Asset Allocation and Investment Horizon

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*Quarterly recommendations by national brokerage firms since the third quarter of 1989
provide an opportunity to compare different approaches to asset allocation. To follow
a brokerage firm's recommendation every quarter is to practice tactical asset alloca-
tion. Both the length of the investor's decision horizon and brokerage commissions that
are incurred when portfolio changes are made impact investment performance, and
both contribute to the risk experienced by investors. Buy-and-hold and strategic asset
allocation would have served investors better than tactical asset allocation during the
first half of the 1990s.*

I. INTRODUCTION

In a recent article in this *Review*, Walker and Hatfield (1996) investigated the question of
whether the published advice of professional analysts on individual securities documented
in the *Wall Street Journal* can be used advantageously by individual investors. The authors
concluded that it may be possible for professionals to identify attractive securities, but that
ability may be offset by the transaction costs necessary to implement their recommenda-
tions. The authors also reminded readers that individual security selection decisions logi-
cally follow asset allocation decisions.

Every quarter on an ongoing basis, the *Wall Street Journal* also reports the recom-
mended asset allocations (i.e., stocks, bonds, and cash) of the large national brokerage
firms.[1] The recommendations tend to change over time, and so investment strategists at
those firms must believe that they can successfully predict when stocks, bonds, and cash
are likely to do well as asset categories. If investors follow the brokerage firms and change
their asset allocations each quarter, they are engaging in *market timing*, an activity whose
value has been seriously questioned by some researchers.

In this paper, "investment horizon" is defined as the time span between investment
decisions, and with the idea that investors may decide not to change their portfolio blend
every quarter. If an investor changes the portfolio blend just two times per year, then he/
she behaves as if the investment horizon is six months. A change of blend every calendar
quarter would reflect an investment horizon of three months. So even though the brokerage

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firms are making asset allocation recommendations at least every quarter, investors may choose to adopt longer investment horizons and change their portfolio blends less often.

The quarterly *Journal* recommendations provide a window of opportunity for examining the impact of investment horizon on asset allocation decisions. After reviewing the relevant literature on asset allocation, we carefully investigate how investors would have fared had they followed the brokerage firm recommendations over time. We examine the impact of brokerage commissions on ensuing portfolio performance. We consider the risk that investors face when the follow the asset allocation recommendations of the national brokerage firms. We find that strategies of buy-and-hold and/or strategic asset allocation would have served investors better than a strategy of tactical asset allocation during the first half of the 1990s.

II.   NATURE AND IMPORTANCE OF ASSET ALLOCATION

Asset allocation is a decision-making process in which the investment funds of an individual or a group of individuals are allocated to investment categories rather than to individual assets. Studies by Brimson, et.al. (1986,1990) have shown convincingly that allocation of investment funds to asset categories is far more important than the selection of individual securities within each asset category.

The simplest breakdown for asset allocation is into just two categories: fixed income (bonds) and equity (common stocks) securities. Broader schemes of asset allocation include categories such as large- and small-capitalization common stocks, government and corporate bonds, real estate, gold, commodities, international securities, and venture capital opportunities. But the most common scheme for asset allocation is into three categories--stocks, bonds, and cash. That is what the brokerage firms tend to do, and that scheme is used in this study.

A number of prior studies of asset allocation are germane to what we do here. A decade ago, Sharpe (1986) suggested a useful taxonomy for asset allocation that included strategic, tactical, and insured approaches. The significant difference between strategic and tactical approaches to asset allocation is that a *strategic allocation* calls for an investor to hold constant a recommended blend over time, while a *tactical allocation* periodically reassesses the portfolio blend and makes appropriate adjustments. In that sense, strategic asset allocation employs a longer investment horizon than does tactical asset allocation, which really is more of a market timing approach. An even less active approach is *buy-and-hold*, where no portfolio adjustments are made once an initial portfolio of asset categories is purchased.

Asset allocation decisions can be made in a variety of ways. Four specific strategies were compared by Perold & Sharpe (1988). Smith (1974) suggested a weighted-average measure of suitability for making asset allocations, while Tarrazo (1997) provided an alternative approach using fuzzy-set theory. Waring (1994) explained how mean-variance optimization can be used to structure portfolios for 401(k) retirement plans. Black & Litterman showed how an optimizing approach can be applied to international bond portfolios, but with outlooks for interest rates and currencies being compared to expected returns from an asset pricing model.

Another approach in asset allocation studies is to examine investor portfolios to try and infer investment attitudes about risk. Blume & Friend (1975) examined Federal Reserve Board data and concluded that individuals seem to maintain their percentage mix of riskier and safer investments and thus exhibit constant relative risk aversion. In contrast, Cohn, et.al. (1975) used cross-sectional brokerage firm data to infer decreasing relative risk aversion, which is a tendency to put a larger percentage of wealth into riskier investments as wealth increases.

There also are different findings from empirical investigations of just how well various asset allocation strategies would have worked in practice. Earlier studies such as Sharpe (1975), Henriksson (1984), and Jeffrey (1994) provide *ex post* evidence that market timing and tactical asset allocation do not add value. The mood of the popular press [e.g. Clements (1995)] also is not very encouraging toward strategies of market timing and tactical asset allocation. Some hope was provided by Phillips, et.al. (1996). The authors examined the performance of eleven managers who use tactical asset allocation to manage institutional portfolios. Using performance data net of management fees, they found that the managers outperformed appropriate benchmarks during the 1977–87 period, but they did not continue to do that during the 1988–94 period.

