

Cusip #

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CASH_USD

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04951310

Percent of Total Holdings
STRONG LARGE CAP GROWTH
12/31/2002
U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value
MSFT	Microsoft Corp.	6.19	705000	36448500.54
CASH_USD	U.S. Dollar	5.04	29686460	29686460.00
PFE	Pfizer Inc.	4.54	875000	26748749.73
JNJ	Johnson & Johnson	3.74	410000	22021099.62
INTC	Intel Corp.	2.70	1020000	15881399.69
GE	General Electric Co.	2.48	600000	14610000.23
CSCO	Cisco Systems Inc.	2.37	1065000	13951500.41
DELL	Dell Computer Corp.	2.22	490000	13102599.89
MRK	Merck & Co. Inc.	1.78	185000	10472850.11
NUE	NuCor Corp.	1.69	241000	9953299.82
IBM	International Business Machines Corp.	1.58	120000	9300000.00
LLY	Eli Lilly & Co.	1.56	145000	9207500.00
AMGN	Amgen Inc.	1.48	180000	8701200.03
MDT	Medtronic Inc.	1.43	185000	8435999.72
KSS	Kohl's Corp.	1.42	150000	8392500.11
FRX	Forest Laboratories Inc.	1.42	85000	8348700.10
CCU	Clear Channel Communications Inc.	1.33	210000	7830900.19
APA	Apache Corp.	1.21	125000	7123750.21
PHA	Pharmacia Corp.	1.21	170000	7105999.87
NXTL	Nextel Communications Inc.	1.18	600000	6930000.11
VIA.B	Viacom Inc.	1.11	160000	6521599.73
BHI	Baker Hughes Inc.	1.09	200000	6437999.73
ORCL	Oracle Corp.	1.09	596000	6436800.11
VOD	Vodafone Group PLC	1.06	345000	6251400.29
AMAT	Applied Materials Inc.	1.05	475000	6189249.87
C	Citigroup Inc.	1.05	175000	6158249.76
TGT	Target Corp.	0.99	195000	5850000.00
XLNX	Xilinx Inc.	0.98	280000	5768000.11
PEP	PepsiCo Inc.	0.97	135000	5699700.16
NBR	Nabors Industries Ltd.	0.96	160000	5643200.07
TXN	Texas Instruments Inc.	0.94	370000	5553700.08
ITW	Illinois Tool Works Inc.	0.94	85000	5513100.05
ABC	AmerisourceBergen Corp. (Holding Co.)	0.92	100000	5431000.14
PG	Procter & Gamble Co.	0.88	60000	5156400.15
KLAC	KLA-Tencor Corp.	0.84	140000	4951799.85
MMM	3M Co.	0.84	40000	4932000.12
MCHP	Microchip Technology Inc.	0.83	200000	4890000.15
ABT	Abbott Laboratories	0.81	120000	4800000.00
QCOM	QUALCOMM Inc.	0.78	127000	4621529.92
EMC	EMC Corp.	0.78	750000	4604999.90
VZ	Verizon Communications	0.76	115000	4456250.00
SLM	SLM Corp.	0.71	40000	4154400.02
ESV	ENSCO International Inc.	0.70	140000	4123000.11

Strong 0525

ADI	Analog Devices Inc.	0.69	170000	4057900.14
AA	Alcoa Inc.	0.68	175000	3986500.12
ADBE	Adobe Systems Inc.	0.67	160000	3968160.10
GILD	Gilead Sciences Inc.	0.66	115000	3910000.00
NOK	Nokia Corp.	0.66	250000	3875000.00
MEDI	MedImmune Inc.	0.65	140000	3803800.01
SCH	Charles Schwab Corp.	0.64	350000	3797500.13
GSF	GlobalSantaFe Corp.	0.64	155000	3769599.95
GS	Goldman Sachs Group Inc.	0.64	55000	3745499.92
WYE	Wyeth	0.63	100000	3740000.15
BUD	Anheuser-Busch Cos. Inc.	0.62	75000	3630000.11
JPM	J.P. Morgan Chase & Co.	0.61	150000	3600000.00
WMT	Wal-Mart Stores Inc.	0.60	70000	3535699.88
LMT	Lockheed Martin Corp.	0.59	60000	3465000.00
IR	Ingersoll-Rand Co. Ltd.	0.58	80000	3444800.11
DHR	Danaher Corp.	0.56	50000	3284999.85
GENZ	Genzyme Corp.	0.55	110000	3252699.97
LEH	Lehman Brothers Holdings Inc.	0.54	60000	3197400.05
APC	Anadarko Petroleum Corp.	0.53	65000	3113500.10
BSX	Boston Scientific Corp.	0.51	70000	2976400.03
FISV	Fiserv Inc.	0.49	85000	2885750.06
AGN	Allergan Inc.	0.49	50000	2880999.95
COX	Cox Communications Inc.	0.48	100000	2839999.96
UPS	United Parcel Service Inc.	0.48	45000	2838600.08
SYMC	Symantec Corp.	0.48	70000	2835699.88
AZO	AutoZone Inc.	0.48	40000	2826000.06
NVLS	Novellus Systems Inc.	0.48	100000	2807999.99
HPQ	Hewlett-Packard Co.	0.46	155000	2690800.09
AXP	American Express Co.	0.45	75000	2651249.89
SBUX	Starbucks Corp.	0.45	130000	2649399.89
BBBY	Bed Bath & Beyond Inc.	0.44	75000	2589749.91
OXY	Occidental Petroleum Corp.	0.43	90000	2560500.07
DE	Deere & Co.	0.43	55000	2521749.92
FDO	Family Dollar Stores Inc.	0.42	80000	2496799.93
FLEX	Flextronics International Ltd.	0.42	300000	2456999.87
HD	Home Depot Inc.	0.41	100000	2402000.05
FRE	Freddie Mac	0.40	40000	2361999.97
ASML	ASML Holding N.V.	0.40	280000	2340799.90
PX	Praxair Inc.	0.39	40000	2310800.02
HDI	Harley-Davidson Inc.	0.39	50000	2310000.04
MAR	Marriott International Inc.	0.39	70000	2300899.93
AFL	AFLAC Inc.	0.38	75000	2259000.06
AOL	AOL Time Warner Inc.	0.38	170000	2227000.06
DOV	Dover Corp.	0.37	75000	2186999.99
INTU	Intuit Inc.	0.36	45000	2111399.92
CL	Colgate-Palmolive Co.	0.36	40000	2097200.01
AMZN	Amazon.com Inc.	0.35	110000	2077899.93
USAI	USA Interactive	0.35	90000	2062800.01
PPG	PPG Industries Inc.	0.34	40000	2006000.06
YHOO	Yahoo! Inc.	0.33	120000	1962000.05
OMC	Omnicom Group Inc.	0.33	30000	1937999.95
LOW	Lowe's Cos.	0.32	50000	1875000.00

SYU	Sysco Corp.	0.30	60000	1787400.05
BAC	Bank of America Corp.	0.30	25000	1739249.99
CSC	Computer Sciences Corp.	0.29	50000	1722500.04
JDSU	JDS Uniphase Corp.	0.28	670000	1654900.02
ROH	Rohm & Haas Co.	0.28	50000	1623999.98
WAG	Walgreen Co.	0.27	55000	1605450.03
APOL	Apollo Group Inc.	0.26	35000	1540000.00
IGT	International Game Technology	0.26	20000	1518399.96
MER	Merrill Lynch & Co. Inc.	0.26	40000	1518000.03
NWL	Newell Rubbermaid Inc.	0.26	50000	1516500.00
WYNN	Wynn Resorts Ltd.	0.26	115000	1507649.96
PFG	Principal Financial Group Inc.	0.26	50000	1506499.96
UVN	Univision Communications Inc.	0.25	60000	1470000.00
ONE	Bank One Corp.	0.25	40000	1461999.97
NOC	Northrop Grumman Corp.	0.25	15000	1455000.00
WFC	Wells Fargo & Co.	0.24	30000	1406099.97
ACL	Alcon Inc.	0.23	35000	1380750.03
DVN	Devon Energy Corp.	0.23	30000	1377000.05
SYK	Stryker Corp.	0.23	20000	1342400.05
SGP	Schering-Plough Corp.	0.23	60000	1332000.05
CDWC	CDW Computer Centers Inc.	0.22	30000	1315499.95
LLTC	Linear Technology Corp.	0.22	50000	1285999.97
BAX	Baxter International Inc.	0.21	45000	1260000.00
CAH	Cardinal Health Inc.	0.20	20000	1183799.97
AIG	American International Group Inc.	0.20	20000	1156999.97
MXIM	Maxim Integrated Products Inc.	0.17	30000	991200.03
FON	Sprint Corp. (FON Group)	0.16	65000	941199.97
NT	Nortel Networks Corp.	0.16	575000	925750.01
SLB	Schlumberger Ltd.	0.14	20000	841800.00
ZMH	Zimmer Holdings Inc.	0.14	20000	830400.01
	<i>Total</i>		<i>100.00</i>	<i>589112400.87</i>

*Holdings Data As Of
STRONG LARGE CAP GROWTH 12/31/2002*

Cusip #

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Strong 0529

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Percent of Total Holdings
STRONG GROWTH FUND
12/31/2002
U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value	Cusip #
MSFT	Microsoft Corp.	3.45	980000	50666000.75	59491810
CASH_USD	U.S. Dollar	3.33	49025128	49025128.00	CASH_USD
FRX	Forest Laboratories Inc.	3.01	450000	44199000.55	34583810
KSS	Kohls Corp.	2.70	710000	39724500.54	50025510
AMGN	Amgen Inc.	2.55	775000	37463500.12	03116210
DELL	Dell Computer Corp.	2.46	1350000	36098999.69	24702510
PFE	Pfizer Inc.	2.24	1075000	32862749.67	71708110
APOL	Apollo Group Inc.	2.04	680000	29920000.00	03760410
CSCO	Cisco Systems Inc.	1.96	2200000	28820000.84	17275R10
BSX	Boston Scientific Corp.	1.81	625000	26575000.29	10113710
MCHP	Microchip Technology Inc.	1.79	1075000	26283750.82	59501710
PHA	Pharmacia Corp.	1.59	560000	23407999.57	71713U10
SYMC	Synatec Corp.	1.58	575000	23293249.03	87150310
BBBY	Bed Bath & Beyond Inc.	1.48	630000	21753899.23	07589610
JNJ	Johnson & Johnson	1.33	364000	19550439.67	47816010
WON	Westwood One Inc.	1.30	510000	19053600.31	96181510
SII	Smith International Inc.	1.28	575000	18756499.39	83211010
QLGC	QLogic Corp.	1.21	515000	17772649.14	74727710
ACL	Alcon Inc.	1.13	420000	16569000.32	H0130110
NVLS	Novellus Systems Inc.	1.12	585000	16426799.96	67000810
PFGC	Performance Food Group Co.	1.11	480000	16300319.82	71375510
GENZ	Genzyme Corp.	1.11	550000	16263499.83	37291710
ESV	ENSCO International Inc.	1.10	550000	16197500.42	26874Q10
UVN	Univision Communications Inc.	1.10	660000	16170000.00	91490610
CTMI	CTI Molecular Imaging Inc.	1.09	650000	16028999.90	22943D10
MERQ	Mercury Interactive Corp.	1.06	525000	15566249.80	58940510
IGT	International Game Technology	1.06	205000	15563599.82	45990210
XTO	XTO Energy Inc.	1.05	625000	15437500.48	98385X10
TCB	TCF Financial Corp.	0.97	325000	14199249.55	87227510
INTC	Intel Corp.	0.96	910000	14168699.72	45814010
ANSI	Advanced Neuromodulation Systems Inc.	0.95	400000	14039999.39	00757T10
WFMI	Whole Foods Market Inc.	0.91	254000	13393419.88	96683710
CHS	Chico's FAS Inc.	0.90	700000	13236999.89	16861510
VIA.B	Viacom Inc.	0.89	320000	13043199.46	92552430
SLM	SLM Corp.	0.88	125000	12982500.08	78442P10
LOW	Lowe's Cos.	0.87	340000	12750000.00	54866110
LLY	Eli Lilly & Co.	0.86	200000	12700000.00	53245710
ERTS	Electronic Arts Inc.	0.86	255000	12691350.12	28551210
ROST	Ross Stores Inc.	0.85	295000	12505049.82	77829610
PNRA	Panera Bread Co.	0.83	350000	12183500.48	69840W10
KLAC	KLA-Tencor Corp.	0.82	340000	12025799.64	48248010
BEAS	BEA Systems Inc.	0.77	985000	11297950.26	07332510
MXJM	Maxim Integrated Products Inc.	0.73	325000	10738000.30	57772K10
FSH	Fisher Scientific International Inc.	0.73	355000	10678399.97	33803220
HDI	Harley-Davidson Inc.	0.72	230000	10626000.18	41282210
SCH	Charles Schwab Corp.	0.72	975000	10578750.37	80851310
INTU	Intuit Inc.	0.72	225000	10556999.59	46120210
ACS	Affiliated Computer Services Inc.	0.72	200000	10530000.31	00819010
CLS	Celestica Inc.	0.69	720000	10152000.27	15101Q10
LMT	Lockheed Martin Corp.	0.69	175000	10106250.00	53983010
XLNX	Xilinx Inc.	0.68	485000	9991000.19	98391910
OSI	Outhack Steakhouse Inc.	0.67	285000	9815399.61	68989910
PETM	PETSMART Inc.	0.64	550000	9421499.54	71676810
AFFX	Affymetrix Inc.	0.63	405000	9270449.75	00826T10
NXTL	Nextel Communications Inc.	0.63	800000	9240000.15	65332V10
CVD	Covance Inc.	0.63	375000	9221250.06	22281610
ABT	Abbott Laboratories	0.63	230000	9200000.00	00282410
USAI	USA Interactive	0.62	400000	9168000.03	90298410
KMX	CarMax Group Inc.	0.61	500000	8939999.58	14313010
AIG	American International Group Inc.	0.59	150000	8677499.77	02687410
AAP	Advance Auto Parts Inc.	0.58	175000	8557500.27	00751Y10
CDWC	CDW Computer Centers Inc.	0.58	195000	8550749.70	12512910
PAYX	Paychex Inc.	0.57	300000	8369999.89	70432610
NUE	NuCor Corp.	0.56	200000	8259999.85	67034610
COH	Coach Inc.	0.56	250000	8229999.54	18975410
VOD	Vodafone Group PLC	0.55	450000	8154000.38	92857W10
GSF	GlobalSantaFe Corp.	0.55	335000	8147199.90	G3930E10
ADI	Analog Devices Inc.	0.54	335000	7996450.28	03265410
GILD	Gilead Sciences Inc.	0.52	225000	7650000.00	37555810
BCR	C.R. Bard Inc.	0.51	130000	7540000.00	06738310
FAST	Fastenal Co.	0.51	200000	7477999.88	31190010
EBAY	eBay Inc.	0.51	110000	7460199.97	27864210
ADBE	Adobe Systems Inc.	0.51	300000	7440300.18	00724F10
SIAL	Sigma-Aldrich Corp.	0.50	150000	7305000.11	82655210
CRL	Charles River Laboratories International Inc.	0.48	185000	7118799.92	15986410

