_{i,t-1} + \beta_2 \Delta volume_{i,t-1} + \beta_3\ \Delta volatility_{i,t-1}$$
$$+\beta_4 \Delta mktsize_{i,t-1}\ \beta_5\ \Delta premium_{i,t-1} + \beta_6 \Delta price_{i,t-1} + \beta_7 \Delta spread_{i,t-1} + Year\ FE + e_i \quad (2)$$

where *i* indexes ETN and *t* indexes calendar quarters.

If the lagged ETN characteristics are found to be significant, then support is provided for Falkenstein's characteristic-based herding. As motivated in hypothesis 1, institutions should prefer liquid ETNs, therefore β_2 is expected to be positive and significant. This would suggest that as ETNs become more liquid, institutions increase their holdings of that security. Hypothesis 2 states that institutional investors prefer riskier or more volatile ETNs. Following this, β_3 is expected to be positive and significant. Lastly, when looking at return preferences, if institutional investors follow a momentum approach then β_1 should be positive and significant, while a negative coefficient would suggest the implementation of a contrarian investment strategy.

Hypothesis 4 motivated tests of the impact of institutional turnover on changes in ETN liquidity ($\Delta volume_{i,t-1}$), returns ($\Delta returns$) and discounts premiums) ($\Delta premium_{i,t-1}$). These three variables will serve as the dependent variables for three separate equations. The explanatory variable of interest is the prior period's change in institutional holdings (*Inst Turn*$_{t-1}$). Controls are included for changes in the market size, changes in volatility, as well as the age and fees of the ETN. Year fixed-effects are also included. Given the panel dataset, the estimations may be biased from cross-correlation, autocorrelation, or both. Robustness tests exclude the clustering of error and instead include objective fixed-effects and issuer fixed-effects. Therefore the equations to be tested are:

$$\Delta volume_{i,t} = \beta_0 + \beta_1 \Delta Inst\ Holdings_{i,t-1} + \beta_2 \Delta returns_{i,t-1} + \beta_3 \Delta volatility_{i,t-1} + \beta_4\ \Delta premium_{i,t-1} + \beta_5\ \Delta marketsize_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 \Delta age_{i,t-1} + Year\ FE + e_{i,t} \quad (3a)$$

$$\Delta premium_{i,t} = \beta_0 + \beta_1 \Delta Inst\ Holdings_{i,t-1} + \beta_2 \Delta returns_{i,t-1} + \beta_3 \Delta volatility_{i,t-1} + \beta_4\ \Delta volume_{i,t-1} + \beta_5\ \Delta marketsize_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 \Delta age_{i,t-1} + Year\ FE + e_{i,t} \quad (3b)$$

$$\Delta returns_{i,t} = \beta_0 + \beta_1 \Delta Inst\ Holdings_{i,t-1} + \beta_2 \Delta volume_{,t-1} + \beta_3 \Delta volatility_{i,t-1} + \beta_4\ \Delta premium_{i,t-1} + \beta_5\ \Delta marketsize_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 \Delta age_{i,t-1} + Year\ FE + e_{i,t} \quad (3c)$$

where *i* indexes ETN and *t* indexes calendar quarters.

Institutional turnover is expected to be positively related to changes in returns and negatively related to changes in liquidity and the discount/premium of an ETN. A negative and significant β_1 for equation (3a) would support the findings of Blume and Keim (2012) that institutional holdings can cause the security to be illiquid. When looking at the ETN's premium or discount, a negative β_1 is expected for equation (3b). Significant changes in institutional ownership can impact demand and convey investor expectations. This should result in more extreme mispricing with changes in institutional ownership. The relationship between changes in institutional ownership and change in returns over the next period provides insight on whether institutional investor trading is profitable. If institutional investors are skilled, as suggested in equities research, then a positive β_1 for equation (3c) is expected. An alternative interpretation of a positive β_1 for regression 3c is that institutional turnover significantly impacts the returns the following period.

4. Empirical Results

The following section details the findings of the above hypotheses and models. Before the formal analyses are presented, general descriptive statistics provide an overview of characteristics of institutional holdings of ETNs and how institutional holdings have changed over time. We find that institutional liquidity and volatility preferences apply to the ETN market; however institutional investors do not seem to incorporate any return preferences when it comes to selecting ETNs. Institutional turnover is positive and significantly related to changes in subsequent ETN returns.

4.1 Descriptive Statistics

Table 1 shows that the on average, an ETN in a given quarter will have 11 institutional holders and 1.4 million shares held by institutional investors. Of the 238 ETNs in this analysis, AMJ (JP Morgan Alerian Mid-stream Energy MLP Index ETN), DJP (iPath Bloomberg Commodity Index ETN), VXX (iPath S&P500 VIX Short-term Futures ETN), and INP (iPath MSCI India ETN) have the highest average number of institutional investors per quarter with values of 167, 127, 118 and 81 respectively. When looking at the highest average number of shares held each quarter by institutional investors AMJ, RJI (ELEMENTS Rogers International Commodity ETN), VXX, and DJP have the highest values with 39.4, 24.4, 22.6, and 20.9 million shares respectively.

Descriptive statistics for the ETN characteristics are presented in Table 2. Of note is that on average ETNs in the sample have negative returns, sell at a slight discount, have market capitalization of $97 million, and shares held short average approximately 4% of the shares outstanding.

4.2 Results

We know from published papers that institutional preferences impact the equities that those institutions choose to hold. Equation (1) tests whether institutional equity preferences also apply to institutional holdings of ETNs. Hypothesis 1 focuses on institutional liquidity preferences, hypothesis 2 considers risk preferences, and hypothesis 3 looks at institutional return preferences and tests whether institutions follow momentum or contrarian investment strategies. Table 3 presents three variations of equation (1). Model 1 is the full model as presented in equation (1). Model 2 includes the spread variable and Model 3 also includes the spread while also substituting the price indicator variable in for the price variable. The sign and significance of the variables of interest remain consistent over all three variations of Equation (1).

