SURVIVOR BIAS IN COMMODITY TRADING ADVISOR PERFORMANCE

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INTRODUCTION

The impact of survivor bias on empirical studies of investment performance and investment benchmark creation has received considerable attention. For instance, for equity mutual fund managers, Malkiel (1995) estimates the average annual return of survivor mutual funds exceeded that of all mutual funds by 1.5% annually. Thus, empirical studies based on the performance of mutual funds from data bases that exclude nonsurvivors may bias results toward overstating expected mutual fund performance for randomly chosen investment portfolios. Likewise, in the managed futures area, studies of public commodity fund performance [Elton et al. (1992)] have attempted to ascertain the impact of survivor

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bias.[1] These studies conclude that approximately 10% of public funds in the sample dissolved each year with an annualized return to nonsurviving funds of about −20% per year.

Results of previous research on public commodity funds may not, however, be easily extended to reflect direct investment with individual commodity trading advisors (CTAs) or portfolios of CTAs. First, not all CTAs participate in public commodity funds. For instance, 10 of the 56 CTAs (18%) included in this study did not trade for any public commodity funds over all or a very substantial portion of the time period examined. Second, individual CTAs trade for multiple public commodity funds. Treating each public commodity fund as an independent observation biases performance analysis toward those CTAs participating in the greatest number of public commodity funds. Lastly, previous studies on survivor bias for commodity funds do not focus on the monthly time series patterns of the survivor and nonsurvivor subsamples prior to CTA dissolution.

This study analyzes the differential risk/return performance of survivor and nonsurvivor CTA subsamples. A dissolution rate of approximately 10% per year is found. This dissolution rate is consistent with dissolution rates reported for public commodity funds [Elton et al. (1992)] as well as the mortality rate reported for equity mutual funds in existence during similar reporting periods [Malkiel (1995)]. In the year before dissolution, this study's results indicate that the average nonsurviving CTA had annualized returns of −27%. This result is consistent with the performance of nonsurviving public commodity funds reported in earlier studies [Elton et al. (1992)]. Results also indicate that the variance of nonsurviving CTA returns is considerably higher than the variance of surviving CTA returns.

This study shows, using both cross-sectional and traditional abnormal return methodology, that the return differential between survivor and nonsurvivor samples (on an absolute and risk-adjusted basis) is due primarily to underperformance in the months just prior to dissolution and

[1]Survivor bias has likewise been addressed in index creation in the managed futures industry. For instance, Barclays CTA indices require at least four years of past history to be included. This restriction is based on the belief that few investors would consider a CTA without several years experience and that new CTAs may have a abnormally high level of dissolution. For the Barclays indices, these restrictions reduce the number of new CTAs in their indices. In contrast the Managed Accounts Reports (e.g., MAR) CTA indices require that reporting CTAs have at least one year of past history and $500,000 under management. Pre-1992, the MAR indices were constructed from large CTAs to create an index similar to Dow Jones 30 industrial for stocks. The MAR indices reported today have been reconstructed back to 1980s and include all reporting CTAs who meet classification restrictions. As a result, previous empirical studies that use pre-1992 MAR indices are not necessarily comparable to results using present indices.

not necessarily due to persistent underperformance over an extended period of time. Thus, the impact of survivor bias on CTA performance results may be time period dependent. More importantly, while dissolving CTAs underperform survivors by a wide margin in their final year of existence, they comprise only about 10% of the universe at any one time, and, thus, the impact of survivor bias on a diversified CTA portfolio is considerably less. Second, the low return correlation among individual CTA returns and between CTAs and equity portfolios means that survivor bias is less problematic when CTAs are viewed as possible additions to traditional asset portfolios.

The article is organized as follows: First, construction of the data set is discussed along with the testing methodologies employed. Second, two sets of results are presented and discussed. The first set of results compare the performance of nonsurviving CTAs with a control group of surviving CTAs. The second set of results addresses the impact of excluding nonsurviving CTAs from diversified portfolios. In the final section, the implications of these results on benchmark creation for managed futures are discussed as well as the determination of the benefits of managed futures as an asset class.

