Are asset allocation funds good at market timing?

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Abstract[1]

"*Don't forget that* your *incredible success in consistently making each move at the* right *time in the market is but* my *pathetic failure in making each move at the* wrong *time. … … I don't know anyone who can do it successfully, nor anyone who has done so in the past. Heck, I don't even know anyone who* knows *anyone who has timed the market with consistent, successful, replicable results."* (John Bogle, quoted in The Finance Buff, 2011).

John C. Bogle, the founder of the Vanguard Group, has long insisted on the superiority of index funds over actively managed mutual funds and the foolishness of attempts to time the market. He published two articles in the *Journal of Portfolio Management* showing that in eight out of nine style categories, managed mutual funds had lower risk-adjusted returns than the corresponding indexes did. While this demonstrates the failure of stock picking by mutual funds to serve investors well, it says nothing about their ability to time the market by changing styles. Managers of asset allocation funds often use a flexible combination of stocks, bonds, and cash; some, but not all, shift assets frequently based on analysis of business-cycle trends. To test his view of market timing, we evaluated the returns of 82 major asset allocation funds by comparing them with the returns of corresponding baskets of Vanguard's index funds over a 13-year time span. We find that on average the index funds have higher risk-adjusted returns. We conclude that "*simplicity is the ultimate sophistication*" applies to mutual fund investments.

Keywords Mutual fund families, Performance, Expense ratio

JEL Classification: G10 G11 G20

[1] Parts of section [1, 4, 5, 7] are identical with Meng Xie's (2012) honors thesis, because Meng and I are both advised by Prof. Tower, and we used exact same approaches on different topics. Thus, we used identical explanations for the methodologies used in both papers. Tower presented an earlier version of this study at the October 2012 Bogleheads reunion, Tower and Chen (2011).

1. Introduction

John C. Bogle, the founder of the Vanguard Group, has long insisted on the superiority of index funds over actively managed mutual funds and the foolishness of attempts to time the market. He published two articles in the *Journal of Portfolio Management* (1998 & 2002a) showing that in eight out of nine style categories, managed mutual funds had lower risk adjusted returns than the corresponding indexes did. While this demonstrates the failure of stock picking by mutual funds to serve investors well, it says nothing about their ability to time the market by changing styles. As Morningstar (2012) writes "Managers of asset allocation funds often use a flexible combination of stocks, bonds, and cash; some, but not all, shift assets frequently based on analysis of business-cycle trends." To test Bogle's view of market timing, we evaluated the returns of 82 major asset allocation funds by comparing them with the returns of corresponding baskets of Vanguard's index funds over a 13-year time span. We find that on average the index funds have higher risk adjusted returns. We conclude that "*simplicity is the ultimate sophistication*"[2] applies to mutual fund investments.

An implication of Bogle's view is that asset allocation funds could not beat well-run index funds such as Vanguard's own index funds over a long time-span. In this study, we test his belief by figuring out whether the largest no load asset allocation funds at the beginning of 1999 made wise style adjustments over a 13-year time span that covers two major economic downturns (the 2000 dot-com bubble and the 2008 financial crisis). In 1999 these funds were called either asset

[2] "Simplicity is the ultimate sophistication" is a statement originally made by Leonardo De Vince. Steve Jobs was also highly driven by this phrase and truly believed that "*simplicity was a virtue*", according to the author of his biography, Walter Isaacson. I believe that this philosophy not only created Apple Company that has changed our lives; it also applies well to mutual fund investments.

allocation funds or balanced funds. We have found no difference in behavior by the two types of fund. By 2011, Morningstar had dropped the terminology "balanced funds." So we refer to all as asset allocation funds.

We ask whether the investors of asset allocation funds have experienced higher risk-adjusted returns than they would otherwise have had from investing in comparable Vanguard index or near index funds. We picked Vanguard funds as our benchmark, because Vanguard is the largest U.S. mutual fund family, and it has a wide range of low cost index and near-index mutual funds. We compare the risk-adjusted returns of each asset allocation fund and the corresponding risk-adjusted return of the fund's *clone* portfolio consisting of Vanguard's index or near index funds.

To make this assessment, we use a technique developed by Nobel Lauriate, William Sharpe, called style analysis. It infers what the style of investment of a portfolio is, based on its pattern of returns, but without looking at the composition of the portfolio. He uses stock and bond indexes as his benchmark. We use Vanguard index and near index funds as our benchmarks, for we are interested in the comparison between the returns of asset allocation funds and the benchmark. Vanguard does not cover some segments of the market with index funds, such as international growth and international value, so we are forced to use some non-index funds. We want to know whether the fund managers make wise style adjustments over time. To assess this we perform two comparisons.

First we compare the performance of each asset allocation fund to a basket of Vanguard index and near index funds with constant portfolio weights, where the weights on the basket are chosen

so that the pattern of monthly returns of the portfolio most closely matches that of the asset allocation fund. In deference to Bogle's writings we refer to this basket as the **stay-the-course** clone of the asset allocation fund. We could have named it the rebalanced or strategic asset allocation clone.

Next we compare the performance of each mutual fund to a basket of Vanguard index and near index funds with variable portfolio weights, where the weights vary to reflect the changing style of the asset allocation fund. We call this portfolio the **market-timing** clone. We could have named it the tactical asset allocation clone. These clones do not have identical properties, just similar properties. They mimic the mutual fund as closely as possible, given constraints on their composition.

Then, we ask whether each asset allocation fund makes wise style adjustments. We answer the question by comparing the net alpha of **stay-the-course** clone and the net alpha of **market-timing** clone. If the mutual fund outperforms the **stay-the-course** clone by more than the **market-timing** clone, then we conclude that part of the asset allocation fund outperformance is due to style adjustments, and vice versa.

We finish by using regression to find variables that contribute to the underperformance of asset allocation funds.

2. Data Source

We use the Morningstar Principia Disk (2012) as our major data source of fund information. We sort major asset allocation funds by total asset under management. We pick the top 100 no-load asset allocation funds. The most recently updated Morningstar Principia disk provides us with a complete monthly return data of all extant funds at the end of 2011, which marks the end of the model's investigation period.

However, we must contend with "survivorship-bias": mutual fund companies tend to kill funds with bad performance and merge them into funds with better performance. We cannot obtain the data from the 2012 Morningstar Principia Disk for "killed" funds. Consequently, we turn to The Center for Research in Security Prices (CRSP for short) as a complement to gather the monthly returns of "killed" funds. We will elaborate on the "survivorship-bias" issue in later sections.

Also, we discard 18 funds at the end for the following reasons:

1. The fund's monthly return cannot be found in both databases.
2. The fund's investment strategy is different from a common mutual fund's strategy and we cannot build a clone using our benchmark funds with a satisfactory correlation. Funds with these strategies are long-short funds and market neutral mutual funds. Therefore, we claim that they are "outliers" and decide not to include them in the research.

These exclusions reduce our final sample size to 82 funds. Exhibit 2.1 is a summary of our data sample. Appendix 1 is a full list of the total 100 funds that we have investigated. It names mutual

funds, so you can assess the performance of the asset-allocation funds provided by your favorite mutual funds family.

Exhibit 2.1. *Data sample summary*

Category	Number
Extant fund (Until Dec, 2011)	52
Killed funds	30
Effective sample size	82
Discarded funds	18
Total sample Size	100

3. The Benchmark

As mentioned in previous sections, we use Vanguard's index and near index funds as our benchmarks to construct the clone portfolio for each fund. Exhibit 3.1 consists of all the funds that we have included in the benchmarks. A couple of other Vanguard index funds are omitted in the tables because they played no role in any benchmark that we calculated for any asset allocation fund.

We believe that this is a set of funds that permit us to construct comprehensive and well-diversified portfolios that cover major asset allocation funds on the market. The benchmark portfolios track the performance of both the bond and equity markets. It also covers specific geography and industries such as European stock index and REIT index. In fact, they do give us high performance correlations (>95%) between the benchmark clone's monthly return and mutual fund samples' monthly returns.

Exhibit 3.1: *Benchmark portfolio*

1	Vanguard 500 Index Investor	12	Vanguard Mid Capitalization Index Inv
2	Vanguard Emerging Mkts Stock Idx	13	Vanguard Pacific Stock Index Inv
3	Vanguard European Stock Index Inv	14	Vanguard Prime Money Market Inv
4	Vanguard Extended Market Idx Inv	15	Vanguard REIT Index Inv
5	Vanguard Growth Index Inv	16	Vanguard Short-Term Bond Index Inv
6	Vanguard High-Yield Corporate Inv	17	Vanguard Small Cap Growth Index Inv
7	Vanguard Interm-Term Bond Index Inv	18	Vanguard Small Cap Index Inv
8	Vanguard International Explorer Inv	19	Vanguard Small Cap Value Index Inv
9	Vanguard International Growth Inv	20	Vanguard Total Bond Market Index Inv
10	Vanguard International Value Inv	21	Vanguard Total Intl Stock Index Inv
11	Vanguard Long-Term Investment-Grade Inv	22	Vanguard Value Index Inv

4. Shaping Sharpe's Style Analysis and the M square Method of Risk Adjustment to our Purposes: The Stay-the-Course Clone

We use a technique called "style analysis" presented in Sharpe (1992), to explore whether a mutual fund out-returns a basket of indexes with the same style. Using this technique, the return of each mutual fund is described as the return of a basket of Vanguard index funds and near index funds plus a constant term plus a random term with mean zero. The size and sign of the constant term reflects the prowess of investors in mutual funds' relative to investing in Vanguard index and near index funds. The basket chosen is that which gives the lowest mean square sum of the random terms. Intuitively, it is the basket that tracks the return of the fund the best. Specifically, in

combination with the constant term that helps the fit the most, it is the basket that predicts most accurately. The constant term reflects differences in expense ratios, transactions costs and other aspects of the prowess of mutual fund management.

This basket is labeled the **clone** for the portfolio. If the mutual fund's clone is largely composed of stocks in Vanguard's value and small index funds, then the composition of the clone will be largely Vanguard's value and small index funds, because the returns of a combination of these funds will best explain the returns of the mutual fund. Thus, the composition of the mutual fund can be inferred by examining the composition of the clone. The size of the constant term will depend positively on Vanguard's expenses and turnover relative to the mutual fund. One appeal of Sharpe's (1992) methodology is that if different degrees of smallness or value have different patterns of return, the Sharpe methodology captures those, whereas, simply characterizing the value or smallness dimension of a portfolio by one number, as Fama-French (1993) loads do, does not capture these different patterns of return. For example, return may be a nonlinear function of size and value, so characterizing fund performance as a function of Fama-French loads may hide information that emerges from a Sharpe style-analysis approach.

