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Exchange Traded Notes: An Introduction

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Exchange Traded Notes: An Introduction

Abstract

The first Exchange Traded Note (ETN) was introduced in 2006. Since then, at least 64 other ETNs have been issued, with more announced. This financial security, which is growing in number and popularity, is often confused with Exchange Traded Funds (ETFs) and seems to be largely misunderstood by the general investing public and even by institutional investors and academicians. Since no academic work has been published on the subject, our paper offers a seminal introduction to ETNs. We provide five basic categories of information related to ETNs: (1) descriptive information about ETNs, (2) fine print related to ETNs that we believe investors should understand before purchasing shares, (3) a few simple examples of ETNs that are available, (4) a simple analysis of how closely ETN market prices track their indicative values (something akin to NAV) and (5) a discussion of why ETNs may appeal to various investor classes. We believe our work will help investment professionals, individual investors, and academicians better understand ETNs, and we believe our work will also provide the catalyst for much future empirical work on these financial securities.

Exchange Traded Notes: An Introduction

2006 witnessed the introduction of a new breed of security – exchange traded notes (ETNs). In June of 2006 Barclay's launched the first two ETNs under the family name "iPath" – one known as the Dow Jones – AIG Commodity Index Total Return ETN (ticker: DJP) and the other known as the S&P GSCI Total Return Index ETN (ticker: GSP). Since that date, the iPath family has added 15 other ETNs, while other fund families have issued at least 63 other ETNs with more announced and on the way.

The ETN acronym itself seems to have created much confusion and misunderstanding. Many retail and institutional investors, popular press, and even academicians seem to consistently lump ETNs together with Exchange Traded Funds (ETFs). As a simple example, Conover et al. (2009) report that including precious metals in one's portfolio can improve the risk-return profile of the portfolio and suggest that inclusion of precious metals in a portfolio can be achieved using ETFs or ETNs without making any distinction between the two securities. Their co-mingling of these investments without disclaimer about the differences is common. This unfortunate co-categorization is understandable in light of the acronym similarities. But while ETNs do share a few similarities with ETFs, they are very different from ETFs in a number of critical respects.

Not surprisingly given the extremely recent genesis of ETNs, we can find no literature on the subject. Our objective is to provide the seminal descriptive introduction to ETNs. Our paper is divided into four main sections: (1) descriptive information about ETNs, (2) fine print related to ETNs that we believe investors should understand before purchasing shares, (3) a few simple examples of ETNs that are available, (4) a simple analysis of how closely ETN market prices track their indicative values (something akin to NAV discussed later) and (5) a discussion of why ETNs may appeal to various investor classes. We believe our introduction is merited for at least two reasons. First, all agents (investors, advisors, and academicians) in the investing sphere can benefit from clarification regarding what ETNs really are and how they differ from ETFs. Second, we believe this new asset class represents a fertile area for research, and we hope our introduction will provide a catalyst for further empirical research on the subject.

ETN FEATURES

Economist John Kenneth Galbraith once stated, "The rule is that financial operations do not lend themselves to innovation...The world of finance hails the invention of the wheel over and over again, often in a slightly more unstable version." His quote is eerily prescient in the case of ETNs. ETNs are similar to zero-coupon bonds that are sold in very low denominations with mid to long-term maturities, early redemption clauses, and variable interest rates. Once the notes are issued, they typically trade on

major U.S. exchanges. Unlike ETFs, whose tax treatment is similar to that of ordinary stock¹, the tax treatment of ETNs is still unclear. We briefly discuss each of these features of ETNs below.

BASIC FEATURES

Most ETNs are issued by large investment banks (or what used to be investment banks) such as Barclays or the now defunct Lehman Brothers and their prospectuses are very clear about the fact that **the notes are unsecured obligations**. For example, the pricing supplement included in the prospectus for DJP (mentioned earlier) states, “The Securities are unsecured promises of Barclays Bank PLC and are not secured debt.” As unsecured debt obligations of the issuing institution, **one of the major risk factors that should influence the price of ETNs is the financial viability of the issuing institution**. This would be somewhat mitigated if the issuing institution were to insure the debt instruments. But the recent troubles in the mortgage backed securities markets have taught us that insurance isn’t always the safety net we hope it to be.

This aspect of ETNs represents a significant difference from ETFs. ETNs, as debt instruments, should have a default risk component present in their market prices. Since ETFs are not debt instruments, and in fact, usually have physical assets held in trust backing each ETF share generally should not have a default risk component in their market prices. Stated differently, **ETN investors face the possibility (though, with hopefully small probabilities) that the issuer may be unable to pay the obligation at maturity, while ETF investors face no such risk**.

ETN prospectuses are also very clear about the fact that no interest payments will be distributed to shareholders. The pricing supplement in the DJP prospectus states “You will not receive any periodic interest payments on the Securities.” This statement is representative of those made in the prospectuses for the other ETNs we have identified.

ETNs typically are issued at the full principal amount, which for the ETNs we have located is almost universally \$10, \$25, or \$50. While the maturity dates range from 2020 – 2038, **the majority of the ETNs have maturities of 30 years from inception**.