Finally, it is appropriate to mention two recent studies that examined asset allocation with an *ex ante* perspective. Smith (1997) looked at the brokerage firm asset allocations in the sense of how close the recommended portfolios were to efficient portfolios in a mean-variance space. He found that no single firm is dominant at all, and the difficulty is that there is no agreement as to the necessary portfolio inputs that are necessary for the optimization. Bierman (1997) also used an *ex ante* analysis to revisit the question of what happens to investment risk when the investment horizon gets longer. He concluded that lengthening the investment horizon does increase risk at least by some popular measures.

III. RECOMMENDED BLENDS BY NATIONAL BROKERAGE FIRMS

Since the middle of 1989, the *Wall Street Journal* has published on a quarterly basis the recommended asset allocations of leading U.S. brokerage firms. Although sixteen firms have participated, CS First Boston and Edward D. Jones joined the group in 1994, and Evelen first appeared in the second half of 1995. Among the other thirteen firms, all have participated for at least two years, and eight firms have been involved since inception. The recommended blends of those thirteen firms, as reported on a quarterly basis in the *Journal*, constitute the data for this investigation. It should be noted that while some of the brokerage firms may change their recommendations more frequently, this study utilizes just the quarter-end blends of the brokerage firms. When on occasion a brokerage firm recommended other categories such as real estate, gold, commodities, and foreign stocks, those assets were combined with common stocks into a single equity category.

Table 1 includes the recommended percentage allocations for common stocks by the thirteen national brokerage firms at the end of each quarter, from the third quarter of 1989 (89-3) through the end of calendar year 1995 (95-4). For each brokerage firm, for each quarter, and for the entire horizon, the maximum, minimum, range (maximum minus minimum), average, and standard deviation of the common stock recommendations are shown. The maximum common stock recommendation was 85%, the minimum value was 24%,

TABLE 1

Common Stock Recommendations by Brokerage Firms Quarter End, 1989–1995
(in percentage)

Brokerage Firm	89-3	89-4	90-1	90-2	90-3	90-4	91-1	91-2	91-3	91-4	92-1	92-2	92-3	92-4	93-1	93-2
A. G. Edwards	45	45	40	40	40	45	55	50	55	55	55	50	45	50	45	55
Dean Witter	85	85	85	85	50	45	55	55	45	65	55	55	60	60	60	60
Goldman Sachs	65	50	35	35	35	50	60	60	75	75	75	75	75	75	60	60
Kemper															50	50
Kidder Peabody	50	45	45	50	60	60	70	70	70	70	70	70	70	70	70	70
Lehman Brothers																75
Merrill Lynch	50	50	40	50	45	55	55	55	60	65	60	55	60	60	55	55
Paine Webber	24	25	56	56	56	59	57	55	64	67	57	64	73	71	69	73
Prudential	70	35	40	40	40	65	80	60	75	65	65	45	45	55	70	70
Raymond James	60	60	75	65	65	65	70	70	70	70	60	55	45	55	55	60
Salomon Brothers														50	50	45
Shearson	60	60	65	65	65	65	65	60	60	60	55	55	55	50	50	
Smith Barney	50	50	45	50	45	50	50	55	50	60	55	50	50	50	50	50
Maximum	85	85	85	85	65	65	80	70	75	75	75	75	75	75	70	75
Minimum	24	25	35	35	35	45	50	50	45	55	55	45	45	50	45	45
Range	61	60	50	50	30	20	30	20	30	20	20	30	30	25	25	30
Average	55.9	50.5	52.6	53.6	50.1	55.9	61.7	59.0	62.4	65.2	60.7	57.4	57.8	58.0	57.0	60.3
Std Dev	15.5	15.2	16.2	14.2	10.3	7.6	8.8	6.2	9.8	5.5	6.7	8.9	11.2	8.9	8.4	9.4

(Table 1 continued)

Brokerage Firm	93-3	93-4	94-1	94-2	94-3	94-4	95-1	95-2	95-3	95-4	Maximum	Minimum	Range	Average	Std Dev
A. G. Edwards	65	65	60	50	45	40	40	50	45	55	65	40	25	49.4	7.2
Dean Witter	60	60	50	50	50	50	60	60	60	60	85	45	40	60.2	11.7
Goldman Sachs	70	70	80	85	85	65	70	65	65	65	85	35	50	64.6	13.8
Kemper	50	50	55	55	40	65	55	60			65	40	25	52.7	6.2
Kidder Peabody	70	70	60	50	66	65					70	45	25	63.1	9.2
Lehman Brothers	75	50	50	50	45	45	40	55	65	70	75	40	35	56.4	12.1
Merrill Lynch	60	60	60	50	50	50	55	55	50	50	65	40	25	54.2	5.5
Paine Webber	77	68	58	52	49	48	52	58	58	64	77	24	53	58.1	12.3
Prudential	80	85	65	60	65	55	60	55	50	50	85	35	50	59.4	13.3
Raymond James	60	70	65	65	60	55	65	65	65	70	75	45	30	63.1	6.5
Salomon Brothers	45	45	50	50	45	45	45	45	45	50	50	45	5	46.9	2.4
Shearson											65	50	15	59.3	5.1
Smith Barney	55	55	50	50	50	50	50	55	60	60	60	45	15	51.7	3.9
Maximum	80	85	80	85	85	65	70	65	65	70	85				
Minimum	45	45	50	50	40	40	40	45	45	50		24			
Range	35	40	30	35	45	25	30	20	20	20			61		
Average	63.9	62.3	58.6	55.6	54.2	51.6	53.8	56.6	56.3	59.4				57.4	
Std Dev	10.4	10.8	8.4	10.0	12.2	7.5	9.3	5.7	7.7	7.5					10.8

Note: "89-3" indicates the end of the third quarter of 1989.

