

Chapter 6 - Exchange Traded Products (ETPs)

written for Economics 104 Financial Economics by Prof Gary R. Evans

First edition May 2009, this edition October 12, 2019

© Gary R. Evans. This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.



This chapter, prepared for students in Economics 104, introduces the reader to *exchange traded products (ETPs)* which are often described by the media as *exchange traded funds (ETFs)*. An ETF, however, has a narrower legal definition than an ETP and is in most cases a safer investment asset, so we will buck the media tradition and refer to the wider definition in this chapter. The legal distinction is actually quite important, but is tedious to discuss, so the discussion is deferred until an appendix at the end of this chapter (which the Economics 104 student is expected to read and understand).

Here is what this chapter will cover:

1. What is an ETP and how does it differ from a mutual fund?
2. Classification (types) of ETPs.
3. How the NAV and iNAV are calculated for ETPs and how the ETPs are collateralized.
4. How ETPs are introduced to the stock market.
5. ETP fees, taxes, and finding online information.
6. How to research an ETP.

Appendix A - The performance of select ETFs during the flash crash of May 6, 2010

Appendix B - The Important Distinction Between true ETFs, ETF-like Funds and Exchange Traded Notes (ETNs).

If you are a student in Economics 104, this is probably the second-most important chapter you will read (after the chapter about mutual funds) if your objective is to learn what is necessary to manage your own retirement accounts. The market for ETPs in retirement accounts is currently only about one sixth of the market for mutual funds, but that number is growing rapidly. As we will see below, ETPs are in many respects easier to buy and sell than mutual funds while retaining the advantage of diversity and range of choice. Increasingly ETPs are being allowed as assets of choice in employer-controlled retirement accounts and are already widely available and popular in investor-controlled retirement accounts (like rollover IRAs, spousal IRAs and Roth IRAs).

However, many ETPs are potentially dangerous as investment assets and all are not suitable for retirement accounts. Further, the distinction between the safer ETPs (which are usually ETFs) and the far riskier ETPs (which are usually exchange traded notes [ETNs] but are not restricted to this category) are not well understood nor explained by the media. Therefore, the inherent risk in some categories of ETPs are emphasized in this chapter.

1. What are exchange traded products (ETPs) and how do they differ from mutual funds?

ETPs are very similar to mutual funds. Like mutual funds, a huge number of investors, by buying the ETP, effectively pool their money, allowing an investment company like **Black Rock** to purchase investment assets dedicated to some stated investment objective. The most common ETPs invest in stock or yield-bearing financial assets just like their mutual fund counterparts. But the range of assets in which ETPs are allowed to invest is essentially unlimited. In addition to stocks and bonds, ETPs invest in options contracts, futures contracts, in commodities like gold, oil, and natural gas, in

foreign currencies and assets tied to real estate. As we will see below, ETP investments can be *leveraged*, which implies that the price performance of an ETP can be realized on a scale of two or higher than the gain or loss of the underlying asset class on which the ETP is based (for example, you can buy an ETP that promises to more or less *double* the performance of the Dow Jones Industrial Average).

Because they are pooled assets like mutual funds, they offer the same primary advantages of mutual funds, including the all-important advantage of *diversity*, which lowers risk. In chapter 5, when discussing mutual funds, the benefit of diversity was pointed out by the example of investing in a growth fund like the **Vanguard Growth and Income Large Cap Fund (VQNPX)** which allowed the small investor the obvious benefit of investing small amounts in more than 1,000 large-cap stocks. **Vanguard** also offered an **S&P 500 Index Fund** (now closed to investors because of its sheer size) that directly tracks the S&P 500 index. But today an investor can also choose to buy shares of the **SPDR** (pronounced "spider") **State Street Global Advisers S&P 500 Exchange Traded Fund (SPY)**, which is the oldest ETF¹ (created in 1993). These two options are equivalent from an investment point of view - in both cases the investor is investing in the stocks that make up the famous index.

Additionally, like mutual funds, ETPs offer an extremely high level of *choice*. According to the **Investment Company Institute** at the end of 2018 there were 1,988 competing ETPs in the United States managing \$3.4 trillion in assets (in a global market of \$4.7 trillion).² But the degree of choice involves much more than just numbers. The growing popularity of ETPs also allows the small investor to invest, sometimes directly but typically indirectly, in commodities like oil and gold, in foreign currencies, and foreign investments of many different varieties, choices that are not available in the world of mutual funds. Of course this expanded choice comes with expanded risk. Investing in natural gas, especially through futures contracts, which is how it is done with ETPs, is certainly not on the same scale of risk as investing in **SPY** or any S&P 500 index fund.

Just like mutual funds, ETPs are always sponsored by fund families (and many, but not all of them, are sponsored by a fund family that also offers mutual funds, like **Vanguard**).

However, ETPs differ from mutual funds in a number of very important ways:

- a) You always buy or sell an ETP just like you do a stock. You do not buy an ETP directly from the sponsoring fund family through their website. Instead you buy the ETP in your brokerage account in the exact same way that you would a stock, through the use of market or limit orders, in a stipulated number of shares. In other words, you can set a GTD limit order to buy **100** shares of **SPY** at the price of **293.10** the same way that you might set a limit order to buy **100** shares of **TSLA** (Tesla Motors) at **237.72**.
- b) This implies that the market price of an ETP, driven by supply and demand, rises and falls throughout the day just as it does for a stock. As is the case for a mutual fund, a daily NAV must be calculated and published for an ETP, which represents the per-share value of the ETP given the value of the assets holdings of the ETP at the end of the market day. Additionally, for an ETP, an interim **iNAV**, which is the net asset value calculated by the fund family on a recurring basis, such as every 15 minutes, is also published. You may remember that for a mutual fund, the convention is to specify the dollar amount of the fund that you want to buy and then your trade is executed at the end of the trading day at the published NAV. But for the ETP the NAV and iNAV are only references. The price traded is a fluid price, which will obviously be close to the iNAV, but nonetheless, market determined.

¹ And this is a true ETF in that it invests directly in the financial assets that it tracks, in this case the stocks that make up the S&P 500. Again, this definitional distinction is explained in Appendix B.

² **Investment Company Institute**, "2019 Investment Company Fact Book, 59th edition, Page 82.

- c) Whereas mutual funds are regarded as largely buy-and-hold investment assets with restrictions on how soon you can sell them after you buy them, there are no such restrictions on ETPs. You can buy one in the morning and sell it 15 minutes later with no penalty. They trade exactly like stocks and can be used for strategies ranging from day-trading to buy-and-hold. Although this feature of ETPs is very nice, it is also one of the reasons that even the safest of them must be regarded as riskier than an equivalent mutual fund. There is always an inherent potential volatility built into assets than can rapidly be bought and sold. This high-turnover feature of ETPs explains their role in the chilling example of the flash crash of 2010, which is discussed in **Appendix A** of this chapter.
- d) Many ETPs pay dividends because many of the stocks that make up the ETP pay dividends. The ETP management company determines dividend payment dates and record dates. Just like for a stock, if you are the registered owner of an ETP at the end of the record date, you are entitled to the dividend, which is paid later (whether you hold it or not on the payment date). Unlike a mutual fund, where the proceeds from dividends can be rolled back into the fund balance, ETP dividends are paid out in cash and are taxable.

Like mutual funds, ETPs are sold in shares. The process for creating shares and first offering them to the market is explained in **Section 4** below.

2. Exchange Traded Product (ETP) Classifications

ETPs can be classified by (a) asset category and (b) tracking objective. Any one of the four asset categories shown below can be associated with any one of the three tracking objective. Here is a summary:

Category	Tracking Objective
Equity	Direct (Long)
Bond (Fixed Income)	Inverse (Short)
Sector	Leveraged
Commodity/Currency	

Most but not all ETPs are tied to an index. In some cases, the index is a traditional and recognizable index that existed long before ETPs were created. In recent years though the index is one specifically created to give the ETP something to track. In all cases, the index will consist of a **market basket** of securities and the index itself will be a weighted sum of the prices of all of the securities in the market basket. ETPs that are not designed to replicate an index typically tracks either a market basket of securities or commodities or a single security or commodity. Multiple examples will be given below.

A **direct (long) equity index** ETP is designed to track an index like the S&P 500 directly and proportionately. For example, if on any given day the S&P 500 rises by 1.24%, then the popular **SPDR S&P 500 (SPY)** ETF, which is an example of this kind of ETF, should rise by nearly the same percentage, with very little error. Just like an index mutual fund, as goes the index, so goes the ETF.

An **inverse (short) equity index** ETP is designed to go proportionately in the opposite direction (the inverse) of an index like the S&P 500 by the same percentage. The **ProShares Short S&P 500 (SH)** ETP tracks the S&P 500 inversely in this way. Ideally, if on any given day the S&P 500 falls by 1.24%, the **SH** ETP is supposed to rise by 1.24%.

A **leveraged** ETP, which can be long or short, is designed to replicate either directly or inversely the index, sector, or commodity that it tracks by some multiple, typically 2X or 3X. For example, the **ProShares Ultrashort (2X) S&P 500 (SDS)** ETP is a **leveraged inverse index** designed to move opposite of the S&P 500 by a factor of 2 – if the S&P 500 falls by 1.24%, the **SDS** ETP is supposed to rise by 2.48%.

Figure 1 below shows these three ETPs and how they tracked over a 6-month period in 2019. The S&P 500 Index, which rose over this period by more than 10%, is not shown because **SPY** (in blue) tracks it nearly perfectly and would sit right

on top of the index. The inverse **SH** ETP, shown in red, is a mirror image of **SPY**. Finally, **SDS**, shown in green, magnifies **SH** by, in this case, doubling its loss.

