Fidelity versus Vanguard: Comparing the Performance of the Two Largest Mutual Fund Families[1]

By

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ABSTRACT

This paper compares the risk and return of investing in equity mutual funds provided by the world's two largest mutual fund families: Fidelity and Vanguard over a long horizon. We believe this will help guide investors; this study is an example of the calculations that mutual fund companies should facilitate by being required to provide accurate, accessible and free data. Over the entire period 1977 through 2003 both Fidelity's (no load) and Vanguard's diversified U.S. funds out returned the Wilshire 5000 index; Fidelity's portfolio out returned Vanguard's portfolio by 0.62 % per year but under returned it by 0.39 % when risk adjusted.

JEL Classification Codes: G & G2.

1. INTRODUCTION

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Investors typically choose to invest with one or a few fund families.[2] The market timing and late trading scandals have occurred in some mutual fund companies but not others. Different companies provide clients with different menus of mutual funds, with different advice[3] and give brokers different incentives to sell different types of mutual funds. All these considerations suggest that it is important to track the performance of different mutual fund families. Fidelity is the largest mutual fund family in the world and Vanguard is second largest, so it seems sensible to start by comparing the two.

Vanguard touts its low expenses and corporate governance structure: its owners are the shareholders in its mutual funds. Fidelity's owners are not the shareholders in its mutual funds, its expenses are typically higher, the turnover of its funds is typically higher, and its equity funds typically hold a larger proportion of their assets as cash. Fidelity touts its stock-picking and research prowess. Thus comparison of the performance of the two families sheds light on the combined impact of these factors.

This paper has several goals:

- To guide investors in choosing between Fidelity and Vanguard.
- To present an example of the calculations that mutual funds should facilitate by providing accurate, accessible and free data, and either they or an advisory service should provide in order to guide investors' decisions; this paper provides a template for the calculations we believe should be readily available to guide investors in their choices.
- To expose underperformance in order to induce fund families to lower expenses and trading costs and to improve their advice.
- To determine whether Fidelity managed funds beat their corresponding indexes, because the issue of active versus passive investing is a lively issue, as Reinker & Tower [2004] (who just look at Vanguard managed versus index funds) discuss.

[2] It simplifies decision making and some retirement plans, like Duke's permit investment with only a few families. This study and others like it should be handy for the human resources staff which picks which fund families to work with.

[3] See, for example, the web pages of Fidelity and Vanguard. Vanguard recommends books including those by John Bogle and other web sites. Both web pages offer advisory services.

- To discover whether there are certain types of funds or investment strategies within fund families that investors should shun or embrace.
- To help investors make wise decisions about where to invest and to induce fund families to pass on more of investment returns to shareholders, thereby encouraging saving, for this will enhance the quality and quantity of investment, and raise wages, welfare and economic growth.
- To provide instructors with handy graphs to illustrate the salient points in this paper.[4]

2. METHOD

This paper asks whether a typical investor in the Fidelity or Vanguard family of funds would have seen a better performance over time spans from January 2004 all the way back to January 1977 just after the inception of the first Vanguard index fund and for shorter spans as well. Following Reinker & Tower [2004] we feel that since savers invest in a bundle of mutual funds, risk adjustment should compare the performance of those bundles, as opposed to individual funds.

Consequently, we construct bundles of mutual funds that share characteristics, and we compare the performance of the Fidelity bundles with the corresponding Vanguard bundles. Following Reinker & Tower [2004], we refer to these bundles as synthetic portfolios. We are interested in how clients of these families fared in the aggregate, so we construct these synthetic portfolios using net assets at the end of the previous year to weight each year's annual returns.[5] Vanguard has only no loads, so to make the comparison interesting we compare Vanguard's funds with Fidelity's no- load funds.[6]

[4] We were surprised by how much more clearly we saw the issues after we graphed the data. This discovery reminds Tower of he was puzzled by a paradox he had discovered using calculus and did not understand. He asked Arnold Harberger about it. Harberger's answer was "Graph it" and when Tower did, the solution to the puzzle became evident.

[5] Different fund families have different style biases, so we would expect them to perform differently in the aggregate, but part of their advice to clients should consist of recommending the appropriate style mix. Our test is designed to capture the impact of this advice or its absence as well as performance of the individual funds which comprise the portfolios.

The returns of the indexes we use are weighted by market capitalization, i.e. the total asset value of each stock in them. The returns of our synthetic portfolios are also weighted by net assets. We use net assets at the end of the previous year, provided by Morningstar Principia Pro and the Center for Research in Security Prices, CRSP. Thus they are weighted by the market capitalization of the mutual funds. Consequently, the returns to the portfolios represent how well investors in the mutual funds in each portfolio did. We can think of the performance of each of these portfolios as representing the performance received by the average investor in these portfolios.

We compare the entire no load portfolios of the two families and also subsets of the two families' portfolios, where the entire portfolios encompass all mutual funds that hold at least 75 percent of their assets in equities and have no loads. The subsets for Fidelity are three: Fidelity U.S. diversified portfolios (which are broken down into regular managed, Advisor managed and Spartan index), the portfolio of Fidelity Advisor sector funds, and portfolios of two Fidelity international funds (regular and Advisor). We also examine the Fidelity Select sector funds, which dropped their loads in 2003. The advisor funds can be purchased only through an advisor, so it is interesting to find out whether advisors add value. Finally, we compare the performance of these portfolios with the corresponding indices.

Dan Wiener notes that this methodology gives credit to a fund family or takes it away based on investors' choices. "For instance, the fact that lots of people still have money in Magellan is not a Fidelity decision. There are plenty of other funds Fidelity has offered that could be used instead. Investors are choosing to stay in that fund, which as it has grown much larger, has under performed more. This 'hurts' Fidelity's rating. By the same token, when Vanguard closes or adds a high minimum to a hot fund like Capital Opportunity, doesn't this hurt their performance as well? …[T]he investors' choice to invest in a particular fund doesn't necessarily indicate the fund company has necessarily done something well, or poorly on the performance front."

Our study assesses the impact of all of these effects. Another useful sort of study would compare the outcomes of maximizing strategies for different types of investor who invest in different fund families. However, a straw poll of our colleagues leads us to believe that Fidelity and Vanguard investors have similar goals, so our approach is useful.

[6] The reader concerned with the performance of Fidelity load funds can adjust our calculations for any loads and expense differentials.

We do not reckon with tax consequences. So this study should be interpreted as analyzing returns for Fidelity and Vanguard funds held in a retirement account, where taxes are not paid until the funds are sold. Considering taxes would generally put Fidelity managed funds at a disadvantage relative to both index funds and Vanguard managed funds, because index and Vanguard funds usually have lower turnover rates, which generally shrinks taxes. See Jeffrey and Arnott [1993].[7]

For both Fidelity and Vanguard we ignore tax-managed funds. For Vanguard we ignore the very low cost Admiral funds, which are only available to big investors. We also are interested in what investors perceive as equity funds, so we exclude any fund for any year in which it had less than 75% of its assets invested in equities at the beginning of the year.

Real rates of return are calculated using the consumer price index from the Bureau of Labor Statistics. **Throughout the paper, return and standard deviation of return refer to annualized real returns. Our average returns are average real geometric returns (the constant annualized real returns of investments).**

3. THE INDEX BENCHMARKS

In order to provide benchmarks for the performance of our two mutual fund families, we consider four key indexes since January 1977, the year immediately following the inception of the first index fund, now called the Vanguard 500 Index fund. These are the S&P 500, the Wilshire 5000, Morgan Stanley's Europe, Australia, and the Far East (EAFE) and MS's World indexes. The data are drawn from Morningstar Principia Pro disks.

Exhibits 1, 2 and 3 provide summary data for the performance of our index and managed portfolios as well as for the indexes. Our start dates of each of the time spans considered

[7] However, as Reinker and Tower [2004] note, persuing tax efficiency may raise turnover, so higher turnover does not always reduce tax efficiency.

there are for the inception dates of our synthetic portfolios and January 2000, when the U.S. market reached its peak, and the end dates in all cases are January 2004. The inception date of each portfolio is defined as the first January following the inception of the first fund in that portfolio. In all the exhibits underlining is used to indicate that a portfolio out performed the corresponding index, and **bolding** is used to indicate that a portfolio beat the corresponding portfolio of the other company.

The published version of this paper is accompanied by two web appendixes, which supplement the material here, Zheng and Tower [2004]. Appendix A contains Exhibits A1-A8, which are structured like Exhibit 4, but apply to other portfolios, and Appendix B lists the funds that comprise our portfolios.

Since January 1977 the Wilshire 5000 has a higher average return than the S&P 500 index [Exhibits 1 and A1] and is also less risky, having a lower standard deviation of return [Exhibits 2 & A1]. This supports the view that a broad based U.S. index is a better benchmark for index funds to mimic than a more narrowly based index. It also supports the use of the Wilshire 5000 index as our benchmark for U.S. equity portfolios.[8] [9] Over the entire period, the EAFE and World indexes have performed less well than the two U.S. indexes [Exhibits 1 & A1].

Evaluating these indexes is important, because as a theoretical matter if markets are efficient investing in broad-based indexes is the best strategy and because investing in broad-based indexes has been advocated as a wise practical strategy by experts including John Bogle and Burton Malkiel (2003). See Reinker and Tower [2004].

4. RISK ADJUSTMENT

[8] However, the Wilshire 5000 out returns the S&P 500 for only 11 of the 26 spans beginning in years starting from January 1977 through 2003 and ending in January 2004, although the standard deviation of the Wilshire 5000 is less than that of the S&P500 for 18 out of 27 spans.

[9] Each standard deviation in each exhibit is the estimated standard deviation of the population based on a sample, and it is calculated using Microsoft Excel.

Investors care about risk as well as return. Consequently, we calculate risk-adjusted returns, and we present the risk-adjusted return differentials between each Fidelity portfolio and both its corresponding Vanguard portfolio and its corresponding index. Our performance differentials are always expressed as the performance of the Fidelity portfolio minus that of one of the two alternatives.

Risk adjustment works this way. For each pair of a Fidelity portfolio and its corresponding Vanguard portfolio or index, we ask what would the average annual rate of return be if the portfolio or index with the higher standard deviation of return, our proxy for risk, had been combined with a risk free asset so as to make its standard deviation of return equal to that of the portfolio with the lower standard deviation of return. This method was developed by Modigliani & Modigliani [1997]. For our riskless rate of return, we use the return on the Vanguard Treasury money market fund.[10]

We risk adjust in this way, so that risk adjustment never imagines the investor to sell a mutual fund short, since this is impossible to do. Investors who are concerned solely with return should look at the return differentials we calculate, while those concerned with risk as well should look at our risk-adjusted returns.

The Vanguard Treasury money market fund is not truly risk free. But its standard deviation of return is small. We can construct the efficient frontier for the high-risk portfolio with average return on the vertical axis and standard deviation of return on the horizontal, as the proportion of the "risk free asset" is changed in the portfolio. This efficient frontier is curved, with the end points lying at the return and standard deviation of the Vanguard Treasury money fund and the high-risk portfolio. Reinker & Tower [2004] use Microsoft Excel's solver to equate the standard deviation of the risk adjusted high-risk portfolio with that of the low-risk portfolio. In this paper to save effort, we approximate the efficient frontier by a straight line through its two endpoints, so that the

[10] This method of constructing portfolios and risk adjusting their performance is discussed in more detail in Reinker & Tower [2004], which also discusses how to impute the return on the Vanguard Treasury money fund for the early periods when it did not exist.

risk-adjusted return of the high standard deviation portfolio is a function of the average returns to the high-risk portfolio and the Vanguard Treasury money market fund and the standard deviations of these portfolios as well as that of the low-risk equity portfolio.[11]

We do not present the risk-adjusted differential for spans less than six years, because risk adjustment is sensible only over longer time periods.

5. THE VANGUARD FAMILY

Reinker & Tower [2004] examine the Vanguard family's U.S. portfolios. They show average rates of returns and standard deviations for the Treasury money market fund, the (asset weighted) portfolio of U.S. index funds and the (asset weighted) portfolio of U.S. managed funds.

Whether the index or managed portfolio has the better return depends on the time span, [Exhibits 1, 2, A1 & A2] but the managed portfolio has a lower standard deviation for all periods beginning before 2000.[12]

For the time span beginning in 1977 Vanguard's U.S.index portfolio has lower return and higher standard deviation of return than the Wilshire 5000 index. But its U.S. managed portfolio bests the Wilshire 5000 on both average return and standard deviation [Exhibits 1, 2, A1 & A2]. This is impressive, given the expenses of fund management.[13]

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[11] The ideal method of risk adjustment would be to calculate the expected lifetime utility of an investor following reasonable saving and allocation rules, who is faced with alternative portfolios. But the results would be specific to the investor and rules adopted. Moreover, as Reinker & Tower [2004] point out, the selection of a less risky asset for dilution of the riskier portfolio is somewhat arbitrary. Thus, our risk adjustment method is an imperfect compromise between usefulness and simplicity.

[12] The performance of these portfolios is discussed in detail in Reinker & Tower [2004], Kizer [2005] and Reinker & Tower [2005].

[13] Reinker and Tower did not compare the Vanguard portfolios with the Wilshire 5000 and EAFE indexes, so the comparison here is new.

Vanguard's first international index and managed funds have inception dates of 1990 and 1981 respectively, so our start dates for the corresponding portfolios are January 1 of the two following years. Over all but one of the spans and over the longest span the managed portfolio beats the index portfolio on average return [Exhibits 1 and A3] and over all spans the managed portfolio beats the index portfolio on standard deviation [Exhibits 2 and A3]. The index portfolio has lower average expenses and turnover than the managed portfolio.[14]

For the life of the Vanguard International index portfolio (since 1991), the Vanguard international index portfolio out returns the EAFE index, with a lower standard deviation. The same is true of the Vanguard international managed portfolio over its life (since 1982). From the start of the international index portfolio, the managed portfolio outshines the index portfolio on both return and standard deviation [Exhibits 1, 2 & A3]. ***Most surprising to us is that both the Vanguard US managed portfolio and the Vanguard international managed portfolio beat their corresponding indexes in spite of the expenses the portfolios incur and the fact that expenses are not subtracted from index returns.***

6. FIDELITY U.S. DIVERSIFIED PORTFOLIOS

The Fidelity U.S. diversified portfolios

Fidelity has three different types of no load U.S. diversified equity funds. The regular funds are managed funds that do not need to be purchased through an advisor. The Spartan equity funds are index funds with low expense ratios. The Advisor funds must be purchased through an advisor, and a fee is generally paid to that advisor.[15] Exhibits 4, 5

[14] The figures we use in this paper for the international managed portfolio differ from those in Reinker & Tower [2004], because the current paper excludes global funds, which invest both in the U.S. and abroad, in order to focus on funds that hold almost exclusively foreign assets.

