9-207-129
REV: JANUARY 28, 2008

LUIS M. VICEIRA
HELEN H. TUNG

The Vanguard Group, Inc. in 2006 and Target Retirement Funds

On a bright afternoon in late 2006, Vanguard's Chairman and CEO Jack Brennan approached the window of his office at Vanguard's main campus in Valley Forge, Pennsylvania. As usual, he had a busy afternoon and evening ahead of him, but he wanted first to spend time reflecting on the meeting he had just held with senior management. The meeting had focused on Vanguard's family of life-cycle funds, called Target Retirement Funds, and the role these funds played in the initiatives aimed at growing Vanguard's retail, defined-contribution, and client advisory services. Life-cycle funds were funds of funds built on the idea of "age-based investing," or the notion that investors should allocate more of their long-term savings to stocks when they were young and had longer retirement horizons and decrease this allocation as they approached retirement. By contrast, traditional life-style (or balanced) funds were funds of funds built on the idea of "risk-based investing," or the notion that the fraction of savings allocated to stocks should be a function of investors' risk tolerance and independent of their investment horizon.

Despite early requests from clients, Vanguard had added Target Retirement Funds to its offerings only in October 2003, almost 10 years after some of its competitors offered the first age-based target-date funds. Following its standard process for the adoption of new products, Vanguard had done so only after a lengthy internal discussion and reflection guided by Vanguard's pledge to its clients to "manage your investments with prudence, a long-term perspective, and the goal of providing returns that are consistently better than those of competitors."

Vanguard's Target Retirement Funds had proven popular both with investors in company-sponsored retirement plans and with individual investors. Since their launch in 2003, assets under management (AUM) had grown to $18.5 billion. External factors, including a shift in the private retirement savings system from defined-benefit pension plans to defined-contribution pension plans, the pending retirement of the "Baby Boomer" generation, and legislative actions focused on defined-contribution plans, appeared to only increase demand.[1]

The pending approval of the Pension Protection Act would make it possible for sponsors of defined-contribution plans to take a more active role in advising plan participants, and many of them

---

[1] See L.M. Viceira and Helen Tung, "The U.S. Retirement Savings Market and the Pension Protection Act of 2006," HBS Note No. 207-130 (Boston: Harvard Business School Publishing, 2007).

Professor Luis M. Viceira and Research Associate Helen H. Tung prepared this case. 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.

had already expressed interest in adopting life-cycle funds as the default allocation for their plans. Brennan had been informed at the meeting that a company with a $1 billion employee defined-contribution plan was considering remapping half of that amount into Vanguard's Target Retirement Funds. In addition, individual investors with tax-exempt retirement savings accounts and non-retirement assets had poured $5.8 billion in net cash flow to these funds since inception.

At the meeting, Brennan had also seen a presentation by Vanguard's Information Technology Division. This division had been working for some time on a proposal to streamline and improve Vanguard's online investment services. This proposal, if approved, would make Target Retirement Funds the recommended one-stop investment option for Vanguard investors looking for a simple, yet effective, approach to long-term investing.

Since its founding in 1975, Vanguard had pioneered low-cost investing among retail investors, mostly but not exclusively in the form of indexed funds, and it had defended and recommended this approach to investing without hesitation. In doing so, Vanguard firmly believed that it was acting in the best interest of its clients, who were also its shareholders. Investors shared and trusted Vanguard's investment philosophy, and by 2006 Vanguard had become one of the largest asset managers in the world and the manager of reference for low-cost investing and high-quality customer service. Vanguard's brand and client trust were very precious to Brennan and every single employee at the company. Brennan always examined every decision regarding new products carefully to make sure it would preserve and contribute to these valuable Vanguard intangible assets. Were life-cycle funds the next step in Vanguard's quest to make investing as simple, low cost, and effective as it could possibly be? Should Vanguard promote the use of life-cycle funds through the defined-contribution pension funds for which it provided investment services and through its online advisory services?

The Vanguard Group in 2006

The Vanguard Group was one of the largest asset managers in the U.S. At year-end 2006, Vanguard managed over $1 trillion in assets and employed over 12,000 people.[2] Vanguard provided individual and institutional investors with mutual funds (both internally and externally managed), exchange-traded funds (or ETFs), bonds, certificates of deposit, annuities, 529 college savings plans, brokerage services, and investment advisory services, mainly to clients in the United States and, to a lesser extent, abroad. At December 31, 2006, approximately $91 billion of AUM was held by non-U.S. clients.

Ninety percent of the assets Vanguard managed were mutual fund assets. At March 31, 2007, Vanguard offered a total of 130 U.S. mutual funds, of which 85 were focused on U.S. stock or bond markets, 10 were money market-type funds, 25 were balanced (mix of equity, bond, and money market securities) funds, and 10 were focused on international markets. The Vanguard mutual fund family was one of the three largest in the U.S., along with that of Fidelity Investments and American Funds.[3] Unlike American Funds, which sold its funds exclusively through channels such as

[2] For comparison, at year-end 2005, registered investment companies (mutual funds, closed-end funds, ETFs, and unit investment trusts) managed almost $10 trillion and served nearly half of U.S. households. See "2006 Investment Company Fact Book," Investment Company Institute, 2006.

[3] American Funds was managed by Capital Research & Management Company, a division of The Capital Group Companies. Assets in American Funds totaled $850 billion, and an additional $300 billion was managed by the Capital Guardian Trust Company and Capital International companies. (http://www.capgroup.com/about_us/timeline.html, January 8, 2007).

brokerage houses, Vanguard primarily distributed its funds directly to investors through its online client services and telephone service.

John C. Bogle founded Vanguard in May 1975 after leaving his post as chairman of Wellington Management Company. Vanguard initially took from Wellington the task of administering 11 of its mutual funds, with about $1.8 billion in assets, while Wellington retained the task of selecting the funds' investments and distribution. In 1976 Vanguard introduced one of the first retail index funds[4] in the industry, the Vanguard 500 Index Fund, which eventually became the second-largest mutual fund in the world, with AUM of $112 billion as of September 30, 2006.[5] In 1977, Vanguard became a no-load,[6] direct-distribution mutual fund company.

Clients as Shareholders: Marrying Low-Cost Investing and High-Quality Client Service

Vanguard defined itself as a "mutual mutual-fund company." Usually, a mutual fund was controlled by a management company. The management company charged fees to its funds to manage, distribute, and market the fund and made a profit for its owners. Every dollar that went to the management company came from the fund investor. Typically, outside investors owned mutual fund management companies, either privately (such as Fidelity or Capital Research & Management Company, the manager of the American Funds) or publicly (such as T. Rowe Price).

Vanguard was the exception, since the ownership of Vanguard was structured so that it was owned exclusively and jointly by the mutual funds it distributed and, as a result, indirectly by the investors in those mutual funds. Anyone investing in one of the Vanguard funds also indirectly, through the funds, became a shareholder of the management company. Accordingly, the interest of the fund investors was fully and directly aligned with the interests of the management company. Vanguard provided services to the funds on an at-cost basis, with no profit component, and all savings were passed on to fund investors in the form of lower costs. At Vanguard, maximizing profits meant maximizing returns to the client.

Vanguard was committed to a philosophy of cost minimization and high-quality service to its clients-shareholders. Success was measured in terms of cost savings and client satisfaction, which Vanguard felt could be achieved only through a corporate culture of attention to cost, teamwork, and customer dedication. Vanguard mutual funds were all no-load funds whose average expense ratio was among the lowest in the retail mutual fund business. In 2006, the average expense ratio associated with Vanguard funds was 20 basis points, compared with the mutual fund industry's average of 126 basis points.

Vanguard also kept track of the quality of its service. Phone calls were closely monitored, error rates scrutinized, and a significant number of surveys conducted to determine client satisfaction.

Vanguard did not launch a new fund unless it thought the fund would benefit its clients. In the same spirit, Vanguard did not hesitate to close a fund to new investors if it felt that by doing so it

---

Fidelity Investments was the largest mutual fund company in the U.S. with more than $2.9 trillion in custodied assets and nearly $1.4 trillion in managed assets as of December 31, 2006.

[4] An index mutual fund was a passively managed fund that attempted to closely match the performance of a particular market index, such as the S&P 500 or the Lehman Brothers Long Government/Corporate Bond Index.

[5] This included $69.5 billion Investor shares and $42.6 billion Admiral shares. "Lipper Performance Report for the 25 Largest Mutual Funds," Lipper, November 2, 2006.

[6] A load was a sales commission paid when fund shares were bought or sold.

would protect its clients from chasing past performance in a "hot" sector or if capacity constraints at its fund managers threatened to make management of the fund ineffective. For example, Vanguard closed its Health Care Fund (which had total assets of $26.9 billion at December 31, 2006) to new investors on March 23, 2005.

The Firm

Vanguard was headquartered in Malvern, Pennsylvania and had two other offices in the United States: Scottsdale, Arizona and Charlotte, North Carolina. The firm also had international operations, which served primarily institutional investors outside the United States with offices in Melbourne, Australia; Brussels, Belgium; Tokyo, Japan; and Singapore. Vanguard also had a presence in France and the Netherlands.

In the U.S., Vanguard was organized around two business divisions: retail investors and institutional investors. The retail division provided individual investors direct access to mutual funds, brokerage services, annuities, financial planning, asset management, and trust services. The retail division was segmented to include services for retirement planning and high-net-worth investors.

The institutional investor division provided investment management and related services for employer-sponsored retirement plans (record-keeping and investment-only services), foundations, and endowments. Clients included corporations, broker-dealers, investment advisors, hospitals, school districts, unions, government agencies, insurance companies, and banks.

The low-cost approach to investing led Vanguard to promote index investing early on. However, Vanguard offerings were not limited solely to index funds. It also offered low-cost actively managed mutual funds, some of which were externally managed. At December 31, 2006, approximately 37% of total fund offerings, representing 45% of total AUM, were index funds.[7]

Categorizing by type of fund, 64% were stock funds (representing 69% of AUM), 27% were bond funds (18% of AUM), and 9% were money market funds (13% of AUM). Target Retirement Funds were funds of funds that invested in underlying funds. Vanguard offered 11 Target Retirement Funds with target dates starting in 2005 and ranging in five-year increments to 2050 and a Target Retirement Income Fund. Assets associated with these funds totaled $16.5 billion at December 31, 2006.

In addition, about 30% of funds (representing 30% of total AUM) were managed in whole or in part by external managers. The size of the externally managed funds ranged from a few hundred million dollars to $45.7 billion for the Wellington fund as of December 31, 2006. Vanguard managed the relationship with external managers with an eye toward getting a fair value for investment management services by offering the prospect of a stable, long-term partnership.

For years, Vanguard had also refrained from expensive, aggressive advertising. Vanguard's marketing department was relatively small and had a budget that was far smaller than that of its competitors. The scope of Vanguard's marketing department encompassed print, Web, and oral presentations, but Vanguard's success was to a large extent attributable to word-of-mouth advertising by its clients. Complementing its marketing efforts, Vanguard also focused on having a consistent and accessible public relations department. Overall, Vanguard's ownership structure and

[7] For a list of Vanguard funds by asset class with price and performance information, see https://flagship.vanguard.com/VGApp/hnw/FundsByType.

operating goals translated into a cost structure that differed substantially from that of its competitors. (See **Exhibit 1** for a cost structure comparison of the Vanguard 500 index and PRIMECAP funds with corresponding average industry funds.)

In 2006, Vanguard received about $1.5 billion per week of new cash flows, of which 25% were investments in funds of funds, which flowed mostly into Target Retirement Funds. Eighty percent of transactions and business were done through the Web, where the marginal cost per transaction was less than $0.01, compared with $12 per phone call. This trend toward Web-based transactions was further exemplified by the fact that in 1996 Vanguard had 1,500–2,000 employees managing the phones, while only half that number did so in 2006.

