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Innovating into Active ETFs: Factor Funds Capital Management LLC

Many investment factors have had positive returns associated with them over long periods of time, including value, momentum and small-size.

— Bill DeRoche – Chairman and CEO of FFCM

The market opportunity is to create tradable instruments that can capture the essence of these factors in a cost-efficient, transparent and liquid manner. The best delivery mechanism for that is the ETF.

— Kishore Karunakaran – President and COO of FFCM

On a breezy Wednesday afternoon in October 2010, Kishore Karunakaran, President and COO of FFCM, LLC (FFCM), looked out the window of his downtown office and contemplated the volume of sailboat traffic crisscrossing the historic Boston Harbor. In many ways, this scene reminded him of the vast and constantly evolving global financial markets.

This week Karunakaran was finalizing how best to market a new family of exchange-traded funds (ETFs) called QuantShares. QuantShares provided investors with direct exposure to a variety of popular equity factors bundled in inexpensive, tax-efficient and easily traded ETFs. QuantShares were revolutionary because previously investors could only gain or hedge pure exposure to investment factors by trading in and out of large baskets of stocks or by entering into complex swap agreements with an investment bank.

Karunakaran strongly believed in the QuantShares product but had a few concerns. First, as a startup that did not have unlimited capital, how should FFCM educate and distribute to the large and highly-dispersed universe of potential institutional and retail investors? Second, how could FFCM take advantage of its first mover status and defend itself against potential competitors who might attempt to replicate the QuantShares platform? Finally, a major European bank recently approached FFCM regarding a potential distribution agreement. Should FFCM consider wholesaling some of its products to this bank, which would brand the ETFs and market them through its own global distribution network, or propose some alternative?

Professors Kenneth A. Froot and Lauren Cohen and Research Associate Scott Waggoner prepared this case. Certain details have been disguised. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

FFCM Background

In spring 2010, FFCM opened its downtown Boston office with a vision to provide investors efficient and inexpensive exposure to popular investment factors thorough a novel family of ETFs. These factors could be purely quantitative, such as stock price momentum, or qualitative, such as Wall Street research analyst opinions. Phillip Lee, one of FFCM's senior traders, linked his previous investment experiences with Goldman Sachs and Platinum Grove Asset Management to FFCM's mission, "While trading large quant books and looking at available products to execute strategies, we often wondered why no one else had done this before. It was a very natural thing given how investors think about factor-based approaches."

FFCM, an acronym for Factor Funds Capital Management, was led by a team of five seasoned investors, including Bill DeRoche, Chuck Martin and Karunakaran, all who previously held senior Portfolio Manager roles at State Street Global Advisors. Additionally, Richard Block and Phillip Lee were senior traders who previously worked at major Wall Street investment banks and large Asset Managers. (See **Exhibit 1** for team biographies.) According to Karunakaran, "We tried to put together a complementary team with deep expertise in portfolio construction, research and trading. We also put some of the best-of-breed technology platforms in place." Combined, the FFCM management team had over 80 years of investing experience managing over $100 billion in assets, helping them to understand the intricate challenges faced by portfolio managers (PMs), how to identify and construct marketable factors and how to scale up an ETF platform.

FFCM's launch was financed by founding partners and angel investors, including two founding partners at .406 Ventures (Liam Donohue and Maria Cirino). To help cover early marketing and operating costs, FFCM filled a two part convertible note offering in December 2009 and April 2010 and was completing a Series A preferred stock offering that fall. FFCM also recruited a variety of partner firms, including several bulge bracket banks and a leading index provider.

FFCM realized a major milestone when the U.S. Securities and Exchange Commission (SEC) granted exemptive relief to QuantShares for its Fund of Funds product suite in June 2010. This effectively paved the way for QuantShares to bring the first long-short single factor ETFs to market. However, the SEC still needed to complete approvals of some of FFCM's additional requests. Karunakaran hoped the SEC would complete these "approvals," which were required of most ETFs, within a few months.

ETF Background[a]

An ETF could be defined as "an investment product that allows an investor to buy and sell shares in a single security that represents a fractional ownership of a portfolio of securities. Legally, ETFs are open-ended investment companies or unit investment trusts that are registered under the Investment Company Act of 1940."[1] As highlighted below, ETFs were similar to mutual funds yet traded through broker-dealers continuously on securities exchanges, such as the NYSE Arca, much like the stocks of publicly-listed companies. ETFs became popular largely because they provided investors with diversification and liquidity in a low cost, tax efficient vehicle. ETFs also helped bring small and retail investors benefits traditionally available only to large institutional investors.[2]

[a] Some of the core information for this section was based on: Lawrence Carrel, *ETFs for the Long Run* (Hoboken, NJ: John Wiley & Sons, Inc., 2008).

Brief History

In January 1993, the American Stock Exchange and State Street Global Advisors (SSgA) launched the first popular U.S. ETF, the Standard & Poor's Depository Receipts (SPDRs). Commonly known as Spiders, this ETF was designed to track the performance of the S&P 500 index. The S&P 500 index included equities of 500 leading companies in leading industries; while the index focused on the market performance of large-capitalization stocks, it captured 75% of the value of U.S. equities.[3]

After a relatively slow start, the U.S. ETF industry evolved at a rapid pace. Between 1999 and 2009, ETF industry assets under management (AUM) grew from $34 billion to $777 billion and the number of ETFs increased from 30 to 797, respectively. The mutual fund industry still dwarfed the ETF industry, managing $11.1 trillion in assets in 8,624 funds at the end of 2009.[4] (See **Exhibits 2** and **3**.)

While early ETFs invested principally in broad-based domestic equity indices, sponsors began launching specialized ETFs and similar vehicles covering global equities, sector-specific equities, bonds and commodities. In 2009 just 39% of ETF assets (and 28% of funds) were invested with a broad-based domestic equities mandate.[5] Most ETFs were passively managed and by the end of 2009, there were only 22 active ETFs, holding a combined total of $1 billion in assets.[6]

Competitive Environment

Three ETF providers managed approximately 70% of the $1 trillion in global ETF assets. BlackRock was the largest global asset manager with $3.2 trillion in assets under management[7] and its iShares ETF business was the industry's uncontested leader, managing $493 billion (46% of the global ETF market) as of August 2010. iShares also represented 13 of the 20 largest ETFs in the world. BlackRock became a major player in the ETF business in June 2009, after announcing it would acquire a majority stake in Barclay's Global Investors (BGI) for $13.5 billion; this transaction included BGI's iShares business.[8] (See **Exhibit 4** for a summary of the largest global ETFs.)

Although State Street Corporation focused on providing diverse services to institutional investors, it also operated SSgA, a $1.8 trillion asset manager.[9] SSgA managed $140 billion in ETFs through its SPDR funds. The Vanguard Group, Inc. was a leading investment manager with $1.4 trillion in AUM.[10] Known for low-cost and index mutual funds, Vanguard leveraged its index fund infrastructure to create low-cost classes of ETFs. Vanguard ETFs held $113 billion and three of the firm's ETFs ranked in the global top-twenty.

Despite the apparent concentration in the ETF industry, a large number of global financial institutions, asset managers and start-ups were aggressively competing for market share based on the industry's rapid growth, its future potential and its limited international market penetration to date. (See **Exhibits 5** and **6** for a summary of leading asset managers and ETF providers.)

Creation and Redemption Process

To facilitate the distribution of an ETF's fund shares to the investing public, the ETF's sponsor or distributor chose market makers to act as the ETF's Authorized Participants (APs). The APs played a critical role in an ETF's initial public offering (IPO) by creating fund shares in **creation units**, typically institutional blocks of 50,000 fund shares. In a nutshell, an AP purchased a basket of securities that mirrored the ETFs "holdings," exchanged these securities with the ETF's distributor and received ETF fund shares, which it subsequently sold to public investors.

