

C A M B R I D G E A S S O C I A T E S L L C

EXCHANGE TRADED FUNDS: VERSATILITY AT A PRICE

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CONTENTS

Summary 3

Exhibits

- 1 Product Description and Trading Growth: ETF Volume and Assets 12
- 2 Trading and Tracking 13
- 3 Selected Exchange-Traded Funds 14
- 4 S&P 500 SPDR and Vanguard Funds Capital Gains Distributions as a Percent of NAV 15
- 5 European ETFs Average Daily Volume 16

SUMMARY

Introduction

Exchange-traded funds (ETFs) will revolutionize passive investing, their promoters promise. ETFs trade like stocks: investors can buy and sell them during the day, trade them on margin, use stop-loss and limit orders, and sell them short—all features traditional index funds lack. Critics, on the other hand, counter that ETFs encourage day trading, reinforce proclivities to market time, and, therefore, are the tool of the speculator and market-timer. Jack Bogle, the champion of passive index funds, is reputed to have said that ETFs are like giving an arsonist a can of gas and a match.

Many sponsors claim that ETFs are more economical than index funds. However, while the expense ratios of some ETFs may be relatively lower, they can be much more expensive when total costs are included. These fees—including commissions, bid-offer spreads, management fees, and custodial costs—are usually implicit expenses and not included in most analyses of ETFs. Although ETFs are not preferable to index funds on a strict cost-comparison basis, their versatility provides investors with additional approaches to portfolio diversification and risk control. As such, ETFs are a very different vehicle than index funds, and investors should determine the unique needs of their portfolios when deciding which to buy.

Although the merits of ETFs may be debatable, their growth is undisputed—from \$1 billion in assets in 1993 to about \$87 billion globally today, and they could reach \$500 billion by 2007, if not sooner (see Exhibit 1). In comparison, roughly \$600 billion is now invested in traditional index funds, with \$90 billion in Vanguard's S&P 500 Index Fund alone. Currently, there are over 150 ETFs worldwide, and their number is growing every day. They run the gamut from plain vanilla funds that replicate the S&P 500 and FTSE 100 to more narrowly focused products, such as those that track the Russell 2000® Value Index, the S&P 500 health care sector, and the MSCI Malaysia Index.

Structure Matters

ETFs come in three forms: unit investment trusts, managed investment companies, and grantor trusts. **Unit investment trusts** (UITs) must fully replicate an underlying index by holding all its constituent securities proportionately weighted, and they cannot use enhanced strategies. In the UIT structure dividends are not immediately reinvested but are held in an interest-bearing account until the end of each quarter, at which time they are disbursed to investors. Examples of UITs include the S&P 500 Standard & Poor's Depository Receipts (SPDR), which replicates the S&P 500; QQQs (popularly known as 'Qubes') which track the Nasdaq 100; and DIAs ('Diamonds'), which track the Dow Jones Industrial Average (DJIA).

The rigid structure of UITs contrasts with the more flexible format of **managed investment companies**. Managers of these may supplement their stock holdings with cash or derivatives, engage in securities lending, and reinvest dividends. Examples include iShares and Sector SPDRs, such as the S&P 500 Value iShares, Dow Jones Healthcare iShares, and iShare MSCI Germany.

The third type of structure is the **grantor trust**, which consists of a static basket of ten to 20 securities in a specific industry or sector. The stocks remain the same throughout the life of the product, reflecting corporate actions and stock splits. As a consequence, grantor trusts have less flexibility to refresh the list of stocks over time or replace them as mergers or spin-offs occur. Examples include holding company depository receipts (HOLDRs), such as the Broadband, Semiconductor, and B2B Internet HOLDRs. Dividends are not reinvested, but instead are passed through to investors.

More Than an Index Fund

Beyond expanding the menu of available indexes and sectors to track, ETFs also provide investors with additional approaches to portfolio diversification and risk control. Investors with idle cash could put their money to work in a product that is tied to the fund's benchmark or to certain sectors. For example, a value fund using the Russell 1000® or Russell 2000® Value index as its benchmark could invest cash into the iShares that are tied to the benchmark. This would minimize cash drag or benchmark risk until the investor determines which stocks to purchase. Similarly, portfolio managers may hold relatively small allocations to ETFs in order to manage recent inflows or expected outflows.