SHARE CREATION AND REDEMPTION

Gastineau [2001] explains an important feature of the typical ETF is the ability of “specialists, market makers, and arbitrageurs” (p. 91) – known as authorized investors – to both create and redeem shares of the ETF. **The fluid creation and redemption of shares helps to ensure that the market price of the ETF remains relatively close to the net asset value (NAV)**. Periodically, the market price of an ETF will rise above or fall below the NAV of the fund. When the market price falls sufficiently below the NAV, it signals that the price of the ETN is below the collective price of the stocks comprising the ETF. In this case, these authorized investors buy shares of the “underpriced” ETF and then redeem the ETF shares and receive shares of the stocks comprising the fund, which they then sell at the collective price above what they paid to obtain the underpriced ETF shares. **The buying pressure on the ETF shares**

¹ See Poterba and Shoven [2002] for a detailed examination of the tax treatment of ETFs.

combined with the reduction in supply of ETF shares resulting from the redemption help to push the ETF price up towards its NAV. This process works in the opposite direction when the shares of the ETF are priced above the NAV: shares are created and then sold driving the price down towards the NAV. In short, efficient pricing of ETFs (market prices remaining close to NAVs) is a direct result of the fluid share creation and redemption process. ETNs have similar mechanisms, but as we discuss, these processes do not seem to be comparably as fluid; therefore, our opinion is that mispricing is likely to be a more pronounced problem in the ETN space.

The typical ETN contains an early redemption clause, which allows investors to redeem their ETN shares at any time for what is known as the redemption or indicative value (discussed later), provided investors redeem a certain number of shares (typically at least 50,000) and follow the process outlined in the prospectus. It seems the early redemption clause is intended to be tantamount to the redemption feature of ETFs. However, we note two significant differences between the redemption procedures of ETFs and ETNs. First, ETFs have privileged or authorized investors (specialists and market makers) whose job it is to monitor the difference between market prices and NAVs and to act to reduce that difference. ETNs do not appear to have such agents who are directly responsible for monitoring and reducing potential mispricing. Second, the redemption procedures for many of the ETNs require an investor to notify the issuer of his intention to redeem at least one day prior to the actual redemption. Some ETNs require notification as much as ten business days in advance of the actual redemption.² If the early redemption clause is intended to serve the same arbitrage minimizing role that the share creation and redemption mechanism serves for ETF investors, then the time lag between the decision to redeem and actual redemption of ETN shares may be an impediment to the efficient pricing of these securities in the market. It may be expected that those ETNs with the longest lags between redemption notification and redemption execution have the least efficient prices.

On the opposite side – share creation – ETNs typically reserve the right in their prospectus to issue more shares of the security at any time in the future under the same terms as the original issue. The pricing supplement to the DJP prospectus reads, “We may, without your consent, create and issue additional securities having the same terms and conditions as the Securities.” True to its word, Barclays issued DJP shares on the following dates after the initial issue, which was June 9, 2006: October 3, 2006; November 28, 2006; December 26, 2006; January 29, 2007; April 13, 2007; July 2, 2007; August 13, 2007; and February 1, 2008. Clearly, this ETN creation process is meant to serve a purpose similar to that of the ETF share creation process. But here again, we see significant differences. Most notably, the creation of new shares does not seem nearly as fluid. **To create shares of an ETF is a relatively simple matter of the authorized investor depositing the necessary shares of individual stocks with the trust. It can and does happen on a weekly or even daily basis. To create new shares of an ETN requires an entirely new seasoned offering. It seems to happen no more frequently than monthly and sometimes**

² For example, the prospectus for FUE (ELEMENTSSM Linked to the MLCX Biofuels Index (Exchange Series) - Total Return) states that an irrevocable order to redeem must be submitted five business days before the next weekly valuation date. The actual redemption, then, occurs four business days after the weekly valuation date. Adding the five days before the valuation date, the day of the valuation date, and the four days after the valuation date leaves an investor with a 10-day lag between the request to redeem and the execution of the request.

several months pass between episodes of share creation. Further, the party responsible for initiating the ETN share creations are not authorized investors who have the opportunity to profit from such transactions, and therefore, the incentive to actively engage in the share creation process; rather, it is the issuer of the ETN. These considerable differences between ETFs and ETNs in the share creation process suggest that ETN shares are created much less frequently than ETF shares.

Collectively, the creation and redemption processes of ETNs seem much less fluid than the same processes for ETFs. The creation process seems especially infrequent and cumbersome for ETNs relative to ETFs. Recalling that share creation helps to reduce the price of overpriced ETFs and recognizing the obstacles to the creation of ETN shares, one is inclined to believe that mispricing on the over valuation side are not only possible but perhaps to be expected *ceteris paribus*. To a lesser degree, the redemption process also seems less efficient for ETNs, suggesting mispricing is on the undervaluation side is also a possibility. The main point is that ETFs seem to have better mechanisms for keeping their prices relatively efficient. Because of this, mispricing among ETFs is expected to be minimal. The same cannot be said for ETNs. Mispricing can and likely is a prevalent issue and one worthy of empirical investigation.

CALCULATION OF THE REDEMPTION (INDICATIVE) VALUE

The redemption value (more commonly referred to as the indicative value) represents the amount of money owed by the issuing institution to investors holding a particular ETN. At maturity, owners of an ETN receive the final redemption or indicative value. As mentioned above, investors may receive the indicative value at any point before maturity provided they meet the restrictions in the prospectus regarding early redemption of shares. Since investors may redeem their shares for the indicative value, it is calculated daily. The indicative value of an ETN – and therefore the interest rate of the ETN – is typically linked to an index, often a non-equity index, and reduced by what is called an investor fee. For example, in the case of DJP, the indicative value is tied to the Dow Jones – AIG Commodity Total Return Index (Bloomberg Ticker: DJAIGTR), and the investor fee is equal to 75 basis points per year, which accrues on a daily basis. The daily indicative value for this ETN is calculated by first growing the principal by the increase in the index since inception:

$$\text{Principal} \times \left(\frac{\text{Index Value at Redemption Date}}{\text{Index Value at Issue Date}} \right) \quad (1)$$

The value from (1) is then reduced by the total investor fee accrued to the redemption date, which for DJP is calculated as (m = days since inception; inception date is $t = 0$):

$$\sum_{t=1}^m \text{Annual Investor Fee (\%)} \times \text{Principal} \times \left(\frac{\text{Index Value}_t}{\text{Index Value at Issue Date}} \right) \times \frac{1}{365} \quad (2)$$

The net effect of (1) minus (2) is that the indicative value of the ETN is equal to the principal amount of the note grown at the compounded rate of the index less an investor fee that accrues on a daily basis. It is noteworthy, and most of the prospectuses state explicitly, that the total accumulated

investor fee is dependent not only on the ending value of the index on the redemption date, but also on the price path that the index follows to arrive at the final value on the redemption date.