Source: *Wall Street Journal*, quarterly issues.

and the range was 61%. For the sample of thirteen brokerage firms, the average common stock recommendation was 57.4%, while the standard deviation was 10.8%. Overall, there was considerable diversity in common stock recommendations, and that is one component of risk experienced by investors who follow the common stock suggestions of the national brokerage firms.

Brokerage firms also differed considerably in how their common stock recommendations changed from quarter to quarter. Most brokerage firms provided recommendations that were *multiples* of 5%. An exception was Paine Webber whose recommendations changed by increments and fractions, suggesting that the firm was using an analytical model that generated more precise percentages. The range of common stock allocations was highest for Paine Webber (53%) and lowest for Salomon Brothers (5%). While Salomon Brothers' asset recommendations did not begin until the end of 1992, they have been either 45% or 50% for common stocks in every subsequent quarter. Over time, the average common stock recommendation was highest (65.2%) at the end of December 1991; it was lowest (50.1%) at the end of September 1990.

Table 2 provides further detail by including recommendations for bonds and cash, along with that for common stocks. The maximum, minimum, average, and standard deviations of recommendations by brokerage firms for stocks, bonds, and cash during the 1989-95 period are reported. In addition to the 57.4% average for common stocks already reported, we see that the average recommendations were 30.6% for bonds and 12.0% for cash. The only firm recommending a zero percentage for bonds was Prudential (on three occasions), while a total of eight firms recommended a zero percentage for cash at least once.

Ranges are not included in Table 2, but further inspection of the quarterly data reveals that the range both for common stocks and cash was 61%, followed closely by a 55% range for bonds. Average recommendations for each quarter also are not included in Table 2, but it can be reported that the highest value for bonds was 37.1% at the end of 1990, while the lowest was 23.9% at the end of third quarter 1993. For cash, the highest average was 20.7% at the end of 1989, while the lowest was 2.6% just two years later. Overall, there was considerable diversity among the brokerage firms in their suggested allocations among the three asset categories.

While some brokerage firms occasionally did not change their recommended blends from one quarter to the next, the historical pattern does suggest a strategy of tactical asset allocation by the national brokerage firms. Part of the risk experienced by investors who follow the advice of the brokerage firms may be that considerable changes in their portfolios must be made in order to remain in step with the tactical asset allocation recommendations. It remains to be seen here if such changes in asset allocations add value for investors.

IV.   PERFORMANCE BENCHMARKS

In order to investigate the impact of asset allocations on investor performance, the Standard & Poor's 500 Composite Index (S & P 500) was used a measure of the level of common stocks. The level of bonds was portrayed by an index of long-term U.S. government issues (U.S. Long), while the level of cash was portrayed by an index of 90-day U.S. treasury bills (U.S. Bill).[2]

TABLE 2
Asset Allocation Recommendations by Brokerage Firms, 1989–1995
(in percentage)

Brokerage Firm	Common Stocks				Bonds				Cash			
	Maximum	Minimum	Average	Std Dev	Maximum	Minimum	Average	Std Dev	Maximum	Minimum	Average	Std Dev
A. G. Edwards	65	40	49.4	7.2	45	25	38.7	4.9	20	5	11.9	4.8
Dean Witter	85	45	60.2	7.6	50	15	32.1	9.6	25	0	7.7	7.5
Goldman Sachs	85	35	65.6	13.8	55	15	28.3	10.6	30	0	7.1	5.9
Kemper	65	40	52.7	6.2	30	20	24.5	4.5	30	10	22.7	7.2
Kidder Peabody	70	45	63.1	9.2	40	20	27.6	5.3	35	0	9.2	13.0
Lehman Brothers	75	45	56.4	12.1	35	25	31.4	3.7	30	0	12.3	9.4
Merrill Lynch	65	40	54.2	5.5	50	25	36.5	7.8	20	0	9.2	5.3
Paine Webber	77	24	58.1	12.3	47	15	32.8	8.3	61	0	9.1	15.2
Prudential	85	35	59.4	13.3	55	0	27.5	16.0	40	0	13.1	12.8
Raymond James	75	45	63.1	6.5	30	10	18.8	5.1	40	5	18.1	8.8
Salomon Brothers	50	45	46.9	2.4	35	30	31.2	2.1	25	15	21.9	4.2
Shearson	65	50	59.3	5.1	40	20	32.0	5.1	20	5	8.7	5.3
Smith Barney	60	45	51.7	3.9	40	25	34.0	4.8	25	0	14.2	5.8
Aggregate	85	24	57.4	10.8	55	0	30.6	9.5	61	0	12.0	9.9

Source: Wall Street Journal, selected issues

A *first* performance benchmark in what follows is simply how each of those popular indexes did during a given period of time. In particular, we shall report the wealth relatives (non-annualized) for price appreciation for the given period. For example, during an *earlier* time period, the S & P 500 stood at 349.15 at the end of the third quarter of 1989 (89-3), and it advanced to 451.67 by the end of the first quarter of 1993 (93-1). The resulting wealth relative benchmark for common stocks was 451.67 / 349.15 = 1.294. The corresponding wealth relative for common stocks for a *later* time period (93-2 to 94-4) was 459.27 / 451.67 = 1.017, and for the *entire* time period, the benchmark wealth relative was 459.27 / 349.15 = 1.315.

