

CHAPTER IV

RESULTS



4.1 Principal Components Analysis

We reproduce in Table VII below the information on the first five extracted factors from the 25 hedge fund indices using the period 1996-2005. We use the Kaiser criterion developed by Henry Kaiser (eigenvalue greater than one) as a rule to determine how many factors should be extracted. Approximately 74% of the variance in the hedge fund strategies can be explained by the first five factors.

Table VII
Principal Components Analysis: Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.655	42.619	42.619	10.655	42.619	42.619
2	2.888	11.551	54.171	2.888	11.551	54.171
3	2.455	9.821	63.991	2.455	9.821	63.991
4	1.447	5.789	69.780	1.447	5.789	69.780
5	1.175	4.700	74.480	1.175	4.700	74.480

Source: Author from Principal Components Analysis

The explanatory power of the derived factors (See Appendix) differs significantly by strategy, but it should be noted that the explanatory power is highest for strategies like managed futures, event driven, and equity-related indices and much less for fixed income and equity market neutral strategies. While the next section will attempt to link these factors to well known market factors, the explanatory power of the principal components overall is suggestive that the equity market returns may explain a good amount of the variation in returns.

It is worth noting at this point that:

- The PCA derives only linear factors. A good amount of recent literature on hedge funds suggests that many hedge fund strategies have non-linear return profiles.
- Table VIII confirms that there is a strong correlation between the first two derived factors and the equity market return. The S & P Small Cap 600 has a correlation of .75 with the first factor and -.39 with the second factor.

Table VIII
Correlations Between the S & P Small Cap 600 with the First Two Derived PCA
Factors
1996-2005

		Correlations	
		REGR factor score 1	REGR factor score 2
SPSC600	Pearson		
	Correlation	0.7527	-0.3933
	Sig. (2-tailed)	0.00	0.00
	N	120	120

These correlations provide strong evidence that hedge fund returns, overall, do in fact have a significant equity market component. We use the S&P Small Cap 600 rather than the more popular S&P 500 because hedge fund managers are known to pursue opportunities in smaller stocks. This assertion is supported by a comparison of the correlations in Table IX.

Table IX
Comparison of Correlations Between First Factor and S&P Stock Indices

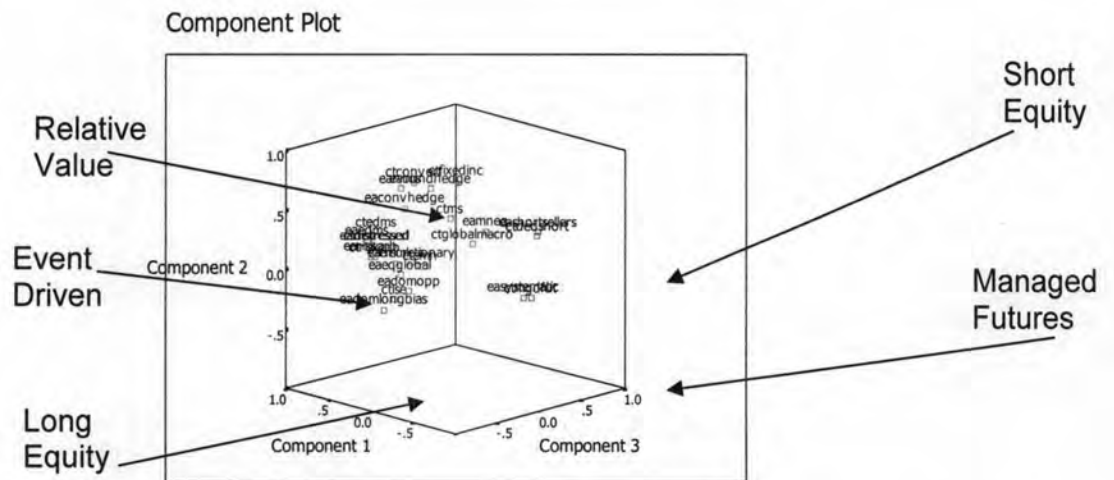
Correlations		Factor 1
Factor 1	Pearson Correlation	1
	Sig. (2-tailed)	.
	N	120
SP500Ret	Pearson Correlation	0.6483
	Sig. (2-tailed)	0.000
	N	120
SPSC600	Pearson Correlation	0.7527
	Sig. (2-tailed)	0.0000
	N	120

4.1.1 Strategy Classification

While the main objective of the PCA was to identify common factors underlying different hedge fund and managed futures strategies, the exercise also sheds light on another issue of some importance among practitioners and academics: the issue of hedge fund classification.

The issue of hedge fund classification has received much discussion, perhaps because many practitioners find classification extremely useful in their equity and fixed income allocations. The Alternative Investment Management Association (AIMA) conducted a survey (AIMA 2003) to determine approaches to hedge fund classifications and identified several potential problems that inhibit classification. These include the considerable flexibility in approach accorded hedge funds. The issues as enumerated by AIMA include overlapping strategies, differences in leverage, non-uniqueness, granularity, and strategy drift. As a result of these issues, the article reported a wide variety of classification schemes used by practitioners.