DATA

The universe of CTAs identifiable from public sources at the end of 1987 was obtained. The only criteria for inclusion in the data set was three years of documented investment history. This restriction is consistent with investment controls by institutional money managers [Epstein (1992)] and is similar to restrictions used in constructing CTA benchmarks for the institutional investor community (e.g., Barclays). Applying the above criteria, 68 independent CTAs were identified. Performance records were obtained for all but 12 of the 68 CTAs.[2] (A complete list of the 68 CTAs included in the study; the 44 CTAs who survived the period of analysis; the 12 who dissolved during the analysis period; and the 12 CTAs not included directly due to failure to obtain full performance records are provided in the Appendices).[3]

[2]Performance data for 7 of these 12 CTAs was not available in any form. Some performance data was available from the funds for which five CTAs worked. The equally weighted monthly return of the funds for which those five CTAs worked was 0.65% for the period of this study (1988/1991). The MAR Fund/Pool equally weighted monthly return for the same time period was .77%. For the 12 months prior to dissolution, the two funds which contained two listed CTAs and subsequently dissolved had mean monthly returns of −2.48% and −.89%. Results for the public commodity funds containing the five CTAs for whom direct CTA performance data is not available are generally consistent with the larger CTA sample.

[3]The 12 "missing" CTAs are known to have filed CFTC papers and/or have traded for CTA funds in

Performance records were obtained for the 56 individual CTAs included in the study for the period 1985 through 1991. Results are reported net of fees[4] from all types of accounts they manage, including public commodity funds, private pools, and individual managed accounts. The return for an individual CTA represents a weighted average return of all managed accounts, weighted by the assets managed in each of the three account categories.

METHODOLOGY

Returns for individual CTAs are determined as:

$$R_{i,T} = \ln(\text{NAV}_{i,T}/\text{NAV}_{i,T-1}) \tag{1}$$

where,

$R_{i,T}$ = Monthly rate of return for CTA, i, in period, T

$\text{NAV}_{i,T}$ = Total asset value for CTA, i, in period, T.

Portfolio construction is as follows:

$$Rp_{i,T} = \ln\left(\sum_{i} (R_{i,T}/N)\right) \tag{2}$$

where N = Number of CTAs in sample at time, T. For Managed Account Report Commodity Trading Advisor (MAR) indices used in this study, returns are computed as follows:

$$Rcta_{i,T} = \ln(\text{MAR}_{i,T}/\text{MAR}_{i,T-1}) \tag{3}$$

Four portfolios of CTAs are used in the analysis.

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the 36 months prior to the analysis period, and, hence, should be included in the study. Of these, five of the CTAs in Appendix C are known to have subsequently traded for public funds listed in *Futures Magazine*, but individual returns are not available. Of these five, three were still listed as participating in funds through the entire analysis period (1988–1991), and, hence, were "survivors." However, their returns were not available from public sources. Two CTAs were trading in 1988 for funds that did not continue through 1991. If one adds these 2 CTAs to the other 7 "missing" CTAs and the 12 CTAs who dissolved with full publicly available return records, then total dissolution rate was approximately 30% (21 of 68 CTAs) and the annual dissolution rate was approximately 10%. Again, these rates are consistent with those reported for public commodity funds [Elton et al. (1992)]. This study's results are impacted by the inability to locate returns for the "missing" CTAs. However, the five funds the missing CTAs traded for reflect that of the whole sample. It is assumed that the additional "missing" CTAs do likewise. Results are presented both with and without this assumption about the performance of these missing CTAs.

[4]Generally, these fees include management fees, incentive fees, and brokerage commissions.

Portfolio I = Portfolio of Survivor CTAs.

Portfolio II = Portfolio of 56 CTAs with full performance data.[5]

Portfolio III = Portfolio with 90% investment in Survivor CTAs and assumed 10% investment in Nonsurvivor Portfolio.

Portfolio IV = Managed Accounts Reports (MAR) Diversified CTA Index.