We perform two calculations. The stay-the-course calculation is performed using Microsoft Excel's solver utility. Solver is instructed to find the weighted sum of the returns of the Vanguard indexes and the constant term that minimizes the mean square error of prediction, subject to the constraints that all the coefficients are positive and add to one. Requiring all coefficients to be positive means conceptually that no index funds are sold short. Requiring the coefficients to add to one means conceptually that the portfolio shares sum to one.

We are interested in comparing the managed fund with the mutual fund index and near index portfolio of the same riskiness. Modigliani and Modigliani (1997) risk adjust by adding a risk free asset to the portfolio they wish to evaluate, such that the standard deviation of return of the risk-free-asset augmented portfolio and the index are the same. They call their method the M square technique of risk adjustment. We risk adjust by requiring that the standard deviation of return of the managed fund and that of the benchmark collection of Vanguard index and near-index funds be the same, by adjusting the composition of the clone. We instruct solver to include that restriction in minimizing prediction error. We will explain the Market-Timing calculation below.

5. Why We Like the Geometric Alpha Better than the Arithmetic Alpha

The criterion we use for outperformance of the actively managed fund is the geometric alpha. This criterion is the continuously compounded geometric return of the managed fund minus that of the clone over the time span. Geometric average return measures the average return over a span of time. It is calculated as *Ln(value at the end of the period/value at the beginning of the period)/ length of the period.*

The average arithmetic return does not tell how rapidly a portfolio has grown from start of the span to the end. If two funds have experienced the same cumulative return over the time span, the more volatile fund will have a higher average arithmetic return, but by definition the two funds will have the same geometric return. Also, if one believes that anomalous returns in one direction are likely to be followed by anomalous returns in the other direction, so average geometric returns are more likely to be replicated than average arithmetic returns, the geometric average return is

superior to the arithmetic average return for predicting multi-period returns. In other words when the distribution of future returns is drawn from the distribution of past returns without replacement the past geometric average return is a better predictor than the past average arithmetic average return. This argument is more fully developed with a numerical example in Tower (2009a).

Continuous compounding in measuring average returns is also likely to generate a more stable alpha. If the only reason an alpha is negative is that the expense ratio is higher for the asset-allocation fund than for Vanguard, then if we use differential annual rates of return to measure alpha, alpha will be less negative in falling markets than in rising markets, because of the confusion of compounding. When markets are rising, a small difference in alpha will result in a large difference in return over the year. But, with continuous compounding, constant expense ratios will lead to constant alphas. For example, suppose the fund has a 1% expense ratio and the benchmark has none. If over a year the value of the underlying assets fall close to zero both the fund and the benchmark will have close to a minus 100% rate of return with an annualized alpha of close to zero, whereas the geometric alpha will equal minus 1 percentage point per year: the difference in the expense ratios.

Much of the discussion in this section draws from Tower (2009b). Some of the sentences are identical and we thought it would be distracting to set them off with quotation marks, so we have not done so.

6. The Stay-the-Course Clone result

Appendix 2 shows the portfolio weights of every stay-the-course clone. These are Vanguard's index or near index funds based on stay-the-course method. It tells how each mutual fund is mimicked. As we mentioned before, 22 of Vanguard's index funds or near index funds are included.

Exhibit 6.1 shows the basic information of our portfolios based on stay-the-course calculation. Please note that we weight the monthly returns of each fund by the number of their observations. Killed funds have fewer observations, and this procedure makes sure that extant and "killed" funds are treated equally. We use the weighted average throughout this paper. Our data set begins in June 1998 and ends in December 2011. As discussed in the next section, in calculating the alphas for the market-timing comparison, we start 8 months into the data series and finish 8 months before the end. We wish to use the same time period for both the stay-the-course and the market-timing benchmarks. So the analysis of all funds begins in January 1999 and ends in May 2011, except for killed funds. For killed funds the analysis ends 8 months before their demise.

The gross alpha is the extent to which the fund outreturns its clone, after accounting for the difference in expense ratios between the fund and the clone. Thus if the returns of the assets that comprise the fund and the clone are identical, but the fund has an expense ratio that is one percentage point per year higher than its clone, the gross alpha zero percentage points per year and the net alpha is minus one percentage point per year. To assess the prowess of the fund at stock and style picking we use gross alpha, and to assess the return to the investor we use net alpha. The

average gross alpha is -0.238%, which indicates that on average, before expenses are subtracted from returns, mutual funds underperform their clones by 0.238%. The average correlation between the fund and clone returns (weighted) is 0.967, close to 1, indicating that the clones have tracked their corresponding mutual funds tightly.

6.1: *Stay-the-course result 1 – Average gross alpha and correlation (Weighted)*

Stay-the-course	Gross alpha %	Correlation
Average (Total Weighted)	-0.238	0.967

Exhibit 6.2 shows the alpha after we take expense ratio into consideration and find that the excess expense ratio of mutual fund is 0.511% higher than the Vanguard clone on average. Consequently, it brings the net alpha down to -0.75%. This number indicates that the asset-allocation fund on average underperforms the Vanguard's clone by -0.75% if we take the expense into consideration.

Exhibit 6.2: *Stay-the-course result 2 – Excess expense ratio results in lower net alpha on average (Weighted)*

Stay-the-course	Net alpha %	Expense ratio %	Clone expense ratio %	Excess Expense ratio %
Average (Total Weighted)	-0.750	0.726	0.215	0.511

Exhibit 6.3 shows the (weighted) average result for all of the extant funds. As we mentioned before, "the survivorship bias" leads bad performing funds to death. Therefore, it is fair to argue that the killed ones are the evils that bring the average performance down. The average

alpha of the extant funds is higher than the overall as expected. The average gross alpha is 0.080%, which means that they actually outperform Vanguard's index funds. However, when we take the expense ratio into consideration, this surplus disappears and gives us a net alpha of -0.387%, still underperforming the benchmark. The improvement of extant funds over the average is 0.363%. **Those who ignore survivorship bias mislead themselves.**

Exhibit 6.3: *Stay-the-course result 3 – Extant funds' average alphas, correlation, ignoring "Survivorship bias" (Weighted)*

Stay-the-course	Net alpha %	Gross alpha %	Correlation
Average (Extant Weighted)	-0.387	0.080	0.968

7. The Market-Timing Clone

Rodriguez and Tower (2008) used benchmarks over varying spans to ask whether style adjustments facilitated performance by Vanguard's actively managed funds. David Blanchett (2010) used Visual Basic to explore the same question, determining the benchmark composition in each month by requiring similar performance of the fund and the benchmark over a window of months before and after the month in question. Blanchett refers to this as a rolling regression. We adopt the same approach here. We use a fifteen-month window to determine the portfolio, 7 months on either side of the month in question. Since our data begins in June of 1998 and ends in December of 2011, we compare returns beginning in Jan of 1999 and ending in May 2011. We want comparable coverage by our stay-the-course simulation and by our market-timing simulation. Consequently, we adopt the same starting and ending dates.

8. The Market-Timing Clone Result

Now we turn to the result of the Market-timing clone. Exhibit 8.1 shows the Net alpha, Gross alpha and correlation based on the calculation. Again, the gross alpha is negative, -0.572% which means the asset allocation funds underperform the corresponding Vanguard clone by 0.6 percentage points per year.

Exhibit 8.1: *Market-timing clone result 1 – Average gross alpha and correlation (Weighted)*

Market-timing	Gross Alpha%	Correlation
Average (Total Weighted)	-0.572	0.968

Exhibit 8.2 shows the result with the expense ratio information. The average excess expense ratio of the asset allocation fund over the Vanguard clone is 0.511%. This brings the net alpha down to lower than -1% per year, which is a fairly significant underperformance in the mutual fund industry.

Exhibit 8.2: *Market-timing clone result 2 – Excess expense ratio results in lower net alpha on average (Weighted)*

Market-timing	Net alpha %	Expense ratio%	Clone expense ratio%	Excess Expense Ratio %
Average (Total Weighted)	-1.084	0.726	0.215	0.511

In Exhibit 8.3, we pick only extant funds at the end of 2011. There is a decent improvement similar to the stay-the-course case, the gross alpha is -0.318% and the net alpha is -0.786%.

Exhibit 8.3: *Market-timing clone result 3 – Extant funds' average alphas, correlation, ignoring "Survivorship bias" (Weighted)*

Market-timing	Net alpha %	Gross Alpha%	Correlation
Average (Extant Weighted)	-0.786	-0.318	0.964

Section 9 contains further discussion of the stay-the-course results versus the market-timing results.

9. Survivorship Bias

Survivorship bias denotes the fact that mutual fund companies tend to kill their badly performing funds. Because we cover a relatively long time period (from 1998-2011) and two major economic downturns (dot-com bubble and financial crisis) happened in this period, we expect survivorship bias plays in big role in our study.

To make sure that we are calculating every fund's performance fairly, we assign less weight to killed funds when calculating all our averages. For example, if we examine a fund's return starting in January 1999, and the fund is killed in August 2005, then we explore performance from January 1999 through December 2004. The total observations that we have is $6 \times 12 = 72$. Extant funds will have all observations through eight months prior to December 2011. Killed funds tend to underperform over their short lives. This weighting system avoids putting too much weight on the killed funds.

Over the period of our study which is from June 1998 till May 2011, 30 out of 82 of our targets were killed which counts for 36.5% of our whole effective data set. The death date also proves our expectation that two major economic downturns have played a big role in "killing" bad performers: 13 of them were killed during 2000 and 2008-09. We believe that experiencing two major economic downturns offers a comprehensive study.

Exhibit 9.1 shows the average net alpha of killed funds in both Stay-the-course and Market-timing models. The results prove our expectation: the average underperformance of killed funds is significantly larger than the total weighted average as well as the extant weighted average. Both of net alphas are less than -2 percentage points per year.

Exhibit 9.1: *Average Net Alpha of Killed funds in Stay-the-course and Market-timing models*

Stay-the-course	%	Market-timing	%
Average Net Alpha (Killed Weighted)	-2.216	**Average Net Alpha (Killed Weighted)**	-2.289

Exhibit 9.2 and 9.3 show the difference between extant and killed funds' performance and the difference between total weighted and killed funds' performance in both methods. For Stay-the-course, the underperformance of killed funds is 1.8% with regard to extant funds is and 1.5% compared with the all funds. In Market-timing, the underperformance is a bit improved: 1.5% with respect to the extant-weighted and 1.2% with regard to the total weighted.