Figure 1 – Price Performance of the S&P500 ETFs **SPY, **SDS**, and **SH****



Source: finance.yahoo.com

The index ETPs include a huge number of *global index funds* that track, typically long, an index for stocks specific to a country or a region. Examples of these include **iShares MSCI Japan Index (EWJ)** and **iShares MSCI Australia Index (EWA)**, which track the **MCSI Indexes** for Japan and Australia, respectively, and the **Vanguard European ETF, VGK**.

A bond ETP, also called a *fixed income ETP*, tracks the price of a specific bond index. For example, **TLT**, the **iShares Barclays 20+ Year Treasury Bond** tracks the weighted sum of the prices of a market basket of U.S. Treasury bonds that have maturities of more than 20 years remaining. **TLT** is an example of an ETP that does not track an index. It tracks a market basket of bonds.

High yield junk bonds, as they are called, are represented by **JNK**, the **SPDR Barclays Capital High Yield Bond ETP**. Unlike **TLT**, this ETP tracks an index, the **Barclays Capital High Yield Very Liquid Index**, which, as the name implies, largely exists to give this ETP something to track.

Bond ETPs generally track bond prices rather than their yields, so when interest rates are falling these funds tend to realize capital gains.³

Most *sector ETPs* are long and most track an index that is specific to a sector. For example, there are currently more than 35 ETPs in the financial services sector if global funds are included. Examples include **XLF**, the **Financial Services SPDR** and **PGF**, the **PowerShares Financial Preferred ETP**, and **FAS**, the **Direxion 3X Financial Bull**, which is a *long leveraged (3X)* sector equity ETP.

³ Bond prices and their yields move inversely. This is explained in a later chapter about yield-bearing financial assets.

In the technology sector you can find ETPs as diverse as an ETP for cloud computing (**SKYY**), for semiconductors (**SOXX**) and software (**IGV**), in addition to more inclusive and general technology ETPs, like **IXN**, the **iShares S&P Global Technology** ETP.⁴

Commodity ETPs track either the prices of single commodities or indexes of commodity groups. Typically, there will be ETPs that allow you to go long or short. For example, if you think that the price of gold is going to rise, then you can buy the popular **SPDR Gold Shares (GLD)**, which directly tracks the price of gold. If instead you think that the price of gold will fall, you might instead buy a **commodity inverse leveraged (2X)** ETP, the **ProShares UltraShort (2X) Gold (GLL)**, which will rise twice as fast as the price of gold falls.

USO is designed to track the price of oil in the United States, **UNG**, the price of natural gas. These ETPs are examples of ETPs that do not track indexes but instead a single commodity.

Figure 2

A REPRESENTATIVE SELECTION OF EXCHANGE TRADED FUNDS			
Domestic Index		Commodities and Metals	
DJIA	DIA	GOLD	GLD
S&P500	SPY	SILVER	SLV
RUSSELL 2000	IWM	U.S. OIL	USO
NASDAQ 100	QQQ	Yield-bearing FA	
RUSSELL MIDCAP	IWR	UST 20-YR BOND	TLT
Global Index		UST 7-10 YR NOTE	IEF
AUSTRALIA	EWA	UST 1-3 YR NOTE	SHY
BELGIUM	EWK	UST TIPS	TIP
BRAZIL	EWZ	UST BILLS	SHV
CANADA	EWI	I-GRADE BONDS	LQD
EURO STOXX	FEZ	JUNK BONDS	JNK
FRANCE	EWQ	Technology Specialty	
GERMANY	EWG	CYBERSECURITY	HACK
HONG KONG	EWH	CLOUD	SKYY
ITALY	EWI	SEMICONDUCTOR	XSD
JAPAN	EWJ	SOFTWARE	IGV
MEXICO	EWV	Sector	
SINGAPORE	EWS	ENERGY	XLE
SOUTH AFRICA	EZA	HEALTHCARE	XLV
SOUTH KOREA	EWY	US OIL & GAS	IEO
SPAIN	EWP	FINANCIAL	XLF
TAIWAN	EWT	US REAL ESTATE	IYR
UNITED KINGDOM	EWU	UTILITIES	IDU
Funds that track indexes			
Funds that track the actual prices of commodities (not companies)			
Funds that track the prices of these financial assets (not companies)			
Market baskets of stock in these industries (typically with an index)			

Figure 2, taken from a lecture slide, shows an assortment of ETPs in various asset categories and sectors. On the left side it is clear that the U.S. investor can invest indirectly in national overseas markets. On the right side you can find commodities and many classes of notes and bonds and money market assets. And this list is hardly inclusive. Many more of all of these categories of funds are represented. This is just meant to be a representative sample.

It should be noted that all inverse (short) and even some long ETPs attempt to track only the *daily change*, called the **delta**, in the price of whatever they track, rather than try to match the value day by day of the price of their target, like an index fund does.

One might ask, "well wouldn't two such funds achieve the same result, because if one fund succeeds at matching the daily delta, over the long run won't it track its target perfectly?"

The answer will be "no" for some **delta-tracking** funds for two reasons:

(1) there is always some error in tracking and for some delta-tracking funds the error is large. If the error is

⁴ There is always the possibility that one of these ETFs will be withdrawn from the market because of lack of liquidity (meaning not enough traders buy it to make it profitable for the fund managers). The 2010 version of this chapter listed **BHH**, an ETF for business-to-business internet companies and the 2013 version listed **PXN** for Nanotech. Both **PXN** and **BHH** have disappeared.

also biased (consistently large or small) then the cumulative effect over time will prevent the ETP from tracking a price accurately over a long time horizon.

(2) We will see below that delta-tracking funds are collateralized with assets that don't perform well enough to track the ETP's target reliably. This is especially true for leveraged delta funds. There will be some examples below.

3. The NAV, iNAV and how ETPs are Secured or Collateralized

The **Net Asset Value (NAV)** of an ETP is equal to the value of the assets owned by the ETP divided by the number of shares outstanding of the ETP (examples will be shown below). Unlike mutual funds, where the NAV is only calculated at the end of the day, ETP managers will calculate the NAV throughout market hours and list the result, called the **Intraday Net Asset Value (iNAV)**, now also called the **Intraday Indicative Value (IIV)**.

Because the moment-to-moment market value of an ETP is determined by supply and demand there is no guarantee that the actual market price of the ETP matches the iNAV, although for most ETPs it will be within one or two percent. For some ETPs, though, the market price has a bias above the iNAV and is said to be trading at a **premium**. If the market price is consistently or frequently below the iNAV, then the ETP is trading at a **discount**. The integrity of the ETP secured portfolio will obviously have a large impact upon the ETP's NAV.

How ETPs are secured is no small matter. Some ETPs track very reliably, but some don't. In some cases, this is because they are secured with securities that can only loosely meet the ETP's stated investment objective. Also the long-term safety of ETPs has not been challenged very much. Generally, if there are problems with ETPs in the future it would likely arise in those ETPs that hold assets that are risky, volatile, or illiquid.

When researching ETPs to search for investment candidates, a full understanding of what assets are owned by the ETP is essential.

Figure 3 – The SPDR Gold Share physical gold inventory



Generally, ETPs hold their assets in one of three forms, depending upon the type of ETP:

1. a market basket consisting of the asset or assets being tracked, directly;
2. a market basket made up of the components of an index with weights equal to the weighting used in the index, either proportionate to or a fraction of whatever index is being tracked (example below);
3. a portfolio of futures contracts.⁵

One of the best examples of option 1 above, a market basket consisting of the assets being tracked, is offered by the famous and popular gold tracking stock, **SPDR Gold Shares (GLD)**. This ETF physically holds gold in inventory in an

⁵ To completely understand this the reader needs to know what a futures contract is. Since that comes later in the course we will just have to let the explanation in the text suffice for the time being.

amount equal to the Net Asset Value of **GLD** stock shares in circulation.⁶ **Figure 3** shows a photo of that inventory, which on October 12, 2019 at 3:25 PM PDT, consisted of 921.71 tonnes (29,633,808.57) ounces of gold, and had a value of \$43,827,508,294.91.⁷ Given that there were 314.4M shares in circulation, the **GLD NAV** at that moment was \$139.40 and the market price was within a few cents of that.

It should be obvious why such ETPs are generally regarded as safe - your paper is backed by a stored commodity proportionate in value to the value of the stock in circulation.

It should also be understood that very few commodity ETPs are secured this way! Many are secured by futures contracts, (option 3 above). For example, as will be seen below, the **United States Oil (USO)** ETP is secured mostly by near-term oil futures contracts rather than stored oil.

Of course for many physical commodities it makes no sense to store physical inventory. The cost of storage can be quite high, but more important, for critical commodities like oil and natural gas, it makes no sense to perpetually hoard huge inventories just to provide backing for a tracking stock.

TLT, the popular **iShares Barclays 20+ Year Treasury Bond** ETF is a good example of a fund that satisfies option one above (holding a market basket of multiple assets) by keeping a portfolio of U.S. Treasury bonds that fit their investment criteria.

Figure 4 (created for another document used in Economics 136 that explains how to speculate with this ETF) shows what that inventory was on October 8, 2019. This fund does not track an index, but the portfolio value will reflect the market value of the bonds (and other assets) that are shown in **Figure 4**, which at that moment was \$18,979,225,632 and given that there were 130,600,000 shares outstanding on that day, the **NAV** for **TLT** would have been equal to 18,979,225,632/130,600,000, or **\$145.32**.