Figure A
Visualization of First Three Factors from
Principal Components Analysis, 1996-2005



While our research does not definitely resolve the classification issues because it relies on strategy-level data rather than individual hedge fund data (a hedge fund index might incorporate multiple distinct sub-strategies with different loadings to factors), nevertheless we can classify the hedge funds of the two providers into five categories, based primarily on the correlations of individual indices with the first two derived factors from our principal components analysis.

We classify twenty-one of the twenty-five indices into Event Driven, Equity (with Long and Short sub-categories), Global, Relative Value, and Managed Futures categories. Most of the classifications are as expected and fit general market practice. However, four indices did not fit easily into this classification scheme. Specifically, the Other or Unclassified group in Table X includes the CSFB/Tremont Global Macro and the previously-mentioned equity market neutral indices, as well as the CSFB/Tremont Multi-Strategy Classification. The latter strategy CSFB/Tremont notes is: “characterized by their ability to dynamically allocate capital among strategies falling

within several traditional hedge fund disciplines.” Thus its non-classification with other strategies is not a surprise, as it may more properly be viewed as an allocation to multiple strategies. In the case of the equity market neutral, it may be that the data providers’ represent different sub-categories within the broader strategies. Global macro may be an opportunistic style, that varies its factor exposure over time.

Table X
Unclassified Funds

Other/Unclassified	Factor				
	Factor I	II	Factor III	Factor IV	Factor V
CTEMN	0.487	-0.079	0.075	0.260	0.054
CTGlobalMacro	0.450	0.005	0.656	-0.184	-0.211
CTMS	0.344	0.307	0.289	-0.243	0.615
EAMNEq	0.018	0.249	0.376	0.085	-0.275

Source: Author

The five strategy categories that seemed to fit the other twenty-one indices were:

Event Driven encompasses Distressed and Risk Arbitrage strategies. These indices rely on corporate events (bankruptcy and merger arbitrage, respectively).

Under the **Equity** category are long and short equity strategies, though we separate out the Evaluation Strategies Equity Global from the other equity strategies because global strategies have less negative correlation with Factor II. Long and short strategies have similar loadings to the first two factors, but with opposite signs.

The **Global** Strategy also includes the Evaluation Associates Discretionary strategy and CSFB Tremont Emerging Markets Strategy. One strategy we expected to be in this category, CSFB Tremont Global Macro was not classified here because it did not match correlations with Factor I or II.

The **Relative Value** grouping included both convertible arbitrage and fixed income arbitrage strategies from CSFB Tremont and Evaluation Associates. Frequently in the literature, the Relative Value grouping includes equity market neutral strategies. However, both provider's Equity Market Neutral strategy did not match the positive loadings to Factor I or Factor II characteristic of other Relative Value Strategies.

Finally, the **Managed Futures** category included the managed futures strategies for both vendors. Managed futures are not technically a hedge fund strategy, but are frequently utilized in portfolios of hedge funds.

The full list of strategies and their classification is contained in Table XI below:

Table XI
Strategy Classifications

(Based on Correlations with PCA Derived Factors)

Event Driven

	Factor				
	Factor I	II	Factor III	Factor IV	Factor V
CTDistressed	0.830	0.057	-0.096	0.206	-0.157
CTEDMS	0.938	0.134	0.005	0.028	-0.120
CTRiskArb	0.754	-0.006	-0.196	0.305	-0.047
EARiskArb	0.786	-0.004	-0.209	0.327	0.042
EADistressed	0.779	0.079	-0.169	0.269	-0.198
EAEDMS	0.873	0.106	-0.168	0.271	0.031

Equity

**Sub-category:
Long Equity**

	Factor				
	Factor I	II	Factor III	Factor IV	Factor V
CTLSE	0.798	-0.421	0.079	-0.253	0.109
EADomLongBias	0.765	-0.470	-0.076	-0.261	0.135
EADomOpp	0.620	-0.316	0.071	-0.422	0.146

**Sub-category:
Short Equity**

	Factor				
	Factor I	II	Factor III	Factor IV	Factor V
CTDEShort	-0.750	0.383	0.221	-0.025	-0.126
EAShortSellers	-0.709	0.396	0.271	-0.022	-0.041

Global

	Factor I	Factor II	Factor III	Factor IV	Factor V
EAEqGlobal	0.813	-0.236	0.169	-0.215	-0.085
EADiscretionary	0.798	-0.152	0.281	-0.008	-0.162
CTEmMkts	0.804	-0.124	0.102	-0.201	-0.223

Relative Value

	Factor I	Factor II	Factor III	Factor IV	Factor V
CTConvert	0.589	0.597	0.106	0.112	0.319
CTFixedInc	0.411	0.583	0.420	-0.236	-0.087
EACnvHedge	0.504	0.435	-0.086	0.092	0.482
EABondHedge	0.471	0.553	0.178	-0.255	-0.220
EARvMS	0.584	0.578	-0.064	0.109	-0.101

Managed Futures

	Factor I	Factor II	Factor III	Factor IV	Factor V
CTMgdFut	-0.145	-0.359	0.755	0.413	0.120
EASystematic	-0.048	-0.369	0.767	0.411	0.152