Percent of Total Holdings
STRONG GROWTH FUND
 12/31/2002
 U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value	Cusip #
EMC	EMC Corp.	0.46	1100000	6753999.85	26864810
BK	Bank of New York Co.	0.46	280000	6708799.74	06405710
DHR	Danaher Corp.	0.45	100000	6569999.69	23585110
FCN	FTI Consulting Inc.	0.44	160000	6424000.24	30294110
KKD	Krispy Kreme Doughnuts Inc.	0.44	190000	6416300.09	50101410
FII	Federated Investors Inc.	0.43	250000	6342500.21	31421110
ROH	Roehm & Haas Co.	0.43	195000	6333599.91	77537110
SNPS	Synopsys Inc.	0.42	135000	6230250.21	87160710
VAR	Varian Medical Systems Inc.	0.42	125000	6199999.81	92220P10
WYE	Wyeth	0.42	165000	6171000.25	98302410
MMM	3M Co.	0.42	50000	6165000.15	88579Y10
CTSH	Cognizant Technology Solutions Corp.	0.42	85000	6139550.29	19244610
FDC	First Data Corp.	0.41	170000	6019699.97	31996310
BSC	Bear Stearns Cos.	0.40	100000	5940000.15	07390210
GWV	W.W. Grainger Inc.	0.40	115000	5928249.91	38480210
TEVA	Teva Pharmaceutical Industries Ltd.	0.39	150000	5791500.09	88162420
TARO	Taro Pharmaceutical Industries Ltd.	0.38	150000	5639999.77	M8737E10
HET	Harrah's Entertainment Inc.	0.38	140000	5543999.79	41361910
JBLU	JetBlue Airways Corp.	0.38	205000	5535000.00	47714310
ATH	Audem Inc.	0.36	85000	5346500.13	03674B10
MYL	Mylan Laboratories Inc.	0.36	150000	5235000.23	62853010
LLTC	Linear Technology Corp.	0.35	200000	5143999.86	53567810
STE	STERIS Corp.	0.35	210000	5092500.00	85915210
ADSK	Autodesk Inc.	0.34	350000	5005000.07	05276910
FHCC	First Health Group Corp.	0.34	205000	4991750.08	32096010
ICST	Integrated Circuit Systems Inc.	0.33	265000	4836250.00	45811K20
COCO	Corinthian Colleges Inc.	0.32	125000	4732500.08	21886810
QCOM	QUALCOMM Inc.	0.32	130000	4730699.92	74752510
WFC	Wells Fargo & Co.	0.32	100000	4686999.89	94974610
WLP	Wellpoint Health Networks Inc.	0.31	65000	4625400.24	94973H10
MDT	Medtronic Inc.	0.31	100000	4559999.85	58505510
RDC	Rowan Cos. Inc.	0.31	200000	4540000.15	77938210
UOPX	Apollo Group Inc.-University of Phoenix Online	0.30	125000	4480000.02	03760420
DOV	Dover Corp.	0.30	150000	4373999.98	26000310
CDIS	Cal Dive International Inc.	0.29	180000	4230000.00	12791410
LEH	Lehman Brothers Holdings Inc.	0.27	75000	3996750.07	52490810
MWD	Morgan Stanley	0.27	100000	3991999.82	61744644
MAN	Manpower Inc.	0.27	125000	3987499.95	56418H10
CAKE	Cheesecake Factory Inc.	0.27	110000	3976500.17	16307210
STM	STMicroelectronics N.V.	0.27	200000	3902000.05	86101210
FRE	Freddie Mac	0.26	65000	3838249.95	31340030
CCU	Clear Channel Communications Inc.	0.25	100000	3729000.09	18450210
AZO	AutoZone Inc.	0.24	50000	3532500.08	05333210
G	Gillette Co.	0.24	115000	3491400.07	37576610
WM	Washington Mutual Inc.	0.23	100000	3452999.88	93932210
JCP	J.C. Penney Co. Inc.	0.23	150000	3451500.03	70816010
MEDI	Mediastream Inc.	0.23	125000	3396250.01	58469910
SYK	Stryker Corp.	0.23	50000	3356000.14	86366710
ORCL	Oracle Corp.	0.22	300000	3240000.06	68389X10
BJS	BJ Services Co.	0.22	100000	3231000.14	05548210
WTW	Weight Watchers International Inc.	0.22	70000	3217900.09	94862610
RESP	Respironics Inc.	0.22	105000	3195254.97	76123010
AXP	American Express Co.	0.22	90000	3181499.86	02581610
DCTM	Documentum Inc.	0.21	200000	3131999.97	25615910
NWL	Newell Rubbermaid Inc.	0.21	100000	3032999.99	65122910
BMET	Biomet Inc.	0.20	105000	3009299.98	09061310
DRL	Doral Financial Corp.	0.19	100000	2860000.04	25811P10
RNR	RenaissanceRe Holdings Ltd.	0.19	70000	2771999.89	G7496G10
WSM	Williams-Sonoma Inc.	0.18	100000	2714999.96	96990410
NSCN	NetScout Technologies Inc.	0.17	150000	2526000.02	64117V10
AMLN	Amylin Pharmaceuticals Inc.	0.16	150000	2420999.91	03234610
CL	Colgate-Palmolive Co.	0.16	45000	2359350.01	19416210
ABC	AmerisourceBergen Corp. (Holding Co.)	0.13	35000	1900850.05	03073E10
FDO	Family Dollar Stores Inc.	0.13	60000	1872599.95	30700010
WOOF	VCA Antech Inc.	0.12	120000	1800000.00	91819410
	Total	100.00		1470171311.39	

Holdings Data As Of
 STRONG GROWTH FUND 12/31/2002

From: [REDACTED]
Sent: Wednesday, January 08, 2003 8:53 AM
To: [REDACTED]
Subject: RE: Canary Capital Mgmt - Stern Family

Sorry - here are the other holdings.



[REDACTED]. Holdings
12-31-02.xls

-----Original Message-----

From: [REDACTED]
Sent: Wednesday, January 08, 2003 8:19 AM
To: [REDACTED]
Subject: RE: Canary Capital Mgmt - Stern Family

Thanks so much for the Growth Fund list. The original spread sheet which [REDACTED] provided to [REDACTED] also included Adv Mid Growth, Growth 20 and Large Cap Growth. May I get those as well ???

Thanks,

[REDACTED]
Investment Counselor

x [REDACTED]

-----Original Message-----

From: [REDACTED]
Sent: Wednesday, January 08, 2003 7:37 AM
To: [REDACTED]
Subject: FW: Canary Capital Mgmt - Stern Family

Here are the holdings for the [REDACTED] Growth Fund as of 12-31-02. Please let me know if there's anything else you need.

Thanks,

[REDACTED]
Strong Intermediary

<< File: Growth 12-31-02.xls >>

-----Original Message-----

From: [REDACTED]
Sent: Tuesday, January 07, 2003 3:15 PM
To: [REDACTED]
Subject: FW: Canary Capital Mgmt - Stern Family

If you have pulled [REDACTED] Growth holdings can you fwd to [REDACTED]?

-----Original Message-----

From: [REDACTED]
Sent: Tuesday, January 07, 2003 2:37 PM
To: [REDACTED]
Cc: [REDACTED]; [REDACTED]
Subject: FW: Canary Capital Mgmt - Stern Family

You had provided the [REDACTED] holdings that [REDACTED] was able to e-mail to this client, do we have the yr end info available, if not when might I be able to get the list out to them ??

Thanks,

[REDACTED]

Investment Counselor

x [REDACTED]

-----Original Message-----

From: [REDACTED]
Sent: Tuesday, January 07, 2003 1:06 PM
To: [REDACTED]
Subject: FW: Canary Capital Mgmt - Stern Family

Let me know if you have a problem.

-----Original Message-----

From: [REDACTED]
Sent: Tuesday, January 07, 2003 1:01 PM
To: [REDACTED]; [REDACTED]
Subject: RE: Canary Capital Mgmt - Stern Family

[REDACTED]'s group pulled them for me last time. There should be no issue if we release them at the same time we ship them to [REDACTED] and other organizations.

Maybe [REDACTED] or someone on your team could help [REDACTED] get these.
Thanks
[REDACTED]

-----Original Message-----

From: [REDACTED]
Sent: Tuesday, January 07, 2003 12:33 PM
To: [REDACTED]
Subject: Canary Capital Mgmt - Stern Family

Received a call today from [REDACTED], she is looking for the updated holdings for the [REDACTED] funds...do we have that info available for them ??

Thanks.. [REDACTED]

[REDACTED]

From: [REDACTED]
Sent: Monday, May 12, 2003 8:28 AM
To: [REDACTED]@canarycapital.com
Subject: Strong ([REDACTED]) Holdings 4-30-03.xls



Strong ([REDACTED])
Holdings 4-30-0...

Hi [REDACTED],

Here are the April holdings.

Thanks.