When considering the collateral for a traditional index ETF, such as the famous **SPDR S&P500 (SPY)** ETF, which controls more than \$265 billion in assets (fall 2019), one would expect to see a portfolio consisting of the stocks that make up the index weighted with the same weights that they have in the index. Typically a quick visit to the fund-family website will confirm this relationship.⁸

Figure 4
TLT: iShares 20+ Year Treasury Bond Fund
Portfolio Composition on October 8, 2019

NAV: **145.32** Shares Out: **130,600,000**

Maturity	Years	Market Value	Weight %	Coupon	YTM	Price
15-Feb-45	29.38	1,381,661,865.19	7.26	2.50	2.00	109.95
15-Feb-46	30.38	1,324,201,929.38	6.96	2.50	2.01	110.06
15-Aug-44	28.88	1,222,480,073.35	6.42	3.13	1.98	122.32
15-May-43	27.62	1,216,194,636.19	6.39	2.88	1.97	117.02
15-May-46	30.63	1,210,858,798.87	6.36	2.50	2.01	110.08
15-Aug-48	32.88	1,200,709,263.19	6.31	3.00	2.01	121.51
15-Nov-45	30.13	1,038,265,865.08	5.46	3.00	1.99	120.46
15-Feb-48	32.38	960,900,549.47	5.05	3.00	2.01	121.29
15-Nov-40	25.13	891,193,476.79	4.68	4.25	1.87	141.37
15-May-48	32.63	882,263,323.31	4.64	3.13	2.01	124.15
15-Nov-43	28.13	718,881,949.41	3.78	3.75	1.96	134.16
15-Aug-43	27.88	700,789,871.18	3.68	3.63	1.96	131.56
15-Aug-47	31.88	696,425,925.34	3.66	2.75	2.01	115.69
15-Aug-45	29.88	673,159,527.43	3.54	2.88	2.00	117.71
15-May-47	31.63	659,195,780.81	3.46	3.00	2.00	121.02
15-Aug-40	24.88	634,701,759.12	3.34	3.88	1.86	134.69
15-Nov-47	32.13	630,362,468.91	3.31	2.75	2.01	115.77
15-Aug-42	26.88	605,306,418.93	3.18	2.75	1.95	114.60
15-Nov-42	27.13	580,088,630.11	3.05	2.75	1.96	114.54
15-Feb-43	27.38	560,689,371.10	2.95	3.13	1.96	121.69
15-Nov-46	31.13	534,743,229.23	2.81	2.88	2.00	118.21
15-Feb-40	24.38	436,411,449.80	2.29	4.63	1.83	147.36
15-Nov-39	24.13	80,518,596.98	0.42	4.38	1.82	142.83
15-Nov-48	33.13	30,097,366.92	0.16	3.38	2.00	130.13
15-May-39	23.62	28,727,530.04	0.15	4.25	1.81	140.23
15-May-49	33.63	25,674,875.09	0.13	2.88	2.01	119.2
15-Aug-41	25.88	24,389,402.04	0.13	3.75	1.91	132.84
15-Nov-41	26.13	14,759,825.52	0.08	3.13	1.93	121.52
15-Feb-47	31.38	13,834,420.90	0.07	3.00	2.00	121.06
15-May-40	24.62	13,252,773.97	0.07	4.38	1.85	143.2
15-May-37	21.62	12,920,791.78	0.07	5.00	1.70	149.96
15-Nov-44	29.13	6,593,587.30	0.03	3.00	1.99	119.94
15-May-44	28.63	6,324,092.67	0.03	3.38	1.98	127.09
15-May-38	22.62	3,945,374.74	0.02	4.50	1.75	143.44
15-Feb-38	22.38	3,004,810.11	0.02	4.38	1.75	141.12
15-May-45	29.63	2,447,010.85	0.01	3.00	1.99	120.2
Total Bond Value:		19,025,976,621.10				
Cash and other (net):		-46,750,989				
Total Assets:		18,979,225,631.92				

* Other is mostly dividends receivable from bond holdings, plus cash less borrowings.
**Weighted average of bonds only.
Source: iShares online prospectus for iShares 20+ Year Treasury Bond Fund, this date.

⁶ It is probably more accurate to say that market arbitrage in this very liquid ETF keeps the market cap of **GLD** in circulation almost exactly equal to the dollar value of the fund's gold inventory.

⁷ Current data about **GLD** is found at <https://www.spdrgoldshares.com/usa/financial-information>

⁸ To confirm this, the reader might want to stop here and go to **SPDR** website at <https://us.spdrs.com/en/etf/spdr-sp-500-etf-SPY> and review fund overview and holdings.

Such funds, if large and popular, will track their target index nearly perfectly and in most cases reliable substitutes for the equivalent mutual funds.⁹

Figure 5 – Portfolio Holdings of the USO ETP on 10/8/2019

Daily Funds Holdings		as of October 8, 2019	
Futures Contracts	Quantity	Price	Market Value
NY MEX WTI Crude Oil Nov 19	24,770	56.23	\$1,303,645,100
Liquid (Cash) Assets			
US T Bills different maturities			\$1,268,966,538
Cash			\$178,410,532
Total Liquid Assets			\$1,447,377,070

Source: USO Oil Fund Holdings: <http://www.uscfinvestments.com/holdings/uso>

Commodity delta funds which promise to track only the daily performance of its commodity target will typically, by necessity, secure its assets through futures contracts. A good example is provided by the popular **United States Oil Fund (USO)** ETP offered by **United States Commodity Funds (USCF)**. USO defines their investment objective to be¹⁰

The investment objective of USO is for the daily changes in percentage terms of its shares' NAV to reflect the daily changes in percentage terms of the spot price of light, sweet crude oil delivered to Cushing, Oklahoma, as measured by the daily changes in price of USO's Benchmark Oil Futures Contract, less USO's expenses.

Then under the listing of **USO's Portfolio**,¹¹

USO invests primarily in listed crude oil futures contracts and other oil-related futures contracts, and may invest in forwards and swap contracts. These investments will be collateralized by cash, cash equivalents, and US government obligations with remaining maturities of two years or less.

Figure 5 shows the actual asset holdings of **USO** on October 8, 2019. As can be seen, the market-sensitive component of the holdings consists entirely of a single near-term futures contracts set to expire in November 2019. These contracts must be rolled over as their maturity approaches.

Note in **Figure 5** that the fund holds liquid assets in the form of U.S. Treasury Bills (all with maturities of less than one year) plus cash assets equal to a value that is almost equal to the market value of the crude oil futures contract. For reasons that will become clear in **Chapter 10 - Futures Contracts**, a futures contract is not considered an asset. The total assets held by this ETP equals only the sum of their liquid assets, or \$1.447 billion dollars.

When the amount of cash or liquid assets held by the fund is approximately the same value as the market value of the futures contracts, as is the case here, then the ETP is an *unleveraged* ETP. The fund's rate of growth should match the rate of growth of the target price (in this case, the price of crude oil). As we will see in **Chapter 10**, in a *leveraged* ETP

⁹ If there is a slight discrepancy in tracking, it is because as the fund liquidates or adds shares it may have a slight market impact.

¹⁰ USO actually calls itself an "exchange traded security" rather than an ETF. This is discussed in Appendix B. Stated "Fund Objective and Key Features" of the funds featured at <http://www.uscfinvestments.com/home>, as of September 29, 2018. Bold and italics are my emphasis.

¹¹ See the references for the **USO United States Oil Fund** under <http://www.uscfinvestments.com/home>

the value of the futures contract will be a multiple of the cash value held by the fund by the magnitude of the leverage. For example, if this were a 2X leveraged fund, the value of the futures contract would be roughly double the value of the cash held by this fund.¹²

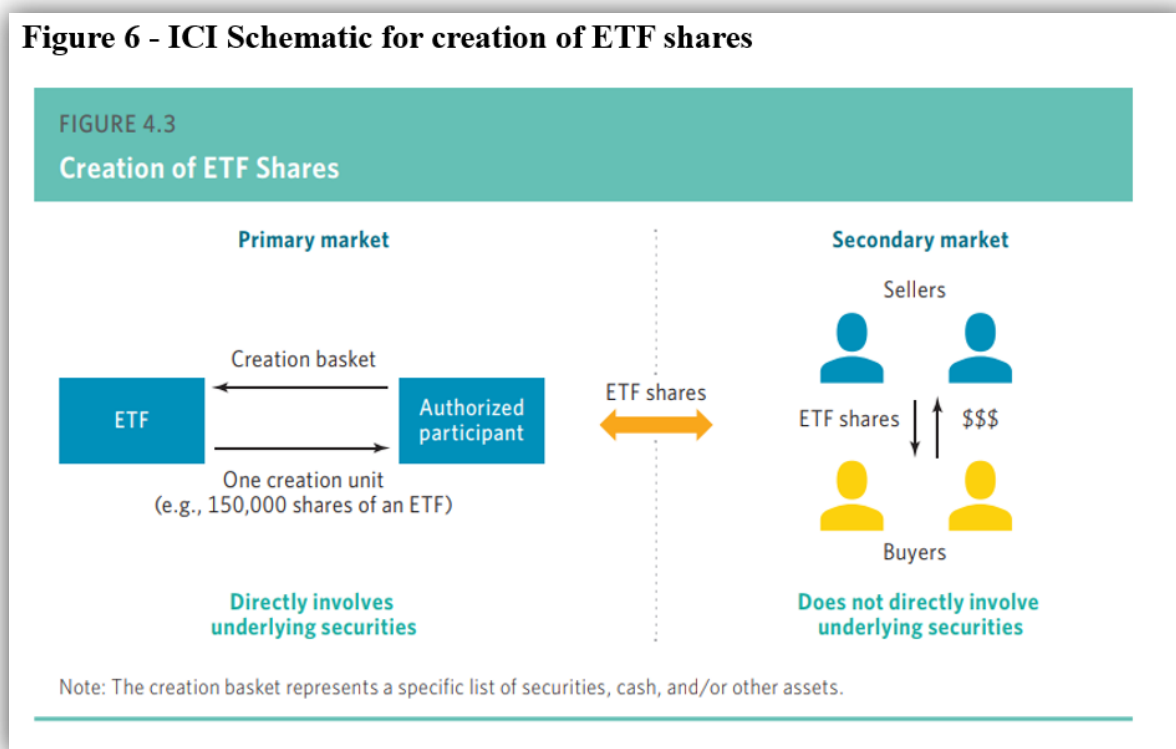
Because the NAV for such a fund is easy to calculate and is published daily on the website (the NAV for USO on October 11, 2019 was \$11.43 at market close) it is easy to determine whether the market price tracks the NAV or trades at a premium or discount to the NAV. But the NAV will have no connection to any other number, such as the price of oil on that day (why would it? - the NAV equals the fund total value divided by shares issued, which of course has no connection to the price of a barrel of crude oil), so it is much harder to determine if the NAV day after day, is meeting its tracking objective.