A *second* performance benchmark for each brokerage firm is how an investor would have done if the recommended portfolio blends were *not* changed over time. It is essentially a buy-and-hold strategy once an initial blend is implemented. Buy-and-hold also minimizes transaction costs since no adjustments are made each quarter. The investment horizon of the investor is simply the total time period. Two versions of buy-and-hold are calculated for each brokerage firm. One version uses the *initial* blend recommended by the firm at the beginning of the time period. Because the achieved result depends only on the recommended blend at the beginning, we also examine a second version for buy-and-hold that uses the *average* blend for the brokerage firm over the total time period. Investors would not know the average blend at the beginning of the time period, but it is included as a benchmark that better represents buy-and-hold for a given brokerage firm over time.

A *third* performance benchmark is strategic asset allocation. A single blend is recommended by each brokerage firm, but adjustments are made to rebalance/restore that particular blend at the end of each investment horizon, be it one quarter, six months, or a full year. As such, strategic asset allocation lies between the extremes of tactical asset allocation on the one hand, and buy-and-hold on the other. Two versions of strategic asset allocation are examined, and they parallel the two versions for buy-and-hold. One benchmark is strategic asset allocation based on the *initial* blend at the end of third quarter 1989, while the other benchmark is strategic asset allocation using the *average* blend recommended by each brokerage firm during the time period.

V.   EMPIRICAL RESULTS

The research questions are straightforward. How would an investor have fared had he/she followed the tactical asset allocation recommendations of each national brokerage firm on a quarterly basis? How does their achieved results compare with the performance benchmarks discussed in the previous section? And what about risk?

The research design was to examine for each brokerage firm its recommended asset allocations (for stocks, bonds, and cash) at successive quarter-ends, and to see how the resulting three-asset portfolio would have done over the next quarter, the next six months, and the next full year. Because the brokerage firms tended to change their asset allocations each quarter, it did not seem fruitful to measure the achieved performance of a given portfolio blend over longer time spans. Such measurements were done for an *earlier* 14-quarter time period (89-3 through 93-1) during which ten brokerage firms made recommendations, a *later* 7-quarter period (93-1 through 94-4) during which eleven firms were suggesting

asset allocations, and the *entire* 21-quarter period (89-3 through 94-4) for which eight firms made recommendations each quarter.

The results are presented in Table 3. The values shown are wealth relatives for price appreciation based on the market indicators for common stocks, bonds, and cash, respectively. The results are comparable across the sample of brokerage firms involved in each of the three time periods, as well as with the performance benchmarks that are included for each time period. Again, the S & P 500 indicator is the benchmark for common stocks, the US Long indicator is the benchmark for bonds, and the US Bill indicator is the benchmark for cash.

The "1 Qtr" columns include results when the investor changed asset allocations every quarter; that is, when her/his investment horizon was three months, and thus coincided with that of the brokerage firm. The "2 Qtr" columns show results that assume a six-month investment horizon. In other words, the investor acts on every other (i.e., second) quarterly asset allocation suggestion by the brokerage firm. Similarly, the "4 Qtr" columns in Table 3 assume that the investor changed their portfolio blends only once per year, which is every fourth asset allocation suggestion by the brokerage firm. All three choices of investment horizon necessitate portfolio changes during a longer time period, and thus all three choices really are examples of tactical asset allocation.

The largest wealth relative in each column is noted. For recommendations during the earlier time period (89-3 through 93-1), investors would have done better by following the recommended blends of Kidder Peabody and/or Paine Webber if their investment horizon was a single quarter. For investment horizons of two quarters, Kidder Peabody produced the highest wealth relative. And for investment horizons of four quarters, Paine Webber outperformed the other brokerage firms substantially--essentially a result of their 70% common stock recommendation at 89-3.

For asset recommendations during the entire time period (89-3 through 94-4), investors should have followed Goldman Sachs if their investment horizon was either one or two quarters, but those investors would have done better following Paine Webber if their investment horizon was four quarters. For the later time period (93-1 through 94-4), investors should have followed Goldman Sachs for investment horizons of one quarter or a full year. In contrast, they should have followed Prudential if the investment horizon was six months in length.

In summary, achieved performance by investors who followed the tactical asset allocation recommendations of national brokerage firms depended on what time period they were in the security markets, which firm's advice did they follow, but also the frequency of portfolio changes as determined by their choice of an investment horizon. No single brokerage firm had the best results for all investment horizons and for all three time periods.

Table 3 also contains the comparable average wealth relatives for stocks, bonds, and cash during each time period. Those performance benchmarks are for individual asset types, and thus no portfolio changes are necessary each quarter. Because the brokerage firms recommended different blends of common stocks, bonds, and cash, the achieved blended results ended up being greater than the results just for bonds or cash, but less than the results if investors had decided to be in stock market completely.