[REDACTED]
Strong Investments
Investment Counselor
[REDACTED]

Percent of Total Holdings
STRONG GROWTH FUND

4/30/2003

U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
PFE	Pfizer Inc.	4.57	2335000	71801250.00	71708110
AMGN	Amgen Inc.	2.71	695000	42603499.47	03116210
DELL	Dell Computer Corp.	2.63	1425000	41296499.35	24702510
MSFT	Microsoft Corp.	2.47	1520000	38851199.19	59491810
APOL	Apollo Group Inc.	2.29	665000	36003099.59	03760410
KSS	Kohl's Corp.	2.20	610000	34647999.53	50025510
CSCO	Cisco Systems Inc.	2.12	2225000	33375000.00	17275R10
FRX	Forest Laboratories Inc.	1.91	580000	29997600.71	34583810
GENZ	Genzyme Corp.	1.78	695000	27987650.32	37291710
JNJ	Johnson & Johnson	1.52	425000	23953000.26	47816010
UVN	Univision Communications Inc.	1.49	775000	23467000.53	91490610
BSX	Boston Scientific Corp.	1.48	540000	23246999.59	10113710
PAYX	Paychex Inc.	1.34	675000	21026249.74	70432610
GILD	Gilead Sciences Inc.	1.32	450000	20762999.73	37555810
ADI	Analog Devices Inc.	1.30	615000	20368799.34	03265410
CASH_USD	U.S. Dollar	1.28	20173032	20173032.00	CASH_USD
INTC	Intel Corp.	1.26	1075000	19747750.90	45814010
BBBY	Bed Bath & Beyond Inc.	1.19	475000	18748250.58	07589610
ACL	Alcon Inc.	1.19	425000	18721249.68	H0130110
SII	Smith International Inc.	1.15	510000	18135600.70	83211010
DOX	Amdocs Ltd.	1.15	1025000	18101499.84	G0260210
WFMI	Whole Foods Market Inc.	1.13	300000	17793000.41	96683710
ACS	Affiliated Computer Services Inc.	1.08	355000	16933500.27	00819010
ANSI	Advanced Neuromodulation Systems Inc.	1.06	400000	16739999.39	00757T10
C	Citigroup Inc.	1.06	425000	16681250.00	17296710
ERTS	Electronic Arts Inc.	1.05	280000	16559199.83	28551210
USAI	USA Interactive	1.05	550000	16472500.42	90298410
BJS	BJ Services Co.	1.04	450000	16429499.24	05548210
VOD	Vodafone Group PLC	1.01	805000	15906800.18	92857W10
ESV	ENSCO International Inc.	1.01	625000	15874999.76	26874Q10
CHS	Chico's FAS Inc.	1.01	650000	15821000.10	16861510
EBAY	eBay Inc.	0.95	160000	14865600.59	27864210
MERQ	Mercury Interactive Corp.	0.92	425000	14424499.42	58940510
VIA.B	Viacom Inc.	0.88	320000	13891199.95	92552430
MXIM	Maxim Integrated Products Inc.	0.88	350000	13765500.64	57772K10
XTO	XTO Energy Inc.	0.84	675001	13162519.50	98385X10
COH	Coach Inc.	0.83	300000	13052999.50	18975410
SLM	SLM Corp.	0.82	115000	12880000.00	78442P10
LOW	Lowe's Cos.	0.81	290000	12728099.82	54866110
KLAC	KLA-Tencor Corp.	0.80	305000	12505000.00	48248010
NVLS	Novellus Systems Inc.	0.78	440000	12333200.30	67000810
FSH	Fisher Scientific International Inc.	0.78	425000	12244249.77	33803220
NSCN	NetScreen Technologies Inc.	0.77	595000	12066600.41	64117V10
LLY	Eli Lilly & Co.	0.77	188500	12030069.94	53245710
FDC	First Data Corp.	0.75	300000	11768999.86	31996310
HAR	Harman International Industries Inc.	0.74	175000	11653249.36	41308610
MCHP	Microchip Technology Inc.	0.74	560000	11647999.57	59501710
FHCC	First Health Group Corp.	0.74	465000	11643600.43	32096010
LLTC	Linear Technology Corp.	0.71	325000	11192999.55	53567810
RESP	Respironics Inc.	0.71	290000	11141799.47	76123010
FDX	FedEx Corp.	0.70	185000	11077800.20	31428X10

Strong 0536

Percent of Total Holdings
STRONG GROWTH FUND

4/30/2003

U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
CTMI	CTI Molecular Imaging Inc.	0.69	590000	10832400.36	22943D10
IGT	International Game Technology	0.69	125000	10787500.38	45990210
OSI	Outback Steakhouse Inc.	0.68	300000	10722000.50	68989910
TCB	TCF Financial Corp.	0.67	265000	10493999.60	87227510
BVF	Biovail Corp.	0.67	290000	10483500.44	09067J10
DHR	Danaher Corp.	0.66	150000	10347000.50	23585110
GLW	Coming Inc.	0.65	1900000	10298000.14	21935010
XLNX	Xilinx Inc.	0.65	375000	10143749.71	98391910
GTRC	Guitar Center Inc.	0.63	425000	9842999.94	40204010
ICST	Integrated Circuit Systems Inc.	0.62	450000	9773999.69	45811K20
SYMC	Symantec Corp.	0.61	220000	9669000.17	87150310
WFC	Wells Fargo & Co.	0.61	200000	9651999.66	94974610
HD	Home Depot Inc.	0.61	340000	9564199.71	43707610
TARO	Taro Pharmaceutical Industries Ltd.	0.58	200000	9151999.66	M8737E10
FCN	FTI Consulting Inc.	0.58	200000	9050000.00	30294110
JBLU	JetBlue Airways Corp.	0.57	285000	8960400.15	47714310
MEDI	MedImmune Inc.	0.56	250000	8862500.19	58469910
SAP	SAP AG	0.55	340000	8673400.08	80305420
DCTM	Documentum Inc.	0.54	465600	8562383.72	25615910
ROST	Ross Stores Inc.	0.54	225000	8525249.86	77829610
NXTL	Nextel Communications Inc.	0.54	570000	8413200.13	65332V10
AIG	American International Group Inc.	0.53	145000	8402750.11	02687410
ADSK	Autodesk Inc.	0.53	540000	8402400.23	05276910
DRL	Doral Financial Corp.	0.53	210000	8402099.65	25811P10
UOPX	Apollo Group Inc.-University of Phoenix Oni	0.52	186100	8249813.34	03760420
BEAS	BEA Systems Inc.	0.51	750000	8024999.86	07332510
QLGC	QLogic Corp.	0.50	180000	7923600.08	74727710
BCR	C.R. Bard Inc.	0.50	125000	7922500.13	06738310
ALTR	Altera Corp.	0.50	500000	7905000.21	02144110
LEH	Lehman Brothers Holdings Inc.	0.50	125000	7871250.15	52490810
HEW	Hewitt Associates Inc. (Cl A)	0.48	275000	7620249.75	42822Q10
JDSU	JDS Uniphase Corp.	0.47	2300000	7429000.04	46612J10
NBR	Nabors Industries Ltd.	0.46	185000	7252000.14	G6359F10
ORCL	Oracle Corp.	0.45	600000	7128000.07	68389X10
CAKE	Cheesecake Factory Inc.	0.45	225000	7107750.03	16307210
WTW	Weight Watchers International Inc.	0.45	151200	7103375.93	94862610
ADBE	Adobe Systems Inc.	0.44	200000	6905999.76	00724F10
STJ	St. Jude Medical Inc.	0.42	125000	6557499.89	79084910
EMC	EMC Corp.	0.41	715000	6499350.11	26864810
RDC	Rowan Cos. Inc.	0.41	315000	6457500.00	77938210
WYE	Wyeth	0.40	145000	6311849.82	98302410
PFCB	P.F. Chang's China Bistro Inc.	0.40	150000	6285000.23	69333Y10
GWV	W.W. Grainger Inc.	0.40	135000	6230250.21	38480210
WON	Westwood One Inc.	0.39	175000	6107500.27	96181510
PNRA	Panera Bread Co.	0.38	175000	5951749.71	69840W10
PTEN	Patterson-UTI Energy Inc.	0.37	175000	5789000.32	70348110
IRM	Iron Mountain Inc.	0.37	145000	5778249.78	46284610
PEP	PepsiCo Inc.	0.36	130000	5626399.84	71344810
QCOM	QUALCOMM Inc.	0.35	175000	5578999.85	74752510
BRL	Barr Laboratories Inc.	0.35	100000	5559999.85	06830610
RNR	RenaissanceRe Holdings Ltd.	0.35	125000	5536250.11	G7496G10
CKFR	CheckFree Corp.	0.35	200000	5513999.94	16281310

Strong 0537

Percent of Total Holdings
STRONG GROWTH FUND
 4/30/2003
 U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
ADS	Alliance Data Systems Corp.	0.33	246600	5178600.00	01858110
TEVA	Teva Pharmaceutical Industries Ltd.	0.33	110000	5137000.08	88162420
DISH	EchoStar Communications Corp.	0.32	170000	5091500.13	27876210
COCO	Corinthian Colleges Inc.	0.32	110000	5024800.03	21886810
BSC	Bear Stearns Cos.	0.32	75000	5012999.73	07390210
PETM	PETsMART Inc.	0.31	320000	4841600.04	71676810
BOBJ	Business Objects S.A.	0.29	210000	4563299.90	12328X10
MTG	MGIC Investment Corp.	0.29	100000	4545999.91	55284810
AXP	American Express Co.	0.29	120000	4543200.07	02581610
HDI	Harley-Davidson Inc.	0.28	100000	4443999.86	41282210
MYL	Mylan Laboratories Inc.	0.28	155000	4381850.07	62853010
KMX	CarMax Inc.	0.27	200000	4229999.92	14313010
WOOF	VCA Antech Inc.	0.27	250000	4197249.89	91819410
STM	STMicroelectronics N.V.	0.26	200000	4118000.03	86101210
NUE	NuCor Corp.	0.26	100000	4084999.85	67034610
GDT	Guidant Corp.	0.25	100000	3899000.17	40169810
G	Gillette Co.	0.24	125000	3806250.10	37576610
PCAR	Paccar Inc.	0.24	65000	3790799.98	69371810
YHOO	Yahoo! Inc.	0.24	150000	3715500.07	98433210
GMH	General Motors Corp. (Class H)	0.23	300000	3540000.06	37044283
FDO	Family Dollar Stores Inc.	0.22	100000	3418999.86	30700010
JNPR	Juniper Networks Inc.	0.21	325000	3327999.93	48203R10
INTU	Intuit Inc.	0.21	85000	3299699.97	46120210
BRCM	Broadcom Corp.	0.20	180000	3220199.89	11132010
SBL	Symbol Technologies Inc.	0.19	275000	3005750.08	87150810
DGX	Quest Diagnostics Inc.	0.19	50000	2987500.00	74834L10
ACE	ACE Ltd.	0.19	90000	2977200.16	G0070K10
NOK	Nokia Corp.	0.18	175000	2899749.95	65490220
CL	Colgate-Palmolive Co.	0.18	50000	2858499.91	19416210
JOSB	Jos. A. Bank Clothiers Inc.	0.18	100000	2845999.91	48083810
BR	Burlington Resources Inc.	0.18	60000	2778600.08	12201410
FLR	Fluor Corp.	0.18	80000	2765599.98	34341210
GTK	GTECH Holdings Corp.	0.16	75000	2525249.86	40051810
AGN	Allergan Inc.	0.16	35000	2458750.00	01849010
BBY	Best Buy Co. Inc.	0.15	70000	2420600.13	08651610
VRTS	Veritas Software Corp.	0.14	100000	2206999.97	92343610
XL	XL Capital Ltd.	0.13	25000	2057500.08	G9825510
NTAP	Network Appliance Inc.	0.11	129100	1711866.03	64120L10
	Total	100.00		1572461258.64	

