

ETFs: An Imperfect Hedge?

Equity Research

ETF Hedging: Proceed with caution

The rise of investor usage of ETFs as hedges continues. In a bid to gain quick exposure to evolving markets, avoid single stock M&A risk or take sector views, we believe the use of “blunt force” hedging via ETFs may impair portfolio returns and potentially create negative alpha.

The spotlight intensifies as assets grow

With a six-fold increase in the number of ETFs since 2006 and a one-quarter share of average daily value traded in the United States, the impact of ETFs is likely to continue. Indeed, while global mutual fund AUM is now roughly in line with their '07 levels assets invested in ETFs is 70% higher.

Pay heed all that enter: All hedges are not created equal

ETFs have commonly overlooked pitfalls as hedging applications by investors. Position sizes can be unintentionally reduced without applying rigor to analyzing individual stock weights of ETF short positions. This reduction of weight can reorder position levels and alter expected returns. We highlight two case studies below.

1. **Hedge Fund Most Held.** When applying a 50% net hedge of SPY and QQQ ETFs to a mock portfolio of top hedge fund holdings identified by our Portfolio Strategy team, we witness mid-teen rises in Tech and Financial holdings and a corresponding double-digit short in Staples.
2. **An Energy Book.** In a similar vein the relative weights of XOM, CVX, COP and SLB, HAL, BHI in the XLE (Energy Select ETF) and OIH (Oil Services ETF) can easily draw down top position weights on the long side of a portfolio constructed from the top S&P 500 energy names.

In both cases investors are arguably better off reducing long exposure or selecting individual stocks on the short side.

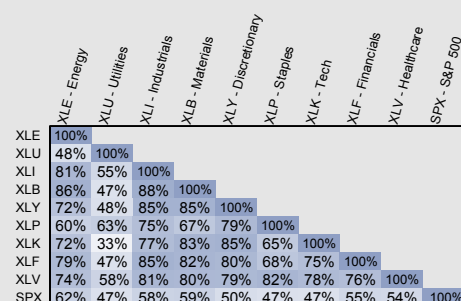
Beware of the Fog ... of Correlation

Sectors are more correlated than understood, undermining expectations for alpha generation. While stating that Energy & Materials are correlated is not surprising, we highlight unlikely pairs of sectors who run in tandem (on a 3-month and 3-year basis) including: **Financials & Industrials**, **Tech & Discretionary** and **Materials & Discretionary**. This reality argues against sector-based hedging to a certain degree. **Staples** and **Utilities** ETFs show the greatest degree of dispersion as hedging tools.

PREVIOUS ETF RESEARCH

ETFs for the Single Stock Manager: Correlations, Myths & Realities, published January 6, 2012.

3-MONTH DAILY PAIRWISE CORRELATIONS



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Stock selections in this report are based on individual analyst criteria.

Unless otherwise mentioned, the prices, price targets and ratings in this report are based on the market close of June 13, 2012.

Related Research:

ETFs for the Single Stock Manager: Correlations, Myths & Realities, published January 6, 2012.

Portfolio Manager Summary

The rise of investor usage of ETFs as hedges continues. In a bid to gain exposure in rapidly changing markets, avoid single-stock M&A risk and take sector views more easily, investors are creating unintended consequences to their portfolios. In this paper we address the impact of ETFs when used as “blunt force” hedging instruments and highlight to equity managers – both long and long/short– how the use of these products may create negative alpha and impair returns.

The spotlight intensifies as assets grow

- Although ETFs have close to a tenth of the AUM of their traditional mutual fund counterparts, they are commanding greater attention and use from institutional investors. Since 2006, the number of US-registered ETFs has grown from nearly 200 to 1,200, with AUM similarly rising from over \$200 billion to over \$1.2 trillion.
- We note that ETFs, on average, have accounted for approximately 25% of total dollar volume of the Consolidated Tape, up from 10-15% in 2004.

How correlated are sectors to each other? More than you think

Managers and analysts creating long/short portfolios are increasingly instituting sub-optimal hedges. Indeed, many investors attempt to hedge away sector risk or take outright negative views on groups by utilizing ETFs. This application, which we speak to clients about often, can create unintended consequences for portfolios. Specifically when we compare and contrast where correlations sit for individual sectors against (1) one another, (2) history and (3) the market as a whole, we find surprising relationships.

- **Sector vs. Sector.** We see high trailing 3-month daily correlations among less-than-obvious pairs of sectors, including: Financials & Industrials, Tech & Discretionary and Materials & Discretionary (all with correlations of 85%). These high levels of correlations warrant examination by portfolio managers to ensure that they are achieving the hedging efficiency they desire or anticipated. Utilities are the least correlated sector to others (average correlation of 50%) and, as such, may provide the best hedging opportunities if an investor has a specific sector view.
- **Now vs History.** Historical sector correlation trends are worthy of analysis. In contrasting a 3-month **daily** correlation and 3-year **weekly** view, we see Tech and Industrials showing pockets of falling correlations to other sectors, suggesting they may now serve as better relative hedges. In contrast, Healthcare (XLV) has become more coupled to other sectors. While 32 of the examined 36 sector pairs showed decreases in correlations, all of the four that showed increases included Healthcare.
- **Sectors vs the S&P 500.** On a 3-month basis, Utilities, Staples and Tech are the least correlated sector ETFs to the S&P 500 (47% for all).