Source: Author

4.1.2 Matching Factors from PCA With Known Risk Factors

Following Amenc (2002), we derived a list of possible factors from factors already acknowledged to be significant by other studies. Thus, we attempt to avoid the problem mentioned of trying to overfitting to the data. Variables considered include equity returns (both the S & P 500 and S & P Smallcap 600), value and size indicators (both Fama and French SMB and HML, as well as S & P Growth minus Value and Large Cap Minus Small cap indicators), bond returns (Federal Reserve ten year and three month constant maturity indices), credit spreads (Federal Reserve BAA minus Ten Year), equity market volatility, bond market slope (ten year constant maturity yield minus three months constant maturity), dividend yields, long-term earnings yield (ten year earnings divided by price).

Because some of the variables listed above are highly correlated, we assure that only one of two such variables was used in any regression equations.

4.1.3 Naming of Factors

Naming of the PCA factors is somewhat difficult, since the PCA identifies factors, but offers no clues in exactly what they are. Nevertheless, it may be useful to subjectively label at least the first three factors for further exposition. We used both correlations of strategies to the factors and correlations to market factors in the naming effort.

Our labeling and rationale for the factors are as follows;

Factor I: The Market

Factor II: Convergent/Divergent

Factor III: Risk Premium Inconsistency

Factor IV: Value

Factor V: Volatility

The table on the following page summarizes the prediction models for the first three factors for both a three month and six month time horizon.

Factor I- Equity Market: Because the first factor correlates strongly with the equity market, we use two well known equity valuation variables, the dividend yield and Robert J. Shiller's 10-year earnings yield as explanatory variables. Finally, VIX, the implied volatility is added to the six month prediction model, incorporating an idea of Alistair Lowe at State Street Global Advisors.

Factor II-Convergent/Divergent: Rosenberg (2001) uses the convergent/divergent dichotomy in suggesting a hedge fund portfolio diversification strategy. Their distinction is between convergent strategies, which are said to depend on asset mispricing and divergent strategies, which contend that past patterns in securities prices can predict future patterns. In their paper, they group equity market neutral, relative value, and event driven strategies into the convergent category and managed futures and global macro in the divergent category.

The highlighted Component II (Table XII) results on the following page show a high positive correlation with relative value strategies (convertible arbitrage and fixed income) and a high negative correlation with long equity and managed futures strategies.

Table XII
Strategy Correlations with Second Factor

High	1	2	3	4	5
CTConvert	0.5891	0.5975	0.1059	0.1121	0.3186
CTFixedInc	0.4114	0.5829	0.4204	-0.2360	-0.0872
EARvMS	0.5843	0.5782	-0.0644	0.1086	-0.1006
EABondHedge	0.4714	0.5530	0.1777	-0.2550	-0.2204
EA Conv Hedge	0.5043	0.4348	-0.0859	0.0916	0.4822
Low	1	2	3	4	5
EAEqGlobal	0.8130	-0.2362	0.1694	-0.2146	-0.0848
EADomOpp	0.6198	-0.3163	0.0712	-0.4216	0.1462
CTMgdFut	0.1447	-0.3587	0.7551	0.4129	0.1204
EASystematic	0.0480	-0.3689	0.7667	0.4106	0.1515
CTLSE	0.7982	-0.4211	0.0793	-0.2532	0.1094
EADomLongBias	0.7653	-0.4704	-0.0758	-0.2607	0.1353

Factor III-Risk Premium Inconsistency: Factor Three correlates positively with managed futures and global macro funds, while being negatively related to event

driven funds. As we shall see in the following section, factor three relates levels of equity volatility with the BAA credit spread, a relationship recognized by Merton (1974), which suggested that corporate debt resembles the writing of a put option on the firm.

Rosenberg (2003) noted that during periods of high credit risk, including 1998-2003 (included in our study) there was high (80-90%) correlation between VIX, the CBOE's measure of S&P 500 short-term volatility and the BBB credit spread. It may be that an inconsistency between risk premiums in the equity and bond markets suggests significant movement in one of the markets, benefiting trend following funds, while the same movement may not be favorable for event driven or relative value funds, which benefit from a more stable environment.

Table XIII
Strategy Correlations with Factor Three

High	1	2	3	4	5
EASystematic	-0.0480	-0.3689	0.7667	0.4106	0.1515
CTMgdFut	-0.1447	-0.3587	0.7551	0.4129	0.1204
CTGlobMacro	0.4503	0.0046	0.6557	-0.1841	-0.2115
Low	1	2	3	4	5
EACnvHedge	0.5043	0.4348	-0.0859	0.0916	0.4822
CTDistressed	0.8296	0.0574	-0.0957	0.2059	-0.1573
EAEDMS	0.8732	0.1064	-0.1679	0.2712	0.0310
EADistressed	0.7790	0.0790	-0.1691	0.2692	-0.1978
CTRiskArb	0.7545	-0.0064	-0.1956	0.3052	-0.0469
EARiskArb	0.7855	-0.0038	-0.2090	0.3269	0.0420

Factor IV-Value: The fourth factor is a value factor and shows positive correlation with Fama and French's HML factor and negative correlation with Growth Minus Value. It is most positively correlated with the returns of managed futures and event driven strategies and negatively correlated with the returns of equity strategies.