The choice of investment horizon thus had an impact on portfolio performance, but it was not the same in each time period. In the earlier time period, performance was on *average* slightly better for shorter investment horizons. For the later time period, performance was significantly lower for a six-month investment horizon. But for the entire time period,

TABLE 3

Price Appreciation for Recommended Asset Allocations by National Brokerage Firms Quarterly, 1989–1995

Brokerage Firm	Earlier Time Period			Entire Time Period			Later Period		
	1 Qtr	2 Qtr	4 Qtr	1 Qtr	2 Qtr	4 Qtr	1 Qtr	2 Qtr	4 Qtr
A. G. Edwards	1.236	1.227	1.218	1.256	1.278	1.257	1.013	1.008	1.000
Dean Witter	1.201	1.206	1.209	1.220	1.235	1.251	1.013	0.863	1.015
Goldman Sachs	1.267	1.251	1.210	1.349*	1.327*	1.275	1.067*	1.003	1.047*
Kemper							1.016	1.022	1.022
Kidder Peabody	1.283*	1.299*	1.290						
Lehman Brothers							1.004	0.853	1.017
Merrill Lynch	1.241	1.239	1.223	1.265	1.279	1.257	1.017	0.861	1.010
Paine Webber	1.284*	1.281	1.339*	1.308	1.294	1.410*	1.013	0.996	1.020
Prudential	1.274	1.233	1.193	1.317	1.299	1.294	1.032	1.030*	1.030
Raymond James	1.248	1.225	1.235	1.278	1.296	1.266	1.030	0.878	1.027
Salomon Brothers							1.000	0.748	1.000
Shearson	1.259	1.258	1.270						
Smith Barney	1.237	1.238	1.234	1.254	1.255	1.251	1.012	0.857	1.005
Average	1.253	1.246	1.242	1.282	1.283	1.283	1.020	0.920	1.018
S&P 500	1.294	1.294	1.294	1.315	1.315	1.315	1.017	1.017	1.017
US Long	1.182	1.182	1.182	1.038	1.038	1.038	0.879	0.879	0.879
US Bill	1.138	1.138	1.138	1.021	1.021	1.021	0.897	0.897	0.897

Note: * Highest wealth relative ($) for that time period and investment horizon.

the average wealth relative were essentially the same for all three choices of investment horizon. That means that on average, it didn't really matter how often investors followed the advice of the national brokerage firms. That is an interesting result, but as we shall now see, it is an incomplete picture of the impact of asset allocation recommendations on investor portfolio performance.

VI. BROKERAGE COMMISSIONS

The impact of investment horizon on asset allocation recommendations is not complete until transaction costs are considered. Because all investors (both individual and institutional) have different tax situations, we ignore taxes in this investigation, and thus transaction costs are just brokerage commissions. If an investor's portfolio blend is revised each quarter (1 Qtr) to follow a brokerage firm's recommendations, then brokerage commissions will be incurred each quarter. In contrast, if the portfolio blend is revised only once per year (4 Qtr), then brokerage commissions will be incurred only at the beginning and end of each twelve-month period.

In addition, brokerage costs are not the same for all asset classes. Commission costs for stocks are generally higher for stocks than they are for either bonds or cash. Let s represent the one-way percentage commission for common stocks; let b represent the one-way commission for bonds; and let c represent the one-way commission for cash. Usually, one would expect $s > b > c$. We assume that s, b, and c are the same for all brokerage firms. However, the dollar commissions for an investor following different brokerage firms will not be the same—because the suggested asset allocations by brokerage firms are different each quarter, and also because their suggestions vary from one quarter to the next. In what follows, we assume that $s = 1.0\%$, $b = 0.5\%$, and $c = 0.0\%$.[3]

Table 4 uses the asset allocation recommendations of A.G. Edwards to illustrate how brokerage commissions are incorporated into the analysis. The left hand panel includes the three market indicators, while the middle panel includes the quarterly recommendations of A.G. Edwards for the entire time period of the investigation. As of 89-3, A.G. Edwards recommended 45% common stocks, 45% bonds, and 10% cash. The right hand panel of Table 4 determines the impact of brokerage commissions for each of the three choices of investment horizon. The "Sum" column indicates the available percentage of initial portfolio wealth before commissions at that point in time. The right-adjacent column in each instance (1 Qtr, 2 Qtr, or 4 Qtr) indicates for that choice of investment horizon the wealth relative after commissions are paid to implement A.G. Edwards' suggested asset allocations.

The available percentage before commissions at the start of the time period (i.e., 89-3) would be 100%. The after-commissions wealth relative at 89-3 would be $(.01) [100\% - (45\%)(1.0\%) - (45\%)(0.5\%) - (10\%)(0.0\%)] = 0.99325$, and thus reflects the initial brokerage costs to construct the recommended portfolio.