The results in Table 3 suggest that institutions prefer ETNs with higher liquidity with positive and significant coefficient estimates for *Volume*. This finding suggest a rejection of the null of hypothesis 1 and supports the conclusion that the institutional preferences for liquidity that has been documented in equity holdings is also applicable to the ETN market.

Looking at tests of hypothesis 2, the coefficient for ETN volatility is positive and significant at the 1% level for all three models in Table 3. This supports the rejection of the null of hypothesis 2. When it comes to the ETN market, prior findings of institutional investor preferences for more volatile securities is supported for ETNS as well.

Table 3 also presents the relationship between institutional preferences and ETN returns. Here it is found that an ETN's prior quarter's return is not significantly related to the proportion of institutional ownership. Given the insignificant coefficient, we fail to reject the null of hypothesis 3 and there is no support for the implementation of institutional return preferences in the ETN market.

Equation (2) provides an extension of the tests of institutional preferences. Here we test whether changes in ETN characteristics are related to changes in institutional ownership. It is expected that institutional preferences for liquidity and volatility hold when looking at changes in ETN characteristics. Furthermore, the equation tests characteristic-based herding by institutional investors. Table 4 presents the results of Equation (2). Model 1 includes only the explanatory variables of interest without additional ETN controls included. Model 2 includes all of the controls except for changes in spread while model 3 provides the full model.

The results in Table 4 provide some support for institutional preferences for higher volatility ETNs. Specifically, changes in ETN volatility are positively related to changes in institutional ownership. Support is not found for either the liquidity preferences hypothesis or the institutional return hypothesis. When looking at characteristic-based herding overall, little support is provided for occurrence of characteristic-based herding in the ETN market.

Hypothesis 4 considers the impact of institutional turnover on subsequent ETN liquidity, mispricing, and returns. Table 5 presents the results of equation (3a) and considers the relationship between changes in institutional ownership and subsequent changes in ETN liquidity. Model 1 includes changes in institutional ownership as the only explanatory variable while model 2 presents the results from the full equation. In both variations, changes in institutional ownership is not significantly related to changes in ETN volume. This suggests that institutional turnover does not impact subsequent ETN liquidity.

Tests looking at institutional turnover related to changes in ETN discounts and premiums as given in equation (3b) are presented in Table 6. Model 1 includes changes in institutional ownership as the only explanatory variable while model 2 presents the results from the full equation. Model 3 includes an additional control, $\Delta Short$, which captures changes in the number

of shares shorted standardized by shares outstanding. Changes in short selling are included to control for the information contained by changes in the level of short sales which may impact ETN discounts (premiums). In all three variations of the model, the coefficient for changes in institutional turnover is non-significant. This suggests that changes in institutional ownership does not significant influence ETN discounts (premiums).

Table 7 presents the results from equation (3c). For all variations of the model, a positive and significant relationship is found between institutional turnover and subsequent changes in returns. This finding can be interpreted in 2 ways: 1. Institutions are informed investors and use their information to follow a profitable trading strategy in the ETN market 2. Institutional turnover impacts future ETN returns.

When considering the results from equations (3a) and (3b) we fail to reject the null of hypothesis 4; thus changes in institutional ownership do not influence subsequent change sin ETN liquidity or mispricing. This is in contrast to the prior tests of institutional investors in the equities market. The positive and significant relationship between institutional turnover and changes in ETN returns suggests a rejection of the null of hypothesis 4 when it is applied to return. Institutional turnover has been found to be positively related to subsequent changes in equity returns, thus a similar impact of turnover or skill of institutional investors is applicable to

4.3 Robustness and Future Analyses

Cross sectional data can be obtained from Bloomberg for the current quarter that details institutional holdings at the institutional investor level (in contrast to the aggregate data used in the primary analysis). Table 8 utilizes cross-sectional data obtained from Bloomberg for Q3 of 2013. The cross-sectional data includes additional variables such as position change, *institution_type* and the metro area and country of the institutional holder. For the cross sectional

data, there are 682 holder observations. Of these institutions, 370 of them hold only 1 ETN. The institutional descriptive variables holder level are presented in Panel A of Table 8. Here it is found that on average, an institutional investor holds 613,053 ETN shares. For quarter 3 of 2013, institutional investors on average increased their position in the ETN market by 97,357 shares and ETNs make up 1.28% of the institutional investor's portfolio.

There are 193 ETNs included in this cross-sectional sample, with 13 of the ETNs being held by only 1 institutions. The descriptive variables at the ETN level are presented in Panel B of Table 8. On average, an ETN has 2.2 million shares held by institutional investors with a 344,031 increase in an ETN's average shares held from quarter 2 of 2013.

ETN cross-sectional characteristics, such as whether the ETN has a derivative-like index can be utilized to test whether these variables are related to the proportion of shares held by institutional investors. Panel A of Table 9 uses the proportion of ETN shares held by institutional investors as the dependent variable while Panel B uses the number of institutional holders. The explanatory variables include several cross-sectional ETN variables. Leverage Indicator is a dichotomous variable which equals 1 if the ETN has leverage-based characteristics and 0 otherwise. Paired Indicator is a dichotomous variable which equals 1 if the ETN is an inverse-pair ETN and 0 otherwise. The derivative indicator is a dichotomous variable that equals 1 if the ETN has a derivative-like index and 0 otherwise. Here we find that institutions are more likely to hold a lower proportion of ETNs that have derivative like returns and a higher proportion of ETNs that are older. When looking at the number of institutional holders, a higher number of holders is associated with ETNs that have higher fees, are older and are less unique.

Tests similar to those related to hypothesis 1 are completed using this cross-section of data. Table 10 presents an analysis similar to that of as Equation (1) for the cross sectional data.

Here none of the liquidity, volatility, or return preferences are found to be significant when looking at the proportion of shares held by institutions. Panel B looks at the relationship for the number of institutional holders and here volume is positive and significantly related. This suggests that the more liquid ETN attract a higher number of individual institutional investors.