[15] One advisor described to us his company's charges as follows: " I can only tell you what we charge, which is $4,500 per year plus 50 basis points on the first $5 million, plus 40 basis points on the second $5 million, 30 basis points on the third $5 million, and 20 basis points on all else. Fees are paid quarterly in arrears on the average (of beginning of quarter and end of quarter) account balances. The $4,500 per year is subject to adjustment up or down depending on the amount of front end and annual fact finding and

& 6 describe the return characteristics of the portfolios made up of the first group of equities, and Exhibit 3 summarizes that information. The Spartan portfolio tracks the Vanguard US index portfolio closely. We provide data for it in Exhibits 3, 7 and A5.

The Fidelity regular managed diversified portfolio

Exhibit 4 shows the Fidelity regular U.S. managed diversified portfolio (henceforth just Fidelity U.S. managed) to out return the Vanguard U.S. managed portfolio over the longest span in spite of the average expense and turnover differentials, which favor Vanguard. Fidelity lags behind Vanguard on a risk-adjusted basis for that same time period. For many shorter periods like the second half of the entire span (beginning in 1990) the Fidelity portfolio does better on both accounts, regardless of whether the performance is risk adjusted.

Exhibit 3 summarizes the exhibits by reporting the performance of Fidelity portfolios from their inception and comparing them with their corresponding Vanguard portfolios and indexes. It also uses Microsoft Excel's paired t-test to calculate the probability that each Fidelity portfolio will have a higher average return in the future and less risk than the corresponding Vanguard portfolio, if future returns and risk are drawn from the same population as past returns.

Risk, in this instance, is measured as the average absolute value of deviations of annual return about the mean. The probability that the Fidelity U.S. diversified portfolio will yield a higher return over the long run in the future is 75.9%, and the probability that its risk will be lower than Vanguard's is 0.2 %. This exhibit also presents the portfolio shares for the various funds to help develop a sense of how important each one is.

What causes the differential of the Fidelity return over the Vanguard return to change? A regression indicates that there is no time trend. However, when we regress the

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analysis. The asset based fee is for monitoring and keeping up to date on the account investments and researching potential investments." We do not include these advisor charges in our calculations.

continuously compounded annual rate of return differential favoring Fidelity on the annual percent real return of the Wilshire 5000 index we find that each 1 % percentage point per year (henceforth % pt/yr) increase in the Wilshire return raises the differential favoring Fidelity by 0.15 % pt/yr, with a t-statistic on the coefficient of 2.23. So it appears that when the stock market is rising, the performance of Fidelity is high relative to Vanguard, perhaps reflecting the more speculative positions taken by Fidelity investors and managers than by those at Vanguard.

Since 80% of Fidelity no-load assets are held in the regular U.S. managed portfolio [Exhibit 3], the comparison between the Fidelity and Vanguard portfolios in this section is the essence of our investigation. To highlight these calculations we reprise them in Exhibits 5 & 6, in different forms. Exhibit 5 shows the investment in each of the two portfolios and the Wilshire 5000 index in January of each year since 1977 necessary to grow into $100 in January 2004. As in all of our calculations we assume investment income is reinvested. Exhibit 5 indicates that the two mutual fund portfolios out-perform the Wilshire 5000 index for prolonged periods of time. Since 1994 the two portfolios and the Wilshire 5000 have shown roughly equal returns. Both Fidelity and Vanguard experience less of a bubble in 2000 than the Wilshire 5000, with Vanguard experiencing considerably less.[16]

To end up with $100 in January 2004, in January 1977 an investor would need to place $11.9 in the Wilshire 5000 index, a smaller $10.6 in the Vanguard portfolio or a still smaller $9.1 in the Fidelity portfolio. Thus the Fidelity portfolio beats the other two assets.

Exhibit 6 presents the average performance of Fidelity and Vanguard US managed portfolios above the Wilshire 5000. On both return and risk adjusted return: the Vanguard US managed portfolio beats the Wilshire 5000 index for all spans starting prior to 1984;

[16] The graphs use red triangles to refer to Fidelity portfolios, drawing on Fidelity's pyramid logo and red as the color of faithfulness. They use blue rectangles to denote Vanguard funds, recalling that Lord Nelson's flagship at the Battle of the Nile, Vanguard, was a square rigger. The real value graphs like Exhibit 5 can be used to calculate cumulative returns. For example since January 1997 Fidelity's U.S. Managed portfolio returned a total of [100/9.1-1]*100 percent.

the Fidelity US managed portfolio beats the Wilshire 5000 index for all spans starting prior to 1994.

We were surprised at how the two portfolios out performed the Wilshire 5000 index as shown in Exhibits 5 & 6. This is consistent with an article by Robert Arnott, Jason Hsu and Phil Moore, forthcoming in the *Financial Analysts Journal*, and discussed in McDonald [2004]. The authors find that indexes constructed using various value-oriented metrics (book value, income, revenue, sales, gross dividends, and number of employees) outperformed the S&P 500 index, which uses capitalization as its weights. This implies that, historically, there has been room for active management on value criteria to outpace indexes.

Fidelity funds held smaller proportions of their assets as equities than their Vanguard counterparts. Consequently we expected the Fidelity portfolio to perform less well. That Fidelity out returned was a surprise. Perhaps it should not have been. Smithers and Wright [2000] find that when fundamentals are unfavorable being fully invested in the stock market produces lower returns than switching to a money market portfolio, and Harney and Tower [2003] make the same prediction.[17]

[17] Stein and de Muth [2003] in a book plugged by Milton Friedman on the back cover make a similar argument. However their simulations do not ask: when should an investor switch back and forth between stocks and bonds? Instead they look at the strategy for incremental investments: asking when should an investor put new funds into the stock market or into short term Treasuries? They also assume that market timing investors are prescient, investing twice as much each year in the stock market as their buy and hold brethren when they think the stock market is going to go up in the future. Had a saver who started to invest in 1988 followed their advice on any of their value criteria she would have held only short term Treasuries since then and done less well than the buy and hold investor. The authors use the price earnings ratio as one of their value criteria, without adopting the Shiller [2000] and Harney & Tower [2003] technique of using a long period to calculate earnings and therefore reduce their cyclical component. When they suggest investing only when the S&P500 index is below its historical moving average, they do not correct for inflation.

They also argue that fundamentals are a bad guide to whether to invest in the stock market in the short run but a good guide in the long run. (pp. 6 and 7). How can this be, given that the long run is the aggregate of short runs? The reason is, as Harney and Tower's [2003] graphs show is that the run up of the stock market since 1991 means that if one uses a fundamental like Tobin's **q** to predict rates of return, one finds that the critical level of **q** that provides negative real rate of return gets lower as one goes from predicting one year returns to five year returns to ten year returns. This is because one is excluding from the long run calculations, initial investments in the highly valued market in the 90's, which have done well.

Our prediction is that when studies are done correctly, they will find that to justify market timing, one must use momentum as part of the calculation as Smithers and Wright [2000] and Harney and Tower [2003] do. Alternatively one must use risk-adjusted returns as one's criterion, instead of naked average

These comparisons elevate our enthusiasm for active management. Both the Fidelity and Vanguard portfolios considered in this section outperform the Wilshire 5000 index for many periods, suggesting that wise fund selection and management trumps the costs of running the mutual funds.

On a risk-adjusted basis, the Fidelity regular U.S. diversified portfolio beat its Vanguard counterpart 17 out of 22 times, while losing to it over the longest span. ***The US managed portfolios of Fidelity and Vanguard tie with the Wilshire 5000 for average performance from 1994 onward with the smallest 2000 bubble for Vanguard. Both Fidelity and Vanguard beat the Wilshire 5000 from 1977, with Fidelity beating Vanguard from 1977*** [Exhibits 5 & 6]**.** The out return of the managed funds early on and the similar performance to the Wilshire 5000 since 1994 is consistent with the idea that financial markets have become more efficient and it is now harder for managed funds to beat the indexes.

The Fidelity Advisor US diversified portfolio

Suskind [2004, p.228] writes about Alan Greenspan's interest in "the idea of tracking and publishing the ex-post performance of analysts' recommendations (what they predicted versus what occurred) so that their credibility and that of their firms could be assessed." Have advisors added value for Fidelity investors in US managed mutual funds?

The Fidelity Advisor US managed portfolio performs less well than the Vanguard US managed portfolio for all but three spans, on a non-risk adjusted basis. Over its life the Fidelity portfolio under performs the Vanguard portfolio by 0.34 % pt/yr and on a risk adjusted basis under performs it by 1.06 % pt/yr. [Exhibits 1-3 & A4] Over its lifetime it under returns the Fidelity U.S. regular diversified portfolio by 2.15 % pt/yr (in spite of a

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returns. Also, see Merriman [2004], who compares the index level with a moving average to arrive at buy and sell signals and finds that market timing reduces risk.

0.16% pt /year lower expense ratio) with a higher standard deviation [Exhibits 4 & A4]. Its lifetime return is less than Vanguard's U.S. index portfolio by 0.34 % pt/yr, with a higher standard deviation. Over its lifetime it also under performs the Wilshire 5000 index on both a risk adjusted and a non risk-adjusted basis by more than the expense ratio for Vanguard index funds over the same period.

All this makes us wonder what advisors who charge anything just to guide investors to Fidelity Advisor funds are doing to earn their charges[18]. It also makes us recall Bogle's [2001] remark when in lauding an index strategy he writes

> …it is worth considering that the best investment advice may be not only *priceless*, but *price-less*.

Different classes of Fidelity Advisor portfolios

In this study we choose to look at only classes of Fidelity funds with the lowest expense ratios and no front end or deferred loads (payable when the fund is sold). Some of the Advisor funds have loads. For example, one Advisor fund picked at random, the Fidelity Advisor Large Cap fund comes in classes A, B, C, I and T. The expense ratios for these classes in 2003 were 1.25%, 2.00%, 1.98% 0.84% and 1.40% of assets per year respectively, with loads of 5.75% (front end), 5.75% (front end), no loads if sold after more than one year, no loads, and 3.50% (front end) respectively. B shares convert automatically to A shares after a seven years and one day.[19] The only fund class we consider is the I class, the class with the lowest expense ratio and no loads. Consequently, we are considering the returns to the most favored investors. Moreover, these most favored investors may be a small fraction of the total. At the end of 2003, $219.21

[18] One advisors tells us that his job is to hold the hands of investors and encourage them to stay fully invested in equities. One advisor also suggests that investors who buy advisor funds are less sophisticated than those who buy regular funds.

[19] This information comes from a phone call to Fidelity. The Fidelity advisor web page, http://advisor.fidelity.com, says that B shares convert after a maximum of 7 years. Morningstar says they "do not convert" but Morningstar, in response to our alert, tells us they are correcting this.

million was held in the I class, whereas $453.9 million was held in the more expensive classes.[20]

Are the higher expenses and turnover reflected in lower returns? Using 2003 figures for expenses and returns for the five classes of this fund, ***we find that the average continuously compounded return is well explained by the expense ratio***. The regression coefficient of the expense ratio is –0.936 with a t value of –45.9. Thus each one percentage-point increase in the expense ratio reduces return by almost one % pt/yr, and the t is extraordinarily big given that there are only five observations. We cannot test for the role of turnover, because the load funds are operated as one fund, so Morningstar and CRSP do not report separate turnover rates for each class of load fund.

Advisor funds with high expenses

Please beware that throughout our analysis we consider only Fidelity's no load funds. The returns on Fidelity's load funds should be lower due to higher expense ratios and loads. For example, the Fidelity Advisor Large Cap fund, Class C, carries an expense ratio of 1.98 % per year, whereas the average expense ratio since 1984 for the Fidelity Advisor US managed portfolio is 0.73 % [Exhibit A4]. Had that portfolio carried the higher expense ratio it would have under returned its Vanguard counterpart by 1.43% % pt/yr, and on a risk adjusted basis by 2.15 % pt/yr.

The Fidelity Spartan index portfolio

The Fidelity Spartan index portfolio and the Vanguard U.S. index portfolio have similar average returns (.04 % pt/yr lower for Fidelity) and standard deviations (.06 % pt/yr higher for Fidelity) since the inception of the Fidelity Spartan index portfolio in 1989. This is to be expected as they have similar average expense ratios over the period (0.24 %/yr for Fidelity and 0.20 %/yr for Vanguard) and turnover rates (6 %/yr for Fidelity and

[20] The loads and part of the expenses are passed on by Fidelity to the advisors.

9 %/yr for Vanguard), and the bulk of both track the S&P 500 index. It also suggests that Fidelity's recent reduction in the expense ratio of its U.S. index funds from 0.20% to 0.10% will significantly influence future contests [Exhibits 3 & A5].

We are mindful of Malkiel's [2003, p.359] point that the average mutual fund under performs the index that corresponds to it. So we were impressed to find that of the five U.S. portfolios considered so far over the longest spans, all but the Advisor portfolio and the Vanguard index out returned the Wilshire 5000 index. Thus either stock picking or choosing the right style plays an important role in obtaining high returns. But our result depends on our decision to focus on the subset of Fidelity funds with relatively low expenses.

7. FIDELITY U.S. SECTOR FUNDS

Exhibits 1, 2, 3 and 8 report results for the Fidelity Select sector portfolio and compares them with the Vanguard U.S. managed portfolio. This sector portfolio and the Fidelity Advisor sector portfolio are made up of funds that invest in particular sectors of the U.S. stock market. For these portfolios we report two sets of results: the asset weighted results and the equally weighted results. The former show the return to investors in the portfolio, and the latter show the return that would have been reaped by an investor who at the start of each year invested equal amounts in each fund in the portfolio. The results for the Select and Advisor sector portfolios are similar [Exhibits 1, 2, 3, A6 & A7]. As Exhibit 3 indicates the Fidelity Advisor sector portfolio is much smaller than the Fidelity Select sector portfolio and was born later, so we do not devote as much attention to the Advisor portfolio.

For every period save one beginning before 2000, the asset-weighted portfolios have lower returns, higher standard deviations and consequently lower risk-adjusted returns than both the Vanguard U.S. Managed portfolio and the Wilshire 5000 index. Both of these Fidelity portfolios substantially under perform the Vanguard U.S. managed portfolio on a risk-adjusted basis for every span beginning before 2000.