Holdings Data As Of
 STRONG GROWTH FUND 4/30/2003

Percent of Total Holdings
STRONG ADVISOR MID CAP GROWTH
4/30/2003
U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
CASH_USD	U.S. Dollar	2.59	2214716	2214715.75	CASH_USD
SII	Smith International Inc.	2.13	51100	1817116.07	83211010
HAR	Harman International Industries Inc.	2.07	26600	1771293.90	41308610
BJS	BJ Services Co.	1.82	42700	1558976.93	05548210
NBR	Nabors Industries Ltd.	1.77	38600	1513120.03	G6359F10
GENZ	Genzyme Corp.	1.71	36300	1461801.02	37291710
MEDI	MedImmune Inc.	1.71	41200	1460540.03	58469910
CTX	Centex Corp.	1.68	21700	1432633.93	15231210
GILD	Gilead Sciences Inc.	1.63	30200	1393427.98	37555810
COCO	Corinthian Colleges Inc.	1.60	30000	1370400.01	21886810
LXK	Lexmark International Inc.	1.57	18000	1341180.04	52977110
SLM	SLM Corp.	1.53	11700	1310400.00	78442P10
ERTS	Electronic Arts Inc.	1.50	21700	1283337.99	28551210
DRL	Doral Financial Corp.	1.50	32000	1280319.95	25811P10
FCN	FTI Consulting Inc.	1.48	28000	1267000.00	30294110
CECO	Career Education Corp.	1.47	21000	1260420.01	14166510
IGT	International Game Technology	1.41	14000	1208200.04	45990210
NVR	NVR Inc.	1.38	3300	1180575.00	62944T10
UVN	Univision Communications Inc.	1.34	37800	1144584.03	91490610
ALTR	Altera Corp.	1.29	69700	1101957.03	02144110
WLP	Wellpoint Health Networks Inc.	1.27	14300	1085942.03	94973H10
DOX	Amdocs Ltd.	1.26	61000	1077259.99	G0260210
ACS	Affiliated Computer Services Inc.	1.24	22300	1063710.02	00819010
PTEN	Patterson-UTI Energy Inc.	1.20	30900	1022172.06	70348110
YHOO	Yahoo! Inc.	1.18	40700	1008139.02	98433210
XTO	XTO Energy Inc.	1.16	50766	989937.00	98385X10
BBBY	Bed Bath & Beyond Inc.	1.14	24800	978856.03	07589610
DHI	D.R. Horton Inc.	1.11	40000	948000.03	23331A10
QLGC	QLogic Corp.	1.08	21000	924420.01	74727710
STJ	St. Jude Medical Inc.	1.07	17400	912803.98	79084910
AET	Aetna Inc.	1.07	18300	911339.99	00817Y10
BER	W.R. Berkley Corp.	1.03	19000	882359.97	08442310
FTN	First Tennessee National Corp.	1.02	20000	875999.98	33716210
COGN	Cognos Inc.	1.02	32000	868479.98	19244C10
TARO	Taro Pharmaceutical Industries Ltd.	0.99	18500	846559.97	M8737E10
NEM	Newmont Mining Corp.	0.99	31200	843024.01	65163910
PPP	Pogo Producing Co.	0.97	21000	831599.97	73044810
CTXS	Citrix Systems Inc.	0.96	43000	817000.00	17737610
FDO	Family Dollar Stores Inc.	0.95	23700	810302.97	30700010
SPLS	Staples Inc.	0.95	42500	809200.04	85503010
STX	Seagate Technology Inc.	0.92	65300	789477.01	G7945J10
MIK	Michaels Stores Inc.	0.92	25100	784123.99	59408710
AZO	AutoZone Inc.	0.90	9500	767694.98	05333210
SYMC	Symantec Corp.	0.89	17400	764730.01	87150310
SFA	Scientific-Atlanta Inc.	0.89	47000	763750.00	80865510
TROW	T. Rowe Price Group Inc.	0.89	25000	763000.01	74144T10
HAL	Halliburton Co.	0.89	35500	760054.99	40621610
FHCC	First Health Group Corp.	0.86	29500	738680.03	32096010
AMZN	Amazon.com Inc.	0.85	25400	728726.01	02313510
DHR	Danaher Corp.	0.85	10500	724290.04	23585110

Percent of Total Holdings
STRONG ADVISOR MID CAP GROWTH
4/30/2003
U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
SRCL	Stericycle Inc.	0.83	18000	706500.00	85891210
ADI	Analog Devices Inc.	0.81	21000	695519.98	03265410
CVC	Cablevision Systems Corp.	0.81	30800	690536.00	12686C10
EMC	EMC Corp.	0.79	74600	678114.01	26864810
BOBJ	Business Objects S.A.	0.79	31000	673629.99	12328X10
ACL	Alcon Inc.	0.77	15000	660749.99	H0130110
PVN	Providian Financial Corp.	0.77	89200	657403.99	74406A10
BLL	Ball Corp.	0.77	11700	657072.00	05849810
WFMI	Whole Foods Market Inc.	0.76	11000	652410.02	96683710
BSC	Bear Stearns Cos.	0.76	9700	648347.96	07390210
PNRA	Panera Bread Co.	0.76	19000	646189.97	69840W10
ARG	Airgas Inc.	0.75	31800	643313.99	00936310
ADSK	Autodesk Inc.	0.74	40800	634848.02	05276910
AGN	Allergan Inc.	0.74	9000	632250.00	01849010
CMVT	Comverse Technology Inc.	0.74	48300	629832.00	20586240
PAYX	Paychex Inc.	0.73	20000	622999.99	70432610
UOPX	Apollo Group Inc.-University of Phoenix	0.73	14000	620620.03	03760420
TJX	TJX Cos.	0.72	32000	616000.00	87254010
MERQ	Mercury Interactive Corp.	0.72	18100	614313.98	58940510
JDSU	JDS Uniphase Corp.	0.71	188000	607240.00	46612J10
NXTL	Nextel Communications Inc.	0.69	40000	590400.01	65332V10
KLAC	KLA-Tencor Corp.	0.69	14300	586300.00	48248010
VRTS	Veritas Software Corp.	0.67	25800	569405.99	92343610
KSS	Kohl's Corp.	0.66	9900	562319.99	50025510
BMET	Biomet Inc.	0.65	18200	554371.98	09061310
TIF	Tiffany & Co.	0.62	19000	527060.00	88654710
LLTC	Linear Technology Corp.	0.61	15200	523487.98	53567810
ATH	Anthem Inc.	0.61	7600	521664.00	03674B10
BBY	Best Buy Co. Inc.	0.59	14600	504868.03	08651610
LH	Laboratory Corp. of America Holdings	0.57	16600	489035.98	50540R40
CMX	Caremark Rx Inc.	0.57	24500	487795.00	14170510
CHS	Chico's FAS Inc.	0.54	19000	462460.00	16861510
MCHP	Microchip Technology Inc.	0.54	22200	461759.98	59501710
COT	Cott Corp.	0.54	25000	458750.01	22163N10
UTSI	UTStarcom Inc.	0.53	21000	457380.01	91807610
PDS	Precision Drilling Corp.	0.53	13300	457254.01	74022D10
CYBX	Cyberonics Inc.	0.53	20000	456600.00	23251P10
GW	Grey Wolf Inc.	0.53	111900	453195.02	39788810
ADBE	Adobe Systems Inc.	0.52	12900	445436.98	00724F10
ADVP	AdvancePCS	0.52	14800	444739.99	00790K10
RNR	RenaissanceRe Holdings Ltd.	0.52	10000	442900.01	G7496G10
LEH	Lehman Brothers Holdings Inc.	0.52	7000	440790.01	52490810
COH	Coach Inc.	0.51	10000	435099.98	18975410
WHI	W Holding Co. Inc.	0.51	22000	433180.01	92925110
JNS	Janus Capital Group Inc.	0.50	30700	426729.99	47102X10
ZMH	Zimmer Holdings Inc.	0.49	9000	422100.01	98956P10
MU	Micron Technology Inc.	0.49	49200	418200.00	59511210
BSX	Boston Scientific Corp.	0.49	9700	417584.99	10113710
NVLS	Novellus Systems Inc.	0.49	14800	414844.01	67000810
ESV	ENSCO International Inc.	0.48	16300	414019.99	26874Q10
PFG	Principal Financial Group Inc.	0.43	12700	369570.00	74251V10

Percent of Total Holdings
STRONG ADVISOR MID CAP GROWTH
 4/30/2003
 U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
BEAS	BEA Systems Inc.	0.43	34500	369149.99	07332510
FISV	Fiserv Inc.	0.41	11800	347156.00	33773810
WFT	Weatherford International Ltd.	0.40	8400	337932.00	G9508910
SDS	SunGard Data Systems Inc.	0.39	15500	333250.00	86736310
CKFR	CheckFree Corp.	0.35	11000	303270.00	16281310
ENTG	Entegris Inc.	0.33	25000	285250.00	29362U10
MCDTA	McDATA Corp.	0.32	26000	275600.01	58003120
OMG	OM Group Inc.	0.32	23300	271678.00	67087210
PFCB	P.F. Chang's China Bistro Inc.	0.30	6100	255590.01	69333Y10
NSM	National Semiconductor Corp.	0.29	13300	249108.99	63764010
ELX	Emulex Corp.	0.25	10300	211047.00	29247520
WEBM	webMethods Inc.	0.20	17000	170850.00	94768C10
	Total	100.00		85510711.74	

Holdings Data As Of
 STRONG ADVISOR MID CAP GROWTH 4/30/2003

Percent of Total Holdings
STRONG GROWTH 20 FUND
 4/30/2003
 U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
GENZ	Genzyme Corp.	5.79	375000	15101250.17	37291710
CHS	Chico's FAS Inc.	5.60	600000	14604000.09	16861510
DELL	Dell Computer Corp.	5.55	500000	14489999.77	24702510
APOL	Apollo Group Inc.	5.40	260000	14076399.84	03760410
GILD	Gilead Sciences Inc.	5.31	300000	13841999.82	37555810
PFE	Pfizer Inc.	5.30	450000	13837500.00	71708110
AMGN	Amgen Inc.	5.29	225000	13792499.83	03116210
GLW	Corning Inc.	4.97	2390000	12953800.18	21935010
KSS	Kohl's Corp.	4.90	225000	12779999.83	50025510
FRX	Forest Laboratories Inc.	4.90	200000	10344000.24	34583810
HAR	Harman International Industries Inc.	3.96	150000	9988499.45	41308610
BBBY	Bed Bath & Beyond Inc.	3.83	225000	8880750.27	07589610
FCN	FTI Consulting Inc.	3.40	195000	8823750.00	30294110
ADSK	Autodesk Inc.	3.38	550000	8558000.23	05276910
MEDI	MedImmune Inc.	3.28	225000	7976250.17	58469910
COH	Coach Inc.	3.06	175000	7614249.71	18975410
CSCO	Cisco Systems Inc.	2.92	450000	6750000.00	17275R10
FDX	FedEx Corp.	2.59	110000	6586800.12	31428X10
CASH_USD	U.S. Dollar	2.52	6536528	6536527.50	CASH_USD
ANSI	Advanced Neuromodulation Systems Inc.	2.51	119800	5013629.82	00757T10
NBR	Nabors Industries Ltd.	1.92	125000	4900000.10	G6359F10
SII	Smith International Inc.	1.88	135000	4800600.19	83211010
ACS	Affiliated Computer Services Inc.	1.84	100000	4770000.08	00819010
NXTL	Nextel Communications Inc.	1.83	315000	4649400.07	65332V10
EBAY	eBay Inc.	1.78	50000	4645500.18	27864210
LOW	Lowe's Cos.	1.78	100000	4388999.94	54866110
MCHP	Microchip Technology Inc.	1.68	200000	4159999.85	59501710
PTEN	Patterson-UTI Energy Inc.	1.59	125000	4135000.23	70348110
DOX	Amdocs Ltd.	1.58	230000	4061799.96	G0260210
DRL	Doral Financial Corp.	1.56	100000	4000999.83	25811P10
MSFT	Microsoft Corp.	1.53	150000	3833999.92	59491810
	Total	1.47		260896207.39	
		100.00			

Holdings Data As Of
 STRONG GROWTH 20 FUND 4/30/2003

Percent of Total Holdings
STRONG LARGE CAP GROWTH
4/30/2003
U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
PFE	Pfizer Inc.	5.71	1129000	34716750.00	71708110
MSFT	Microsoft Corp.	4.92	1170000	29905199.38	59491810
CASH_USD	U.S. Dollar	3.41	20757224	20757224.00	CASH_USD
JNJ	Johnson & Johnson	3.01	325000	18317000.20	47816010
INTC	Intel Corp.	2.99	990000	18186300.83	45814010
CSCO	Cisco Systems Inc.	2.69	1090000	16350000.00	17275R10
DELL	Dell Computer Corp.	2.26	475000	13765499.78	24702510
IBM	International Business Machines Corp.	2.16	155000	13159500.24	45920010
AMGN	Amgen Inc.	2.12	210000	12872999.84	03116210
HD	Home Depot Inc.	2.01	435000	12236549.63	43707610
LLY	Eli Lilly & Co.	1.78	170000	10849399.95	53245710
BSX	Boston Scientific Corp.	1.56	220000	9470999.83	10113710
GE	General Electric Co.	1.55	320000	9424000.24	36960410
VOD	Vodafone Group PLC	1.46	450000	8892000.10	92857W10
MDT	Medtronic Inc.	1.45	185000	8831900.31	58505510
FRX	Forest Laboratories Inc.	1.45	170000	8792400.21	34583810
GENZ	Genzyme Corp.	1.29	195000	7852650.09	37291710
KSS	Kohl's Corp.	1.26	135000	7667999.90	50025510
ORCL	Oracle Corp.	1.25	640000	7603200.07	68389X10
MRK	Merck & Co. Inc.	1.24	130000	7563400.04	58933110
NUE	NuCor Corp.	1.21	180000	7352999.73	67034610
NOK	Nokia Corp.	1.14	420000	6959399.87	65490220
ADI	Analog Devices Inc.	1.14	210000	6955199.78	03265410
MMM	3M Co.	1.14	55000	6932200.05	88579Y10
GLW	Corning Inc.	1.12	1260000	6829200.10	21935010
WYE	Wyeth	1.11	155000	6747149.81	98302410
MEDI	MedImmune Inc.	1.11	190000	6735500.14	58469910
SLM	SLM Corp.	1.11	60000	6720000.00	78442P10
C	Citigroup Inc.	1.10	170000	6672500.00	17296710
KLAC	KLA-Tencor Corp.	1.08	160000	6560000.00	48248010
APOL	Apollo Group Inc.	1.07	120000	6496799.93	03760410
USAI	USA Interactive	1.03	210000	6289500.16	90298410
GILD	Gilead Sciences Inc.	1.02	135000	6228899.92	37555810
DHR	Danaher Corp.	1.02	90000	6208200.30	23585110
EMC	EMC Corp.	1.01	675000	6135750.10	26864810
JDSU	JDS Uniphase Corp.	0.97	1825000	5894750.03	46612J10
PG	Procter & Gamble Co.	0.96	65000	5840249.90	74271810
AGN	Allergan Inc.	0.92	80000	5620000.00	01849010
VIA.B	Viacom Inc.	0.89	125000	5426249.98	92552430
NT	Nortel Networks Corp.	0.89	2100000	5417999.84	65656810
UVN	Univision Communications Inc.	0.87	175000	5299000.12	91490610
QCOM	QUALCOMM Inc.	0.87	165000	5260199.86	74752510
JNPR	Juniper Networks Inc.	0.84	500000	5119999.89	48203R10
DGX	Quest Diagnostics Inc.	0.84	85000	5078750.00	74834L10
MXIM	Maxim Integrated Products Inc.	0.81	125000	4916250.23	57772K10
FDC	First Data Corp.	0.81	125000	4903749.94	31996310
NXTL	Nextel Communications Inc.	0.79	325000	4797000.07	65332V10
ABC	AmerisourceBergen Corp. (Holding Co.)	0.76	80000	4627999.88	03073E10
TXN	Texas Instruments Inc.	0.64	210000	3882899.95	88250810
LOW	Lowe's Cos.	0.61	85000	3730649.95	54866110
LXK	Lexmark International Inc.	0.61	50000	3725500.11	52977110