Anytime after the IPO, if an ETF traded at a significant premium to the market value of its underlying investments (NAV), the AP could issue additional fund shares in secondary offerings with new creation units. Alternatively, if investor demand for the ETF waned, the AP could choose to redeem discounted fund shares with the ETF's custodian in exchange for a basket of the ETF's underlying securities. By helping to balance supply and demand imbalances through this "arbitrage" process, the AP helped to improve both the liquidity and pricing of ETF shares.

Benefits of ETFs

Over the long-term, a large percentage of mutual funds did not beat their benchmark indices, even before factoring in annual management fees. Following the 2008 financial crisis, investors and academics alike increased their scrutiny of returns, expenses and liquidity of mutual funds and so-called alternative investments in the $2 trillion hedge fund industry. Consequently, an increasing number of investors used ETFs to build diversified, transparent and liquid portfolios which closely tracked popular indices at very low cost. According to Karunakaran, "The beauty of ETFs is that you can gain or reduce exposure quickly and in hard to reach spaces."

Many ETFs offered investors **inexpensive** access to a **diversified** portfolio of securities through index investing. Passive ETFs required a small infrastructure and limited recordkeeping. Many passive ETFs did not need researchers or traders or a true portfolio management function or risk control to oversee operations. As ETFs rarely traded their underlying shares, they incurred limited trading costs. Annual expenses for equity and fixed income ETFs averaged just 34bps and 25bps, respectively.[b] Passive ETFs tended to have lower expenses than funds that invested in commodities or employed active strategies, leverage or shorting. For comparison, the annual expenses of passive equity and fixed income mutual funds averaged 93bps and 40bps, respectively. Active mutual fund expenses averaged 146bps and 105bps, respectively.[11] Alternative asset classes typically charged investors "two and twenty," a 2% annual fee on assets under management and 20% of realized capital gains.

Since ETFs **traded like stocks**, investors purchased and sold shares in ETFs (fund shares) on secondary securities markets through broker-dealers throughout the day. Investors could also sell ETFs short, buy ETFs on margin and buy or sell options on certain ETFs through their broker-dealer. Of course, all transactions with broker-dealers had costs. Investors paid broker commissions and lost some economics through the bid-ask spread. Popular ETFs traded at significant volumes which permitted rapid trading and relatively tight bid-ask spreads.

ETFs were significantly more **transparent** than many other investment vehicles. The SEC required ETFs to disclose all portfolio holdings on a daily basis. In comparison, mutual funds generally disclosed their holdings on a quarterly basis, with a lag of up to 60 days after the balance sheet date. Hedge funds were generally more opaque.

Daily reporting and continuous trading provided investors with **tactical precision**. This was especially helpful for institutional investors as daily detailed holdings lists helped investors optimize global diversification and risk management. For example, style, returns and diversification might vary between a fund that held a basket of the exact securities of an index and a fund that invested only in a sample of securities in the same index. These apparently small differences became increasingly important as market volatility increased.

[b] 100 basis points (bps) represented one percent.

From a **tax perspective**, the creation and redemption process helped to make ETFs more efficient than mutual funds, particularly with respect to "inside" capital gains. At the end of the fiscal year, active and index mutual funds often surprised long-term "buy-and-hold" investors with significant taxable capital gains. These capital gains were driven by a portfolio manager's sale of the mutual fund's underlying investment securities, both to purchase different securities (active portfolio rebalancing) and to cash out investors who wished to redeem their fund shares for cash. The gains often were realized at higher short-term (rather than long-term) capital gains rates and accelerated their realization ahead of an eventual "outside" sale of shares by the investor.

Passive ETFs largely avoided "inside" capital gains because they required little or no portfolio rebalancing to track an index whose basket of underlying securities remained relatively static. Additionally, ETFs did not have to sell securities to cash out exiting investors. ETF investors simply sold their fund shares to other investors in secondary market transactions through broker-dealers. Even when APs redeemed creation units for a basket of the fund's underlying securities, these in-kind transactions were non-taxable. Regardless, whenever investors sold securities such as ETFs, mutual funds or individual stocks, they were responsible for any taxes on "outside" capital gains, or the difference between their own sales proceeds and acquisition costs.

Recent Trends

Over time, sponsors developed a variety of ETFs and alternatives. For example, some banks offered exchange-traded notes (**ETNs**) as tax efficient vehicles that provided investors with exposure to hard-to-hold assets and limited tracking error. The ETNs did not actually hold underlying assets of an index but represented an unsecured debt obligation of the issuing bank. Unfortunately, ETNs faced credit risk of the debt issuer, an increasing investor concern following the 2008-2009 effective failures of leading financial firms including Bear Stearns, Lehman Brothers, Merrill Lynch, Wachovia, Citigroup and American International Group (AIG). Commodity and currency exchange-traded vehicles (**ETVs**) were launched in 2004. ETVs periodically rolled-over underlying futures and options positions, leading to potential tracking errors and reducing tax efficiency.[12]

The objective of **leveraged ETFs** was to provide returns that were a multiple of a particular benchmarked index. For example, "ProShares Ultra Gold seeks daily investment results, before fees and expenses, that correspond to twice (200%) the daily performance of gold bullion as measured by the U.S. Dollar p.m. fixing price for delivery in London."[13] **Inverse ETFs** aimed to earn a negative multiple of a given benchmark. For example, in November 2008, Direxion launched a levered inverse fund, the "Financial Bear 3X ETF seeks daily investment results, before fees and expenses, of 300% of the inverse (or opposite) of the price performance of the Russell 1000 Financial Services Index."[14]

In 2010, the SEC and the Financial Industry Regulatory Authority (FINRA) issued an Alert to investors that emphasized the complexity of leveraged and inverse ETFs. A key issue was that these ETFs reset daily, causing returns for some long-term buy-and-hold investors to diverge significantly from expectations, especially in volatile markets. The alert stated that, "Between December 1, 2008, and April 30, 2009, a particular index gained 2 percent. However, a leveraged ETF seeking to deliver twice that index's daily return fell by 6 percent—and an inverse ETF seeking to deliver twice the inverse of the index's daily return fell by 25 percent."[15]

Innovative financial products also exposed investors to some tax risk. In December 2007, the IRS ruled against favorable tax treatment of iPath currency ETNs.[16]

Factor Investing

A **factor** could be defined as a, "common or underlying element with which several variables are correlated."[17] Common factors related to a company's valuation, size or risk and were attractive to investors because they offered persistently positive returns over long periods of time. Consequentially, investors used factor investing to efficiently generate or hedge exposure to specific variables by combining the market-neutral investing techniques discussed below with the factor models highlighted in **Exhibit 7**.

Market-Neutral Investing

"**Market-neutral investing refers to** a group of investment strategies that seek to neutralize certain market risks by taking offsetting long and short positions in instruments with actual or theoretical relationships. These approaches seek to limit exposure to systemic changes in price caused by shifts in macroeconomic variables or market sentiment."[18] A typical market-neutral PM held several hundred stocks long and sold an equal dollar amount of stocks short. In this "dollar neutral" strategy, the PM aimed to eliminate market exposure and produce positive returns in all market conditions.

For example, if the overall market increased, the market-neutral portfolio's long stocks were designed to rise in value on average by more than its short stocks fell. Conversely, if the market decreased, the portfolio's short stocks rose in value on average by more than its long stocks fell. Of course, these relationships did not always hold true. However, over time market-neutral portfolios generally aimed to provide returns similar to those of long-only portfolios but with less volatility.