Several variations of equations (1) and (2) are implemented. Table 11 presents variations of Equation (1) showing the results with year, objective and issuer fixed effects as opposed to clustering of errors. The dependent variable is still the average institutional ownership of a given ETN standardized by average shares outstanding for that quarter. The standard errors are higher using the clustering of errors which suggest that corrections for cross-correlation and auto-correlation are supported. The clustering of errors, however, does not change the significance of the results. Therefore, the results are robust to both models. Table 12 implemented equation (1) using the log of the number of ETN shares held as the dependent variable. This variation provides support for the findings above.

In addition to looking at the number of institutional shares held, Equation (1) is also implemented where the dependent variable is the number of institutional holders. This provides some insight on whether certain ETN characteristics are related to attracting more individual institutional holders. Blume and Keim (2012) find that "the number of institutions that own a stock is more important than the percentage of institutional ownership in explaining the cross section of liquidity" (p. 23). Therefore, even though this analysis is not a focal point because many of the institutional holdings files are aggregated and include multiple managers within a set filing, it is still an important aspect to consider. The results using the number of institutional holders as the dependent variable for equation (1) is presented in Table 13. In the end, this analysis provides a general overview of how ETN characteristics related to the number of

institutional filers. Of particular interest is that volume is positive and significantly related to the number of institutional holders and returns are negatively related. This suggests that ETNs with lower returns and higher liquidity attract a larger number of institutional holders.

Table 14 presents all of the variations of equation 2 without clustering of errors and including year, objective, and issuer fixed-effects. One difference between the models is that here change in volatility is significantly related to changes in institutional holdings. The insignificance of this value in Table 4 is a result of the correction for auto-correlation; clustering of the errors at the firm level. This table also shows basic tests for institutional herding; captured through the lagged institutional turnover explanatory variable. Here a negative relationship is found between changes in the proportion of institutional shares held last period and the change in the proportion of institutional share held this period. Future analyses that have data that distinguishes the number of institutional buys and sells in given quarter can incorporate more advanced tests of institutional herding in the ETN market.

5. Conclusion

Research examines institutional preferences and what type of securities institutions hold. The results of tests on institutional preferences have found that institutions apply liquidity, risk and return preferences to their equity holdings. Building off of these findings, we test whether institutional preferences are applicable to the recently created ETN market. Specifically, we test institutional preferences for ETN liquidity, volatility, and return characteristics. If institutional investors do not apply the same preferences to the ETN market, then ETNs may be meeting a unique preference that institutional investors' desires. If the same preferences apply, then ETNs may serve as a substitute investment for prior institutional holdings.

We find that institutions seem to prefer more liquid ETNs; holding more shares of ETNs with higher volume. Institutional preferences for higher volatility securities is also found in institutional holdings of ETNs. These findings support the liquidity and risk preferences found in the equities markets. Test on return preferences suggest that institutional investors do not incorporate return preferences when selecting ETNs. These findings suggest that institutional investors may view ETNs as "just another investment" and use ETNS simply to minimize transaction costs rather than to obtain new investment opportunities.

Looking at the impact of changes in institutional holdings on the underlying ETN characteristics, evidence supports the impact of institutional turnover on subsequent returns. Institutional literature looking at the impact on equities returns found similar results and suggest that the positive relationship is a result of skilled investments by institutions. Counter to what is hypothesized, tests of the impact of changes in institutional holdings on ETN characteristics fund that institutional turnover is not significantly related subsequent changes in ETN volume or the ETN's discount (premium).

Future analyses can incorporate data at the institutional investor level. The additional details in this data will allow for more accurate results and extensions of the analyses presented. The accuracy of the analysis will be improved because both individual report dates and file dates can be obtained and utilized to correct for the errors made in the Bloomberg institutional holdings variables. Investor level data will also allow for more precise analyses of the impacts of institutional holdings announcements on ETN characteristics. Last, the more detailed data provide the details needed to incorporate formal herding measures based on ETN-quarter institutional buys and sells.

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Table 1
Institutional Holdings Descriptive Statistics

The table presents descriptive statistics of institutional holdings variables for ETNs obtained from Bloomberg. There are 3330 ETN-quarter observations in the Bloomberg data. The *Number of Holders* presents the average number of holders of an ETN in a given quarter. The *Shares Held* variable is presented is the average number of ETN shares held in a given quarter (in millions). *Bloomberg Inst. Holdings* is the average percent of institutional ownership for an ETN in a given quarter[3]. *Inst. Holdings* is the average percent of ETN shares held by institutions in a given quarter, incorporating hand-collected data.

Institutional Holdings Data						
	N	Mean	St Dev	Min	Max	Median
Number of Holders	3330	11.02	23.67	0	262	4
Shares Held	3330	1.45	5.64	0	61.56	0.08
Bloomberg Inst. Holdings	2711	33.06%	35.40%	0.00%	185.99%	20.90%
Inst. Holdings	3233	35.37%	32.96%	0.00%	100.00%	25.24%

[3] This variable has fewer observations because it is not available before Quarter 3 2010.

Table 2
ETN Descriptive Statistics

The table presents the mean values of all ETN variables used in this analysis. *Leverage Indicator* is a dichotomous variable which equals 1 if the ETN has leverage-based characteristics and 0 otherwise. *Paired Indicator* is a dichotomous variable which equals 1 if the ETN is an inverse-pair ETN. *Percent out* is the average percent of ETN shares that are held by institutional investors. *Spread* is the average difference between an ETN's last daily bid and ask price. Price indicator is a dichotomous dependent variable which equals 1 if the ETN's price is greater than $5 and 0 otherwise. *Discount Premium* is the average discount/premium of an ETN from its indicative value standardized by the ETN's price. *Returns* is the average monthly return for an ETN. *Volume* is the average daily volume standardized by share outstanding. *St dev* is the average monthly standard deviation of returns. *Fees* is the average yearly expense ratio. *Shares Out* is the average shares outstanding in millions. *Short* is the average shares sold short standardized by shares outstanding. *Age* is the average age of an ETN in months. *Market size* is the average ETN price multiplied by shares outstanding.