Sector ETFs make it possible to lessen the impact of blowups in individual securities, as well as to customize portfolios by shorting or overweighting certain sectors. For example, an investor who wants exposure to the biotech sector but is uncertain about which stocks to buy in what relative weights, could easily acquire a diversified position in this sector by investing in the Biotech HOLDR. ETFs also can be used to adjust the style tilt of a portfolio, for example providing a value-tilt to the S&P 500 benchmark by buying S&P 500 Value iShares. Similarly, another investor might want to own the S&P 500 minus technology stocks, which could be achieved by buying an S&P 500 ETF and shorting the tech sector ETF. (ETFs are exempt from short-selling restrictions, which forbid short selling on a downtick.)

The ability to trade ETFs intraday is useful when the market is highly volatile. Investors buy or sell an ETF at a price that is usually within the bid-offer spread, while index funds are purchased at a price to be determined at the market's close. This feature allows investors to dictate the price they are willing to pay, rather than being beholden to the market consensus when the trading is over. As such, they may be able to avoid posting significant losses when the market rises (or falls) 5% to 10% in a day.

How Cheap are ETFs?

There are several ways to assess the cost of buying and selling ETFs: expense ratios, bid-offer spreads, and brokerage commissions. The cost of buying and selling a specific ETF is a function of the liquidity of the underlying shares and the opportunity for arbitrage. Derivatives, such as options, futures, and ETFs, allow arbitrageurs and market-makers to hedge their risk, thereby enhancing the liquidity of certain equities, indexes, and sectors. Consequently, the more liquid and actively traded the ETF, the lower the expense ratio (see Exhibit 3). For example, the expense ratio of Barclays' iShares 500 Index is 0.09%, while most HOLDRs charge as little as 0.08%. In contrast, the expense ratio of the less liquid S&P MidCap 400 iShares is 0.20%, Utilities SPDR, 0.28%, and MSCI U.K. Index, 0.84%. By comparison, for retail investors Vanguard charges an annual expense fee of 0.18% for its S&P 500 Index Fund, 0.10% for its Total Stock Market Index; and 0.25% for its MidCap Index Fund.

How ETFs are Created, Redeemed and Traded

Certain large investors, such as market-makers and designated institutional investors, create ETFs by depositing shares of the index constituents with a trustee bank (see Exhibit 2). In return, they receive creation units, which are large, usually 50,000-share blocks. These large investors can hold the creation unit in their own portfolio, or break it up and sell ETF shares on the stock exchange, where broker-dealers and individual investors can purchase them as they would any listed stock. A creation unit can be redeemed for the basket of securities and cash.

Most ETFs trade very close to their net asset value (NAV). If an ETF trades at a discount, investors can buy it in the open market at the discounted price, redeem it for the underlying stocks, and sell those stocks at a profit. Conversely, if an ETF trades at a premium to its NAV, investors could short it at the higher price, buy the underlying securities, and cover the short at a profit. For example, assume the bid-ask spread for the S&P 500 SPDR is $\$99^{7/8}$ – $\$100^{1/8}$, and its NAV is \$100. If an order to buy one million index shares arrived on the floor of the exchange, the institutional investor could take the other side of the transaction by shorting the ETF at $\$100^{1/8}$, while simultaneously hedging this position by buying S&P 500 index futures at the NAV equivalent of \$100, thereby earning a one-eighth profit on the trade.

In addition to the expense ratio, there is also the cost of buying and selling iShares and index funds.¹ The table on the following page breaks down the costs for a \$10 million investment by a foundation or endowment. It shows that when these costs are added to the total calculation, ETFs become much

¹ A note about terminology. What the above paragraph—and most literature on ETFs and index funds—refers to as an "expense ratio" is itemized in Exhibit 2 as "management fee" and custodial/accounting costs. For regulatory and accounting purposes, commingled index funds have a "management fee," not an "expense ratio."

more expensive than index funds—23.85 basis points (bps) vs. 6.60 bps! Not only does the iShare entail higher commission costs than the index fund (6.4 bps vs. 1.2 bps), but its bid-offer spread is relatively wider. The iShare's spread is wider because it trades as an independent security, which has its own bid and offer prices, which is not the case with the index fund. The bid-offer spreads of the highly liquid S&P 500 SPDRs and QQQs are very tight, usually around eight bps, while the spreads for more specialized funds are typically much wider because the prices of their underlying stocks are more volatile or because their trading volume is lower. For example, on January 24, 2001, the average weighted bid-offer spread of the Biotech HOLDR was 27 bps; streetTRACKS U.S. Small-Cap, 30 bps; Fortune 500 Index Fund, 40 bps; Russell 2000 Value, 75 bps; and Internet Infrastructure HOLDR, 101 bps.