One important aspect of ETNs, which the prospectuses outline very clearly, is that the variable interest rates of most of these securities are tied to indexes that can have negative returns in any given year. The potential for negative returns combined with the investor fee presents the realistic possibility that investors may redeem ETNs for less, perhaps substantially less, than they pay for them. The pricing supplement for DJP warns, “If the value of the Index decreases, or does not increase by an amount greater than the investor fee applicable to your Securities, you will receive less than your original investment in the Securities.”

TRADING OF SHARES

Once issued, most ETNs are traded in secondary markets on recognized exchanges. For example, Barclays listed DJP on NYSE Arca. Technically, these securities have the potential to trade with the same amount of liquidity as an ETF. But reality suggests the liquidity for these securities may be less reliable. The pricing supplement in the DJP prospectus notes, “Although we have listed the Securities on NYSE Arca, a trading market for your Securities may not exist at any time. Certain affiliates of Barclays intend to engage in limited purchase and resale transactions. If they do, however, they are not required to do so and may stop at any time. We are not required to maintain any listing of the securities on NYSE Arca or any other exchange.” We note that several of ETNs in our sample have volume in excess of 1 million shares on a typical day, while others have gone entire days without any trading activity. Most ETNs seem to have typical volume at least in the tens of thousands of shares each day.

TAX TREATMENT

It is still unclear how the IRS views most ETNs. The IRS has stated that currency based ETNs are to be treated as debt instruments for tax purposes. But non-currency ETNs still represent a gray area. Traditionally, zero-coupon bond holders are required to pay taxes on accrued interest in the year it accrues (known as imputed interest), even though the distribution will not occur until maturity. If the IRS concludes these instruments are most closely related to zero-coupon bonds, the same tax treatment will likely apply. However, most zero-coupon bonds don’t have highly variable interest rates like ETNs which also have the real possibility of being negative in any given year.

Regardless, most ETN issuers are hoping for different treatment of the securities by the IRS. For example, the prospectus for FUE, an ETN linked to an index tracking biofuels, states the following:

We intend to take the position that the Securities will be treated for U.S. federal income tax purposes as a prepaid forward contract to purchase the Index and, by purchasing a Security, you will be deemed to have agreed to that treatment. If the Securities are so treated, you should recognize capital gain or loss upon the sale, repurchase or maturity of your Securities in an amount equal to the difference between the amount you receive at such time and your adjusted tax basis in the Security.

While there have been several opinions issued by law and accounting firms related to ETNs, we have not seen a definitive statement from the IRS regarding their tax treatment (See Shapiro and Mulcahy (2008) for a discussion). Most prospectuses acknowledge the uncertainty surrounding the tax treatment of ETNs. Further, the tax treatment of these instruments is not our main focus in this paper, though we see opportunity for research in this area in the future.

THE FINE PRINT

After reading ETN prospectuses we believe there are at least two other pieces of information that investors should know before buying and selling the securities. First, the proceeds from the issuance of an ETN may be used for whatever purposes the issuing institution sees fit. Second, the issuing institution may engage in activities intended to hedge its obligation related to the ETN, which hedging activities may negatively affect the value of the ETN itself.

One very important difference between most ETFs and the ETNs we have identified is that most ETF shares are backed a pool of securities that are held in trust, while ETNs are not. There are specific assets underlying the ETF shares. At any time, an authorized investor can redeem ETF shares for the securities held in trust that underly the ETF. ETNs have no underlying assets. The issuing institution has the right to take the proceeds from the issuance and use them for whatever purposes they desire. The prospectus for DJP explains, "...the net proceeds from the offering of the securities will be used to support the development and expansion of our business and to strengthen further our capital base. That development and expansion may occur through the development of existing operations, the establishment of new subsidiaries or acquisitions if suitable opportunities should arise."

We believe investors should clearly understand that when they buy an ETN they are lending money to the issuing institution with no collateral securing the obligation and that the proceeds from their purchase may be used for almost any business purpose conceivable by the issuing institution. In a time when commercial and investment banks are sorely undercapitalized, we find it striking that many prospectuses state the proceeds of ETN issuances may be used to improve the "capital base" of the investment bank issuing the securities. Viewed with extreme skepticism, one could view ETNs as an attempt to recapitalize investment banks by attracting investors using securities that offer potentially extraordinary returns from difficult to access markets. Of course, if the obligations of the investment banks related to ETNs are not effectively hedged and the commodity, currency, or index tied to the ETN experiences significant growth (in the case of ETNs that offer long exposure), this method of recapitalization could have devastating long-term consequences for the investment bank and could leave unsuspecting ETN investors in the same position as investors who bought mortgage-backed securities that eventually went into default. At the very least, it seems like a conspicuously risky way of raising capital.

Issuing ETNs, though, does not necessarily have to be a high-risk method of raising capital for financial firms. Some issuing firms are engaging in near perfect hedges that essentially provide their firm with near costless capital until maturity plus the annual expense ratio they are able to collect on the

capital. This can be accomplished by issuing two companion ETNs related to a single index. One of the ETNs offers investors the return to the index, while the other offers investors the inverse of the return to the index. If the principal and number of shares issued for each ETN are similar, the issuing firm has essentially hedged away its liability by creating a simultaneous long and short position. Deutsche Bank seems to have particularly embraced this near riskless form of capitalization that also provides a small annual investor fee to the firm. For instance, Deutsche Bank has issued companion ETNs based on the following indices or assets: agriculture (long and short and double long and double short), commodity (long and short and double long and double short), and gold (double long and double short).