Table XIV
Strategy Correlations with Factor Four

High	1	2	3	4	5
CTMgdFut	-0.14472	-0.35871	0.755091	0.412897	0.120402
EASystematic	-0.04803	-0.36894	0.766691	0.410568	0.15152
EARiskArb	0.785521	-0.00381	-0.20904	0.326858	0.04197
CTRiskArb	0.754473	-0.00642	-0.19564	0.305167	-0.04689
EAEDMS	0.873178	0.106382	-0.16794	0.27119	0.030959
EADistressed	0.779049	0.079038	-0.1691	0.26916	-0.19779
CTEMN	0.487282	-0.07934	0.074702	0.260094	0.053877

Low	1	2	3	4	5
CTLSE	0.798177	-0.42106	0.079295	-0.2532	0.109447
EABondHedge	0.471447	0.553042	0.177692	-0.25495	-0.22044
EADomLongBias	0.765256	-0.47043	-0.07583	-0.26072	0.135285
EADomOpp	0.61979	-0.31634	0.071161	-0.42157	0.146192

Factor V- Volatility: Factor Five is most correlated with the absolute value of VIX (the CBOE's measure of one month implied volatility on the S&P 500 index and convertible arbitrage and multi-strategy returns and negatively correlated with emerging markets, global macro, and bond arbitrage.

Table XV
Strategy Correlations with Factor Five

High	1	2	3	4	5
CTMS	0.343795	0.306879	0.289016	-0.2435	0.61507
EACovHedge	0.504337	0.434834	-0.08595	0.091639	0.48219
CTConvert	0.589126	0.59748	0.105871	0.112065	0.318565

Low	1	2	3	4	5
EADistressed	0.779049	0.079038	-0.1691	0.26916	-0.19779
CTGlobalMacro	0.450265	0.004559	0.655696	-0.1841	-0.21147
EABondHedge	0.471447	0.553042	0.177692	-0.25495	-0.22044
CTEmMkts	0.803557	-0.12387	0.101642	-0.20095	-0.22326
EAMNEq	0.017672	0.248672	0.375924	0.085324	-0.27504

4.1.4 Prediction Models for the First Three Components

Several factors governed our prediction of only the first three factors for forecasting horizons of three and six months.

Focus on Three Factors: We focus on the first three derived components for prediction of factors. While 74% of the variation between the indices is found in the first five factors, 64% of the variation is found in the first three factors. Additionally, the fourth and fifth factors appear to be less stable over time.

Forecasting Horizon: Although the Amenc (2000) built a model with a one month forecasting horizon, we believe this is potentially misleading and not practically useful. Hedge funds do not provide the same liquidity of traditional equity or fixed income vehicles and, in addition, some strategy returns are serially correlated. A focus on a one month timeframe may cause substantial reallocations month-to-month that could not practically be implemented (except in the case of a constantly growing fund-of-hedge-funds). Additionally, the serial correlation evident in some strategies has been linked by authors to liquidity; specifically, less liquid strategies exhibit more serial correlation and may impose more liquidity constraints as a result.

The Prediction Models for a three-month and six month horizon are contained in Table XVI and XVII.

Table XVI
Summary of Three Month Prediction Models

Adj. r2			0.09
Variable	B	Std. Error	T
(Constant)	-2.771	0.817	-3.39
divyield	0.989	0.263	3.76
earn10	0.036	0.014	2.58

Adj. r2			0.34
Variable	B	Std. Error	t
(Constant)	-2.56	0.507	-5.06
SPSC600	4.746	0.965	4.92
LAGS(SPSC600,1)	3.365	0.962	3.50
LAGS(SPSC600,2)	2.407	0.960	2.51
BAA Credit	0.328	0.068	4.85

Adj. r2			0.28
Variable	B	Std. Error	t
(Constant)	-1.716	0.444	-3.87
BAA Credit	0.362	0.064	5.7
VIX	-0.045	0.008	-5.78

Table XVII
Summary of Six Month Prediction Models

Factor I			
Adj. r2			0.21
Variable	B	Std. Error	t
(Constant)	-3.209	0.607	-5.29
divyield	1.021	0.185	5.52
earn10	0.033	0.01	3.41
VIX	0.022	0.007	2.98

Factor II			
Adj. r2			0.24
Variable	B	Std. Error	t
(Constant)	-2.279	0.416	-5.48
BAA Credit	0.3	0.055	5.44
SPSC600	2.401	0.753	3.19

Factor III			
Adj. r2			0.45
Variable	B	Std. Error	t
(Constant)	-1.737	0.293	-5.92
BAA Credit	0.339	0.041	8.28
VIX	-0.036	0.005	-7.34

As we suggested earlier, the first factor is highly correlated with the equity market.

The equity market direction was only minimally predictable given a short forecasting horizon. This is not surprising given that available variables used in to determine valuation may be expected to work only with a much longer forecasting horizon. Nonetheless, dividend yield and Schiller's 10-year Price Earnings Yield

explains a small part of the variation over a three-month horizon. As one might expect, predictability was marginally higher at a six-month time horizon.