Vanguard had 22 million shareholder accounts. Vanguard funds typically had two widely held types, or classes, of shares: Investor shares and Admiral shares. Vanguard had created the Admiral share class in an effort to base fees to shareholders on the extent to which they contributed to reducing the cost of fund management and in an effort to reward loyalty. Admiral shareholders were investors with balances of at least $100,000 in the fund or investors who had owned the fund for at least 10 years and had $50,000 or more invested in the fund. Costs of maintaining an account did not rise significantly with an increase in account balance. Accordingly, these large, long-standing accounts were less costly to administer, and Vanguard charged these clients commensurately lower expense ratios that were between 18% and 50% less than the expense ratios charged to Investor shareholders.

Vanguard focused on fee transparency and simplicity. Vanguard was rolling out a single annual flat $20 fee per account for balances below $10,000. This fee was not applicable if a client received all statements through the Web or maintained more than $100,000 in household assets at Vanguard.

Besides its mutual funds, Vanguard offered brokerage services and exchange traded funds (or ETFs).[8] At December 31, 2006, Vanguard had about $60 billion in assets under custody in brokerage accounts and $22 billion in ETFs. Vanguard had started offering ETFs later than competitors such as Barclays Global Investors or State Street Global Advisors, but Vanguard ETFs were growing rapidly. Vanguard's ETF assets were up 60% from the previous year.

Given Vanguard's reliance on direct distribution through phone and online services, technology and information security were key aspects of Vanguard operations. In 2006, technology expenditures accounted for approximately 33% of the operating budget. Vanguard was also actively working to develop and introduce Web 2.0, the second generation of Internet-based services.

Vanguard fostered an open corporate culture that welcomed ideas and views of its employees, and nothing was off limits in meetings of top management, except for whether to go public and to pay for distribution of their funds. Substantial new projects needed approval from the Portfolio Review Group and the board.

Retail Client Services

Vanguard's AUM was divided roughly equally between institutional investors ($500 billion at December 31, 2006) and retail investors ($540 billion at December 31, 2006). On the retail side, Vanguard classified clients into segments based on the amount of assets held at Vanguard. Those

---

[8] ETFs were closed-end index funds whose shares were traded on stock exchanges just as the shares of any other stock but, unlike stock, were redeemable from the issuer.

clients with less than $250,000 were classified as Core investors, those with $250,000 to $1 million were Voyager investors, and those with more than $1 million were Flagship investors.

In 1996, Vanguard decided to go beyond merely offering funds to its retail clients and began providing these clients with financial planning services. Initially the service was entirely paper based, at a cost of approximately $1,500 for the client. After the client filled out a questionnaire, a Vanguard expert in financial planning generated a 30-page report and mailed it back to the client within several weeks of the consultation.

In 2006, Vanguard revamped its financial planning services and launched the Vanguard Financial Plan (VFP). VFP analyzed the portfolio of investment assets[9] held by the client at Vanguard and at other firms and generated recommendations for the portfolio, including retirement advice on how much to save for retirement, how to draw down on the portfolio, and, if desired, how to build a college savings plan. VFP was Web based and produced a simplified 10–15 page report in only one week. In a few days, a Vanguard financial planner made a 45-minute follow-up phone call to the client to review and help implement the plan. Vanguard financial planners were salaried and received no commission for their recommendation. VFP was free to Voyager and Flagship customers or any client transferring $100,000 of new money to Vanguard. VFP was also available to Core clients at a cost of $1,000. Additional consultation in estate planning, insurance, and education and cash flow planning was available for a separate fee of $500 to $1,000, depending on the customer's account size.

Vanguard observed that clients used the service to validate their prior investment choices or to revamp their holdings. Clients often held either a "collection" of assets or a "portfolio" of assets. A "collection" of assets included some assets held for their associations with emotions or memories. In a "portfolio," each asset had a specific financial reason for being in the portfolio. To give clients a sense of the risk and return of different portfolios, the VFP service ran simulations to determine best- and worst-case scenarios. Voyager and Flagship clients also received a free annual "checkup." Voyager clients' account maintenance, IRA, and transfer fees were waived.

Vanguard also provided discretionary advice through its Asset Management Services (AMS) program. Clients with more than $500,000 of investable assets at Vanguard and all Flagship clients qualified for this program. The AMS program provided ongoing active portfolio management with adjustments at least twice per year, including asset allocation, portfolio construction, rebalancing and monitoring, and management of any legally mandatory withdrawal requirements from certain types of accounts.[10] Under the AMS program, clients received in-depth quarterly reviews and had unlimited access to a financial advisor who worked to meet their specific needs, including tax planning. AMS also provided clients with access to experts in taxes, trust planning, estate planning, long-term care planning, and insurance. The fee charged for AMS depended on the amount of assets held at Vanguard (**Exhibit 2a**). The "all-in" cost to the client, including the mutual fund and advice fees, was lower than the management fees alone of most other mutual funds.

[9] Real estate was excluded from the analysis.

[10] Non-Roth IRA account owners were required to take minimum withdrawals from their IRA accounts when they reached the age of 70 ½ years. This requirement also applied to those who held simplified employee pension (SEP) plans and Simple IRAs. Bill Bischoff, "Understanding the IRA Withdrawal Rules," *SmartMoney*, January 8, 2007.

Institutional Client Services

On the institutional side, Vanguard provided services through three departments: the Financial Advisor Services (FAS) program, the Institutional Asset Management (IAM) program, and the Integrated Retirement Plan Solutions (IRPS) program.

Vanguard started FAS in 2002, through which Vanguard sold its mutual funds and ETFs to brokers and financial advisors on a non-compensation basis. This distribution channel became more attractive to Vanguard in the late 1990s with the shift in the financial advisory business from commission-based advisor compensation (typically paid by the investment product provider) to fee-based compensation (paid by the advisee-client).

The IAM business unit provided investment management services for defined-contribution plans, defined-benefit plans, endowments, and foundations. These assets were considered "investment only" because Vanguard did not provide record-keeping services to the accounts (underlying account maintenance).

Under IRPS, Vanguard provided record-keeping services to employer-sponsored retirement plans with a minimum of $10 million in plan assets. The investment alternatives for plan participants typically included Vanguard and non-Vanguard funds, stable value investments, and employer stock, when applicable. The IRPS business unit also provided record-keeping services to defined-benefit plans.

Record-keeping services required building a very costly administrative and technological infrastructure, of which only a handful of financial services providers were capable. However, despite its high cost, record-keeping services played an increasingly important role in building a customer base. By becoming the plan administrator for 401(k) plans, these firms typically gained access to the assets in the plan, since plan sponsors often chose the funds from the plan administrator as investment options in their plans. Moreover, the firm was able to position itself as the default rollover choice for plan participants when they left or retired from the sponsoring company. In 2005, Vanguard set targets to retain 80%–90% of attractive clients who rolled over assets from their 401(k)s. This contrasted with targets of 40% in 2000 and 20% in 1995.

Competition among the record-keeping firms to win a sponsor's business often hinged on intangible qualities of the firm. To help plan sponsors more easily compare the bids of competing firms, Vanguard pushed for "all-in pricing" (i.e., pricing inclusive of the operating costs associated with the underlying investment funds) to administer the retirement plans. The bids were quite close, but Vanguard was able to differentiate itself by emphasizing its culture, service quality, and education message.

Vanguard also offered retirement planning services to plan participants. One of theses services was an automatic retirement service called "One Step," which Vanguard introduced in late 2003. This service addressed all four important aspects of retirement planning: whether to participate, how much to contribute, how to invest, and how to distribute assets upon retirement. One Step automatically enrolled employees in their 401(k) plans and increased plan contribution by a set percentage annually. The default fund option was a life-cycle fund based on the employee's age, though employees had the option to opt out of this default at any time.

In April 2004, Vanguard began offering ongoing investment advice and professional portfolio management to plan participants through its Vanguard Managed Account Program (VMAP). VMAP selected a portfolio of low-cost, diversified funds for a participant based on the participant's risk preferences and other factors such as retirement age, nonplan assets, and family information but did not include tax planning. The portfolio was reviewed quarterly and adjusted if circumstances changed and as the participant neared retirement age. The participant spoke to a VMAP representative by phone if needed and received quarterly statements.

VMAP was designed for participants who lacked the time, motivation, and/or expertise needed to manage their accounts. VMAP used an automatic investment management process developed by Financial Engines, Inc., although Vanguard was the lead advisor. The fee for this service was tiered, depending on the assets managed, and ranged from 10 to 40 basis points (as shown in **Exhibit 2b**).[11] As of May 1, 2006, 280 plans had signed up for VMAP. Growth had been strong amidst a three-year promotional rollout for VMAP. The program rolled out at a rate of five to six plan sponsors per month. Assets under VMAP totaled $6 billion at year-end 2006, compared with $3 billion in December 2005 and $1.2 billion in December 2004.

Vanguard Target Retirement Funds

Life-Cycle Funds

Target Retirement Funds were Vanguard's approach to the concept of funds focused on a client's anticipated year of retirement. These funds, known as target-date funds, age-based funds, or life-cycle funds, could be contrasted with static allocation funds. Static allocation funds, also known as life-style funds or balanced funds, were typically a portfolio of underlying funds representing different asset classes and investment styles that automatically rebalanced their holdings in order to maintain a constant asset target mix over time. Accordingly, static allocation funds maintained a static risk level over time and generally used words such as "aggressive," "moderate," or "conservative" in the fund name to indicate the fund's risk level. For example, Vanguard's LifeStrategy Growth Fund sought to track the investment performance of a portfolio invested 80% in stocks and 20% in bonds and rebalanced periodically to keep this percentage allocation constant over time.[12]

Target-date funds were also balanced mutual funds but, unlike static allocation funds, they changed their target mix over time according to a prespecified "glide-path" schedule. The target mix of the fund typically became more conservative by the target date. At that date or at a later date, the fund was folded into a balanced fund with a stable asset mix. Investors were advised to choose the fund whose target date was closest to the date they expected to retire and to invest all their retirement savings in that fund. (**Exhibits 3** and **4** list the target-date fund offerings, as well as asset allocation glide paths and returns, of the two largest target-date fund families as ranked by assets managed: the Vanguard Target Retirement Funds and Fidelity Freedom Funds, respectively.)

---

[11] Competitors of VMAP included mPower, acquired by Morningstar on May 30, 2003; Ibbotson Associates, also acquired by Morningstar on December 12, 2005; Guided Choice from Charles Schwab; and ProManage.

[12] Specifically, with 60% of its assets, the fund sought to track the investment performance of the Morgan Stanley Capital International (MSCI) U.S. Broad Market Index, which represented 99.5% or more of the total market capitalization of all the U.S. common stocks regularly traded on the New York and American Stock Exchanges and the Nasdaq over-the-counter market. With 40% of its assets, the fund sought to track the investment performance of the Lehman Brothers Aggregate Bond Index, which measured a wide spectrum of public, investment-grade, taxable, fixed-income securities in the United States—including government, corporate, and international dollar-denominated bonds, as well as mortgage-backed and asset-backed securities, all with maturities of more than one year.

Rationale for Life-Cycle Funds

The primary feature of target-date funds was that they reduced stock exposure over time as the target maturity date neared, in line with the advice that financial planners traditionally gave to their clients. This approach was in contrast to the advice that emerged from standard portfolio theory, which was that an investor's portfolio allocation to risky assets should be a function of risk tolerance, not age.

