Supplementary Tables to "Hedge Fund Risk Dynamics: Implications for Performance Appraisal"*

The analyses performed in the paper originally used the CISDM database of hedge funds. At the suggestion of the referee, we obtained the Lipper TASS database of hedge funds and re-did our analyses. The key results using the TASS database are reported in the paper. This supplement includes all tables summarizing the TASS results but not reported in the paper. The table numbers correspond to the table numbers used in the text. Table IA.I in this supplement, for example, contains the summary statistics for the monthly returns of the hedge funds included in the TASS database, while Table I in the paper contains the summary statistics for the monthly returns of the hedge funds included in the TASS database.

^{*}Citation format: Bollen, Nicolas P.B., and Robert E. Whaley, 2009, Internet Appendix to "Hedge Fund Risk Dynamics: Implications for Performance Appraisal," *Journal of Finance* 64, 987-1037, <u>http://www.afa.jof.org/IA/2009.asp</u>. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

Table IA.I Summary Statistics of Reported Monthly Returns of TASS Funds

See Appendix Table A1 for definitions of fund types. The summary statistics are the number of funds and the equally weighted averages of the mean monthly return, μ ; the standard deviation of monthly returns, σ ; the Sharpe ratio, *SR*; the skewness, *Skew*; the excess kurtosis, *Kurt*; the autocorrelation coefficient, AR(1); the percentage of funds with an AR(1) coefficient significantly positive at the 5% probability level, %>>0; and the percentage of funds with an AR(1) coefficient significantly positive at the 5% probability level, %>>0. Data are from January 1994 through December 2005.

Туре	No. of funds	μ	σ	SR	Skew	Kurt	AR(1)	% >>0	%<<0
		·	Ра	anel A. Live	e Funds				
HF	1,652	0.0111	0.0320	0.3656	0.1478	3.2676	0.1472	29.7%	1.3%
FOF	796	0.0070	0.0171	0.3414	-0.1934	2.4272	0.2028	36.8%	1.0%
CTA/MF	303	0.0103	0.0537	0.1350	0.3538	1.7509	0.0014	6.3%	3.0%
	2,751								
			Ра	nel B. Dead	d Funds				
Туре	No. of funds	μ	σ	SR	Skew	Kurt	AR(1)	%>>0	%<<0
HF	2,077	0.0081	0.0429	0.2019	0.0214	3.4227	0.1339	23.5%	1.4%
FOF	525	0.0048	0.0256	0.1751	-0.2191	3.0817	0.1830	32.6%	1.1%
CTA/MF	902	0.0064	0.0601	0.0350	0.2761	2.4183	0.0032	5.1%	4.4%
	3,504								
			Р	anel C. All	Funds				
Туре	No. of funds	μ	σ	SR	Skew	Kurt	AR(1)	% >>0	%<<0
HF	3,729	0.0094	0.0381	0.2744	0.0774	3.3540	0.1398	26.3%	1.3%
FOF	1,321	0.0061	0.0205	0.2753	-0.2036	2.6873	0.1949	35.1%	1.1%
CTA/MF	1,205	0.0074	0.0585	0.0601	0.2956	2.2505	0.0028	5.4%	4.1%
	6,255								

Table IA.II

Distribution of Length of Reported Monthly Return Series of TASS Funds See Appendix Table A1 for definitions of fund types. Listed are the 25th, 50th, and 75th percentiles of the distributions of history lengths, in months, of different fund types. Data are from January 1994 through December 2005.

Туре	No. of funds	25 th	50 th	75 th			
Panel A. Live Funds							
HF	1,652	39	60	96			
FOF	796	35	50	83			
CTA/MF	303	54	93	141			
	2,751						
	Panel B.	Dead Funds					
Туре	No. of funds	25^{th}	50 th	75 th			
HF	2,077	36	52	78			
FOF	525	36	50	76			
CTA/MF	902	35	54	80			
	3,504						
	Panel C.	All Funds					
Туре	No. of funds	25^{th}	50 th	75 th			
HF	3,729	37	55	84			
FOF	1,321	35	50	79			
CTA/MF	1,205	36	60	93			
	6,255						

Table IA.V Summary Statistics of Factor Models Estimated Using Reported Monthly Returns of 2,751 Live TASS Funds

See Appendix Table A1 for definitions of fund types and factors. Listed are summary statistics of factor models estimated by OLS. For each fund, an optimal subset of factors is selected using the Bayesian Information Criterion. Listed in Panel A are the number of funds of each type; the average adjusted- R^2 ; alpha, α ; total volatility, σ ; residual volatility, σ_{ε} ; and the number of factors used in each regression. Listed in Panels B and C are the percentage of funds for which a factor is included in the optimal subset and the exposure to each factor averaged across funds for which the factor is included in the optimal subset, respectively. Data are from January 1994 through December 2005.