Both Portfolios I and II assume equal investment and monthly rebalancing among listed CTAs. Portfolio III assumes that the CTAs for whom direct CTA performance data was not available had return performance and dissolution patterns similar to the 12 nonsurviving CTAs included in the sample. The annual dissolution rate for the combined nonsurvivor sample is 10%. Portfolio IV reflects the performance of the MAR Diversified CTA index, the index which most closely reflects the trading style of the CTAs analyzed in this study.

For the 12 nonsurviving CTAs whose performance data is available, a paired comparison is made between the performance of the nonsurviving CTA and the performance of all surviving CTAs over the same time period. Two cross-section time periods are analyzed: (a) the period 36 months to 12 months before CTA dissolution and (b) the 12 months before CTA dissolution. In addition to reporting on the relative cross-sectional CTA performance of the average survivor CTA and the paired nonsurvivor CTA, the time series properties of the survivor CTA and nonsurvivor CTA return series are reported also. The cumulative abnormal return (CAR), standardized abnormal return (SAR) and cumulative standardized abnormal returns (CSAR) prior to final CTA dissolution are reported as well. SARs are determined using cross-sectional standard errors [Peterson (1989)]. Abnormal returns are determined using variety of alternative performance benchmarks. The alternative benchmarks are as follows:

Benchmark I = Mean of the dissolving CTA during the two years leading up to the dissolution year.

Benchmark II = Market model residual at time, t, determined from MAR dollar-weighted CTA-based Market Model. Two years leading up to dissolution year are used to estimate parameters to the model.

[5]At the time of selection, the 56 CTAs who are included in Portfolio II managed the principal portion of the funds under management in the managed futures industry. For example, the 56 CTAs included in this study managed 88.9% of all of the funds reported under management in Managed Accounts Reports Quarter IV 1987, Quarterly Performance Report.

TABLE I

Performance of Surviving and Nonsurviving CTA Subsamples

	Annualized Mean Return	*Annualized Standard Deviation*
Panel A: Summary of CTA Subsample Performance from 36 to 12 Months Before Dissolution		
Nonsurviving CTAs	10.57%	56.72%
Surviving CTAs	18.71%	35.70%
T-test[a] (mean), *F*-test[b] (SD)	−0.54	2.52
P-value of test	0.2936	0.0000
Panel B: Summary of CTA Subsample Performance in 12 Months Prior to Dissolution		
Nonsurviving CTAs	−27.33%	49.25%
Surviving CTAs	13.89%	32.33%
T-test (mean), *F*-test (SD)	−3.01	2.32
P-value of test	0.0015	0.0000

[a]*T*-test assumes each monthly return for a nonsurviving CTA is matched with the average return for all CTAs who survive the analysis period. With 12 nonsurviving CTAs and 24 months (Panel A), this yields a sample size of 288 matched pairs.
[b]The *F*-test is the ratio of the sample variance of all nonsurviving CTA monthly returns (288 in Panel A) to the sample variance of all surviving CTAs during the same months (44 CTAs, 24 months, 1056 observations).

Benchmark III = Return of an equal-weighted portfolio of all surviving CTAs at time, t.

RESULTS

Cross-Sectional Relative Return Performance

Tables IA and IB report the risk and return performance of paired nonsurvivor and survivor CTA subsamples for (a) a two-year period during which no dissolution takes place and (b) a one-year period before final dissolution. For the period 36 months to 12 months before dissolution, the average nonsurvivor CTA had an annualized return of 10.57% compared to an annualized return for the survivor sample of 18.71%. While the average nonsurvivor CTA reported lower average returns, the difference is not statistically significant, with a matched pair t-value of −.54. Using monthly data for the period, 36 months to 12 months before dissolution, nonsurviving CTAs had an annualized standard deviation of 56.72% compared to an annualized standard deviation for the survivor sample of 35.70%. The difference in the variance of the two samples is highly significant, with an overall F-ratio of 2.52.