Combining Market-Neutral Investing and Factor Models

As an extension to the basic market-neutral methodology, some PMs constructed portfolios that aimed to neutralize most market risks but to gain exposure to specified investment factors.[19] Thus, a portfolio's returns could be derived principally from the PM's area of investing expertise, independent of market movements. For example, a PM who favored small stocks over large might hedge out any overall market exposure by selling short a sufficient quantity of large stocks to offset any market exposure from long positions in small stocks. Furthermore, if that portfolio tended to benefit when growth stocks rallied against value stocks, then the PM might also purchase a sufficient quantity of value stocks and sell short growth stocks (i.e., go "long" an appropriate amount of the HML factor[c]). This would make the portfolio's return insensitive to fluctuations in both the overall market and the HML factor. According to Karunakaran, "These long-short, market-neutral strategies are agnostic to overall market moves. They allow investors to do well while markets are down and while markets are up. Investors should be able to capture the spread consistently if the factor themes hold."

PMs used three principal models as the basis for factor investing. **Fundamental factor models** were based on some of the metrics utilized by traditional stock analysts such as the price-to-equity ratio. **Macroeconomic factor models** were based on metrics such as interest rates and inflation rates. **Statistical factor models** applied statistical analysis to historic economic data to identify significant factors.[20] In practice, most PMs identified several factors that explained stock returns and used that

[c] The HML factor (high minus low premium) represented, "the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks" as summarized in **Exhibit 7**.

information to construct fundamental multifactor investing models. Common factors used in Barra's models are summarized in **Exhibit 8**.

While methodologies varied, investors typically followed some basic steps in the factor investing process. For example, a quantitative PM first performed an **initial screen** of the equities markets, reducing the initial universe from approximately 9,000 U.S. stocks[21] to between 500 and 2,000 stocks by eliminating stocks that she deemed illiquid, difficult to trade or challenging to short. Second, the PM analyzed historic stock returns to **identify statistically significant factors** common across this reduced universe of equities, such as Fama and French's market risk premium, SMB and HML. Third, using this historic data, the PM developed a multi-factor model to estimate future stock returns. Fourth, the PM calculated each of the factors for each of the individual stocks and used the multifactor model to rank each stock based on expected returns across the universe of relevant investable securities. Based on these rankings, the PM typically bought long "high ranked" inexpensive stocks and sold short "low ranked" expensive stocks. Since most PMs also utilized portfolio optimization processes, which helped with diversification and neutralizing unintentional exposure to other factors, they did not always follow the buy-sell signals of the factor models.[22]

After a period of time, perhaps one week or one month, the PM calculated factor returns as the spread between the long positions and the short positions. This was also known as the spread return of factors. Periodically, the PM also reran the factor model and rebalanced the portfolio. For example, if the long positions in the factor rose relative to the shorts, some overall long market exposure would accumulate. Thus, either some of the long positions would need to be sold, or the short positions would need to be enhanced, or both. At that point the list of stocks that were favored (disfavored) by the factor also might have changed, and this would involve liquidating positions in some stocks and opening up new short or long positions in other stocks. To determine the frequency of rebalancing, the PM weighed the benefits of tracking the factor more precisely against the costs from additional trading.[23]

In reality, managers could add value throughout the factor investing process. For example, PMs differed in their initial universe screens, subsequent stock screens, selection of factor types, number of factors, regression models, portfolio optimization, frequency of rebalancing, level of human intervention, frequency of model calibration and use of risk controls.[24]

These factor-based, market-neutral strategies offered relatively low correlations to traditional investments since they "derive **returns from relationships between securities** rather than from the directional bias associated with traditional investment in stocks or bonds,"[25] Thus, adding market-neutral strategies to a portfolio could help improve diversification and increase the portfolio's return to risk profile as measured by the **Sharpe ratio**.

Despite its benefits, factor investing did have some downsides. For example, historic factor behavior might not reflect future behavior. PMs faced significant operational risks given the complexity of the factor models, importance of effective risk management and large volume of trades. Factor models also could struggle with atypical events, such as the economic crisis of 2008-2009 or a surprise change in regulations related to the Dodd-Frank Wall Street Reform and Consumer Protection Act signed in summer 2010. Additionally, most investors lacked the infrastructure to build a factor investing strategy.

Furthermore, designing a factor-based platform required significant technical expertise. Credit Suisse noted, "Because the goal for the replicator is to have the correct exposures to the appropriate factors at different points in time, an investor evaluating such models should ensure that the model has the ability to adapt to different market environments. . . By applying a "less-is-more" approach, a

well-designed replicator will include the least number of parameters necessary. . . Complicated technique, while providing a good in-sample fit, tends to perform poorly out-of-sample (in the real world), a common sign of overfitting."[26]

Factor Portfolios

As mentioned above, many PMs used the Fama and French factors to assess the factor exposure of their portfolios. Along with these three factors (Mkt-Rf, SMB, and HML), another common factor was Momentum, which was the hedged portfolio going long stocks with high recent returns and short stocks with low recent returns (termed "UMD," up minus down stocks).[27] **Exhibit 9** provides data on the annual factor returns from 1927-2009, while **Exhibit 10** shows an excerpt of the monthly factor return data.[d] Karanukaran wanted to be sure of his grasp on the dynamics and relationships between each of these factors as he considered what FFCM could bring to the table in this space.

QuantShares

The Opportunity

The benefits of factor investing were well documented. However, investors historically faced limited choices when it came to managing their exposure to popular investment factors; they could trade large baskets of underlying securities, trade a reduced number of standard ETFs or use total return swaps (TRSs).

Only a handful of the largest global investors had sufficient scale and infrastructure to efficiently increase and decrease their exposures to investment factors by trading in and out of **large baskets of underlying securities**. Thus, some investors **used active and passive ETFs**, or active and index mutual funds, as a proxy to adjust their exposure to investment factors. While this solution appeared to be easier to administer, it provided access to only a limited number of factors and risked significant tracking error.

Investment banks attempted to simplify this process by marketing customized **TRSs**. TRSs could be viewed as contracts in which a bank promised to provide a client long or short exposure to specified factors for a period of time. Thus, rather than buying or selling a basket of securities to increase or reduce exposure to a particular factor, the investor could change his exposure via swap agreements. DeRoche observed, "The TRS market essentially disappeared overnight after the 2008 failure of Lehman Brothers, as investors became increasingly aware of counterparty risk." While the TRS market partially recovered by 2010, many investors were unable or unwilling to participate in swaps due to their own investment mandate restrictions or the swap market's complexity, illiquidity, cost, credit exposure, large minimum notional values and ISDA agreements. DeRoche continued, "Based on our conversations with a wide variety of investors, we found people were still interested in factor exposure but not via swaps."

The QuantShares Solution

QuantShares aimed to fill this need by providing investors with exposure to a variety of popular factors while offering liquidity, transparency and low costs. In essence, QuantShares combined the benefits of TRSs and ETFs, charging investors approximately 75bps in annual expenses. Since

[d] The full monthly data series are provided in the Spreadsheet Supplement to the case.

QuantShares did not reset daily, FFCM did not anticipate the anomalies encountered by investors in leveraged and inverse ETFs. Karunakaran summarized, "With QuantShares, we want to give investors everything they have been afraid of, including full transparency, full liquidity and low fees."