	Panel A. Regr	Panel A. Regression Statistics				
Statistic	All	HF	FOF	CTA/MF		
No. of funds	2,751	1,652	796	303		
Adjusted-R ²	29.9%	28.5%	36.8%	19.3%		
α	0.53%	0.61%	0.26%	0.78%		
σ	3.01%	3.20%	1.70%	5.36%		
σ_{ε}	2.45%	2.58%	1.30%	4.74%		
No. of factors	2.2	2.1	2.6	1.9		
Panel	B. Percent of Fur	nds with Fact	tor Exposure			
Factor	All	HF	FOF	CTA/MF		
MKTXS	56.5%	55.4%	72.4%	20.1%		
SMB	19.2%	23.1%	16.7%	5.0%		
HML	21.5%	22.5%	26.5%	3.3%		
SMBSQ	15.2%	18.6%	12.1%	4.6%		
HMLSQ	9.5%	11.4%	7.5%	4.0%		
D10YR	22.5%	17.7%	34.3%	17.8%		
DSPRD	26.2%	24.4%	37.8%	5.6%		
PTFSBD	10.2%	8.6%	6.5%	28.7%		
PTFSFX	16.4%	7.2%	24.1%	45.9%		
PTFSCOM	9.6%	8.6%	6.2%	23.8%		
PTFSIR	5.0%	6.1%	2.3%	6.6%		
PTFSSTK	10.8%	9.7%	8.7%	22.1%		
	Panel C. Averag	e Factor Exp	osure			
Factor	All	HF	FOF	CTA/MF		
MKTXS	0.3531	0.4232	0.2346	0.4179		
SMB	0.2829	0.3269	0.1675	0.1890		
HML	0.2227	0.2379	0.2014	0.1055		
SMBSQ	0.1735	0.1317	0.0669	1.8248		
HMLSQ	0.0664	0.0089	0.1000	0.8001		
D10YR	-0.1882	-0.1865	-0.1609	-0.3351		
DSPRD	-0.1718	-0.1819	-0.1722	0.0725		
PTFSBD	0.1086	0.0134	0.0051	0.3260		
PTFSFX	0.2515	0.2061	0.1471	0.4345		
PTFSCOM	0.2174	0.1719	0.1273	0.3686		
PTFSIR	-0.0827	-0.1095	-0.0218	-0.0036		
PTFSSTK	0.1244	0.0678	0.1105	0.2741		

Table IA.VI Summary Statistics of Factor Models Estimated Using Reported Monthly Returns of 2,179 Live TASS Funds

See Appendix Table A1 for definitions of fund types. Listed are summary statistics of factor models estimated by OLS using the futures contract factors listed in Appendix Table A1. For each fund, an optimal subset of factors is selected using the Bayesian Information Criterion. Listed are the number of funds of each type; the average adjusted- R^2 ; alpha, α ; total volatility, σ ; residual volatility, σ_{c} ; and the number of factors used in each regression. Data are from January 1994 through December 2005.

Statistic	All	HF	FOF	CTA/MF
No. of funds	2,179	1,325	590	264
Adjusted-R ²	21.0%	20.5%	23.1%	18.5%
α	0.62%	0.87%	0.46%	-0.22%
σ	3.15%	3.37%	1.67%	5.39%
$\sigma_{\!\scriptscriptstyle {\cal E}}$	2.74%	2.91%	1.43%	4.79%
No. of factors	1.3	1.3	1.4	1.5

Table IA.XI Significant Parameter Changes in Factor Models Estimated Using Reported Monthly Returns of 1,071 Live TASS Funds and 1,374 Dead TASS Funds

See Appendix Table A1 for definitions of factors. Listed are summary statistics of factor exposures of funds for which a constant-beta model can be rejected in favor of the following switching-beta model at the 10% probability level:

$R_t = \alpha_0 + \beta_0^{\mathrm{T}} F_t + \varepsilon_t$	for	$t = 1, \dots, T\pi$	
$R_t = \alpha_0 + \alpha_1 + \left(\beta_0^{\mathrm{T}} + \beta_1^{\mathrm{T}}\right)$	$F_t + \varepsilon_t$ for	$t = T\pi + 1, \dots$., T

where $T\pi$ is the switch date. Listed for each factor are the number of funds for which the factor is selected, the average factor loading prior to the switch in factor loadings, and the 25th, 50th, and 75th percentiles of the distributions of switch magnitudes. Data are from January 1994 through December 2005.

				β_1	
Factor	No. of funds	β_0	25^{th}	50 th	75 th
]	Panel A. Liv	e Funds		
MKTXS	707	0.3443	-0.2678	0.0388	0.3061
SMB	209	0.2983	-0.3704	-0.1018	0.1299
HML	258	0.1608	-0.0390	0.1580	0.3406
SMBSQ	195	0.3925	-0.7017	-0.3452	0.0119
HMLSQ	134	0.0118	-0.5009	-0.1627	0.2105
D10YR	170	-0.1247	-0.1195	-0.0355	0.0542
DSPRD	307	-0.2353	-0.0906	0.0190	0.2795
PTFSBD	114	0.0441	-0.2843	0.0420	0.1805
PTFSFX	124	0.2871	-0.2386	-0.0314	0.1647
PTFSCOM	72	0.5429	-0.6796	-0.1542	0.0623
PTFSIR	60	-0.0282	-0.2465	0.0000	0.2194
PTFSSTK	110	0.0728	-0.1158	0.0054	0.2069
	I	Panel B. Dea	d Funds		
MKTXS	672	0.4316	-0.3229	0.0145	0.3203
SMB	260	0.3096	-0.3342	-0.0960	0.1664
HML	251	-0.0501	-0.1277	0.1184	0.3871
SMBSQ	276	0.1408	-0.7529	-0.3201	0.1817
HMLSQ	179	-0.0511	-0.7068	-0.1403	0.2457
D10YR	160	-0.0489	-0.2674	-0.0307	0.1288
DSPRD	290	-0.2616	-0.2086	0.0132	0.3414
PTFSBD	214	0.0536	-0.3299	0.0384	0.3115
PTFSFX	165	0.3436	-0.4187	-0.0521	0.2631
PTFSCOM	140	0.4188	-0.6630	-0.2820	0.1065
PTFSIR	86	-0.1032	-0.3151	-0.0334	0.3746
PTFSSTK	171	0.0820	-0.2906	-0.0094	0.1926