Case studies: ETFs as an imperfect hedging tool

Given how often index and sector ETFs are used as hedging tools for implementing long/short strategies, we examine how well they perform this task.

- **Hedge Fund Most Held.** When applying a 50% net hedge using SPY and QQQ ETFs to a mock portfolio of top hedge fund holdings we witness mid-teen increases in Technology and Financial weights and a corresponding double-digit short position in Consumer Staples.
- **An Energy Book.** In a similar vein the relative weights of XOM, CVX, COP and SLB, HAL, BHI in the XLE (Energy Select ETF) and OIH (Oil Services ETF) can easily draw down top position weights on the long side of a portfolio constructed from the top S&P 500 energy names.

ETFs and the Industry: Impact and Importance is Rising

Although ETFs have less than a tenth of the AUM of their traditional mutual fund counterparts, they are commanding greater attention and use from institutional investors. Since the start of 2006, the number of US-registered ETFs has grown from approximately 200 to 1,200, with a similarly steep rise in AUM from over \$200 billion to \$1.2 trillion (see Exhibit 1).

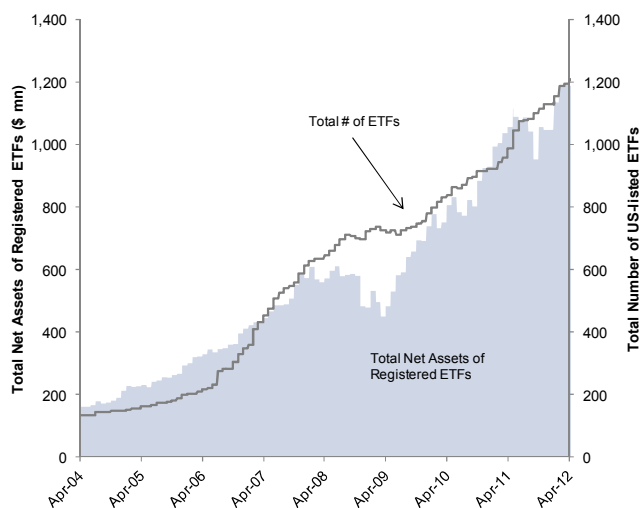
Exchange-Traded Funds (ETFs) are open-ended investment vehicles. Their structure allows for diversity in the types of underlying assets, but two-thirds of ETFs are equity-focused.

ETFs passively channel beta, but active variations are emerging

The vast majority of ETFs traded today are designed to provide easy access to a given market, passively channeling beta. As evidence of this, ETFs that track broad-based indices (such as the SPY with its S&P 500 benchmark) have had the lion's share of AUM and trading activity. As shown in Exhibit 2, these types of ETFs command nearly 60% of total ETF average daily value traded (ADVT) and sector-specific funds (such as the Energy-focused XLE and Financials-focused XLF) account for 15% of ADVT.

Exhibit 1: ETF growth remains unabated

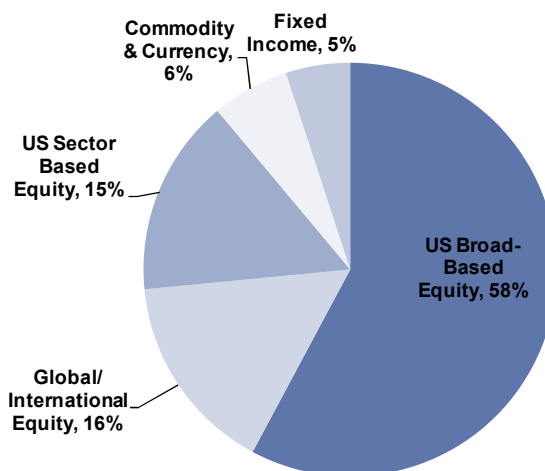
Total net assets held by US ETFs against the total number of ETFs, excluding ETNs and Funds of Funds



Source: Investment Company Institute.

Exhibit 2: ADVT breakdown by category

Includes average daily value traded of 100 most traded US-listed ETFs



The majority of ETF trading activity is in broad-based ETFs, such as those indexed to the S&P 500 or the Russell 2000.

Source: Bloomberg.