Percent of Total Holdings
STRONG LARGE CAP GROWTH
4/30/2003
U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
OMC	Omnicom Group Inc.	0.61	60000	3714000.09	68191910
INTU	Intuit Inc.	0.57	90000	3493799.97	46120210
BUD	Anheuser-Busch Cos. Inc.	0.57	70000	3491600.07	03522910
FDO	Family Dollar Stores Inc.	0.56	100000	3418999.86	30700010
FISV	Fiserv Inc.	0.56	115000	3383300.01	33773810
NVLS	Novellus Systems Inc.	0.55	120000	3363600.08	67000810
GUC	Gucci Group N.V.	0.55	35000	3357900.09	40156610
LMT	Lockheed Martin Corp.	0.54	65000	3253249.95	53983010
AZO	AutoZone Inc.	0.53	40000	3232399.90	05333210
AXP	American Express Co.	0.53	85000	3218100.05	02581610
ADBE	Adobe Systems Inc.	0.51	90000	3107699.89	00724F10
GS	Goldman Sachs Group Inc.	0.50	40000	3036000.06	38141G10
LEH	Lehman Brothers Holdings Inc.	0.47	45000	2833650.05	52490810
EBAY	eBay Inc.	0.46	30000	2787300.11	27864210
BBY	Best Buy Co. Inc.	0.46	80000	2766400.15	08651610
PAYX	Paychex Inc.	0.44	85000	2647749.97	70432610
IGT	International Game Technology	0.43	30000	2589000.09	45990210
LLTC	Linear Technology Corp.	0.42	75000	2582999.90	53567810
XLNX	Xilinx Inc.	0.42	95000	2569749.93	98391910
NBR	Nabors Industries Ltd.	0.42	65000	2548000.05	G6359F10
DLTR	Dollar Tree Stores Inc.	0.42	100000	2544000.05	25674710
AET	Aetna Inc.	0.41	50000	2489999.96	00817Y10
ACL	Alcon Inc.	0.40	55000	2422749.96	H0130110
BBBY	Bed Bath & Beyond Inc.	0.39	60000	2368200.07	07589610
JPM	J.P. Morgan Chase & Co.	0.39	80000	2348000.03	46625H10
AMZN	Amazon.com Inc.	0.38	80000	2295200.04	02313510
AFL	AFLAC Inc.	0.38	70000	2289699.94	00105510
MCHP	Microchip Technology Inc.	0.38	110000	2287999.92	59501710
CL	Colgate-Palmolive Co.	0.38	40000	2286799.93	19416210
LU	Lucent Technologies Inc.	0.37	1265000	2276999.94	54946310
MER	Merrill Lynch & Co. Inc.	0.37	55000	2257749.96	59018810
DISH	EchoStar Communications Corp.	0.37	75000	2246250.06	27876210
HDI	Harley-Davidson Inc.	0.37	50000	2221999.93	41282210
WAG	Walgreen Co.	0.36	70000	2160200.04	93142210
HAL	Halliburton Co.	0.35	100000	2140999.98	40621610
SBUX	Starbucks Corp.	0.33	85000	1998350.02	85524410
YHOO	Yahoo! Inc.	0.33	80000	1981600.04	98433210
DOW	Dow Chemical Co.	0.32	60000	1958399.96	26054310
WYNN	Wynn Resorts Ltd.	0.32	115000	1955000.00	98313410
PPG	PPG Industries Inc.	0.32	40000	1940399.93	69350610
HCA	HCA Inc.	0.32	60000	1925999.91	40411910
AMAT	Applied Materials Inc.	0.31	130000	1900599.99	03822210
SII	Smith International Inc.	0.29	50000	1778000.07	83211010
IR	Ingersoll-Rand Co. Ltd.	0.29	40000	1763200.07	G4776G10
PCS	Sprint Corp. (PCS Group)	0.29	500000	1750000.00	85206150
MCD	McDonald's Corp.	0.28	100000	1710000.04	58013510
ACS	Affiliated Computer Services Inc.	0.27	35000	1669500.03	00819010
CAH	Cardinal Health Inc.	0.27	30000	1658399.96	14149Y10
COX	Cox Communications Inc.	0.27	50000	1654999.92	22404410
GMH	General Motors Corp. (Class H)	0.27	140000	1652000.03	37044283
ESV	ENSCO International Inc.	0.27	65000	1650999.98	26874Q10
MTG	MGIC Investment Corp.	0.26	35000	1591099.97	55284810

Percent of Total Holdings
STRONG LARGE CAP GROWTH
 4/30/2003
 U.S. Dollar

<u>Ticker</u>	<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Portfolio Shares</u>	<u>Ending Market Value</u>	<u>Cusip #</u>
CCU	Clear Channel Communications Inc.	0.26	40000	1564400.02	18450210
PD	Phelps Dodge Corp.	0.26	50000	1559500.03	71726510
PEP	PepsiCo Inc.	0.25	35000	1514799.96	71344810
FDX	FedEx Corp.	0.25	25000	1497000.03	31428X10
OXY	Occidental Petroleum Corp.	0.25	50000	1492500.02	67459910
BAC	Bank of America Corp.	0.24	20000	1481000.06	06050510
TRB	Tribune Co.	0.24	30000	1469399.99	89604710
PFG	Principal Financial Group Inc.	0.24	50000	1455000.02	74251V10
TGT	Target Corp.	0.22	40000	1337599.95	87612E10
ITW	Illinois Tool Works Inc.	0.21	20000	1279599.99	45230810
AA	Alcoa Inc.	0.21	55000	1261150.02	01381710
HOT	Starwood Hotels & Resorts Worldwide Inc.	0.20	45000	1207800.01	85590A20
APA	Apache Corp.	0.19	20000	1145000.00	03741110
VRTS	Veritas Software Corp.	0.18	50000	1103499.98	92343610
BEAS	BEA Systems Inc.	0.18	100000	1069999.98	07332510
SPLS	Staples Inc.	0.14	45000	856800.04	85503010
TSM	Taiwan Semiconductor Manufacturing Co. Lt	0.14	100000	836999.99	87403910
DOV	Dover Corp.	0.12	25000	718499.99	26000310
COF	Capital One Financial Corp.	0.10	15000	628049.98	14040H10
PX	Praxair Inc.	0.10	10000	580800.02	74005P10
SYK	Stryker Corp.	0.06	5000	335050.01	86366710
UPS	United Parcel Service Inc.	0.05	5000	310599.99	91131210
	Total	100.00		607855474.36	

Holdings Data As Of
 STRONG LARGE CAP GROWTH 4/30/2003

[REDACTED]

From: [REDACTED]@[REDACTED].com]
Sent: Wednesday, March 12, 2003 1:01 PM
To: [REDACTED]
Subject: RE: [REDACTED] Holdings 02-28-03.xls

Thanks
[REDACTED]

-----Original Message-----

From: [REDACTED] [mailto:[REDACTED]@strong.com]
Sent: Wednesday, March 12, 2003 1:59 PM
To: [REDACTED]@canarycapital.com
Subject: [REDACTED] Holdings 02-28-03.xls

<<[REDACTED] Holdings 02-28-03.xls>> Let me know if you need additional information.

Thanks,

[REDACTED]

*Investment Counselor
Strong Investments*

[REDACTED]

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7/3/2003

Confidential Treatment
Requested By Strong Capital

Strong 0547

[REDACTED]

From: [REDACTED]
Sent: Wednesday, June 11, 2003 2:24 PM
To: [REDACTED]@canarycapital.com
Cc: [REDACTED]
Subject: May holdings for Strong Funds

Hi [REDACTED]

Please find attached the most recent monthly holdings for the Strong [REDACTED] funds. Let me know if you need any further details on the funds for the month of May. Feel free to contact me directly in the future with any questions or requests at Strong. I can be reached at [REDACTED] and/or [REDACTED]@Strong.com.

Regards,

[REDACTED]
Strong Private Client



Strong ([REDACTED])
Holdings 5-31-0...

Percent of Total Holdings
STRONG GROWTH FUND
5/30/2003
U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value
PFE	Pfizer Inc.	3.60	1930000	59868600.88
DELL	Dell Computer Corp.	2.72	1440000	45172801.21
CSCO	Cisco Systems Inc.	2.20	2225000	36512249.66
APOL	Apollo Group Inc.	2.05	590000	34125600.09
AMGN	Amgen Inc.	2.04	525000	33988498.88
GENZ	Genzyme Corp.	1.92	675000	31988249.59
MSFT	Microsoft Corp.	1.74	1175000	28916750.72
BSX	Boston Scientific Corp.	1.68	535000	27873499.18
ADI	Analog Devices Inc.	1.60	690000	26599499.47
USAI	USA Interactive	1.46	635000	24282401.07
UVN	Univision Communications Inc.	1.44	800000	23880000.31
ERTS	Electronic Arts Inc.	1.42	345000	23649751.05
KSS	Kohl's Corp.	1.37	435000	22772249.34
INTC	Intel Corp.	1.35	1075000	22381499.67
DOX	Amdocs Ltd.	1.33	1135000	22143850.26
GILD	Gilead Sciences Inc.	1.32	420000	21949199.30
GLW	Corning Inc.	1.32	3000000	21929999.83
SII	Smith International Inc.	1.29	525000	21467249.68
C	Citigroup Inc.	1.23	500000	20510000.23
ESV	ENSCO International Inc.	1.22	675000	20250000.00
FRX	Forest Laboratories Inc.	1.20	395000	19947500.00
MERQ	Mercury Interactive Corp.	1.18	500000	19655000.69
BBBY	Bed Bath & Beyond Inc.	1.17	465000	19432350.43
BJS	BJ Services Co.	1.16	475000	19337249.57
PAYX	Paychex Inc.	1.16	630000	19227600.29
JNJ	Johnson & Johnson	1.14	350000	19022499.47
EBAY	eBay Inc.	1.07	175000	17788750.27
VOD	Vodafone Group PLC	1.05	800000	17527999.88
FDC	First Data Corp.	1.03	415000	17189299.24
ACL	Alcon Inc.	1.02	400000	17000000.00
FSH	Fisher Scientific International Inc.	1.00	525000	16637250.28
NSCN	NetScreen Technologies Inc.	0.99	735000	16434600.45
WFMI	Whole Foods Market Inc.	0.99	300000	16391999.82
FDX	FedEx Corp.	0.96	250000	15994999.89
COH	Coach Inc.	0.96	325000	15967250.35
VIA.B	Viacom Inc.	0.96	350000	15932000.16
XTO	XTO Energy Inc.	0.94	730001	15665820.79
NVLS	Novellus Systems Inc.	0.94	450000	15601499.18
UOPX	Apollo Group Inc.-University of Phoenix O	0.90	330000	15051300.20
ICST	Integrated Circuit Systems Inc.	0.90	575000	14978749.56
JBLU	JetBlue Airways Corp.	0.90	440000	14907200.47
KLAC	KLA-Tencor Corp.	0.88	315000	14562449.86
BVF	Biovail Corp.	0.86	305000	14225199.81