The second important piece of information we think investors should know is that issuing firms may engage in hedging activity related to their ETN obligations (which, per se, is not surprising) that may negatively affect the value of the ETN. The rationale is simple: if a particular investment bank wants to hedge its obligation related to one of its ETNs and does so with enough dollar volume in a sufficiently thin market, the investment bank may actually move prices in that market in a way that reduces the indicative value of the security. While we don't think this is a major concern for many of the ETNs, we believe investors should understand the relative ability of a single investor to move prices in a given market that may drive the variable interest rate of their ETN. If an ETN is tied to a security or index whose price or level could be moved by a single large market participant, investors would be wise to avoid investing in such an ETN.

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SOME EXAMPLES

As mentioned above, one of the first ETNs issued was iPath's DJP. The indicative value for this ETN is linked to a broad index of commodities known as the Dow Jones – AIG Commodity Total Return Index, which is meant to track a broad basket of commodity prices through their corresponding futures contracts. The essence of this particular ETN is to give investors an opportunity to invest in a security whose price movement is tied to a diversified basket of commodities. The earliest price data we have for this ETN begins October 30, 2006. If an investor had purchased \$50,000 of DJP (ignoring transaction costs) on that date, he would have had \$74,830 by June 30, 2008. By contrast, the same investor would have had only \$47,137 if he had instead purchased (again, ignoring transaction costs) \$50,000 worth of SPY, which is the exchange traded fund (ETF) that tracks the S&P 500. This ETN was more than just a safe haven during turbulent times in the stock markets. While most equity investors were generally seeing their portfolios trade flat or decline, those long in DJP watched their portfolios grow at an average daily rate of 9.9 basis points, which represents roughly a 28% geometrically annualized return assuming 250 trading days in a year.³

³ Updated data shows that \$50,000 invested in DJP on October 30, 2006 would be valued at \$40,597 on August 7, 2009, while \$50,000 invested in SPY over the same time period would be valued at \$38,785 by the same end date. So while DJP declined substantially in value since June 30, 2008, it still provided investors a higher overall return than SPY.

The following is a list of just six other ETN ticker symbols with the index or asset to which they are tied in parentheses: RJA (a broad basket of agricultural commodities), LSO (an index comprised primarily of futures contracts on live cattle and lean hogs), FUE (an index comprised of biofuels and products used to make biofuels), GBB (the exchange rate between the US Dollar and the British Pound), PTM (the price of platinum), and DZZ (double the inverse of the return to gold). As the list demonstrates, ETNs offer investors an impressive array of diversification options outside of equity markets. We believe the extraordinary performance of DJP relative to the S&P 500 since inception and the unprecedented opportunities for diversification that ETNs offer both retail and institutional investors are sufficient to warrant the attention of academia and motivate our current work.

ETN SUMMARY STATISTICS

If one is considering investing in an ETN, a primary question of interest is how closely the price of the ETN tracks the indicative value. Investors should be very wary of investing in securities claiming to generate returns associated with a specific index or basket of securities if the actual returns to the security do not in reality track closely with the returns to the index or basket from which it claims to derive its returns. Our goal in this section is to assess how closely ETN prices track with the prices of their corresponding indicative values (the ETN equivalent of net asset value for mutual funds and ETFs).

It is important to recognize that there may be justification for ETN prices to consistently hover below indicative values due to the risks of the securities not captured in the indicative value – default risk being one of several risk factors capture in ETN prices but absent from the corresponding indicative values. It is also important to remember from our earlier discussion that the impediments to share creation and redemption may lead to consistent over and underpricing of these securities. Our present concern is not to disentangle these two factors (justifiably priced risk factors vs. mispricing stemming from inefficiencies) that can drive market prices above or below indicative value; rather we merely seek to measure the proximity of market prices to indicative values to give investors a general sense for the average difference between market prices and indicative values. For lack of a more descriptive term, we refer to this difference between the market price and the indicative value of a particular ETN as the WDF distance. We define the WDF distance (WDFD) on day t as⁴:

$$WDFD_{i,t} = IV_{i,t} - MP_{i,t} \quad (3)$$

Where $WDFD_{i,t}$ is the WDF distance for ETN i on day t , $IV_{i,t}$ is the indicative value of ETN i at the close of trading on day t , and $MP_{i,t}$ is the closing market price of ETN i on day t . ETNs are relatively new. The earliest ETN we have identified debuted in June of 2006. We are unaware of a tidy data set on which to rely for ETN data. We create a sample of ETNs primarily by performing internet searches and in speaking with industry contacts. Constructing a data set thusly would normally expose our work to

⁴ We would have preferred to refer to this difference as tracking error, but some have taken issue with our application of that label to this particular situation. Accordingly, we have defined our own label to avoid any confusion with other definitions of tracking error used in the literature.

extreme survivorship bias. However, we believe the fact that our data set begins so recently (2006) mitigates this concern in our study. Daily market price data for our ETNs is obtained from Bloomberg starting with each fund's date of inception and ending on June 30, 2008. We truncate our sample at June 30, 2008 because we seek a data set that is sterilized from the monumental collapse that occurred in the late summer and fall of 2008, though the behavior of ETNs during and after this period obviously offers a fertile area for potential research. We also obtain daily indicative value data for each fund over the same period from Bloomberg.⁵

Table 1 contains summary statistics for the WDF distance in our study for the overall sample and for each fund in our sample. In Table 1, we list: the ticker symbol for all ETNs in our study (65 total), the ticker symbol for each fund's issuer, the asset or basket of assets that drives each fund's intrinsic value, each fund's inception date (earliest date is June 6, 2006 and latest is June 10, 2008), the number of observations for each fund (which ranges from 6 to 469), each fund's average WDF distance (which ranges from -0.176 to 0.280), and the p-value for the simple t-test of whether the WDF distance is significantly different from zero. The mean WDF distance for the overall sample is -0.01551, which is significant at the 1% level. 42 of the funds have negative average WDF distance. Of the 42, 29 are significant at the 10% level or better.