Marking the tremendous rise in ETF trading activity

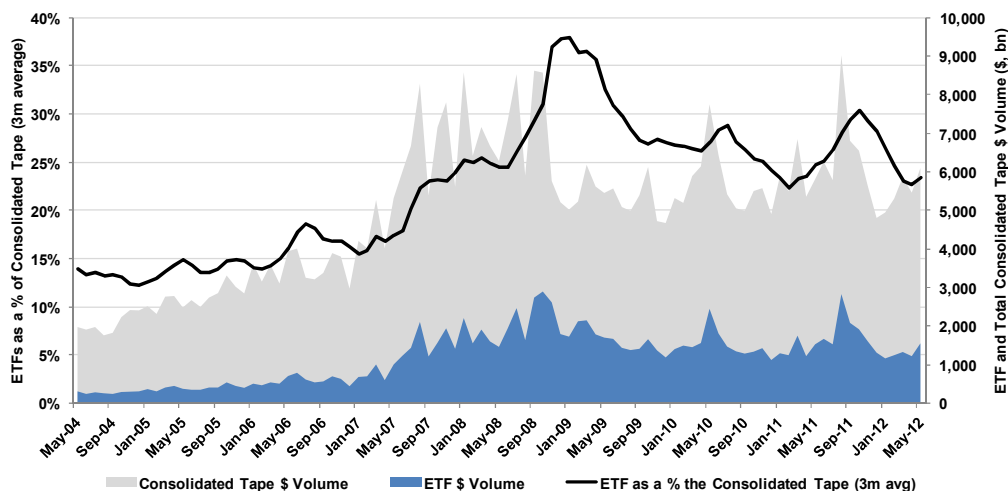
While the recent growth in ETF AUM has been substantial, ETF trading activity has been even more so. We believe this rapid increase in trading volume has been shaped by the broader availability of the products, the relative ease of use, low fee structure, increased marketing, and investor demand to manage macroeconomic exposures. **To be clear, we are not taking a view on the forward usage of the product in either a standalone or a relative context, but rather providing an observation of where we are today.**

To put the use of ETFs into some perspective, we offer the following stats:

- The total 3-month average daily value traded for the 100-most traded US-listed ETFs is nearly \$60 billion, versus over \$65 billion for the 100-most traded stocks in the S&P 500.
- Additionally, while ETF trading as a percentage of broader activity can be measured using various assumptions on OTC and exchange-based transactions, our estimate is based on extrapolation of data released by NYSE Arca. **Although dollar volumes have varied, particularly during a December of low activity levels, we note that ETFs have accounted for approximately 25% of total dollar volume of the Consolidated Tape recently, up from 10-15% in 2004 (see Exhibit 3).**

Exhibit 3: ETFs dollar volume have maintained sizable share

Dollar value traded of ETFs, the Consolidated Tape, and ETFs as a % of the Consolidated Tape



Source: ArcaVision, Goldman Sachs Research.

ETF AUM growth is outpacing traditional mutual funds

On a global basis, equity ETF AUM now stand at over \$1 trillion, nearly 11% of the \$9.5 trillion for mutual funds. However, growth rates between the two fund classes differ substantially. From 2002, ETF growth, of all asset classes, has averaged 25% per year in the United States (see Exhibit 4). Conversely, traditional mutual funds flows have been averaging 3% annual growth for the same period (see Exhibit 5). And the picture that emerged since the 2008 downturn shows a strong bifurcation: **While global mutual fund AUM at the end of 2011 was 6% lower than their 2007 levels, ETF AUM were 70% higher (see Exhibits 6-7).**

ETFs are taking share of passive strategies, less so from active

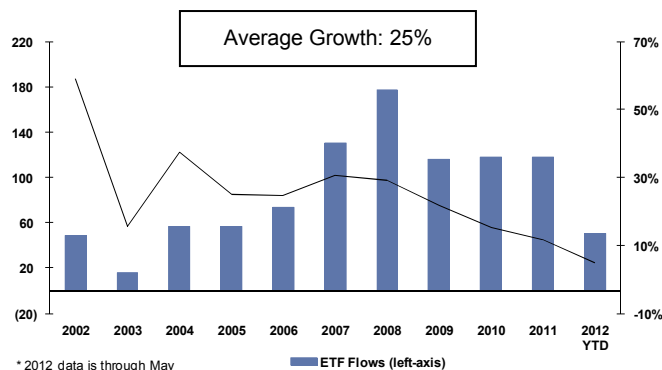
The investor shift into passive strategies is real, but not new, as a move toward lower-cost investing has been underway for the last decade, as shown by the share gains of passive strategies at the expense of active (see Exhibit 8). The pace of passive share gains has been steady over the last 10-plus years, with 23% of mutual fund AUM now held in passive funds vs just 8% in 1999. We note that a small but growing share of ETF AUM is the “active” ETF that is designed to enhance performance through rules-based mechanisms, rather than tracking a mostly static index.

Lastly, as we show in Exhibit 9, ETFs now command half of AUM of all passive investments. We note that their share has hovered above 50% since 2009, having grown from 9% in 1999.

The ETF market in pictures

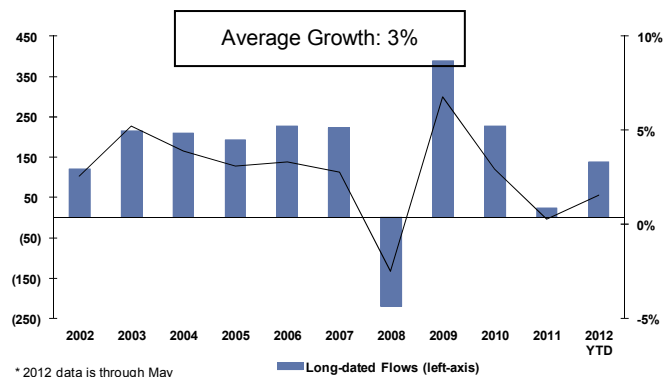
- ETF AUM is smaller, but growing faster than those for open-end mutual funds.
- ETF are increasing their foothold on the growing passive asset market.