However, a very different picture emerges when we consider the same portfolios, except assume that investors invest equal amounts of money at the beginning of each year in each of the sector funds. These equally weighted portfolios outperform the Vanguard U.S. managed portfolio and the Wilshire 5000 on the bases of both non-risk-adjusted and risk-adjusted return for every period beginning before 1999.[21]

This made us wonder whether Fidelity Select Sector funds outperform indexes of stock performance in those same sectors. There are five Select funds (Financial, Health Care, Natural resources, REIT, and Telecommunications) that have corresponding indexes for those sectors reported in the April 2004 Morningstar Principia Pro disk (Dow Jones Financial, Dow Jones Healthcare, Goldman Sachs Natural Resources, Dow Jones Telcom, and Wilshire REIT). The mean of the average annual continuously compounded returns for the funds exceeds the corresponding mean for the corresponding index on average by 1.97 % pts per year, and the outperformance of the mutual funds is significantly greater than zero (on a one tailed test) at the 2.7% level of significance. ***Thus in spite of mutual fund expenses our small sample of Select sector funds outperforms the corresponding indexes***.[22]

Investors in Fidelity's sector funds have done less well than those who have invested in Vanguard's managed U.S. portfolio or the Wilshire 5000. For example, investors in the Select sector portfolio over its lifetime under returned the Vanguard managed U.S. portfolio by 2.57 % pt/yr and under performed it by 4.01 % pt/yr on a risk-adjusted basis. But investors, who maintained equal values in either of the two Fidelity sector portfolios, saw a higher return than in Vanguard's managed U.S. portfolio or the Wilshire 5000. ***These diametrically opposed results are consistent with the idea that Fidelity selects sectors and stocks within those sectors wisely, but that Fidelity sector investors make bad decisions about which sectors to speculate in***, although as Exhibit 3 indicates this

[21] The Fidelity Select funds carried loads prior to mid 2003. So while today they are no load funds, historically they were not. We do not reckon with the historical loads on these funds.
[22] The authors are currently exploring whether this result holds more broadly.

sort of investment constitutes only 5.11 % of the entire no-load portfolio, so most Fidelity investors do not invest much in these funds.

The asset weighted Select sector portfolio loses to the Wilshire 5000 with a bigger bubble in 2000; the equal weighted portfolio beats the Wilshire 5000 with a smaller bubble in 2000. [Exhibits 1, 2, 3 & 9].

Bogle's [2001] has lamented:

> The siren song of past performance, sung by fund managers and distributors and danced to by investors, has resulted in investment decisions that are unwise to a fault. … Investors value their portfolios frequently, and trade their fund shares like stocks. These characteristics lead to foolish investment behavior.

This seems to apply to investors in the Fidelity select portfolio.[23]

Our results also imply that orangutans throwing darts at a list of select sector funds would have produced higher returns than did investors, whether or not they were guided by advisors.

8. FIDELITY INTERNATIONAL FUNDS

[23] William Bernstein has mentioned to us that the Morningstar unpopular fund strategy, which selectively invests in those areas that have drawn the least assets in the past three years has made significant excess returns in the process.

Hilsenrath [2004] quotes Richard Thaler as noting that when Swedish social security was privatized "Swedish investors tended to pile into risky technology stocks and invested too heavily in domestic stocks. He thinks U.S. reform, if it happens, should be less flexible. 'If you give people 456 mutual funds to choose from they're not going to make great choices,' he says." This position is consistent with our observations here.

Clements [2004] makes the same point:

"Unfortunately, during the past decade, my confidence in the investment acumen of ordinary investors has been shaken. I have come across too many serial blunderers, folks who jumped from technology stocks in the late 1990s, to bonds in the bear market, to real-estate investment trusts in 2004, always buying after the big money has already been made.

These investors have neither the education nor the emotional fortitude to invest sensibly. That is one of the reasons I believe replacing traditional company pension plans with 401(k) plans has been a mistake. Similarly, I fear that the privatization of Social Security will be a disaster unless it is accompanied by a slew of safeguards." Need to quote the Clements article the day before Thanksgiving in the WSJ.

The Fidelity regular international portfolio and the Fidelity Advisor international portfolio account for only 5 % and 0.2 % of our entire portfolio of Fidelity funds as Exhibit 3 indicates. Exhibits 1, 2, 3, A1, A3, A8 and A9 present data for the international portfolios and the EAFE index. Exhibit 8 compares the Fidelity international managed portfolio with the Vanguard international managed portfolio and the EAFE index. On a risk-adjusted basis since inception, the Fidelity regular international portfolio under returns its Vanguard managed counterpart by 2.16 % pt/yr, while the Fidelity Advisor international portfolio out returns the Vanguard portfolio by 1.18 % pt/yr. Since the start of the Advisor portfolio in 1996 it has returned 1.72 % pt/yr more than its Fidelity regular counterpart with 2.82 % /yr less standard deviation. Thus here advisors' allocation advice is apparently beneficial.

Over the longest spans, the Vanguard international managed and the Vanguard international index portfolios have out returned the EAFE index by 0.80 and 1.62 % pt/yr respectively, with a lower standard deviation. The Fidelity Advisor portfolio has out returned the EAFE and the Fidelity regular international portfolio under performed the EAFE by only 0.33 % pt/yr, which is small, given costs and foreign taxes, although the Fidelity standard deviations were higher. ***So these international portfolios have performed creditably relative to the EAFE index.***

9. FIDELITY ENTIRE PORTFOLIO

Exhibit 10 compares the performance of the Fidelity entire portfolio with the Vanguard entire portfolio. The entire portfolios consist of all the mutual funds discussed above except for the select funds, which carried a load at the time, and we have added other funds, again in proportion to their asset weights. For both companies we have added in global funds. In the case of Vanguard we added in Vanguard's tiny collection of four sector funds, and in the case of Fidelity we added back in its three regular sector funds, which we had not considered previously. Thus, our goal is to present the performance of

the two families' entire no load fund portfolios. As before, in each case, we weight return figures by net assets at the end of the previous year.

The Fidelity entire portfolio has returned more than the Vanguard entire portfolio over the longest span, with the Fidelity portfolio returning 0.33 % pt/yr per year more without risk adjustment. But, Fidelity has returned 0.70 % pt/yr less on a risk-adjusted basis. If past and future returns are drawn from the same population, the probability that Fidelity will have a higher return than Vanguard over an infinite time horizon is 61.3%, and the probability that Fidelity will have a lower risk is 0.1%. The corresponding figures for the Fidelity regular US managed portfolio versus the Vanguard U.S. managed portfolio are 75.9 % and 0.2 % respectively. [Exhibit 3]. ***The return of Fidelity's entire portfolio beats Vanguard's over the entire period, but the ranking of risk adjusted returns is reversed, and the two portfolios are tied from 1994, with a smaller bubble for Vanguard.*** [Exhibits 3 & 9].

To explain fluctuations in the differential returns we regressed the annual continuously compounded Fidelity entire portfolio rate of return minus the same for Vanguard on time and the return on the World index. Finding no important or significant time trend, we dropped the time and used the return of the World index as our sole independent variable. We discover that each one % pt/yr increase in the return of the World index raises the differential in favor of Fidelity by 0.08 % pt/yr, with a t-value of 1.34. This is similar to our result for the Fidelity U.S. diversified portfolio, and we offer the same explanation for it.

The Fidelity entire portfolio beats the World index on return for every period beginning prior to 2002 and on risk-adjusted return for every period. This is remarkable, given the taxes levied by foreign countries on dividends paid by their companies. It reflects, in part, the heavy weighting of the Fidelity portfolio in US stocks, which have performed well relative to foreign stocks over the period.

Exhibit 11 reprises the information in Exhibit 10 in graphical form. It shows how many real dollars would have had to be invested in the two entire portfolios at each year to generate $100 in January 2004. The two portfolios hug one another back through 1994, while in the spans up to 1994 Vanguard was the superior performer.

The decision of what to put into the Fidelity entire portfolio is somewhat arbitrary. Had we included the sector funds, the Fidelity entire portfolio would have looked worse. Had we incorporated Fidelity Advisor funds with loads and higher expenses the results would also have been different. We chose to draw the line at all Fidelity no load funds as characterized by Morningstar.[24]

10. MANAGED FUNDS VERSUS INDEXING

John Bogle [2004] writes:

> Our introduction of [the first index fund] was … dubbed 'Bogle's Folly," and described as un-American. Fidelity chairman Edward C. Johnson led the skeptics assuring the world that Fidelity had no intention of following Vanguard's lead. 'I can't believe that the great mass of investors are going to be satisfied with just receiving average returns. The name of the game is to be the best.'

This makes us wonder: how have Fidelity managed funds fared relative to the indexes and index funds?

Both of the Fidelity non-Advisor U.S. diversified portfolios (the indexed and the managed) for the longest spans, out returned the Wilshire 5000 index whether or not the returns are risk adjusted [Exhibits 1-7 & A5].

[24] When the Select funds are included in the calculation since January 1977 the Fidelity entire portfolio under returns the Vanguard entire portfolio by 0.10 % pt/yr and underperforms it by 1.04 % pt/yr on a risk adjusted basis.

That both the Fidelity and Vanguard managed US portfolios have out performed the Wilshire 5000 index since 1977, whether or not return is risk adjusted lends credence to Johnson's early distain for index funds, but recently the advantage of the managed portfolios has shrunk [Exhibit 6].

Since the start of the Fidelity Spartan index portfolio in 1989 it under returned the Fidelity US managed portfolio by 1.03 % pt/yr, and its standard deviation of return was 0.61 %/ year higher. Over the same time span it out returned the Vanguard U.S. managed portfolio by 1.10 % pt/yr, but its standard deviation was 1.43 % pt/yr higher. So historically, Fidelity's Spartan Index portfolio was beaten by the Fidelity U.S. regular managed portfolio and out returned the Vanguard U.S. managed portfolio [Exhibits 1 & 2]. ***Both the Fidelity and Vanguard US index portfolios beat the Wilshire 5000 on average return, whether risk adjusted or not, since inception of the Fidelity index portfolio in 1989.*** [Exhibit 7].[25]

The Fidelity and Vanguard entire portfolios performed well compared to the World index. The Fidelity entire portfolio out returned the world index by 2.67 % pt/yr since 1977 and was the winner on return over all but the shortest two of the 27 spans considered. Of course, international funds have to pay taxes to foreign governments, so global indexes have a built-in advantage over global mutual funds. [Exhibits 1, 2, 3, 10, & 11].

Fidelity only has one international index fund, the International Index Fund. It tracks the EAFE index. Its inception date is quite recent, November 1997. Over the five years ending March 2004 it has under returned the EAFE index by a mere 0.02 % pt/yr. [See Morningstar].

[25] We are in the process of extending Kizer [2005] and Reinker & Tower [2005] to find out whether style choice or stock picking skill accounts for the superior performance of the managed funds.

Since 1987, the inception of the Fidelity international managed portfolio, the Fidelity portfolio under returns the EAFE index by a small 0.33 % pt/yr, while the Vanguard international managed portfolio beats it by a substantial 1.67 % pt/yr. [Exhibits 3 & 9].

11. FIDELITY VERSUS VANGUARD: SUMMARY

Exhibit 3 summarizes the exhibits by reporting the performance of Fidelity portfolios from their inception and comparing them with their corresponding Vanguard portfolios and indexes. Of particular interest is how Vanguard and Fidelity portfolios have fared since the peak of the market bubble early in 2000. The last column in the figure shows Fidelity's portfolios to have fared considerably worse than Vanguard's during that time. This is consistent with the idea that Fidelity investors take on more risk than Vanguard investors do.

Exhibit 12 provides a visual interpretation of some of the material in Exhibit 3. It shows the return differential and the standard deviation differential between each Fidelity portfolio and its Vanguard counterpart, for the life of each Fidelity portfolio. For this collection of portfolios in all but three cases the Fidelity return is lower and in all cases the Fidelity standard deviation is higher. One case where Fidelity out returns is the crucially important regular U.S. diversified portfolio, which constitutes 80% of the Fidelity entire portfolio.

Fidelity managed fund portfolios typically have higher standard deviations than do the comparable portfolios made up of corresponding Vanguard funds. This is surprising, as Fidelity funds typically hold a larger proportion of their assets as cash. We need to cite numbers here. [Exhibit 12].

If Fidelity were to have lowered its expenses to that of Vanguard, for the entire portfolio it would have raised the return contests it won from 19 to 24 out of 27 spans and the risk adjusted return contest from 9 to 15 out of 23 spans. Thus expenses affect the likelihood of winning these contests substantially.

To assess the role of expenses and turnover, we regressed the risk-adjusted annual continuously compounded return differential favoring Fidelity over Vanguard over the life of each Fidelity portfolio on the average expense ratio and turnover differentials. Our regression equation is:

Return = -0.479 * Expense Ratio - 0.0335 * Turnover + 1.00; $R^2 = 0.494$

(0.207) (1.74)

where the t's are in parentheses. This equation implies that each one percentage point increase in the expense differential reduces the return differential by almost half a % pt/yr and each 100 percentage point increase in turnover reduces the return differential by over three % pt/yr. We note the statistical weakness of the relationship.

Exhibit 13 graphs this risk-adjusted return differential versus the weighted average of the Expense ratio and turnover, where the weighs are the absolute values of the coefficients from the regression. ***It shows how high differentials for average expense ratios and turnover reduce the risk-adjusted return differential. It also shows that on a risk adjusted basis Fidelity loses to the corresponding Vanguard portfolio in six out of seven cases.***

12. CONCLUSION

We have presented lots of data here. Our conclusions defy simple summary. It is tempting to look just at the longest spans, but performance contests depend on the time period involved. Still, as a matter of history, since January 1977, the year after Vanguard founded the first index fund, an investor who bought and held the Fidelity entire portfolio would have earned 0.33 % pt/yr more with higher risk than one who bought and held the Vanguard entire portfolio and 0.70% % pt/yr less with the same risk; part of this latter differential is likely explained by Vanguard's expense ratio being 0.40 % age points lower than Fidelity's and Vanguard's turnover rate being 69 % age points lower. But it is

not clear how far back an investigator should look to help make a guess about future performance.

In reflecting on all these calculations we also conclude that Fidelity portfolios are riskier than Vanguard portfolios,[26] Fidelity investors have done a bad job picking sector funds, although sector funds may be good investments if chosen sensibly and investors should avoid Fidelity Advisor funds with high loads and expenses.

Malkiel [2003, p.374] comments:

> I have often said that the two best things that have happened to the mutual-fund industry are the arrival of Jack Bogle (who started the low-cost consumer-friendly Vanguard Group of mutual funds during the mid-1970s) and Don Phillips (who in the early 1990s initiated the extremely useful Morningstar Service, which publishes information on mutual funds." Malkiel [2003, p.374].[27]

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[26] William Bernstein has suggested to us that Fidelity is basically a growth house and Vanguard a value house which could explain most, if not more than most, of the difference.