FFCM envisioned that **investors might use QuantShares to** alter their current portfolios or as a platform to create a diversified investment strategy via hedging, cash equitization, factor timing or funds of funds:

- **Hedging -** QuantShares provided investors a method to hedge a bias (such as deep value) quickly and inexpensively, while allowing them to maintain their core portfolio of securities.
- **Cash equitization –** Most portfolio managers tended to hold cash in their portfolios to accommodate customer redemption requests. In order to mitigate cash drag on portfolio returns, PMs typically invested in index futures or index ETFs. While these index products provided core index exposure, they risked giving up some performance and introducing style drift because they were not invested precisely in the style of the PM. QuantShares could replace index futures and index ETFs to help the PM to more accurately track his investment style.
- **Factor timing –** Over time, certain factors, such as value and sentiment, tended to outperform the market on their own. But there were periods when a factor became underinvested (undervalued) or overinvested (overvalued). QuantShares allowed managers to easily buy long an underinvested factor or sell short an overinvested factor.
- **Fund of funds –** Since certain factors tended to provide positive return by themselves, some quantitative PMs built diversified portfolios by investing in several factors. Typically PMs gained exposure to a factor by identifying and acquiring an appropriate basket of securities; to maintain factor exposure over time, the PM periodically rebalanced the basket, buying and selling selected securities. QuantShares ETFs helped any investor quickly and inexpensively gain or reduce exposure to a variety of factors, replicating some of the techniques used by quantitative PMs.

Lee added, "I think we will find quite a number of ways investors will use QuantShares that we have not even contemplated."

Launching QuantShares

In order for QuantShares to succeed, Karunakaran believed that FFCM needed to target the right clients, optimize the firm's relationships with third-party distributors and preempt potential competitive threats. Karunakaran also began planning QuantShares' next-generation of ETFs (potentially covering exotic factors, foreign countries, specialized industries and fixed income securities) and its global distribution platform for Europe, Asia and beyond.

Institutional and Retail Distribution

FFCM anticipated that professionals who already utilized factors as part of their investment and risk management strategies would represent the first wave of QuantShares clients. Those users included quantitative portfolio managers, investment strategists and the risk managers where risk was at the epicenter of the multistrategy hedge fund pursuing various discretionary strategies. Consequently, the **institutional investor market** represented a key target market for FFCM. Broadly

defined, this market included traditional asset managers, hedge funds, brokers and banks. According to Lee, "Another group of institutional clients could be the end-users themselves, such as pensions and endowments, looking for systematic beta exposure. They would never try to build out DIY systems to manage large baskets of securities so naturally would look to the QuantShares solution." The **retail investor market** was another major FFCM target. This market was driven by household liquidity and included the savings and retirement funds that households invested in such products as mutual funds, annuities, fixed income securities and equities.

FFCM envisioned educating investors and marketing QuantShares both directly and through intermediaries. **Direct marketing** could include a proprietary FFCM sales force and paid advertising directed towards traditional media and the internet. Barclays Global Investors (BGI) provided a recent model of successful direct marketing of ETFs to a broad market. At the turn of the millennium, BGI developed its family of ETFs branded iShares and invested in a massive investor education and marketing campaign. BGI's parent company at that time, Barclay's Bank PLC, supported this initiative with capital and an international banking, research, sales and trading platform.[28] Karunakaran commented, "iShares and State Street did a fantastic job of paving the way for ETFs through mass education and distribution."

FFCM could also leverage a variety of **intermediaries**, or third-party distributors, to help market QuantShares. For example, several bulge bracket **investment banks** agreed to participate in the IPOs of, and act as APs for, QuantShares. Martin observed, "Strategists talk about factor investing ideas a lot but previously offered no way for the small investor to act on them."

Karunakaran also considered targeting a different set of **intermediaries that specialized in the retail** investor market. He found the retail market to be attractive given that U.S. households alone owned $45 trillion in financial assets[29] and given the recent success of mutual funds and ETFs in penetrating this market. Several asset managers operated large retail distribution networks with proprietary sales forces, internet-based investing tools and distribution agreements with other institutional and independent advisors. Karunakaran observed, "Retail distribution requires a big platform. As a start-up, it is tough to compete with the BlackRocks of the world." While BlackRock and Vanguard already operated large ETF businesses, QuantShares could help them to expand their higher-margin ETF product offerings. Alternatively, other leading asset managers with small or no ETF businesses, such as Fidelity or JP Morgan Asset Management, might be interested in working with QuantShares to launch an ETF initiative."

Karunakaran was excited about FFCM's third-party distributors but wondered if he could improve **monitoring and compensation** systems. Overall, these appeared to be straightforward issues in the financial services industry. For example, a third-party distributor of mutual funds or insurance products could quantify its performance by linking specific customer sales agreements to the products sold during a given period of time. Based on this performance, the distributor collected a commission as a percentage of first-year insurance premiums or new mutual fund assets. However, it was more difficult to link the intangible ETF research, sales and marketing efforts of a third-party distributor to the success of an ETF. Attribution was further complicated by the fact that ETFs traded relatively anonymously on large securities exchanges. Karunakaran wondered if FFCM could develop creative alternatives to incentivize all of FFCM's partners and to reward the best performers both before and after a fund's IPO.

Wholesaling Opportunities

Recently a major European bank expressed an interest in collaborating with FFCM. Based on the preliminary conversations, Karunakaran envisioned several distribution possibilities. For example,

FFCM could integrate these new ETFs into the QuantShares distribution platform, the bank could market the new ETFs exclusively through its own distribution network or both the bank and FFCM could jointly market the new ETFs. While the opportunity appeared to be compelling, Karunakaran had some additional concerns. For example, should the new ETFs be branded under the bank's name, the QuantShares brand or some combination of the two? Could FFCM leverage this relationship to help distribute the QuantShares family in Europe without alienating FFCM's current banking partners? Should FFCM propose similar ventures with other banks and asset managers? How would the partners share economics under the different scenarios?

Other Competitive Concerns

An overarching concern of Karunakaran related to potential ETF competition. First and foremost, he was worried that an established ETF firm with a large distribution network could quickly replicate QuantShares and compete head-to-head with FFCM. He also worried that others might beat QuantShares to market with innovative factor ETFs, such as those offering exposure to different exotic factors, industries, geographies and underlying assets.

To mitigate some of these competitive pressures, FFCM had a patent pending with the USPTO; this could prevent others from directly copying QuantShares. Karunakaran also believed that many leading banks and asset managers would not introduce factor-based ETFs to avoid cannibalizing higher margin products, such as mutual funds, hedge funds and TRSs. Other potential competitors would need time to staff a quantitative team capable of designing and deploying a scalable platform of factor-based ETFs. And all potential competitors likely would be delayed by SEC filings and regulatory relief requests. Furthermore, if all went according to plan, Karunakaran expected QuantShares to be the first single factor ETFs to market.

While he was skeptical of the **first mover advantage** in many industries, he did see some relevance in the ETF space. For example, SPDR was launched in 1993 as one of the first ETFs and remained the largest global ETF in 2010, with $62.2 billion in AUM. State Street launched the first U.S. gold ETF (GLD) in November 2004 and iShares promptly followed by launching IAU in January 2005; by June 30, 2010, the ETFs held $52.7 and $3.4 billion in assets, respectively.[30] Karunakaran believed that SPDR's and GLD's early launches drove AUM, giving the ETFs economies of scale in operations and distribution while providing the ETFs' investors with liquidity and tight bid-ask spreads through active secondary market trading. Of course, the success of relatively recent entrants into the ETF market, such as iShares and Vanguard, provided cases against the first mover advantage.

Preparing for Monday's Board Meeting

Karunakaran refocused on the task at hand. He needed to resolve several issues and finalize FFCM's marketing plan for his Monday morning presentation to the board of directors. For example, which potential groups of clients should FFCM initially focus on? How might the firm optimize third-party relationships to catalyze investor education and improve the distribution of QuantShares? Could FFCM capitalize on its first mover advantage and mitigate future competitive threats? Did the proposed distribution agreement with the large European bank make strategic sense? Going forward, how should the firm stage the roll-out of innovative new ETFs and expand its distribution overseas? Karunakaran looked forward to answering these questions and finalizing preparations for the U.S. launch of the QuantShares family of funds.