Exhibit 4: ETFs have averaged 25% inflow growth...
ETF inflows (\$ bn) and growth; US only



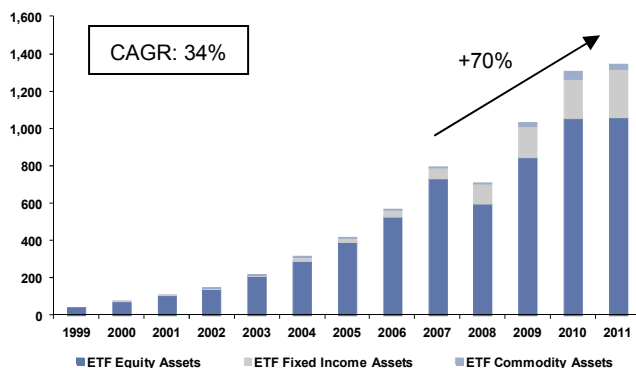
Source: Investment Company Institute, AMG, Goldman Sachs Research.

Exhibit 5: ...vs. 3% for traditional mutual funds
Open-end mutual fund flows (\$ bn) and growth; US only



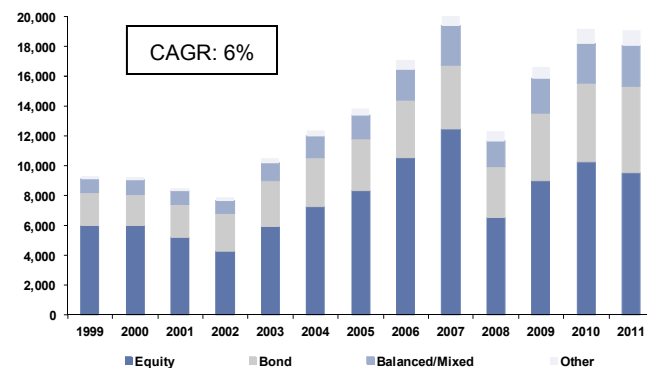
Source: Investment Company Institute, AMG, Goldman Sachs Research.

Exhibit 6: ETF AUM growth has been robust...
Global AUM for ETFs (\$ bn)



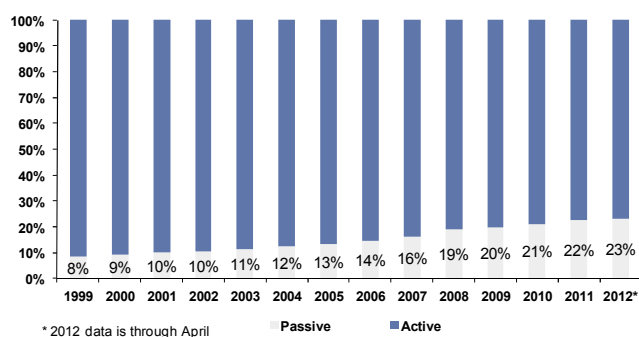
Source: BlackRock, Goldman Sachs Research.

Exhibit 7: ...in contrast to mutual fund AUM
Global AUM for open-end mutual funds (\$ bn)



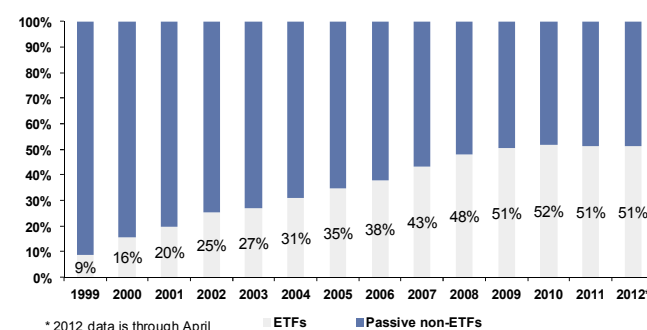
Source: Investment Company Institute, Goldman Sachs Research.

Exhibit 8: Passive funds are taking share
Mutual funds market share – passive vs. active strategies



Source: Strategic Insight (Simfund), Goldman Sachs Research.

Exhibit 9: And ETFs are taking share of passive AUM
Passive market share – ETF vs. non-ETF products % ETF



Source: Strategic Insight (Simfund), Goldman Sachs Research.

How correlated are sectors to one another? More than you think

Given the rise in trading activity in ETFs, we compare and contrast where correlations sit for individual sectors against (1) one another, (2) versus history, and (3) the market as a whole.

To begin, we frame the basis of our discussion by providing a historical analysis of daily and weekly pair-wise correlation of ETFs versus one another, summarized in Exhibits 10 and 11 below. These matrices yield insights on the growing impact of price movements in certain sectors versus each other. They also highlight the unpredictable impact that “blunt force” ETF usage can have on portfolio construction and returns.

- **Indeed, of the 36 sector ETF pairs we examined, correlations on a 3-year basis are higher than 70% for 31 of the instances, emphasizing the importance for portfolio managers to choose sectors wisely when hedging at specific points in time.**
- Although correlations for the individual components of the S&P 500 are now broadly in line with their 1-year and 5-year medians (1-month correlations now stand at 53% versus 50% and 44% on a 1- and 5-year median) **we see higher levels of correlations on a sector-to-sector basis (using ETFs as a proxy). To give some context, the average sector-pair correlation is 72% when measured on a 3-month basis.**

In Exhibit 10, we show a 3-month daily correlation snapshot along with a guide to the most and least correlated pairs.