[27] With regard to the second half of the comment, Dan Wiener tells us that Joe Mansueto founded Vanguard, while Phillips was hired by Mansueto as its editor. Also, while we find the Morningstar service marvelously helpful, we would appreciate more information about exactly what day of the year the data applies to, wish that Morningstar would publish data on funds that have been killed, and lament the incorrect data on net assets which Morningstar typically publishes for the first and second complete years of operation of funds, although Morningstar has corrected the figures for Vanguard and has responded enthusiastically to correct erroneous data. We also wish that CRSP and Morningstar would publish the date at which a fund was acquired by a fund family, rather than the inception date of a fund, which may be much earlier, but part of the blame here may lie with the failure of fund families to provide this data automatically. Fidelity reports that dates are identical for the inception and acquisition for all of their funds, but this is not the case with Vanguard.

Finally, we are curious to know why there are so many discrepancies between the data from Morningstar , CRSP and mutual fund companies. We have attempted to resolve differences by using the more reasonable number. These differences are particularly noticeable for expense ratios. Morningstar tells us that it uses data submitted to it by fund companies and often these data are subsequently updated by the company but not Morningstar.

Researchers in this area should be aware that funds change their names frequently, so it is easier to categorize funds by their CRSP identification numbers and their names. This makes categorizing funds tricky. For example the fund with CRISP ID 00816 was at one point in its life an advisor fund, but was a regular fund before and after that period. Also in 1989 the CRISP ID applies to an automotive and a government bond mutual fund. Morningstar and CRSP could with relatively low cost develop programs to check their work for consistency . The moral for researchers is that for accuracy it is essential to double check unreasonably high and low numbers and to examine the data for unusual patterns and mutual fund names. We would like to see fund families publish these figures with information about exactly how they are calculated.

Since January 1994 both of the entire portfolios have had almost identical returns, with a bigger bubble in 2000 for Fidelity. Since January 1994 both of the two U.S. managed portfolios and the Wilshire 5000 index have all had almost identical returns. Since 1977 the two U.S. managed portfolios have beaten the Wilshire 5000 index whether or not the returns are risk adjusted. Since 1987, the inception of the Fidelity international managed portfolio, the Vanguard international managed portfolio has beaten the EAFE index by a considerable margin and the Fidelity international portfolio has lost to it by only a bit whether or not the returns are risk adjusted. All this leads us to conclude that both fund companies and their founders deserve accolades. [Exhibits 4, 5, 10 & 11].[28][29]

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Another data quirk is that percents of fund assets invested in stocks are reported by CRSP, but for earlier years, zero is reported for all funds, so a simple screen on stock percentage leads to erroneous results. For example, our initial calculations excluded the early years of the Fidelity Magellen fund for this reason, and significantly under calculated the return to the Fidelity portfolio as a result.

[28] Daniel Wiener helped us bring an earlier draft of the paper into focus with his comment: "My sense here is that, overall, neither fund family comes out as superior, yet both are superior to indexes in general. As both Jim [James H. Lowell III] and I have noted for years, Fidelity tends to be riskier, and its returns are better, but investors, as you note, are horrible sector investors. Vanguard is cheaper, but they actually do their active funds a disservice by harping on the benefits of indexing when, in fact, the value of lower expenses accrues across the board to active as well as passive ones."

[29] Surowiecki [2004, p.33] citing Bogle [2001, p. 20] argues "Between 1984 and 1999, for instance, almost 90 percent of mutual-fund managers underperformed the Wilshire 5000 index, a relatively low bar. … Wharton professor J. Scott Armstrong wrote, "I could find no studies that showed an important advantage for expertise." He draws the conclusion that the market is smarter than the managers. Our examination of Vanguard and Fidelity concludes that the U.S. managed diversified portfolio beat the Wilshire 5000 on both a risk adjusted and non risk adjusted basis since 1977. Moreover the international portfolios of Fidelity and Vanguard have performed creditably relative to the EAFE index. The sector fund portfolios and the advisor managed U.S. portfolio do support the Surowiecki thesis, however.

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EXHIBIT 1

Average Returns for Portfolios and Indexes									
Name	inception	Average return from							
		1977	1982	1984	1987	1989	1991	1996	2000
FIDELITY		bold means beat corresponding Vanguard portfolio							
		underline means beat corresponding index							
US Managed	1977	**9.30**	**11.56**	**10.61**	**9.68**	**9.90**	**10.74**	6.57	-5.92
Advisor US Managed	1984	n.a.	n.a.	8.46	7.52	**7.88**	**9.71**	5.35	-7.96
Spartan Index	1989	n.a.	n.a.	n.a.	n.a.	8.87	9.19	**6.78**	-7.50
Select Sector Asset wtd	1982	n.a.	7.33	5.37	6.51	**7.85**	8.05	5.37	-10.95
Sel Sector Equally wtd	1982	n.a.	**11.14**	**9.98**	**10.11**	**11.42**	**12.68**	**9.41**	**1.37**
Adv Sector Asset wtd	1996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.26	-8.75
Adv Sector Equally wtd	1996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**9.24**	-3.90
International Managed	1987	n.a.	n.a.	n.a.	2.67	1.75	2.42	2.67	**-5.69**
Advisor Intl Managed	1996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**4.39**	**-6.71**
Entire	1977	**9.05**	**11.25**	**10.18**	**9.30**	**9.50**	**10.31**	**5.24**	-5.94
VANGUARD		bold means beat corresponding Fidelity portfolio							
		underline means beat corresponding index							
Treasury Money	1977	7.66	2.56	2.20	1.78	1.73	1.56	1.62	0.70
US Managed	1977	8.68	9.90	8.80	7.79	7.77	9.61	**6.62**	**-2.93**
US Index	1977	7.66	10.06	9.42	8.51	**8.90**	**9.31**	6.76	**-7.14**
International Managed	1982	n.a.	8.48	7.55	**4.67**	**4.67**	**4.29**	**2.69**	-6.13
International Index	1991	n.a.	n.a.	n.a.	n.a.	n.a.	3.47	1.24	-7.07
Entire	1977	8.72	10.00	8.95	7.71	7.61	9.16	5.03	**-4.45**
INDEXES bold means beat both corresponding Fidelity and Vanguard portfolios									
S&P 500	1977	8.02	10.00	9.54	8.77	8.90	9.03	**6.82**	-7.64
Wilshire 5000	1977	8.19	9.41	8.97	8.39	8.59	9.11	6.55	-6.96
EAFE	1977	6.84	7.08	7.43	3.00	0.58	2.67	0.84	-8.15
World	1977	6.38	7.64	7.53	5.00	3.56	5.10	3.34	-8.61

EXHIBIT 2

Average Standard Deviations for Portfolios and Indexes								
Name	**inception**	**Standard deviation from**						
		1977	**1982**	**1984**	**1987**	**1989**	**1991**	**1996**
FIDELITY	**bold means beat corresponding Vanguard portfolio**							
	underline means beat corresponding index							
US Managed	1977	16.25	16.50	17.03	17.46	18.11	18.02	19.45
Advisor US Managed	1984	n.a.	n.a.	17.41	18.63	19.37	19.18	21.66
Spartan Index	1989	n.a.	n.a.	n.a.	n.a.	18.72	18.90	21.65
Select Sector Asset wtd	1982	n.a.	21.20	21.27	22.31	23.37	24.32	28.11
Sel Sector Equally wtd	1982	n.a.	**15.16**	**15.42**	**15.56**	**16.36**	**16.15**	**17.05**
Adv Sector Asset wtd	1996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	22.12
Adv Sector Equally wtd	1996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	23.91
International Managed	1987	n.a.	n.a.	n.a.	21.11	22.36	23.28	27.42
Advisor Intl Managed	1996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	24.60
Entire	1977	16.08	16.35	16.84	17.25	17.91	17.82	19.48
VANGUARD	**bold means beat corresponding Fidelity portfolio**							
	underline means beat corresponding index							
Treasury Money	1977	2.44	2.04	1.72	1.43	1.51	1.48	1.70
US Managed	1977	**14.31**	**15.40**	**15.76**	**16.76**	**17.29**	**16.88**	**19.09**
US Index	1977	16.10	16.04	16.76	17.63	**18.65**	**18.79**	**21.44**
International Managed	1982	n.a.	20.23	20.17	**17.46**	**18.46**	**18.37**	**20.29**
International Index	1991	n.a.	n.a.	n.a.	n.a.	n.a.	**18.54**	**21.58**
Entire	1977	**14.06**	**15.07**	**15.44**	**16.18**	**16.88**	**16.54**	**19.06**
INDEXES bold means beat both corresponding Fidelity and Vanguard								
S&P 500	1977	15.53	15.66	16.38	17.24	18.35	18.60	21.49
Wilshire 5000	1977	15.40	15.84	16.53	17.26	18.29	18.43	20.99
EAFE	1977	21.82	23.30	23.98	19.31	19.28	18.91	21.68
World	1977	16.40	17.36	18.04	16.86	17.55	17.27	20.80

EXHIBIT 3

Characteristics of Fidelity Funds From Inception: Differentials are values for Fidelity minus values for corresponding Vanguard Portfolio. Fidelity minus index is the average return of the Fidelity portfolio minus that of the corresponding index (%). Risk is mean absolute deviation from mean return.

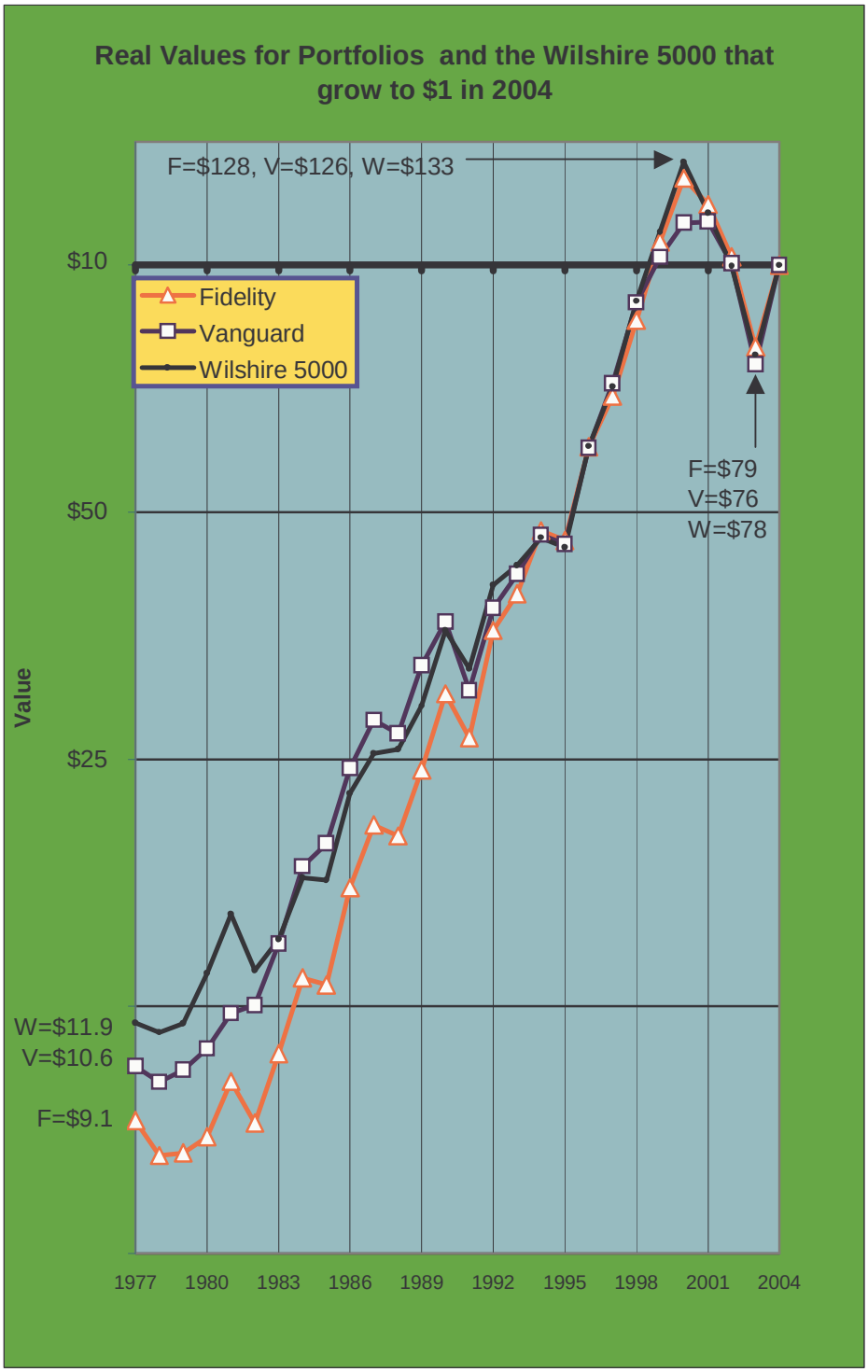
Name		US Managed	Advisor US Managed	Spartan Index	Select Sector Asset wtd	Sel Sector Equally wtd	Adv Sector Asset wtd	Adv Sect Equally wtd	International Managed	Advisor Intl Managed	Entire
Start year		1977	1984	1989	1982	1982	1996	1996	1987	1996	1977
Differentials: Fido minus Van	Avg retn	**0.62**	-0.34	-0.04	-2.57	**1.24**	-1.35	**2.62**	-2.00	**1.71**	**0.33**
	SD	1.94	1.65	0.06	5.80	**-0.24**	3.04	3.86	3.65	4.31	2.02
	RA retn	-0.39	-1.06	-0.06	-4.01	**1.37**	-1.90	**1.24**	-2.16	**1.18**	-0.70
	Avg exp	0.17	0.42	0.05	0.56	n.a.	0.63	n.a.	0.73	0.57	0.40
	Avg TO	66	54	-3	94	n.a.	86	n.a.	53	38	69
Probability: Fido's long run	retn > Van's	**75.9**	27.4	44.1	29.0	**77.9**	42.3	**61.6**	25.3	**76.6**	63.1
	risk < Van's	0.2	8.2	46.8	21.5	**59.7**	16.4	**97.2**	36.0	16.0	0.1
Spans where Fido is better	Not RA	**19/27**	0/12	4/15	1/22	**22/22**	0/8	**5/8**	7/17	**7/8**	**19/27**
	RA	**17/22**	4/10	1/10	0/21	**20/20**	0/4	**4/7**	5/15	**5/6**	**14/22**
Fidelity retn minus index retn	Not RA	**1.11**	-0.51	**0.27**	-2.57	**1.24**	-1.28	**2.69**	-0.32	**3.56**	**2.67**
	RA	**0.67**	-0.86	**0.1**	-4.01	**1.37**	-1.49	**1.99**	-0.41	**3.20**	**2.77**
Fido minus Van retn 2000-04		-3.00	-1.00	-0.36	-8.02	**4.30**	-5.82	-0.97	**0.44**	-0.58	-1.48
Portfolio share 2004		79.79	1.56	7.97	5.09	n.a.	0.02	n.a.	5.41	0.17	100.00