The difference in the costs in bps of the bid-offer spread and commissions between the iShare and index fund represents the premium paid for instant liquidity. The table below assumes that 90% of the commingled fund investment is crossed. However, it is quite possible that an index fund will not charge any commission at all if the investor is willing to purchase the fund over several days, thereby allowing the entire amount to be crossed at zero cost as other investors redeem their shares. By waiting several days, however, the investor incurs some market risk, which could increase the overall cost of the purchase. Therefore, someone who invests \$10 million in a single transaction pays higher transaction costs in order to avoid market risk and obtain instant access to the market.

For a transaction involving an iShare, the broker-dealer earns 14.4 bps, which includes round-trip commission and the bid-offer spread of the ETF. The management fee is charged annually and billed directly to the client. The index provider does not charge a custodial/accounting fee for the iShare, but it totals 0.4 bps for the index fund, an annual sum that is taken from the account's net return.

**Cost Comparison of Exchange-Traded Funds vs. Index Funds
in Basis Points (bps)**

| | iShare S&P 500 | S&P 500 Commingled Index Fund |
|-------------------------------|-------------------------------|--|
| Round-trip Commission | 6.40 | 1.20 |
| Bid-Offer Spread | 8.00 | N/A |
| Management Fee | 9.45 | 5.00 |
| Custodial/Accounting Costs | N/A | 0.40 |
| Total | 23.85 | 6.60 |

Source: A major index provider.

Assumptions: \$10 million investment by a foundation/endowment (using the most inexpensive vehicle for that investment amount).

Notes: Assuming \$0.08 round-trip commission for the iShare, and 90% of commingled fund investment is crossed. The iShare is an independent security that has its own bid-offer spread, which is not the case with the index fund. The custodial/accounting cost for the iShare is included in the management fee.

Less Realized Capital Gains?

To date, ETFs have generated less realized capital gains relative to traditional index funds and, although they have not been around long enough for us to assume this will always be the case, structural differences make it likely that the distinction will persist. Similar to traditional mutual funds, ETFs generate two kinds of capital gains tax: annual capital gains that are distributed to all shareholders and capital gains to a specific investor upon redemption.

As with mutual funds, investors pay taxes on capital gains net of losses when they close their ETF position, while dividends paid by the ETF are taxed as ordinary income. In addition, the unique structure of ETFs allows them to distribute minimal annual capital gains to their shareholders. As explained in a previous text box, unlike traditional index fund managers, sponsors of ETFs do not sell shares directly to the public for cash when they are redeemed. Instead, authorized institutions redeem ETFs by swapping creation units with the sponsor in exchange for shares of the underlying securities, which does not trigger a tax event for the fund. When fund managers of traditional index funds need to raise cash—usually when the amount of redemptions exceeds purchases—they sell a proportionate share of all of their holdings. These transactions can trigger capital gains tax liabilities, which are passed on to the remaining shareholders. In the ETF, each security has an associated tax basis that was created during the purchase, and during the redemption process, the sponsor issues the securities with the lowest cost basis. As a consequence, the shares remaining in the ETF have a relatively higher cost basis, less imbedded capital gains liability, and therefore, fewer gains to distribute. It is the redeeming investor who is responsible for paying the tax, not the remaining shareholders. This said, however, as with traditional index funds, changes in the underlying index may generate capital gains or losses for an ETF. This problem is particularly acute for small- or mid-cap indexes when companies graduate to larger cap indexes.

According to the American Stock Exchange, the S&P 500 SPDR has distributed only \$0.09 per share in capital gains since its launch in 1993, whereas the Vanguard S&P 500 Index Fund has distributed \$2.49 per share over the same period. On the other hand, some managed investment companies, such as iShares, have generated larger capital gains distributions. For example, the 2000 capital gains distribution for the iShares S&P 500 Index Fund was \$0.07 per share while it was \$0.63 per share for the iShares MSCI U.K. Index.

A fund may also throw off capital gains as a result of actions taken to comply with SEC regulations. For example, in 2000, iShares MSCI Canada and iShares MSCI Sweden were forced to trim their large holdings in Nortel and Ericsson to meet SEC-mandated diversification requirements. As a consequence, they paid out \$4.39 and \$5.21 per share in capital gains distributions, respectively.

For taxable investors, ETFs may have higher realized capital gains relative to the Vanguard Tax-Managed Fund, which has thus far eliminated them completely (see Exhibit 4). However, the tracking error of the Vanguard Tax-Managed Fund has been higher relative to ETFs.