Suppose the investor decides on the shortest (i.e., quarterly) investment horizon. Here is a breakdown of the available percentage three months later at 89-4:

Common stocks	(0.99325) (45%) (353.40/349.15)	=	45.240%
Bonds	(0.99325) (45%) (104.74/101.37)	=	46.182
Cash	(0.99325) (10%) (100.48/99.23)	=	10.058
Available percentage			101.480%

TABLE 4
Analysis of Tactical Asset Allocation Recommendations by A. G. Edwards Quarterly, 1989–1994

Year & Quarter	Market Indicators			% Recommendations			Results for Alternative Investment Horizons					
	S&P 500	US Long	US Bill	Stocks	Bonds	Cash	Sum	1 Qtr	Sum	2Qtr	Sum	4 Qtr
89-3	349.15	101.37	99.23	45	45	10	100.000	0.99325	99.325	0.99325	99.325	0.99325
89-4	353.40	104.74	100.48	45	45	10	101.480	1.01473				
90-1	339.94	97.27	98.20	40	45	15	96.247	0.96188	95.936	0.95884		
90-2	358.02	98.12	99.02	40	45	15	98.733	0.98719				
90-3	306.05	93.54	99.62	40	40	20	91.003	0.90947	89.854	0.89812	90.394	0.90334
90-4	330.22	101.16	102.48	45	40	15	97.306	0.97259				
91-1	375.22	100.19	103.10	55	35	10	102.938	1.02857	101.762	1.01629		
91-2	371.16	98.63	103.60	50	40	10	101.734	1.01657				
91-3	387.86	104.36	105.60	55	40	5	106.502	1.06445	105.415	1.05388	105.258	1.05173
91-4	417.09	108.94	108.65	55	40	5	112.880	1.12868				
92-1	403.69	105.03	106.75	55	40	5	109.154	1.09153	108.058	1.08045		
92-2	408.14	106.77	109.28	50	40	10	110.667	1.10613				
92-3	417.80	113.72	113.47	45	40	15	115.226	1.15174	114.145	1.14038	113.803	1.13713
92-4	435.71	11.94	11.97	50	35	15	116.446	1.16381				
93-1	451.67	119.78	112.97	45	40	15	121.521	1.21440	121.540	1.21529		
93-2	450.53	121.51	112.64	55	40	5	121.950	1.21822				
93-3	458.93	130.20	114.01	65	30	5	126.631	1.26419	128.223	1.27873	125.424	1.25062
93-4	466.45	125.79	113.41	65	30	5	126.447	1.26428				
94-1	445.77	113.80	107.70	60	25	15	118.851	1.18756	119.853	1.19746		
94-2	444.27	109.30	105.40	50	40	10	116.961	1.16745				
94-3	462.69	105.60	104.50	45	40	15	117.484	1.17396	119.022	1.18713	118.117	1.17879
94-4	459.27	105.60	101.10	40	45	15	116.432	1.16347				
95-1	500.71	109.80	103.60	40	40	20	123.060	1.22280	125.699	1.24874	123.961	1.23170
Average				49.35	39.13	11.52						
Brokerage Commissions				1.0%	0.5%	0.0%						

TABLE 5

Comparison between Actual and Recommended Asset Proportions at 89–4, and the Necessary Adjustments.

	Actual Weight	*Recommended*	*Adjustment*
Common stocks	45.240/101.480 = 44.580%	45%	Buy
Bonds	46.182/101.480 = 45.508%	45%	Sell
Cash	10.058/101.480 = 9.912%	10%	Buy

These component and total percentages facilitate a comparison between actual and recommended asset proportions at 89-4, and the necessary adjustments that must be made (see Table 5).

In this instance, the necessary adjustments are not large, because A.G. Edwards did not change their recommended proportions from 89-3 to 89-4.

The after-commission wealth relative at 89-4 would thus be given as

$$(.01)(101.48)[1 - (.01) \mid .44580 - .45 \mid - (.005) \mid .45508 - .45 \mid - 0] = 1.01473$$

Absolute values are used in the expression because some adjustments are to buy more of an asset category, while other adjustments are to sell some of an asset category.

Similar calculations are done for each quarter, except that at the end of the time period (95-1), the portfolio holdings are assumed to be sold. The final after-commission wealth relative (1 Qtr) is 1.22280, which means that the investor's wealth increased by 22.28%. That is a "cash-to-cash" result in that brokerage commissions are incurred at the beginning, at each quarter adjustment, and at the end of the time period.

Alternatively, if the investor selected a six-month investment horizon, then portfolio adjustments would be made every other quarter. The result is an after-commission wealth relative (2 Qtr) of 1.24874, which is about 2.6% higher than the former. And for a full year investment horizon with adjustments just once per year, the result is 1.23170 and thus between the results for shorter investment horizons. The results are comparable for each of the three investment horizons because portfolios are constructed at 89-3, and they are liquidated at 95-1. Differences are in how often the portfolios are adjusted.

By changing all the commissions to zero, it is possible to obtain a before-commission wealth relative for each investment horizon, as well as a wealth relative that reflects aggregate brokerage commissions for the time period. For example, the 1 Qtr before-commission wealth relative was 1.25559 for A.G. Edwards. Because wealth relatives are multiplicative, the aggregate brokerage commission wealth relative also can be calculated. For A.G. Edwards, it was 1.22280 / 1.25559 = .97388, or about 2.6% for the entire time period.