There were, however, theoretical arguments that supported adopting an age-based approach to investing. These arguments were summarized in the working document that prompted discussions at Vanguard that ultimately led to the creation of Vanguard's Target Retirement Funds.[13] One set of arguments noted that traditional portfolio theory was not inconsistent with age-based investing once human wealth (the value of future income from work and Social Security benefits) was factored in the portfolio allocation decision. Since most people had reasonably predictable earnings over their lives, their human wealth could be viewed as an asset with bond-like characteristics. The value of human wealth declined as they aged, and there was less earnings and benefits (the "coupons" on the bond) to collect. Thus, initially investors might want to weight their financial portfolios toward equities, since they already held a large investment with bond-like characteristics through their human wealth, and reduce this weighting as they aged.[14]

A second set of arguments for age-based investing was based on empirical evidence suggesting that stocks were mean reverting, that is, that their long-time-horizon returns were less volatile than their short-time-horizon returns. As illustrated in **Exhibit 5**, the annualized volatility of real (or inflation-adjusted) stock returns appeared to decline the longer the time horizon, from about 16% per annum at a one-year horizon to about 8% per annum at horizons of 25 years or longer.[15] Similarly, the range of returns experienced by investors since 1926 changed depending on the time horizon, with short time horizons exhibiting a much wider spread than long time horizons. (See **Exhibit 6**.) This evidence suggested that, all else being equal, buy-and-hold investors with longer time horizons (i.e., younger investors) would want to weight their portfolios toward equities since equities appeared to be less risky at long horizons. [16]

However, it was unclear that long-time-horizon investors would want to simply buy and hold stocks if their returns were mean reverting. Mean reversion meant that stock returns were at least partially predictable at long time horizons, so that a bear market would be more likely to follow an expansionary period in the stock market, and a bull market would be more likely to follow a

---

[13] Catherine D. Gordon and Kimberly A. Stockton, "Fund for Retirement: The 'Life-Cycle' Approach," Vanguard Investment Counseling and Research, 2003.

[14] See Z. Bodie, R. Merton, and W. Samuelson, "Labor Supply Flexibility and Portfolio Choice in a Life Cycle Model," *Journal of Economic Dynamics and Control* 16, (1991): 427–449; L. M. Viceira, "Optimal Portfolio Choice for Long-Horizon Investors with Nontradable Labor Income," *Journal of Finance*, 56 (2001): 433–470; Y. L. Chan and L. M. Viceira, "Asset Allocation with Endogenous Labor Income: The Case of Incomplete Markets," manuscript, Harvard Business School, 2001. See also Chapters 6 and 7 in J. Y. Campbell and L. M. Viceira, *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors* (Oxford University Press, 2002).

[15] If stocks did not exhibit mean reversion, the line shown in the plot would be horizontal. The line shows the volatility (or standard deviation) of stock returns at different holding horizons properly scaled (by dividing by the square root of the number of years in the holding horizon) so that it would be flat if returns were not mean reverting. Note that, in that case, the volatility of holding period returns would be equal to the volatility of one-year returns times the square root of the number of years in the holding period.

[16] See J. Y. Campbell and L. M. Viceira, "The Term Structure of the Risk-Return Tradeoff," *Financial Analysts Journal*, Vol. 61, No. 1 (2005); and J. Jurek and L. M. Viceira, "Optimal Value and Growth Tilts in Long-Horizon Portfolios," NBER working paper 12017, 2005.

recessionary period. Empirically, times of unusually high stock prices relative to dividends or earnings appeared to be followed by periods of low average stock returns. **Exhibit 7** gives an example of this evidence. It shows 10-year real returns on the S&P 500 when stocks are purchased at different initial price-to-earnings multiples and dividend-to-price ratios. This evidence suggested that investors might want to tactically tilt their portfolios away from stocks at times when stock prices are high relative to earnings of dividends and toward stocks at times when stock prices are low.

Mean reversion called for long-time-horizon investors to strategically hold more stocks on average, but also to tactically allocate their portfolios depending on market conditions. [17] A strategy that mechanically moved portfolio allocations away from stocks as investment horizons shrank might not capture the portfolio implications of mean reversion in stock returns.

Finally, the statistical evidence as to whether stock returns were mean reverting was disputed by some academics. In the absence of mean reversion, stocks would be equally risky at all time horizons and, while a longer time horizon meant more opportunities to grow, it also meant more opportunities for down markets to occur.[18] For these reasons, Vanguard believed that the mean-reversion argument was not nearly as compelling as the human-wealth argument for reducing stock exposure as retirement neared.

Critics of life-cycle funds complained that using only one metric, time frame, as the sole determinant of investing strategy did not adequately address differing risk tolerances among individuals who chose the same life-cycle fund. Though lifestyle funds accounted for investors with differing risk tolerances, they also required investors to periodically reevaluate their lives and adjust their risk accordingly, most likely resulting in reallocating assets to funds with a lower risk level as they aged, a process performed automatically in life-cycle funds. Ideally, a fund family might have wanted to offer funds that allowed investors to choose a fund based on both target date and risk level. But some firms, such as Vanguard, feared that the added complexity would confuse and hinder investors from choosing a fund and begin what they thought was the most critical aspect of investing, which was simply to start saving as early as possible.

Origins and Growth of Life-Cycle Funds

Life-cycle funds were first offered in 1994 by Wells Fargo as an investment option for those who wished to avoid adjusting and rebalancing their portfolio as the time for withdrawal neared. The concept caught on quickly, as Barclays Global Investors, which had acted as advisors for Wells Fargo, and then Fidelity, with its large and well-established infrastructure, distribution channels, and significant presence in the 401(k) industry, introduced their own versions of life-cycle funds in 1996.

Vanguard opted instead to introduce static allocation funds, in the belief at that time that a risk-based approach to investing was more appropriate for investors saving for retirement than an age-based approach. On September 30, 1994, Vanguard introduced a family of lifestyle funds called LifeStrategy Funds that included three risk levels (conservative growth, moderate growth, and growth) and an income fund that provided current income and some capital appreciation. Vanguard

---

[17] See, for example, Chapter 4 in J. Y. Campbell and L. M. Viceira, *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors* (Oxford University Press, 2002). See also See J. Y. Campbell and L. M. Viceira, "Consumption and Portfolio Decisions When Expected Returns are Time Varying," *Quarterly Journal of Economics*, Vol. 114, No. 2 (1999); J. Y. Campbell, Y. L. Chan, and L. M. Viceira, "A Multivariate Model of Strategic Asset Allocation," *Journal of Financial Economics*, Vol. 67, No. 1 (2003); J. Jurek and L. M. Viceira, "Optimal Value and Growth Tilts in Long-Horizon Portfolios," NBER working paper 12017, 2005.

[18] Paul A. Samuelson, "Why We Should Not Make Mean Log of Wealth Big Though Years to Act Are Long," *Journal of Banking and Finance* 3 (1979): 305–307.

did not follow suit with its own age-based fund until 2003, almost 10 years after age-based funds first hit the market.

By 2006, industrywide AUM in age-based funds had grown to $114 billion, up from about $1 billion in 1996. AUM in static allocation funds had grown to $189 billion, up from about $5 billion in 1996. **Exhibit 8** shows the growth in AUM in life-cycle funds between 1996 and 2006, and **Exhibit 9** lists the largest defined-contribution (DC) advisors by AUM as well as the DC advisors with the largest AUM in life-cycle funds in 2006. With about $49.2 billion in AUM, Fidelity was the largest asset manager of life-cycle funds. Despite having launched its funds only in 2003, at year-end 2006 Vanguard was the third-largest provider of life-cycle funds, with $16.5 billion in AUM. The majority (90%) of life-cycle fund assets were held in retirement accounts; by contrast, the percentage of lifestyle fund assets held in retirement accounts was considerably smaller (59%).

The Design of Life-Cycle Funds

There was considerable variation in the way the mutual fund industry structured life-cycle funds. Most life-cycle funds, such as those offered by Fidelity and Vanguard, invested in other mutual funds, but some invested directly in securities. Vanguard's family of Target Retirement Funds included 10 funds, with target dates set at five-year intervals from 2005 to 2050 and the Target Retirement Income Fund for those already in retirement. (**Exhibit 3** lists the funds, asset allocation glide paths, and returns.)

Each Target Retirement Fund invested in up to seven broadly diversified Vanguard funds according to an asset allocation designed for investors retiring at the target date. Target Retirement Funds with distant target dates invested more heavily in equities, which included exposure to international and emerging markets. As the target retirement year approached, the fund's asset mix was adjusted to mirror the asset allocation of the Target Retirement Income Fund. The fund was then folded into the Vanguard Target Retirement Income Fund when Vanguard's board deemed appropriate, which occurred between 5 and 10 years after the target date. Each fund adjusted its holdings on a daily basis to match the target asset mix dictated by its glide-path schedule.

Fees for each Target Retirement Fund were based exclusively on the underlying Vanguard funds, which, with only two exceptions, were all index funds.[19] Because of its low-cost philosophy, Vanguard did not charge an overlay fee for asset allocation and passed on the low expense ratios of the underlying index funds to its investors. The average weighted expense ratio for each of the Target Retirement Funds was 0.21%, which was less than one-third the industry average for similar funds.

In contrast to Vanguard's index approach to life-cycle funds, Fidelity managed its life-cycle funds actively. Fidelity offered 12 life-cycle funds, called Freedom Funds, 11 of which were managed to specific target retirement dates, set at five-year intervals starting from 2000 and ending at 2050. The 12th fund, the Freedom Fund Income Fund, was designed for retirees who sought high current income and, as a secondary objective, capital appreciation. A Freedom Fund's investment strategy became increasingly conservative over time and was more similar to that of the Income Fund as the target date drew near. Fidelity's board of directors determined when it would be appropriate to fold the fund into the Income Fund, which occurred about 10–15 years after the target date. (See **Exhibit 4** for the composition, asset allocation glide path, and fund returns of Fidelity's Freedom Funds.)

[19] Exceptions were the money market and inflation-protected securities funds.

Each Fidelity Freedom Fund invested in roughly 20 actively managed Fidelity mutual funds. The allocation in these funds was not fixed. The managers of a Freedom Fund were able to make tactical deviations from the fund's rolldown asset mix schedule if they deemed it necessary in light of market conditions, though they did not attempt to capture short-term market opportunities.[20] Up until mid-2005, Fidelity charged an overlay fee of eight basis points (or 0.08%) on top of fees for the underlying funds, which averaged 68 basis points.[21]

Unlike the age-based life-cycle funds offered by Vanguard and Fidelity, Wells Fargo's life-cycle funds sought to replicate the returns of the appropriate global Dow Jones Target Date indices, the first life-cycle indices in the investment industry. The family of funds, called Wells Fargo Advantage Dow Jones Target Date Funds, included four target-date funds set 10 years apart, starting from 2010 and ending at 2040, and a Today fund for those who were retired and planned to withdraw substantial portions of their investments. (See **Exhibit 10** for the asset allocation glide path and fund returns of Wells Fargo's life-cycle funds.)[22] The funds had an average expense ratio of 72 basis points, which was slightly lower than the industry average of 75 basis points.

Age-based funds were still in their infancy, and companies offering them adjusted their design from time to time. Vanguard had made asset allocation adjustments to its Target Retirement Funds in June 2006. These changes had increased the overall equity exposure of the funds and, within the equity component of the funds, the share of foreign equity. The new allocations were designed to reduce the probability that an investor might outlive his retirement savings (as shown in **Exhibit 11**).

The new asset allocations in Vanguard's Target Retirement Funds had equity allocations that were 10–20 percentage points higher on average than in their previous version. In the newly designed funds, young investors (before age 40) had a 90% equity exposure, transition investors (age 65) had a 50% equity exposure, and retired investors (after age 75) had a 30% equity exposure. The new allocations made Vanguard's Target Retirement Funds one of the most aggressive in the industry. By comparison, Fidelity's Freedom Funds had 83% equity for early investors, 48% equity for transition investors, and 21% for retired investors.[23]

Vanguard's new Target Retirement Funds also increased exposure to international equity markets and introduced exposure to emerging markets, a category entirely absent in the previous version of the funds. Vanguard added its Emerging Markets Stock Index Fund to each of the funds, accounting for roughly 1%–2.5% of assets. Vanguard also added the European Stock Index and Pacific Stock Index Funds to the Income Fund and the 2005 Fund. This increased the international equity exposure of these funds to roughly 6% and 10%, respectively. This was large relative to other age-based life-cycle funds in the industry. By comparison, the Fidelity Freedom Income and 2005 Funds had international exposures of 0% and 7.7%, respectively.