Variable	MEAN	MIN	MAX	STD
Leverage Indicator	0.244	0.000	1.000	0.430
Paired Indicator	0.159	0.000	1.000	0.366
Percent Out	0.355	0.000	1.000	0.329
Spread	21.827	0.009	219.200	35.160
Price	56.929	2.347	7257.521	261.643
Price Ind	0.970	0.000	1.000	0.170
Discount Premium	-0.002	-0.396	0.379	0.025
Return	-0.001	-0.419	0.808	0.078
Volume	0.044	0.000	2.401	0.109
St Dev	0.020	0.000	0.200	0.016
Fees	0.796	0.300	1.650	0.235
Shares Out	3.282	0.002	227.386	12.065
Short	0.043	0.000	4.027	0.136
Age	22.360	0.000	78.000	18.930
Market Size	97.140	0.388	5858.079	386.376

Table 3
Institutional Preferences for ETN Characteristics

The table presents the results from equation (1): $Inst\ Holdings_{i,t} = \beta_0 + \beta_1 returns_{i,t-1} + \beta_2 volume_{i,t-1} + \beta_3 volatility_{i,t-1} + \beta_4 mktcap_{i,t-1} + \beta_5 premium_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 age_{i,t-1} + \beta_7\ price_{i,t-1} + Year\ FE_{i,t}$ (1) where i is a given ETN and t is a given quarter. The dependent variable is the number of ETN shares outstanding that are held by institutional investors (*Inst Own*i) at the end of a given quarter standardized by shares outstanding. $Volume_{i,t-1}$ is the mean volume standardized by the shares outstanding. V$olatility_{i,t-1}$ is the standard deviation of monthly returns. Mean monthly returns over the quarter are used to obtain $returns_{i,t-1.}$ The log of the average market capitalization of the ETN calculated as price times shares outstanding is $mktcap_{i,t-1}$. The log of an ETN's average price over the quarter is $price_{i,t-1}$. The ETN's discount/premium standardized by the average ETN price the quarter is $premium_{i,t-1}$. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are also included as controls. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 is the full model. Model 2 includes the spread variable. Model 3 substitutes the price indicator variable ($price\_ind_{i,t-1}$) for the log of an ETN's average price over the quarter ($price_{i,t-1}$). (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	(1)	**(2)**	**(3)**
Returns	0.01	0.12	0.05
	(0.93)	(0.15)	(0.50)
Volume	0.16***	0.16***	0.36***
	(0.00)	(0.00)	(0.00)
Volatility	2.59***	3.31***	3.95***
	(0.00)	(0.00)	(0.00)
Market Size	0.01***	0.01***	0.02***
	(0.00)	(0.00)	(0.00)
Premium	-3.42*	-3.53**	-3.77**
	(0.07)	(0.02)	(0.02)
Fees	0.09***	0.08***	0.08***
	(0.00)	(0.00)	(0.10)
Age	0.04***	0.04***	0.03***
	(0.00)	(0.00)	(0.00)
Price	0.09***	0.08***	-
	(0.00)	(0.00)	
Price Indicator	-	-	0.12**
			(0.02)
Spread	-	-0.00	-0.00
		(0.42)	(0.19)
Year FE	Yes	Yes	Yes
Clustering of Errors	Yes	Yes	Yes
Intercept	-0.06	-0.05	0.09
Obs	2799	2335	2335
RSQ	0.13	0.14	0.10

Table 4
Characteristic-Based Herding in the ETN Market

The table presents the results from equation 2: $\Delta Inst\ Holdings_{i,t} = \beta_0 + \beta_1 \Delta returns_{i,t-1} + \beta_2 \Delta volume_{i,t-1} + \beta_3\ \Delta volatility_{i,t-1} + \beta_4 \Delta mktsize_{i,t-1}\ \beta_5\ \Delta premium_{i,t-1} + \beta_6 \Delta price_{i,t-1} + \beta_7 \Delta spread_{i,t-1} + Year\ FE + e_i$ (2) where i is a given ETN and t is a given quarter. The dependent variable, $\Delta Inst\ Own_{i,t}$, is the difference between the proportion of institutional ownership at quarter t and the proportion of institutional ownership over the prior quarter. The changes in the explanatory variables are calculated by looking at the difference in the values from period t-1 and the prior quarter (t-2). $\Delta returns_{i,t-1}$is the difference in the average ETN returns. $\Delta volume_{i,t-1}$ is the differences in the average ETN volume standardized by shares outstanding. $\Delta volatility_{i,t-1}$ is the difference in the average standardization of monthly returns. $\Delta mktsize_{i,t-1}$ is difference between the log of the average market capitalization of the ETN. $\Delta premium_{i,t-1}$ is the difference in the average premium or discount of an ETN standardized by the average price the quarter. $\Delta price_{i,t-1}$ is the difference of the change in average log price. $\Delta spread_{i,t-1}$ is the change in the orthogonalized spread variable. Model 1 includes only the explanatory variables of interest without additional ETN controls included. Model 2 includes all of the controls except for changes in spread while model 3 provides the full model. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2	3
ΔReturns	0.06	0.05	0.07
	(0.13)	(0.20)	(0.14)
ΔVolume	-0.04	-0.04	-0.02
	(0.25)	(0.21)	(0.65)
ΔVolatility	0.71	0.73	0.44
	(0.15)	(0.15)	(0.47)
ΔMarket Size	-	-0.00	-0.00
		(0.83)	(0.82)
ΔPremium	-	-2.06**	-1.77**
		(0.02)	(0.04)
ΔPrice	-	0.02	0.03
		(0.38)	(0.40)
ΔSpread	-	-	-0.00
			(0.49)
Year FE	Yes	Yes	Yes
Clustering of Errors	Yes	Yes	Yes
Intercept	-0.01	-0.01	-0.01
Obs	2240	2240	1860
RSQ	0.01	0.01	0.01