Exhibit 10: Correlations on a 3-month basis: Identifying the most and least correlated sector pairs as they stand now
Correlation of **daily** returns for the trailing 3-months

	XLE	XLU	XLI	XLB	XLY	XLP	XLK	XLF	XLV	SPX
XLE - Energy	100%									
XLU - Utilities	48%	100%								
XLI - Industrials	81%	55%	100%							
XLB - Materials	86%	47%	88%	100%						
XLY - Discretionary	72%	48%	85%	85%	100%					
XLP - Staples	60%	63%	75%	67%	79%	100%				
XLK - Tech	72%	33%	77%	83%	85%	65%	100%			
XLF - Financials	79%	47%	85%	82%	80%	68%	75%	100%		
XLV - Healthcare	74%	58%	81%	80%	79%	82%	78%	76%	100%	
SPX	62%	47%	58%	59%	50%	47%	47%	55%	54%	100%

Top and Bottom Pairs		
Sector Pairs		Correlation
Materials - Industrials	XLB - XLI	88%
Materials - Energy	XLB - XLE	86%
Materials - Discretionary	XLB - XLY	85%
Financials - Industrials	XLF - XLI	85%
Tech - Discretionary	XLK - XLY	85%
Tech - Utilities	XLK - XLU	33%
Financials - Utilities	XLF - XLU	47%
Materials - Utilities	XLB - XLU	47%
Staples - Energy	XLP - XLE	60%
Tech - Staples	XLK - XLP	65%

Note: We limit the top and bottom pairs to include at most three pairs with a given sector ETF.

Source: Bloomberg, Goldman Sachs Research.

To gauge correlations on a longer horizon, we include a 3-year view in Exhibit 11. We note that these figures are calculated on a weekly basis.

Exhibit 11: A longer view on correlations
Correlation of **weekly** returns for the trailing 3-years

	XLE	XLU	XLI	XLB	XLY	XLP	XLK	XLF	XLV	SPX
XLE - Energy	100%									
XLU - Utilities	65%	100%								
XLI - Industrials	87%	69%	100%							
XLB - Materials	90%	63%	92%	100%						
XLY - Discretionary	83%	70%	94%	89%	100%					
XLP - Staples	74%	78%	79%	73%	80%	100%				
XLK - Tech	83%	64%	89%	87%	92%	76%	100%			
XLF - Financials	80%	60%	90%	85%	86%	71%	81%	100%		
XLV - Healthcare	77%	74%	82%	77%	79%	83%	77%	73%	100%	
SPX	56%	47%	61%	60%	58%	53%	60%	55%	56%	100%

Top and Bottom Pairs		
Sector Pairs		Correlation
Discretionary - Industrials	XLY - XLI	94%
Materials - Industrials	XLB - XLI	92%
Tech - Discretionary	XLK - XLY	92%
Financials - Industrials	XLF - XLI	90%
Materials - Energy	XLB - XLE	90%
Financials - Utilities	XLF - XLU	60%
Materials - Utilities	XLB - XLU	63%
Tech - Utilities	XLK - XLU	64%
Financials - Staples	XLF - XLP	71%
Healthcare - Financials	XLV - XLF	73%

Note: We limit the top and bottom pairs to include at most three pairs with a given sector ETF.

Source: Bloomberg, Goldman Sachs Research.

Current (3m) cross-sector correlations and hedging takeaways...

- Perhaps not surprisingly, we see among the least amount of dispersion between Industrials and Energy as well as Materials and Industrials. **Surprising, however, is that less obviously paired ETFs exhibit strikingly high correlations. For example, we highlight: Financials & Industrials, Tech & Discretionary and Materials & Discretionary.**
- **Utilities is the sector least correlated to others and, as such, may provide a more optimal hedge if an investor has a specific sector view on the group.** We do note that Staples are the second least correlated.

We provide a full listing of 3-month and 3-year sector-pair correlations in the Appendix for those who wish to dig deeper.

... and how they've moved: now vs history (3 months vs 3-years)

- **Tech (XLK) and Industrials (XLI) show pockets of falling correlations to other sectors, albeit the figures remain high.** In addition, the correlation between the Tech and Industrials fell to 77% on a 3-month basis from 89% on a 3-year basis. Among the notable examples of falling correlations, those between Tech and Energy fell to 72% from 83% over the same two periods.
- **Healthcare (XLV) has become more coupled to other sectors.** While 32 of the examined 36 sector pairs showed decreases in correlations, all of the four that showed increases included Healthcare. As an example, correlations between Healthcare and Financials rose to 76% from 73%, versus an average decrease in correlations of 8% among all 36 pairs.

How sectors are correlated to the broader market

- **Utilities (XLU), Staples (XLP) and Tech (XLK) are the sector ETFs least correlated to the S&P 500**, with current 3-month correlations of 47% each.
- **Energy (XLE) is the only sector with an increase in correlations to the S&P 500**, having risen to 62% on a 3-month basis versus 56% on a 3-year. **In contrast, Tech (XLK) and Discretionary (XLY) saw the greatest declines in correlations.** They fell to 47% from 60% and 50% from 58%, respectively, on a 3-month and 3-year basis.