Exhibit 9.2: *Comparison of Extant weighted / weighted and Killed fund's performance – Stay-the-course*

Stay-the-course	%	Stay-the-course	%
Average Net Alpha (Extant Weighted)	-0.387	**Average Net Alpha (Total Weighted)**	-0.750
Average Net Alpha (Killed Weighted)	-2.216	**Average Net Alpha (Killed Weighted)**	-2.216
Underperformance of killed funds	1.829	**Underperformance of killed funds**	1.466

Exhibit 9.3: *Comparison of Extant weighted / weighted and Killed fund's performance – Market-timing*

Market-timing	%	Market-timing	%
Average Net Alpha (Extant Weighted)	-0.786	**Average Net Alpha (Total Weighted)**	-1.084
Average Net Alpha (Killed Weighted)	-2.289	**Average Net Alpha (Killed Weighted)**	-2.289
Underperformance of killed funds	1.503	**Underperformance of killed funds**	1.205

10. Stay-the-Course and Market-Timing differential – Style Adjustment

The difference between net alpha of Stay-the-course and Market-timing indicates whether fund managers are making wise style adjustments to their portfolios. Because net alphas are all negatives with regard to the Vanguard's index fund benchmark, we claim that smart decisions are made if net alpha of Market-timing is more negative then the stay-the-course one. In words, this means that the market-timing portfolio returned better than the stay-the-course portfolio.

Exhibit 10.1 shows the comparison for all three weighted averages based on the two calculations. The benefit section shows the magnitude of fund managers' "intelligence" in different scenarios. On average, fund managers save 0.33% net alpha by style adjustments. For, the extant funds, the benefit increases a little bit to 0.40%. Killed funds only gain 7 basis points via style adjustments. Perhaps funds are killed as punishment for making bad style adjustments.

Exhibit 10.1: *Benefit of style adjustment – asset allocation funds' wise decisions*

Style adjustment	Net alpha % (Stay-the-course)	Net alpha % (Market-timing)	Net alpha % (Benefit)
Average (Total Weighted)	-0.750	-1.084	0.33
Average (Extant Weighted)	-0.387	-0.786	0.40
Average (Killed Weighted)	-2.216	-2.289	0.07

11. Determinants of Fund Performance: Some Regressions

We regress net alpha against the following variables based on **Stay-the-course** result to figure out the impact and importance of each variable. The concept of "importance" is used by Tower (2012). We define importance as the product of the variable's standard deviation and its regression coefficient. So it shows the impact of a one standard deviation change in the X variable on the Y variable. The reason we don't use the traditional metric, significance, is we don't know how to calculate significance as the number of observations for the killed funds vary and are different from that of the extant funds. The sign of importance is the same as the regression coefficient. Positive means the bigger the variable, the bigger the net alpha, vice versa. The magnitude of "Importance" of one variable is measured by the absolute value of its importance term. In the exhibit, we do not report the constant term.

Exhibit 11.1 shows the multiple regression, where we allow every variable to be involved simultaneously. We recognize MSE (-) (the mean standard error of prediction), Correlation (-) and Ln of net assets (+) as top three important terms. The negative sign of MSE indicates that the more style adjustments of the asset-allocation funds, the lower the net alpha is. The negative sign of correlation indicates that funds that are tracked loosely by the clone portfolio have higher net alpha.

The positive sign of net assets indicates that bigger funds tend to do better than smaller ones. A one percentage point in the expense ratio differential cuts the alpha by 0.236 percentage points per year. We have omitted the constant term from the exhibit, but not from the regression.

Exhibit 11.1: *Multiple Regression of net alpha on all possible variables*

Overall

Ranking	Variable	Importance	Sign	Absolute value of importance	Standard deviation	Regression coefficient
1	MSE	-1.009	Negative	1.009	0.523	-1.930
2	Correlation	-0.578	Negative	0.578	0.037	-15.667
3	Log of net assets	0.323	Positive	0.323	1.117	0.289
4	Intl stock share	0.297	Positive	0.297	0.126	2.354
5	Stock share	-0.272	Negative	0.272	0.161	-1.690
6	Stdev of intl stock share	0.149	Positive	0.149	0.075	1.981
7	Stdev of stock share	-0.092	Negative	0.092	0.286	-0.322
8	Excess Expense ratio	-0.089	Negative	0.089	0.375	-0.236

Exhibit 11.2 shows individual regression results: for each variable, we ignore all other variables and regress net alpha solely on that variable.

We recognize Stock share (-), excess expense ratio (-), MSE (-) and Log of net assets (+) as important variables. MSE (-) and Log of net assets (+) reaffirm our observation in the multiple regressions. The negative sign of stock share means that the higher the stock shares of an asset allocation fund, the lower the net alpha is.

The negative sign of excess expense ratio means that higher expense ratio brings down the net alpha. We emphasize the coefficient of the excess expense ratio since it is greater than minus one. Jack Bogle has remarked, “In mutual fund investing you get what you don’t pay for.” The fact that the coefficient is more negative than minus one implies that you get a multiple of what you don’t pay for. Tower and Zheng (2008) found similar results, and echoing Bernstein (1999 &

2000), they argue that fund families that rip you off through high explicit expense ratios, are likely to rip you off in nontransparent ways as well. Score another victory for low cost mutual funds.

All the variables that represent market timing show a negative impact on alpha. Alpha is reduced by a high MSE, a low correlation, a high standard deviation of the international stock share and a high standard deviation of the stock share. This is a remarkable indictment of market timing.

Exhibit 11.2: *Regression of net alpha of individual possible variable (residual term omitted)*

Individual

Ranking	Variable	Importance	Sign	Absolute value of importance	Standard deviation	Regression coefficient
1	Stock share	-0.471	Negative	0.471	0.161	-2.932
2	Excess Expense ratio	-0.430	Negative	0.430	0.375	-1.147
3	MSE	-0.357	Negative	0.357	0.523	-0.683
4	Log of net assets	0.302	Positive	0.302	1.117	0.270
5	Intl stock share	-0.192	Negative	0.192	0.126	-1.518
6	Correlation	0.169	Positive	0.169	0.037	4.584
7	Stdev of intl stock share	-0.165	Negative	0.165	0.075	-2.192
8	Stdev of stock share	-0.009	Negative	0.009	0.286	-0.030

12. Conclusion

Based on our calculations, passively managed Vanguard's index / near index funds do deliver better returns (net alphas) compared with major asset allocation funds on average in all scenarios that we have considered here. Underperformance of asset allocation funds is persistent and significant over the 13-year time span that we have covered.

However, regardless of the underperformance, we conclude that asset allocation funds are making wise style adjustments. Such wise adjustments help asset allocation funds reduce the gap of underperformance with regard to Vanguard's portfolio.

We echo other studies by rediscovering that higher expense ratios decrease the net alpha on average.

Our study demonstrates once again that Bogle is right on encouraging investors to go for simple, stable and cheap instruments such as Vanguard's index funds. "*Simplicity is the ultimate sophistication*" indeed holds in mutual fund investments.

Appendix

Appendix 1: *Comprehensive list of funds*

Rank	Ticker	Name	Net Assets $MM	Prospectus Objective	Killed Date
1	VWELX	Vanguard Wellington	25829.2	Balanced	
2	FPURX	Fidelity Puritan	25682.3	Balanced	
3	VWINX	Vanguard Wellesley Income	8499.2	Balanced	
4	VGSTX	Vanguard STAR	7931.4	Balanced	
5	VAAPX	Vanguard Asset Allocation	6543.4	AA	
6	DODBX	Dodge & Cox Balanced	5770	Balanced	
7	FBALX	Fidelity Balanced	5316.4	Balanced	
8	FSFLX	Invesco Total Return	3040.8	AA	Jul-05
9	VSMGX	Vanguard LifeStrat Mod Grth	2084.6	AA	
10	VBINX	Vanguard Balanced Index	1900.9	Balanced	
11	VASGX	Vanguard LifeStratGrowth	1804.2	AA	
12	USAIX	USAA Income	1768.6	AA	
13	RPBAX	T. Rowe Price Balanced	1592.6	Balanced	
14	IDMYX	IDS Mutual Y	1387	Balanced	Jul-11
15	VSCGX	Vanguard LifeStrat Cons Grth	1352.1	AA	
16	EFONX	Evergreen Foundation	1285.5	Balanced	Jun-05
17	FRINX	Founders Balanced*	1254.1	Balanced	May-08
18	LDDVX	Lindner Dividend Inv	1162.9	Balanced	Feb-04
19	JABAX	Janus Balanced	1136.6	Balanced	
20	TWBIX	American Cent Balanced Inv	998.6	Balanced	
21	LOMMX	CGM Mutual	942	Balanced	
22	FASIX	Fidelity Asset Manager: Inc	940.8	AA	
23	STFBX	State Farm Balanced	927.4	Balanced	
24	CBALX	Columbia Balanced	925.8	Balanced	
25	PAXWX	Pax World**	837.6	Balanced	
26	ABSBX	AARP Balanced Stock & Bond	776	Balanced	Aug-00
27	NVGBX	Norwest Advant Growth Ball	768.2	AA	
28	MBLDX	MassMutual Instl Balanced S	765.4	Balanced	
29	ESAIX	Evergreen Sel Balanced Instl*	717.4	Balanced	Jun-03
30	WFAAX	MasterWorks Asset Allocation	600.8	AA	
31	BTAMX	BT Instl Asset Management	546.5	Balanced	
32	NVMBX	Norwest Advant Mod Bal I	510.4	Balanced	
33	FBAIX	First American Balanced**	491.4	Balanced	
34	DVIBX	Diversified Inv Balanced	490	Balanced	
35	PGEYX	George Putnam of Boston Y	482.2	Balanced	
36	NIMBX	MainStay Inst Multi Instl	474.6	AA	Oct-09
37	HMBAX	HighMark Balanced Fid	458.2	Balanced	
38	VAXIX	VanguardLifeStratIncome**	434.3	AA	
39	RYURX	Rydex Ursa Inv**	420.4	AA	
40	PBAIX	BlackRock Balanced Instl	414.1	Balanced	
41	MPBAX	MAS Balanced Instl	406.4	Balanced	
42	TRPBX	T.Rowe Price Pers Str Bal	399	AA	
43	CFDAX	CitiSelect Folio 400	396.3	AA	Oct-00
44	COAGX	Caldwell & Orkin Market Opp**	374.6	AA	
45	JPDVX	JP Morgan Inst Diversified	362.5	Balanced	
46	CFCAX	CitiSelect Folio 300	337.7	AA	Oct-00
47	AYBLX	AmSouth Balanced Premier	328.6	Balanced	
48	DRBAX	Dreyfus Balanced	322.1	Balanced	Dec-04
49	STAAX	Strong Asset Allocation	319.7	AA	Jul-08
50	DEICX	Delaware Instl	318.7	Balanced	Apr-09