SLM	SLM Corp.	0.83	115000	13800000.00
QLGC	QLogic Corp.	0.83	275000	13780250.17
HD	Home Depot Inc.	0.76	390000	12671100.65
GTRC	Guitar Center Inc.	0.76	525000	12563250.16
DCTM	Documentum Inc.	0.75	585000	12396150.31
ANSI	Advanced Neuromodulation Systems Inc.	0.72	250000	12034999.85
LLTC	Linear Technology Corp.	0.71	325000	11839750.10
CHS	Chico's FAS Inc.	0.71	550000	11769999.79
SAP	SAP AG	0.70	410000	11676799.81
IGT	International Game Technology	0.69	130000	11445200.12
XLNX	Xilinx Inc.	0.67	375000	11212499.86
HAR	Harman International Industries Inc.	0.67	150000	11129999.54
JNPR	Juniper Networks Inc.	0.66	800000	11047200.01
BRCM	Broadcom Corp.	0.66	450000	11029500.10
DRL	Doral Financial Corp.	0.66	260000	10992799.68
WFC	Wells Fargo & Co.	0.65	225000	10867499.83
RESP	Respironics Inc.	0.64	290000	10695200.31
TARO	Taro Pharmaceutical Industries Ltd.	0.64	225000	10660500.24
LEH	Lehman Brothers Holdings Inc.	0.62	145000	10386349.60
FHCC	First Health Group Corp.	0.61	400000	10223999.79
LOW	Lowe's Cos.	0.61	240000	10142399.60
DISH	EchoStar Communications Corp.	0.61	305000	10095499.53
JDSU	JDS Uniphase Corp.	0.59	2600000	9827999.93
CTMI	CTI Molecular Imaging Inc.	0.59	565000	9802750.22
ALTR	Altera Corp.	0.58	500000	9649999.62
EMC	EMC Corp.	0.58	890000	9629799.73
PFCB	P.F. Chang's China Bistro Inc.	0.56	210000	9258900.03
AXP	American Express Co.	0.55	220000	9165199.97
SYMC	Symantec Corp.	0.52	190000	8618400.12
ROST	Ross Stores Inc.	0.51	200000	8444000.24
STJ	St. Jude Medical Inc.	0.51	150000	8414999.77
LLY	Eli Lilly & Co.	0.49	135000	8068950.06
TCB	TCF Financial Corp.	0.48	200000	7937999.73
NUE	NuCor Corp.	0.47	165000	7860599.90
MXIM	Maxim Integrated Products Inc.	0.47	200000	7840000.15
KMX	CarMax Inc.	0.45	325000	7556250.00
RDC	Rowan Cos. Inc.	0.45	315000	7541100.17
ADS	Alliance Data Systems Corp.	0.44	300000	7359000.21
VRSN	VeriSign Inc.	0.43	480000	7190399.78
ACS	Affiliated Computer Services Inc.	0.43	155000	7182700.02
WFR	MEMC Electronic Materials Inc.	0.43	625000	7181249.86
ORCL	Oracle Corp.	0.43	550000	7155500.13
BCR	C.R. Bard Inc.	0.42	100000	7015000.15
GWW	W.W. Grainger Inc.	0.42	150000	7005000.11
AIG	American International Group Inc.	0.42	120000	6945600.13
VRTS	Veritas Software Corp.	0.42	250000	6929999.83
OSI	Outback Steakhouse Inc.	0.41	185000	6835750.14
CTX	Centex Corp.	0.40	85000	6598549.77
TEVA	Teva Pharmaceutical Industries Ltd.	0.38	125000	6331250.19
PETM	PETSMART Inc.	0.37	355000	6137950.33
PNRA	Panera Bread Co.	0.37	175000	6104000.19
NXTL	Nextel Communications Inc.	0.36	400000	5995999.91

DNA	Genentech Inc.	0.36	95000	5947950.06
NOK	Nokia Corp.	0.35	325000	5863000.30
PEP	PepsiCo Inc.	0.35	130000	5746000.10
IRM	Iron Mountain Inc.	0.34	145000	5727500.00
WYE	Wyeth	0.34	130000	5700499.80
PCAR	Paccar Inc.	0.34	85000	5607450.10
RNR	RenaissanceRe Holdings Ltd.	0.34	125000	5587500.10
PETC	PETCO Animal Supplies Inc.	0.33	265000	5570300.12
AOL	AOL Time Warner Inc.	0.33	365000	5555300.10
YHOO	Yahoo! Inc.	0.33	185000	5520400.03
BGEN	Biogen Inc.	0.33	130000	5514599.76
CAKE	Cheesecake Factory Inc.	0.31	150000	5089500.05
MIL	Millipore Corp.	0.31	125000	5087500.10
MNST	Monster Worldwide Inc.	0.30	250000	4969999.79
GMH	General Motors Corp. (Class H)	0.29	400000	4879999.92
ADSK	Autodesk Inc.	0.29	325000	4855499.86
WOOF	VCA Antech Inc.	0.29	258000	4850399.80
BBY	Best Buy Co. Inc.	0.29	125000	4837500.10
COCO	Corinthian Colleges Inc.	0.28	100000	4706000.14
STM	STMicroelectronics N.V.	0.27	200000	4561999.89
NBR	Nabors Industries Ltd.	0.27	100000	4508000.18
CMVT	Converse Technology Inc.	0.27	295000	4504650.14
UTSI	UTStarcom Inc.	0.27	150000	4447499.94
WTW	Weight Watchers International Inc.	0.26	100000	4258000.18
NTAP	Network Appliance Inc.	0.26	250000	4257500.17
WON	Westwood One Inc.	0.25	125000	4232500.08
MYL	Mylan Laboratories Inc.	0.25	145000	4187599.88
COF	Capital One Financial Corp.	0.25	85000	4094449.84
LEN	Lennar Corp.	0.24	60000	4023000.18
HEW	Hewitt Associates Inc. (Cl A)	0.24	175000	3998750.07
APA	Apache Corp.	0.24	60000	3955199.89
MCO	Moody's Corp.	0.24	75000	3911250.11
BSC	Bear Stearns Cos.	0.23	50000	3863499.83
MCHP	Microchip Technology Inc.	0.23	165000	3814800.14
BR	Burlington Resources Inc.	0.22	70000	3730300.06
SBL	Symbol Technologies Inc.	0.22	275000	3684999.90
MEDI	MedImmune Inc.	0.21	100000	3540999.98
ADBE	Adobe Systems Inc.	0.21	100000	3531999.97
G	Gillette Co.	0.20	100000	3361000.06
QCOM	QUALCOMM Inc.	0.20	100000	3354999.92
GSPN	GlobespanVirata Inc.	0.20	400000	3304000.09
NDN	99 Cents Only Stores	0.18	95000	3019100.07
CL	Colgate-Palmolive Co.	0.18	50000	2980999.95
FCN	FTI Consulting Inc.	0.18	80000	2936799.93
PTEN	Patterson-UTI Energy Inc.	0.17	75000	2744999.89
GTK	GTECH Holdings Corp.	0.16	75000	2635499.95
XMSR	XM Satellite Radio Holdings Inc.	0.15	225000	2524500.06
AGN	Allergan Inc.	0.15	35000	2523850.02
OMC	Omnicom Group Inc.	0.15	35000	2443349.91
VTSS	Vitesse Semiconductor Corp.	0.14	450000	2263500.09
LXK	Lexmark International Inc.	0.13	30000	2232000.05
AMZN	Amazon.com Inc.	0.11	50000	1794499.97

DGX	Quest Diagnostics Inc.	0.10	25000	1584000.02
FRED	Fred's Inc.	0.09	40000	1470800.02
IPMT	iPayment Inc.	0.03	24200	556624.19
BSXRH	BOSTON SCIENTIFIC CORPORATION (	0.01	130000	100750.00
APOLHK	APOLLO GROUP INC CLASS A OPTION	-0.01	-70000	-201607.02
	Total	100.00		1663139938.28

Holdings Data As Of
STRONG GROWTH FUND 5/30/2003
Russell 3000 Growth 5/30/2003

Cusip #

71708110
24702510
17275R10
03760410
03116210
37291710
59491810
10113710
03265410
90298410
91490610
28551210
50025510
45814010
G0260210
37555810
21935010
83211010
17296710
26874Q10
34583810
58940510
07589610
05548210
70432610
47816010
27864210
92857W10
31996310
H0130110
33803220
64117V10
96683710
31428X10
18975410
92552430
98385X10
67000810
03760420
45811K20
47714310
48248010
09067J10

78442P10
74727710
43707610
40204010
25615910
00757T10
53567810
16861510
80305420
45990210
98391910
41308610
48203R10
11132010
25811P10
94974610
76123010
M8737E10
52490810
32096010
54866110
27876210
46612J10
22943D10
02144110
26864810
69333Y10
02581610
87150310
77829610
79084910
53245710
87227510
67034610
57772K10
14313010
77938210
01858110
92343E10
00819010
55271510
68389X10
06738310
38480210
02687410
92343610
68989910
15231210
88162420
71676810
69840W10
65332V10

36871040
65490220
71344810
46284610
98302410
69371810
G7496G10
71601620
00184A10
98433210
09059710
16307210
60107310
61174210
37044283
05276910
91819410
08651610
21886810
86101210
G6359F10
20586240
91807610
94862610
64120L10
96181510
62853010
14040H10
52605710
42822Q10
03741110
61536910
07390210
59501710
12201410
87150810
58469910
00724F10
37576610
74752510
37957V10
65440K10
19416210
30294110
70348110
40051810
98375910
01849010
68191910
92849710
52977110
02313510

74834L10
35610810
46262E10
BSXRH
APOLHK

Percent of Total Holdings
STRONG LARGE CAP GROWTH
5/30/2003
U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value	Cusip #
PFE	Pfizer Inc.	4.18	860000	26677200.39	71708110
INTC	Intel Corp.	3.23	990000	20611799.70	45814010
CSCO	Cisco Systems Inc.	2.80	1090000	17886899.83	17275R10
GLW	Corning Inc.	2.71	2370000	17324699.86	21935010
HD	Home Depot Inc.	2.47	485000	15757650.81	43707610
MSFT	Microsoft Corp.	2.20	570000	14027700.35	59491810
DELL	Dell Computer Corp.	2.14	435000	13645950.37	24702510
AMGN	Amgen Inc.	1.72	170000	11005799.64	03116210
BSX	Boston Scientific Corp.	1.71	210000	10940999.68	10113710
JDSU	JDS Uniphase Corp.	1.67	2820000	10659599.92	46612J10
GENZ	Genzyme Corp.	1.60	215000	10188849.87	37291710
IBM	International Business Machines Corp.	1.59	115000	10124600.11	45920010
VOD	Vodafone Group PLC	1.58	460000	10078599.93	92857W10
JNJ	Johnson & Johnson	1.45	170000	9239499.74	47816010
NT	Nortel Networks Corp.	1.44	2930000	9200200.31	65656810
BRCM	Broadcom Corp.	1.42	370000	9068700.08	11132010
NUE	NuCor Corp.	1.42	190000	9051599.88	67034610
C	Citigroup Inc.	1.29	200000	8204000.09	17296710
GILD	Gilead Sciences Inc.	1.27	155000	8100299.74	37555810
ADI	Analog Devices Inc.	1.27	210000	8095499.84	03265410
KLAC	KLA-Tencor Corp.	1.27	175000	8090249.92	48248010
OMC	Omnicom Group Inc.	1.26	115000	8028149.72	68191910
NOK	Nokia Corp.	1.26	445000	8027800.41	65490220
GE	General Electric Co.	1.21	270000	7749000.21	36960410
JNPR	Juniper Networks Inc.	1.21	560000	7733040.01	48203R10
EMC	EMC Corp.	1.14	675000	7303499.79	26864810
AXP	American Express Co.	1.14	175000	7290499.97	02581610
USAI	USA Interactive	1.14	190000	7265600.32	90298410
VIA.B	Viacom Inc.	1.11	155000	7055600.07	92552430
ORCL	Oracle Corp.	1.08	530000	6895300.12	68389X10
SMH	Semiconductor HOLDRs Trust	1.08	230000	6888500.18	81663620
LEH	Lehman Brothers Holdings Inc.	1.07	95000	6804849.74	52490810
TXN	Texas Instruments Inc.	1.03	320000	6560000.00	88250810
DGX	Quest Diagnostics Inc.	0.99	100000	6336000.06	74834L10
MDT	Medtronic Inc.	0.95	125000	6091249.94	58505510
SLM	SLM Corp.	0.94	50000	6000000.00	78442P10
PG	Procter & Gamble Co.	0.94	65000	5968299.98	74271810
KSS	Kohl's Corp.	0.86	105000	5496749.84	50025510
FRX	Forest Laboratories Inc.	0.83	105000	5302500.00	34583810
LOW	Lowe's Cos.	0.83	125000	5282499.79	54866110
APOL	Apollo Group Inc.	0.82	90000	5205600.01	03760410
FDC	First Data Corp.	0.81	125000	5177499.77	31996310
DISH	EchoStar Communications Corp.	0.80	155000	5130499.76	27876210