Exhibit 1 FFCM Management Team

Bill DeRoche, CFA, Chairman and Chief Executive Officer

Prior to joining FFCM, Bill was a Vice President at State Street Global Advisors and was the head of the U.S. Enhanced Equities team. His focus was on managing long only and 130/30 U.S. strategies, as well as providing research on SSgA's stock-ranking models and portfolio construction techniques. During Bill's time at SSgA, the Global Enhanced Equities team grew to over $100 billion in assets. Prior to joining SSgA in 2003, Bill was a quantitative analyst and portfolio manager at Putnam Investments. Bill has been working in the investment management field since 1995.

Bill holds a Bachelor's degree in Electrical Engineering from the United States Naval Academy and a Master of Business Administration degree from the Amos Tuck School of Business Administration at Dartmouth College. He also has earned the Chartered Financial Analyst designation.

Kishore Karunakaran, President and Chief Operating Officer

Prior to joining FFCM, Kishore was a Director in the Quantitative Equities Stock Selection group at Platinum Grove Asset Management, LP. He worked on all aspects of research, portfolio construction, trading, risk control and capital raising efforts for the Dynamic Omega Strategies Market Neutral Fund. Prior to joining Platinum Grove, Kishore was a Vice President in the Global Stock Selection team at AQR Capital Management, LLC. Prior to joining AQR, Kishore was a Vice President at State Street Global Advisors and a Senior Portfolio Manager in the Global Enhanced Equities Group. Before SSGA, Kishore co-founded Viscosity Capital Management.

Kishore holds a Master of Business Administration degree from the University of Chicago Booth School of Business with concentrations in Analytical Finance, Econometrics and Statistics. He has a Joint Masters in Economics and Econometrics with Honors from the University of Sydney, Australia and a BA in Economics with Honors from the University of New South Wales, Australia.

Chuck Martin, CFA, Chief Investment Officer

Prior to joining FFCM, Chuck was a Vice President at State Street Global Advisors and a Senior Portfolio Manager in the firm's Global Enhanced Equities group. He provided research and portfolio management for multiple investment strategies including large and small cap 130/30 funds. During Chuck's time at SSgA, the Global Enhanced Equities team grew from $3 billion in assets to over $100 billion. Prior to joining SSgA in 2001, Chuck was an equity analyst at SunTrust Equitable Securities where he covered technology companies. Chuck has worked in the investment industry since 1993.

Chuck earned his Bachelor of Arts degree in Economics from Colby College and his Master of Business Administration degree in Finance from Georgetown University. He also has earned the Chartered Financial Analyst designation.

Richard Block, CPA, Chief Administrative Officer and Director of Marketing

Prior to joining FFCM, Rich was a Managing Director and Head of Global Equity Trading at Putnam Investments. He developed equity derivatives strategies for the firm's portfolios and started Putnam's program trading desk. Rich developed customized algorithmic trading strategies

which were instrumental in significantly decreasing firm wide transaction costs. Rich was a member of Putnam's Advisory board and has served on the NYSE ITAC Committee and the NASDAQ's Quality of Markets Committee. He was a member of The National Organization for Investment Professionals (NOIP). Prior to joining Putnam, Rich worked as a trader on Morgan Stanley's equity derivatives desks in both NY and London.

Rich attended N.Y.U. business school and is a graduate of Albany State University. He also is a Certified Public Accountant.

Philip Lee, PhD, Chief Technology Officer and Managing Director of Trading

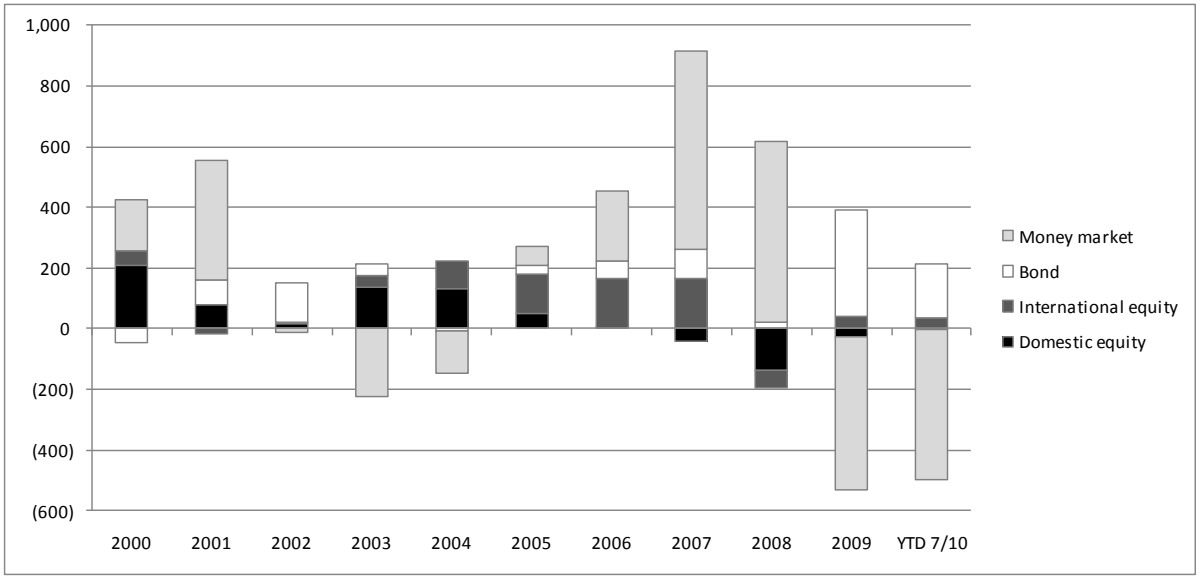
Prior to joining FFCM, Phil was an equity strategist at Platinum Grove Asset Management, LP responsible for supervising electronic trade execution, automating trade operations, and building out systems infrastructure. Prior to that role, he co-managed statistical arbitrage strategies in the Japanese Equity Market. Previously, Phil was Director of Development at Principia Capital Management, LLC, a statistical arbitrage hedge fund, where he developed the firm's quantitative research and trading platforms. Prior to joining Principia, Phil was a Vice President in Goldman Sachs' Fixed Income Derivatives research division where he modeled bond options. He has fifteen years of investment experience.

Phil holds a PhD in engineering from the University of Pennsylvania and bachelor's and master's degrees in engineering from The Cooper Union.

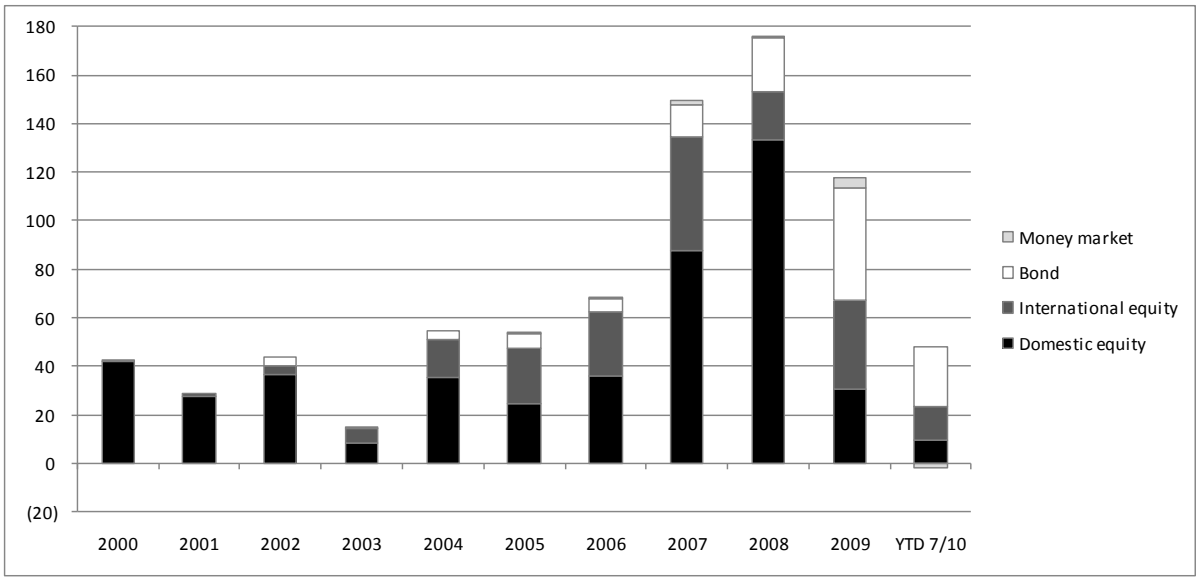
Source: Company information.