The Global Scope of ETFs

Global ETFs are growing dramatically in coverage and trading volume. The wide array includes those that track a single country, region, style, or sector. An investor can obtain exposure to international equity markets by purchasing these ETFs on their own domestic markets or on international exchanges. Investors in the United Kingdom can purchase ETFs that track the FTSE and EuroSTOXX indexes, as well as non-U.K. indexes, such as QQQs and Dow Jones indexes. Investors in Singapore can trade several ETFs that are cross-listed with the American Stock Exchange: DJIA Diamonds, S&P 500 SPDRs, iShares S&P 500, iShares Dow Jones U.S. Technology Sector, and iShares MSCI Singapore.

While Europe's ETF market was initially concentrated in the EuroSTOXX 50 and FTSE-based products, the number has grown substantially thus far in 2001, from eight at the beginning of the year to 46 by the end of June (see Exhibit 5). The 46 ETFs include single country indexes, such as the DAX, CAC, and FTSE, as well as sector, regional, and global ETFs. Average daily volume has grown from \$6 million in the fourth quarter of 2000, to \$111 million in the first quarter of 2001, to \$149 million in the second quarter.

In Asia, the most actively traded ETF is Hong Kong's Tracker Fund. Japan began trading ETFs in July this year, with three tracking the Nikkei average and two that are based on the broader Tokyo Stock Price Index (Topix). Nikkei-linked ETFs account for about 95% of the daily trading volume, which totals about \$93 million (¥11.4 billion).

Most ETF sponsors want to establish a global network for their funds whereby they will trade 24 hours per day, seven days per week. In order to expand into global markets, however, sponsors must meet the regulations of each country where the fund will be domiciled. This can be a time-consuming process and can distort the index. Some countries, for example, limit the weightings of component securities in equity funds. Because the equity indexes of many countries are dominated by a few large companies, ETF sponsors must adjust their relative weights to make them acceptable to regulators. This also means, however, that the ETF no longer accurately represents that country's index.

Bedeviled by Tracking Error

Tracking error between an ETF and the tracked index usually arises due to the following factors: fund fees and expenses, slight premiums or discounts, rebalancing due to index changes, the fund's dividend reinvestment policy, and nonconcurrent trading (for example, the Hong Kong market is closed while the MSCI Hong Kong iShare is trading in the United States).

Tracking error can also be the result of the difference between the pricing and trading times. In the United States, the NAVs for ETFs are calculated at the market's 4:00 P.M. (EST) close, but the funds are allowed to trade until 4:15 P.M. As a result, the displayed premium/discount figures can reflect the comparison of an NAV calculated at 4:00 with a market price of a trade executed slightly later during the day. In addition, some companies announce their earnings after 4:00, which can affect the market's 4:15 closing price. Microsoft, for example, announces its earnings at 4:05. Given the company's weight in the S&P 500 and Russell indexes, price movements will have an impact on the futures and ETF markets.

ETFs in the Future

The ETF industry is not only rapidly changing and transforming the nature of passive investing, it also may alter the nature of active management as well. Faced with the problem of the limited supply of indexes to track and ways to slice them, ETF sponsors are in the process of designing new products, such as debt-related ETFs, REIT ETFs, fixed-income ETFs, commodity ETFs, and ETFs that are cross-listed on international exchanges. Sponsors also plan to move away from plain vanilla funds by creating new products that use enhanced, leveraged, or even actively managed strategies. These funds must first overcome the formidable obstacle of the SEC, which has expressed skepticism about the desirability and ramifications of actively managed ETFs. Another barrier to establishing actively managed funds is the regulation that requires daily disclosure of the fund's holdings, which will no doubt discourage many fund managers who are loath to publicize their best picks.

Conclusion — Is Versatility Worth the Premium?

ETFs are more adaptable than traditional index funds because they *can* be more than a portfolio's passive core. Because ETFs carry a premium for their versatility and strategic capabilities, investors should clearly define the unique needs of their portfolios before deciding whether to buy an ETF or an index fund. If the primary purpose is to track a specific benchmark over the long haul, they should purchase the relevant index fund. However, if they want to implement some of the strategies considered in this report, then ETFs will probably be the appropriate vehicle. ETFs may, as their promoters claim, revolutionize the nature of passive investing, but they are not more economical than traditional index funds. There is a trade-off in the capabilities and price between the two vehicles, and each investor must weigh the relative merits of each.