Table 6 presents in wealth relative terms the before-commission performance, the aggregate brokerage cost for the time period, and hence the after-commission performance. Results are presented for three different investment horizons, as well as for each of eight brokerage firms that made recommendations during the entire time period (89-3 through 94-4).[4] First, we note as expected that the wealth relatives for brokerage commissions increased with the length of the investment horizon. The effective commission averaged 3.0% (1 - 0.970) for a quarterly horizon, 2.6% for a six-month horizon, and 2.3% for a full-year investment horizon. Second, the highest wealth relative is noted for each invest-

TABLE 6

Impact of Brokerage Commissions on Price Appreciation Following Recommended Asset Allocations by National Brokerage Firms

Entire Time Period 1989–1994

Brokerage Firm	1 Qtr Horizon			2 Qtr Horizon			4 Qtr Horizon		
	Before	Commission	After	Before	Commission	After	Before	Commission	After
A. G. Edwards	1.256	0.974	1.223	1.278	0.977	1.249	1.257	0.980	1.232
Dean Witter	1.220	0.968	1.182	1.235	0.973	1.202	1.251	0.973	1.217
Goldman Sachs	1.349*	0.965	1.302*	1.327*	0.968	1.284*	1.275	0.975	1.243
Merrill Lynch	1.265	0.974	1.231	1.279	0.979	1.252	1.257	0.981	1.232
Paine Webber	1.308	0.971	1.271	1.295	0.973	1.260	1.410*	0.979	1.381*
Prudential	1.317	0.956	1.259	1.299	0.963	1.251	1.294	0.966	1.251
Raymond James	1.287	0.974	1.254	1.296	0.976	1.265	1.266	0.977	1.237
Smith Barney	1.254	0.978	1.226	1.255	0.982	1.232	1.251	0.983	1.229
Average	1.282	0.970	1.244	1.283	0.974	1.249	1.283	0.977	1.253
S & P 500	1.315	0.980	1.289	1.315	0.980	1.289	1.315	0.980	1.289
US Long	1.038	0.990	1.028	1.038	0.990	1.028	1.038	0.990	1.028
US Bill	1.021	1.000	1.021	1.021	1.000	1.021	1.021	1.000	1.021

Note: * Highest wealth relative for that investment horizon.

ment horizon, both before and after brokerage commissions. Investors who followed Goldman Sachs did the best for both 1 Qtr and 2 Qtr investment horizons, while investors who listened to Paine Webber did the best for the 4 Qtr horizon.

Brokerage commissions overall did not change those particular results, but rankings of performance for all eight firms did change when commissions were brought into the picture. In other words, there were instances when commissions from more frequent portfolio revision did offset the advantages of changing portfolio blends every quarter, or more frequently. Naturally, it is the after-commission results that ultimately matter to investors. Table 6 also reports the corresponding wealth relatives for individual investments (in common stocks, bonds, and cash, respectively) both before and after brokerage commissions.

A key extension of the results in Table 6 is to examine how well tactical asset allocation measures up to alternatives such as buy-and-hold and strategic asset allocation, when brokerage commissions are included. That was mentioned at the outset as one of the motivating questions for this investigation. By holding the asset allocations of a given brokerage firm constant over time, and repeating the calculations, the effect of strategic asset allocation can be analyzed. In turn, the effect of a buy-and-hold strategy can be determined if there are no interim adjustments between purchasing the three-asset portfolio at the beginning of the time period and selling that portfolio at the end.

In Table 7, the after-commission wealth relatives for tactical asset allocation by eight national brokerage firms during the entire time period (89-3 through 95-1) are included in the left-hand panel. The results of strategic asset allocation for the same period appear in the next two panels, followed by the buy-and-hold results in the right-hand panel. For both strategic asset allocation and buy-and-hold, there are two versions. One version uses the *initial* brokerage firm suggestions at 89-3, while the other version uses the *average* recommendations of each brokerage firm during the entire time period.

For tactical asset allocation, investors following Goldman Sachs experienced the highest wealth relative for 1 Qtr and 2 Qtr investment horizons, while Paine Webber's investors did the best for a 4 Qtr investment horizon. For strategic asset allocation, Dean Witter provided the best performance if their investors maintained their initial recommendations, but Goldman Sachs was best if their investors utilized the average recommendations throughout the time period. For buy-and-hold, the results are the same. Investors following Dean Witter did the best if they maintained the initial (89-3) blend, while investors following Goldman Sachs did the best if they utilized their average suggestions in a buy-and-hold strategy.

Further perspective is available if the results in Table 7 are examined by investment horizon rather than by type of asset allocation. For an investment horizon of one quarter, the best result was strategic asset allocation using Dean Witter's initial blend of 85% common stocks and 15% bonds. For an investment horizon of six months, the best result is the same. But for an investment horizon of twelve months, the best result would have been for investors who followed Paine Webber's asset allocation recommendations every four quarters.

Finally, if one examines just the average results for the sample of eight national brokerage firms, the best result was buy-and-hold over the entire time period using the initial recommendations at the end of the third quarter of 1989. That result, 1.270, is second (in Table 7) only to the 1.381 result that would have been achieved in investors followed Paine

TABLE 7

Comparison of Asset Allocation Strategies Based on Brokerage Firm Recommendations
Entire Time Period 1989–1994