We believe Table 1 is welcome news for investors. The average ETN has a market price that diverges from its indicative value by less than 2 cents per day on average. Further, the most extreme average daily WDF distance in the entire sample is 28 cents (ignoring INP, which is an extreme outlier). Perhaps most encouraging, 54 of the ETNs have an average daily WDF distance that is less than 10 cents. We interpret these results to mean that by and large ETN market prices track very closely with their indicative values. This means that investors have reasonable assurance that an ETN promising returns corresponding to a certain index or basket of securities is likely to produce actual returns in relative proximity to those promised.

INVESTOR APPEAL

While the hope for favorable tax treatment provides some investor incentive, we believe the primary appeal and benefit of ETNs to most investors relates to the exposure they offer investors to non-traditional asset markets and classes.⁶ If the market price of an ETN closely correlates with the indicative value, which is an empirical question of intense interest, ETNs offer retail and institutional investors an opportunity to gain exposure to markets that may otherwise be accessible only through derivatives or securities that invest in derivative products.⁷ This represents, in our opinion, the most appealing aspect of ETNs – they offer investors both long and short exposure to individual currencies and commodities and to diversified currency and commodity markets in general: (1) at an affordable

⁵ We removed DOD prior to January 7, 2008 due to suspicious data – closing price was \$266.40 on January 4, 2008 and \$9.74 on January 8. The post January 7, 2008 data aligns well with the indicative value, whereas the data up to that point appears conspicuously inconsistent with the indicative value.

⁶ Bernstein [2002], Gastineau [2001], and Dellva [2001] give similar reasons for the popularity of ETFs.

⁷ For example, the new generation of ETFs that offer exposure to commodity and other non-equity markets.

price, (2) with tremendous convenience, (3) with known transaction costs, (4) with a fair amount of liquidity, (5) without having to enter the world of derivatives with its complexities and leverage, and (6) without having to short a security or asset. Against the backdrop of the macro economy as of the writing of this paper, which is painted by the recent collapse of the real estate market, devastated but rebounding US stock markets, and an unprecedented volatility in various commodity prices, one can easily see the appeal of such a security.

RETAIL INVESTOR APPEAL

ETNs possess obvious appeal to retail investors, most of whom feel constrained to equity markets. The reasons for retail investors' confinement to the role of spectator in non-equity markets are numerous. Among the reasons, time and resource constraints, knowledge and experience limitations, and an aversion to the downside risk inherent with futures contracts and short positions seem most salient in keeping retail investors from exploring currency and commodity markets.

ETNs provide an opportunity for retail investors to overcome many of the barriers that have kept them largely corralled in the equity markets in the past. As mentioned earlier, the price for most ETNs is well below \$100. Further, purchasing an ETN is no more difficult or expensive than purchasing a stock. And like purchasing a stock, buying an ETN technically puts an investor in a long position, which means no margin requirements apply, even if the ETN itself offers double the inverse of the return to a given currency, commodity, or index! Finally, since there is no leverage involved in taking a simple long position in an ETN, investors' potential losses are limited to the price of the ETN. For all intents and purposes, ETNs represent a very simple way to allow retail investors access to markets that were once very difficult for them to enter. And from a traditional portfolio management perspective, ETNs offer retail investors a viable opportunity for greater diversification outside of equities, which has the potential to move investors' portfolios closer to the efficient frontier.

MUTUAL AND PENSION FUND APPEAL

ETNs offer a similar appeal to one set of institutional investors. Most mutual funds and pension funds are prohibited by their charters from investing in derivatives. But it is not clear whether a charter that prohibits buying and selling derivatives also tacitly prohibits taking positions in securities traded on stock exchanges that are linked to derivatives products. Considering the importance of tracking error in the mutual fund industry, it is likely that the vast majority of mutual and pension fund managers have no interest in investing in any product whose return is dependent upon derivatives markets. But it is not outside the realm of possibility that at least some mutual fund managers would embrace the opportunity to take a small position in a currency or commodity market to either add an extra boost to their funds' returns or to provide a portfolio hedge. ETNs may provide just such an avenue. Mutual and pension fund managers who are limited by their charters to purchasing and selling certain types of securities may be allowed to buy ETNs, which can offer them exposure to numerous currency and commodity markets, which were heretofore off limits to them.

Further, many charters prevent mutual and pension fund managers from short selling. Again, it is unclear if a charter that prohibits short selling also tacitly prohibits taking a long position in a security

whose return is decidedly the inverse of some other asset, market, or index's return. And again, most mutual and pension fund managers are loathe to assume short positions (with the notable exception of bear market funds). But it is easy to conceive of a mutual fund manager who wishes he had the ability to short sell either to boost fund returns or to hedge his fund during turbulent times. On top of providing the opportunity for exposure to previously off-limit markets, ETNs can offer either short or long exposure in those markets. The ability of ETNs to offer returns that mirror short positions to investors who are technically taking long positions may appeal to mutual and pension fund managers.⁸

HEDGE FUND APPEAL

Much of the above may also create interest in ETNs by hedge funds, but most hedge funds are not constrained in the way that retail investors and mutual and pension fund managers are. For that reason, we believe the primary appeal of ETNs to hedge funds revolves around the more exotic ETNs. Several ETNs offer either double long or double short exposure to a particular commodity or currency. For instance, Deutsche Bank offers an ETN whose indicative value is based on double the inverse of the return to gold. Essentially, this ETN offers its owner a double short position in gold. A recent article in the Wall Street Journal noted that ETFs offering similar double short and double long positions have become popular with hedge funds because of the leveraged positions they offer without requiring actual monetary borrowings.⁹ ETNs should appeal to hedge funds for the same reason.