Strong 0557

AMZN	Amazon.com Inc.	0.76	135000	4845149.92	02313510
BBH	Biotech HOLDERS Trust	0.75	40000	4810000.00	09067D20
XLNX	Xilinx Inc.	0.75	160000	4783999.94	98391910
MRK	Merck & Co. Inc.	0.74	85000	4724300.16	58933110
VRTS	Veritas Software Corp.	0.74	170000	4712399.88	92343610
COF	Capital One Financial Corp.	0.72	95000	4576149.83	14040H10
UVN	Univision Communications Inc.	0.70	150000	4477500.06	91490610
YHOO	Yahoo! Inc.	0.70	150000	4476000.02	98433210
TGT	Target Corp.	0.69	120000	4395600.13	87612E10
BBBY	Bed Bath & Beyond Inc.	0.69	105000	4387950.10	07589610
WYE	Wyeth	0.69	100000	4384999.85	98302410
QCOM	QUALCOMM Inc.	0.68	130000	4361499.90	74752510
DLTR	Dollar Tree Stores Inc.	0.68	150000	4350000.00	25674710
MXIM	Maxim Integrated Products Inc.	0.68	110000	4312000.08	57772K10
NVLS	Novellus Systems Inc.	0.68	110000	4312000.08	57772K10
EBAY	eBay Inc.	0.65	120000	4160399.78	67000810
LLY	Eli Lilly & Co.	0.65	120000	4160399.78	67000810
CCU	Clear Channel Communications Inc.	0.64	40000	4066000.06	27864210
MMM	3M Co.	0.64	40000	4066000.06	27864210
MU	Micron Technology Inc.	0.61	65000	3885050.03	53245710
AET	Aetna Inc.	0.61	95000	3866500.07	18450210
FDO	Family Dollar Stores Inc.	0.59	30000	3794100.04	88579Y10
LU	Lucent Technologies Inc.	0.59	30000	3794100.04	88579Y10
AOL	AOL Time Warner Inc.	0.59	335000	3792199.90	59511210
ABT	Abbott Laboratories	0.58	65000	3732299.88	00817Y10
JPM	J.P. Morgan Chase & Co.	0.57	100000	3645000.08	30700010
LLTC	Linear Technology Corp.	0.57	100000	3645000.08	30700010
RTH	Merrill Lynch Retail HOLDERS Trust	0.55	1600000	3536000.06	54946310
FISV	Fiserv Inc.	0.55	1600000	3536000.06	54946310
BBY	Best Buy Co. Inc.	0.55	225000	3424500.06	00184A10
PAYX	Paychex Inc.	0.54	225000	3424500.06	00184A10
LMT	Lockheed Martin Corp.	0.54	75000	3341249.94	00282410
DHR	Danaher Corp.	0.52	100000	3286000.06	46625H10
NXTL	Nextel Communications Inc.	0.52	100000	3286000.06	46625H10
MAS	Masco Corp.	0.51	90000	3278700.03	53567810
NBR	Nabors Industries Ltd.	0.51	90000	3278700.03	53567810
SEBL	Siebel Systems Inc.	0.49	40000	3156000.06	76127U10
SBUX	Starbucks Corp.	0.49	40000	3156000.06	76127U10
SII	Smith International Inc.	0.49	95000	3146399.90	33773810
MEDI	MedImmune Inc.	0.49	95000	3146399.90	33773810
IGT	International Game Technology	0.49	80000	3096000.06	08651610
AEP	American Electric Power Co. Inc.	0.48	100000	3052000.05	70432610
AWE	AT&T Wireless Services Inc.	0.48	100000	3052000.05	70432610
ACS	Affiliated Computer Services Inc.	0.48	65000	3017299.88	53983010
DOW	Dow Chemical Co.	0.47	65000	3017299.88	53983010
TSM	Taiwan Semiconductor Manufacturing Co.	0.47	45000	3011399.92	23585110
MER	Merrill Lynch & Co. Inc.	0.47	45000	3011399.92	23585110
SUNW	Sun Microsystems Inc.	0.47	200000	2997999.95	65332V10
FDX	FedEx Corp.	0.47	200000	2997999.95	65332V10
NEM	Newmont Mining Corp.	0.46	120000	2952000.05	57459910
WAG	Walgreen Co.	0.46	120000	2952000.05	57459910
BUD	Anheuser-Busch Cos. Inc.	0.46	65000	2930200.12	G6359F10
		0.46	65000	2930200.12	G6359F10
		0.44	300000	2822999.95	82617010
		0.43	110000	2713700.01	85524410
		0.42	65000	2657849.96	83211010
		0.42	75000	2655749.99	58469910
		0.41	30000	2641200.03	45990210
		0.41	90000	2613600.08	02553710
		0.40	330000	2564099.99	00209A10
		0.40	55000	2548700.01	00819010
		0.40	80000	2543999.94	26054310
		0.40	250000	2535000.09	87403910
		0.37	55000	2381499.96	59018810
		0.35	515000	2240249.95	86681010
		0.35	35000	2239299.98	31428X10
		0.35	75000	2224499.99	65163910
		0.34	70000	2155300.06	93142210
		0.33	40000	2105200.04	03522910

HOT	Starwood Hotels & Resorts Worldwide Inc.	0.32	70000	2028599.97	85590A20
AMAT	Applied Materials Inc.	0.32	130000	2022800.05	03822210
PPL	PPL Corp.	0.32	50000	2021999.93	69351T10
ESV	ENSCO International Inc.	0.31	65000	1950000.00	26874Q10
PPG	PPG Industries Inc.	0.30	40000	1945200.04	69350610
MTG	MGIC Investment Corp.	0.30	35000	1890700.02	55284810
BR	Burlington Resources Inc.	0.29	35000	1865150.03	12201410
PD	Phelps Dodge Corp.	0.29	50000	1822500.04	71726510
HAL	Halliburton Co.	0.28	75000	1790250.06	40621610
CL	Colgate-Palmolive Co.	0.28	30000	1788599.97	19416210
IR	Ingersoll-Rand Co. Ltd.	0.27	40000	1751999.97	G4776G10
MCHP	Microchip Technology Inc.	0.27	75000	1734000.06	59501710
CAH	Cardinal Health Inc.	0.27	30000	1731299.97	14149Y10
GMH	General Motors Corp. (Class H)	0.27	140000	1707999.97	37044283
UTX	United Technologies Corp.	0.27	25000	1706250.00	91301710
OXY	Occidental Petroleum Corp.	0.26	50000	1687000.08	67459910
HDI	Harley-Davidson Inc.	0.26	40000	1686399.99	41282210
ALA	Alcatel S.A.	0.26	179400	1657655.96	01390430
GS	Goldman Sachs Group Inc.	0.26	20000	1630000.00	38141G10
WYNN	Wynn Resorts Ltd.	0.25	85000	1600549.99	98313410
KO	Coca-Cola Co.	0.25	35000	1594949.99	19121610
PFG	Principal Financial Group Inc.	0.25	50000	1588000.01	74251V10
ABC	AmerisourceBergen Corp. (Holding Co.)	0.25	25000	1567249.97	03073E10
PEP	PepsiCo Inc.	0.24	35000	1547000.03	71344810
LXK	Lexmark International Inc.	0.23	20000	1488000.03	52977110
ACL	Alcon Inc.	0.23	35000	1487500.00	H0130110
BAC	Bank of America Corp.	0.23	20000	1483999.94	06050510
AGN	Allergan Inc.	0.23	20000	1442200.01	01849010
AA	Alcoa Inc.	0.21	55000	1353550.03	01381710
APA	Apache Corp.	0.21	20000	1318399.96	03741110
ITW	Illinois Tool Works Inc.	0.19	20000	1240999.98	45230810
ADBE	Adobe Systems Inc.	0.17	30000	1059599.99	00724F10
GWV	W.W. Grainger Inc.	0.16	21300	994710.02	38480210
HCA	HCA Inc.	0.16	30000	990000.00	40411910
DNA	Genentech Inc.	0.15	15000	939150.01	36871040
DOV	Dover Corp.	0.12	25000	757749.99	26000310
PX	Praxair Inc.	0.09	10000	599900.02	74005P10
CIEN	CIENA Corp.	0.07	75000	431250.00	17177910
UPS	United Parcel Service Inc.	0.05	5000	312150.00	91131210
BSXRH	BOSTON SCIENTIFIC CORPORATION (	0.01	95000	73625.00	BSXRH
	Total	100.00		638269880.72	

Holdings Data As Of
STRONG LARGE CAP GROWTH 5/30/2003
Russell 1000 Growth 5/30/2003

Percent of Total Holdings
STRONG GROWTH 20 FUND
 5/30/2003
 U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value
GLW	Corning Inc.	8.49	3100000	22660999.82
GENZ	Genzyme Corp.	6.66	375000	17771249.77
GILD	Gilead Sciences Inc.	6.36	325000	16984499.45
HAR	Harman International Industries Inc.	6.25	225000	16694999.31
DELL	Dell Computer Corp.	5.88	500000	15685000.42
EBAY	eBay Inc.	5.52	145000	14739250.22
FDC	First Data Corp.	5.04	325000	13461499.40
COH	Coach Inc.	4.60	250000	12282500.27
FDX	FedEx Corp.	4.19	175000	11196499.92
VRTS	Veritas Software Corp.	4.15	400000	11087999.73
APOL	Apollo Group Inc.	3.79	175000	10122000.03
VRSN	VeriSign Inc.	3.65	650000	9736999.70
DOX	Amdocs Ltd.	3.11	425000	8291750.10
CSCO	Cisco Systems Inc.	3.07	500000	8204999.92
SII	Smith International Inc.	3.06	200000	8177999.88
CHS	Chico's FAS Inc.	3.01	375000	8024999.86
JNPR	Juniper Networks Inc.	2.97	575000	7940175.01
AMGN	Amgen Inc.	2.43	100000	6473999.79
BBBY	Bed Bath & Beyond Inc.	2.35	150000	6268500.14
ESV	ENSCO International Inc.	2.25	200000	6000000.00
BRCM	Broadcom Corp.	2.16	235000	5759850.05
WFR	MEMC Electronic Materials Inc.	2.15	500000	5744999.89
BJS	BJ Services Co.	2.06	135000	5495849.88
KSS	Kohl's Corp.	1.96	100000	5234999.85
ADI	Analog Devices Inc.	1.81	125000	4818749.90
BSX	Boston Scientific Corp.	1.76	90000	4688999.86
IGT	International Game Technology	1.32	40000	3521600.04
BSXRH	BOSTON SCIENTIFIC CORPORATION (	0.01	45000	34875.00
APOLHK	APOLLO GROUP INC CLASS A OPTION	-0.06	-52000	-149765.21
	Total	100.00		266956081.99

Holdings Data As Of
 STRONG GROWTH 20 FUND 5/30/2003
 Russell 3000 Growth 5/30/2003

Cusip #

21935010
37291710
37555810
41308610
24702510
27864210
31996310
18975410
31428X10
92343610
03760410
92343E10
G0260210
17275R10
83211010
16861510
48203R10
03116210
07589610
26874Q10
11132010
55271510
05548210
50025510
03265410
10113710
45990210
BSXRH
APOLHK