51	SWHGX	Schwab MarketTrack Growth	311.4	AA	
52	BTBYX	Wachovia Balnced Y	306.5	Balanced	Jun-02
53	SWBGX	Schwab MarketTrack Balanced	297.7	AA	
54	FFFEX	Fidelity Freedom 2030**	282.4	AA	
55	TWSMX	American Cent StrAlc:Mod Inv	271.7	AA	
56	SRFBX	Stein Roe Balanced A**	268.8	Balanced	
57	NVCBX	Norwest Advant Strat Inc I	261.1	Balanced	
58	IMABX	Invesco Balanced	260.3	Balanced	Nov-03
59	PDBLX	Dreyfus Premier Balanced R	254.5	Balanced	Jan-09
60	STFRX	Stagecoach LifePath 2040 A**	248.2	AA	
61	HLBAX	One Group Asset Alloc Fid	246.5	AA	Feb-05
62	SCBAX	Scudder Balanced	245.3	Balanced	Mar-05
63	CHTAX	Chicago Trust Balanced	241.1	AA	Mar-10
64	PPDVX	JP Morgan Diversified	241	Balanced	
65	FPACX	UAM FPA Crescent Instl	238	Balanced	
66	USBLX	USAA Growth & Tax Strategy	237.6	Balanced	
67	CFBPX	CitiFunds Balanced	236.4	Balanced	Oct-00
68	SPBAX	Scudder Pathway Balanced	235.1	Balanced	
69	PKBAX	Parkstone Bal Alloc Instl	235.1	Balanced	Jun-00
70	GAATX	Galaxy Asset Alloc Tr**	233.6	AA	
71	BMNIX	Barr Rosenberg Mkt Neutrl Is**	228.3	AA	Oct-09
72	DVASX	Diversified Inv Intm/Lg Str**	223.2	AA	
73	SBATX	STI Classic Balanced Tr	220.5	Balanced	Mar-07
74	FSGNX	First American Strat Gr&Inc	212.6	Balanced	
75	FIBAX	Firstar Balanced Growth Inst**	210.4	Balanced	
76	SIAAX	Pacific Horizon Asset AlcSRF	210.1	AA	Jun-00
77	AONAX	Aon Asset Allocation	209.6	AA	Dec-02
78	PCBSX	BlackRock Balanced Svc	206.9	Balanced	
79	PRSIX	T.Rowe Price Pers Str Inc	206.3	AA	
80	PFAAX	Preferred Asset Allocation	203.8	AA	Jun-06
81	CFBAX	CitiSelect Folio 200	200.2	AA	Oct-00
82	ACVBX	Achievement Balanced Instl**	195	Balanced	
83	TWSCX	American Cent StrAlc:Con Inv	183.5	AA	
84	FFFAX	Fidelity Freedom Income	180.8	AA	
85	FMRIX	Federated Mgd Gr & Inc Instl**	179.7	AA	Jul-11
86	STLCX	MasterWorks LifePath 2020	163	AA	
87	SWOGX	Schwab MarketManager Growth	163	AA	May-09
88	STTRX	Stagecoach LifePath 2020A	161.9	AA	
89	ELDFX	Elfun Diversified	161.8	AA	
90	CFEAX	CitiSelect Folio 500*	159.5	AA	Oct-00
91	STLEX	MasterWorks LifePath 2040	158.5	AA	
92	VLAAX	Value Line Asset Allocation**	155.6	AA	
93	TWSAX	American Cent StrAlc:Agg Inv**	152.2	AA	
94	AADGX	AARP Diversified Growth	140.8	AA	Sep-00
95	BMGFX	Boston Balanced	138.1	AA	
96	STLBX	MasterWorks LifePath 2010	132.1	AA	Nov-09
97	STHRX	Stagecoach LifePath 2030A	128.7	AA	
98	SWCGX	Schwab MarketTrack Conserv	126.1	AA	
99	BTILX	BT Investment Lifecycle Long	126.1	AA	
100	FLMFX	Flex-funds Muirifield**	123.6	AA	

	Killed Funds
*	Killed but resumed funds
**	Discarded funds

Appendix 2.1.1: *Stay-the-course clone weight (first half)*

Rank		Vanguard 500 Index Investor	Vanguard Emerging Mkts Stock Idx	Vanguard European Stock Index Inv	Vanguard Extended Market Idx Inv	Vanguard Growth Index Inv	Vanguard High-Yield Corporate Inv	Vanguard Interm-Term Bond Index Inv	Vanguard International Explorer Inv	Vanguard International Growth Inv	Vanguard International Value Inv	Vanguard Long-Term Investment-Grade Inv	Vanguard Mid Capitalization Index Inv	Vanguard Pacific Stock Index Inv	Vanguard Prime Money Market Inv	Vanguard REIT Index Inv	Vanguard Short-Term Bond Index Inv	Vanguard Small Cap Growth Index Inv	Vanguard Small Cap Index Inv	Vanguard Small Cap Value Index Inv	Vanguard Total Bond Market Index Inv	Vanguard Total Intl Stock Index Inv	Vanguard Value Index Inv	Sum
1	Vanguard Wellington	0.00	0.00	0.00	0.00	0.00	0.04	0.23	0.00	0.00	0.14	0.01	0.00	0.00	0.02	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.46	1.00
2	Fidelity Puritan	0.00	0.00	0.00	0.00	0.06	0.15	0.06	0.00	0.00	0.08	0.00	0.05	0.00	0.12	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.38	1.00
3	Vanguard Wellesley Income	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.08	0.00	0.00	0.04	0.03	0.13	0.00	0.00	0.00	0.00	0.00	0.29	1.00
4	Vanguard STAR	0.00	0.00	0.00	0.00	0.05	0.05	0.17	0.00	0.04	0.05	0.04	0.16	0.00	0.09	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.30	1.00
5	Vanguard Asset Allocation	0.39	0.00	0.06	0.00	0.12	0.00	0.12	0.01	0.01	0.00	0.02	0.00	0.00	0.00	0.03	0.00	0.02	0.00	0.00	0.04	0.00	0.19	1.00
6	Dodge & Cox Balanced	0.00	0.00	0.00	0.00	0.00	0.13	0.06	0.00	0.00	0.11	0.00	0.08	0.00	0.00	0.06	0.11	0.00	0.00	0.03	0.00	0.00	0.42	1.00
7	Fidelity Balanced	0.00	0.03	0.00	0.00	0.10	0.11	0.16	0.00	0.00	0.08	0.00	0.16	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	1.00
8	Invesco Total Return	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	1.00
9	Vanguard LifeStrat Mod Grth	0.47	0.01	0.05	0.01	0.00	0.00	0.06	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.02	0.00	0.29	0.00	0.00	1.00
10	Vanguard Balanced Index	0.45	0.00	0.00	0.13	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.39	0.00	0.00	1.00
11	Vanguard LifeStratGrowth	0.51	0.01	0.06	0.04	0.04	0.00	0.01	0.02	0.02	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.03	0.02	0.00	0.13	0.04	0.04	1.00
12	USAA Income	0.00	0.00	0.00	0.00	0.00	0.12	0.14	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.66	0.00	0.00	1.00
13	T. Rowe Price Balanced	0.19	0.00	0.04	0.00	0.09	0.13	0.03	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.20	0.04	0.14	1.00
14	IDS Mutual Y	0.00	0.00	0.00	0.00	0.24	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.17	0.00	0.00	0.00	0.01	0.00	0.48	1.00
15	Vanguard LifeStrat Cons Grth	0.24	0.00	0.03	0.00	0.06	0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.03	0.00	0.00	0.43	0.00	0.05	1.00
16	Evergreen Foundation	0.24	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	1.00
17	Founders Balanced*	0.00	0.00	0.00	0.19	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
18	Lindner Dividend Inv	0.72	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	1.00
19	Janus Balanced	0.00	0.03	0.06	0.07	0.26	0.00	0.17	0.01	0.01	0.00	0.02	0.00	0.03	0.00	0.00	0.31	0.03	0.00	0.00	0.00	0.00	0.00	1.00
20	American Cent Balanced Inv	0.31	0.00	0.00	0.02	0.11	0.00	0.07	0.00	0.00	0.00	0.00	0.03	0.01	0.10	0.00	0.00	0.01	0.00	0.01	0.24	0.00	0.08	1.00
21	CGM Mutual	0.00	0.16	0.00	0.00	0.10	0.00	0.00	0.00	0.20	0.07	0.00	0.24	0.11	0.10	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
22	Fidelity Asset Manager: Inc	0.00	0.01	0.00	0.00	0.12	0.15	0.00	0.00	0.04	0.00	0.00	0.02	0.00	0.20	0.00	0.19	0.02	0.00	0.00	0.21	0.00	0.04	1.00
23	State Farm Balanced	0.39	0.00	0.00	0.00	0.09	0.00	0.23	0.00	0.00	0.05	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
24	Columbia Balanced	0.32	0.00	0.00	0.00	0.18	0.03	0.00	0.01	0.06	0.00	0.00	0.02	0.00	0.00	0.00	0.15	0.04	0.00	0.00	0.19	0.00	0.00	1.00
26	AARP Balanced Stock & Bond	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.30	0.06	0.00	0.00	0.00	0.03	0.00	0.00	0.51	1.00
27	Norwest Advant Growth Ball	0.00	0.00	0.00	0.00	0.24	0.01	0.00	0.00	0.14	0.00	0.00	0.01	0.00	0.22	0.02	0.00	0.03	0.00	0.07	0.00	0.00	0.26	1.00
28	MassMutual Instl Balanced S	0.00	0.00	0.00	0.00	0.11	0.06	0.14	0.00	0.00	0.03	0.00	0.00	0.00	0.17	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.46	1.00
29	Evergreen Sel Balanced Instl*	0.00	0.00	0.00	0.22	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.13	0.00	0.00	0.18	0.00	0.00	1.00
30	MasterWorks Asset Allocation	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
31	BT Instl Asset Management	0.00	0.01	0.03	0.00	0.29	0.14	0.02	0.00	0.10	0.00	0.04	0.00	0.00	0.00	0.03	0.19	0.01	0.00	0.00	0.00	0.00	0.15	1.00
32	Norwest Advant Mod Bal I	0.01	0.00	0.00	0.00	0.14	0.04	0.00	0.00	0.10	0.00	0.00	0.02	0.00	0.33	0.02	0.10	0.01	0.00	0.04	0.05	0.00	0.15	1.00
34	Diversified Inv Balanced	0.49	0.00	0.02	0.00	0.08	0.07	0.00	0.00	0.00	0.00	0.08	0.00	0.01	0.00	0.02	0.12	0.00	0.00	0.00	0.11	0.00	0.00	1.00
35	George Putnam of Boston Y	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.48	1.00
36	MainStay Inst Multi Instl	0.25	0.01	0.03	0.04	0.10	0.04	0.00	0.01	0.00	0.00	0.04	0.00	0.01	0.18	0.03	0.00	0.02	0.00	0.00	0.16	0.00	0.09	1.00
37	HighMark Balanced Fid	0.00	0.01	0.00	0.00	0.27	0.07	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.04	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.30	1.00
40	BlackRock Balanced Instl	0.03	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.18	0.02	0.00	0.29	0.00	0.08	0.00	0.26	0.05	0.00	0.00	0.00	0.00	0.06	1.00
41	MAS Balanced Instl	0.00	0.04	0.00	0.00	0.29	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.22	0.00	0.24	1.00
42	T.Rowe Price Pers Str Bal	0.00	0.00	0.06	0.00	0.11	0.15	0.09	0.00	0.00	0.11	0.00	0.12	0.00	0.00	0.02	0.17	0.02	0.00	0.00	0.00	0.00	0.17	1.00
43	CitiSelect Folio 400	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.01	0.08	0.20	0.26	0.08	0.00	0.00	0.08	0.00	0.07	0.00	0.13	0.00	0.00	0.00	1.00
45	JP Morgan Inst Diversified	0.15	0.01	0.01	0.03	0.16	0.02	0.05	0.01	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.00	0.20	0.04	0.15	1.00
46	CitiSelect Folio 300	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.01	0.05	0.13	0.28	0.05	0.00	0.13	0.05	0.06	0.06	0.00	0.10	0.00	0.00	0.00	1.00