EXHIBIT 4

The Fidelity U.S. Managed Portfolio vs. the Vanguard U.S. Managed Portfolio and the Wilshire 5000 Index (%)												
	Average real return		*Standard deviation*		*Expense ratio*		*Turnover*		*Average real return differential vs*			
									Vanguard		*Wilshire 5000*	
Start year	*Fido*	*Van*	*Fido*	*Van*	*Fido*	*Van*	*Fido*	*Van*	*Not RA*	*RA*	*Not RA*	*RA*
2003	25.85	**32.08**			0.84	**0.50**	51	**38**	-6.24		-2.72	
2002	-1.15	**-0.25**	**34.08**	40.13	0.85	**0.48**	56	**42**	-0.90		-1.25	
2001	-5.52	**-4.00**	**25.70**	29.63	0.84	**0.46**	63	**42**	-1.53		-0.76	
2000	-5.92	**-2.93**	**21.06**	24.21	0.82	**0.40**	68	**40**	-3.00		**1.04**	
1999	-1.30	**-0.45**	**21.14**	21.53	0.79	**0.39**	69	**39**	-0.86		**0.54**	
1998	**2.61**	1.75	21.33	**19.88**	0.77	**0.39**	68	**40**	**0.85**	**0.76**	**0.92**	**0.94**
1997	**5.40**	4.84	20.79	**19.97**	0.76	**0.37**	69	**39**	**0.56**	**0.39**	**0.42**	**0.66**
1996	6.57	**6.62**	19.45	**19.09**	0.77	**0.39**	76	**38**	-0.04	-0.15	**0.03**	**0.42**
1995	8.96	**9.08**	19.61	**19.39**	0.78	**0.44**	79	**37**	-0.12	-0.20	-0.23	**0.39**
1994	7.74	**7.86**	18.96	**18.76**	0.80	**0.45**	82	**36**	-0.12	-0.19	-0.20	**0.32**
1993	**8.74**	8.20	18.23	**17.81**	0.81	**0.43**	86	**35**	**0.54**	**0.36**	**0.78**	**1.22**
1992	**8.91**	8.35	17.38	**16.98**	0.83	**0.36**	92	**35**	**0.56**	**0.37**	**1.14**	**1.59**
1991	**10.74**	9.61	18.02	**16.88**	0.84	**0.38**	94	**34**	**1.13**	**0.49**	**1.63**	**1.82**
1990	**8.97**	7.41	18.45	**17.91**	0.85	**0.43**	97	**33**	**1.56**	**1.32**	**1.38**	**1.42**
1989	**9.90**	7.77	18.11	**17.29**	0.85	**0.46**	97	**32**	**2.13**	**1.72**	**1.31**	**1.38**
1988	**10.52**	8.56	17.64	**16.97**	0.87	**0.51**	96	**33**	**1.96**	**1.60**	**1.66**	**1.68**
1987	**9.68**	7.79	17.46	**16.76**	0.88	**0.46**	97	**33**	**1.88**	**1.54**	**1.28**	**1.19**
1986	**10.19**	8.16	17.05	**16.31**	0.88	**0.55**	97	**33**	**2.03**	**1.64**	**1.61**	**1.45**
1985	**11.21**	8.92	17.17	**16.17**	0.89	**0.58**	98	**32**	**2.29**	**1.71**	**1.70**	**1.47**
1984	**10.51**	8.80	17.03	**15.76**	0.89	**0.69**	98	**33**	**1.72**	**1.03**	**1.54**	**1.28**
1983	**11.11**	9.49	16.80	**15.68**	0.89	**0.74**	98	**34**	**1.62**	**0.97**	**1.68**	**1.35**
1982	**11.56**	9.90	16.50	**15.40**	0.89	**0.84**	100	**34**	**1.66**	**0.97**	**2.15**	**1.74**
1981	**10.47**	9.56	16.87	**15.15**	0.88	**0.70**	101	**33**	**0.91**	**0.01**	**2.23**	**1.94**
1980	**10.72**	9.59	16.53	**14.82**	0.88	**0.68**	102	**34**	**1.14**	**0.17**	**2.09**	**1.83**
1979	**10.48**	9.45	16.25	**14.54**	0.88	**0.67**	102	**34**	**1.03**	**0.03**	**1.59**	**1.31**
1978	**10.09**	9.21	16.07	**14.31**	0.88	**0.70**	101	**34**	**0.87**	-0.14	**1.46**	**1.14**
1977	**9.30**	8.68	16.25	**14.31**	0.87	**0.70**	99	**33**	**0.62**	-0.39	**1.11**	**0.67**

EXHIBIT 5

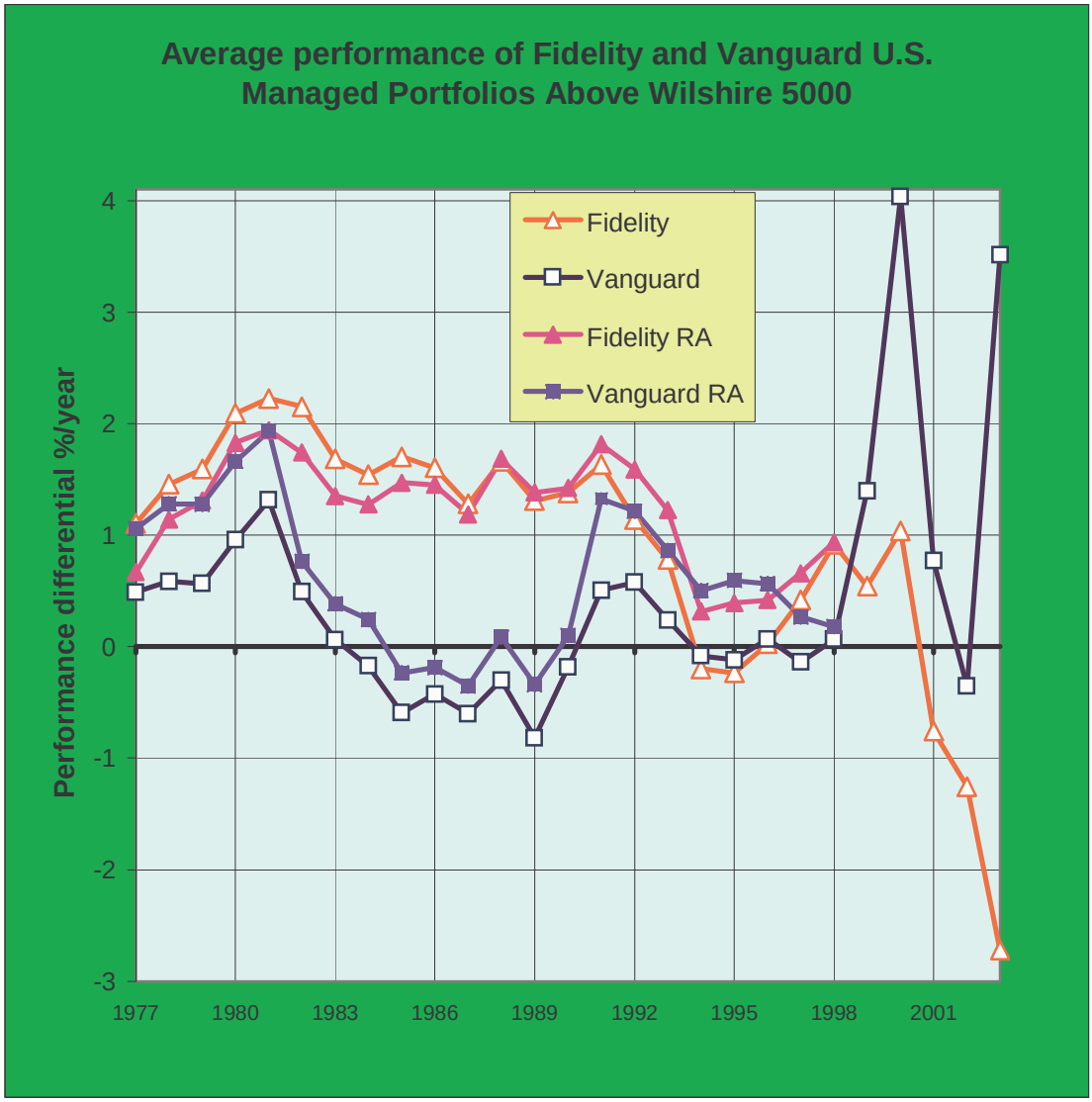
Real Values for US Managed Portfolios of Fidelity & Vanguard and the Wilshire 5000 that grow to $100 in 2004



A tie from 1994 onward, with the smallest 2002 bubble for Vanguard. Both Fidelity and Vanguard beat the Wilshire 5000 from 1977. Fidelity beats Vanguard from 1977.

EXHIBIT 6

Average Performance of Fidelity & Vanguard US Managed Portfolios above the Wilshire 5000



On both return and risk adjusted return: the Vanguard U.S. Managed Portfolio beats the Wilshire 5000 index for all spans starting prior to 1984; the Fidelity U.S. Managed Portfolio beats the Wilshire 5000 index for all spans starting prior to 1994.

EXHIBIT 7
Differential Average Returns for US Index Portfolios:
Fidelity and Vanguard minus Wilshire 5000

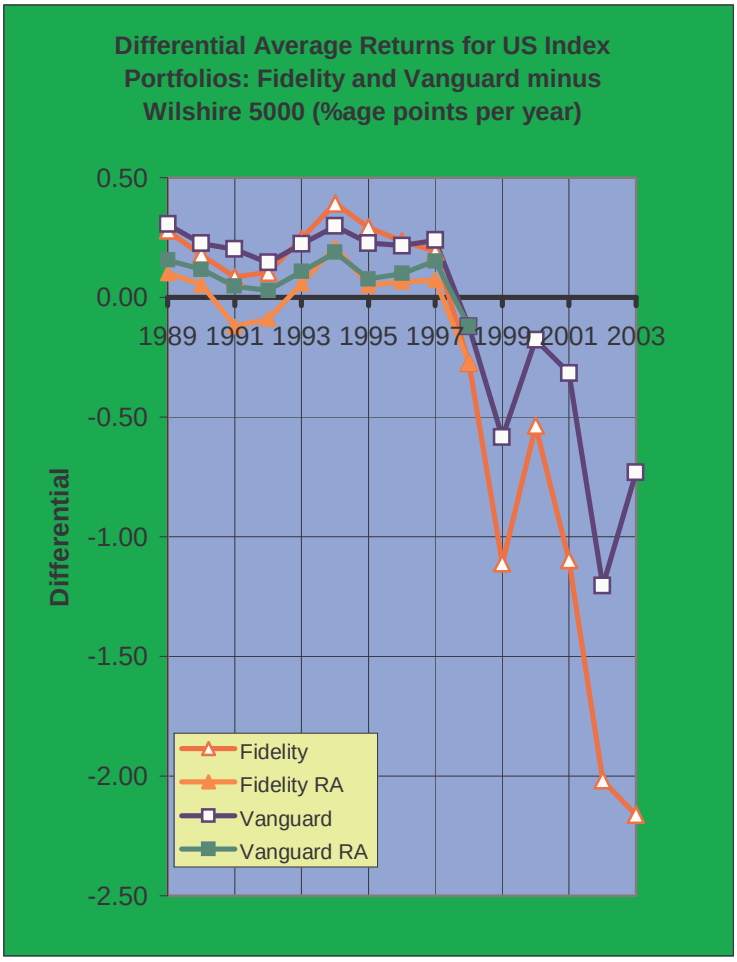
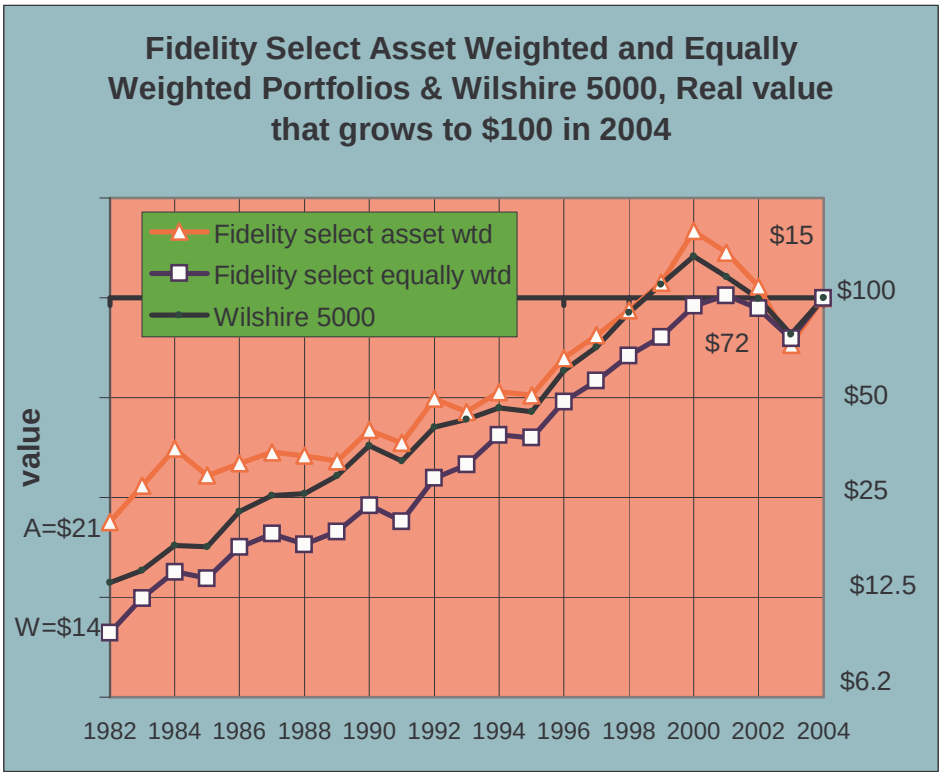
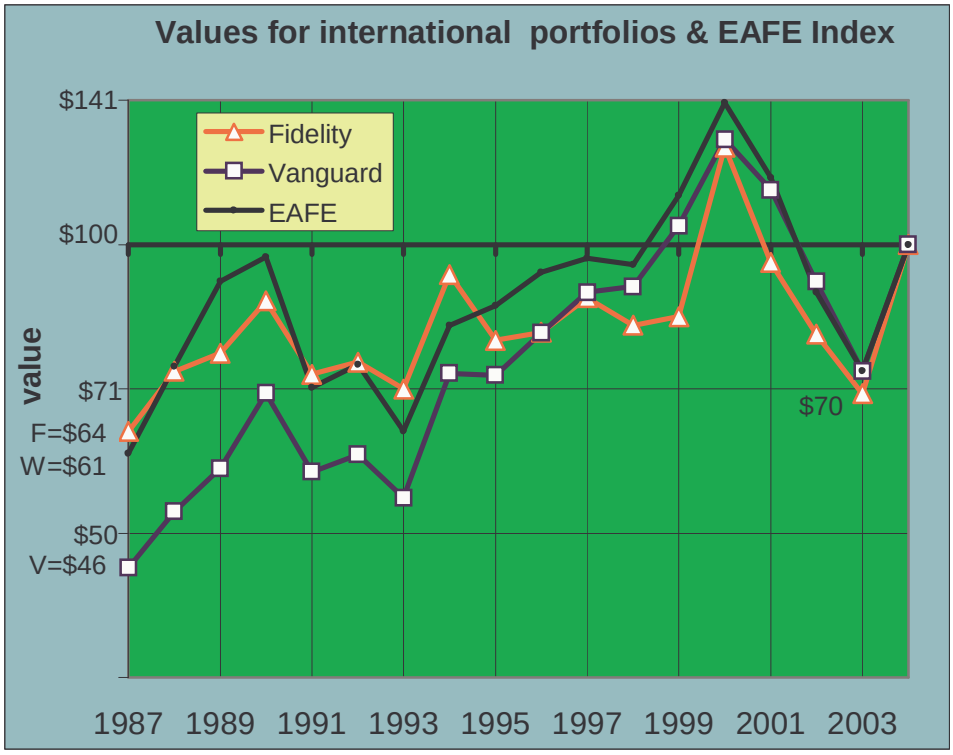