However, Factors II and III appear to be more predictable, as judged by adjusted r-square and standard error measures. **Factor II relates equity market returns with credit spreads.** A very positive factor II environment is when the equity market has performed very poorly and credit spreads are very wide. In the historical record, August 1998 was such a period. The S&P Smallcap 600 was down 19% in August 1998 and had suffered greater than 5% losses in two of the previous three months, while BAA credit spreads relative to Treasuries were historically wide at 342 basis points. As discussed earlier, this environment favors long-biased equity funds over relative value and short-biased funds.

In contrast, February 2000 marked a unfavorable Factor II environment, as the equity market had been very strong (+4.18%, +8.22%, -3.1%, and +13.39% in the previous 4 months, with credit spreads were very tight at 191 basis points over Treasuries. This environment may favor convertible arbitrage funds, possibly because the strong equity market makes issuance of convertible bonds attractive for issuers.

The best predictor for Factor III relates **BAA credit spreads with equity market volatility** and, as suggested earlier, is broadly consistent with Merton (1974). A very positive Factor Three environment is when BAA yields are wide, but equity volatility is low (Dec 1994). In contrast, a very negative Factor Three environment is when BAA yields are low, but equity volatility is high (August 1998).

4.2 Portfolio Optimizations

Table XVIII
Portfolio Optimizations

Portfolio	Maximum Portfolio Exposure to Any Factor	Optimizations Performed
A “Low Risk”	0.40	<ul style="list-style-type: none"> • Historical • Historical with Predictive Models
B	0.60	<ul style="list-style-type: none"> • Historical • Historical with Predictive Models
C “Higher Risk”	0.80	<ul style="list-style-type: none"> • Historical • Historical with Predictive Models

4.2.1 Optimizations Using Historical Data

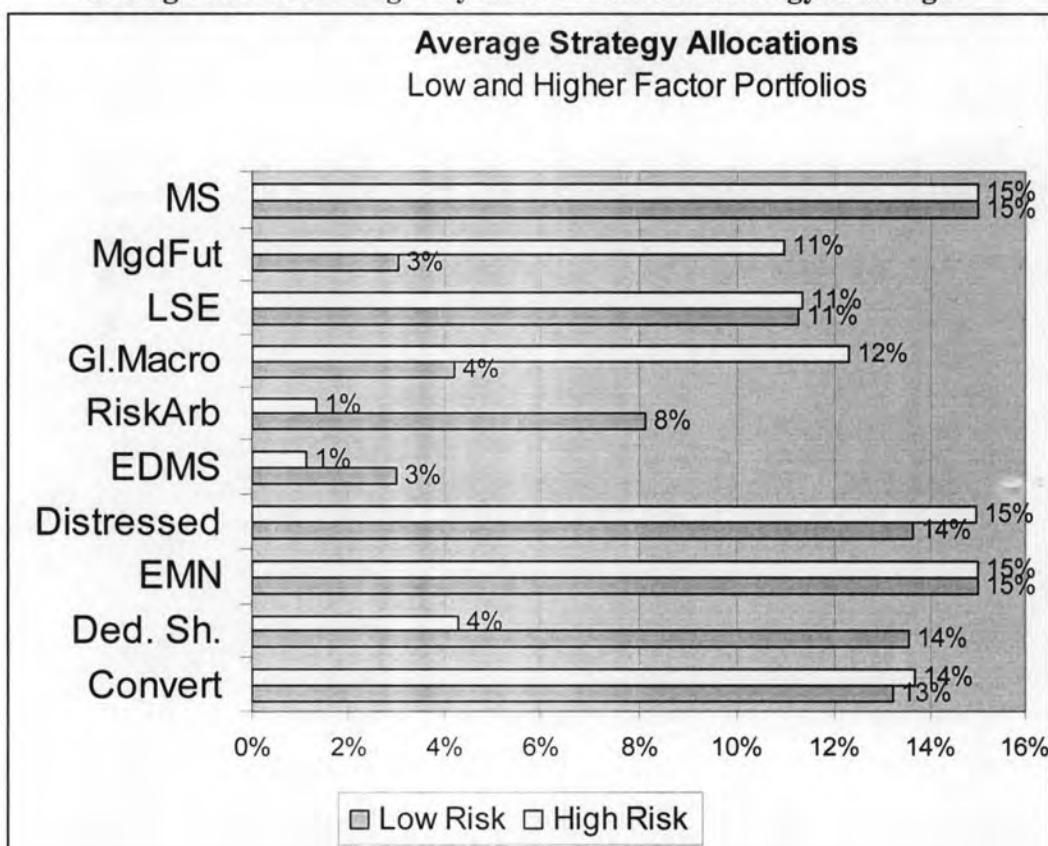
The models using only historical data provide useful information on allocations assuming factor realizations couldn't be estimated. See Figure B on the next page.

One interpretation of the above chart is that strategies can be divided into several categories based on their average allocation for low and higher factor risk exposure. This suggests five meaningful categories.