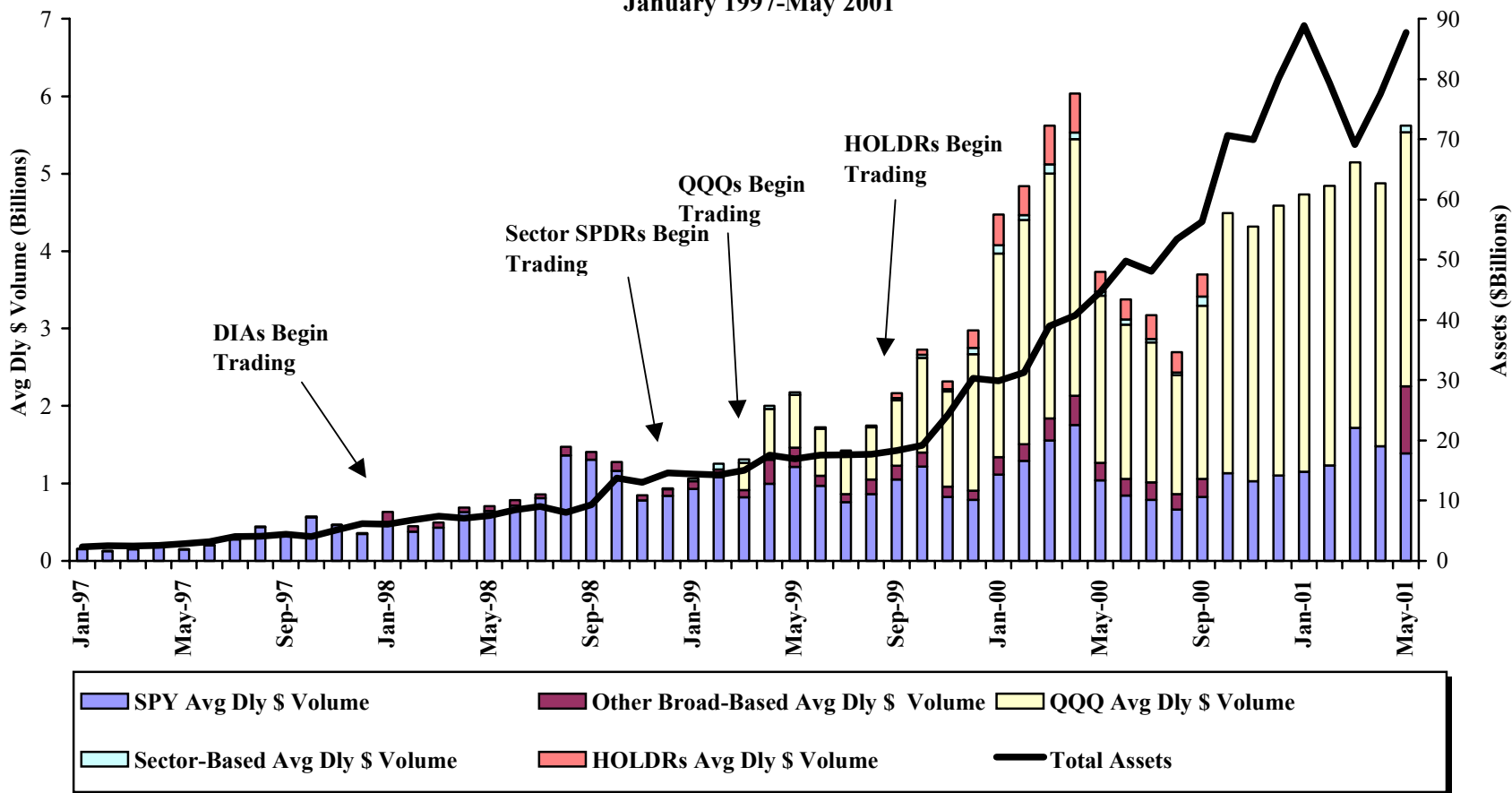
EXHIBITS

Exhibit 1

PRODUCT DESCRIPTION AND TRADING GROWTH

ETF Volume and Assets

January 1997-May 2001

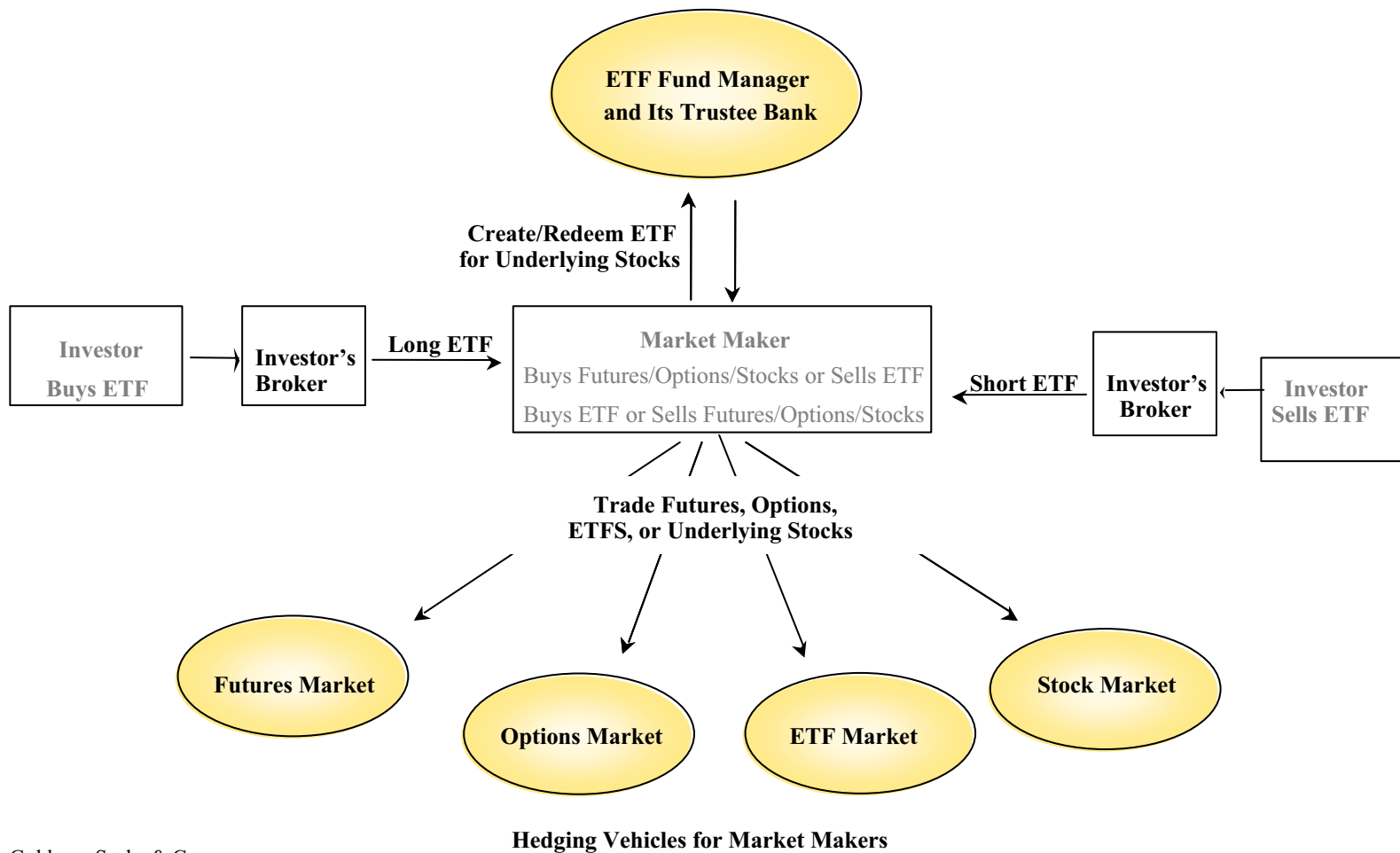


Source: Goldman Sachs & Co.

Exhibit 2

TRADING AND TRACKING

Liquidity Sources Reduce Costs, Increase Capital Commitment



Source: Goldman Sachs & Co.