Exhibit 2 U.S. Fund Flows for Mutual Funds and ETFs (in $ Billions)

U.S. Mutual Fund Flows (excluding ETFs)



U.S. ETF Flows



Source: Adapted from BlackRock, Inc., "ETF Landscape Industry Review from BlackRock," August 2010, p. 47.

Exhibit 3 U.S. ETF Assets (in $ Millions and Number of Funds as of December 31)

Total Net Assets by Type of Fund

Year	Broad-based eq.	Sector equity	Global equity	Commodities	Hybrid	Bond	Totals
1993	$464	–	–	–	–	–	$464
1994	424	–	–	–	–	–	424
1995	1,052	–	–	–	–	–	1,052
1996	2,159	–	$252	–	–	–	2,411
1997	6,200	–	506	–	–	–	6,707
1998	14,058	$484	1,026	–	–	–	15,568
1999	29,374	2,507	1,992	–	–	–	33,873
2000	60,529	3,015	2,041	–	–	–	65,585
2001	74,752	5,224	3,016	–	–	–	82,993
2002	86,985	5,919	5,324	–	–	$3,915	102,143
2003	120,430	11,901	13,984	–	–	4,667	150,983
2004	163,730	20,315	33,644	$1,335	–	8,516	227,540
2005	186,832	28,975	65,210	4,798	–	15,004	300,820
2006	232,487	43,655	111,194	14,699	–	20,514	422,550
2007	300,930	64,117	179,702	28,906	$119	34,648	608,422
2008	266,161	58,374	113,684	35,728	132	57,209	531,288
2009	304,044	82,073	209,315	74,508	169	107,018	777,128

Number of Funds by Type of Fund

Year	Broad-based eq.	Sector equity	Global equity	Commodities	Hybrid	Bond	Totals
1993	1	-	–	–	–	–	1
1994	1	-	–	–	–	–	1
1995	2	-	–	–	–	–	2
1996	2	-	17	–	–	–	19
1997	2	-	17	–	–	–	19
1998	3	9	17	–	–	–	29
1999	4	9	17	–	–	–	30
2000	29	26	25	–	–	–	80
2001	34	34	34	–	–	–	102
2002	34	32	39	–	–	8	113
2003	39	33	41	–	–	6	119
2004	60	42	43	1	–	6	152
2005	81	65	49	3	–	6	204
2006	133	119	85	16	–	6	359
2007	197	191	159	28	5	49	629
2008	204	186	225	45	6	62	728
2009	222	181	244	47	5	98	797

Source: Adapted from Investment Company Institute and Strategic Insight Simfund via "2010 Investment Company Factbook," Investment Company Institute, pp. 136 and 137.

Exhibit 4 Top 20 Global ETFs (in $ Millions as of August 2010)

Rank	ETF	AUM
1	SPDR S&P 500	$62,200
2	iShares MSCI Emerging Markets Index Fund	39,404
3	iShares MSCI EAFE Index Fund	31,875
4	Vanguard Emerging Markets	30,208
5	iShares S&P 500 Index Fund	20,898
6	iShares Barclays TIPS Bond Fund	20,541
7	PowerShares QQQ Trust	15,846
8	iShares iBoxx $ Investment Grade Corporate Bond Fund	14,460
9	Vanguard Total Stock Market ETF	13,634
10	iShares Barclays Aggregate Bond Fund	12,519
11	iShares Russell 2000 Index Fund	12,169
12	iShares S&P/TSX 60 Index Fund	10,677
13	iShares Russell 1000 Growth Index Fund	9,910
14	iShares MSCI Brazil Index Fund	9,082
15	Vanguard Total Bond Market ETF	8,921
16	iShares Barclays 1-3 Year Treasury Bond Fund	8,718
17	S&P 400 MidCap SPDR	8,570
18	iShares Russell 1000 Value Index Fund	8,058
19	iShares FTSE/Xinhua China 25 Index Fund	7,563
20	SPDR DJ Industrial Average ETF	7,552

Source: Adapted from BlackRock, Inc., "ETF Landscape Industry Review from BlackRock," August 2010, p. 16.

Exhibit 5 Top Global Asset Managers (in $ Billions as of December 31, 2009)

Rank	Manager	AUM
1	BlackRock	$2,462
2	State Street Global	1,682
3	BNY Melon Asset Management	980
4	Fidelity Investments	977
5	Vanguard Group	830
6	PIMCO	810
7	J.P. Morgan Asset Management	754
8	Legg Mason	580
9	AXA Investment	563
10	Wellington Management	537
11	Northern Trust Global	502
12	Prudential Financial	485
13	Capital Research	428
14	TIAA-CREF	378
15	Deutsche Asset Management	377
16	ING	374
17	Goldman Sachs Group	372
18	Wells Capital	363
19	Aviva Investors	363
20	Federated Investors	350
21	UBS Global Investors	318
22	BNP Parabis Investment	304
23	AllianceBernstein	300
24	HSBC Global Asset	253
25	Aberdeen Asset Management	232
26	T. Rowe Price	222
27	Morgan Stanley	222
28	Credit Suisse Asset Management	217
29	New York Life Investments	207
30	Invesco	201
31	Principal Global Investors	198
32	MetLife	197
33	Dimensional Fund Advisors	165
34	Franklin Templeton	156
35	Loomis, Sayles	141

Source: Adapted from *Pensions & Investments*, May 31, 2010, p. 16.

Exhibit 6 Top 20 Global ETF Providers by ETF AUM (in $ Billions as of August 2010)

Rank	ETF Provider	No. ETFs	AUM
1	iShares	453	$493
2	State Street Global Advisors	110	140
3	Vanguard	47	113
4	Lyxor Asset Management	127	44
5	db x-trackers	161	38
6	PowerShares	136	33
7	ProShares	99	24
8	Van Eck Associates	27	15
9	Nomura Asset Management	32	13
10	Credit Suisse Asset Management	54	12
11	Zurich Cantonal Bank	7	9
12	Bank of New York	1	9
13	Wisdom Tree Investments	43	7
14	Claymore Securities	70	7
15	Commerzbank	79	7
16	Direxion Shares	38	6
17	Amundi ETF	87	6
18	Hang Seng Investment Management	3	6
19	Nikko Asset Management	14	5
20	ETFlab Investment	35	5
Subtotals		**1,623**	**$992**
Global totals		**2,308**	**$1,062**

Source: Adapted from BlackRock, Inc., "ETF Landscape Industry Review from BlackRock," August 2010, pp. 17-19.