In contrast to results in Table IA, Table IB indicates that the average nonsurviving CTA experiences a large negative annualized return (−27.3%) in the 12 months before dissolution. Compared to the returns

of surviving CTAs (13.89% annualized), the underperformance of nonsurviving CTAs is significant at the 1% level, with a *t*-statistic of −3.01. The volatility of returns for nonsurvivors in the final 12 months is similar to the volatility in the previous 24 months. The annualized standard deviation of nonsurvivor monthly returns is 49.25% in the final year, which is slightly less than in the 24 preceding months, but not significantly so. For CTA survivors, the comparable annualized standard deviation is 32.33%.[6] In conclusion, during the year immediately preceding CTA dissolution, (1) nonsurviving CTA returns are lower than returns of surviving CTAs, (2) nonsurviving CTAs have higher return volatility than surviving CTAs, and (3) nonsurviving CTAs do not experience increased return volatility in the 12 months preceding dissolution.

CTA Abnormal Return Patterns

In this section, analysis of the return pattern in the final year before CTA dissolution is presented. Analysis of the risk-adjusted return pattern provides insight into the typical return pattern experienced by a CTA nearing dissolution. In Table IIA and Figures 1 and 2, the average returns and cumulative average returns of nonsurviving and the surviving CTA subsamples are presented. Table IIB and Figure 3 report the cumulative abnormal returns (CAR), standardized abnormal return (SAR), and cumulative standardized abnormal returns (CSAR) for the 12 months preceding CTA dissolution.[7]

Results in Table II and Figures 1–3 show that there is little difference in the actual return patterns between the surviving and nonsurviving subsamples as well as the abnormal return patterns in the period from 12 months to 9 months before CTA dissolution. The large negative returns by nonsurvivors take place in the 8 months just prior to CTA dissolution. Two periods of significantly negative average SAR (from 8 to 5 months and from 3 to 1 month) are separated by a period of positive returns.[8] Unfortunately, the similar return performance of the nonsurviving CTAs

[6]The analysis period, 1985–1991, was a period of generally declining volatility in CTA returns. Even though the dissolution dates for each CTA are different, and thus the final 36 months of each CTA are different, it is not surprising that the period, 36 to 12 months, shows higher volatility than the period, 12 to 1 months. The former contains proportionately more data from the more volatile early years of the study and the latter proportionately more from the less volatile period.

[7]The Methodology employed in these tables is explained in the third section.

[8]This could suggest that investors are willing to tolerate a single period of significant underperformance by a CTA but are unwilling to tolerate two in close succession. With equity already reduced because of trading losses, sizable redemptions could force the CTA to close. It is also consistent with the notion that managers adjust their trading strategy in the short run to compensate for a large negative return.

TABLE II

CTA Subsample Performance in 12 Months Prior to Dissolution

Panel A: Comparison of Surviving and Nonsurviving CTA Portfolios

	Average Monthly Return		*Cumulative Return*	
Months to Dissolution	*Nonsurvivor*	*Survivors*	*Nonsurvivors*	*Survivors*
12	−0.0519	0.0088	−0.0519	0.0088
11	0.0158	−0.0001	−0.0361	0.0087
10	0.0086	0.0110	−0.0275	0.0197
9	0.0211	0.0120	−0.0064	0.0317
8	−0.0537	0.0190	−0.0601	0.0507
7	−0.0534	0.0261	−0.1135	0.0767
6	−0.0637	−0.0104	−0.1773	0.0663
5	−0.0696	0.0062	−0.2468	0.0725
4	0.0506	0.0011	−0.1962	0.0736
3	0.0334	0.0085	−0.1628	0.0820
2	−0.0705	0.0150	−0.2333	0.0971
1	−0.0400	0.0419	−0.2733	0.1389