Appendix 2.1.2: *Stay-the-course clone weight (second half)*

Rank		Vanguard 500 Index Investor	Vanguard Emerging Mkts Stock Idx	Vanguard European Stock Index Inv	Vanguard Extended Market Idx Inv	Vanguard Growth Index Inv	Vanguard High-Yield Corporate Inv	Vanguard Interm-Term Bond Index Inv	Vanguard International Explorer Inv	Vanguard International Growth Inv	Vanguard International Value Inv	Vanguard Long-Term Investment-Grade Inv	Vanguard Mid Capitalization Index Inv	Vanguard Pacific Stock Index Inv	Vanguard Prime Money Market Inv	Vanguard REIT Index Inv	Vanguard Short-Term Bond Index Inv	Vanguard Small Cap Growth Index Inv	Vanguard Small Cap Index Inv	Vanguard Small Cap Value Index Inv	Vanguard Total Bond Market Index Inv	Vanguard Total Intl Stock Index Inv	Vanguard Value Index Inv	Sum
47	AmSouth Balanced Premier	0.00	0.00	0.00	0.00	0.00	0.06	0.14	0.00	0.00	0.04	0.00	0.13	0.00	0.00	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.35	1.00
48	Dreyfus Balanced	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.04	0.00	0.22	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.24	1.00
49	Strong Asset Allocation	0.43	0.00	0.01	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.12	0.00	0.00	1.00
50	Delaware Instl	0.37	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.04	0.21	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.15	0.00	0.00	0.14	1.00
51	Schwab MarketTrack Growth	0.44	0.00	0.12	0.02	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.09	0.00	0.00	0.04	0.09	0.04	0.04	0.00	0.00	1.00
52	Wachovia Balnced Y	0.00	0.00	0.01	0.02	0.31	0.00	0.00	0.04	0.00	0.00	0.13	0.03	0.00	0.16	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.27	1.00
53	Schwab MarketTrack Balanced	0.33	0.00	0.09	0.01	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.00	0.00	0.04	0.05	0.03	0.24	0.00	0.00	1.00
55	American Cent StrAlc:Mod Inv	0.18	0.02	0.00	0.08	0.03	0.00	0.03	0.03	0.16	0.00	0.00	0.06	0.00	0.11	0.00	0.27	0.04	0.00	0.00	0.00	0.00	0.00	1.00
57	Norwest Advant Strat Inc I	0.00	0.00	0.00	0.00	0.07	0.04	0.00	0.00	0.06	0.00	0.00	0.03	0.00	0.28	0.01	0.14	0.01	0.00	0.01	0.29	0.00	0.06	1.00
58	Invesco Balanced	0.00	0.00	0.00	0.12	0.26	0.07	0.00	0.00	0.00	0.00	0.00	0.06	0.02	0.01	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.24	1.00
59	Dreyfus Premier Balanced R	0.00	0.00	0.08	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.16	0.02	0.00	0.00	0.00	0.00	0.05	0.00	0.29	1.00
61	One Group Asset Alloc Fid	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.37	0.00	0.01	1.00
62	Scudder Balanced	0.42	0.00	0.00	0.00	0.19	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
63	Chicago Trust Balanced	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.08	0.05	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	1.00
65	UAM FPA Crescent Instl	0.00	0.04	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.05	0.00	0.14	0.00	0.00	0.00	0.19	0.00	0.00	0.20	0.00	0.00	0.10	1.00
66	USAA Growth & Tax Strategy	0.06	0.00	0.00	0.00	0.32	0.08	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.09	1.00
67	CitiFunds Balanced	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.54	1.00
68	Scudder Pathway Balanced	0.00	0.00	0.05	0.01	0.25	0.10	0.03	0.04	0.05	0.00	0.00	0.00	0.01	0.07	0.00	0.03	0.05	0.00	0.00	0.16	0.00	0.15	1.00
69	Parkstone Bal Alloc Instl	0.00	0.00	0.02	0.00	0.40	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.05	0.24	0.00	0.00	0.17	0.00	0.00	0.07	0.00	0.00	1.00
73	STI Classic Balanced Tr	0.25	0.00	0.00	0.00	0.10	0.00	0.42	0.00	0.00	0.00	0.00	0.05	0.00	0.09	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.07	1.00
74	First American Strat Gr&Inc	0.00	0.00	0.00	0.00	0.17	0.11	0.00	0.01	0.13	0.00	0.04	0.09	0.00	0.00	0.02	0.23	0.04	0.00	0.00	0.00	0.01	0.16	1.00
76	Pacific Horizon Asset AlcSRF	0.14	0.02	0.00	0.00	0.38	0.19	0.00	0.00	0.00	0.00	0.03	0.05	0.00	0.07	0.03	0.06	0.01	0.00	0.00	0.01	0.00	0.00	1.00
77	Aon Asset Allocation	0.33	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.08	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.00	0.11	1.00
78	BlackRock Balanced Svc	0.04	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.18	0.01	0.00	0.29	0.00	0.07	0.00	0.27	0.05	0.00	0.00	0.00	0.00	0.06	1.00
79	T.Rowe Price Pers Str Inc	0.00	0.00	0.06	0.00	0.07	0.13	0.09	0.00	0.00	0.07	0.00	0.08	0.00	0.01	0.01	0.30	0.02	0.00	0.00	0.05	0.00	0.11	1.00
80	Preferred Asset Allocation	0.00	0.00	0.08	0.00	0.28	0.00	0.00	0.02	0.00	0.00	0.05	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.04	0.21	0.00	0.32	1.00
81	CitiSelect Folio 200	0.00	0.03	0.00	0.00	0.06	0.00	0.08	0.00	0.02	0.08	0.29	0.01	0.00	0.15	0.05	0.13	0.03	0.00	0.08	0.00	0.00	0.00	1.00
83	American Cent StrAlc:Con Inv	0.12	0.00	0.05	0.03	0.00	0.00	0.06	0.00	0.05	0.00	0.00	0.06	0.00	0.08	0.00	0.37	0.03	0.00	0.00	0.09	0.00	0.06	1.00
84	Fidelity Freedom Income	0.03	0.00	0.00	0.00	0.09	0.07	0.00	0.01	0.02	0.00	0.03	0.02	0.00	0.28	0.02	0.30	0.03	0.00	0.00	0.10	0.00	0.00	1.00
86	MasterWorks LifePath 2020	0.00	0.00	0.04	0.01	0.26	0.03	0.00	0.00	0.07	0.00	0.05	0.00	0.03	0.04	0.01	0.07	0.00	0.00	0.00	0.14	0.02	0.23	1.00
87	Schwab MarketManager Growth	0.12	0.00	0.11	0.22	0.27	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	1.00
88	Stagecoach LifePath 2020A	0.00	0.02	0.00	0.01	0.26	0.00	0.17	0.00	0.03	0.00	0.06	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.21	1.00
89	Elfun Diversified	0.00	0.00	0.04	0.00	0.19	0.12	0.13	0.00	0.09	0.04	0.00	0.02	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	1.00
90	CitiSelect Folio 500*	0.00	0.00	0.00	0.02	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.04	0.00	0.09	0.25	0.09	0.00	0.00	0.00	0.00	0.04	1.00
91	MasterWorks LifePath 2040	0.25	0.02	0.10	0.05	0.25	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.18	1.00
94	AARP Diversified Growth	0.00	0.04	0.17	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.08	0.01	0.00	0.00	0.00	0.05	0.19	0.00	0.22	1.00
95	Boston Balanced	0.28	0.00	0.00	0.00	0.10	0.00	0.19	0.00	0.00	0.03	0.00	0.00	0.00	0.23	0.01	0.07	0.00	0.00	0.04	0.00	0.00	0.05	1.00
96	MasterWorks LifePath 2010	0.00	0.00	0.02	0.00	0.17	0.03	0.00	0.00	0.09	0.00	0.04	0.00	0.01	0.00	0.02	0.33	0.00	0.00	0.00	0.12	0.00	0.16	1.00
97	Stagecoach LifePath 2030A	0.00	0.01	0.00	0.01	0.32	0.04	0.02	0.00	0.06	0.00	0.09	0.04	0.01	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.25	1.00
98	Schwab MarketTrack Conserv	0.22	0.00	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.01	0.00	0.04	0.02	0.02	0.45	0.05	0.01	1.00
99	BT Investment Lifecycle Long	0.00	0.02	0.03	0.00	0.29	0.14	0.02	0.00	0.08	0.00	0.04	0.00	0.00	0.00	0.03	0.18	0.01	0.00	0.00	0.00	0.00	0.15	1.00