EXHIBIT 8
Real Values for Fidelity Select Sector Portfolios & the Wilshire 5000 Index that Grow to $1 in January 2004



The asset weighted loses to the Wilshire 5000 with a bigger bubble in 2000; the equal weighted beats the Wilshire 5000 with a smaller bubble in 2000

EXHIBIT 9
Real Values for Fidelity & Vanguard International Managed Portfolios and the EAFE Index that Grow to $100 in January



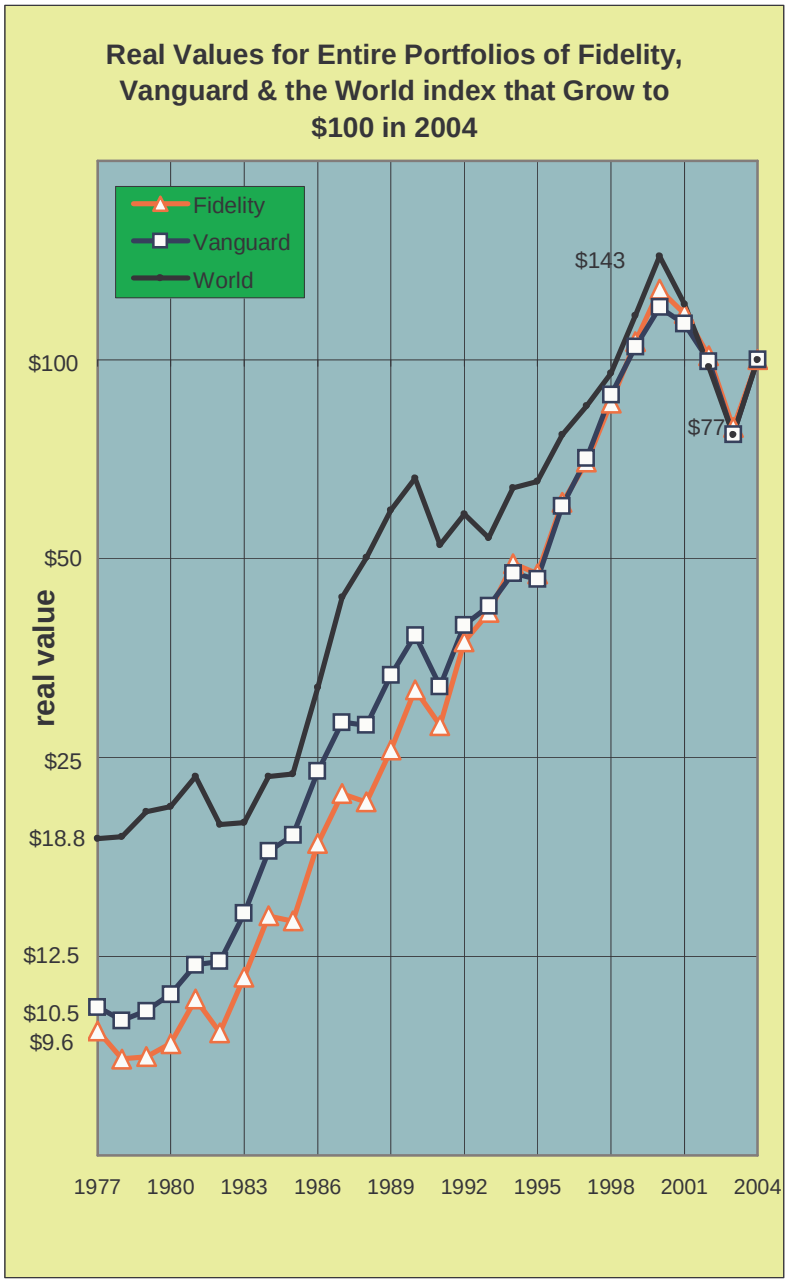
Vanguard beats EAFE, which beats Fidelity

EXHIBIT 10

The Fidelity Entire Portfolio vs. the Vanguard Entire Portfolio and the World Index (%)												
	Average real return		Standard deviation		Expense ratio		Turnover		Average real return differential vs			
									Vanguard		World	
Start year	Fido	Van	Fido	Van	Fido	Van	Fido	Van	Not RA	RA	Not RA	RA
2003	26.74	**29.94**			0.81	**0.31**	49	**20**	-28.94		-3.28	
2002	-0.67	**0.28**	**34.57**	37.16	0.81	**0.31**	53	**20**	-0.95		-1.94	
2001	-5.21	**-4.07**	**26.13**	27.83	0.80	**0.31**	60	**22**	-1.14		**0.99**	
2000	-5.94	**-4.45**	**21.48**	22.81	0.78	**0.30**	64	**23**	-1.48		**2.67**	
1999	-1.23	**-0.88**	**21.56**	21.23	0.76	**0.30**	65	**22**	-0.35		**1.79**	
1998	**2.55**	2.07	21.47	**20.27**	0.74	**0.30**	65	**23**	**0.48**	**0.40**	**1.75**	**1.68**
1997	**5.24**	5.03	20.82	**20.12**	0.73	**0.30**	66	**23**	**0.21**	**0.08**	**2.91**	**2.97**
1996	6.42	**6.58**	19.48	**19.06**	0.75	**0.30**	73	**23**	-0.16	-0.27	**3.08**	**3.20**
1995	8.65	**8.88**	19.42	**19.15**	0.77	**0.31**	76	**23**	-0.23	-0.33	**3.82**	**3.90**
1994	7.36	**7.73**	18.83	**18.48**	0.78	**0.32**	79	**23**	-0.37	-0.48	**2.79**	**2.78**
1993	**8.35**	8.12	18.10	**17.55**	0.80	**0.32**	83	**23**	**0.23**	**0.00**	**2.54**	**2.57**
1992	**8.53**	8.01	17.26	**16.75**	0.81	**0.32**	88	**23**	**0.52**	**0.29**	**3.95**	**4.08**
1991	**10.31**	9.16	17.82	**16.54**	0.82	**0.33**	91	**24**	**1.15**	**0.46**	**5.21**	**4.91**
1990	**8.56**	7.10	18.24	**17.43**	0.84	**0.33**	93	**23**	**1.46**	**1.13**	**5.56**	**5.51**
1989	**9.50**	7.61	17.91	**16.88**	0.85	**0.34**	93	**23**	**1.89**	**1.40**	**5.94**	**5.77**
1988	**10.11**	8.29	17.44	**16.50**	0.85	**0.35**	92	**23**	**1.83**	**1.33**	**5.70**	**5.61**
1987	**9.30**	7.71	17.25	**16.18**	0.86	**0.36**	93	**24**	**1.59**	**1.08**	**4.30**	**4.12**
1986	**9.82**	8.29	16.85	**15.87**	0.87	**0.37**	94	**25**	**1.53**	**1.02**	**3.27**	**3.56**
1985	**10.85**	9.12	17.00	**15.83**	0.88	**0.38**	95	**25**	**1.73**	**1.06**	**2.95**	**3.45**
1984	**10.18**	8.95	16.84	**15.44**	0.88	**0.39**	96	**25**	**1.23**	**0.49**	**2.64**	**3.04**
1983	**10.79**	9.62	16.63	**15.36**	0.88	**0.41**	96	**26**	**1.16**	**0.44**	**2.80**	**3.17**
1982	**11.25**	10.00	16.35	**15.07**	0.88	**0.42**	98	**27**	**1.25**	**0.47**	**3.60**	**3.94**
1981	**10.17**	9.60	16.71	**14.87**	0.88	**0.44**	99	**27**	**0.57**	-0.37	**3.65**	**3.90**
1980	**10.44**	9.65	16.38	**14.54**	0.88	**0.44**	100	**27**	**0.79**	-0.22	**3.74**	**4.00**
1979	**10.21**	9.51	16.09	**14.27**	0.88	**0.45**	100	**28**	**0.70**	-0.33	**3.70**	**3.96**
1978	**9.83**	9.26	15.91	**14.05**	0.87	**0.46**	99	**28**	**0.57**	-0.48	**3.22**	**3.46**
1977	**9.05**	8.72	16.08	**14.06**	0.87	**0.47**	97	**28**	**0.33**	-0.70	**2.67**	**2.77**

EXHIBIT 11

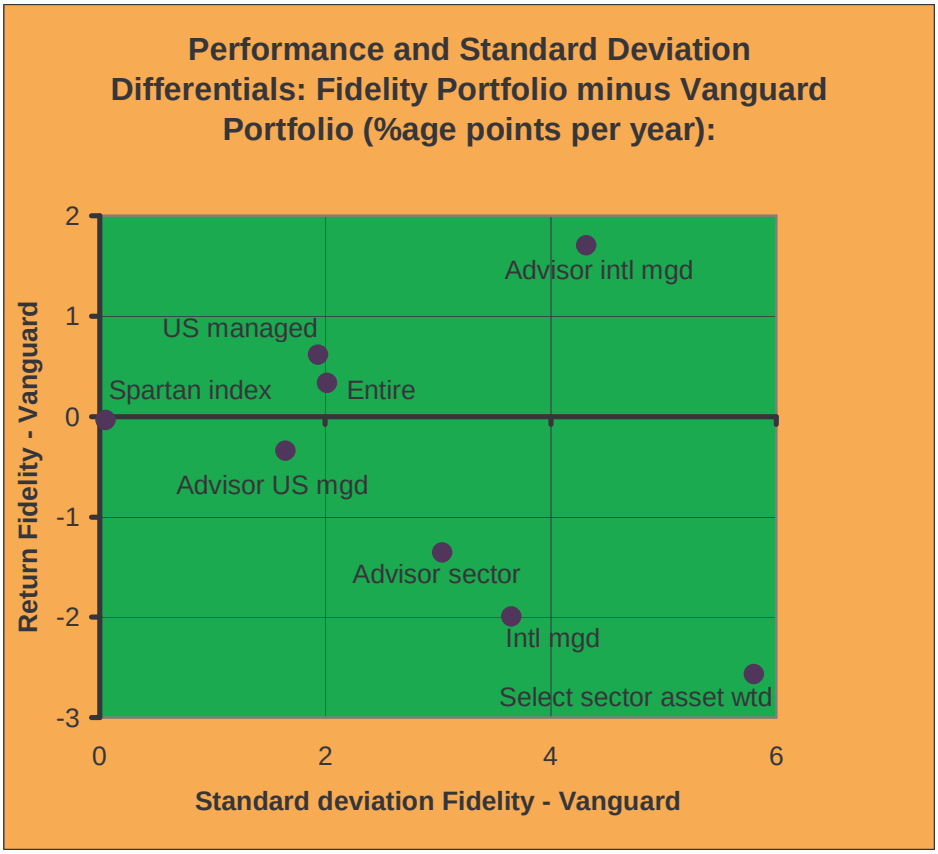
Real Values for Entire Portfolios of Fidelity, Vanguard & the World index that grow to $100 in 2004



Fidelity beats Vanguard but they are tied from 1994, with a smaller bubble for Vanguard. The decline from the 2000 peak is largest for the World index.

EXHIBIT 12

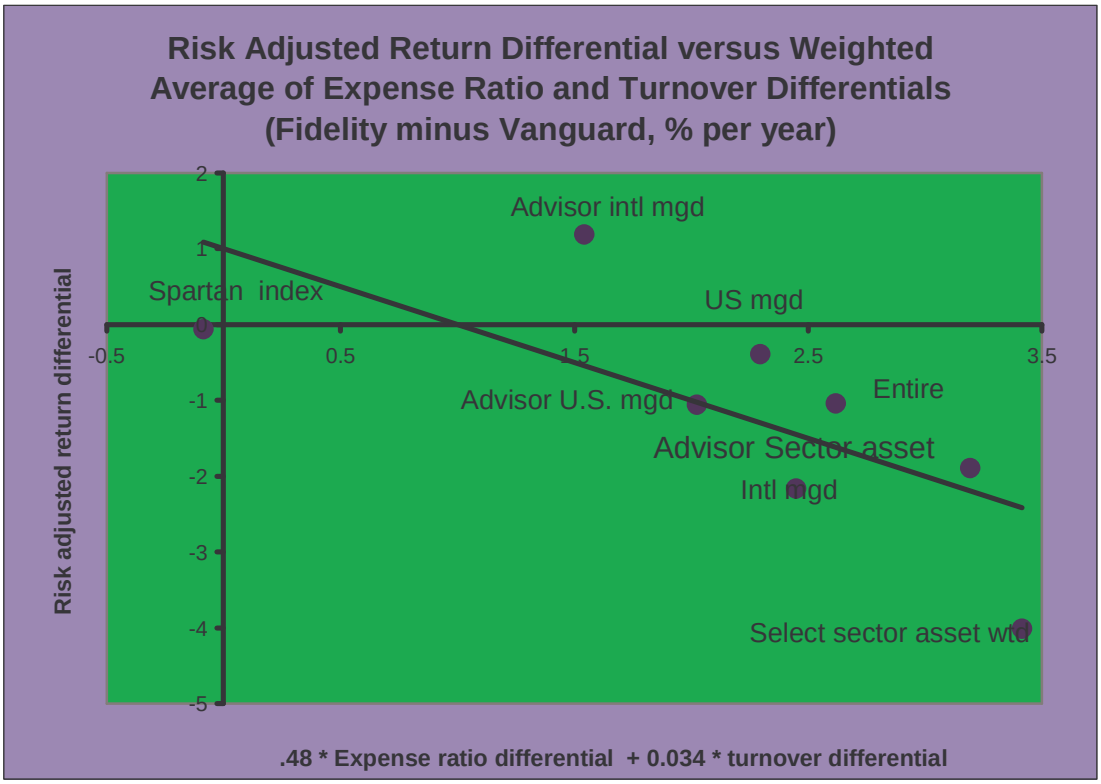
Performance Differentials over the Lives of Diversified Fidelity Portfolios



Fidelity has higher standard deviations.