Exhibit 7 Introduction to Single Factor and Multifactor Models

The Capital Asset Pricing Model (CAPM), developed independently by William Sharpe, John Lintner, Jack Treynor and Jan Mossin in the 1960s, helped to estimate expected risk premium for a given security above the risk-free rate of return. The CAPM **single factor model** estimated $E(R_i)$, the expected return of a stock i, as:[31]

$\mathbf{E(R_i) = R_f + \beta_i [E(R_M) - R_f]}$, where:

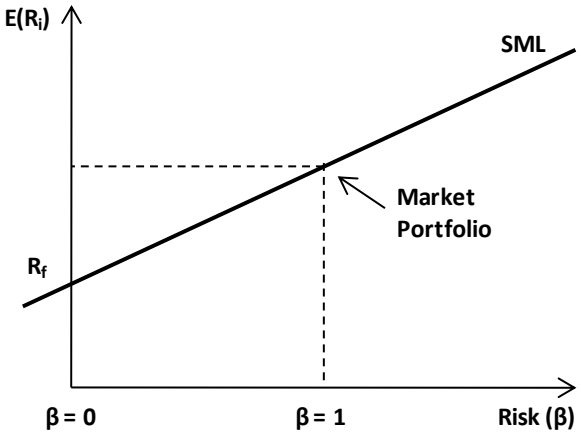
$\mathbf{R_f}$ was the risk-free rate of return, often measured as the return on a U.S. treasury bill,

$\mathbf{\beta_i}$, or beta, measured security i's sensitivity to market price movements and

$\mathbf{E(R_M)}$ was the expected return of the market portfolio.

This model decomposed the returns of a stock into two principal components: a risk-free return and a premium for taking on a certain level of market risk. Since the **market risk premium** was estimated as $[E(R_M) - R_f]$, the beta of the market portfolio was defined as 1. Similarly, the beta of a risk-free security was 0, such that $E(R_f) = R_f$. According to the model, the expected returns of other securities fell along security market line, with riskier securities offering higher expected returns as illustrated in the following diagram:

Figure A Security Market Line



Multifactor Model Extension

While the market model assumed that one factor, beta, explained market returns, academics and investors alike recognized that incorporating additional factors might help better explain market returns. For example, Eugene Fama and Kenneth French used three factors in a related **multifactor model** that estimated $E(R_i)$, the expected return of portfolio i, as:[32]

$$\mathbf{E(R_i) = R_f + \beta_i[E(R_M) - R_f] + s_iE(SMB) + h_iE(HML)}$$

This model indicated that the expected return of a portfolio above the risk-free rate was based on its sensitivity of its returns to three factors (also known as risk factor premiums):

$E[(R_M) - R_f]$ was the market risk premium,

E(SMB) (small minus big risk premium) was "the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks" and

E(HML) (high minus low risk premium) was "the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks."

β_i, **s_i**, and **h_i** were **factor sensitivities**, or risk loadings, and measured security i's sensitivity to market price movements.

Exhibit 8 Common Factors Used in Barra Models

Value	Growth	Earnings Variation	Leverage	Foreign Sensitivity
▪Book value	▪Five-year payout	▪Variability in earnings	▪Market leverage	▪Exchange rate sensitivity
▪Wall Street projected earnings	▪Variability in capital structure	▪Variability in cash flows	▪Book leverage	▪Oil price sensitivity
▪Trailing earnings	▪Growth in total assets	▪Earnings quality	▪Debt-to-assets	▪Sensitivity to other market indices
▪Projected operating income	▪Growth in total revenues	▪Std. deviation of Wall Street projected earnings	▪Senior debt rating	▪Export to domestic revenue mix
▪Historic sales	▪Historic earnings growth			
▪Projected sales	▪Wall Street projected earnings growth			
	▪Recent earnings changes			

Source: Adapted from Jennifer Bender and Frank Nielsen, "The Fundamentals of Fundamental Factor Models," MSCI Research, June 2010, p. 5, http://www.mscibarra.com/research/articles/2010/The_Fundamentals_of_Fundamental_Factor_Models_Jun2010.pdf, accessed October 25, 2010.

Exhibit 9 Common Factor Annualized Returns from 1927-2009. Mkt is the value-weighted U.S. stock market return (NYSE, NASDAQ, and AMEX); Rf is the return of the 90-day t-bill; S is the return on a portfolio of small market capitalization stocks; B is the return on a portfolio of large market capitalization stocks; H is the return on a portfolio of high (Book Value/Market Value) stocks; L is the return on a portfolio of low (Book Value/Market Value) stocks; U is the return on a portfolio of stocks that have high recent stock returns; D is the return on a portfolio of stocks that have low recent stock returns

Date	Market	Risk Free	Small	Big	High B/M	Low B/M	Winner	Loser
	Mkt	Rf	S	B	H	L	U	D
1927	33.42	3.13	30.57	33.45	33.27	38.80	38.27	15.39
1928	39.05	3.54	38.49	34.52	32.30	41.46	50.31	22.81
1929	-15.02	4.74	-36.93	-8.24	-19.85	-32.65	-21.12	-42.41
1930	-28.81	2.43	-37.82	-32.97	-44.77	-31.15	-23.22	-49.61
1931	-44.35	1.09	-47.32	-51.78	-55.06	-39.83	-35.33	-59.62
1932	-8.48	0.95	-4.72	-8.93	-0.96	-6.59	-14.08	5.47
1933	57.50	0.30	134.58	83.86	117.80	102.03	109.23	89.96
1934	4.27	0.18	20.88	-4.57	-6.50	23.48	21.12	2.92
1935	44.84	0.14	59.40	46.84	52.15	45.28	68.88	47.82
1936	32.15	0.18	53.07	37.61	60.66	31.78	45.90	39.45
1937	-34.61	0.29	-49.62	-35.70	-46.27	-41.38	-44.23	-41.39
1938	28.16	-0.04	37.80	26.15	25.71	38.51	31.53	31.11
1939	2.12	0.01	2.62	-2.67	-8.03	9.23	3.15	2.43
1940	-7.45	-0.02	-3.69	-5.07	-6.23	-4.62	-3.67	-9.41
1941	-9.63	0.04	-11.04	-6.09	-2.85	-15.01	-4.36	-13.31
1942	16.30	0.28	26.99	21.45	34.36	14.97	16.96	31.98
1943	28.06	0.36	64.00	33.35	67.92	33.56	55.63	41.89
1944	21.35	0.33	43.69	26.79	45.85	28.67	41.21	31.01
1945	38.45	0.32	66.21	39.96	61.84	48.12	64.30	50.01
1946	-5.90	0.36	-10.01	-6.00	-7.83	-10.35	-7.59	-12.64
1947	3.38	0.50	-1.84	5.67	7.00	-2.14	6.93	-7.40
1948	2.33	0.81	-5.63	3.34	1.40	-1.91	4.16	-8.19
1949	20.11	1.12	22.54	19.37	19.88	23.42	23.33	22.88
1950	30.03	1.22	38.48	36.47	53.69	27.06	43.63	28.07
1951	20.83	1.49	14.76	19.73	13.32	18.16	24.04	12.56
1952	13.29	1.65	8.87	15.42	14.07	10.97	15.03	6.01
1953	0.36	1.83	-2.86	-1.50	-6.98	0.81	5.49	-10.85
1954	50.17	0.86	55.80	57.75	70.38	45.50	59.49	48.98
1955	25.30	1.57	19.46	25.71	26.63	21.23	29.31	15.36
1956	8.48	2.47	6.95	7.62	4.68	7.09	16.84	-2.46
1957	-10.38	3.15	-15.80	-13.36	-19.31	-13.07	-11.29	-21.12
1958	44.83	1.53	67.36	53.09	70.99	58.42	52.53	62.41
1959	12.60	2.98	19.52	13.88	18.12	17.29	24.39	5.21
1960	1.15	2.67	-3.19	-0.78	-7.29	-2.07	7.40	-10.08
1961	26.94	2.12	27.77	27.35	29.87	24.32	33.19	22.78
1962	-10.32	2.73	-15.72	-6.48	-6.28	-16.61	-9.32	-21.26
1963	20.88	3.11	17.68	23.77	30.35	14.93	25.15	13.52
1964	16.31	3.53	16.19	17.97	21.03	11.31	19.17	14.39
1965	14.39	3.92	38.11	15.29	32.46	26.68	38.79	18.26
1966	-8.69	4.75	-6.25	-9.03	-8.99	-8.05	-1.84	-12.30
1967	28.57	4.21	76.23	25.61	49.65	58.80	68.18	45.75
1968	14.17	5.22	39.88	15.66	36.45	18.38	27.98	25.78