Table 5
Institutional Turnover and Subsequent ETN Liquidity

The table is based off of equation (3a) where $\Delta volume_{i,t} = \beta_0 + \beta_1 \Delta Inst\ Holdings_{i,t-1} + \beta_2 \Delta returns_{i,t-1} + \beta_3 \Delta volitility_{i,t-1} + \beta_4\ \Delta premium_{i,t-1} + \beta_5\ \Delta marketsize_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 \Delta age_{i,t-1} + Year\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter. The dependent variable, $\Delta volume_{i,t}$, is the differences in the average ETN volume standardized by shares outstanding at quarter t and the proportion of average ETN volume standardized by shares outstanding the prior quarter. The changes in the explanatory variables are calculated by looking at the difference in the values from period t-1 and the prior quarter (t-2). The primary explanatory variable is $\Delta Inst\ Own_{i,t-1}$ which captures is the difference between the proportion of institutional ownership and the proportion of institutional ownership over the prior quarter. $\Delta returns_{i,t-1}$ is the difference in the average ETN returns. $\Delta volatility_{i,t-1}$ is the difference in the average standardization of monthly returns. $\Delta mktsize_{i,t-1}$ is difference between the log of the average market capitalization of the ETN. $\Delta premium_{i,t-1}$ is the difference in the average premium or discount of an ETN standardized by the average price the quarter. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are also included as controls. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 includes changes in institutional ownership as the only explanatory variable while model 2 presents the results from the full equation. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2
Δ Inst Holdings	-0.01	-0.01
	(0.17)	(0.10)
Δ Returns	-	-0.01
		(0.85)
Δ Volatility	-	-0.96*
		(0.05)
Δ Premium	-	0.33
		(0.39)
Δ Market Size	-	0.00
		(0.16)
Fees	-	-0.01
		(0.30)
Age	-	-0.00*
		(0.05)
Year FE	Yes	Yes
Clustering of Errors	Yes	Yes
Intercept	0.00	0.01
Obs	2211	2211
RSQ	0.00	0.02

Table 6
Institutional Turnover and ETN Mispricing

The table is based off of equation (3b) where $\Delta premium_{i,t} = \beta_0 + \beta_1 \Delta Inst\ Holdings_{i,t-1} + \beta_2 \Delta returns_{i,t-1} + \beta_3 \Delta volitility_{i,t-1} + \beta_4\ \Delta volume_{i,t-1} + \beta_5\ \Delta marketsize_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 \Delta age_{i,t-1} + Year\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter. The dependent variable, $\Delta premium_{i,t}$, is the difference in the average premium or discount of an ETN standardized by the average price the quarter and the difference in the average premium or discount of an ETN standardized by the average price for the prior quarter . The changes in the explanatory variables are calculated by looking at the difference in the values from period t-1 and the prior quarter (t-2). The primary explanatory variable is $\Delta Inst\ Holdings_{i,t-1}$ which captures is the difference between the proportion of institutional ownership and the proportion of institutional ownership over the prior quarter. $\Delta returns_{i,t-1}$ is the difference in the average ETN monthly returns. $\Delta volatility_{i,t-1}$ is the difference in the average standardization of monthly returns. $\Delta mktsize_{i,t-1}$ is difference between the log of the average market capitalization of the ETN. $\Delta volume_{i,t-1}$ is the differences in the average ETN volume standardized by shares outstanding at quarter t and the proportion of average ETN volume standardized by shares outstanding the prior quarter. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are also included as controls. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 includes changes in institutional ownership as the only explanatory variable while model 2 presents the results from the full equation. Model 3 includes an additional variable, ΔShort, which captures changes in the number of shares shorted standardized by shares outstanding. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2	3
ΔInst Holdings	-0.00	-0.00	-0.00
	(0.67)	(0.83)	(0.82)
ΔReturns	-	0.00*	0.00*
		(0.07)	(0.08)
ΔVolume	-	0.00	0.00
		(0.91)	(0.94)
ΔVolatility	-	0.02	0.02
		(0.33)	(0.33)
ΔMarket Size	-	0.00	0.00
		(0.36)	(0.40)
Fees	-	0.00	0.00
		(0.87)	(0.82)
Age	-	-0.00***	-0.00***
		(0.00)	(0.00)
ΔShort	-	-	-0.00
			(0.24)
Year FE	Yes	Yes	Yes
Clustering of Errors	Yes	Yes	Yes
Intercept	-0.00	-0.00	-0.00
Obs	2211	2211	2211
RSQ	0.00	0.01	0.01

Table 7
Institutional Turnover and Subsequent ETN Returns

The table is based off of equation (3c) where $\Delta returns_{i,t} = \beta_0 + \beta_1 \Delta Inst\ Holdings_{i,t-1} + \beta_2 \Delta volume_{,t-1} + \beta_3 \Delta volitility_{i,t-1} + \beta_4\ \Delta premium_{i,t-1} + \beta_5\ \Delta marketsize_{i,t-1} + \beta_6 fees_{i,t-1} + \beta_7 \Delta age_{i,t-1} + Year\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter. The dependent variable, $\Delta returns_{i,t}$, is the difference in the average monthly ETN returns this period and the prior quarter. The changes in the explanatory variables are calculated by looking at the difference in the values from period t-1 and the prior quarter (t-2). The primary explanatory variable is $\Delta Inst\ Own_{i,t-1}$ which captures is the difference between the proportion of institutional ownership and the proportion of institutional ownership over the prior quarter. $\Delta premium_{i,t-1}$ is the difference in the average premium or discount of an ETN standardized by the average price. $\Delta volatility_{i,t-1}$ is the difference in the average standard deviation of monthly returns. $\Delta mktsize_{i,t-1}$ is difference between the log of the average market capitalization of the ETN. $\Delta volume_{i,t-1}$ is the differences in the average ETN volume standardized by shares outstanding at quarter t and the proportion of average ETN volume standardized by shares outstanding the prior quarter. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are also included as controls. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 includes changes in institutional ownership as the only explanatory variable while model 2 controls for returns. Model 3 presents the full equation plus a control for lagged change in returns while model 4 is the equation as it is presented in (3c). (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses).