[20] "Supplement to the Fidelity Freedom Funds May 30, 2006 Prospectus," March 28, 2007, p. 41.

[21] Fidelity Freedom Funds Prospectus, May 30, 2006.

[22] Originally, Wells Fargo adopted a different approach to manage its life-cycle funds. The original funds, called Wells Fargo Advantage Outlook Funds, were managed by using quantitative models to strategically allocate assets among a small group of indices and invested in individual securities to achieve their allocation targets instead of buying other funds. In June 2006, Wells Fargo changed the investment methodology, the subadvisor of the funds, and the name of the funds. Barclays Global Fund Advisors was replaced by Global Index Advisors, which helped create the Dow Jones Target Date Indices.

[23] "Fidelity Freedom Funds Prospectus," May 30, 2006, pp. 38–40.

Target Retirement Fund Investors

Vanguard had found that the demographic and wealth characteristics of Target Retirement Fund investors were not substantially different from those of other fund investors, at least in the subset of investors who were DC plan participants. (**Exhibit 12** shows the average demographics and plan account balances of participants in DC plans offering life-cycle funds.) On average, the participants who chose to invest in Target Retirement Funds were slightly younger and had somewhat higher income per household, shorter job tenure, and lower DC account balances than those participants who chose not to invest in the funds. Some of these characteristics were consistent with the fact that the rate of adoption of these funds was higher among new plan participants (42%) than among existing participants (26%) (see **Exhibit 13**). The higher rate of adoption among new enrollees could have resulted from the fact that increasingly plans were adopting these funds as the default plan allocation (see **Exhibit 14**). Vanguard had also found that about half of new enrollees and about one-third of existing participants contributing to age-based life-cycle funds invested in these funds exclusively. The rest combined these funds with other investment options (see **Exhibit 15**).

Vanguard also considered Target Retirement Funds to be a useful tool to retain DC plan participants once they had to roll over their holdings or retired, since these funds offered a simple way to consolidate investments.

Vanguard Express

Vanguard relied on phone and online services to distribute its products and to interact with clients. The firm did not have retail offices and engaged only in limited marketing efforts to promote its funds among investors. These efforts involved advertisements in websites, magazines, and newspapers addressed to middle- and high-income audiences. (**Exhibit 16** shows a sample of Vanguard advertisements in 2006.)

Given its reliance on direct distribution, it was crucial for Vanguard to make the process of opening an account online as simple as possible. Vanguard had found that about three-quarters of the people who started the process of opening an account online never completed the process. Those who did not complete the process fell typically within two categories of investors. One type of investor was the "financial avoider" who felt overwhelmed by the number and variety of available investment options. The second type of investor was an educated or "engaged" investor who understood the value of low-cost investing but felt simply too busy to complete the process or to fill out a lengthy questionnaire.

To target these investors, Vanguard's Information Technology Division had designed a new online service that, if implemented, could simplify investing for as much as 80% of Vanguard's current and prospective clients. They had code-named this service Vanguard Express.

The service, to be offered within Vanguard.com, provided clients the ability to open an account and invest their assets in about 10–15 minutes. Vanguard Express was able to do so not only by simplifying client information gathering but also by suggesting to clients a one-stop portfolio allocation in real time.

Target Retirement Funds played a central role in this service because the asset allocation recommendation would simply be one of these funds, selected to match the client's goals or situation. Vanguard would then follow up with the customer via an e-mail. Thus the service was designed to reduce choice while still maintaining control over the investment decision: If the recommendation did not satisfy the client, he could always go beyond the proposed allocation and explore other Vanguard funds.

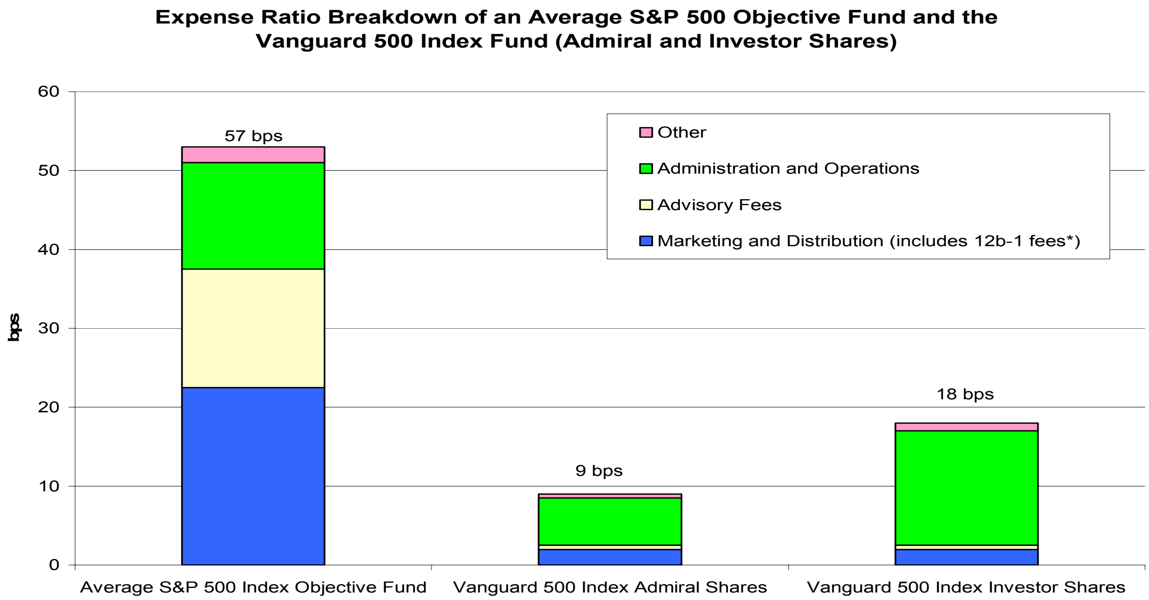
Success or Failure?

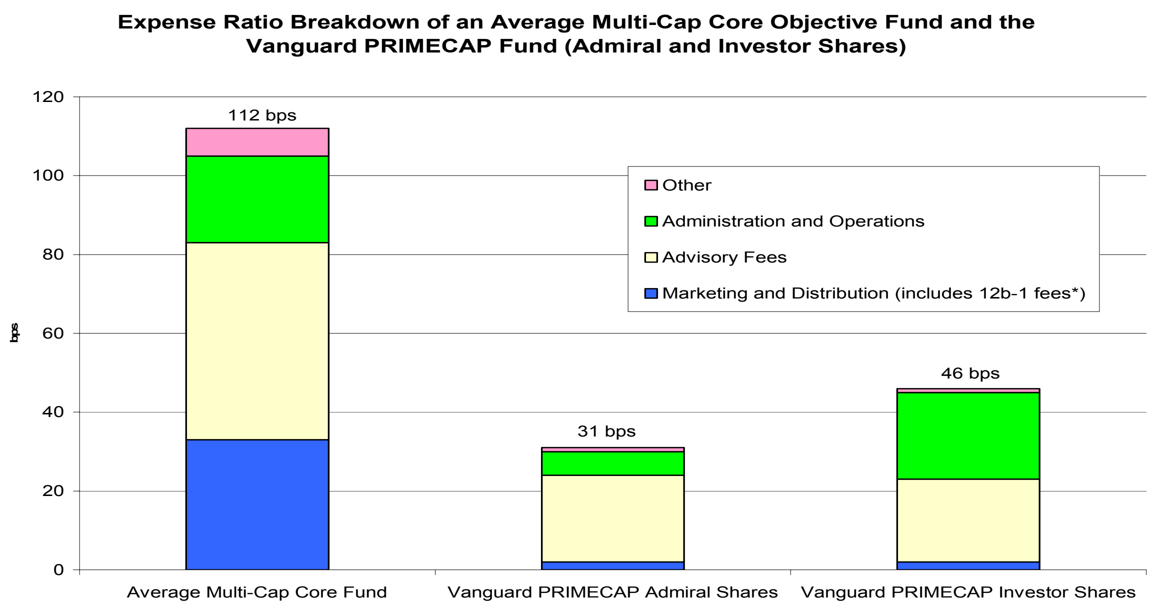
Brennan knew that the stakes were high. The retirement savings market appeared to be moving inexorably toward a system where individuals were responsible for funding their own retirement. Assets in individual retirement accounts already accounted for 85% of the $12.6 trillion in total private retirement assets. This trend presented mutual fund companies with important opportunities for growth, since they provided the investment vehicles of choice for individuals to invest their retirement savings. At Vanguard, almost $228 million of the $602 billion it managed in retail assets were IRAs, and about half of the $576 billion in institutional assets were DC plan assets.

At the same time, this trend also presented mutual fund companies with significant challenges, since both their own experience with investors and academic research showed that many individual investors lacked the expertise or the willingness to undertake the complex process of investing for retirement. There appeared to be a need to develop financial products that treated savers as consumers of financial products, not as financial engineers. Perhaps the financial services industry should adopt the mind-set of the electronics industry or the automobile industry, which did not require clients to build electronic devices or cars from scratch and instead strived to offer them products that satisfied their needs given their budget.

Would individuals and plan sponsors embrace Target Retirement Funds as the financial services industry equivalent of Toyota's dependable Camry? Or would it be a product that might not ultimately provide the services it was intended to? At stake was the reputation of Vanguard as the industry leader that always sought what it believed was best for its clients and the welfare of millions of Americans now responsible for providing for their own retirement.

Exhibit 1 Expense Ratio Breakdown Comparison of Vanguard S&P 500 and PRIMECAP Funds with their Corresponding Average Industry Funds





Source: Lipper.

* Vanguard funds did not carry 12b-1 fees. Named for the Securities and Exchange Commission rule that originated it, the 12b-1 permitted a mutual fund to collect a fee from investors to pay for some or all of the costs of promotions, sales, or any other activity associated with the distribution of the fund's shares. The fees had to be reasonable, usually 0.5% to 1.0% of the fund's assets and up to a maximum of 8.5% of the offering price per share. A fund was called "no load" if its 12b-1 fee did not exceed 0.25% of assets.

Exhibit 2a Asset Management Services Annual Fees

AUM (minimum $500K)	Annual Fee[a]
First $1 M	.75%
Next $1 M	.35%
Subsequent amounts	.20%

Source: Vanguard.

Exhibit 2b VMAP Annual Fees

AUM (minimum $500K)	Annual Fee[a]
First $100 K	.40%
Next $150 K	.30%
Next $250 K	.20%
Next $500 K	.10%
For $1 M account	Effective .185%

Source: Vanguard.