Panel B: Abnormal Returns of Nonsurviving CTA Portfolio

	Cumulative Abnormal Return			*Standardized Abnormal Return*			*Cumulative Standardized Abnormal Rtn*		
Months to Dissolution	*Past Performance*	*Adjusted for Market Risk*	*Relative to Survivors*	*Past Performance*	*Adjusted for Market Risk*	*Relative to Survivors*	*Past Performance*	*Adjusted for Market Risk*	*Relative to Survivors*
12	−0.0607	−0.0497	−0.0635	−1.4423	−1.4397	−1.2939	−1.4423	−1.4397	−1.2939
11	−0.0537	−0.0564	−0.0510	0.1970	−0.2009	0.4546	−1.2453	−1.6406	−0.8393
10	−0.0539	−0.0555	−0.0555	−0.0034	0.0305	−0.1150	−1.2487	−1.6101	−0.9543
9	−0.0417	−0.0495	−0.0502	0.3950	0.1903	0.1892	−0.8537	−1.4198	−0.7651
8	−0.1042	−0.1143	−0.1258	−2.9492	−2.1548	−2.5965	−3.8029	−3.5746	−3.3616
7	−0.1664	−0.1703	−0.2074	−2.1442	−1.4418	−2.5353	−5.9471	−5.0163	−5.8969
6	−0.2389	−0.2393	−0.2645	−1.5688	−1.3406	−1.1631	−7.5159	−6.3569	−7.0600
5	−0.3173	−0.3069	−0.3422	−1.3607	−1.2063	−1.5405	−8.8766	−7.5632	−8.6004
4	−0.2755	−0.2548	−0.2942	0.7478	0.9484	0.8875	−8.1288	−6.6148	−7.7129
3	−0.2509	−0.2267	−0.2720	0.8594	1.1360	0.9341	−7.2695	−5.4789	−6.7788
2	−0.3302	−0.2894	−0.3595	−1.8527	−1.9387	−2.4245	−9.1222	−7.4176	−9.2033
1	−0.3790	−0.3468	−0.4441	−1.8538	−2.2417	−3.0250	−10.9760	−9.6593	−12.2283

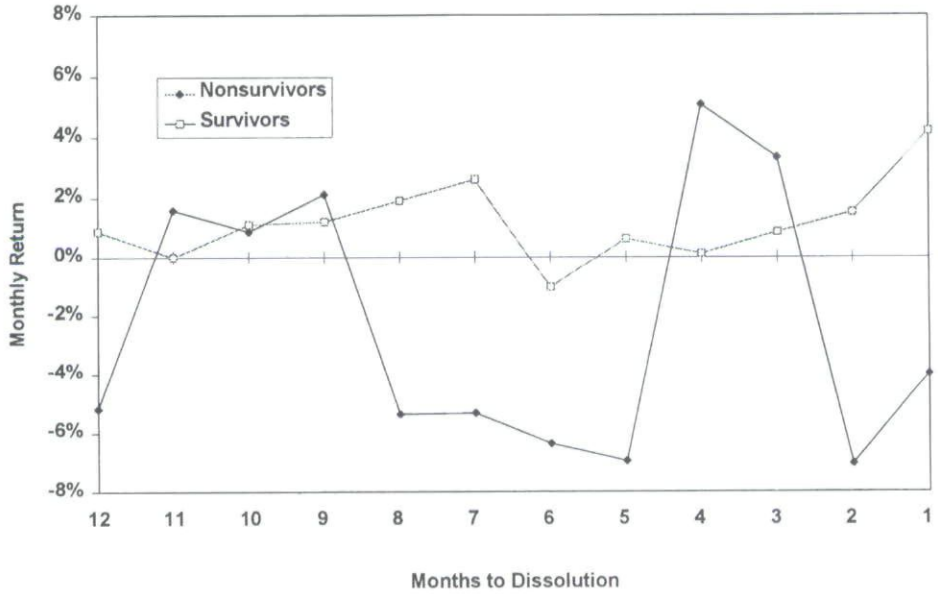

FIGURE 1
Survivor and nonsurvivor performance in 12 months prior to dissolution.