Further, if standard margin requirements are applied to ETNs, a hedge fund could buy Deutsche Bank's gold double short ETN on 50% margin, which would essentially provide that hedge fund a quadruple short position in gold. This tactic is likely possible with most ETNs. We believe the opportunity to achieve extreme long or short exposure in a specific currency or commodity or in a diversified basket of currencies or commodities may appeal to certain types of hedge fund managers.

Products such as these more exotic ETNs create an environment where in order to deliver significant alpha for investors, a hedge fund manager simply needs to be right about the directional movement of a few currencies or commodities. It may be particularly reassuring to the hedge fund manager and his investors to know that the hedge fund wouldn't actually be buying or selling any of the currencies or commodities on which he is betting, since buying and selling could move the prices of the assets if the hedge fund is operating with large enough amounts of money. Instead, the hedge fund is buying a security that is distinctly separate from the currency or the commodity of interest, though the security's indicative value is directly tied to the commodity or currency. And due to the early redemption clause and the ability and willingness of ETN issuers to issue more shares as needed, it is possible that the large buy and sell orders from hedge funds could be structured to have minimal impact the price of the ETN itself. We think this ability to take extreme short and long positions in currencies and commodities without affecting the prices of those commodities or currencies will appeal to hedge fund managers.

⁸ We note that there are several ETFs that offer a similar opportunity in more traditional asset markets. For instance, QID offers investors a daily return before fees that corresponds to twice inverse of the return to the NASDAQ – 100.

⁹ Zuckerman, Gregory and Mara Lemos Stein, June 26, 2008, "Hedge Funds Bet on Aggressive ETFs," pg. C11.

Related to these exotic ETNs and their leveraged ETF cousins, we believe that ETNs may have an advantage. Leveraged ETFs – those offering anything other than a simple long position in a collection of stocks – usually rely on a bevy of derivatives to try to secure the promised returns to investors. For instance, Proshares offers an ETF (ticker GLL) that “seeks daily investment results, before fees and expenses, that correspond to twice (200%) the inverse (opposite) of the daily performance of gold bullion as measured by the U.S. Dollar fixing price for delivery in London.” A cursory analysis of the holdings of this ETF reveals a combination of forwards and futures contracts. While synthetic securities created through combinations of equities and derivatives are not uncommon, it is questionable whether such a synthetic security does an effective job of actually earning twice the inverse of the daily return to gold. Further, it is questionable whether the authorized investors for this ETF are able to accurately price the underlying NAV and whether they are able to efficiently keep the market price close to that convoluted NAV. DZZ, the ETN cousin of this ETF, does not suffer from these problems. Instead of using a complex concoction of derivatives to generate double the inverse of the daily return to gold, the issuing firm simply guarantees investors the redemption value will accrue interest at precisely double the inverse of the daily return to gold. As long as the issuing institution does not default on the notes, investors will ultimately get precisely that return.

It is not our intent here to empirically investigate the possibility that exotic or leveraged ETNs more precisely earn the return stated in the prospectus than their ETF cousins, but we believe the hypothesis deserves rigorous testing and the outcome of the debate will be of interest to many practitioners. Simple calculations suggest the hypothesis may have traction. We subtracted twice the inverse of the daily return to GLD (an ETF that simply invests in gold) from the daily returns to both GLL and DZZ [$\text{Ret}_{\text{DZZ}} - (-2) \times \text{Ret}_{\text{GLD}}$ and $\text{Ret}_{\text{GLL}} - (-2) \times \text{Ret}_{\text{GLD}}$]. We loosely refer to these differences as tracking error. The tracking error for these two securities should be negative and somewhere close to the average daily expense ratio. However, this is not what we see. The average tracking error for GLL from December 5, 2008 to August 7, 2009 was -0.0331%, which is far below the average daily expense ratio of -0.0038% (based on 250 trading days per year). The average daily tracking error for DZZ was actually positive (0.028%), which is far *above* the average daily expense ratio of -0.0030%. In this case, investors would have been much better shooting for double the inverse of the daily return to gold by purchasing the ETN rather than the ETF.

CONCLUSION

ETNs are increasing in number and popularity. We have provided what we hope is a beneficial descriptive introduction to these relatively new financial securities. Specifically, we have: (1) outlined the important features of ETNs, highlighting significant differences between ETNs and ETFs along the way, (2) presented important “fine print” related to ETNs that investors should know before investing in the securities, (3) provided several simple examples of the types of ETNs available, (4) provided summary statistics outlining the various ETNs on the market and how closely their market prices track the corresponding indicative values (demonstrating that investors should generally feel confident that

purchasing an ETN will provide the return stated in the accompanying prospectus), and (5) discussed why ETNs may appeal to certain classes of investors.