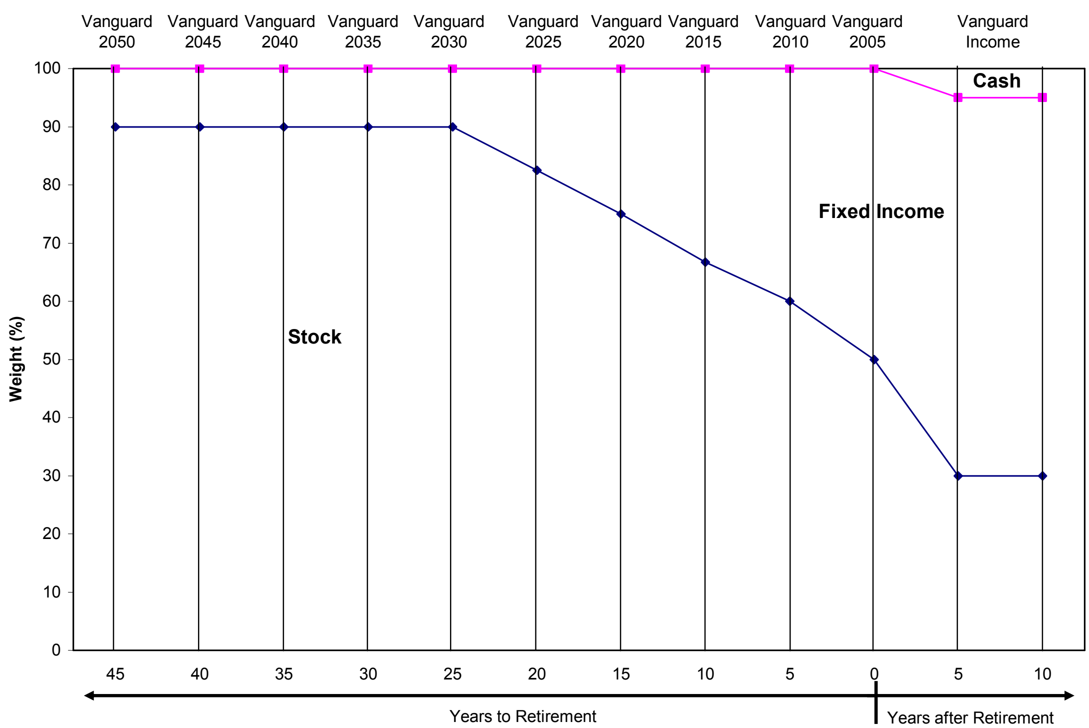
[a]Paid quarterly and was based on the market value of AUM at end of each quarter. Minimum annual fee was $4.5K. Annual fee includes brokerage commissions and other security transaction expenses incurred up to a maximum of $1.5K. For qualified plans and AUM or $10M or more, a different fee schedule applied. For trust services, an additional $2.5K per registration may be applicable. This fee covered trust administration or consulting, principal and income tax reporting, tax return preparation, and beneficiary communications.

Exhibit 3a Vanguard Target Retirement Funds Asset Allocation (June 7, 2006)

	Target Retirement Fund										
Underlying Vanguard Fund	**Income**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
Total Stock Market Index	24.0%	40.0%	48.0%	53.3%	60.0%	66.0%	72.0%	72.0%	72.0%	72.0%	72.0%
European Stock Index	3 5	5.9	7.1	7.9	8.8	9.7	10.6	10.6	10.6	10.6	10.6
Pacific Stock Index	1.7	2.8	3.3	3.7	4.2	4.6	5.0	5.0	5.0	5.0	5.0
Emerging Markets Stock Index	0.8	1.3	1.6	1.8	2.0	2.2	2.4	2.4	2.4	2.4	2.4
Total Bond Market Index	45.0	40.0	40.0	33.3	25.0	17.5	10.0	10.0	10.0	10.0	10.0
Inflation-Protected Securities	20.0	10.0	0	0	0	0	0	0	0	0	0
Prime Money Market	5.0	0	0	0	0	0	0	0	0	0	0

Source: The Vanguard Group.

Exhibit 3b Vanguard Target Retirement Funds Asset Allocation Changes over Time (June 7, 2006)



Source: Vanguard.

Exhibit 3c Vanguard Target Retirement Fund Returns[a] and Assets Managed (January 31, 2007)

Target Retirement Fund	1 Year	3 Year	5 Year	10 Year	Since Inception	Standard Deviation[b] (3 years)	Beta[b]	R-squared[b]	Total Assets ($ bill)	Inception Date
Income	6.16%	5.28%	--	--	6.02%	3.24	0.37	0.44	0.92	10/27/03
2005	7.89	6.28	--	--	7.40	3.63	0.52	0.70	1.11	10/27/03
2010	-	-	--	--	11.11	--	--	--	0.39	06/07/06
2015	10.65	8.32	--	--	9.69	4.28	0.68	0.89	4.76	10/27/03
2020	-	-	--	--	13.31	--	--	--	0.57	06/07/06
2025	12.23	9.50	--	--	11.08	4.96	0.81	0.92	4.91	10/27/03
2030	-	-	--	--	15.31	--	--	--	0.34	06/07/06
2035	13.56	11.00	--	--	12.98	6.18	1.01	0.93	3.26	10/27/03
2040	-	-	--	--	14.91	--	--	--	0.14	06/07/06
2045	13.78	11.75	--	--	13.98	6.90	1.12	0.92	1.56	10/27/03
2050	-	-	--	--	15.56	--	--	--	0.52	06/07/06
Total									18.48	

Source: Morningstar.

[a]Non-load-adjusted returns. Vanguard Target Retirement Funds did not have front-end or contingent deferred sales charges.

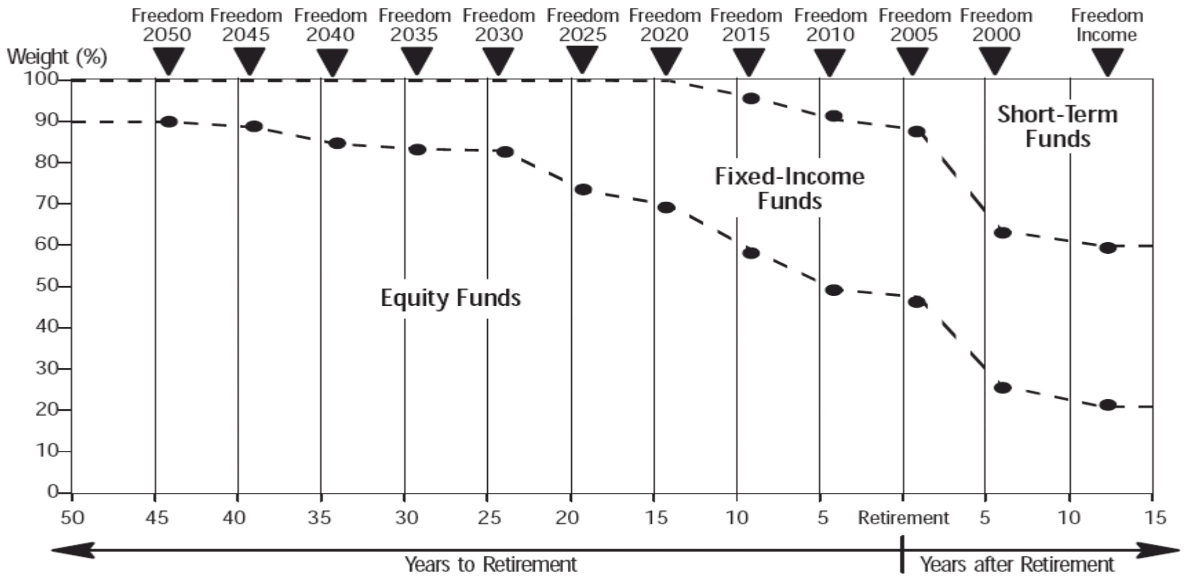
[b]As of December 31, 2006. Beta and r-squared were relative to the S&P 500 Index, using 36-month fund returns.

Exhibit 4a Fidelity Freedom Funds Asset Allocation (May 30, 2006)

	Freedom Fund											
Underlying Fidelity Fund	**Income**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
Domestic Equity Funds												
Blue Chip Growth	3.0%	3.6%	5.8%	5.8%	7.2%	8.1%	8.9%	9.7%	10.0%	10.0%	10.4%	10.5%
Disciplined Equity	3.1	4.0	5.9	6.0	7.1	8.2	8.9	9.8	10.2	10.0	10.4	10.5
Equity Income	3.1	4.0	5.9	6.0	7.1	8.3	8.9	9.8	10.1	10.0	10.4	10.5
Fidelity Fund	1.6	1.7	1.9	3.5	2.1	4.9	2.5	5.2	2.5	3.5	0.0	0.0
Growth & Income Portfolio	3.2	3.9	6.5	6.5	7.9	9.0	9.9	10.8	11.3	11.1	11.8	11.9
Fidelity Growth	2.0	2.6	3.7	3.9	4.6	5.2	5.6	6.2	6.3	6.4	6.7	6.8
Company Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mid-Cap Stock	2.1	2.7	3.8	4.1	4.6	5.5	5.7	6.3	6.6	6.4	6.7	6.8
OTC Portfolio	1.6	1.9	2.9	3.0	3.6	4.1	4.5	4.9	5.0	5.1	5.3	5.4
Small Cap Growth	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.4
Small Cap Independence	0.3	0.2	0.8	0.7	1.0	1.1	1.2	1.3	1.4	1.4	1.4	1.4
Small Cap	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Value Fund	0.9	0.7	2.3	1.9	2.8	2.9	3.4	3.5	3.9	3.8	5.3	5.4
Total	*21.1*	*25.5*	*39.9*	*41.8*	*48.5*	*57.9*	*60.1*	*68.2*	*68.1*	*68.4*	*69.2*	*70.0*
International Equity Funds												
Diversified International	0.0	0.2	1.9	1.9	2.6	3.0	3.3	3.7	3.9	4.1	4.9	5.0
Europe	0.0	0.2	2.7	2.6	3.6	4.2	4.4	5.1	5.2	5.5	6.8	7.0
Japan	0.0	0.1	0.8	0.8	1.1	1.2	1.4	1.5	1.6	1.7	1.9	2.0
Overseas	0.0	0.1	1.9	1.9	2.6	3.0	3.3	3.7	3.8	4.1	4.9	5.0
Southeast Asia	0.0	0.0	0.4	0.4	0.5	0.6	0.7	0.8	0.8	0.8	1.0	1.0
Total	*0.0*	*0.6*	*7.7*	*7.6*	*10.4*	*12.0*	*13.1*	*14.8*	*15.3*	*16.2*	*19.5*	*20.0*
Investment Grade Fixed Income Funds												
Government Income	13.5	13.0	12.1	12.8	10.2	7.9	6.4	3.4	2.9	1.8	5.0	5.0
Intermediate Bond	8.8	8.6	8.3	8.6	7.1	5.4	4.5	2.3	2.0	1.2	5.0	5.0
Investment Grade Bond	13.9	13.4	13.1	13.4	11.2	8.5	7.1	3.7	3.1	1.9	0.4	0.0
Strategic Real Return	1.0	0.9	2.0	1.2	2.0	1.0	1.3	0.4	0.6	0.3	0.3	0.0
Total	37.2	35.9	35.5	36.0	30.5	22.8	19.3	9.8	8.6	5.2	10.7	10.0
High-Yield Fixed Income Funds												
Capital & Income	0.9	0.8	2.5	2.6	3.3	3.6	3.8	3.6	4	5.1	0.5	0
High Income	0.8	0.8	2.5	2.5	3.2	3.6	3.7	3.6	4	5.1	0.1	0
Total	*1.7*	*1.6*	*5*	*5.1*	*6.5*	*7.2*	*7.5*	*7.2*	*8*	*10.2*	*0.6*	*0*
Short-Term Funds												
Retirement Money Market Portfolio	26.3	25.6	7.5	5.8	2.6	0.1	0	0	0	0	0	0
Short-Term Bond	13.7	10.8	4.4	3.7	1.5	0	0	0	0	0	0	0
Total	*40*	*36.4*	*11.9*	*9.5*	*4.1*	*0.1*	*0*	*0*	*0*	*0*	*0*	*0*

Source: Fidelity Freedom Funds Prospectus, May 30, 2006.

Exhibit 4b Fidelity Freedom Funds Asset Allocation Change over Time (May 30, 2006)



Source: Fidelity Freedom Funds Prospectus, May 30, 2006.