Exhibit 3**SELECTED EXCHANGE-TRADED FUNDS****As of May 31, 2001**

| <u>Product Name</u> | <u>Number of Stocks¹</u> | <u>Weight Method²</u> | <u>Assets (\$ mil)</u> | <u>Average Daily Volume (\$ mil)</u> | <u>Expense Ratio (%)</u> | <u>Launch Date</u> |
|--|-------------------------------------|----------------------------------|------------------------|--------------------------------------|--------------------------|--------------------|
| <u>Country- or Region-Based ETFs³</u> | | | | | | |
| Nasdaq 100 | 100 | MC | 23,354 | 3,279.7 | 0.18 | Mar-99 |
| S&P 500 SPDR | 500 | C | 28,721 | 1,386.9 | 0.12 | Jan-93 |
| DJIA Diamonds | 30 | P | 3,048 | 355.6 | 0.10 | Jan-98 |
| S&P 500 iShares | 500 | C | 2,711 | 43.5 | 0.09 | May-00 |
| Hong Kong Tracker Fund | 33 | C | 3,576 | 19.2 | 0.10 | Nov-99 |
| MSCI Japan | 280 | MC | 621 | 7.1 | 0.84 | Mar-96 |
| iFTSE100 iShares | 100 | C | 186 | 2.3 | 0.35 | Apr-00 |
| MSCI EMU | 295 | MC | 50 | 1.3 | 0.84 | Jul-00 |
| MSCI UK | 74 | MC | 123 | 0.8 | 0.84 | Mar-96 |
| STOXX 50 Europe | 50 | FC | 17 | 0.2 | 1.00 | Apr-01 |
| MSCI Malaysia | 117 | MC | 71 | 0.2 | 0.99 | Mar-96 |
| <u>Size- and Style-Based ETFs</u> | | | | | | |
| Russell 2000 iShares | 2,000 | FC | 892 | 30.1 | 0.20 | May-00 |
| S&P 500/Barra Value iShares | 391 | C | 416 | 6.0 | 0.18 | May-00 |
| S&P 500/Barra Growth iShares | 109 | C | 210 | 3.3 | 0.18 | May-00 |
| Russell 3000 iShares | 3,000 | FC | 541 | 3.3 | 0.20 | May-00 |
| DJ US Total Market iShares | 2,024 | MC | 67 | 1.3 | 0.20 | Jun-00 |
| <u>Sector-Based ETFs</u> | | | | | | |
| Technology SPDR | 94 | C | 1,179 | 25.4 | 0.28 | Dec-98 |
| Energy SPDR | 31 | C | 284 | 10.7 | 0.28 | Dec-98 |
| DJ US Technology iShares | 319 | C | 106 | 3.6 | 0.60 | May-00 |
| High Tech 35 streetTRACKS | 35 | EW | 58 | 2.2 | 0.50 | Sep-00 |
| DJ US Energy iShares | 88 | C | 59 | 1.9 | 0.60 | Jun-00 |
| iFTSE TMT iShares | 34 | C | 18 | 0.0 | 0.50 | Oct-00 |
| <u>HOLDERS</u> | | | | | | |
| Biotech HOLDERS | 20 | MC | 1,107 | 155.0 | 0.08 | Nov-99 |
| Internet HOLDERS | 19 | MC | 182 | 14.0 | 0.08 | Sep-99 |
| Utilities HOLDERS | 20 | MC | 70 | 8.3 | 0.08 | Jun-00 |
| Regional Bank HOLDERS | 20 | MC | 80 | 7.0 | 0.08 | Jun-00 |

Sources: Goldman Sachs Equity Derivatives Research, www.amex.com, www.vanguard.com, and www.ishares.com.

¹ Number of stocks as of 12/29/2000.² Weighting Method: C=Cap; MC=Modified Cap; P=Price; FC=Float Cap; EW=Equal Weighted.³ Number of shares as of 11/30/2000.

Exhibit 4**S&P 500 SPDR AND VANGUARD FUNDS CAPITAL GAINS DISTRIBUTIONS
AS A PERCENT OF NAV**

| | <u>Inception Date</u> | <u>1996</u> | <u>1997</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
|---|-----------------------|-------------|-------------|-------------|-------------|-------------|
| S&P 500 SPDR | Jan-93 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vanguard 500 Index | Aug-76 | 0.36 | 0.66 | 0.37 | 0.74 | 0.00 |
| Vanguard Tax-Managed Capital Appreciation Fund | Sep-94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**TOP TEN iSHARE MSCI REGION FUNDS CAPITAL GAINS DISTRIBUTIONS
AS A PERCENT OF NAV**

| | <u>1996</u> | <u>1997</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
|------------------|-------------|-------------|-------------|-------------|-------------|
| MSCI Sweden | 0.82 | 4.20 | 4.73 | 2.83 | 25.51 |
| MSCI Canada | 0.00 | 1.04 | 5.86 | 4.01 | 25.92 |
| MSCI Italy | 1.02 | 0.00 | 3.01 | 10.39 | 8.10 |
| MSCI Belgium | 0.40 | 0.77 | 10.82 | 7.41 | 0.00 |
| MSCI Netherlands | 0.52 | 3.32 | 6.26 | 7.08 | 0.47 |
| MSCI Spain | 0.92 | 4.65 | 2.31 | 5.28 | 3.31 |
| MSCI Switzerland | 0.00 | 4.13 | 7.78 | 2.01 | 0.71 |
| MSCI Germany | 0.07 | 0.43 | 0.05 | 1.84 | 11.34 |
| MSCI U.K. | 0.00 | 1.03 | 0.60 | 3.06 | 5.61 |
| MSCI Mexico | 0.00 | 2.91 | 3.58 | 0.08 | 2.51 |