Appendix 2.2.1: *Stay-the-course calculation – Non-weighted (first half)*

Rank	Name	Net alpha %	Gross alpha %	MSE %	Correlation	Expense ratio %	Clone expense ratio %	Excess Expense ratio %	Stock share	Intl stock share	Fund return %	Date killed (Blank means alive)
1	Vanguard Wellington	1.35	1.40	0.74	0.97	0.32	0.26	0.06	0.60	0.14	0.54	
2	Fidelity Puritan	0.26	0.62	0.69	0.97	0.63	0.26	0.37	0.58	0.08	0.42	
3	Vanguard Wellesley Income	0.74	0.80	0.69	0.93	0.28	0.22	0.07	0.32	0.00	0.53	
4	Vanguard STAR	0.32	0.06	0.44	0.99	0.00	0.26	-0.26	0.60	0.08	0.49	
5	Vanguard Asset Allocation	-0.84	-0.59	0.90	0.97	0.39	0.14	0.25	0.82	0.07	0.27	
6	Dodge & Cox Balanced	1.48	1.75	1.17	0.95	0.53	0.26	0.27	0.70	0.11	0.61	
7	Fidelity Balanced	0.60	1.00	0.83	0.97	0.64	0.25	0.39	0.64	0.10	0.52	
8	Invesco Total Return	-4.77	-4.30	0.88	0.95	0.79	0.32	0.47	0.65	0.03	-0.03	Jul-05
9	Vanguard LifeStrat Mod Grth	-0.30	-0.42	0.21	1.00	0.00	0.13	-0.13	0.65	0.11	0.38	
10	Vanguard Balanced Index	-0.05	0.06	0.10	1.00	0.21	0.10	0.11	0.59	0.00	0.38	
11	Vanguard LifeStratGrowth	-0.41	-0.41	0.22	1.00	0.00	0.00	0.00	0.85	0.16	0.34	
12	USAA Income	-0.20	0.11	0.52	0.91	0.53	0.22	0.31	0.02	0.00	0.47	
13	T. Rowe Price Balanced	0.25	0.78	0.40	0.99	0.73	0.19	0.53	0.60	0.13	0.42	
14	IDS Mutual Y	-2.70	-2.23	0.81	0.97	0.70	0.22	0.48	0.73	0.00	-0.02	Jul-11
15	Vanguard LifeStrat Cons Grth	-0.28	-0.45	0.22	0.99	0.00	0.18	-0.18	0.45	0.07	0.39	
16	Evergreen Foundation	-2.47	-1.63	0.67	0.97	1.03	0.19	0.84	0.61	0.00	0.03	Jun-05
17	Founders Balanced*	-5.55	-4.78	1.28	0.93	0.99	0.22	0.77	0.75	0.00	0.01	May-08
18	Lindner Dividend Inv	-1.36	-0.84	1.90	0.89	0.61	0.08	0.53	0.82	0.00	-0.26	Feb-04
19	Janus Balanced	0.80	1.45	0.86	0.95	0.85	0.19	0.65	0.51	0.10	0.50	
20	American Cent Balanced Inv	-0.35	0.41	0.43	0.99	0.92	0.16	0.76	0.59	0.00	0.32	
21	CGM Mutual	-2.29	-1.53	3.36	0.75	1.07	0.31	0.76	0.90	0.42	0.41	
22	Fidelity Asset Manager: Inc	0.16	0.52	0.42	0.96	0.60	0.25	0.35	0.24	0.05	0.41	
23	State Farm Balanced	0.46	0.42	0.68	0.96	0.13	0.17	-0.04	0.53	0.05	0.36	
24	Columbia Balanced	0.22	0.77	0.59	0.98	0.73	0.18	0.55	0.63	0.06	0.38	
26	AARP Balanced Stock & Bond	-9.61	-9.01	0.63	0.97	0.84	0.23	0.61	0.70	0.09	0.24	Aug-00
27	Norwest Advant Growth Ball	-0.14	0.51	0.65	0.98	0.94	0.29	0.65	0.76	0.14	0.36	
28	MassMutual Instl Balanced S	-1.40	-1.03	0.77	0.97	0.61	0.24	0.37	0.60	0.03	0.24	
29	Evergreen Sel Balanced Instl*	-1.08	-1.26	1.20	0.96	0.00	0.18	-0.18	0.66	0.00	-0.18	Jun-03
30	MasterWorks Asset Allocation	-3.68	-2.37	2.85	0.91	1.60	0.29	1.31	1.00	1.00	0.76	
31	BT Instl Asset Management	-1.27	-0.96	0.57	0.98	0.57	0.25	0.31	0.62	0.14	0.29	
32	Norwest Advant Mod Bal I	-0.01	0.60	0.49	0.98	0.89	0.28	0.61	0.48	0.10	0.38	
34	Diversified Inv Balanced	-1.14	-0.17	0.45	0.99	1.09	0.12	0.97	0.62	0.02	0.24	
35	George Putnam of Boston Y	-2.64	-2.09	1.35	0.92	0.80	0.24	0.55	0.55	0.00	0.22	
36	MainStay Inst Multi Instl	-1.01	-0.23	0.43	0.99	0.97	0.18	0.79	0.58	0.04	-0.01	Oct-09
37	HighMark Balanced Fid	-1.31	-0.59	0.57	0.98	0.94	0.23	0.72	0.61	0.03	0.23	
40	BlackRock Balanced Instl	-0.12	0.57	0.80	0.97	0.98	0.29	0.69	0.65	0.22	0.53	
41	MAS Balanced Instl	-0.06	0.37	0.55	0.98	0.67	0.23	0.44	0.64	0.11	0.38	
42	T.Rowe Price Pers Str Bal	0.28	0.90	0.48	0.99	0.87	0.25	0.62	0.60	0.17	0.49	
43	CitiSelect Folio 400	-2.71	-1.40	0.28	0.99	1.65	0.34	1.31	0.74	0.30	0.45	Oct-00
45	JP Morgan Inst Diversified	-0.33	0.08	0.29	1.00	0.62	0.21	0.41	0.66	0.14	0.37	
46	CitiSelect Folio 300	-3.72	-2.53	0.13	1.00	1.50	0.31	1.19	0.53	0.19	0.25	Oct-00

Appendix 2.2.2: *Stay-the-course calculation – Non-weighted (second half)*

47	AmSouth Balanced Premier	-0.21	0.59	0.91	0.94	1.03	0.23	0.80	0.54	0.04	0.45	
48	Dreyfus Balanced	-2.14	-1.36	0.63	0.98	0.96	0.18	0.78	0.69	0.00	0.06	Dec-04
49	Strong Asset Allocation	-2.08	-1.08	0.57	0.97	1.10	0.11	0.99	0.62	0.02	0.22	Jul-08
50	Delaware Instl	-5.12	-4.50	1.18	0.93	0.78	0.16	0.62	0.77	0.04	-0.02	Apr-09
51	Schwab MarketTrack Growth	-0.54	-0.15	0.20	1.00	0.52	0.12	0.40	0.81	0.12	0.34	
52	Wachovia Balnced Y	-0.14	0.37	0.70	0.98	0.77	0.26	0.51	0.71	0.04	0.00	Jun-02
53	Schwab MarketTrack Balanced	-0.75	-0.38	0.19	1.00	0.52	0.15	0.37	0.62	0.09	0.35	
55	American Cent StrAlc:Mod Inv	0.16	0.99	0.50	0.99	1.08	0.25	0.83	0.60	0.20	0.48	
57	Norwest Advant Strat Inc I	-0.23	0.35	0.40	0.95	0.83	0.26	0.57	0.25	0.06	0.38	
58	Invesco Balanced	-2.10	-1.09	0.77	0.98	1.22	0.20	1.02	0.71	0.00	-0.36	Nov-03
59	Dreyfus Premier Balanced R	-2.69	-1.91	0.61	0.97	1.00	0.23	0.77	0.69	0.08	0.13	Jan-09
61	One Group Asset Alloc Fid	-1.20	-0.46	0.39	0.99	0.85	0.11	0.74	0.59	0.02	0.14	Feb-05
62	Scudder Balanced	-0.89	-0.01	0.75	0.97	1.02	0.15	0.87	0.60	0.00	0.05	Mar-05
63	Chicago Trust Balanced	-0.22	0.60	1.02	0.94	1.07	0.25	0.82	0.63	0.00	0.13	Mar-10
65	UAM FPA Crescent Instl	2.06	3.20	1.87	0.85	1.39	0.25	1.14	0.54	0.09	0.75	
66	USAA Growth & Tax Strategy	-1.26	-0.64	0.89	0.94	0.84	0.21	0.62	0.51	0.00	0.24	
67	CitiFunds Balanced	-1.76	-0.99	0.82	0.94	1.02	0.24	0.78	0.62	0.00	-0.19	Oct-00
68	Scudder Pathway Balanced	-1.87	-1.90	0.41	0.99	0.23	0.26	-0.03	0.61	0.14	0.25	
69	Parkstone Bal Alloc Instl	-7.97	-7.12	0.65	0.96	1.12	0.27	0.85	0.68	0.06	0.39	Jun-00
73	STI Classic Balanced Tr	-2.26	-1.47	0.68	0.94	0.96	0.17	0.79	0.50	0.00	0.18	Mar-07
74	First American Strat Gr&Inc	-0.82	-0.69	0.43	0.99	0.40	0.28	0.12	0.62	0.15	0.38	
76	Pacific Horizon Asset AlcSRF	-3.04	-2.30	0.05	1.00	0.95	0.21	0.74	0.64	0.02	0.54	Jun-00
77	Aon Asset Allocation	0.70	1.08	1.12	0.92	0.56	0.19	0.37	0.66	0.08	0.20	Dec-02
78	BlackRock Balanced Svc	-0.43	0.42	0.80	0.97	1.13	0.28	0.85	0.65	0.22	0.51	
79	T.Rowe Price Pers Str Inc	0.32	0.86	0.36	0.99	0.77	0.23	0.54	0.42	0.13	0.49	
80	Preferred Asset Allocation	-1.40	-0.70	0.93	0.96	0.92	0.22	0.70	0.75	0.10	0.19	Jun-06
81	CitiSelect Folio 200	-3.89	-2.66	0.12	1.00	1.50	0.27	1.23	0.35	0.12	0.00	Oct-00
83	American Cent StrAlc:Con Inv	-0.16	0.64	0.37	0.98	1.00	0.20	0.80	0.40	0.11	0.42	
84	Fidelity Freedom Income	-0.45	-0.66	0.30	0.97	0.05	0.25	-0.21	0.22	0.04	0.36	
86	MasterWorks LifePath 2020	-0.70	-0.13	0.29	1.00	0.81	0.24	0.57	0.67	0.12	0.31	
87	Schwab MarketManager Growth	-1.53	-1.21	1.04	0.97	0.50	0.18	0.32	1.00	0.18	0.17	May-09
88	Stagecoach LifePath 2020A	-1.15	-0.16	0.45	0.99	1.23	0.23	0.99	0.62	0.13	0.28	
89	Elfun Diversified	0.19	0.18	0.62	0.98	0.27	0.27	-0.01	0.60	0.18	0.39	
90	CitiSelect Folio 500*	-4.07	-2.64	1.23	0.94	1.65	0.22	1.43	0.75	0.00	-0.38	Oct-00
91	MasterWorks LifePath 2040	-1.05	-0.41	0.38	1.00	0.80	0.16	0.64	0.95	0.14	0.23	
94	AARP Diversified Growth	-0.91	-1.11	0.21	1.00	0.00	0.19	-0.19	0.73	0.21	0.62	Sep-00
95	Boston Balanced	0.48	1.30	0.90	0.93	1.00	0.19	0.81	0.51	0.03	0.39	
96	MasterWorks LifePath 2010	-0.41	0.30	0.33	0.99	0.95	0.25	0.70	0.48	0.12	0.14	Nov-09
97	Stagecoach LifePath 2030A	-1.18	-0.20	0.38	1.00	1.23	0.25	0.98	0.80	0.15	0.26	
98	Schwab MarketTrack Conserv	-1.02	-0.68	0.23	0.99	0.52	0.17	0.34	0.42	0.08	0.35	
99	BT Investment Lifecycle Long	-1.63	-0.95	0.56	0.99	0.93	0.25	0.68	0.62	0.13	0.26	