The key points related to ETNs are the following. ETNs are unsecured debt instruments. Ultimately, the return investors earn come from the guarantee of the issuing institution to pay whatever return is promised in the prospectus. Since there is no collateral backing up ETNs and the return earned by investors is literally paid at maturity by the issuing institution, the financial health of the issuing institution should be of paramount concern to anyone investing in ETNs. Recognizing that ETNs are debt instruments and that the risks associated with debt instruments apply, we believe ETNs can play an important role in our financial system. ETNs offer investors affordable, highly liquid, and risk controlled access to asset classes such as currencies and commodities that are difficult to otherwise access with modest resources and without assuming considerable risk. Further, more exotic ETNs offer investors opportunities for double long and double short positions in a variety of asset classes, again with relative affordability, high liquidity, and controlled risk. Further, it may be the case that these exotic ETNs do a better job of actually earning double long and double short positions in these asset classes than their ETF counterparts, but this is an empirical point requiring further investigation.

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Table 1 Summary Statistics

This table presents the following information for each of the ETNs in our sample: ticker symbol, the issuing firm's ticker symbol, the asset or basket of assets driving the indicative value, the inception date, the number of observations in our sample, the average daily WDF distance (defined as indicative value – closing market price), and the p-value of the average tracking error. Panel A reports results for the overall sample and the overall sample less INP, which exerts substantial pressure on the overall results due to its number of observations and its anomalous tracking error. Panel B reports results for each of the individual ETNs.

| Panel A: Results for Overall Sample | | | |
|-------------------------------------|------|-------------------|---------|
| Overall Sample | N | Mean WDF Distance | p-value |
| Full Sample Including INP | 7133 | -0.1331 | <.001 |
| Full Sample Excluding INP | 6753 | -0.01551 | <.001 |

| Panel B: Results for the Individual ETNs | | | | | | | |
|--|------------|---------------|---|----------------|-----|-------------------|---------|
| # | ETN Ticker | Issuer Ticker | Underlying | Inception Date | N | Mean WDF Distance | p-value |
| 1 | ADE | DB | DB AUD Overnight Index | 2/20/2008 | 83 | -0.070 | 0.00 |
| 2 | ADZ | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Agriculture | 4/14/2008 | 53 | 0.027 | 0.47 |
| 3 | AGA | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Agriculture | 4/14/2008 | 53 | -0.025 | 0.35 |
| 4 | AGF | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Agriculture | 4/14/2008 | 54 | -0.005 | 0.93 |
| 5 | BSR | BSC | Alerian MLP Select Index | 7/11/2007 | 216 | 0.045 | 0.00 |
| 6 | BWV | GSLA | CBOE S&P 500 BuyWrite Index | 5/22/2007 | 278 | -0.065 | 0.00 |
| 7 | CNY | MS | S&P Chinese Renminbi Total Return Index | 3/14/2008 | 73 | -0.108 | 0.00 |
| 8 | COW | BARC.L | Dow Jones–AIG Livestock Total Return Sub–Index | 10/23/2007 | 169 | -0.124 | 0.00 |
| 9 | CUD | DB | DB CAD Overnight Index | 2/20/2008 | 73 | -0.053 | 0.01 |
| 10 | DAG | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Agriculture | 4/14/2008 | 54 | 0.020 | 0.61 |
| 11 | DDP | DB | Deutsche Bank Benchmark Commodity Index | 4/28/2008 | 27 | 0.053 | 0.17 |
| 12 | DEE | DB | Deutsche Bank Benchmark Commodity Index | 4/28/2008 | 27 | -0.043 | 0.10 |
| 13 | DGP | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Gold (x 2) Plus DB 3-Month T-Bill Index | 2/27/2008 | 86 | 0.009 | 0.76 |
| 14 | DGZ | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Gold (x -1) Plus DB 3-Month T-Bill Index | 2/27/2008 | 85 | -0.012 | 0.49 |
| 15 | DJP | BARC.L | Dow Jones-AIG Commodity Index Total Return | 6/6/2006 | 417 | -0.087 | 0.00 |
| 16 | DOD | DB | Dow Jones High Yield Select 10 Total Return Index | 11/7/2007 | 67 | -0.038 | 0.00 |
| 17 | DPU | DB | Deutsche Bank Optimum Yield Commodity Index | 4/28/2008 | 27 | -0.081 | 0.08 |
| 18 | DRR | MS | Double Short Euro Index | 5/6/2008 | 27 | -0.069 | 0.00 |
| 19 | DYY | DB | Deutsche Bank Optimum Yield Commodity Index | 4/28/2008 | 27 | -0.100 | 0.03 |
| 20 | DZZ | DB | Deutsche Bank Liquid Commodity Index - Optimum Yield Gold (x -2) Plus DB 3-Month T-Bill Index | 2/27/2008 | 86 | -0.038 | 0.29 |
| 21 | EEH | CBJ | SPECTRUM Large Cap U.S. Sector Momentum Index | 8/1/2007 | 94 | 0.031 | 0.00 |
| 22 | EGB | DB | DB GBP Overnight Index | 2/20/2008 | 68 | 0.003 | 0.81 |
| 23 | EOH | LEH | LBCI Agricultural Pure Beta Total Return | 2/20/2008 | 79 | 0.000 | 0.38 |
| 24 | ERE | DB | DB EUR Overnight Index | 2/20/2008 | 83 | -0.028 | 0.00 |