Core Allocations: Multi-Strategy, Distressed, Equity Market Neutral, and Convertible Arbitrage. These four strategies appear at or near the maximum 15% in both low and higher factor exposure portfolios, accounting for an average 56.9% of the low factor risk portfolio and 58.6% of the higher factor risk portfolio.

High Allocation: Long Short Equity. Long/Short Equity receives significant (10%+ allocations) in both the low and high factor exposure portfolios.

Figure C
Average Portfolio Weight by CSFB/Tremont Strategy: Strategic



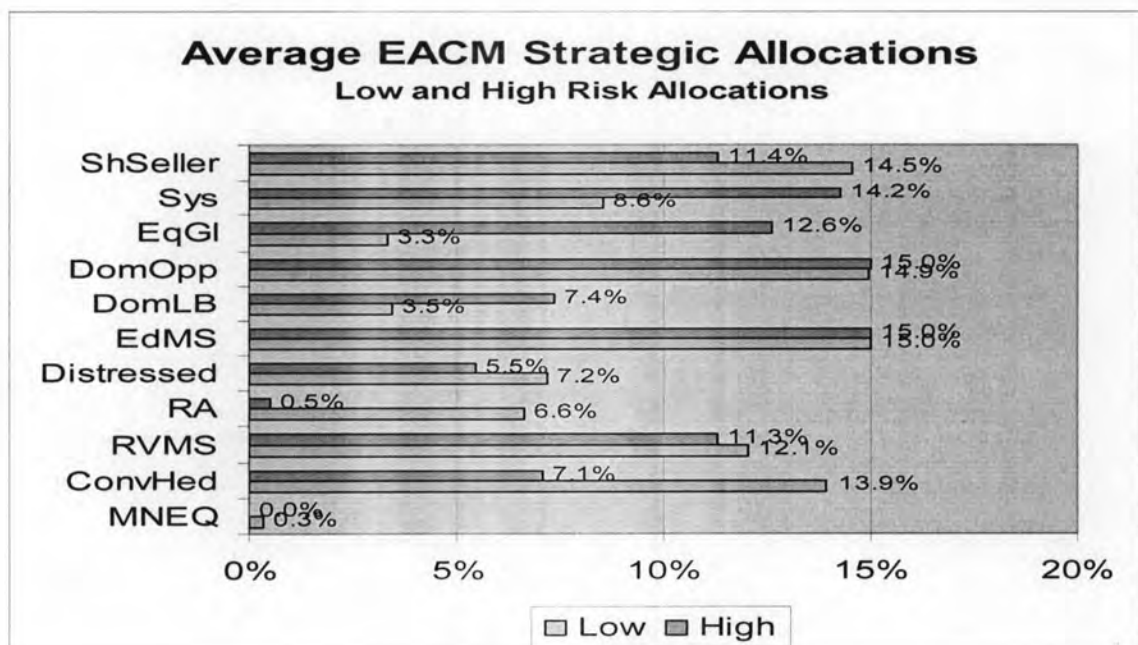
Risk Shifting Allocations: The allocations to four strategies (Global Macro, Dedicated Short, Managed Futures, and Risk Arbitrage) shift significantly depending on level of factor exposure permitted. Specifically, Dedicated Short Bias and Risk Arbitrage indices figure more prominently in lower factor exposure portfolios. In the former case, Dedicated Short Bias appears as a hedge to Long Short Equity, while in the latter case, it is a standalone strategy, useful for its relatively low factor exposure. However, higher return strategies replace Risk Arbitrage at higher factor exposures.

Low Allocation: Event Driven Multi-Strategy. The Event Driven Strategy has lower returns, but higher exposures than Distressed to the first and second factors. Therefore, it does not appear in either optimized strategies based on historical or predicted returns.

No Allocation: Fixed Income Arbitrage and Emerging Markets. Emerging Markets has high factor exposures, while fixed income arbitrage had low factor exposures, but also low returns.

The equivalent strategic allocations on the EACM indices is somewhat similar, though individual strategies sometimes fall into different categories due to the different categorization by the index provider.

Figure D
Average Portfolio Weight by EACM Strategy: Strategic



Source: Author calculations based on portfolio optimizations

4.2.2 Benchmarks

It is worth reconsidering the subject of appropriate benchmark selection. Which we mentioned in a footnote the importance of choosing an appropriate benchmark in a footnote in an asset allocation exercise, causing us to develop a strategic asset allocations of our own rather than rely on the equally weighted benchmark used by Amenc (2002).

An alternative to the equally weighted benchmark is the composite index developed by the CSFB/Tremont and Evaluation Associates index families to represent the performance of their data universe. If they are weighted to match the relative size of each strategy in the hedge fund universe, they may be similar to a capitalization weighted stock index.

A summary of above-mentioned indices for the 1999-2005 period of this study is included in Table XIX below. We also include our strategic allocation constructed for this study for comparison purposes. In the case of the CSFB/Tremont index, our constructed index adds 40 basis points of annualized return with less volatility than the equally weighted model, while our Evaluation Associates model outperformed its equally weighted index by 73 basis points of annualized return, albeit with more volatility. Although the long-only S&P 500 and Smallcap 600 are not appropriate comparisons, we include them for comparison purposes.