Appendix 3.1: *Market-timing calculation – Non-weighted (first half)*

Rank	Name	Net alpha %	Gross Alpha %	Expense ratio %	Clone expense ratio %	Excess Expense Ratio %	Excess stdev of fund return. %/mo	Average stock share	Average intl stock share	Correlation	Mean standard deviation of prediction %age points	Stdev of stock share	Stdev of intl stock share	Date killed (Blank means alive)
1	Vanguard Wellington	0.687	0.744	0.315	0.258	0.057	-0.011	0.632	0.134	0.982	0.556	0.089	0.073	
2	Fidelity Puritan	-0.673	-0.306	0.626	0.259	0.367	0.014	0.631	0.082	0.990	0.434	0.078	0.072	
3	Vanguard Wellesley Income	0.245	0.312	0.282	0.216	0.066	-0.029	0.340	0.063	0.947	0.603	0.096	0.078	
4	Vanguard STAR	-0.002	-0.259	0.000	0.256	-0.256	0.005	0.617	0.128	0.997	0.237	0.050	0.075	
5	Vanguard Asset Allocation	0.191	0.441	0.386	0.136	0.251	-0.026	0.800	0.079	0.994	0.440	0.150	0.111	
6	Dodge & Cox Balanced	1.583	1.853	0.532	0.261	0.271	0.051	0.684	0.127	0.970	0.875	0.113	0.086	
7	Fidelity Balanced	0.009	0.402	0.642	0.250	0.392	0.007	0.670	0.114	0.991	0.445	0.086	0.083	
8	Invesco Total Return	-4.701	-4.229	0.790	0.319	0.471	-0.054	0.680	0.081	0.976	0.643	0.101	0.090	Jul-05
9	Vanguard LifeStrat Mod Grth	-0.029	-0.155	0.001	0.127	-0.126	-0.021	0.648	0.119	0.999	0.115	0.050	0.057	
10	Vanguard Balanced Index	-0.174	-0.063	0.215	0.103	0.112	-0.018	0.595	0.021	0.999	0.146	0.034	0.062	
11	Vanguard LifeStratGrowth	-0.120	-0.120	0.000	0.000	0.000	-0.004	0.842	0.163	1.000	0.091	0.042	0.045	
12	USAA Income	-0.279	0.033	0.530	0.218	0.312	-0.041	0.064	0.033	0.865	0.649	0.136	0.069	
13	T. Rowe Price Balanced	-0.547	-0.015	0.726	0.195	0.531	0.002	0.620	0.142	0.998	0.205	0.059	0.062	
14	IDS Mutual Y	-1.993	-1.516	0.700	0.223	0.477	0.034	0.697	0.060	0.991	0.476	0.113	0.072	Jul-11
15	Vanguard LifeStrat Cons Grth	-0.101	-0.276	0.000	0.175	-0.175	-0.036	0.463	0.074	0.995	0.230	0.061	0.057	
16	Evergreen Foundation	-3.169	-2.327	1.030	0.188	0.842	0.032	0.606	0.093	0.986	0.458	0.112	0.092	Jun-05
17	Founders Balanced*	-4.074	-3.301	0.990	0.217	0.773	-0.024	0.738	0.069	0.962	0.934	0.133	0.083	May-08
18	Lindner Dividend Inv	-2.743	-2.216	0.610	0.083	0.527	-0.001	0.780	0.213	0.940	1.357	0.151	0.139	Feb-04
19	Janus Balanced	-0.377	0.276	0.847	0.194	0.653	0.023	0.554	0.151	0.975	0.578	0.130	0.105	
20	American Cent Balanced Inv	-1.214	-0.453	0.922	0.161	0.761	-0.030	0.585	0.064	0.994	0.310	0.080	0.069	
21	CGM Mutual	-4.758	-4.001	1.066	0.309	0.758	0.002	0.877	0.466	0.836	2.711	0.181	0.344	
22	Fidelity Asset Manager: Inc	-0.309	0.044	0.601	0.248	0.353	0.016	0.264	0.059	0.986	0.254	0.041	0.042	
23	State Farm Balanced	-0.494	-0.531	0.134	0.171	-0.037	-0.007	0.549	0.081	0.979	0.509	0.087	0.063	
24	Columbia Balanced	0.104	0.658	0.731	0.177	0.554	0.014	0.644	0.074	0.990	0.417	0.059	0.062	
26	AARP Balanced Stock & Bond	-6.300	-5.692	0.840	0.232	0.608	-0.012	0.694	0.086	0.980	0.519	0.051	0.034	Aug-00
27	Norwest Advant Growth Ball	-0.253	0.397	0.941	0.292	0.650	-0.008	0.771	0.146	0.994	0.401	0.091	0.101	
28	MassMutual Instl Balanced S	-1.344	-0.978	0.608	0.242	0.367	0.012	0.621	0.040	0.985	0.505	0.056	0.040	
29	Evergreen Sel Balanced Instl*	-1.235	-1.414	0.000	0.179	-0.179	-0.003	0.738	0.059	0.976	0.884	0.145	0.045	Jun-03
30	MasterWorks Asset Allocation	-5.310	-3.999	1.600	0.289	1.311	-2.756	0.967	0.788	0.703	4.460	0.053	0.308	
31	BT Instl Asset Management	-1.612	-1.300	0.566	0.254	0.312	0.034	0.617	0.106	0.995	0.323	0.046	0.069	
32	Norwest Advant Mod Bal I	0.140	0.753	0.893	0.281	0.612	0.019	0.471	0.094	0.992	0.302	0.058	0.073	
34	Diversified Inv Balanced	-1.770	-0.803	1.091	0.124	0.967	0.007	0.605	0.045	0.995	0.290	0.048	0.032	
35	George Putnam of Boston Y	-1.837	-1.283	0.796	0.242	0.554	0.072	0.591	0.032	0.959	0.964	0.073	0.048	
36	MainStay Inst Multi Instl	-1.776	-0.991	0.970	0.184	0.786	0.047	0.569	0.077	0.994	0.289	0.074	0.070	Oct-09
37	HighMark Balanced Fid	-1.836	-1.120	0.945	0.229	0.716	-0.005	0.620	0.056	0.992	0.386	0.067	0.041	
40	BlackRock Balanced Instl	-0.921	-0.227	0.981	0.287	0.694	0.000	0.675	0.212	0.986	0.566	0.080	0.097	
41	MAS Balanced Instl	-0.697	-0.262	0.668	0.233	0.435	0.040	0.633	0.089	0.992	0.378	0.075	0.062	
42	T.Rowe Price Pers Str Bal	-0.282	0.339	0.869	0.248	0.621	0.013	0.628	0.167	0.997	0.229	0.059	0.054	
43	CitiSelect Folio 400	-3.206	-1.899	1.650	0.343	1.307	0.045	0.732	0.266	0.994	0.296	0.042	0.033	Oct-00
45	JP Morgan Inst Diversified	-0.560	-0.146	0.623	0.209	0.414	0.004	0.659	0.149	0.999	0.159	0.040	0.051	
46	CitiSelect Folio 300	-3.968	-2.781	1.500	0.312	1.188	-0.024	0.525	0.156	0.998	0.112	0.042	0.032	Oct-00