	1	2	3	4
ΔInst Holdings	0.03***	0.02***	0.03***	0.03***
	(0.00)	(0.00)	(0.00)	(0.00)
ΔReturns	-	0.43***	0.41***	-
		(0.00)	(0.00)	
ΔVolume	-	-	-0.08	-0.16**
			(0.17)	(0.01)
ΔVolatility	-	-	0.47	0.55
			(0.21)	(0.33)
ΔPremium	-	-	-1.04*	-1.52
			(0.05)	(0.10)
ΔMarket Size	-	-	-0.02***	-0.03***
			(0.00)	(0.00)
Fees	-	-	0.01	0.01*
			(0.54)	(0.09)
Age	-	-	-0.00	-0.00
			(0..34)	(0.03)
Year FE	Yes	Yes	Yes	Yes
Clustering of Errors	Yes	Yes	Yes	Yes
Intercept	0.01	0.00	-0.00	-0.00
Obs	2211	2211	2211	2211
RSQ	0.01	0.21	0.23	0.05

Table 8
Cross-Sectional Sample: Institutional Holder and ETN Descriptive Statistics

The table presents descriptive statistics for a cross sectional sample of ETN holders. The data was obtained for Quarter 3, 2013. Panel A looks at the descriptive statistics based on 682 individual holders. *ETN Shares Held* sums all of the shares held for each institution. *ETN Position Change* is change in each institution's total ETN holdings from the prior quarter. P*ercent of Portfolio* is the percent of the each institution's portfolio that consists of ETNs. Panel B presents the descriptive statistics based on the 186 ETNs included in this analysis. *ETN Shares Held* sums all of the shares held by institutions for each ETN. *ETN Position Change* is change in in institutional holdings for a given ETN from the prior quarter.

Panel A: Holder Descriptive Statistics				
	Mean	St Dev	Min	Max
ETN Shares Held	613053	4097266	0	69279942
Position Change	97357	1361058	-926880	26462520
Percent Portfolio	1.28	4.73	0	98.74
Panel B: ETN Descriptive Statistics				
ETN Shares Held	2166334	9500958	0	89315205
Position Change	344031	2736765	-10582529	25250877

Table 9
Cross-Sectional Sample: Institutional Holdings of ETNs and ETN Characteristics

The table uses the cross sectional sample of institutional holders' data obtained for quarter 3 of 2013. Panel A uses the average number of shares held by institutions standardized by shares outstanding as the dependent variable while Panel B uses the average number of institutional holders. The explanatory variables include several cross section ETN variables. Leverage Indicator is a dichotomous variable which equals 1 if the ETN has leverage-based characteristics and 0 otherwise. Paired Indicator is a dichotomous variable which equals 1 if the ETN is an inverse-pair ETN. Derivative Indicator is a dichotomous variable that equals 1 if the ETN has a derivative-like index and 0 otherwise. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	Panel A	Panel B
	Inst Own	# Inst Holders
Fees	0.76	32.95***
	(0.18)	(0.00)
Derivative Indicator	-1.32***	-6.55
	(0.00)	(0.26)
Leveraged	0.01	-7.41
	(0.97)	(0.25)
Paired-Indicator	-0.40	3.69
	(0.21)	(0.56)
Uniqueness	0.254	-23.43***
	(0.48)	(0.00)
Age	0.00***	0.02***
	(0.01)	(0.00)
Year FE	No	No
Objective FE	Yes	Yes
Issuer FE	Yes	Yes
Intercept	9.12	-25.16
Obs	186	186
RSQ	0.61	0.63

Table 10
Institutional Preferences for ETN Characteristics with Cross-Sectional Data

The table presents an analysis similar to that of Equation (1) $Inst\ Holdings_{i,t} = \beta_0 + \beta_1 returns_{i,t-1} + \beta_2 volume_{i,t-1} + \beta_3\ price_{i,t-1} + \beta_4 volatility_{i,t-1} + \beta_5 mktcap_{i,t-1} + \beta_6 premium_{i,t-1} + \beta_7 fees_{i,t-1} + \beta_7 age_{i,t-1} + Year\ FE + Objective\ FE + Issuer\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter, but here cross section data is used. The cross sectional sample of institutional holders' data obtained for quarter 3 of 2013. For Panel A, the dependent variable is the Institutional ownership of a given ETN standardized by shares outstanding. Panel B uses the number of institutional holders. ETN liquidity variables including mean volume standardized by the shares outstanding (*volume*$_{i,t-1}$), and the average market capitalization of the ETN calculated as price times shares outstanding (*mktcap*$_{i,t-1}$) are included in the testing of hypothesis 1. Average monthly returns calculated over the previous quarter (*returns*$_{i,t-1}$) is the variable of interest in testing hypothesis 2, while the standard deviation of daily returns over the previous quarter(*volatility*$_{i,t-1}$) is the variable of interest for hypothesis 3. The age of the ETN $age_{i,t-1}$ and fees (*fees*$_{i,t-1}$) are included as controls. The ETN's discount/premium standardized by the average ETN price the quarter (*premium*$_{i,t-1}$) is also included as a control. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 presented the primary regression. Model 2 includes the orthogonalized spread variable. Model 3 replaces the price variable with an indicator variable which equals 1 if the price is greater than $5 and 0 otherwise. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	Panel A			Panel B		
	1	2	3	1	2	3
Returns	0.50	71.60	61.05	6.55	453.32	433.48
	(0.82)	(0.48)	(0.54)	(0.75)	(0.64)	(0.64)
Volume	1.39	2.55	2.04	31.89***	50.99***	52.42***
	(0.26)	(0.19)	(0.28)	(0.00)	(0.00)	(0.00)
Volatility	6.48	5.35	4.55	-13.62	-78.14	-136.63
	(0.62)	(0.75)	(0.82)	(0.91)	(0.63)	(0.49)
Market Size	-0.26**	-0.28**	-0.32**	8.87***	9.65***	9.76***
	(0.01)	(0.03)	(0.01)	(0.00)	(0.00)	(0.00)
Premium	60.16	66.86	160.20	-2363.44	-2678.15*	-3204.07*
	(0.68)	(0.63)	(0.42)	(0.10)	(0.09)	(0.09)
Fees	1.20	0.13	0.25	14.53	5.06	4.89
	(0.23)	(0.93)	(0.86)	(0.13)	(0.71)	(0.71)
Age	0.00**	0.00***	0.00	0.01**	0.01	0.01
	(0.04)	(0.00)	(0.19)	(0.02)	(0.16)	(0.19)
Price Indicator	-	-	1.47	-	-	-9.07
			(0.43)			(0.61)
Price	0.00	-0.01	-	0.00	-0.01	-
	(0.86)	(0.62)		(0.99)	(0.96)	
Spread	-	-72.38	-61.46	-	-456.60	-437.29
		(0.48)	(0.53)		(0.64)	(0.64)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Objective FE	Yes	Yes	Yes	Yes	Yes	Yes
Issuer FE	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	12.34	15.18	13.40	-160.61	-156.96	-149.02
Obs	186	186	186	186	186	186
RSQ	0.58	0.60	0.60	0.79	0.81	0.81