This same fund family also offers the **United States 3X Short Oil Fund (USOD)** which goes *short* in the same category of futures contracts, benefitting when the price of oil goes *down*. Additionally, that fund is leveraged 3X, such that if the price of the crude oil futures contract goes down by 1%, the NAV of USOD should rise by 3%.

These complexities should give rise to caution. Although such ETPs such as these may be perfect for shorter-term hedging and speculation, they are really not suitable as substitutes for mutual funds in long-term conservative investment portfolios. We will say more about that at the end of this chapter, where we discuss researching ETPs, and will again return to the subject in the future chapter about futures contracts.

4. Introducing ETPs to the Market

Refer to **Figure 6 – ICI Schematic for creation of ETF shares**, which was copied from the **Investment Company Institute** annual factbook.¹³ This diagram illustrates how the sponsoring ETP fund family first releases large share blocks



of the ETP, called *creation units* to financial firms, called *authorized participants* who effectively serve as market makers

¹² Alas, it is impossible at this point to explain why this is true. To understand how this works you must fundamentally understand how futures contracts are settled, which is detailed and complicated and explained in Chapter 10. So you have to be patient.

¹³ See *Investment Company Institute*, "2018 Investment Company Fact Book, 55th edition, Figure 4.3.

for the ETP, similar to the responsibilities and privileges associated with being the underwriters of an IPO. This release of large blocks of the ETP to the effective market makers is called the **primary market** for ETPs.

Subject to some restrictions, the authorized participants are also allowed to sell creation units back to the ETP fund with a **redemption order** that is executed at the end of the trading day. The redemption order obviously has the effect of withdrawing shares eligible for trading from the markets.

For most ETPs, the authorized participant does not buy the large creation units with cash. Instead, they swap a **creation basket** made up of the actual collateral to be held by the ETP for the large block of creation unit shares (cash can be used sometimes under certain circumstances). Likewise, if the creation units are redeemed by the market makers, the collateral, rather than cash, is returned to the market makers.

Using the **SPDR Gold Shares (GLD)** as our example, a **GLD** creation unit, also called a **Basket**, equals 100,000 shares, and at the time of the publication of their prospectus, April 25, 2012, each **Basket** also represented 10,000 ounces of gold, so each share represented 1/10 of an ounce of gold. Therefore, the **NAV** of each share equaled 1/10 the price per ounce of gold. On April 25, 2012 the closing price of gold at the London PM fix (the market which determined the reference price of gold at that time) was slightly above \$1,500 per ounce, so the end-of-day **NAV** equaled \$150.03. Authorized participants at the time who accepted **GLD** creation units by swapping gold to the trust at this **NAV** (or the relevant **NAV** on any other day) included such recognizable names as Barclays Capital Inc., Citigroup Global Markets Inc., Credit Suisse Securities (USA) LLC, Deutsche Bank Securities Inc., Goldman, Sachs & Co., J.P. Morgan Securities Inc., Merrill Lynch Professional Clearing Corp., Morgan Stanley & Co. Incorporated, and others.¹⁴

The market makers in turn gradually sell shares from their inventory to the general public as is shown on the right side of **Figure 6**. Soon these shares are traded among investors just like traditional stocks. This portion of the market for ETPs is called the **secondary market**.

It is important to understand that prices on the primary market, whether used when units are created or being redeemed, are determined by the per-share defined value of the collateral commodity (such as the amount of gold per share in our **GLD** example) and therefore only indirectly by the cash value of the **NAV** (the amount of gold per **GLD** share in ounces' times the unit (ounce) price of gold). For example, if any authorized participant wanted to redeem a **Basket** (100,000 shares of **GLD**) at the end of the market day on October 12, 2019, then she would be entitled to 9,424.363 ounces of gold, **not** the cash equivalent of that much gold. To get the equivalent amount of cash the gold must then be sold at market by the authorized participant, a process in which the ETP fund is not involved.

In your teacher's opinion, this double-liquidation requirement of divesting of ETP collateral might pose a serious problem in a crisis-induced panic. Market makers may be very reluctant to absorb ETP inventory in a tumbling market if they know they have no direct liquidation options and must hold the unpopular commodity in question overnight. In a seriously declining market, the authorized participants may liquidate their stock inventory and merely step away from the market, just like algo traders are inclined to do for declining stock markets. If that happens, the ETP market may be at the mercy of whomever remains to trade in the secondary market.

This begs the question about why authorized participants trade these markets in the first place. They are not paid by the fund family to buy and redeem creation units. In fact, the fund family charges a fee to sell or redeem creation units. For examples, the **SPDR GLD** ETF charges a flat fee of \$2,000 to sell or redeem any number of **Baskets** (although they will waive the fee under certain circumstances). Instead the authorized participants making trading profits like any other market maker: (1) they benefit by holding inventory if the collateral inventory held by the ETP is popular and rising in value, whether that be a market basket of foreign stocks represented by a MSCI Index, like **EWJ**, the gold held by **GLD**, or the U.S. Treasury Bonds held by **TLT**, (2) they can do spread arbitrage in the secondary market, just like algo traders

¹⁴ *SPDR Gold Trust Prospectus*, April 26, 2012. **GLD** now uses the **LBMA Gold Price PM** instead of the **London PM fix** to determine their **NAV**. This fund charges a reasonable management fee of 0.40% annually, which it assesses by periodically taking some gold from each **Basket** (creation unit). Therefore, whereas on April 25, 2012 each **Basket** represented 100,000 shares and 10,000 ounces of gold (hence each **GLD** share had a **NAV** equal to 0.10 the per-ounce price of gold), by September 29, 2018 each **Basket** still represented 100,000 shares, but only 9,462.946 ounces of gold, so each **GLD** share had a **NAV** equal to 0.094629 the per-ounce price of gold. Whereas this is entirely reasonable and fair it can be rather confusing for the uneducated investor.

do for stocks, taking advantage of spreads between bid and ask, and (3) they can do a special type of arbitrage called **NAV arbitrage**.

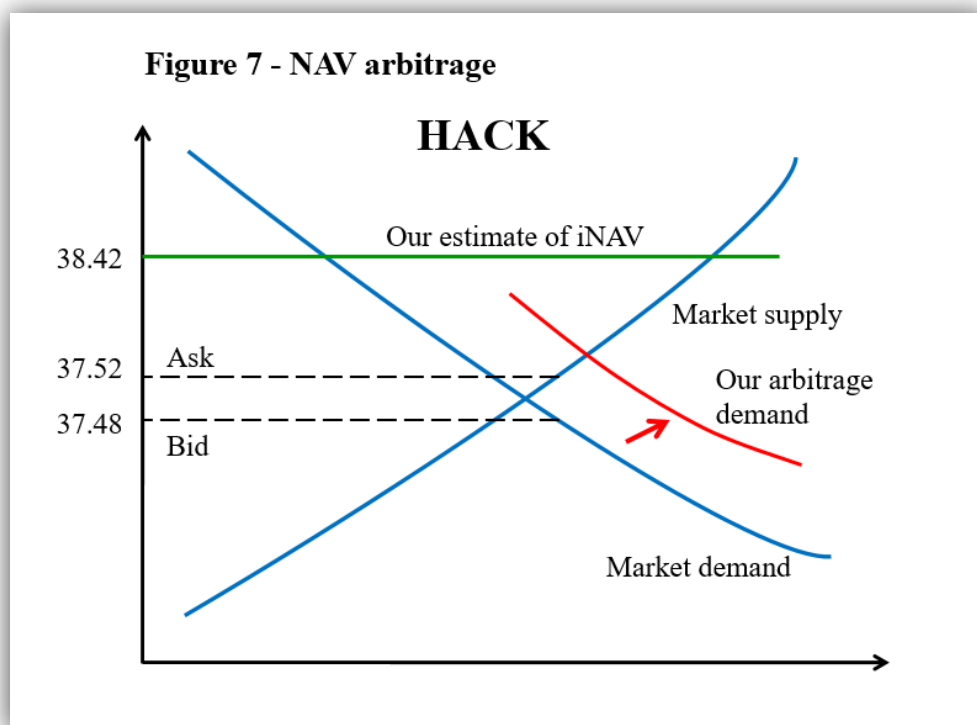
Refer to **Figure 7 – NAV arbitrage** for an explanation. We have already learned that for most ETPs, the market price of the ETP, which responds to mere supply and demand for the stock, is nonetheless likely to track the ETP NAV very closely. But why is this true?

To answer, let's use a new example of a popular sector stock ETF called the **ETFMG Cyber Security ETF** with the clever trading symbol **HACK**. As of October 12, 2019, **HACK**'s portfolio included 55 cyber security stocks at various weights, including some that were clearly in the cyber security business, like **Palo Alto Networks** and **FireEye**, and others that are only marginally so, like **Cisco** and **Trend Micro**. All **HACK** holdings are shown in **Appendix C**.

The closing price for **HACK** on October 11, 2019 was \$37.52. At the same time, the end-of-day value of **HACK**'s portfolio equaled \$1,411 million and there were 37,650,000 shares outstanding, so the NAV equaled \$37.48. We would expect the market price to be close to the iNAV throughout the day.