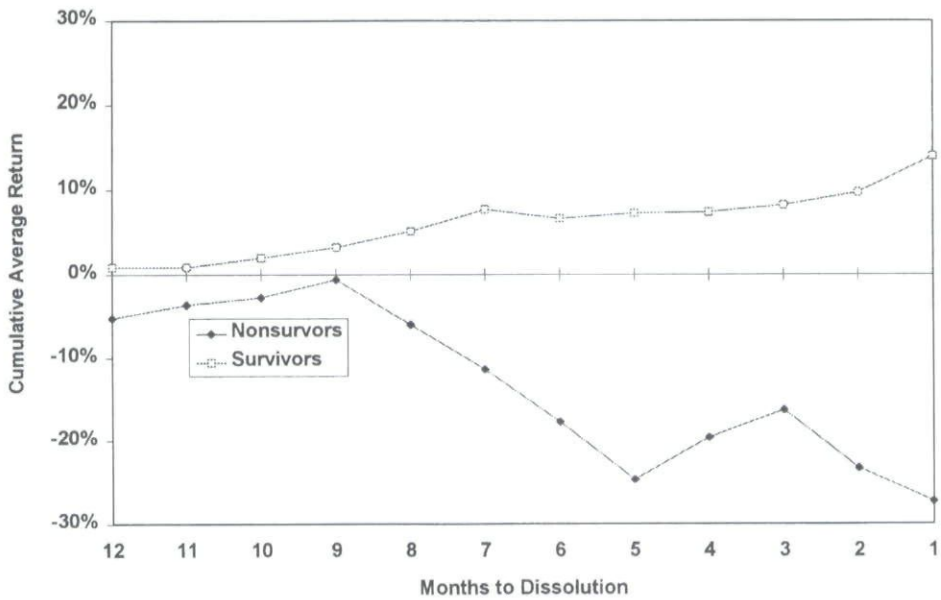

FIGURE 2
Cumulative survivor and nonsurvivor performance in 12 months prior to dissolution.

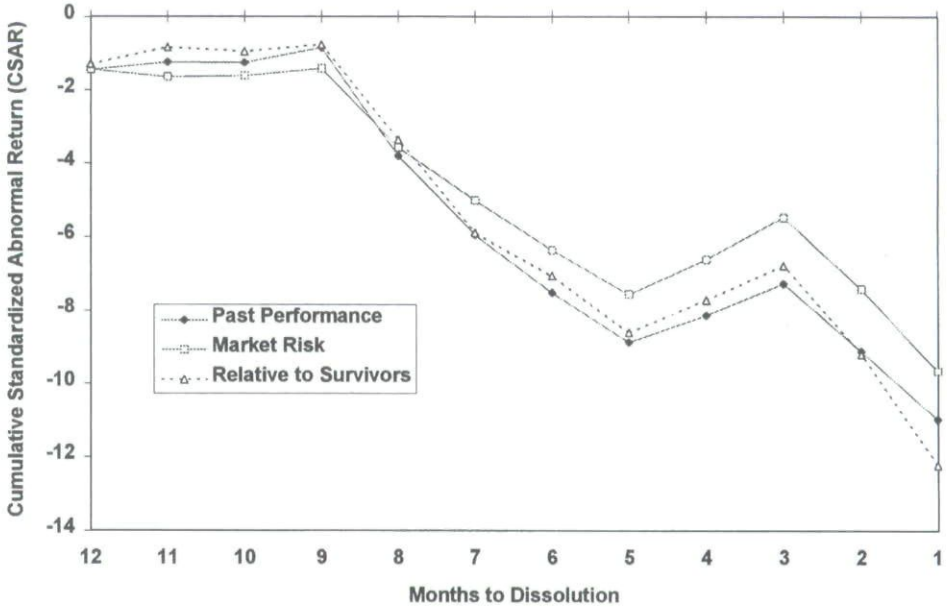

FIGURE 3
Nonsurvivor CSAR in 12 months prior to dissolution.

and the surviving CTAs, except in the months just prior to CTA dissolution, indicates that a CTA selection model based simply on relative CTA return will not accurately forecast CTA dissolution. A model that screens out CTAs with two periods of underperformance in rapid succession would likely screen out the bulk of dissolving CTAs, but not before CTA return losses had already occurred.

Relative Performance of Portfolios of Individual CTAs

Both the cross-sectional and time series results suggest that historical analysis based solely on surviving CTAs will result in an upwardly biased return estimate and a downwardly biased variance estimate. However, CTAs are generally held in portfolios that contain many CTAs and other asset classes (e.g., stock). Results in Table IIIA reflect the marginal impact on CTA performance of including CTA nonsurvivors in a CTA portfolio for the period 1988–1991. As described in the last section, Portfolio I assumes equal investment in all survivor CTAs, Portfolio II assumes equal investment in all CTAs, Portfolio III assumes 90% investment in the survivor portfolio (I) and 10% in a separate portfolio of nonsurvivors and Portfolio IV assumes investment in the MAR Diversified CTA index.