Table XIX
Potential Hedge Fund Benchmarks

1999-2005	Annualized Return	Annualized Volatility
CSFB Hedge Fund Index	9.57%	6.06%
CSFB Equally Weighted	8.54%	3.24%
CSFB 40 3 M Model	8.16%	2.26%
EACM 100	8.41%	4.04%
EA Equally Weighted	9.15%	2.74%
EA 40 3 M Model	9.88%	3.49%
S&P 500 (Price Only)	0.03%	15.02%
S&P SC 600 (Price Only)	0.12%	18.42%

4.2.3 Optimizations Using Predicted Returns

We present summaries of the portfolio optimizations for the CSFB/Tremont and EACM index families respectively using a three month prediction window in Table XIX and XX. The three month CSFB/Tremont TAA models produced between 4 and 8 basis points increase in marginal return over their strategic allocations at slightly higher standard deviation and the EACM TAA models produced between 3 and 9 basis points of marginal return at slightly less standard deviation.

Table XX
CSFB 3 Month Portfolio Results
TAA vs.Strategic Allocations

	Min.	Max	Mean	Std. Dev.	Skew	Kurtosis	Diff.
CSFBEW	-1.15	3.81	0.7351	0.7912	0.60	1.75	
CS3M40H	-1.05	1.93	0.6298	0.6333	-0.34	-0.54	
CS3M40P	-0.85	2.01	0.6741	0.6607	-0.18	-0.75	0.0444
CS6M60H	-1.40	3.40	0.7002	0.7987	0.11	1.19	
CS6M60P	-1.23	2.69	0.7829	0.9424	-0.13	-0.63	0.0826
CS3M80H	-1.35	3.04	0.7704	0.8831	0.14	-0.24	
CS3M80P	-1.22	3.64	0.8554	0.9393	0.05	0.10	0.0850

Source: Author from CSFB/Tremont data

Table XXI
EACM 3 Month Portfolio Results
TAA vs.Strategic Allocations

	Min.	Max	Mean	Std. Dev.	Skew	Kurto sis	Diff.
EACMEW	-0.78	4.50	0.6887	0.9355	1.28	2.98	
EA3M40H	-1.53	5.05	0.7935	1.0084	1.18	3.84	
EA3M40P	-1.17	5.05	0.8273	0.9764	1.22	3.79	0.0338
EA3M60H	-1.68	6.31	0.7952	1.2196	1.60	5.36	
EA3M60P	-1.10	6.31	0.8895	1.1165	1.51	5.81	0.0942
EA3M80H	-1.49	7.02	0.7856	1.3278	1.84	6.10	
EA3M80P	-1.23	7.02	0.8751	1.2061	1.85	7.51	0.0894

Source: Author from EACM data

The six month prediction models for the CSFB/Tremont were marginally less successful than the three month models, with a one to eight basis point pickup in return versus the strategic allocation. The EACM 6 month model suffered further decline relative to the 3 month model, showing marginal gains of 1 to 4 basis points in the low to medium factor risk optimizations and a decline in return of 5 basis points a month in the higher risk optimization..

Table XXII
CSFB 6 Month Portfolio Results
TAA vs. Strategic Allocations

	Min.	Max	Mean	Std. Dev.	Skew	Kurtosis	Diff.
CSFBEW	-1.15	3.81	0.7351	0.7912	0.5961	1.753	
CS6M40H	-1.03	2.71	0.6655	0.6871	-0.240	0.253	
CS6M40P	-1.01	2.58	0.6794	0.7435	-0.150	-0.497	0.0139
CS6M60H	-1.40	3.40	0.7002	0.7987	0.1121	1.187	
CS6M60P	-1.23	2.69	0.7828	0.9424	-0.1285	-0.631	0.0826
CS6M80H	-1.64	4.11	0.7698 81	0.9135	0.5760	1.428	
CS6M80P	-1.43	3.21	0.8454 76	1.0016	-0.072	-0.420	0.0756