Exhibit 4c Fidelity Freedom Fund Returns[a] and Assets Managed (January 31, 2007)

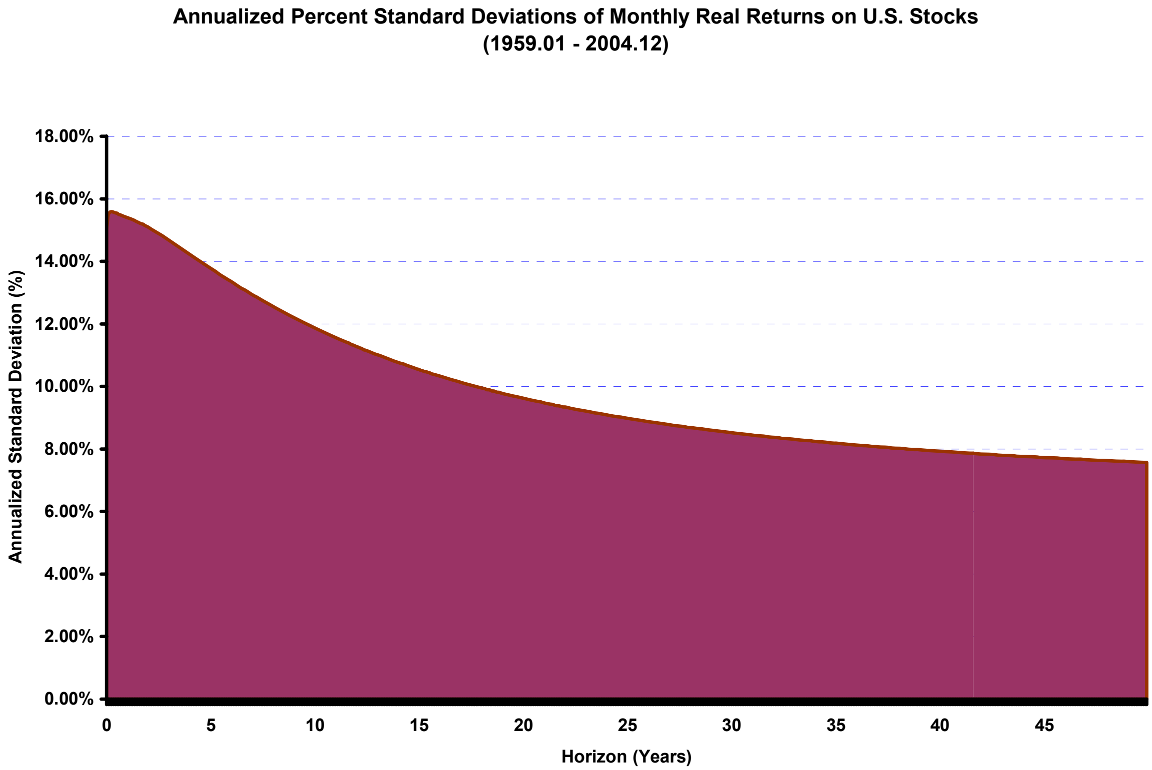
Fidelity Freedom Fund	1 Year	3 Year	5 Year	10 Year	Since Inception	Standard Deviation[b] (3 years)	Beta[b]	R-squared[b]	Total Assets ($ bill)	Inception Date
Income	5.99	4.66	4.31	5.76	5.91	2.21	0.33	0.80	2.32	10/17/96
2000	6.40	5.10	4.65	6.64	6.90	2.55	0.39	0.84	1.65	10/17/96
2005	8.12	7.22	-	-	8.08	4.23	0.69	0.93	0.80	11/06/03
2010	8.12	7.43	6.61	8.07	8.44	4.43	0.73	0.94	12.63	10/17/96
2015	8.79	8.53	-	-	9.59	5.36	0.88	0.93	4.64	11/06/03
2020	9.54	9.50	7.78	8.55	8.97	6.27	1.02	0.92	17.59	10/17/96
2025	9.66	9.86	-	-	11.16	6.69	1.09	0.92	3.84	11/06/03
2030	10.40	10.63	8.23	8.51	8.94	7.28	1.18	0.90	11.25	10/17/96
2035	10.49	10.87	-	-	12.27	7.44	1.20	0.90	2.21	11/06/03
2040	10.77	11.27	8.52	-	1.90	7.81	1.26	0.	5.54	09/06/00
2045	-	-	-	-	10.72	-	-	-	0.10	06/01/06
2050	-	-	-	-	10.82	-	-	-	0.09	06/01/06
Total									62.66	

Source: Morningstar.

[a]Non-load-adjusted returns. Fidelity Freedom Funds did not have front-end or contingent deferred sales charges.

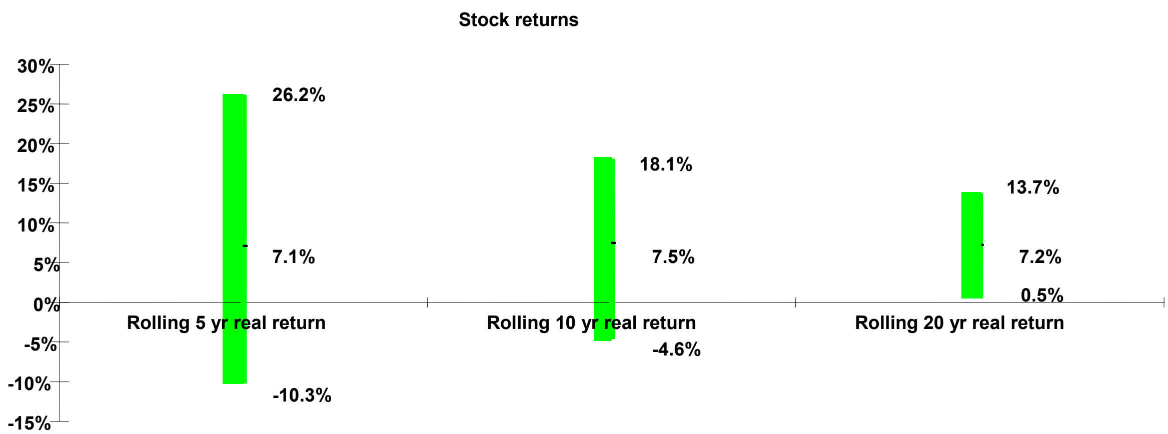
[b]As of December 31, 2006. Beta and r-squared were relative to the S&P 500 Index, using 36-month fund returns.

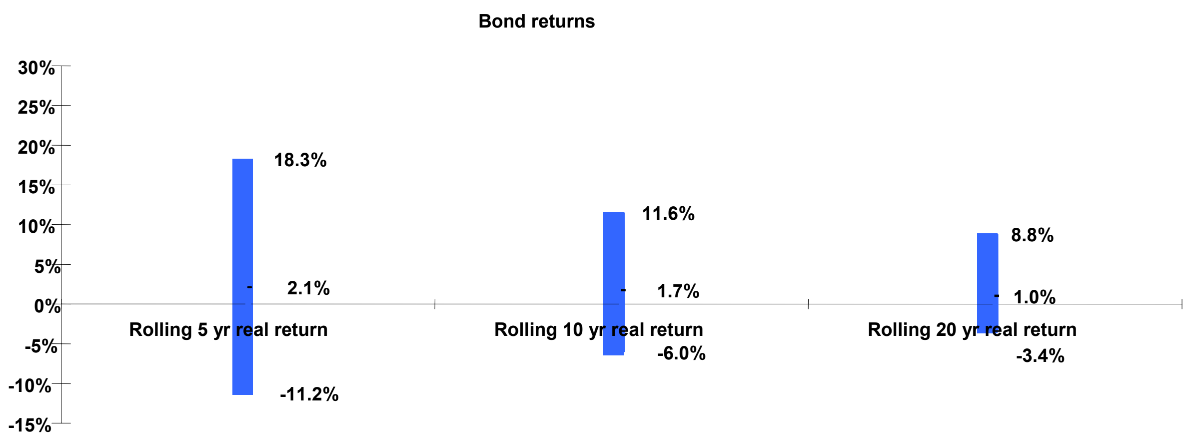
Exhibit 5 Annualized Volatility of Real (or inflation-adjusted) Stock Returns

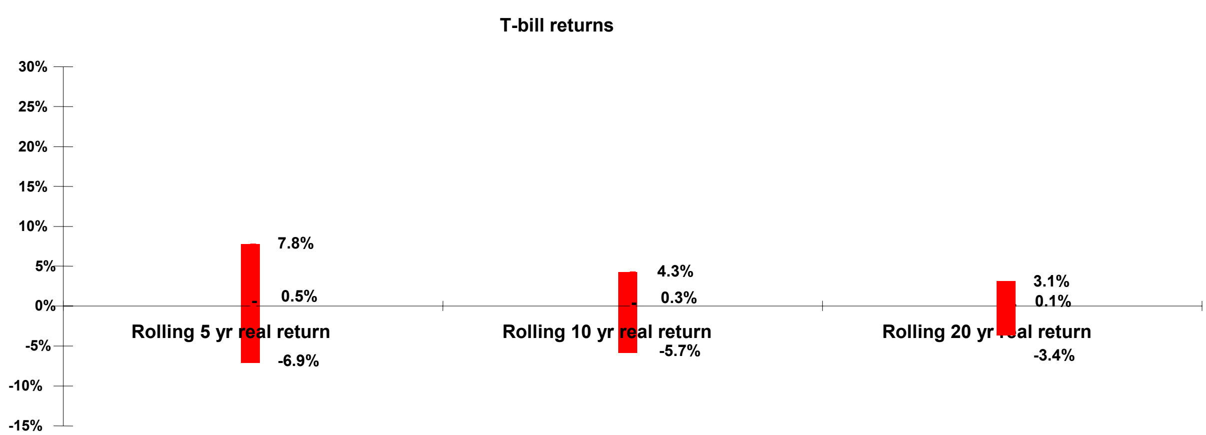


Source: Case author calculations.