Date	Market	Risk Free	Small	Big	High B/M	Low B/M	Winner	Loser
	Mkt	Rf	S	B	H	L	U	D
1969	-10.84	6.57	-24.08	-10.09	-21.12	-10.40	-13.75	-23.57
1970	0.08	6.52	-7.11	4.37	8.63	-12.95	-8.14	-4.93
1971	16.20	4.39	20.48	14.21	13.51	24.90	21.91	18.33
1972	17.34	3.84	4.81	17.05	12.95	10.86	16.92	1.50
1973	-18.75	6.93	-35.31	-11.37	-15.45	-33.43	-16.54	-45.83
1974	-27.94	8.01	-25.80	-25.20	-21.21	-30.57	-23.14	-31.53
1975	37.36	5.80	59.13	44.09	56.51	47.88	40.09	58.69
1976	26.76	5.08	48.19	34.39	51.88	27.87	37.84	30.34
1977	-2.97	5.13	20.38	-2.86	12.73	4.95	15.35	-2.60
1978	8.55	7.19	19.90	5.74	12.80	12.33	22.01	10.02
1979	24.41	10.38	41.29	20.88	30.50	32.72	48.63	21.72
1980	33.24	11.26	35.31	29.73	19.37	43.93	57.47	20.46
1981	-3.98	14.72	6.65	-0.65	15.24	-9.33	-5.35	2.97
1982	20.42	10.53	30.98	22.19	33.77	20.60	39.86	5.19
1983	22.65	8.80	36.13	22.19	37.25	18.40	21.89	31.68
1984	3.16	9.84	-1.57	7.04	11.85	-6.78	2.25	-6.77
1985	31.41	7.72	31.21	32.13	31.94	30.78	37.36	22.62
1986	15.56	6.16	8.95	18.95	18.16	8.17	17.14	8.78
1987	1.83	5.47	-7.75	2.64	-4.94	-2.41	-0.60	3.37
1988	17.56	6.36	25.39	18.67	28.36	14.58	19.38	25.25
1989	28.44	8.38	18.14	30.15	22.70	28.35	34.79	6.85
1990	-6.08	7.84	-20.17	-5.77	-18.94	-8.34	-7.63	-25.08
1991	33.65	5.60	47.44	30.94	33.96	49.03	53.55	39.16
1992	9.06	3.50	20.99	13.21	29.17	6.12	14.43	11.27
1993	11.59	2.90	20.15	12.67	24.46	7.51	27.05	3.36
1994	-0.76	3.91	-0.85	-1.25	-1.29	-1.21	-0.31	-3.57
1995	35.67	5.60	30.26	37.19	32.69	36.15	41.00	23.34
1996	21.16	5.20	18.44	20.30	17.03	16.81	21.82	15.70
1997	30.33	5.25	28.20	31.92	34.59	23.45	32.43	20.69
1998	22.28	4.85	-3.26	20.03	3.80	18.84	22.57	-0.95
1999	25.24	4.69	23.90	12.24	2.69	42.09	45.54	10.96
2000	-11.07	5.88	-6.76	-1.07	2.50	-18.89	-2.98	-18.08
2001	-11.26	3.86	22.20	6.21	19.53	-7.72	5.20	0.73
2002	-20.85	1.63	18.95	-23.31	-22.47	-26.19	-10.13	-35.72
2003	33.14	1.02	59.82	31.74	54.88	39.75	41.33	65.68
2004	13.00	1.19	20.54	14.22	22.75	9.54	14.09	14.54
2005	7.32	2.98	5.33	8.03	7.85	4.14	14.68	-0.76
2006	16.20	4.81	17.94	16.91	22.19	10.28	11.74	19.45
2007	7.32	4.67	-3.45	3.56	-10.83	10.72	12.02	-9.43
2008	-38.30	1.64	-39.35	-39.51	-46.71	-37.64	-36.77	-50.19
2009	31.62	0.05	48.06	30.32	54.85	31.18	13.70	96.97

Source: Adapted from Kenneth French's Online Data Library:
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html, accessed February 2012.

Exhibit 10 Common Factor Monthly Returns from July 1926 (192607) - December 2009 (200912). An excerpt of the data is shown here with the full data series in Spreadsheet Supplement to the case.

Date	Market	Risk Free	Small	Big	High B/M	Low B/M	Winner	Loser
	Mkt	Rf	S	B	H	L	U	D
192607	2.84	0.22	0.76	3.25	0.99	3.90		
192608	2.81	0.25	2.44	3.69	5.37	1.12		
192609	0.59	0.23	-1.05	0.33	-0.46	-0.68		
192610	-3.11	0.32	-3.47	-3.27	-3.03	-3.74		
192611	2.75	0.31	2.82	3.16	2.70	3.09		
192612	3.05	0.28	2.44	2.51	2.48	2.59		
192701	0.14	0.25	1.22	1.33	4.41	-0.52	0.05	-0.19
192702	4.58	0.26	5.73	5.38	7.25	4.08	4.94	6.48
192703	0.62	0.30	-2.14	-0.27	-3.00	-0.08	-0.22	-3.45
192704	0.66	0.25	1.20	0.76	2.32	0.99	2.69	-1.59
192705	5.69	0.30	6.34	5.94	8.51	5.76	7.16	3.82
192706	-2.04	0.26	-1.11	-2.07	-2.37	-0.84	-2.16	-2.80
192707	7.57	0.30	4.55	7.72	5.51	6.91	7.91	3.92
192708	2.70	0.28	0.43	1.23	-0.17	3.33	1.84	0.52
192709	4.90	0.21	1.59	4.87	2.65	3.54	4.41	2.78
192710	-4.19	0.25	-2.71	-4.67	-6.06	-1.91	-4.64	-3.31
192711	6.87	0.21	9.20	6.99	8.51	8.71	7.83	8.31
192712	2.37	0.22	3.52	2.65	2.82	3.83	3.87	0.78
…	…	…	…	…	…	…	…	…
200901	-7.75	0.00	-9.22	-10.12	-12.80	-7.38	-9.85	-7.93
200902	-10.11	0.01	-12.87	-12.04	-16.92	-8.65	-10.28	-14.52
200903	8.77	0.01	11.01	10.08	13.43	8.36	6.58	18.09
200904	11.05	0.01	24.03	13.40	30.28	10.56	5.53	40.29
200905	6.73	0.00	5.98	7.50	11.15	3.88	2.22	14.70
200906	-0.28	0.00	1.61	-0.42	-1.57	3.18	2.14	-3.24
200907	8.25	0.01	10.43	8.01	10.97	7.54	7.11	12.62
200908	3.20	0.01	3.71	4.81	8.59	1.25	0.94	9.82
200909	4.52	0.00	6.77	3.91	5.79	5.21	4.04	9.01
200910	-2.84	0.00	-6.87	-2.73	-5.73	-4.03	-4.83	-7.48
200911	5.74	0.00	2.60	5.72	4.39	4.49	4.66	4.24
200912	2.92	0.00	8.06	2.36	5.20	5.36	7.03	4.09

Source: Adapted from Kenneth French's Online Data Library:
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