Suppose we are one of the market makers who trade **HACK**. So not only do we have an inventory of **HACK**, but we also trade many of the stocks that are listed in **Appendix C**. We also have a computer program written in Python that systematically pulls down quotes for the 52 **HACK** stocks, multiplies those prices times their weight, which gives us a constant instant estimate of the true iNAV of **HACK**, which we can compare to limit order queue for bids and asks on **HACK**. Some of the stocks are traded on foreign markets, such as **Digital Arts**, which trades on the Japanese market under symbol **2326.JP**, and so for those we have to use estimates. Suppose on a very active day we see that *our estimate*

of the **HACK** iNAV is \$38.42, but the stock has a **Level 1** quotation of \$37.48 bid and \$37.52 ask. This phenomenon is represented in **Figure 7**.



We immediately start buying **HACK** on a large scale – so large in fact that our trades have market impact because of the extent to which it shifts out the demand curve. Effectively we shift out the demand curve until the market price rises to our estimate of the iNAV. Once the rest of the market catches up to the true NAV, then we start more slowly selling out our recently acquired inventory.

Maybe we should add one more element to the story. We didn't actually make the trades – our computers do this on our behalf because we need the advantage of

speed. Our algos spot the price discrepancy, makes the trades and then reverse them before we are even aware that the opportunity was there. And in fact this actual high-speed automated response closes off the arbitrage opportunity immediately after it appears. Indeed, our system is so efficient that an actual arbitrage opportunity probably would be narrower than the example provided. Regardless, this is why for most good ETPs that have liquidity, the market price tracks the NAV very well. Arbitrage by authorized participants (and *others* – anyone can do this) keep the prices tight.

Financial analysts and ETP managers are aware of the potential problem of ETP liquidation and have taken steps to reduce the probability of crisis in a liquidation event through two tactics. First, managers will hold a cash reserve (of about 2% of the fund's value, for example). Second, if the demand for cash exhausts reserves, managers can draw cash from a line of credit, effectively taking out a short-term loan until the liquidity event is resolved.¹⁵ These prudent steps considerably reduce the likelihood of a fund collapse due to a sudden surge in redemptions.

5. Prospectuses, Online Information, Fees, and Taxes

Just like mutual funds, the sponsoring families of ETPs are required to (and would normally want to) post substantial current information about objectives, performance, asset holdings, and fees and expenses for ETPs. Investors should not invest in ETPs unless they are completely satisfied with the disclosure found on the sponsoring web site.

It is easy to find the sponsoring web site for an ETP. In a search engine type in the ETP symbol followed by "etf."

ETPs charge annual management fees that are similar to those charged by mutual funds. They will have an **annual expense ratio** (or a similar name, such as **total expense ratio**) that will equal the percentage annually of total fund assets that will be withdrawn from the fund to pay management and other expenses. This information is readily available by finding the website of the sponsoring fund family, then finding the ETP. All fees, including the **annual expense ratio** will be indicated, typically directly on the web page in a location that is easy to find, and always in the fund **prospectus**, the legal document required by the **Securities and Exchange Commission**.¹⁶ The prospectus and the general site information will include information about:

1. The ETP's investment objective, very specifically stated (for example, as provided above for **USO**);
2. The asset holdings of the ETP, in many cases right down to the last asset;
3. The performance of the ETP over time, as measured by capital gains, losses, and dividends if they apply;
4. The annual expense ratio and all fees (except commissions charged by brokers for selling ETPs);
5. Data that shows the correlation between the **NAV** and the market price and whether the ETP has been trading at a **premium** or a **discount** relative to **NAV**;
6. (Prospectus only) The portfolio turnover rate.

In the current competitive era, ETP annual total expense ratios tend to be very low, typically well below 1% per year. This is especially true for the large and popular index ETPs. A visit to the huge **iShares** equity ETP family for example lists hundreds of equity ETPs with most expense ratios below 0.5% and none above 1%. Their flagship **iShares Core S&P 500 UCITS ETF (CSSPX)** has a **Total Annual Fund Operating Expense** of 0.07%!¹⁷

The expenses are deducted from ETP collateral assets throughout the year and the cash is passed on to the management company. Because expense fees are withdrawn from assets, such fees will reduce the **NAV** slightly, although if the fees are low, only very slightly.

Because ETPs are bought and sold like stocks, brokerage **trading commissions**, which are typically the same as the commissions for buying and selling stocks, will reduce the return on ETPs somewhat, especially considering that you don't have to pay commissions when you buy mutual funds. In 2010, however, many competitive brokerage houses announced the suspension of commissions on select ETPs, triggering what *The Wall Street Journal* referred to as "ETF Wars."¹⁸ By fall 2019 most brokerages were charging no brokerage fee to buy and sell ETPs.

ETPs have a huge advantage over mutual funds on tax matters.

¹⁵ This subject was discussed in an insightful article by Mike Bird, "Could ETFs Fall Into a Liquidity Jan," *The Wall Street Journal*, March 21, 2018.

¹⁶ The SEC also allows the option of explaining fees and other pertinent information in a document called a **Product Description**. To see the SEC description of the use of the prospectus and this option, see <http://www.sec.gov/answers/etf.htm>.

¹⁷ As of September 28, 2018. See <http://us.ishares.com> for a representative site for a good fund family. The funds referred to above are found in the **equity** section.

¹⁸ See Jason Zweig, "ETF Wars: The Deflation Scenario Investors Should Cheer," *The Wall Street Journal*, October 9, 2010.

When a simple stock is bought there is no tax on any profits made until the stock is sold. Then the applicable tax rate depends upon how long the stock was held. If held for less than one year, any gain is taxed at the higher **personal income tax rate** (given whatever tax bracket the investor is in), but if held for more than one year, any gain is taxed at the much lower **capital gains tax rate**.

But unlike stocks, holders of mutual funds are taxed on the internal turnover of the mutual fund rather than when the fund is sold.¹⁹ This means that if the fund manager makes many short-term sales while one holds the fund, such sales may, invisibly to the investor, be generating taxable capital gains that are taxed at the personal income tax rate, *even if the fund is not sold by the investor*. The investor may first learn of this when receiving **IRS Form 1099-DIV** (which is also used to report dividend distributions to the fund) at the end of the tax year. Therefore, mutual funds with a high **turnover rate** or **churn rate** as it is sometimes called can generate substantial interim tax liabilities taxed at the personal income tax rate even for an investor who is holding mutual funds for a long period.

In comparison, ETPs are typically taxed like stocks (with some exceptions, described below). Once an ETP is purchased, no tax is incurred until the ETP is sold. If it is held for less than one year, the capital gain will be treated as ordinary taxable income and will be taxed at the higher **personal income tax rate**. If held for more than one year, the gain will be taxed at the much more favorable **capital gains tax rate**.

There are two very significant exceptions:

- (1) ETPs that use futures to secure their investment objective are required at the end of the year to calculate capital gains for that year and report them. Those gains are reported and taxable at the capital gains tax rate (but are *not* deferred until after the investor sells the ETP).
- (2) ETPs in precious metals like gold (including our **GLD** example) have been judged by the IRS to be investing in "collectibles," which strangely requires the ETP managers to report gains at the end of the year, and those gains are *not* eligible for the capital gains tax rate exemption.²⁰

Finally, none of these tax considerations matter if the investor is holding the ETP for a tax-free or tax-deferred retirement account, like a **Roth IRA**, **Traditional IRA**, **Spousal IRA**, or **401-K** account.

6. Researching an ETP

You should never invest a large amount of money in an ETP unless you do some background research into the fund. This is especially true if you plan to use ETPs instead of mutual funds for longer term investments like retirement accounts. Fortunately, all ETP fund families have web sites dedicated to their individual ETPs and they are required by law to offer certain types of information and to keep it current. Also each ETP will offer a *prospectus*,²¹ as is required of a mutual fund, and for large investments it should be reviewed.

At a minimum, you should obtain and understand the following information:

1. What is the stated investment objective? You should read this carefully and clearly understand it. What is the fund claiming to track? Is it an index or is it a daily **delta** of some price? Keep in mind that the latter implies that there might be a compounding error over time.
2. How is the fund collateralized? What assets have they accumulated to back the fund? Do they have a direct and proportionate market basket of an asset or assets, like the **GLD** tracking stock, or do they hold futures or other derivatives that must be rolled over frequently, like **USO**? If the latter, the ETP might be riskier as a long-term investment and might not track the investment objective very well.
3. Is the market price of the fund (which unlike a mutual fund is determined by supply and demand) tracking the **NAV**, or is it trading at a **premium** or **discount**? The sponsoring fund family site must provide this information

¹⁹ Or more correctly, whatever capital gains have not already been taxed because of turnover are then taxed when the fund is sold.

²⁰ All of these tax considerations discussed above are subject to change.