ETFs as an imperfect hedging tool – two case studies

Given how often index and sector ETFs are used as hedging tools for implementing long/short strategies, we examine how well they perform this task. We find that the key item that investors should focus on is the concentration of each stock in the ETF at hand and distortions they can cause against a portfolio.

Case study #1: Hedge fund most held

To provide a hypothetical example, we conduct a scenario analysis using the constituents of Goldman Sachs Portfolio Strategy team's hedge fund Very Important Position basket (Bloomberg: GSTHHVIP¹), which comprises of 50 stocks that "matter most" to hedge funds; i.e., most frequently appear among the largest 10 holdings of hedge funds.²

- While that basket is equal-weighted, for the purposes of our analysis we construct a long portfolio assigning a 75% weight to market capitalization and 25% to 6-month average daily value traded (ADVT) of each constituent. In addition, we cap the maximum holding in each stock to 10% of the portfolio. For example, while AAPL has a 22% weight on the basis of market cap and ADVT, we assign it a 10% weight in the portfolio.
- We partially hedge this portfolio using a combination of the S&P 500 (as represented by the SPY ETF) and the NASDAQ 100 (QQQ ETF) indices. Specifically, we assign 35% short position to SPY and 15% to QQQ.

While the short ETF positions are intended to serve the purpose of offsetting the long portfolio, the weighting differences can create several net positions that are unintentional. **Our analysis suggests that while ETFs are widely used as hedging instruments, they can be too imprecise to be the only tool.** Indeed, looking at a sector level in Exhibit 12:

- We highlight that the relative weight of Information Technology and Financials sectors in the net is much higher than that in the long portfolio, reflecting their increased concentration.
- On the other hand, Consumer Discretionary exposure in the net is much smaller than that in the long portfolio.
- Finally, we note significant net negative positions are created in sectors like Consumer Staples and Industrials, which had no or small exposure in the long portfolio.

Exhibit 12: A case study of unintended exposures

Sector level exposure: A hypothetical portfolio of positions from the Hedge Fund VIP List hedged with SPY and QQQ

GICS Level 1 Sector	Long Position Stocks that "matter most" to HFs		Hedging Book				Net Portfolio	
	Position	%	Short 35% S&P 500 (SPY)		Short 15% NASDAQ 100 (QQQ)		Position	%
Information Technology	\$ 46,280,132	46.3%	\$ (6,973,470)	19.9%	\$ (10,108,410)	67.4%	\$ 29,198,252	58.4%
Financials	25,507,272	25.5%	(4,969,965)	14.2%	0	0.0%	20,537,307	41.1%
Health Care	9,092,529	9.1%	(4,135,635)	11.8%	(1,594,245)	10.6%	3,362,649	6.7%
Energy	8,099,901	8.1%	(3,745,175)	10.7%	0	0.0%	4,354,726	8.7%
Consumer Discretionary	7,073,851	7.1%	(3,921,750)	11.2%	(2,455,560)	16.4%	696,541	1.4%
Materials	2,461,373	2.5%	(1,195,215)	3.4%	(70,770)	0.5%	1,195,388	2.4%
Industrials	1,189,151	1.2%	(3,844,235)	10.4%	(268,455)	1.8%	(2,723,539)	-5.4%
Utilities	295,792	0.3%	(1,321,355)	3.8%	0	0.0%	(1,025,563)	-2.1%
Telecommunication Services	0	0.0%	(1,114,785)	3.2%	(122,700)	0.8%	(1,237,485)	-2.5%
Consumer Staples	0	0.0%	(3,978,415)	11.4%	(379,860)	2.5%	(4,358,275)	-8.7%
	\$ 100,000,000		\$ (35,000,000)		\$ (15,000,000)		\$ 50,000,000	

Source: Bloomberg, Goldman Sachs Research.

¹Note: The ability to trade this basket will depend upon market conditions, including liquidity and borrow constraints at the time of trade.

² For details on the basket please see Hedge Fund Trend Monitor, by David Kostin and team, published May 22, 2012.

In Exhibit 13, we review the net exposures at a stock level, and notice similarities with the sector level analysis, in terms of increased relative concentration of certain stocks as well as several unintentional net positions. For example, the application of ETFs as hedges resulted in nearly identical exposures for AAPL, WFC and PFE despite a much higher initial exposure to AAPL.

Exhibit 13: A case study of unintended exposures

A hypothetical portfolio of positions from the Hedge Fund VIP List hedged with SPY and QQQ