TABLE III

Impact of Survival Bias on Portfolio of CTAs and Common Stocks

Panel A: Impact of Survivor Bias on Performance of CTA Portfolios

	Portfolio I	*Portfolio II*	*Portfolio III*	*Portfolio IV*
	Survivors Only	*All CTAs*	*90% Survivors 10% Nonsurvivors*	*MAR Diversified CTA Index*
Mean annualized return	11.71%	10.51%	9.17%	10.70%
Standard deviation	18.70%	19.87%	20.07%	17.65%
Sharpe ratio	0.63	0.53	0.46	0.61
Excess break-even	6.18%	4.99%	3.96%	4.70%

Panel B: Impact of Survivor Bias on Portfolios with 90% SP500, 10% CTA Portfolio

	Portfolio A	*Portfolio B*	*Portfolio C*	*Portfolio D*	
	SP500 and Portfolio I	*SP500 and Portfolio II*	*SP500 and Portfolio III*	*SP500 and Portfolio IV*	*SP500 Only*
Mean annualized return	16.99%	18.87%	16.74%	16.89%	17.58%
Standard deviation	14.68%	14.79%	14.82%	14.57%	14.23%
Sharpe ratio	1.16	1.14	1.13	1.16	1.24
	Portfolio I	Portfolio II	Portfolio III	Portfolio IV	
Correlation with SP500	0.03	0.03	0.01	0.06	

For the period, 1988–1991, the average annualized return of the CTA survivor portfolio (Portfolio I) was 11.71% with an annualized standard deviation of 18.70%. Portfolio II had a lower average annualized return of 10.51% and a higher annualized standard deviation of 19.87%. The lower average return and higher variance is consistent with a portfolio that contains a percentage of nonsurviving CTAs. The return of Portfolio II (10.51%) is similar to the return of Portfolio IV (the MAR Diversified Index return (10.70%), which purportedly includes both surviving and nonsurviving CTAs.

Portfolio III, which has a greater proportion of nonsurvivors (10%) than Portfolio II, has a lower annualized return (9.17%) and a higher standard deviation (20.07%) than any of the CTA portfolios. Thus, including nonsurviving CTAs in portfolios during the sample period, 1988–1991, would have reduced annual return by approximately 1.0–2.5%, increased standard deviation by 1.2–1.4%, and reduced the Sharpe ratio from 16%–27%, depending on the comparison CTA portfolio.

CTAs, however, are rarely held as stand-alone investments. They are usually combined in portfolios with traditional assets. Table IIIB presents the risk and return performance of CTA/equity portfolios comprising 90% investment in the S&P 500 total return index and 10% investment in Portfolios I–IV. Portfolio A (survivor CTA/equity portfolio) has a Sharpe ratio (return/standard deviation) of 1.16. This is similar to the other CTA/equity portfolios (Sharpe ratios of 1.14, 1.13, and 1.16 for portfolios B, C, and D, respectively). This is not surprising. First, with a dissolution rate of at most 10% per year and 10% investment in CTAs, dissolving CTAs represent at most 1% of the combined CTA/equity portfolio assets. Second, the low correlation between the CTA portfolios and the S&P 500 (as shown in Table IIIB) means that including CTAs in an all-equity portfolio has little impact on the standard deviation of the combined CTA/equity portfolio. Thus, using the survival-only portfolio may introduce survivor bias, but will have little bearing on the question of whether a small number of CTAs should be included in an equity portfolio.

Table IIIA also presents the excess-break-even return[9] for inclusion of the various CTA portfolios with the S&P 500 index. Given the corre-

[9]The break-even rate methodology is discussed in Elton et al. (1987) and Schneeweis et al. (1992). Define the following variables: R_c = Break-even rate of return required for CTA to improve Sharpe ratio. R_r = Riskless rate of return. R_r = Rate of return on index p. P_{cp} = Correlation between CTA c and index p. σ_c = Standard deviation of CTA c. σ_p = Standard deviation of index p. The break-even rate is:

$$\bar{R}_c = \left(\frac{\bar{R}_p - R_r}{\sigma_r}\right)(P_{cp})\sigma_c + R_r$$

lations in Table IIIB, the CTA and S&P 500 variance and return data in Table III, and an assumed 6% annual risk-free rate, there is evidence that including managed futures in an all-equity portfolio would have resulted in a more favorable risk/return tradeoff than a 100% equity portfolio.