²¹ Some fund families describe multiple related ETFs in a single prospectus.

for at least the most recent quarter. A 2% (200 basis points) deviation is usually acceptable (and many good index funds will track at less than 1%) but a number that starts to drift higher, especially above 5%, could identify a problem. This problem could be more acute for a **leveraged delta** fund secured with futures contracts than for a popular and liquid index fund. The failure to properly track the investment objective could also be due to low trading volume, which could indicate a fund destined for withdrawal from the market. Generally, funds that do not track their investment objective well ***should not be used for large-scale or long-term investment accounts!***

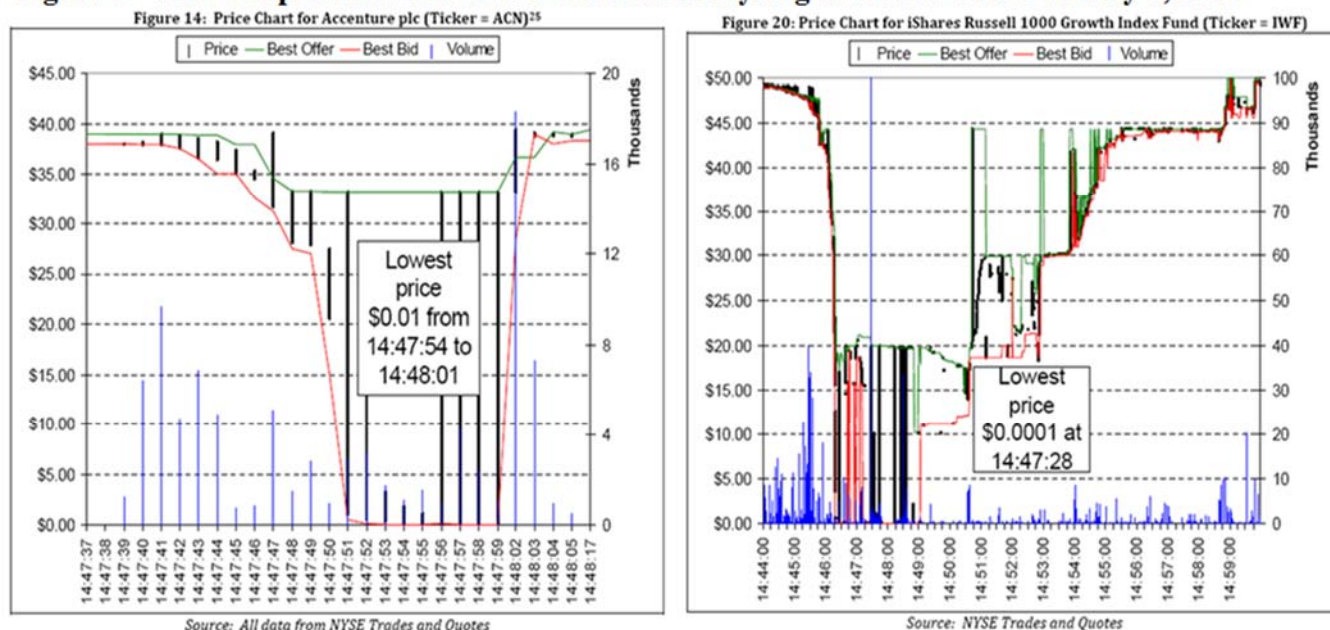
4. Is the fund **NAV** and the fund market value actually reliably tracking the stated investment objective? For index and commodity funds, this is easy to determine. You can run historical prices of the fund through a comparison tracker as was done in **Figure 1**. Also the fund's site should provide information about how well the fund is tracking the investment objective (and you have to wonder why a fund wouldn't provide this information). This is not the same issue as whether the fund is tracking the NAV. In effect criteria three and four state that (a) the market price should track the NAV, and (b) the NAV should track the fund's investment objective. Again, **delta** funds that are using **futures** are less likely to meet this criterion.
5. Is the fund traded at sufficient volume, especially when compared to funds with the same or similar investment objectives offered by a competing fund family? To evaluate this, you won't use the prospectus or information on the fund's web site. Instead you will find this information on a broker site or a financial site like *etfdb.com*.²² These sites make it easy to see who is competing with the fund that you are considering. If one fund is trading at one-tenth the volume of another (often the case when a fund family is trying to crack the market of an established fund with a newcomer and using advertising to do it), why trade the new fund and worry about liquidity problems? The general rule is this: low volume (low liquidity) can lead to tracking problems and may result in the fund being withdrawn from the market. Such funds should be avoided or used with extreme caution.
6. If you are buying the ETP to hold for a long period of time, like you would a mutual fund, then you must review at least ***management fees*** and ***total annual operating expenses*** or ***annual expense ratio*** (different funds label this differently but it is obvious from context) as you would for a mutual fund and hold yourself to more or less the same standards. Generally, there must be very compelling reasons for ***total annual operating expenses*** to be above 1% and for many funds these are less than 0.5 %. If you are instead trading an ETP over short durations, then the expense ratios are not so important.

²² Try **Most Popular ETFs: Top 100 ETFs by Trading Volume**, *ETfdb.com*

Appendix A - Performance of Select ETPs During the Flash Crash of May 6, 2010²³

At 2:47 PM New York time on May 6, 2010, there was a horrific collapse of many individual stock and ETP prices caused by a series of computer glitches. Some stocks, like **Accenture (ACN)**, plunged from a value of just under \$40 per share to one cent per share in just a few seconds, then quickly recovered.

Figure 8 – Two Graphs from the SEC Document Analyzing the Flash Crash of May 6, 2010



The horrific collapse of major stock indexes and their equally startling recovery in less than one trading hour, the so-called **flash crash**, showed a possible vulnerability of ETPs to such market events that are not shared by mutual funds. Because mutual funds cannot be traded during the day, even in a panic or in a program run by a computer, mutual fund shares are not vulnerable to program-generated stock market pyrotechnics of the variety represented by the **flash crash**.

The same can't be said for ETPs.

Look at **Figure 8**, which shows two figures taken from the SEC preliminary investigation into the **flash crash**.

During the **Flash Crash**, because Bid queues collapsed for a few minutes, many stocks saw their prices collapse to the so-called **stub quotes**, which are one-cent (or less) limit-order place-markers placed by market makers. The news media gave a lot of attention to **Accenture (ACN)**, which is shown on the left. But the SEC report demonstrates that quite a number of ETPs, including the reputable **iShares Russell 1000 Growth Index Fund (IWF)** shown on the right followed the same pattern.

Even though only for a brief period of time, the share values fell to one percent of one cent!

Now it is very clear that the fund recovered quickly, in minutes. But a panicked investor isn't necessarily going to know that and there might be a temptation to liquidate the fund before recovery.

Far more important, many investors protect their downside risk by putting **stop-loss** orders on their investments to protect them if some catastrophe strikes while they are not monitoring the market. The **flash-crash** plunged right through the stops, forcing many unintentional sales.

²³ This discussion requires that the reader be somewhat familiar with the Flash Crash of May 6, 2010, as it was called. For students in Economics 104 this will be discussed in class. Otherwise use a search engine to find something of the history or refer to the SEC document that analyzes the crash, **Securities and Exchange Commission, Report of the Staffs of the CFTC and SEC to the Joint Advisory Committee on Emerging Regulatory Issues, Preliminary Finds Regarding the Market Events of May 6, 2010**. The charts shown in the **Appendix** are from this document.

In the words of the authors of the SEC report:

ETFs: As previously discussed, the data suggests that ETFs as a class were affected more than any other category of securities. Trades in securities issued by ETFs appear to have accounted for nearly 70% of the securities in which trades were broken on May 6.²⁴

This unnerving performance urges caution when considering large purchases of ETPs to hold instead of mutual funds for retirement accounts and the like. It additionally cautions against such traditional hedging strategies as using stops to prevent large losses because in this example they produced large losses.

²⁴ *Ibid*, p. 35. "Broken trades" refers to the total breakdown as shown in **Figure 8**.

Appendix B - The Important Distinction Between true ETFs, ETF-like Funds and Exchange Traded Notes (ETNs).

The main text of this chapter glossed over some distinctions between different classes of exchange traded products that will be discussed here in this technical appendix.

Generally, when legally defined, there are three different categories of exchange traded products, (1) true exchange traded funds, or ETFs, (2) ETF-like funds, sometimes called names like "publicly-traded trusts" or "exchange traded securities," and (3) exchange traded notes, or ETNs.

In 2018 the distinctions between categories (1) and (2) don't matter much. True ETFs and products that are closely similar were generally collateralized in the same way and there was no real distinction between them except in name. As shall be seen, ETNs are very different from the other two and the difference is important - for example, the risk parameters are very different for ETNs. For a long time ETNs represented only a small portion of the ETP market, but that is now changing with the growing popularity of a small sub-set of ETNs, in particular volatility ETNs like the **iPath S&P500 VIX Short-term Futures ETN (VXX)**, which plays off of volatility in the S&P500 Index.

A bit of history is in order. In 1940, as a reaction to the stock market crash and depression in the previous decade, Congress passed *The Investment Company Act of 1940* which classified all categories of investment companies and severely restricted their activities.

The modern exchange-traded product industry emerged as the result of the **Securities and Exchange Commission (SEC)** granting compliance exemptions to the 1940 Act on a one-by-one basis to investment firms who agreed to certain SEC restrictions. Those restrictions include but are not limited to: (a) daily publication of the fund NAV, (b) the NAV is either based upon an index or some clearly identified weighted portfolio of securities, (c) issues shares are to be traded on an exchange, (d) the fund identifies itself as an "ETF." The first successful and permanent fund to take advantage of this exemption was the still-famous **SPY**, issued for the first time in 1993 (earlier attempts had failed). **SPY** and the earliest ETFs were generally long equity funds (many of them international) and therefore were cousins to their conservative mutual fund counterparts.

As time passed though the financial services industry got more innovative and inverse funds, leveraged funds, delta funds, commodity funds and currency funds began to emerge and the SEC expanded their exemption practice and changed the rules somewhat. Some of the confusion that clearly arises at product distinctions now are the consequence of the muddled and ad-hoc process used by the SEC to accommodate the market for these new exotic products with guidelines that are not understandable to the investing public.