Long Holdings Stocks that "matter most" to hedge funds			Hedging Book Short 35% S&P 500 (SPY)			Short 15% NASDAQ 100 (QQQ)			Net Portfolio		
Ticker	Position	%	Ticker	Position	%	Ticker	Position	%	Ticker	Position	%
	\$ 100,000,000	100%		\$ (35,000,000)	-35%		\$ (15,000,000)	-15%		\$ 50,000,000	50%
AAPL	\$ 10,000,000	10.0%	AAPL	\$ (1,578,885)	4.5%	AAPL	\$ (2,853,660)	19.0%	AAPL	\$ 5,567,455	5.6%
MSFT	8,851,426	8.9%	MSFT	(646,100)	1.8%	MSFT	(1,312,110)	8.7%	MSFT	6,893,216	6.9%
GOOG	6,039,326	6.0%	GOOG	(429,520)	1.2%	GOOG	(789,690)	5.3%	GOOG	4,820,116	4.8%
WFC	5,882,057	5.9%	WFC	(483,595)	1.4%				WFC	5,398,462	5.4%
PFE	5,771,219	5.8%	PFE	(487,025)	1.4%				PFE	5,284,194	5.3%
JPM	5,187,378	5.2%	JPM	(375,165)	1.1%				JPM	4,812,213	4.8%
BAC	4,239,281	4.2%	BAC	(236,740)	0.7%				BAC	4,002,541	4.0%
BP	3,932,192	3.9%							BP	3,932,192	3.9%
QCOM	3,741,434	3.7%	QCOM	(290,010)	0.8%	QCOM	(524,175)	3.5%	QCOM	2,927,249	2.9%
C	3,733,478	3.7%	C	(237,300)	0.7%				C	3,496,178	3.5%
CSCO	3,448,797	3.4%	CSCO	(262,920)	0.8%	CSCO	(475,230)	3.2%	CSCO	2,710,647	2.7%
BRK.B	2,965,495	3.0%	BRK.B	(417,410)	1.2%				BRK.B	2,548,085	2.5%
V	2,233,047	2.2%	V	(169,225)	0.5%				V	2,063,822	2.1%
AIG	2,072,726	2.1%	AIG	(56,875)	0.2%				AIG	2,015,851	2.0%
EMC	2,043,201	2.0%	EMC	(147,595)	0.4%				EMC	1,895,606	1.9%
EBAY	1,977,258	2.0%	EBAY	(137,200)	0.4%	EBAY	(278,610)	1.9%	EBAY	1,561,448	1.6%
MA	1,880,128	1.9%	MA	(129,150)	0.4%				MA	1,750,978	1.8%
HPQ	1,754,074	1.8%	HPQ	(128,660)	0.4%				HPQ	1,625,414	1.6%
F	1,711,916	1.7%	F	(118,230)	0.3%				F	1,593,686	1.6%
ESRX	1,661,965	1.7%	ESRX	(124,040)	0.4%	ESRX	(225,570)	1.5%	ESRX	1,312,355	1.3%
BIDU	1,633,842	1.6%				BIDU	(173,505)	1.2%	BIDU	1,460,337	1.5%
PCLN	1,567,318	1.6%	PCLN	(93,625)	0.3%	PCLN	(169,230)	1.1%	PCLN	1,304,463	1.3%
ABX	1,495,134	1.5%							ABX	1,495,134	1.5%
Others	16,177,308	16.2%	Others	(28,450,730)	81.3%	Others	(8,198,220)	54.7%	Others	(20,471,642)	-20.5%

Source: Bloomberg, Goldman Sachs Research.

Case study #2: An Energy Book

To provide a sector example, we conduct a scenario analysis of the largest 30 domestic energy stocks on the major US exchanges. Specifically:

- For the long holdings, we assign weights ranging from 2% to 6% to each of these 30 stocks, based on their market caps.
- We partially hedge this book using a combination of the SPDR Energy (XLE) and the Market Vectors Oil Services (OIH) ETFs, assigning a 20% and 10% position, respectively.

In Exhibit 14, we notice that the short ETF positions largely offset the long portfolio; but that weighting differences create several net positions that are unintentional, such as the relatively small position in SLB. Further, the relative weights of stocks like APA and APC in the net portfolio are more than double the exposure to XOM, even though XOM is more heavily weighted in the long portfolio.

Exhibit 14: An example where hedging with an ETF may introduce unintended exposures

A hypothetical portfolio of long positions in the largest 30 energy stocks hedged with a combination of XLE and OIH