IMPLICATIONS AND CONCLUSIONS

Publicly available data sets of CTA returns generally provide information on CTAs currently in existence which meet the listing requirements of the data service. This is not unexpected. Most investment managers have little interest in the historical performance of CTAs who are no longer available for investment. However, estimates of future expected rates of CTA returns based on the historical performance of CTAs available from a current CTA data base may reflect survivor bias. Results in this study indicate the presence of survivor bias in CTA returns; that is, surviving CTAs experience higher returns and lower volatility than nonsurviving CTAs, and thus excluding nonsurvivors from historical analysis may produce biased forecasts of the return/risk tradeoff for randomly selected CTAs.

Results, however, also indicate that the impact of survivor bias is smaller when CTAs are considered as part of a diversified CTA portfolio. In addition, when CTAs are considered as a part of a diversified stock portfolio, the impact of using data bases that contain survivor bias has only a minor influence on traditional measures of risk and return performance. Results also indicate that the returns of the principal market index used as a benchmarks for the CTA does not display significant survivor bias since it includes listed CTAs who may dissolve in future periods. These indices, however, limit inclusion to CTAs with a certain amount of documented trading history. Thus, they are subject to a form of survivor bias if, as is generally assumed, new CTAs have greater than average dissolution risk.

The role of investment advisors who create and monitor multimanager CTA portfolios is not addressed in this study. These advisors screen available CTAs and track these managers to control dissolution risk. Part of the management fee to these advisors may constitute a fee for reducing the cost of CTA dissolution. A study of dissolutions of individual CTAs in multimanager funds would shed light on this question. Lastly, results in this analysis concentrate on diversified CTAs who trade in several underlying asset markets. CTAs who trade in single markets may be expected to face greater systematic dissolution risk. Survivor results reported in

this study may not be directly applicable. In this area, future research is necessary.

APPENDIX A: NAMES OF 44 SURVIVING CTAs INCLUDED IN ANALYSIS

Advanced Algorithm
AO Management
AZF
George Booth
Brandt
Campbell & Co.
Caxton Corp.
Computerized Commodity Advisory
Chang & Crowell
Chesapeake
Colorado Commodities
Commodity Monitors
Cambridge Research Management Corp.
Charles Curran
Desai & Co.
Dunn Capital
Elam
ELM Financial
Fairfield
FMCI
GK
Hickey
John Henry
ICSC
Jones Commodities
Lawless
Lennox
Little Brook
Millburn
Mint Investment
Olink
Pragma
Reynwood
B.N. Rotter
RXR

Saxon
Sabre
Spackenkill
Sunrise
Tide (U.K.)
Tiverton
Trendlogic
Tudor Investment
Visioneering Research & Development

APPENDIX B: NAMES OF 12 NONSURVIVAL CTAs INCLUDED IN ANALYSIS

Don Charles
R.J. Dennis
Dunn & Hargitt
Gulfstream
Investment Timing Services
Kohl, Lane, and Siebens
Neims Stoken
Summit
Techtrader
Thomte
UCA
World Futures

APPENDIX C: NAMES OF 12 CTAs WITHOUT COMPLETE, PUBLICLY AVAILABLE PERFORMANCE RECORDS

William Diener*
Grote Currency*
Aetna Capital Management*
Cresta Commodity Management*
Christopher Funk*
AccuComm Futures Forecast**
Dennis Marlow**
Technical Trading Advisors**
Abell Asset Management**
California Futures Advisors**

*CTAs listed as manager in *Futures Magazine* monthly Fund Review 1/1/88 and followed through 12/91 or dissolution.
**Not listed as manager in *Futures Magazine* monthly Fund Review.

Evergreen Futures**
Tox**

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