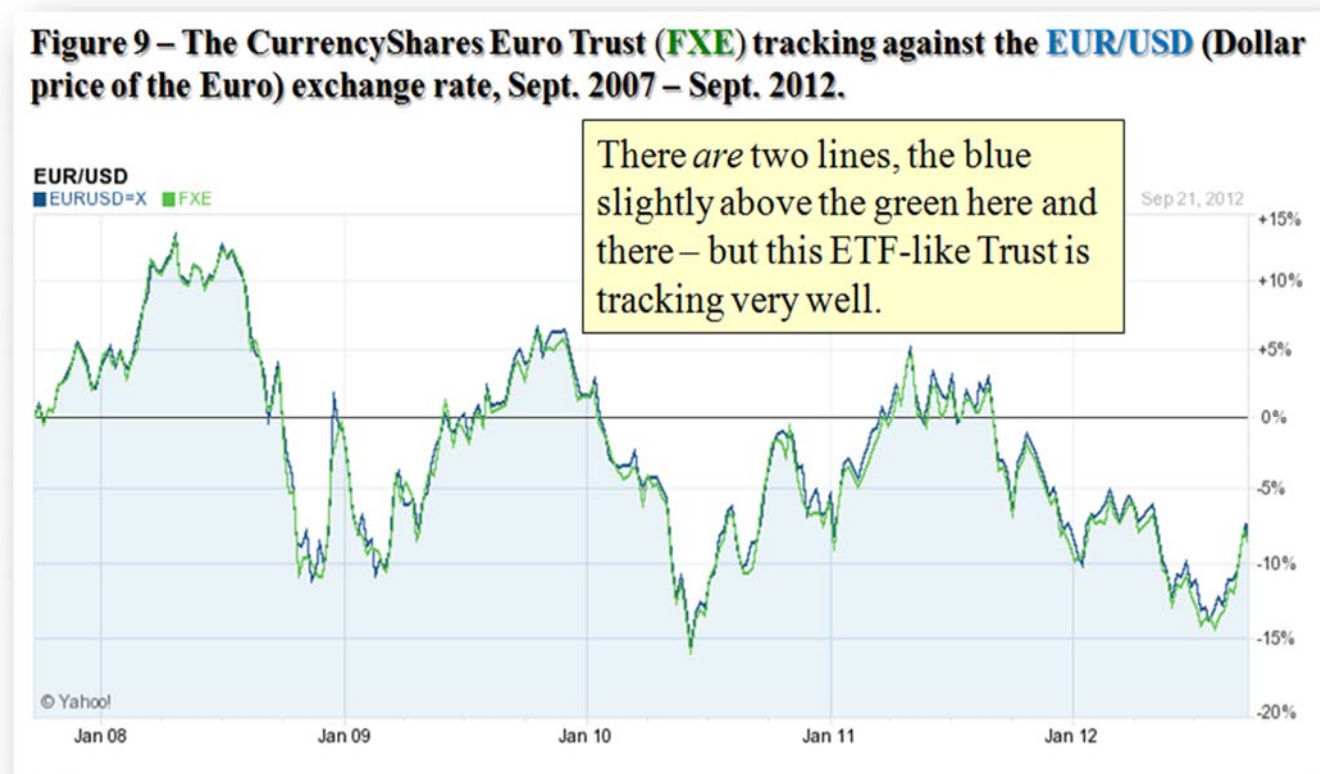
The SEC *now* only refers to the traditional exchange-traded products like **SPY** and **DIA** (the **DJIA** tracker) which meet all of the criteria discussed above (again, criteria very close to those that must be satisfied by their mutual-fund cousins) as "**management investment companies**," Such funds are allowed to clearly identify themselves as ETFs in their promotional literature and most do.

In contrast commodity and currency ETPs in the eyes of the Securities and Exchange Commission differ slightly from traditional stock-based ETFs and especially long index ETFs like **SPY**. Commodity (like **GLD** and **USO**) and currency funds (like the **CurrencyShares Euro Trust (FXE)**) are instead established as "*publicly-traded trusts*" and do not refer to themselves as ETFs, and instead use terms like "shares," "trust," or "exchange-traded securities." Nonetheless they are often called ETFs by the online literature and the media and more important, are classified as ETFs by screeners and other devices used by online investment sites.

Nonetheless these publicly-traded trusts are normally collateralized exactly like an ETF and their holdings are made completely transparent, with as much information provided as one might expect to find in the prospectus for **SPY**.

Generally, they should be thought of as equivalents of ETFs. However, that may change in the future and the smart investor should always peruse the literature, including the prospectus, of any fund that does not call itself an ETF to see if investments and assets are clearly listed as is required for ETFs. This is especially true for large investments in retirement accounts.

The third category, **Exchange Traded Notes (ETNs)**, are similar in their structure and trade the same way as ETFs, and they typically track indexes or prices just like ETFs, but they differ from ETFs²⁵ in a very significant way. When you buy shares in an ETF it is equivalent to an *equity* purchase. The investor effectively owns shares in a fund, just like a stock



investor owns shares in a company. The ETF fund management firm takes the proceeds from such sales and buys (or sells, if short) stocks (SPY), commodities (GLD), futures contracts (USO), or bonds (TLT).

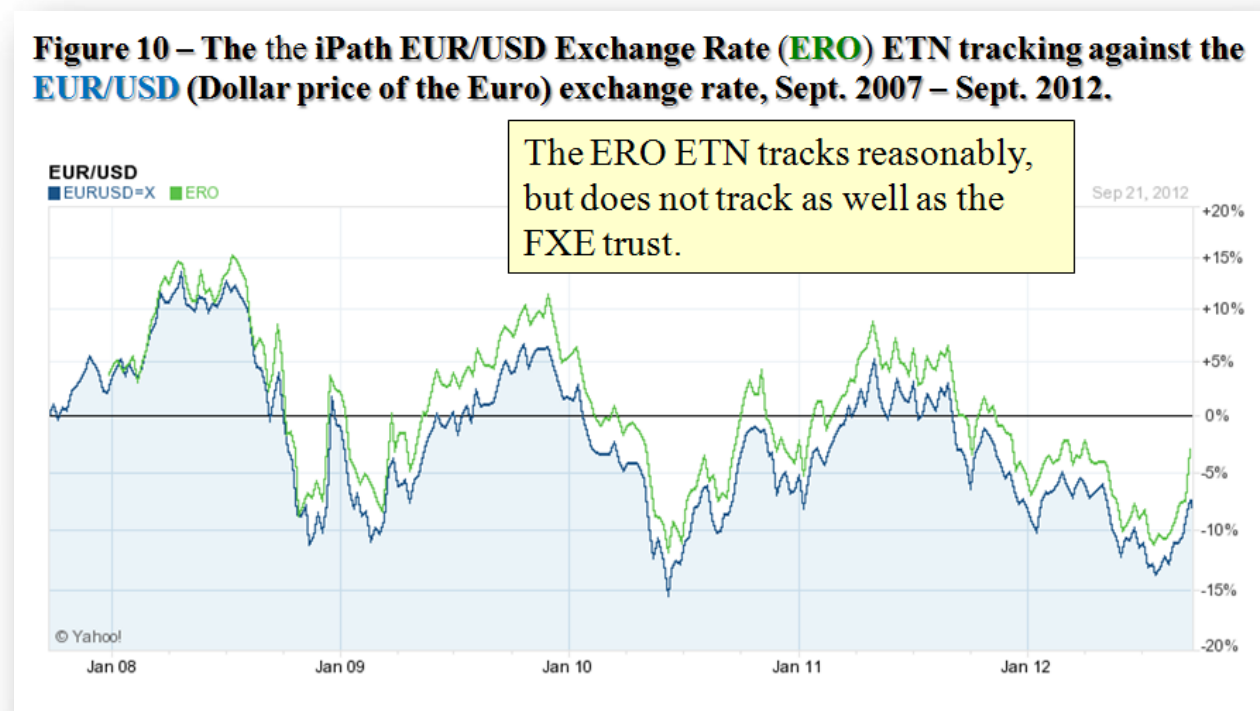
In sharp contrast to this, an Exchange Traded Note is actually a debt instrument issued by a bank to the purchaser of the ETN. The investor is in effect making a loan to the bank. But rather than pay a stipulated rate of interest to the lender, the bank instead promises to pay the lender a rate of return reflective of the performance of an index or some other price benchmark. Far more important, the bank is not required to buy a portfolio of assets to represent to the investors as assets associated with the fund. If you review the fact sheets and prospectuses for ETNs you will notice the strange absence of any discussion of collateralized assets and there will be no portfolio of assets presented. This does not mean that the bank does not hold such assets - they are likely to hold asset portfolios similar to their ETF equivalents because of course they somehow must match the performance of such a portfolio (in an index, for example) because that is what they promise as a payment to the investor. But they are not required to do this and are not required to describe any portfolio investments to the holders of their ETNs.

The contrast may be more apparent if two similar products are compared, the **CurrencyShares Euro Trust (FXE)**, which is a currency share fund very similar to an ETF and collateralized like one, and the **iPath EUR/USD Exchange Rate**

²⁵ From this point on, the term ETF shall refer to both the true ETF and ETF-like trusts and shares that are so similar.

(**ERO**), which is an ETN. Both of these are designed to track the benchmark exchange rate of the Euro to the U.S. Dollar, which is expressed as the Dollar price of the Euro (for example, when this was written that value was \$1.2830).

Looking at the prospectus²⁶ for the **CurrencyShares Euro Trust (FXE)**, it is very clear that this ETF-like currency trust is collateralized very conservatively - share purchases in Dollars are used buy and hold Euros 100% invested with no leverage. On September 24, 2012 **FXE** held \$404,226,924 worth of Euros at a NAV at the end of the market day of \$128.33 (at the time the Euro was trading on the foreign exchange markets for about \$1.29). Since December 2005 **FXE**



tracked its benchmark exchange rate reasonably well, especially in cyclical behavior, but it has a slight tracking error, but nothing to be of concern to an investor. The nearly perfect tracking is shown in **Figure 9**. The fund had an expense ratio of 0.40%, entirely reasonable. The fund was also liquid, hitting an average volume of about one million shares per day during the summer of 2012.