Table 11
Institutional Preferences for ETN Characteristics

The table presents the same analysis as Equation (1) $Inst\,Holdings_{i,t} = \beta_0 + \beta_1 returns_{i,t-1} + \beta_2 volume_{i,t-1} + \beta_3\, price_{i,t-1} + \beta_4 volatility_{i,t-1} + \beta_5 mktcap_{i,t-1} + \beta_6 premium_{i,t-1} + \beta_7 fees_{i,t-1} + \beta_7 age_{i,t-1} + Year\,FE + Objective\,FE + Issuer\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter, but all variations of the regression are presented. The dependent variable is the Institutional ownership of a given ETN standardized by shares outstanding. ETN liquidity variables including mean volume standardized by the shares outstanding ($volume_{i,t-1}$), and the average market capitalization of the ETN calculated as price times shares outstanding ($mktcap_{i,t-1}$) are included in the testing of hypothesis 1. Average monthly returns calculated over the previous quarter ($returns_{i,t-1}$) is the variable of interest in testing hypothesis 2, while the standard deviation of daily returns over the previous quarter($volatility_{i,t-1}$) is the variable of interest for hypothesis 3. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are included as controls. The ETN's discount/premium standardized by the average ETN price the quarter ($premium_{i,t-1}$) is also included as a control. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2	3	4
Returns	0.10	0.06	0.09	0.06
	(0.10)	(0.34)	(0.12)	(0.28)
Volume	-	0.17***	1.97***	0.17***
		(0.00)	(0.00)	(0.00)
Volatility	-	2.89***	2.33***	2.60***
		(0.00)	(0.00)	(0.00)
Market Size	-	-	0.02***	0.02***
			(0.00)	(0.00)
Premium	-	-	-2.64*	-2.97*
			(0.07)	(0.06)
Fees	-	-	-0.05*	-0.04
			(0.07)	(0.10)
Age	-	-	0.03***	0.02**
			(0.00)	(0.01)
Price Indicator	-	-	-	0.15**
				(0.01)
Price	-	-	-1.95***	-
			(0.00)	
Spread	-	-		-
Orth. Spread	-	-	-	-1.69
				(0.77)
Year FE	Yes	Yes	Yes	Yes
Objective FE	Yes	Yes	Yes	Yes
Issuer FE	Yes	Yes	Yes	Yes
Intercept	0.90	0.90	0.47	0.43
Obs	2902	2902	2799	2335
RSQ	0.30	0.34	0.39	0.39

Table 12
Number of Institutional Shares Held and ETN Characteristics

The table presents the same analysis as Equation (1) $Inst\ Shares_{i,t} = \beta_0 + \beta_1 returns_{i,t-1} + \beta_2 volume_{i,t-1} + \beta_3\ price_{i,t-1} + \beta_4 volatility_{i,t-1} + \beta_5 mktcap_{i,t-1} + \beta_6 premium_{i,t-1} + \beta_7 fees_{i,t-1} + \beta_7 age_{i,t-1} + Year\ FE + Objective\ FE + Issuer\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter. The dependent variable is the log of the number of shares held by institutions in a given quarter. ETN liquidity variables including mean volume standardized by the shares outstanding ($volume_{i,t-1}$), and the average market capitalization of the ETN calculated as price times shares outstanding ($mktcap_{i,t-1}$) are included in the testing of hypothesis 1. Average monthly returns calculated over the previous quarter ($returns_{i,t-1}$) is the variable of interest in testing hypothesis 2, while the standard deviation of daily returns over the previous quarter($volatility_{i,t-1}$) is the variable of interest for hypothesis 3. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are included as controls. The ETN's discount/premium standardized by the average ETN price the quarter ($premium_{i,t-1}$) is also included as a control. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 presented the primary regression. Model 2 includes the orthogonalized spread variable. Model 3 replaces the price variable with an indicator variable which equals 1 if the price is greater than $5 and 0 otherwise. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2	3
Returns	0.75	23.48	18.51
	(0.14)	(0.64)	(0.71)
Volume	1.06***	1.34***	0.68
	(0.00)	(0.00)	(0.16)
Volatility	19.53***	17.74***	16.55***
	(0.00)	(0.00)	(0.00)
Market Size	1.15***	1.11***	1.09***
	(0.00)	(0.00)	(0.00)
Premium	-7.36	-5.90	-4.55
	(0.56)	(0.63)	(0.74)
Fees	-0.69***	-1.01***	-0.97***
	(0.00)	(0.00)	(0.00)
Age	0.27***	0.28***	0.33***
	(0.00)	(0.00)	(0.00)
Price Indicator	-	-	-0.86
			(0.10)
Price	-0.44***	-0.40***	-
	(0.00)	(0.00)	
Spread		-	-
Res	-	-22.31	-17.22
		(0.65)	(0.73)
Year FE	Yes	Yes	Yes
Objective FE	Yes	Yes	Yes
Issuer FE	Yes	Yes	Yes
Intercept	-4.88	-4.52	-4.79
Obs	2799	2335	2335
RSQ	0.60	0.63	0.63