| | | | | | | | |
|----|-----|--------|--|------------|-----|--------|------|
| 25 | ERO | BARC.L | euro/U.S. dollar exchange rate | 5/8/2007 | 126 | 0.143 | 0.00 |
| 26 | FUD | UBS | UBS Bloomberg Constant Maturity Commodity Index Food Total Return Index | 4/1/2008 | 61 | -0.039 | 0.03 |
| 27 | FUE | CBJ | MLCX Biofuels Index | 2/5/2008 | 94 | 0.016 | 0.07 |
| 28 | GAZ | BARC.L | Dow Jones-AIG Natural Gas Total Return Sub-Index | 10/23/2007 | 169 | -0.060 | 0.01 |
| 29 | GBB | BARC.L | British pound/U.S. dollar exchange rate | 5/8/2007 | 126 | 0.161 | 0.00 |
| 30 | GCE | GSLA | Claymore CEF Index | 12/6/2007 | 139 | -0.054 | 0.07 |
| 31 | GOE | CS | MLCX Gold Index - Total Return | 4/2/2008 | 27 | -0.109 | 0.04 |
| 32 | GRU | CBJ | MLCX Grains Index - Total Return | 2/5/2008 | 94 | 0.008 | 0.49 |
| 33 | GSC | GSLA | S&P GSCI™ Enhanced Commodity Total Return Strategy Index | 5/3/2007 | 128 | 0.029 | 0.20 |
| 34 | GSP | BARC.L | S&P GSCI | 6/6/2006 | 443 | -0.034 | 0.00 |
| 35 | GWO | DB | Credit Suisse Global Warming Index | 4/1/2008 | 61 | -0.042 | 0.00 |
| 36 | INP | BARC.L | MSCI India Total Return Index | 12/19/2006 | 380 | -2.224 | 0.00 |
| 37 | INR | MS | S&P Indian Rupee Total Return Index | 5/14/2008 | 32 | -0.039 | 0.07 |
| 38 | JJA | BARC.L | Dow Jones-AIG Agriculture Total Return Sub-Index | 10/23/2007 | 169 | -0.035 | 0.49 |
| 39 | JJC | BARC.L | Dow Jones-AIG Copper Total Return Sub-Index | 10/23/2007 | 168 | -0.021 | 0.41 |
| 40 | JJE | BARC.L | Dow Jones-AIG Energy Total Return Sub-Index | 10/23/2007 | 169 | 0.030 | 0.57 |
| 41 | JJG | BARC.L | Dow Jones-AIG Grains Total Return Sub-Index | 10/23/2007 | 169 | -0.086 | 0.00 |
| 42 | JJM | BARC.L | Dow Jones-AIG Industrial Metals Total Return Sub-Index | 10/23/2007 | 126 | -0.052 | 0.02 |
| 43 | JJN | BARC.L | Dow Jones-AIG Nickel Total Return Sub-Index | 10/23/2007 | 169 | -0.033 | 0.14 |
| 44 | JYN | BARC.L | Japanese yen/US dollar exchange rate | 5/8/2007 | 126 | 0.016 | 0.45 |
| 45 | LSC | HBC | S&P Commodity Trends Indicator - Total Return | 6/10/2008 | 6 | -0.033 | 0.07 |
| 46 | LSO | CS | MLCX Livestock Index - Total Return | 4/1/2008 | 54 | -0.176 | 0.00 |
| 47 | OIL | BARC.L | The S&P GSCI™ Crude Oil Total Return Index | 8/15/2006 | 469 | 0.011 | 0.13 |
| 48 | PMY | CS | MLCX Precious Metals Plux Index - Total Return | 4/1/2008 | 61 | -0.005 | 0.56 |
| 49 | PPE | LEH | S&P Listed Private Equity Index Net Return | 2/20/2008 | 91 | -0.052 | 0.61 |
| 50 | PTD | UBS | UBS Bloomberg Constant Maturity Commodity Index Platinum Excess Return Index | 5/8/2008 | 36 | -0.014 | 0.82 |
| 51 | PTM | UBS | UBS Bloomberg Constant Maturity Commodity Index Platinum Total Return Index | 5/8/2008 | 35 | -0.014 | 0.77 |
| 52 | RAW | LEH | LBCI Pure Beta Total Return | 2/20/2008 | 91 | 0.000 | 0.99 |
| 53 | RJA | CBJ | Rogers International Commodity Index - Agriculture Total Return | 10/17/2007 | 94 | -0.030 | 0.00 |
| 54 | RJI | CBJ | Rogers International Commodity Index - Total Return | 10/17/2008 | 94 | -0.034 | 0.00 |
| 55 | RJN | CBJ | Rogers International Commodity Index - Energy Total Return | 10/17/2008 | 94 | -0.027 | 0.00 |
| 56 | RJZ | CBJ | Rogers International Commodity Index - Metals Total Return | 10/17/2008 | 94 | -0.007 | 0.15 |
| 57 | UAG | UBS | UBS Bloomberg Constant Maturity Commodity Index Agriculture Total Return Index | 4/1/2008 | 61 | 0.077 | 0.12 |
| 58 | UBC | UBS | UBS Bloomberg Constant Maturity Commodity Index Livestock Total Return Index | 4/1/2008 | 61 | -0.069 | 0.01 |
| 59 | UBG | UBS | UBS Bloomberg Constant Maturity Commodity Index Gold Total Return Index | 4/1/2008 | 61 | 0.105 | 0.06 |
| 60 | UBM | UBS | UBS Bloomberg Constant Maturity Commodity Index Industrial Metals Total Return Index | 4/1/2008 | 61 | -0.026 | 0.62 |
| 61 | UBN | UBS | UBS Bloomberg Constant Maturity Commodity Index Energy Total Return Index | 4/1/2008 | 61 | 0.280 | 0.00 |
| 62 | UCI | UBS | UBS Bloomberg Constant Maturity Commodity Index Total Return | 4/1/2008 | 63 | -0.043 | 0.03 |
| 63 | URR | MS | Double Long Euro Index | 5/6/2008 | 27 | 0.096 | 0.19 |
| 64 | USV | UBS | UBS Bloomberg Constant Maturity Commodity Index Silver Total Return Index | 4/1/2008 | 61 | 0.200 | 0.01 |
| 65 | WMW | DB | Morningstar Wide Moat Focus Total Return Index | 10/17/2007 | 176 | 0.008 | 0.39 |