Brokerage Firm	Tactical Allocation			Strategic Allocation (Initial)			Strategic Allocation (Average)			Buy-and-Hold	
	1 Qtr	2 Qtr	4 Qtr	1 Qtr	2 Qtr	4 Qtr	1 Qtr	2 Qtr	4 Qtr	Initial	Average
A. G. Edwards	1.223	1.249	1.232	1.214	1.218	1.216	1.228	1.233	1.299	1.220	1.234
Dean Witter	1.182	1.202	1.217	1.353*	1.353*	1.352*	1.265	1.269	1.229	1.356*	1.271
Goldman Sachs	1.302*	1.284*	1.243	1.282	1.285	1.284	1.283*	1.285*	1.282*	1.288	1.286*
Merrill Lynch	1.231	1.252	1.232	1.233	1.234	1.236	1.246	1.250	1.247	1.239	1.252
Paine Webber	1.271	1.260	1.381*	1.131	1.156	1.125	1.257	1.261	1.259	1.252	1.263
Prudential	1.259	1.251	1.251	1.299	1.302	1.300	1.264	1.271	1.265	1.306	1.263
Raymond James	1.254	1.264	1.237	1.261	1.270	1.261	1.271	1.279	1.270	1.268	1.277
Smith Barney	1.226	1.232	1.229	1.228	1.236	1.228	1.232	1.238	1.233	1.235	1.240
Average	1.244	1.249	1.253	1.250	1.257	1.250	1.256	1.261	1.252	1.270	1.261
S & P 500	1.289	1.289	1.289	1.289	1.289	1.289	1.289	1.289	1.289	1.289	1.289
US Long	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028
US Bill	1.021	1.021	1.021	1.021	1.021	1.021	1.021	1.021	1.021	1.021	1.021

Note: * Highest wealth relative for that investment horizon.

Webber's suggestions, but with only a single revision each year. That is strong evidence against the advisability of tactical asset allocation, especially if it is done quarterly.

VII. RISK

The final question concerns the risk that investors face if they follow the asset allocation recommendations of the national brokerage firms. Risk thus far has been reflected in the variability of common stock, bond, and cash recommendations from the third quarter of 1989 through the end of 1995 for the sample of thirteen brokerage firms. Variability was seen to be greater for some firms and less for others. Variability of recommendations also tended to change from one quarter to another during the entire time period. Risk perspective also was reflected in the variability of appreciation for the market indicators chosen for common stocks, bonds, and cash, respectively. So investors' *first* experience with risk is a result of their choices of asset categories to consider, and a particular brokerage firm's recommendations to follow.

We saw that price appreciation depends on the particular time period in which asset allocation recommendations are followed. If it happens to be a time span (like 89-3 through 95-1) when stocks do better than bonds or cash, then common stock recommendations of the most "bullish" brokerage firms will lead to the best performance. It is quite the opposite in periods of time when bonds, or even cash, perform better than common stocks. So investors' *second* experience with risk is when they select a particular time span in which to try to benefit by following the advice of a brokerage firm.

Investors also must select an investment horizon, defined in this paper as the time between investment decisions. If shorter horizons lead to greater turnover among the asset classes, and thus to greater brokerage commissions, it may actually detract from achieved performance. The title of this paper indeed suggests that investors' *third* experience with risk is in their choice of a particular investment horizon.

Investors' *fourth* experience with risk is in their overall decision about asset allocation itself. Our investigation was motivated by the tactical asset recommendations of the national brokerage firms. As one performance benchmark, we looked at strategic allocation, wherein investors re-balanced or restored the recommended asset allocations of a given firm at each investment horizon. As another performance benchmark, we examined buy-and-hold, wherein investors simply began with a recommended asset allocation and no further adjustments were made during the time period. The results presented in Tables 6 and 7 readily attest to the wide variety of outcomes that occurred as a result of investor choices among buy-and-hold, strategic asset allocation, and tactical asset allocation following the recommendations of the national brokerage firms.

To summarize the presence of risk, consider again the results for Dean Witter. If investors had followed that firm's tactical recommendations for the entire period, their achieved performance would have been considerably below the sample average, regardless of investment horizon. If investors instead had adopted Dean Witter's 89-3 recommendations, and made periodic adjustments to restore that blend (i.e., strategic asset allocation), they would have done better than average, and in fact better than by following any of the other seven firms. Investors' achieved performance would have been better than that if they had followed Dean Witter's 89-3 recommendation, but in a buy-and-hold strategy. The best result, of

course, would have been achieved by investors who simply bought and held common stocks for the entire time period.

VIII.   CONCLUSION

An important message of this empirical study is that investment horizon is a critical factor in how individual investors make and implement their asset allocation decisions. Brokerage commissions also play an important role as investors try to determine just how often they should follow the asset allocation recommendations of a national brokerage firm. And we have taken a qualitative look at some of the dimensions of risk that investors face in their asset allocation choices.

In sum, the quarterly *Wall Street Journal* practice of reporting the recommended asset allocations of national brokerage firms is an interesting look at how market prospects are viewed by those firms. However, to implement their tactical asset allocation recommendations every quarter may not be in the best interest of investors. Alternatively, strategic asset allocation, and even the simpler buy-and-hold strategy, together with their savings of brokerage commissions, may indeed be investment strategies that should be thoughtfully considered by many investors.

NOTES

1.   The series of articles under the general title "Your Money Matters" are written by J. R. Dorfman, staff reporter of the *Wall Street Journal*. Helpful comments on this paper were provided by Mr. Dorfman, as well as by Professors S. Badrinath, S. Chakravarty, and M. Cooper.

2.   In their performance calculations, the *Wall Street Journal* uses the S & P 500 and U.S. treasury bills as surrogates for common stocks and cash, respectively, but they use Merrill Lynch's corporates/governments domestic master bond index for bonds. The source of data for the three market indicators used in this study was the *Security Price Index Record Statistical Service,* which is published annually by the Standard & Poor's Corporation.

3.   As long as s > b > c, modest changes in the commission levels for common stocks, bonds, and cash do not change the empirical results of this investigation.

4.   To conserve space, and because the results are very similar, we do not extend the exhibits to include either the earlier or later time periods.

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