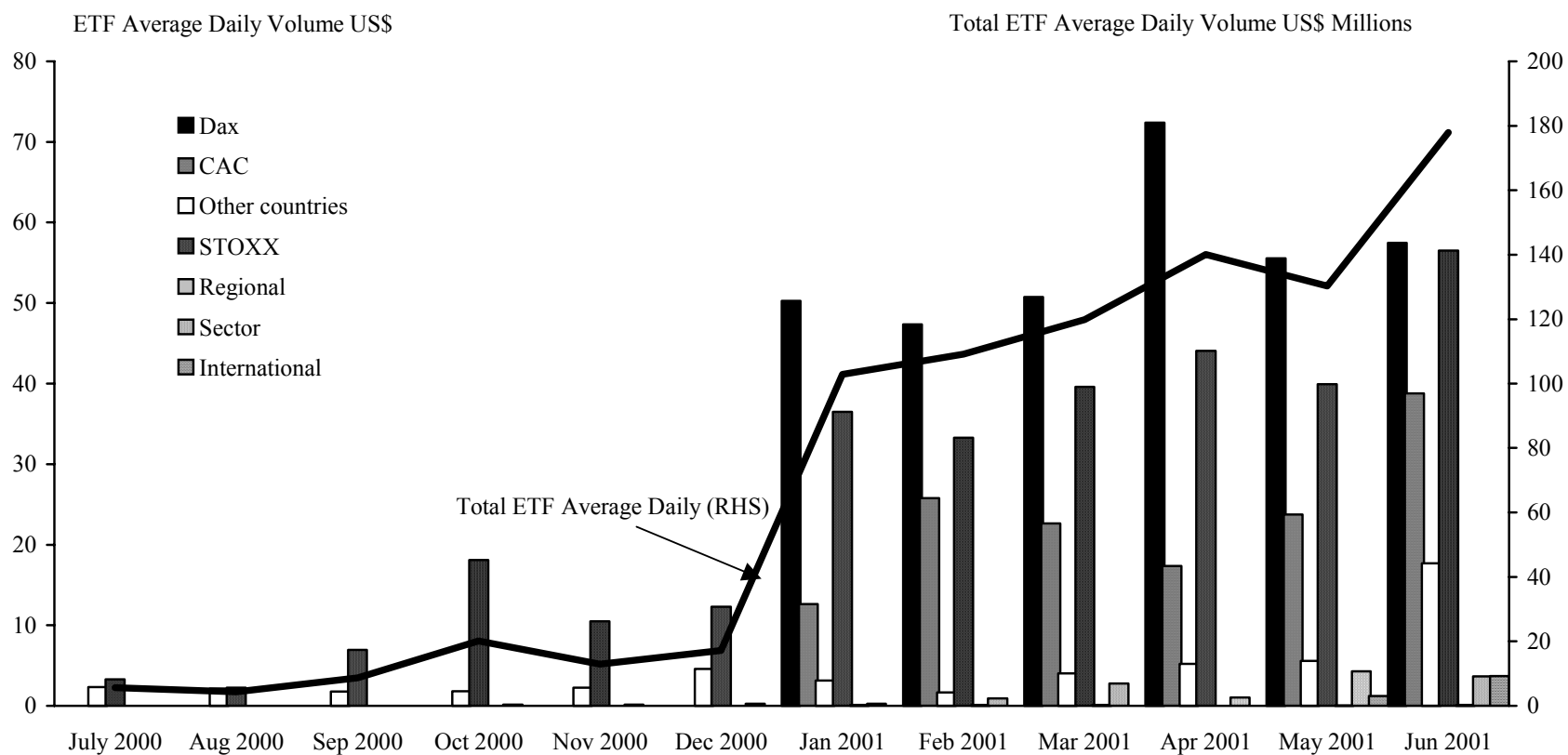
Source: Chicago Board of Exchange.

Exhibit 5

EUROPEAN ETFS AVERAGE DAILY VOLUME

US\$ Millions

Through June 20, 2001



Source: Goldman Sachs & Co.