Table 13
Institutional Holders and ETN Characteristics

The table presents a variation of Equation (1) $Inst\ Holders_{i,t} = \beta_0 + \beta_1 returns_{i,t-1} + \beta_2 volume_{i,t-1} + \beta_3\ price\_Ind_{i,t-1} + \beta_4 volatility_{i,t-1} + \beta_5 mktcap_{i,t-1} + \beta_6 premium_{i,t-1} + \beta_7 fees_{i,t-1} + \beta_7 age_{i,t-1} + Year\ FE + Objective\ FE + Issuer\ FE + e_{i,t}$ where i is a given ETN and t is a given quarter. The dependent variable is the number of Institutional owners. $Volume_{i,t-1}$ is the mean volume standardized by the shares outstanding. $Volatility_{i,t-1}$ is the standard deviation of monthly returns calculated over the prior year. Mean monthly returns over the quarter are used to obtain $returns_{i,t-1}$. The log of the average market capitalization of the ETN calculated as price times shares outstanding is $mktcap_{i,t-1}$. The price indicator variable ($price\_ind_{i,t-1}$) equals 1 if the price of the ETN is greater than $5 and 0 otherwise. The ETN's discount/premium standardized by the average ETN price the quarter is $premium_{i,t-1}$. The age of the ETN $age_{i,t-1}$ and fees ($fees_{i,t-1}$) are also included as controls. Year fixed-effects, objective fixed-effects and issuer fixed-effects included. Model 1 spread variable. Model 2 is the equation as presented above. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2
Returns	-11.49***	-7.52*
	(0.01)	(0.07)
Volume	13.72***	3.16***
	(0.00)	(0.00)
Volatility	33.25	-16.71
	(0.31)	(0.30)
Premium	-42.49**	-32.97**
	(0.01)	(0.01)
Spread	0.04***	-
	(0.00)	
Fees	3.39	5.92**
	(0.22)	(0.01)
Market Size	8.71***	8.99***
	(0.00)	(0.00)
Age	2.02***	0.15***
	(0.00)	(0.00)
Price Indicator	7.61**	7.44*
	(0.04)	(0.05)
Year FE	Yes	Yes
Objective FE	Yes	Yes
Issuer FE	Yes	Yes
Intercept	-122.17	-119.2
Obs	2323	2784
RSQ	0.71	0.62

Table 14
Characteristic-Based Herding in the ETN Market

The table presents all of the variations of equation 2: $\Delta Inst\ Holdings_{i,t} = \beta_0 + \beta_1 \Delta returns_{i,t-1} + \beta_2 \Delta volume_{i,t-1} + \beta_3\ \Delta volatility_{i,t-1} + \beta_4 \Delta mktsize_{i,t-1}\ \beta_5\ \Delta premium_{i,t-1} + \beta_6 \Delta price_{i,t-1} + \beta_7 \Delta spread_{i,t-1} + Year\ FE + Objective\ FE + Issuer\ \ FE + e_i$ (2) where i is a given ETN and t is a given quarter. The dependent variable, $\Delta Inst\ Own_{i,t}$, is the difference between the proportion of institutional ownership at quarter t and the proportion of institutional ownership over the prior quarter. The changes in the explanatory variables are calculated by looking at the difference in the values from period t-1 and the prior quarter (t-2). $\Delta returns_{i,t-1}$is the difference in the average ETN returns. $\Delta volume_{i,t-1}$ is the differences in the average ETN volume standardized by shares outstanding. $\Delta volatility_{i,t-1}$ is the difference in the average standardization of monthly returns. $\Delta mktsize_{i,t-1}$ is difference between the log of the average market capitalization of the ETN. $\Delta premium_{i,t-1}$ is the difference in the average premium or discount of an ETN standardized by the average price the quarter. $\Delta price_{i,t-1}$ is the difference of the change in average log price. $\Delta spread_{i,t-1}$ is the change in the orthogonalized spread variable. (* identifies significance at the .1 level, ** identifies significance at the .05 level and *** identifies significance at the .01 level with p-values presented in the parentheses)

	1	2	3	4	5	6
Δ Inst Holdings	-0.30***	-	-	-	-0.31***	-
	(0.00)				(0.00)	
Δ Returns	-	0.05	0.06	0.05	0.07*	0.46
		(0.18)	(0.11)	(0.19)	(0.07)	(0.60)
Δ Volume	-	-	-0.05	-0.08	-0.07	-0.07
			(0.23)	(0.10)	(0.10)	(0.25)
Δ Volatility	-	-	1.12**	1.12**	0.75*	0.78
			(0.02)	(0.02)	(0.08)	(0.16)
Δ Market Size	-	-	-	-0.01	-0.03**	-0.01
				(0.12)	(0.02)	(0.16)
Δ Premium	-	-	-	-1.87	-2.20	-1.54
				(0.32)	(0.22)	(0.77)
Δ Price	-	-	-	0.04	0.04	0.02
				(0.15)	(0.15)	(0.17)
Δ Spread	-	-	-	-	-	-0.42
						(0.63)
Year FE	No	Yes	Yes	Yes	Yes	Yes
Objective FE	No	Yes	Yes	Yes	Yes	Yes
Issuer FE	No	Yes	Yes	Yes	Yes	Yes
Intercept	0.00	0.00	0.00	0.00	-0.01	0.00
Obs	2240	2240	2240	2240	2240	1860
RSQ	0.11	0.01	0.02	0.02	0.13	0.02