Long Holdings			Hedging Book Short 20% XLE ETF			Short 10% OIH ETF			Net Portfolio		
Ticker	Position	%	Ticker	Position	%	Ticker	Position	%	Ticker	Position	%
	\$ 100,000,000	100%		\$ (20,000,000)	-20%		\$ (10,000,000)	-10%		\$ 70,000,000	70%
XOM	\$ 6,000,000	6.0%	XOM	\$ (3,981,071)	19.9%				XOM	\$ 2,018,929	2.0%
CVX	6,000,000	6.0%	CVX	(3,145,475)	15.7%				CVX	2,854,525	2.9%
SLB	5,000,000	5.0%	SLB	(1,390,328)	7.0%	SLB	(2,106,340)	21.1%	SLB	1,503,332	1.5%
COP	5,000,000	5.0%	COP	(794,562)	4.0%				COP	4,205,438	4.2%
OXY	5,000,000	5.0%	OXY	(918,044)	4.6%				OXY	4,081,956	4.1%
APA	5,000,000	5.0%	APA	(565,383)	2.8%				APA	4,434,617	4.4%
APC	5,000,000	5.0%	APC	(559,395)	2.8%				APC	4,440,605	4.4%
NOV	4,000,000	4.0%	NOV	(550,935)	2.8%	NOV	(990,250)	9.9%	NOV	2,458,815	2.5%
HAL	4,000,000	4.0%	HAL	(473,972)	2.4%	HAL	(902,770)	9.0%	HAL	2,623,258	2.6%
EOG	4,000,000	4.0%	EOG	(470,275)	2.4%				EOG	3,529,725	3.5%
DVN	4,000,000	4.0%	DVN	(416,602)	2.1%				DVN	3,583,398	3.6%
KMI	4,000,000	4.0%	KMI	(247,606)	1.2%				KMI	3,752,394	3.8%
PSX	3,000,000	3.0%	PSX	(325,292)	1.6%				PSX	2,674,708	2.7%
WMB	3,000,000	3.0%	WMB	(402,978)	2.0%				WMB	2,597,022	2.6%
SE	3,000,000	3.0%	SE	(378,603)	1.9%				SE	2,621,397	2.6%
MRO	3,000,000	3.0%	MRO	(314,622)	1.6%				MRO	2,685,378	2.7%
BHI	3,000,000	3.0%	BHI	(349,265)	1.7%	BHI	(601,130)	6.0%	BHI	2,049,605	2.0%
HES	3,000,000	3.0%	HES	(258,035)	1.3%				HES	2,741,965	2.7%
NBL	3,000,000	3.0%	NBL	(312,612)	1.6%				NBL	2,687,388	2.7%
RIG	2,000,000	2.0%				RIG	(480,870)	4.8%	RIG	1,519,130	1.5%
MPC	2,000,000	2.0%	MPC	(205,267)	1.0%				MPC	1,794,733	1.8%
VLO	2,000,000	2.0%	VLO	(264,124)	1.3%				VLO	1,735,876	1.7%
CHK	2,000,000	2.0%	CHK	(242,120)	1.2%				CHK	1,757,880	1.8%
PXD	2,000,000	2.0%	PXD	(393,453)	2.0%				PXD	1,606,547	1.6%
CAM	2,000,000	2.0%	CAM	(276,924)	1.4%	CAM	(465,000)	4.7%	CAM	1,258,076	1.3%
FTI	2,000,000	2.0%	FTI	(269,650)	1.3%	FTI	(437,930)	4.4%	FTI	1,292,420	1.3%
SWN	2,000,000	2.0%	SWN	(183,665)	0.9%				SWN	1,816,335	1.8%
WFT	2,000,000	2.0%				WFT	(406,930)	4.1%	WFT	1,593,070	1.6%
RRC	2,000,000	2.0%	RRC	(214,209)	1.1%				RRC	1,785,791	1.8%
MUR	2,000,000	2.0%	MUR	(183,243)	0.9%				MUR	1,816,757	1.8%
			COG	(227,170)	1.1%				COG	(227,170)	-0.2%
			SUN	(185,253)	0.9%				SUN	(185,253)	-0.2%
			DNR	(178,260)	0.9%				DNR	(178,260)	-0.2%
			RDC	(158,547)	0.8%	RDC	(181,480)	1.8%	RDC	(340,027)	-0.3%
			CNX	(154,488)	0.8%				CNX	(154,488)	-0.2%
			TSO	(149,926)	0.7%				TSO	(149,926)	-0.1%
			BTU	(143,094)	0.7%				BTU	(143,094)	-0.1%
			NE	(122,216)	0.6%	NE	(374,070)	3.7%	NE	(496,286)	-0.5%
			NBR	(106,301)	0.5%	NBR	(171,550)	1.7%	NBR	(277,851)	-0.3%
			EQT	(106,160)	0.5%				EQT	(106,160)	-0.1%
			DO	(106,039)	0.5%	DO	(199,720)	2.0%	DO	(305,759)	-0.3%
			HP	(74,752)	0.4%	HP	(224,320)	2.2%	HP	(299,072)	-0.3%
			QEP	(71,276)	0.4%				QEP	(71,276)	-0.1%
			NFX	(56,908)	0.3%				NFX	(56,908)	-0.1%
			WPX	(42,882)	0.2%				WPX	(42,882)	0.0%
			ANR	(29,017)	0.1%				ANR	(29,017)	0.0%
						SDRL	(475,790)	4.8%	SDRL	(475,790)	-0.5%
						TS	(350,680)	3.5%	TS	(350,680)	-0.4%
						CLB	(269,520)	2.7%	CLB	(269,520)	-0.3%
						ESV	(266,590)	2.7%	ESV	(266,590)	-0.3%
						OII	(233,090)	2.3%	OII	(233,090)	-0.2%
						OIS	(159,120)	1.6%	OIS	(159,120)	-0.2%
						DRC	(154,910)	1.5%	DRC	(154,910)	-0.2%
						SPN	(146,660)	1.5%	SPN	(146,660)	-0.1%
						MDR	(115,150)	1.2%	MDR	(115,150)	-0.1%
						TDW	(112,440)	1.1%	TDW	(112,440)	-0.1%
						PTEN	(105,200)	1.1%	PTEN	(105,200)	-0.1%
						CRR	(68,490)	0.7%	CRR	(68,490)	-0.1%

Source: Bloomberg, Goldman Sachs Research.

Exhibit 15: Our correlation roadmap
Correlation, rankings and deltas on a 3-month versus 3-year basis

Source: Bloomberg. Goldman Sachs Research.

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