Appendix 3.2: *Market-timing calculation – Non-weighted (second half)*

47	AmSouth Balanced Premier	-0.640	0.160	1.027	0.228	0.799	0.028	0.541	0.051	0.979	0.542	0.093	0.056	
48	Dreyfus Balanced	-1.425	-0.641	0.960	0.177	0.783	-0.016	0.710	0.052	0.990	0.457	0.073	0.043	Dec-04
49	Strong Asset Allocation	-3.298	-2.307	1.100	0.109	0.991	0.020	0.618	0.042	0.985	0.438	0.070	0.059	Jul-08
50	Delaware Instl	-3.990	-3.372	0.780	0.161	0.619	0.082	0.705	0.067	0.959	0.872	0.152	0.080	Apr-09
51	Schwab MarketTrack Growth	-0.836	-0.440	0.519	0.123	0.396	0.004	0.802	0.192	0.999	0.143	0.026	0.038	
52	Wachovia Balnced Y	0.468	0.979	0.770	0.259	0.511	0.124	0.706	0.063	0.987	0.565	0.086	0.051	Jun-02
53	Schwab MarketTrack Balanced	-0.971	-0.599	0.518	0.146	0.372	0.009	0.606	0.146	0.999	0.121	0.023	0.035	
55	American Cent StrAlc:Mod Inv	-1.388	-0.555	1.078	0.245	0.833	0.041	0.620	0.181	0.997	0.238	0.076	0.086	
57	Norwest Advant Strat Inc I	-0.007	0.566	0.832	0.259	0.573	0.040	0.241	0.059	0.978	0.274	0.037	0.043	
58	Invesco Balanced	-2.887	-1.871	1.220	0.204	1.016	0.089	0.701	0.061	0.984	0.642	0.083	0.078	Nov-03
59	Dreyfus Premier Balanced R	-2.479	-1.705	1.000	0.226	0.774	-0.024	0.679	0.048	0.990	0.366	0.095	0.044	Jan-09
61	One Group Asset Alloc Fid	-1.541	-0.804	0.850	0.112	0.738	-0.041	0.587	0.064	0.995	0.270	0.037	0.053	Feb-05
62	Scudder Balanced	-2.116	-1.243	1.020	0.147	0.873	0.053	0.606	0.036	0.989	0.432	0.077	0.036	Mar-05
63	Chicago Trust Balanced	-0.998	-0.179	1.070	0.251	0.819	-0.034	0.669	0.068	0.970	0.747	0.061	0.062	Mar-10
65	UAM FPA Crescent Instl	1.924	3.065	1.386	0.246	1.140	-0.003	0.616	0.176	0.911	1.394	0.142	0.129	
66	USAA Growth & Tax Strategy	-1.465	-0.843	0.837	0.215	0.622	0.021	0.520	0.061	0.970	0.628	0.070	0.066	
67	CitiFunds Balanced	-1.740	-0.964	1.020	0.244	0.776	-0.080	0.611	0.001	0.934	0.883	0.018	0.003	Oct-00
68	Scudder Pathway Balanced	1.271	1.239	0.228	0.260	-0.032	-0.814	0.604	0.143	0.963	1.091	0.045	0.055	
69	Parkstone Bal Alloc Instl	-8.801	-7.952	1.120	0.271	0.849	-0.136	0.710	0.195	0.946	0.822	0.068	0.054	Jun-00
73	STI Classic Balanced Tr	-2.500	-1.710	0.960	0.170	0.790	0.005	0.519	0.024	0.971	0.489	0.097	0.038	Mar-07
74	First American Strat Gr&Inc	-1.198	-1.075	0.399	0.276	0.123	0.027	0.612	0.141	0.997	0.256	0.042	0.061	
76	Pacific Horizon Asset AlcSRF	-3.426	-2.683	0.950	0.207	0.743	-0.003	0.665	0.052	0.993	0.295	0.066	0.038	Jun-00
77	Aon Asset Allocation	-0.145	0.230	0.560	0.186	0.374	0.005	0.667	0.188	0.958	0.827	0.108	0.154	Dec-02
78	BlackRock Balanced Svc	-1.244	-0.396	1.133	0.285	0.849	-0.003	0.676	0.209	0.986	0.561	0.079	0.098	
79	T.Rowe Price Pers Str Inc	-0.049	0.488	0.769	0.231	0.538	0.012	0.443	0.125	0.997	0.177	0.045	0.042	
80	Preferred Asset Allocation	-0.304	0.396	0.920	0.220	0.700	-0.057	0.727	0.093	0.989	0.478	0.157	0.100	Jun-06
81	CitiSelect Folio 200	-4.022	-2.796	1.500	0.274	1.226	0.006	0.347	0.099	0.997	0.111	0.027	0.026	Oct-00
83	American Cent StrAlc:Con Inv	-1.135	-0.336	0.996	0.197	0.799	-0.001	0.427	0.102	0.997	0.158	0.053	0.050	
84	Fidelity Freedom Income	-0.337	-0.543	0.045	0.251	-0.206	0.019	0.213	0.036	0.991	0.164	0.036	0.031	
86	MasterWorks LifePath 2020	-3.095	-2.525	0.813	0.243	0.570	-7.093	0.946	0.216	0.376	9.573	2.660	0.560	
87	Schwab MarketManager Growth	-1.808	-1.483	0.500	0.175	0.325	0.030	0.972	0.174	0.986	0.764	0.054	0.140	May-09
88	Stagecoach LifePath 2020A	-0.983	0.009	1.227	0.235	0.992	-0.007	0.597	0.168	0.999	0.150	0.089	0.054	
89	Elfun Diversified	-2.070	-2.077	0.267	0.273	-0.007	0.836	0.650	0.195	0.979	1.096	0.059	0.072	
90	CitiSelect Folio 500*	-3.843	-2.418	1.650	0.225	1.425	0.077	0.911	0.394	0.991	0.416	0.053	0.267	Oct-00
91	MasterWorks LifePath 2040	-0.917	-0.277	0.799	0.160	0.640	-0.013	0.921	0.227	0.999	0.189	0.050	0.083	
94	AARP Diversified Growth	-1.710	-1.902	0.000	0.192	-0.192	0.012	0.692	0.163	0.995	0.266	0.068	0.041	Sep-00
95	Boston Balanced	-1.255	-0.443	1.000	0.188	0.812	-0.027	0.558	0.050	0.969	0.592	0.116	0.061	
96	MasterWorks LifePath 2010	-0.765	-0.061	0.950	0.246	0.704	0.002	0.458	0.129	0.997	0.174	0.045	0.044	Nov-09
97	Stagecoach LifePath 2030A	-0.943	0.039	1.231	0.249	0.981	-0.003	0.770	0.201	0.999	0.145	0.059	0.064	
98	Schwab MarketTrack Conserv	-1.071	-0.727	0.516	0.172	0.344	0.016	0.407	0.101	0.997	0.155	0.026	0.029	
99	BT Investment Lifecycle Long	-1.912	-1.231	0.930	0.249	0.681	0.037	0.616	0.105	0.995	0.321	0.045	0.070	

Appendix 4.1: *Geometric average return for all funds (first half)*

Rank	Ticker	Name	Average return %
1	VWELX	Vanguard Wellington	0.541
2	FPURX	Fidelity Puritan	0.421
3	VWINX	Vanguard Wellesley Income	0.531
4	VGSTX	Vanguard STAR	0.494
5	VAAPX	Vanguard Asset Allocation	0.272
6	DODBX	Dodge & Cox Balanced	0.608
7	FBALX	Fidelity Balanced	0.523
8	FSFLX	Invesco Total Return	-0.027
9	VSMGX	Vanguard LifeStrat Mod Grth	0.378
10	VBINX	Vanguard Balanced Index	0.383
11	VASGX	Vanguard LifeStratGrowth	0.338
12	USAIX	USAA Income	0.466
13	RPBAX	T. Rowe Price Balanced	0.422
14	IDMYX	IDS Mutual Y	0.106
15	VSCGX	Vanguard LifeStrat Cons Grth	0.393
16	EFONX	Evergreen Foundation	0.103
17	FRINX	Founders Balanced*	0.085
18	LDDVX	Lindner Dividend Inv	0.034
19	JABAX	Janus Balanced	0.500
20	TWBIX	American Cent Balanced Inv	0.325
21	LOMMX	CGM Mutual	0.413
22	FASIX	Fidelity Asset Manager: Inc	0.414
23	STFBX	State Farm Balanced	0.359
24	CBALX	Columbia Balanced	0.376
26	ABSBX	AARP Balanced Stock & Bond	0.181
27	NVGBX	Norwest Advant Growth Ball	0.355
28	MBLDX	MassMutual Instl Balanced S	0.235
29	ESAIX	Evergreen Sel Balanced Instl*	0.004
30	WFAAX	MasterWorks Asset Allocation	0.756
31	BTAMX	BT Instl Asset Management	0.292
32	NVMBX	Norwest Advant Mod Bal I	0.375
34	DVIBX	Diversified Inv Balanced	0.244
35	PGEYX	George Putnam of Boston Y	0.218
36	NIMBX	MainStay Inst Multi Instl	0.210
37	HMBAX	HighMark Balanced Fid	0.231
40	PBAIX	BlackRock Balanced Instl	0.533
41	MPBAX	MAS Balanced Instl	0.375
42	TRPBX	T.Rowe Price Pers Str Bal	0.495
43	CFDAX	CitiSelect Folio 400	0.499
45	JPDVX	JP Morgan Inst Diversified	0.370
46	CFCAX	CitiSelect Folio 300	0.349

Appendix 4.2: *Geometric average return for all funds (second half)*

47	AYBLX	AmSouth Balanced Premier	0.449
48	DRBAX	Dreyfus Balanced	0.120
49	STAAX	Strong Asset Allocation	0.140
50	DEICX	Delaware Instl	-0.205
51	SWHGX	Schwab MarketTrack Growth	0.336
52	BTBYX	Wachovia Balnced Y	0.023
53	SWBGX	Schwab MarketTrack Balanced	0.348
55	TWSMX	American Cent StrAlc:Mod Inv	0.477
57	NVCBX	Norwest Advant Strat Inc I	0.382
58	IMABX	Invesco Balanced	-0.049
59	PDBLX	Dreyfus Premier Balanced R	-0.153
61	HLBAX	One Group Asset Alloc Fid	0.178
62	SCBAX	Scudder Balanced	0.135
63	CHTAX	Chicago Trust Balanced	0.190
65	FPACX	UAM FPA Crescent Instl	0.754
66	USBLX	USAA Growth & Tax Strategy	0.245
67	CFBPX	CitiFunds Balanced	0.372
68	SPBAX	Scudder Pathway Balanced	0.251
69	PKBAX	Parkstone Bal Alloc Instl	0.856
73	SBATX	STI Classic Balanced Tr	0.271
74	FSGNX	First American Strat Gr&Inc	0.378
76	SIAAX	Pacific Horizon Asset AlcSRF	0.577
77	AONAX	Aon Asset Allocation	0.114
78	PCBSX	BlackRock Balanced Svc	0.510
79	PRSIX	T.Rowe Price Pers Str Inc	0.488
80	PFAAX	Preferred Asset Allocation	0.237
81	CFBAX	CitiSelect Folio 200	0.163
83	TWSCX	American Cent StrAlc:Con Inv	0.421
84	FFFAX	Fidelity Freedom Income	0.357
86	STLCX	MasterWorks LifePath 2020	0.308
87	SWOGX	Schwab MarketManager Growth	-0.030
88	STTRX	Stagecoach LifePath 2020A	0.276
89	ELDFX	Elfun Diversified	0.392
90	CFEAX	CitiSelect Folio 500*	-0.174
91	STLEX	MasterWorks LifePath 2040	0.234
94	AADGX	AARP Diversified Growth	0.789
95	BMGFX	Boston Balanced	0.389
96	STLBX	MasterWorks LifePath 2010	0.277
97	STHRX	Stagecoach LifePath 2030A	0.264
98	SWCGX	Schwab MarketTrack Conserv	0.352
99	BTILX	BT Investment Lifecycle Long	0.262
		Average	0.316

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