Exhibit 6 Annualized Returns



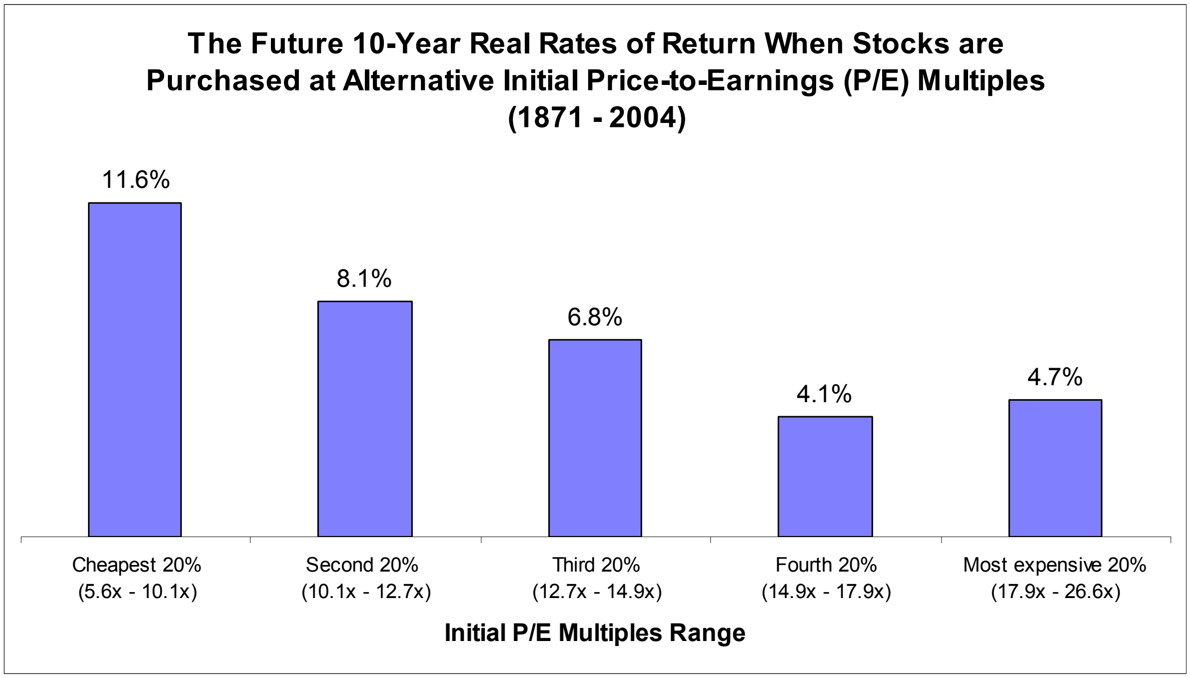


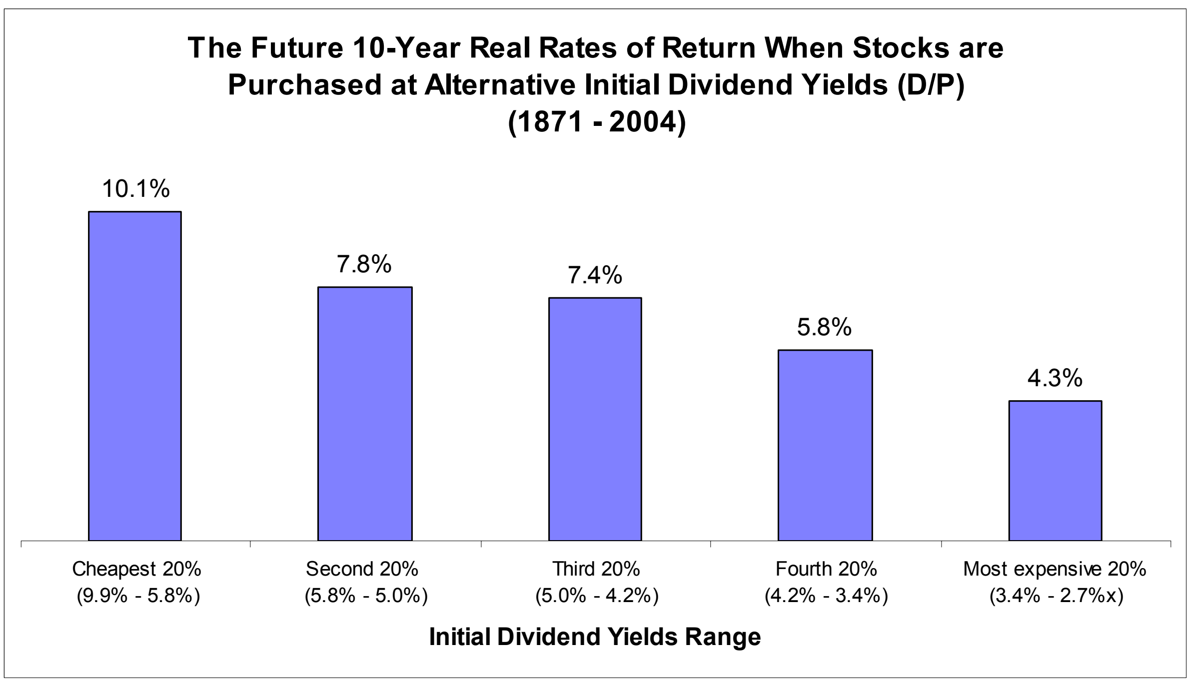


Source: Case author calculations.

Exhibit 7 Reversion of Stock Market

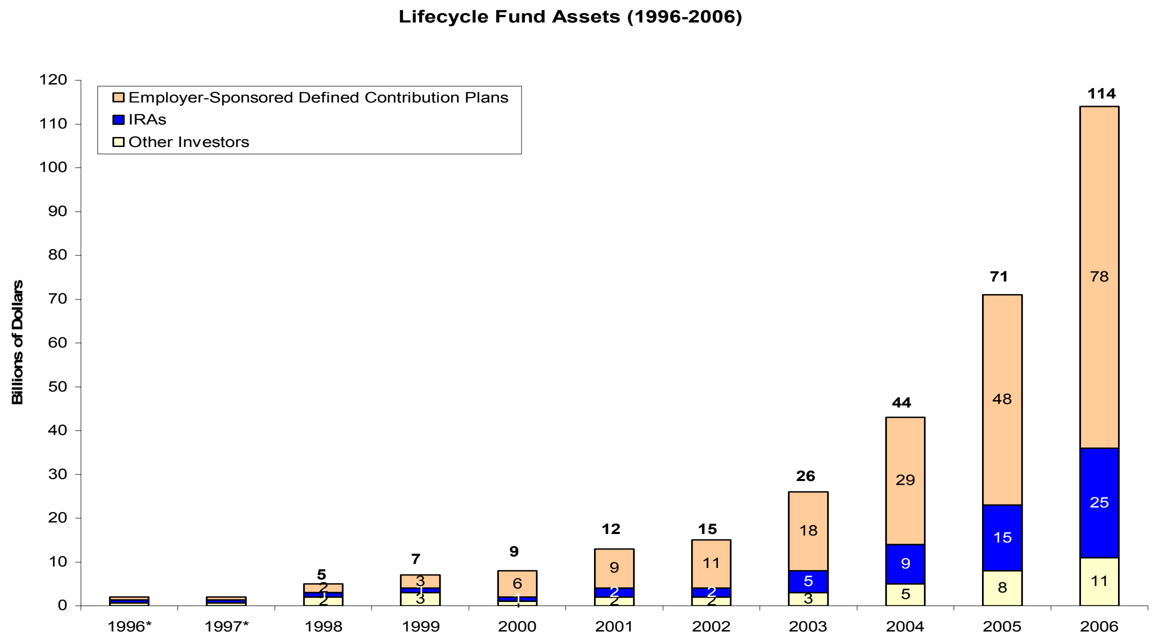
The empirical relation between smoothed price-to-earnings (P/E) multiples and dividend yields (D/P) and future 10-year real returns on the S&P 500. P/E multiples are based on 10-year moving averages of earnings.





Source: Case author based on stock market annual data from Prof. Robert Shiller.

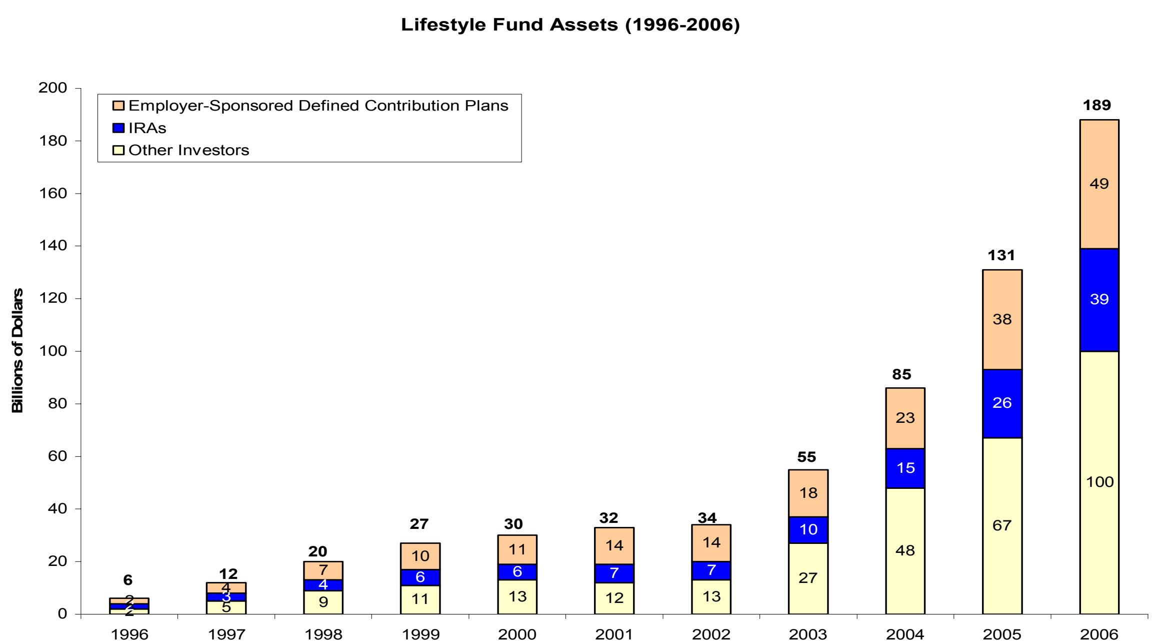
Exhibit 8a Lifecycle Fund Assets, 1996–2005 ($ billions)



Source: Investment Company Institute.

*Each component is less than $1 billion.

Exhibit 8b Lifestyle Fund Assets, 1996–2005 ($ billions)



Source: Investment Company Institute.

Exhibit 9 Top 10 DC Advisors Ranked by DC Plan Assets Managed (2006)

Name	DC AUM ($ MM)
Fidelity Investments	502,943
TIAA-CREF	370,852
Capital Research	284,878
Vanguard	281,593
State Street Global	207,015
Barclays Global Investors NA	188,006
T. Rowe Price	107,166
Prudential Financial	97,356
ING	87,368
AIG Global Investment	76,296

Source: Pensions & Investments.

Top Advisors Offering Life-Cycle Products (2006)

Name	Life-Cycle AUM ($ MM)
Fidelity Investments	63,644
T. Rowe Price	17,258
Vanguard	16,484
The Principal Financial Group	6,691
Barclays Global Investors NA	2,153
State Farm	2,012
MassMutual Financial	1,715
Wells Fargo	1,287
Putnam	835

Source: Strategic Insight.

Exhibit 10a Wells Fargo Advantage Dow Jones Target Date Funds Asset Allocation (August 31, 2006)

	Dow Jones Target Date Funds				
Asset Class	**Today**	**2010**	**2020**	**2030**	**2040**
Domestic Stocks	8%	14%	35%	53%	59%
International Stocks	4	7	18	26	30
Bonds	35	62	43	17	7
Cash	53	17	4	4	4

Source: Wells Fargo Advantage Funds Semi-Annual Report, August 31, 2006.

Exhibit 10b Wells Fargo Advantage Dow Jones Target Date Fund Returns[a] (December 31, 2006)

Wells Fargo Advantage Dow Jones Target Date Fund	1 Year	3 Year	5 Year	10 Year	Since Inception	Inception Date
Target Today	5.12%	4.16%	3.86%	5.17%	5.62%	3/1/94
Target 2010	6.97	5.49	4.25	6.02	7.09	3/1/94
Target 2020	10.67	7.71	5.15	6.61	8.02	3/1/94
Target 2030	12.74	9.23	5.97	7.16	8.82	3/1/94
Target 2040	14.55	10.53	6.54	7.39	9.40	3/1/94

Source: Wells Fargo Advantage Funds fund profile.