EXHIBIT 13

Risk Adjusted Return Differential (Fidelity minus Vanguard) Explained by Expense Ratio & Turnover



High expenses and turnover differential shrinks return differential

APPENDIX A (NOT FOR PUBLICATION)

EXHIBIT A1*

The Indexes (%)								
	Average annual real return				Standard deviation of return			
Year	S&P 500	Wilshire 5000	EAFE	World	S&P 500	Wilshire 5000	EAFE	World
2003	25.68	**28.57**	35.37	30.02				
2002	-1.81	**0.10**	5.86	1.27	**34.62**	35.80	37.19	36.15
2001	-6.33	**-4.77**	-5.22	-6.20	**26.16**	27.16	32.50	29.08
2000	-7.64	**-6.96**	-8.15	-8.61	**21.67**	22.83	27.50	24.48
1999	-2.82	**-1.85**	-2.32	-3.02	**21.86**	23.11	27.45	24.96
1998	1.53	**1.69**	0.81	0.80	22.52	**22.40**	25.57	24.20
1997	**5.07**	4.98	0.47	2.33	22.70	**22.27**	23.41	22.35
1996	**6.82**	6.55	0.84	3.34	21.49	**20.99**	21.68	20.80
1995	**9.54**	9.20	1.64	4.83	21.77	**21.26**	20.36	19.89
1994	**8.40**	7.94	1.96	4.57	20.94	**20.52**	19.20	18.80
1993	**8.26**	7.96	4.15	5.81	19.89	**19.47**	19.74	18.26
1992	**7.94**	7.77	2.43	4.58	19.03	**18.60**	19.75	17.96
1991	9.03	**9.11**	2.67	5.10	18.60	**18.43**	18.91	17.27
1990	**7.76**	7.59	0.22	3.00	**18.50**	18.58	19.98	18.11
1989	**8.90**	8.59	0.58	3.56	18.35	**18.29**	19.28	17.55
1988	**9.07**	8.86	1.85	4.41	17.73	**17.69**	19.32	17.26
1987	**8.77**	8.39	3.00	5.00	**17.24**	17.26	19.31	16.86
1986	**9.07**	8.58	5.67	6.55	**16.75**	16.76	23.26	17.85
1985	**9.94**	9.51	7.64	7.89	**16.71**	16.78	24.59	18.43
1984	**9.54**	8.97	7.43	7.53	**16.38**	16.53	23.98	18.04
1983	**9.93**	9.43	7.96	7.99	**16.04**	16.23	23.46	17.68
1982	**10.00**	9.41	7.08	7.64	**15.66**	15.84	23.30	17.36
1981	**8.74**	8.24	6.10	6.52	**16.29**	16.33	23.24	17.71
1980	**9.06**	8.63	6.19	6.70	**15.99**	16.07	22.73	17.33
1979	**9.04**	8.88	5.77	6.50	**15.65**	15.76	22.39	17.01
1978	**8.66**	8.63	6.43	6.60	**15.47**	15.52	22.17	16.67
1977	8.02	**8.19**	6.84	6.38	15.53	**15.40**	21.82	16.40

* Figures in the Exhibits showing superior return are bolded.

EXHIBIT A2

The Vanguard Family's U.S. Funds (%)										
	Average real return			Standard deviation			Expense ratio		Turnover	
Year	Treas money	Indx	Mgd	Treas money	Indx	Mgd	indx	Mgd	Indx	Mgd
2003	-1.04	27.84	**32.08**				**0.20**	0.50	**11**	38
2002	-0.94	-1.10	**-0.25**	0.13	**36.29**	40.13	**0.20**	0.48	**11**	42
2001	0.16	-5.08	**-4.00**	1.94	**27.04**	29.63	**0.20**	0.46	**10**	42
2000	0.70	-7.14	**-2.93**	1.91	**22.67**	24.21	**0.19**	0.40	**11**	40
1999	0.92	-2.43	**-0.45**	1.73	22.43	**21.53**	**0.19**	0.39	**11**	39
1998	1.32	1.57	**1.75**	1.83	22.44	**19.88**	**0.19**	0.39	**11**	40
1997	1.61	**5.22**	4.84	1.84	22.78	**19.97**	**0.19**	0.37	**10**	39
1996	1.62	**6.76**	6.62	1.70	21.44	**19.09**	**0.19**	0.39	**10**	38
1995	1.76	**9.42**	9.08	1.65	21.65	**19.39**	**0.20**	0.44	**10**	37
1994	1.70	**8.24**	7.86	1.57	20.84	**18.76**	**0.20**	0.45	**9**	36
1993	1.55	8.18	**8.20**	1.56	19.79	**17.81**	**0.20**	0.43	**9**	35
1992	1.47	7.92	**8.35**	1.51	18.92	**16.98**	**0.20**	0.36	**9**	35
1991	1.56	9.31	**9.61**	1.48	18.79	**16.88**	**0.20**	0.38	**9**	34
1990	1.57	7.81	**7.41**	1.43	18.88	**17.91**	**0.20**	0.43	**10**	33
1989	1.73	**8.90**	7.77	1.51	18.65	**17.29**	**0.20**	0.46	**9**	32
1988	1.79	**9.05**	8.56	1.48	18.02	**16.97**	**0.20**	0.51	**10**	33
1987	1.78	**8.51**	7.79	1.43	17.63	**16.76**	**0.20**	0.46	**10**	33
1986	1.95	**8.95**	8.16	1.57	17.18	**16.31**	**0.21**	0.55	**11**	33
1985	2.02	9.81	**8.92**	1.56	17.10	**16.17**	**0.21**	0.58	**12**	32
1984	2.20	**9.42**	8.80	1.72	16.76	**15.76**	**0.21**	0.69	**12**	33
1983	2.34	**9.76**	9.49	1.79	16.39	**15.68**	**0.22**	0.74	**13**	34
1982	2.56	**10.06**	9.90	2.04	16.04	**15.40**	**0.23**	0.84	**13**	34
1981	2.70	8.94	**9.56**	2.12	16.47	**15.15**	**0.23**	0.70	**13**	33
1980	2.59	9.27	**9.59**	2.14	16.17	**14.82**	**0.24**	0.68	**13**	34
1979	2.39	9.07	**9.45**	2.32	15.88	**14.54**	**0.24**	0.67	**14**	34
1978	2.24	8.58	**9.21**	2.39	15.77	**14.31**	**0.25**	0.70	**14**	34
1977	2.11	7.66	**8.68**	2.44	16.10	**14.31**	**0.25**	0.70	**13**	33

EXHIBIT A3

The Vanguard Family's International Funds (%)								
	Average real return		*Standard deviation*		*Expense ratio*		*Turnover*	
Year	*Indx*	*Mgd*	*Indx*	*Mgd*	*Indx*	*Mgd*	*Indx*	*Mgd*
2003	38.31	**35.45**			**0.34**	0.68	**7**	55
2002	7.18	**4.57**	39.07	**38.69**	**0.35**	0.67	**13**	46
2001	**-3.15**	-4.28	33.11	**31.74**	**0.34**	0.65	**10**	47
2000	-7.07	**-6.13**	28.50	**26.42**	**0.34**	0.62	**10**	48
1999	-1.42	**-0.90**	27.92	**25.84**	**0.34**	0.61	**10**	46
1998	0.91	**1.69**	25.45	**23.82**	**0.34**	0.61	**10**	44
1997	0.64	**1.64**	23.29	**21.76**	**0.35**	0.60	**9**	42
1996	1.24	**2.69**	21.58	**20.29**	**0.35**	0.59	**9**	41
1995	2.10	**3.55**	20.29	**19.09**	**0.35**	0.59	**8**	40
1994	2.30	**3.14**	19.13	**18.09**	**0.35**	0.57	**8**	39
1993	4.44	**5.68**	19.60	**19.43**	**0.35**	0.57	**8**	40
1992	3.05	**4.29**	19.33	**19.18**	**0.34**	0.56	**7**	41
1991	3.47	**4.29**	18.54	**18.37**	**0.34**	0.56	**8**	42
1990		2.58		18.69		0.56		41
1989		3.65		18.46		0.56		41
1988		4.08		17.89		0.56		40
1987		4.67		17.46		0.56		42
1986		6.79		19.87		0.56		41
1985		8.23		20.45		0.56		40
1984		7.55		20.17		0.57		40
1983		8.83		20.63		0.60		43
1982		8.48		20.23		0.62		45

EXHIBIT A4

The Fidelity Advisor U.S. Managed Portfolio vs. the Vanguard U.S. Managed Portfolio and the Wilshire 5000 index (%)												
	Average real return		Standard deviation		Expense ratio		Turnover		Average Real Return Differential vs			
									Vanguard		Wilshire 5000	
Start year	Fido	Van	Fido	Van	Fido	Van	Fido	Van	Not RA	RA	Not RA	RA
2003	28.76	**32.08**			0.67	**0.50**	82	**38**	-3.32		**0.19**	
2002	-2.73	**-0.25**	**39.09**	40.13	0.67	**0.48**	83	**42**	-2.48		-2.84	
2001	-6.93	**-4.00**	**29.13**	29.63	0.67	**0.46**	88	**42**	-2.93		-2.16	
2000	-7.96	**-2.93**	**24.03**	24.21	0.69	**0.40**	86	**40**	-5.04		-1.00	
1999	-3.25	**-0.45**	23.43	**21.53**	0.69	**0.39**	85	**39**	-2.80		-1.40	
1998	1.41	**1.75**	24.14	**19.88**	0.69	**0.39**	85	**40**	-0.34	-0.36	-0.28	-0.28
1997	4.32	**4.84**	23.27	**19.97**	0.70	**0.37**	86	**39**	-0.51	-0.93	-0.65	-0.78
1996	5.35	**6.62**	21.66	**19.09**	0.74	**0.39**	84	**38**	-1.26	-1.74	-1.19	-1.32
1995	8.26	**9.08**	22.19	**19.39**	0.75	**0.44**	84	**37**	-0.82	-1.70	-0.94	-1.23
1994	7.43	**7.86**	21.17	**18.76**	0.76	**0.45**	89	**36**	-0.43	-1.13	-0.51	-0.70
1993	8.02	**8.20**	20.13	**17.81**	0.77	**0.43**	94	**35**	-0.17	-0.98	**0.06**	-0.17
1992	8.20	**8.35**	19.20	**16.98**	0.78	**0.36**	89	**35**	-0.15	-0.99	**0.43**	**0.20**
1991	**9.71**	9.61	19.18	**16.88**	0.77	**0.38**	88	**34**	**0.10**	-0.97	**0.61**	**0.26**
1990	**7.44**	7.41	20.06	**17.91**	0.77	**0.43**	90	**33**	**0.03**	-0.66	-0.15	-0.62
1989	**7.88**	7.77	19.37	**17.29**	0.75	**0.46**	91	**32**	**0.10**	-0.64	-0.72	-1.09
1988	8.44	**8.56**	18.81	**16.97**	0.75	**0.51**	93	**33**	-0.12	-0.86	-0.42	-0.85
1987	7.52	**7.79**	18.63	**16.76**	0.74	**0.46**	96	**33**	-0.27	-0.93	-0.87	-1.33
1986	7.97	**8.16**	18.14	**16.31**	0.73	**0.55**	97	**33**	-0.18	-0.90	-0.61	-1.11
1985	8.65	**8.92**	17.85	**16.17**	0.73	**0.58**	98	**32**	-0.26	-1.00	-0.86	-1.29
1984	8.46	**8.80**	17.41	**15.76**	0.73	**0.69**	98	**33**	-0.34	-1.06	-0.51	-0.86

EXHIBIT A5

The Fidelity Spartan U.S. Index Portfolio vs. the Vanguard U.S. Index Portfolio and the Wilshire 5000 Index (%)												
	Average real return		Standard deviation		Expense ratio		Turnover		Average real return differential vs			
									Vanguard		Wilshire 5000	
Start year	Fido	Van	Fido	Van	Fido	Van	Fido	Van	Not RA	Risk adjstd	Not RA	Risk adjstd
2003	26.41	**27.84**			**0.195**	0.197	**7**	11	-1.43		-2.16	
2002	-1.91	**-1.10**	**35.57**	36.29	**0.191**	0.196	**6**	11	-0.81		-2.02	
2001	-5.86	**-5.08**	**26.52**	27.04	**0.188**	0.195	**7**	10	-0.78		-1.10	
2000	-7.50	**-7.14**	**22.08**	22.67	**0.189**	0.194	**8**	11	-0.36		-0.54	
1999	-2.96	**-2.43**	**21.78**	22.43	**0.189**	0.194	**7**	11	-0.53		-1.11	
1998	1.41	**1.57**	22.48	**22.44**	**0.189**	0.193	**6**	11	-0.15	-0.15	-0.27	-0.27
1997	5.17	**5.22**	22.97	**22.78**	**0.189**	0.193	**6**	10	-0.05	-0.08	**0.19**	**0.07**
1996	6.78	6.76	21.65	**21.44**	0.204	**0.195**	**6**	10	**0.02**	-0.03	**0.24**	**0.07**
1995	9.49	9.42	21.89	**21.65**	0.215	**0.197**	**7**	10	**0.07**	-0.03	**0.29**	**0.05**
1994	8.33	8.24	21.05	**20.84**	0.224	**0.196**	**7**	9	**0.09**	**0.02**	**0.39**	**0.21**
1993	8.20	8.18	20.00	**19.79**	0.231	**0.195**	**7**	9	**0.02**	-0.05	**0.25**	**0.06**
1992	7.87	**7.92**	19.14	**18.92**	0.238	**0.195**	**7**	9	-0.04	-0.12	**0.10**	-0.09
1991	9.19	**9.31**	18.90	**18.79**	0.239	**0.195**	**6**	9	-0.12	-0.17	**0.09**	-0.12
1990	7.76	**7.81**	18.93	**18.88**	0.242	**0.197**	**6**	10	-0.05	-0.06	**0.18**	**0.05**
1989	8.87	**8.90**	18.72	**18.65**	0.244	**0.198**	**6**	9	-0.03	-0.05	**0.28**	**0.10**