When retrieving the **FXE** quote one will get a number clearly linked to the exchange rate. When quoting **ERO**, the equivalent ETN on a listing site one encounters a mapping that seems to revolve around the number 50 along with some very low volume numbers. In the same summer months that **FXE** was averaging a million shares a day, **ERO** was averaging 600. The latter illustrates a problem that plagues most ETNs - they are not popular, especially if they have a competing ETF as this one does, and therefore they suffer from illiquidity risk.

As can be seen in **Figure 10** though, **ERO** also does a reasonably good job of tracking the EUR/USD benchmark exchange rate, although, by inspection, with considerably more error than **FXE**. But this is clearly not some kind of investment disaster, at least not yet.

So given the reasonable tracking record of **ERO**, why does the stock price oscillate around 50 in the quotations? This seems arbitrary. It is because, according to the prospectus²⁷, **ERO** is actually an *uncollateralized* medium-term debt

²⁶ Found by searching products at <http://www.currencyshares.com/>

²⁷ Found at <http://www.ipathetn.com/us/product/ero/>

instrument²⁸ - a note with a nominal denomination of \$50! But these notes do not earn interest. Instead their redemption value depends upon the performance of the benchmark exchange rate. These notes can be redeemed prior to maturity by any large trader or any broker able and willing to aggregate a minimum of 50,000 shares for redemption. If redeemed in this way, the shares will be valued at (1) \$50 multiplied times (2) the relative value of the change of the exchange rate since its value on the day the shares were released minus (3) fees. Point (2) is simpler than it sounds. If the shares were issued when the EUR/USD benchmark was \$1.12 and redeemed when it was \$1.20, then excluding fees the redemption value would equal $(50 \times 1.20/1.12) = \53.57 . Given that this right of redemption exists but would seldom be exercised and *can't* be exercised by small investors, the tendency of the NAV or INAV to track the actual exchange rate would usually rely upon the possibility of arbitrage and the willingness of someone to do the arbitrage.²⁹ However arbitrage is not possible if the stock trades at an average of only 1,000 shares a day or less, so the only reason this ETN is tracking is either because small traders are scaling their bids and asks off of the redemption formula above around the notional value of 50 (unlikely for all but the most sophisticated small traders) or the sponsors or market makers are providing small levels of bids and asks to keep the market orderly and reasonably matched to the benchmark.

But tracking is not actually the issue with ETNs. The real issue is collateralization and transparency. You can spend all day staring at the prospectus and you will never find a portfolio list or asset statement like you would have for any ETF or as you did for **FXE** above. That is because when you buy an ETN, you are buying an uncollateralized debt asset - meaning that you are technically lending money to a bank - which is merely a promise by the issuing bank to redeem your loan according to a stipulated redemption scheme, such as the one described above. In order to cover this liability, it is very likely the bank is either directly or indirectly investing in the asset class or hedging the position with, for example, futures contracts, but there is no way for an investor to know this - there is no asset transparency of any kind for an ETN. Nor are these assets insured.

These ETNs therefore have one additional level of risk - the credit risk of the issuing bank. And because they are generally unpopular, or at least they have been until 2012, they suffer from liquidity risk or the risk of being withdrawn from the market. In the latter case the investor would typically receive something near the true NAV of the asset upon redemption, but possibly not, and no one wants to hold a security as its liquidity drains to zero.

It should be clear that ETNs are absolutely *not* suitable investments for long-term strategies or retirement accounts, and are advisable for speculation only after being thoroughly researched and *only* after you are sure that a securitized ETF or ETF-like fund is not available instead. The reason that the **ERO** ETN is unpopular is because any investor benchmarking the EUR/USD exchange rate can do it *with complete transparency* by buying (or shorting) **FXE** instead of using the murkier **ERO**.

²⁸ "Medium-term" in the most nominal sense. The note is technically due on May 14, 2037, but may be redeemed essentially at any time subject to the conditions explained in the text.

²⁹ For an example of arbitrage, if on a day when the exchange rate is \$1.20 if the NAV is only \$1.15, a large trader will step in and try to pick up 50,000 shares for that price, then redeem it for \$1.20. *However*, if fewer than 1,000 shares are trading daily, that is impossible.

Appendix C:

HACK Security holdings as of October 14, 2019

StockTicke	SecurityName	Shares	Price	MarketValue	Weightings
CSCO	CISCO SYS INC	1,108,039	46.56	\$51,590,295.84	3.66%
SPLK	SPLUNK INC	413,227	120.81	\$49,921,953.87	3.54%
PANW	PALO ALTO NETWORKS INC	227,484	210.42	\$47,867,183.28	3.39%
FEYE	FIREEYE INC	3,114,718	15.08	\$46,969,947.44	3.33%
CACI	CACI INTL INC	201,552	229.79	\$46,314,634.08	3.28%
SOPH LN	SOPHOS GROUP PLC	8,501,105	4.26	\$45,801,511.57	3.25%
CYBR	CYBERARK SOFTWARE LTD	432,668	104.39	\$45,166,212.52	3.20%
4704 JP	TREND MICRO INC	927,106	5240.00	\$44,822,027.40	3.18%
PFPT	PROOFPOINT INC	344,780	130.14	\$44,869,669.20	3.18%
FTNT	FORTINET INC	558,890	79.16	\$44,241,732.40	3.14%
AKAM	AKAMAI TECHNOLOGIES INC	489,901	89.55	\$43,870,634.55	3.11%
AVST LN	AVAST PLC	9,340,505	3.71	\$43,830,925.26	3.11%
CHKP	CHECK POINT SOFTWARE TECH LTD ORD	391,798	111.26	\$43,591,445.48	3.09%
SAIC	SCIENCE APPLICATNS INTL CP NEW COM	511,568	84.56	\$43,258,190.08	3.07%
SYMC	SYMANTEC CORP	1,824,962	23.56	\$42,996,104.72	3.05%
JNPR	JUNIPER NETWORKS INC	1,802,964	23.69	\$42,712,217.16	3.03%
SWI	SOLARWINDS CORP	2,287,540	18.64	\$42,639,745.60	3.02%
CVLT	COMMVAULT SYSTEMS INC	932,922	45.48	\$42,429,292.56	3.01%
QLYS	QUALYS INC	537,022	77.70	\$41,726,609.40	2.96%
TENB	TENABLE HLDGS INC	1,874,788	22.05	\$41,339,075.40	2.93%
NET	CLOUDFLARE INC	2,386,273	16.47	\$39,301,916.31	2.79%
CARB	CARBONITE INC	2,715,857	14.47	\$39,284,871.51	2.78%
PSN	PARSONS CORPORATION	1,185,428	32.81	\$38,893,892.68	2.76%
TUFN	TUFIN SOFTWARE TECHNOLOGIS LTD SHS	2,467,433	15.73	\$38,812,721.09	2.75%
SAIL	SAILPOINT TECHNLGIES HLDGS INC COM	2,015,076	18.29	\$36,855,740.04	2.61%
OKTA	OKTA INC	159,122	116.24	\$18,496,341.28	1.31%
ZS	ZSCALER INC	327,562	48.12	\$15,762,283.44	1.12%
CRWD	CROWDSTRIKE HLDGS INC	241,820	60.27	\$14,574,491.40	1.03%
BAH	BOOZ ALLEN HAMILTON HLDG CORP CL A	193,104	71.48	\$13,803,073.92	0.98%
EVBG	EVERBRIDGE INC	192,096	70.62	\$13,565,819.52	0.96%
VRSN	VERISIGN INC	72,830	186.49	\$13,582,066.70	0.96%
LDOS	LEIDOS HLDGS INC	160,713	83.16	\$13,364,893.08	0.95%
VRNS	VARONIS SYS INC	206,278	63.42	\$13,082,150.76	0.93%
FFIV	F5 NETWORKS INC	95,944	135.67	\$13,016,722.48	0.92%
RPD	RAPID7 INC	258,522	50.00	\$12,926,100.00	0.92%
BA/ LN	BAE SYSTEMS	1,831,220	5.56	\$12,891,996.56	0.91%
MIME	MIMECAST LTD	332,025	38.68	\$12,842,727.00	0.91%
MANT	MANTECH INTL CORP	181,633	70.01	\$12,716,126.33	0.90%
VRNT	VERINT SYS INC	286,657	44.01	\$12,615,774.57	0.89%
2326 JP	DIGITAL ARTS INC	198,310	6720.00	\$12,295,457.86	0.87%
RDWR	RADWARE LTD	515,909	23.36	\$12,051,634.24	0.85%

ULE LN	ULTRA ELECTRONIC	480,416	19.64	\$11,947,136.14	0.85%
NTCT	NETSCOUT SYS INC	521,879	21.99	\$11,476,119.21	0.81%
QQ/ LN	QINETIQ GROUP	2,786,247	3.11	\$10,986,088.38	0.78%
SCWX	SECUREWORKS CORP	764,573	12.62	\$9,648,911.26	0.68%
FSCT	FORESCOUT TECHNOLOGIES INC	352,814	25.44	\$8,975,588.16	0.64%
053800 KS	AHNLAB	166,634	60800.00	\$8,522,331.09	0.60%
ZIXI	ZIX CORP	1,138,193	7.05	\$8,024,260.65	0.57%
MOBL	MOBILEIRON INC	1,165,503	6.43	\$7,494,184.29	0.53%
3692 JP	FFRI INC	211,423	3115.00	\$6,076,326.48	0.43%
OSPN	ONESPAN INC	415,960	14.61	\$6,077,175.60	0.43%
ATEN	A10 NETWORKS INC	825,424	6.16	\$5,084,611.84	0.36%
NCC LN	NCC GROUP	1,131,679	1.84	\$2,636,610.31	0.19%
FSC1V FH	F-SECURE OYJ	385,067	2.68	\$1,137,126.01	0.08%
Cash&Othe	Cash & Other	6,218,842	1.00	\$6,218,842.02	0.44%