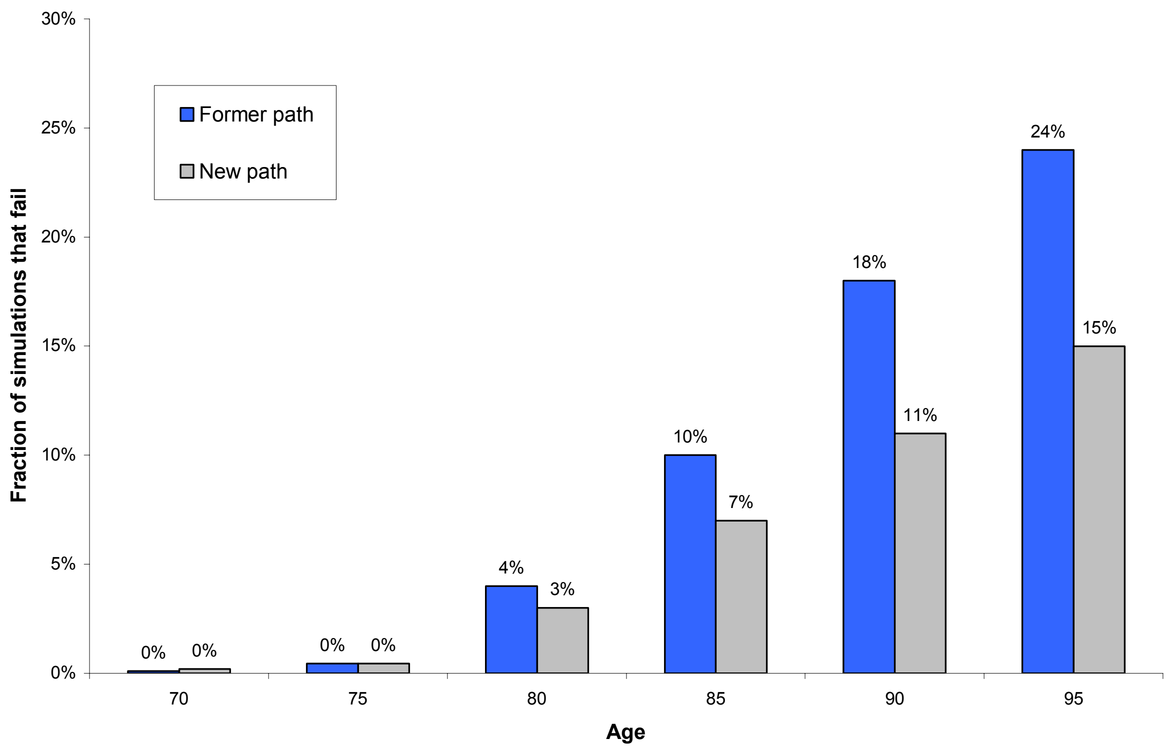
[a]Non-load-adjusted returns. The following fees applied to Wells Fargo Advantage DJ Funds: For Class A shares, the maximum front-end load was 5.75%; for Class B shares, the maximum contingent deferred sales charge was 5.00%; for Class C shares, the maximum contingent deferred sales charge was 1.00%. Administrator class and institutional class shares were sold with neither of these fees.

Exhibit 10c Dow Jones Target Date Index Returns (December 31, 2006)

Dow Jones Indices	1 Year	3 Year	5 Year	10 Year
Target Today	6.64%	5.11%	7.30%	6.60%
Target 2010	8.12	7.41	8.14	7.68
Target 2020	12.22	10.92	9.88	8.67
Target 2030	15.89	13.79	11.33	9.32
Target 2040	17.37	14.86	11.96	9.58

Source: Wells Fargo Advantage Funds fund profile.

Exhibit 11 Probability of Retirement Portfolio Failure with Age[a]



Source: Vanguard.

[a]Assumes spending 50% of age 65 salary, adjusted for inflation, in each year in retirement.

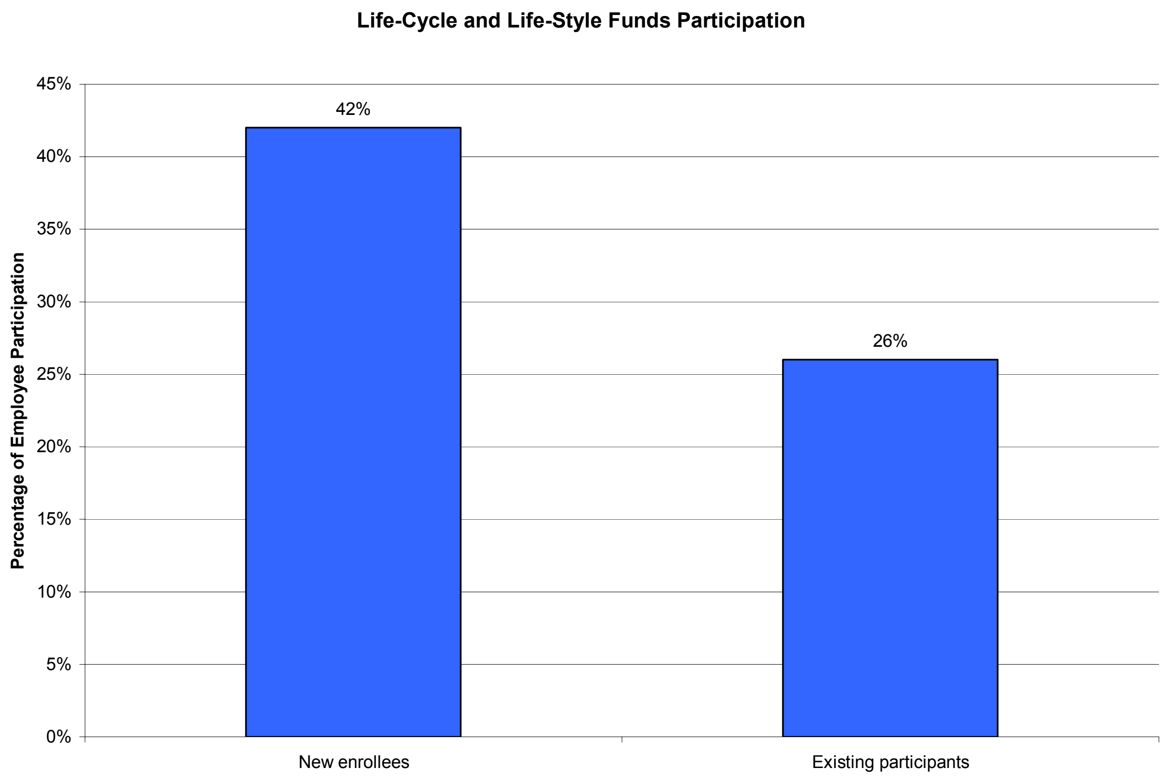
Exhibit 12 Participant Characteristics among Vanguard DC Plans[a] (2005)

	Life-Cycle Fund Investor	Life-Style Fund Investor	Not a Life-Style or Life-Cycle Fund Investor
Total participants	5%	21%	74%
Participant demographics:			
Age	41.4	42.9	44.8
Annual household income	$106,656	$98,153	$100,837
Male	58%	58%	62%
Job tenure (years)	9.2	9.6	12.2
DC plan account:			
Mean account balance	$52,392	$58,060	$64,510
Median account balance	$19,662	$17,974	$24,109
Web registered	58%	51%	45%

Source: Vanguard.

[a]This was among plans offering life-cycle or life-style funds or both.

Exhibit 13 Life-Cycle and Life-Style Funds Participation by New Enrollees and Existing Participants[a] (January 2004–June 30, 2005)



Source: Vanguard.

[a]Among plans that offered life-cycle and life-style funds. New enrollees were hired between January 2004 and June 2005.

Exhibit 14a Life-Cycle and Life-Style Plan Adoption (2005)

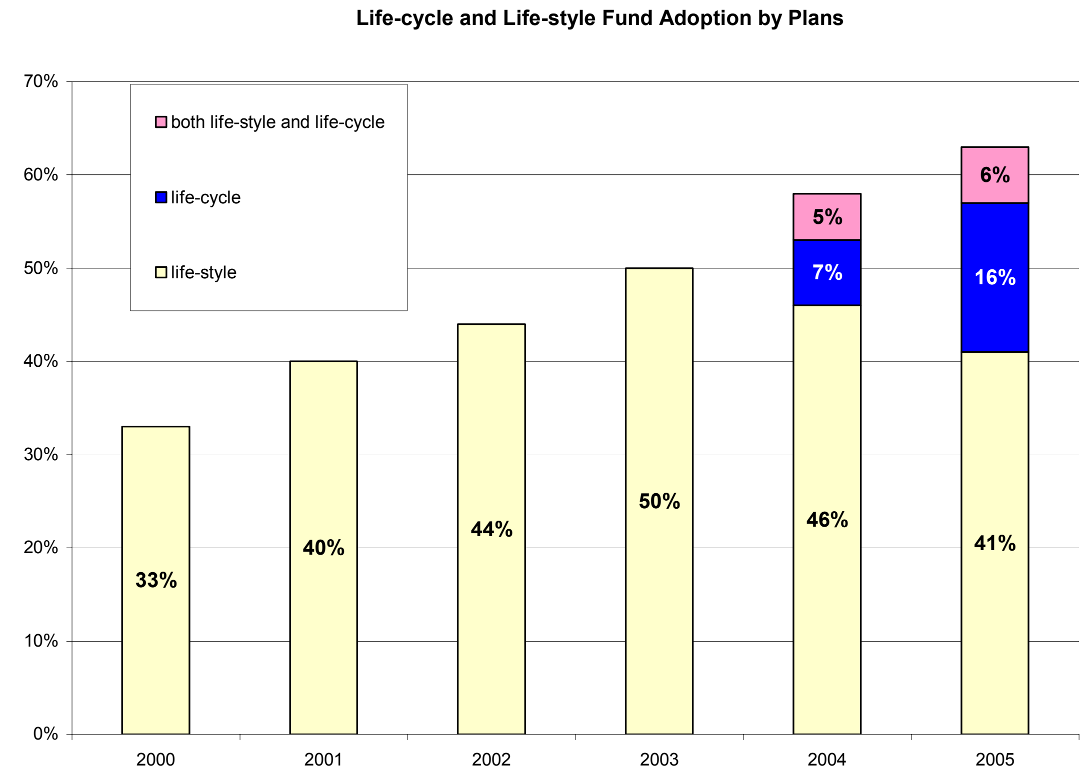


Exhibit 14b Characteristics of Plan Offering Life-Cycle and Life-Style Plans (2005)

	Plans Offering Life-Cycle Fund	Plans Offering Life-Style Fund	Plans Not Offering Life-Cycle or Life-Style
Percentage of plans	16%	41%	37%
Average number of plan participants	1,651	1,693	1,886
Average plan assets ($ millions)	$94	$112	$126

Source: Vanguard.

Exhibit 15 Participant Use of Life-Cycle and Life-Style Funds by New Enrollees and Existing Participants[a] (January 2004–June 2005)

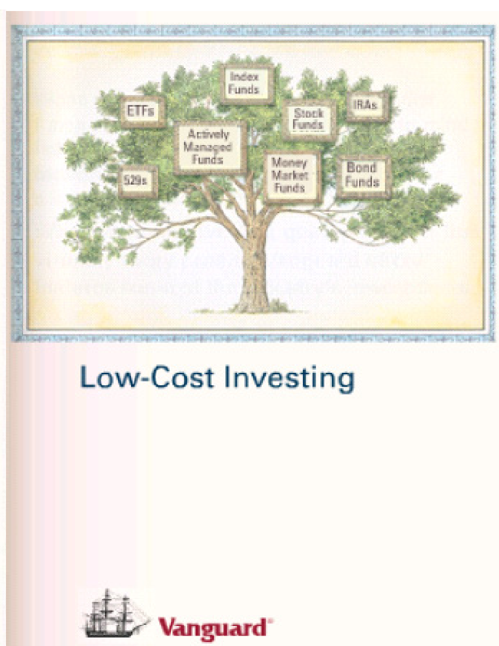
Percentage of Participants Contributing (among those investing in life-cycle and/or life-style funds)	New Enrollees	Existing Participants
One life-cycle or life-style fund	47%	33%
One life-cycle or life-style fund plus other funds	35%	47%
Two or more life-cycle or life-style funds plus other funds	14%	16%
Subtotal	49%	63%
Two or more life-cycle or life-style funds only	4%	4%
Total	100%	100%

Source: Vanguard.

[a]New enrollees were employees hired between January 2004 and June 2005.

Exhibit 16 Vanguard Marketing Campaign (2006)

For more information, go to www.vanguard.com/sonata



Source: Vanguard.