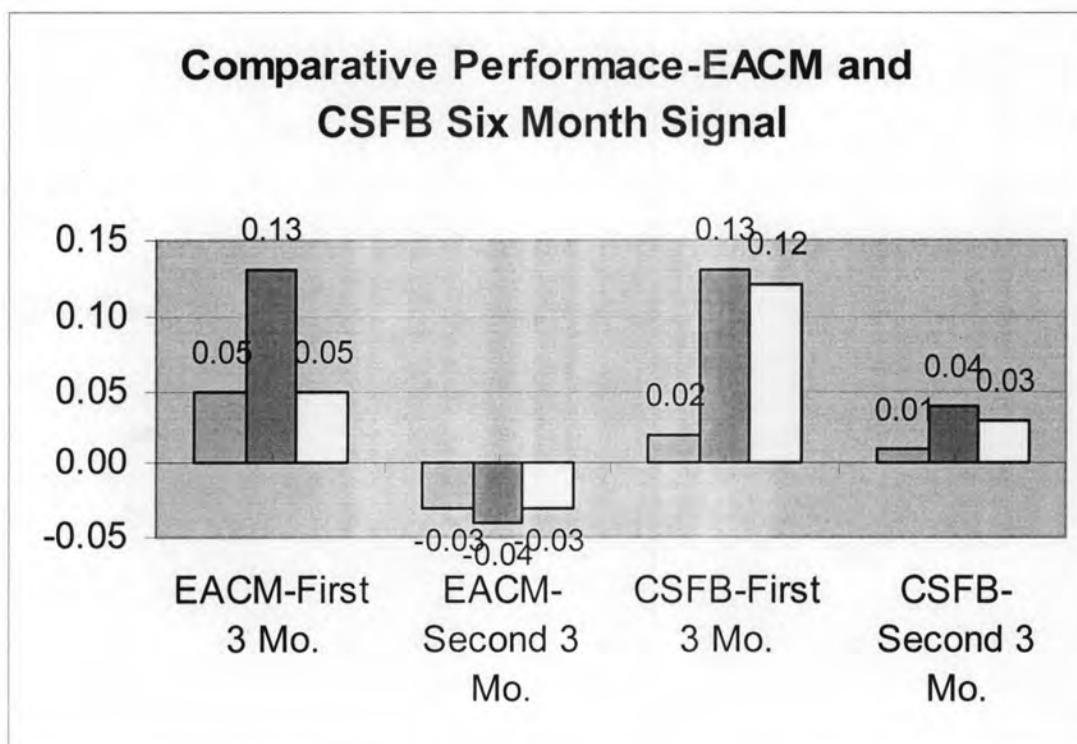
Source: Author from CSFB/Tremont data

Table XXIII
EACM 6 Month Portfolio Results
TAA vs. Strategic Allocations

	Min.	Max.	Mean	Std. Dev.	Skew	Kurtosis	Diff.
EACMEW	-0.77	4.50	0.6887	0.9355	1.28	2.98	
EA6M40H	-1.28	4.91	0.7901	0.9926	1.18	3.55	
EA6M40P	-1.32	4.59	0.8012	0.9780	0.82	2.38	0.0111
EA6M60H	-1.50	6.47	0.8058	1.2182	1.71	5.96	
EA6M60P	-1.61	4.91	0.8500	1.0694	0.63	1.72	0.0441
EA6M80H	-1.34	6.03	0.9007	1.3012	1.04	2.41	
EA6M80P	-1.59	5.40	0.8475	1.1934	0.84	2.07	-0.0532

Source: Author from EACM data

Figure E
Comparative Performance of EACM and CSFB Six Month Signal



This decline in performance between the three and six month TAA is not wholly unexpected, given that a longer length of the prediction window means the prediction is based on older information. The decay of the value of the information can best be seen in Figure D on the previous page, which divides the performance of the six month signal into two three-month buckets. In both the CSFB/Tremont and Evaluation Associates cases, most of the marginal value of the signal is experienced in the first three months, with actual decline in performance in the later months of the EACM signal.

But the three month signal has the disadvantage of being more difficult to practically implement. It is simply not possible to make significant allocation shifts, particularly in the case of less liquid strategies, which may require a minimum year of investment.

4.2.4 Information Ratios

Although we find small increases in realized return for the TAA portfolio optimizations (of one to 8 basis points a month for the CSFB/Tremont and one to 9 basis points a month in the case of the Evaluation Associates) over the strategic asset allocation, we calculate information ratios per Goodwin (1998) to assess this excess return relative to the tracking error incurred. The information ratio measures the excess return (measured by the average increase in return) relative to the excess risk (measured by the standard deviation of the excess return). With 83 degrees of freedom, a t-statistic greater or equal to 1.663 is required for 95% significance. This critical value translates to an information ratio of approximately 0.1814 or higher.

We find only the Evaluation Associates 3 month TAA model with 0.60 factor exposure appears significant (Table XXIV), although two other Evaluation Associates models are close to reaching the 95% standard against our strategic allocation benchmark which relied only on historical data. None of the CSFB/Tremont models (Table XXV) meet the 95% significance standard.

Table XXIV
Summary of Information Ratios of EA TAA Models

Maximum Factor Exposure	3 Month Model	6 Month Model
.40	.1738	.1537
.60	.1918*	.1249
.80	.1809	-.1095

Source: Author

Table XXV
Summary of Information Ratios of CSFB/Tremont TAA Models

Maximum Factor Exposure	3 Month Model	6 Month Model
.40	.0487	.1175
.60	.0810	.1761
.80	-.1095	.1459

Source: Author

Table XXVI
CSFB/Tremont Information Ratios vs. Equal-Weighted Benchmark

Maximum Factor Exposure	3 Month Model	6 Month Model
.40	-.1421	-.1079
.60	.0644	.0741
.80	.2033*	.1548

Source: Author

Table XXVII
Evaluation Associates Information Ratios vs. Equal-Weighted Benchmark

Maximum Factor Exposure	3 Month Model	6 Month Model
.40	-.1421	-.1079
.60	.0644	.0741
.80	.2033*	.1548

Source: Author