EXHIBIT A6

The Fidelity Select Sector Portfolio vs. the Vanguard U.S. Managed portfolio and the Wilshire 5000 Index (%)																
	Average real return		Standard deviation		Expense ratio		Turnover		Average real return differential							
									Fidelity minus Vanguard				Fidelity minus Wilshire 5000			
									Not RA		RA		Not RA		RA	
Start year	Fido asst wtd	Van	Fido asst wtd	Van	Fido asst wtd	Van	Fido asst wtd	Van	Asst wtd	=wtd	Asst wtd	=wtd	Asst wtd	=wtd	Asst wtd	=wtd
2003	**38.19**	32.08			1.17	**0.50**	107	**38**	**6.10**	**0.64**			**9.62**	**4.16**		
2002	-3.95	**-0.25**	50.50	**40.13**	1.12	**0.48**	115	**42**	-3.70	**3.97**			-4.05	**3.62**		
2001	-9.96	**-4.00**	38.17	**29.63**	1.08	**0.46**	118	**42**	-5.96	**3.41**			-5.19	**4.18**		
2000	-10.95	**-2.93**	31.46	**24.21**	1.08	**0.40**	120	**40**	-8.02	**4.30**			-3.98	**8.34**		
1999	-2.07	**-0.45**	35.43	**21.53**	1.11	**0.39**	119	**39**	-1.62	**6.02**			-0.22	**7.41**		
1998	1.43	**1.75**	32.55	**19.88**	1.15	**0.39**	128	**40**	-0.32	**5.13**	-0.37	**5.14**	-0.26	**5.20**	-0.34	**5.25**
1997	3.78	**4.84**	30.14	**19.97**	1.18	**0.37**	136	**39**	-1.05	**3.71**	-1.84	**4.01**	-1.19	**3.57**	-1.81	**4.23**
1996	5.37	**6.62**	28.11	**19.09**	1.21	**0.39**	136	**38**	-1.24	**2.80**	-2.52	**3.38**	-1.17	**2.87**	-2.50	**3.87**
1995	7.79	**9.08**	27.16	**19.39**	1.25	**0.44**	135	**37**	-1.28	**2.31**	-3.12	**3.29**	-1.40	**2.20**	-3.09	**3.80**
1994	6.76	**7.86**	25.95	**18.76**	1.28	**0.45**	132	**36**	-1.10	**2.12**	-2.59	**2.86**	-1.18	**2.04**	-2.57	**3.30**
1993	7.45	**8.20**	24.66	**17.81**	1.31	**0.43**	133	**35**	-0.74	**2.89**	-2.49	**3.54**	-0.51	**3.13**	-2.47	**4.29**
1992	6.00	**8.35**	24.14	**16.98**	1.33	**0.36**	131	**35**	-2.34	**2.64**	-3.78	**3.30**	-1.77	**3.22**	-3.76	**4.36**
1991	8.05	**9.61**	24.32	**16.88**	1.36	**0.38**	131	**34**	-1.56	**3.06**	-3.68	**3.44**	-1.05	**3.57**	-3.57	**4.59**
1990	6.77	**7.41**	23.93	**17.91**	1.38	**0.43**	130	**33**	-0.64	**3.42**	-2.03	**3.80**	-0.82	**3.24**	-1.82	**3.85**
1989	**7.85**	7.77	23.37	**17.29**	1.41	**0.46**	133	**32**	**0.07**	**3.65**	-1.63	**4.01**	-0.74	**2.83**	-1.35	**3.62**
1988	7.08	**8.56**	22.85	**16.97**	1.43	**0.51**	132	**33**	-1.48	**2.72**	-2.93	**3.22**	-1.77	**2.42**	-2.84	**3.23**
1987	6.51	**7.79**	22.31	**16.76**	1.43	**0.46**	132	**33**	-1.29	**2.32**	-2.54	**2.60**	-1.89	**1.71**	-2.52	**2.23**
1986	6.60	**8.16**	21.65	**16.31**	1.42	**0.55**	130	**33**	-1.56	**1.93**	-2.80	**2.25**	-1.99	**1.51**	-2.92	**2.03**
1985	6.70	**8.92**	21.04	**16.17**	1.41	**0.58**	129	**32**	-2.21	**1.87**	-3.38	**2.23**	-2.81	**1.28**	-3.52	**1.95**
1984	5.37	**8.80**	21.27	**15.76**	1.39	**0.69**	130	**33**	-3.43	**1.18**	-4.32	**1.34**	-3.60	**1.01**	-4.42	**1.52**
1983	6.40	**9.49**	21.27	**15.68**	1.39	**0.74**	128	**34**	-3.08	**0.94**	-4.25	**1.21**	-3.02	**1.01**	-4.36	**1.53**
1982	7.33	**9.90**	21.20	**15.40**	1.40	**0.84**	128	**34**	-2.57	**1.24**	-4.01	**1.37**	-2.08	**1.73**	-4.18	**2.07**

EXHIBIT A7

The Fidelity Advisor Sector Portfolio vs. the Vanguard U.S. Managed portfolio and the Wilshire 5000 Index (%)																
	Average real return		Standard deviation			Expense ratio %		Turnover %		Average real return differential						
										Fidelity minus Vanguard				Fidelity minus Wilshire 5000			
										Not risk adjusted		Risk adjusted		Not risk adjusted		Risk adjusted	
Start year	Fido asst wtd	Van	Fido asst wtd		Van	Fido asst wtd	Van	Fido asst wtd	Van	Asst wtd	=wtd	Asst wtd	=wtd	Asst wtd	=wtd	Asst wtd	=wtd
2003	27.32	32.08				0.88	**0.50**	101	**38**	-4.76	**5.26**			-1.25	**8.77**		
2002	-1.25	**-0.25**	**35.88**	47.02	40.13	0.90	**0.48**	123	**42**	-1.00	-1.11			-1.36	-1.46		
2001	-7.25	**-4.00**	**27.90**	34.64	29.63	0.89	**0.46**	124	**42**	-3.25	-1.31			-2.48	-0.55		
2000	-8.75	**-2.93**	**23.16**	28.30	24.21	0.89	**0.40**	119	**40**	-5.82	-0.97			-1.78	**3.07**		
1999	-2.45	**-0.45**	25.23	27.11	**21.53**	0.91	**0.39**	117	**39**	-2.00	**1.72**			-0.60	**3.12**		
1998	1.35	**1.75**	24.40	25.48	**19.88**	0.96	**0.39**	120	**40**	-0.40	**2.90**	-0.41	**2.11**	-0.34	**2.97**	-0.34	**2.53**
1997	2.53	**4.84**	22.39	23.91	**19.97**	1.00	**0.37**	122	**39**	-2.31	**2.13**	-2.42	**1.17**	-2.45	**1.99**	-2.45	**1.59**
1996	5.26	**6.62**	22.12	22.94	**19.09**	1.02	**0.39**	124	**38**	-1.35	**2.62**	-1.90	**1.24**	-1.28	**2.69**	-1.49	**1.99**

EXHIBIT A8

The Fidelity International Managed Portfolio vs. the Vanguard International Managed Portfolio and the EAFE Index (%)												
	Average real return		Standard deviation		Expense ratio		Turnover		Average real return differential vs			
									Vanguard		EAFE	
Start year	Fido	Van	Fido	Van	Fido	Van	Fido	Van	Not RA	RA	Not RA	RA
2003	**43.09**	35.45			1.21	**0.68**	76	**55**	**7.65**		**7.72**	
2002	**11.34**	4.57	**39.92**	38.69	1.22	**0.67**	75	**46**	**6.77**		**5.48**	
2001	**1.44**	-4.28	33.32	**31.74**	1.20	**0.65**	81	**47**	**5.73**		**6.66**	
2000	**-5.69**	-6.13	30.79	**26.42**	1.19	**0.62**	86	**48**	**0.44**		**2.46**	
1999	**3.51**	-0.90	35.61	**25.84**	1.17	**0.61**	89	**46**	**4.41**		**5.83**	
1998	**3.27**	1.69	31.94	**23.82**	1.19	**0.61**	91	**44**	**1.59**	**1.06**	**2.47**	**2.06**
1997	**1.84**	1.64	29.59	**21.76**	1.20	**0.60**	90	**42**	**0.20**	**0.13**	**1.37**	**1.32**
1996	2.67	**2.69**	27.42	**20.29**	1.20	**0.59**	89	**41**	-0.02	-0.31	**1.83**	**1.60**
1995	2.59	**3.55**	25.68	**19.09**	1.21	**0.59**	89	**40**	-0.96	-1.19	**0.95**	**0.76**
1994	0.72	**3.14**	25.01	**18.09**	1.23	**0.57**	92	**39**	-2.42	-2.13	-1.24	-1.00
1993	3.20	**5.68**	25.23	**19.43**	1.28	**0.57**	94	**40**	-2.48	-2.88	-0.95	-1.33
1992	2.38	**4.29**	24.31	**19.18**	1.30	**0.56**	94	**41**	-1.91	-2.11	-0.05	-0.23
1991	2.42	**4.29**	23.28	**18.37**	1.26	**0.56**	94	**42**	-1.86	-2.06	-0.25	-0.42
1990	0.97	**2.58**	23.04	**18.69**	1.29	**0.56**	97	**41**	-1.61	-1.49	**0.76**	**0.84**
1989	1.75	**3.65**	22.36	**18.46**	1.31	**0.56**	99	**41**	-1.89	-1.90	**1.17**	**1.17**
1988	1.92	**4.08**	21.60	**17.89**	1.36	**0.56**	101	**40**	-2.16	-2.19	**0.07**	**0.06**
1987	2.67	**4.67**	21.11	**17.46**	1.40	**0.56**	103	**42**	-2.00	-2.16	-0.32	-0.41

EXHIBIT A9

The Fidelity Advisor International Managed Portfolio vs. the Vanguard International Managed Portfolio and the EAFE Index (%)												
	Average real return		*Standard deviation*		*Expense ratio*		*Turnover*		*Average real return differential vs*			
									Vanguard		*EAFE*	
Start year	*Fido*	*Van*	*Fido*	*Van*	*Fido*	*Van*	*Fido*	*Van*	*Not RA*	*RA*	*Not RA*	*RA*
2003	**39.55**	35.45			1.03	**0.68**	71	**55**	**4.11**		**4.23**	
2002	**7.96**	4.57	39.62	**38.69**	1.07	**0.67**	69	**46**	**3.39**		**2.05**	
2001	**-2.03**	-4.28	33.20	**31.74**	1.06	**0.65**	78	**47**	**2.25**		**3.03**	
2000	-6.71	**-6.13**	29.02	**26.42**	1.09	**0.62**	80	**48**	-0.58		1.42	
1999	**1.44**	-0.90	32.41	**25.84**	1.10	**0.61**	81	**46**	**2.34**		**3.35**	
1998	**2.80**	1.69	29.05	**23.82**	1.12	**0.61**	79	**44**	**1.11**	**0.83**	**1.67**	**1.55**
1997	**3.79**	1.64	26.56	**21.76**	1.13	**0.60**	78	**42**	**2.14**	**1.72**	**3.03**	**2.83**
1996	**4.39**	2.69	24.60	**20.29**	1.17	**0.59**	79	**41**	**1.71**	**1.18**	**3.31**	**3.04**

APPENDIX B. THE PORTFOLIOS (NOT FOR PUBLICATION)

This appendix lists the funds used to comprise each of the Fidelity synthetic portfolios used in this study. The Vanguard funds are listed in Reinker and Tower (2004).

Fidelity Advisor Diversified US Equity Funds

Aggressive Growth	Dividend Growth	Dynamic Cap Appn	Equity Growth
Equity Income	Equity Value	Fifty	Growth and Income
Growth Opportunities	Large Capital	Leveraged Co Stock	Mid Cap
Small Cap	Strategic Growth	Value Strategies	

Fidelity Advisor International Funds

Diversified Intl	Emerging Asia	Emerging Mkt	Europe Capital App
Japan	Korea	Latin America	Overseas

Fidelity Advisor Sector Funds

Biotechnology	Consumer Industries	Cyclical Industries	Developng Comm
Electronics	Financial Services	Health Care	Natural Resources
Real Estate	Technology	Telecom&Utility	Growth

Fidelity Spartan US Index Funds

500 Index	Extended Mkt Indx	Total Market Index (Wilshire 5000)
US Equity Index (S&P 500 Index)		

Fidelity Spartan International Index Funds

International Index (MSCI EAFE Index)

Fidelity Regular (non-Advisor) Diversified US Equity Funds

Aggressive Growth	Asset Manager: Aggressive	Asset Manager: Growth	
Blue Chip Growth	Capital Appreciation	Congress Street	Contrafund
Disciplined Equity	Discovery	Dividend Growth	Equity Income
Equity Income II	Fifty	Focused	Growth and Income
Growth & Income II	Growth Company	Independence	Large Cap Stock
Leveraged Co Stock	Low Priced Stock	Magellan	Mid-Cap
New Millennium	OTC	Small Cap	Independence
Small Cap Stock	Small Cap Retirement	Stock Selector	Structured Large Cap
Growth	Structd Lg Cap Value	Strctd Mid Cap Grw	Strctrd Mid Cap Valu
Trend	Value	Value Discovery	Value Strategies

Fidelity Regular International Funds

Aggressive International	Canada	China Region	Diversified Internatl
Emerging Market	Europe	Europe Cap Apprecn	Intl Growth & Income
International Small Cap	Japan	Japan Small Companies	Latin America
Nordic	Pacific Basin		

Fidelity Regular Sector Funds (there are too few of these for us to do anything with them in the article)

Export and Multinational	Real Estate Investment	Utilities

Select International Funds (there are too few of these for us to do anything with them in the article.)

Southeast Asia

Fidelity Select Sector Funds

Air Trans	Automotive	Banking	Biotechnology	Brokerage	Business Svc
Chemicals	Computers	Constr&Hous	Consumer In	Cyclical In	Defense&Aer
Dev Comm	Electronics	Energy	Energy Serv	Environment	Fincl Svcs
Food & Agri	Gold	Health Care	Home Finan	Ind Eqp	Indust Mat
Insurance	Leisure	Medical Del	Medical Syst	Multimedia	Natural Gas
Natural Res	Netw&Infras	Paper&For	Pharma	Retailing	Software
Technology	Telecommun	Transport	Utilities	Wireless	Automation &
Machinery	Elec Utilities	Life Insurance	Precious Metals&Minerals		Restaurants

Note: the last five funds have been killed.

Funds added to make Fidelity entire portfolio complete

sector

Export and multinational	Real estate inv	Southeast Asia	Utilities

global

Advisor global equity	Worldwide

Funds added to make Vanguard entire portfolio complete.

Dividend growth	Energy	Global equities.	Healthcare	REIT