Percent of Total Holdings
STRONG ADVISOR MID CAP GROWTH
5/30/2003
U.S. Dollar

Ticker	Company Name	Portfolio Weight	Portfolio Shares	Ending Market Value	Cusip #
SII	Smith International Inc.	2.18	51100	2089478.97	83211010
NBR	Nabors Industries Ltd.	1.82	38600	1740088.07	G6359F10
BJS	BJ Services Co.	1.82	42700	1738316.96	05548210
GENZ	Genzyme Corp.	1.80	36300	1720256.98	37291710
CTX	Centex Corp.	1.76	21700	1684570.94	15231210
GILD	Gilead Sciences Inc.	1.65	30200	1578251.95	37555810
NVR	NVR Inc.	1.62	3800	1549450.00	62944T10
ERTS	Electronic Arts Inc.	1.56	21700	1487535.07	28551210
HAR	Harman International Industries Inc.	1.52	19600	1454319.94	41308610
QLGC	QLogic Corp.	1.52	29000	1453190.02	74727710
UTSI	UTStarcom Inc.	1.46	47000	1393549.98	91807610
KLAC	KLA-Tencor Corp.	1.42	29300	1354538.99	48248010
DRL	Doral Financial Corp.	1.41	32000	1352959.96	25811P10
ALTR	Altera Corp.	1.41	69700	1345209.95	02144110
LEN	Lennar Corp.	1.40	20000	1341000.06	52605710
IGT	International Game Technology	1.38	15000	1320600.01	45990210
WFR	MEMC Electronic Materials Inc.	1.38	114700	1317902.97	55271510
WLP	Wellpoint Health Networks Inc.	1.37	15300	1305701.94	94973H10
CECO	Career Education Corp.	1.35	21000	1289189.99	14166510
ACS	Affiliated Computer Services Inc.	1.32	27300	1265082.00	00819010
DHI	D.R. Horton Inc.	1.29	47000	1235630.04	23331A10
AET	Aetna Inc.	1.28	21300	1223045.96	00817Y10
YHOO	Yahoo! Inc.	1.27	40700	1214488.01	98433210
DOX	Amdocs Ltd.	1.24	61000	1190110.01	G0260210
CMVT	Comverse Technology Inc.	1.22	76300	1165101.03	20586240
PTEN	Patterson-UTI Energy Inc.	1.18	30900	1130939.95	70348110
LXK	Lexmark International Inc.	1.17	15000	1116000.02	52977110
AMZN	Amazon.com Inc.	1.14	30400	1091055.98	02313510
XTO	XTO Energy Inc.	1.14	50766	1089438.31	98385X10
ATH	Anthem Inc.	1.12	14600	1070909.98	03674B10
BBBY	Bed Bath & Beyond Inc.	1.08	24800	1036392.02	07589610
HAL	Halliburton Co.	1.04	41500	990605.03	40621610
WDC	Western Digital Corp.	1.03	79000	989080.04	95810210
COH	Coach Inc.	1.03	20000	982600.02	18975410
NSM	National Semiconductor Corp.	1.03	39300	980927.96	63764010
SWH	Software HOLDRS Trust	1.02	31100	979961.01	83404B10
STJ	St. Jude Medical Inc.	1.02	17400	976139.97	79084910
VRTS	Veritas Software Corp.	1.02	17400	976139.97	79084910
MME	Mid Atlantic Medical Services Inc.	1.01	34800	964655.98	92343610
COCO	Corinthian Colleges Inc.	1.00	20000	958000.03	59523C10
CTXS	Citrix Systems Inc.	0.98	20000	941200.03	21886810
BER	W.R. Berkley Corp.	0.98	43000	936970.04	17737610
FTN	First Tennessee National Corp.	0.98	19000	935750.00	08442310
			20000	935199.97	33716210

Strong 0562

UVN	Univision Communications Inc.	0.96	30800	919380.01	91490610
TROW	T. Rowe Price Group Inc.	0.96	25000	917749.98	74144T10
PPP	Pogo Producing Co.	0.94	21000	898799.98	73044810
PVN	Providian Financial Corp.	0.94	99200	896768.00	74406A10
TARO	Taro Pharmaceutical Industries Ltd.	0.92	18500	876530.02	M8737E10
FDO	Family Dollar Stores Inc.	0.90	23700	863865.02	30700010
SBL	Symbol Technologies Inc.	0.90	64000	857599.98	87150810
ADI	Analog Devices Inc.	0.85	21000	809549.98	03265410
BRCM	Broadcom Corp.	0.85	33000	808830.01	11132010
GLW	Corning Inc.	0.84	110000	804099.99	21935010
COT	Cott Corp.	0.83	37000	795870.01	22163N10
MIK	Michaels Stores Inc.	0.83	21100	793571.01	59408710
ESV	ENSCO International Inc.	0.82	26300	789000.00	26874Q10
RI	Ruby Tuesday Inc.	0.82	34000	784379.99	78118210
NXTL	Nextel Communications Inc.	0.82	52000	779479.99	65332V10
LM	Legg Mason Inc.	0.81	12000	775320.01	52490110
ADTN	Adtran Inc.	0.81	16000	772799.99	00738A10
BSC	Bear Stearns Cos.	0.78	9700	749518.97	07390210
CVH	Coventry Health Care Inc.	0.78	17000	742220.00	22286210
COGN	Cognos Inc.	0.77	27000	740880.01	19244C10
VRSN	VeriSign Inc.	0.77	49000	734019.98	92343E10
SFA	Scientific-Atlanta Inc.	0.76	37000	728530.02	80865510
MERQ	Mercury Interactive Corp.	0.74	18100	711511.02	58940510
JDSU	JDS Uniphase Corp.	0.74	188000	710639.99	46612J10
ICST	Integrated Circuit Systems Inc.	0.74	27000	703349.98	45811K20
DHR	Danaher Corp.	0.73	10500	702659.98	23585110
PNRA	Panera Bread Co.	0.69	19000	662720.02	69840W10
AGN	Allergan Inc.	0.68	9000	648990.01	01849010
UOPX	Apollo Group Inc.-University of Phoenix O	0.67	14000	638540.01	03760420
ACL	Alcon Inc.	0.67	15000	637500.00	H0130110
MU	Micron Technology Inc.	0.67	56200	636183.98	59511210
SPLS	Staples Inc.	0.66	32500	630174.98	85503010
PDS	Precision Drilling Corp.	0.66	16300	629831.99	74022D10
RNR	RenaissanceRe Holdings Ltd.	0.65	14000	625800.01	G7496G10
ADV	AdvancePCS	0.65	18800	622279.97	00790K10
DADE	Dade Behring Holdings Inc.	0.65	27100	617879.98	23342J20
SYMC	Symantec Corp.	0.64	13400	607824.01	87150310
CYBX	Cyberonics Inc.	0.63	32000	606080.02	23251P10
CELG	Celgene Corp.	0.63	19000	598119.99	15102010
EAT	Brinker International Inc.	0.62	17000	592110.03	10964110
BBY	Best Buy Co. Inc.	0.59	14600	565020.01	08651610
LLTC	Linear Technology Corp.	0.58	15200	553736.00	53567810
CMX	Caremark Rx Inc.	0.58	24500	553210.00	14170510
LH	Laboratory Corp. of America Holdings	0.56	16600	533690.03	50540R40
EMC	EMC Corp.	0.54	47600	515031.99	26864810
NVLS	Novellus Systems Inc.	0.54	14800	513115.97	67000810
JNPR	Juniper Networks Inc.	0.53	37000	510933.00	48203R10
BSX	Boston Scientific Corp.	0.53	9700	505369.99	10113710
LEH	Lehman Brothers Holdings Inc.	0.52	7000	501409.98	52490810
GW	Grey Wolf Inc.	0.52	111900	501312.00	39788810
OIH	Merrill Lynch Oil Service HOLDERS Trust	0.50	7500	481650.01	67800210
JNS	Janus Capital Group Inc.	0.50	30700	477385.01	47102X10

STX	Seagate Technology Inc.	0.50	31300	474194.99	G7945J10
MEDI	MedImmune Inc.	0.48	13000	460330.00	58469910
AZO	AutoZone Inc.	0.48	5500	460240.00	05333210
ADBE	Adobe Systems Inc.	0.48	12900	455628.00	00724F10
ETM	Entercom Communications Corp.	0.46	9000	436949.99	29363910
SRCL	Stericycle Inc.	0.45	11000	435160.02	85891210
SNDK	SanDisk Corp.	0.42	11000	399740.00	80004C10
PAYX	Paychex Inc.	0.38	12000	366240.01	70432610
EW	Edwards Lifesciences Corp.	0.38	12000	363840.00	28176E10
SDS	SunGard Data Systems Inc.	0.37	15500	356500.00	86736310
ENTG	Entegris Inc.	0.32	25000	310250.00	29362U10
TEVA	Teva Pharmaceutical Industries Ltd.	0.32	6000	303900.01	88162420
MCHP	Microchip Technology Inc.	0.31	13000	300560.01	59501710
CKFR	CheckFree Corp.	0.28	11000	269279.99	16281310
PFCB	P.F. Chang's China Bistro Inc.	0.28	6100	268949.00	69333Y10
CHS	Chico's FAS Inc.	0.25	11000	235400.00	16861510
WHI	W Holding Co. Inc.	0.21	12000	196200.00	92925110
	Total	100.00		95641581.06	

Holdings Data As Of
STRONG ADVISOR MID CAP GROWTH 5/30/2003
Russell Midcap Growth 5/30/2003

Untitled by-Control for Microsoft Exchange Mailbox Contents Query

Printed on 7/17/2003, 6:25 PM

Server Name EXCHANGE02
Display Name [REDACTED]
Folder Path Inbox\Operations Procedures\Nichols Point\Canary Mgmt
Body

All,

The got the account documents last night. The money will be a wire transfer coming from a [REDACTED] account. We should be getting account documents on Monday 12/2. Please call me with any questions.

—Original Message—

From: [REDACTED]
Sent: Wednesday, November 27, 2002 1:27 PM
To: [REDACTED]; [REDACTED]
Cc: [REDACTED]; [REDACTED]; [REDACTED]
Subject: Canary Management

One of the issues I was reviewing yesterday concerned the active trading of mutual funds and what issues may arise with USC. After consulting with USC it appears that as long as our TA does not question the activity, USC will not reject any of the trades for flipping. We will work out a communication flow between brokerage operations, USC and the transfer agent to alert them to activity by this client so trades are not affected.

Is there any information on where the assets will be transferring from? Will this be a check or transfer? Just want to be sure the right people are in the loop. Thanks.

Mailbox Directory Name [REDACTED]
Time Message Delivered 11/27/2002 3:12:55 PM
Display "From:" [REDACTED]
Display "To:" [REDACTED]; [REDACTED]
Subject RE: Canary Management

Report Generated by Strong Financial Corp.

Time Message Delivered 11/27/2002 1:26:42 PM
Display "From:" [REDACTED]
Display "To:" [REDACTED]
Subject Canary Management

Server Name EXCHANGE05
Display Name [REDACTED]
Folder Path SPC\Sales\Prospects
Body [REDACTED]

These are March #'s.

Hey, we are going to be doubling up on our mutual fund positions in a week or two. Some time shortly thereafter, we will double up on our hedge fund position.

Edward Stern
Managing Principal
Canary Investment Management
212. [REDACTED] (work)
646. [REDACTED] (cell)

-----Original Message-----
From: [REDACTED] [mailto:[REDACTED]@strong.com]
Sent: Thursday, May 01, 2003 4:40 PM
Subject: Strong Capital Management, Inc.

All,

~~I hope that you are well. I have attached the April numbers for some~~

Report Generated by Strong Financial Corp.



Canary Search

Printed on 7/17/2003, 5:26 PM

Server Name
Display Name
Folder Path
Body

EXCHANGE05
██████████
SPC\Sales\Prospects

I will check with ██████████ regarding funding this Friday. It may have to wait till next month, since time is tight.

There are two issues with ██████████, and you may be able to resolve them for me:

1. We may want to open the account in another entity's name. This would be for financing reasons.
2. I need to check with my people. There may be a settlement issue on certain exchanges at ██████████. Let me check, and I will be back to you shortly.

██████████
-----Original Message-----
From: ██████████ [mailto:██████████@strong.com]
Sent: Tuesday, February 25, 2003 10:21 AM
To: 'Stern, Edward'
Cc: ██████████
Subject: Strong Capital Management, Inc.

Eddie,

Thanks for taking the time yesterday to speak with ██████████. We are looking forward to having you in the hedge fund, and I will work with Noah to make sure that all of the details are taken care of so that you can invest. I am assuming that when you said you wanted to be in by the end of the month that you meant this Friday (28th). If that is not the case please let me know via email.

As for the clearing through B of A, it is not going to work out. It is essential for our relationship with ██████████ (our clearing firm) to keep the trades in house and have them clear through our platform. The confidentiality of the trades is less of a concern. Please let us know if there is something else that we can do to help with your B of A relationship, but the clearing of our fund trades is not going to be possible.

As ██████████ mentioned we would still like to be considered for a cash management solution. I am happy to connect our portfolio managers, ██████████ and ██████████, to ██████████ if appropriate to further discuss our Ultra Short Term Bond products.

Report Generated by Strong Financial Corp.

Canary Search

Printed on 7/17/2003, 5:26 PM

Server Name

EXCHANGE05

Display Name

[REDACTED]

Folder Path

SPC\Sales\Prospects

Body

Great, [REDACTED]. My assistant's name is [REDACTED]. She can be reached at [REDACTED]. I look forward to speaking with you on Monday. She has my schedule.

Regards,

ES

—Original Message—

From: [REDACTED] [mailto:[REDACTED]@strong.com]

Sent: Thursday, October 17, 2002 6:00 PM

To: 'ejstem@canarycapital.com'

Subject: Strong Capital Management, Inc.

Mr. Stem,

I just spoke with [REDACTED] regarding your meeting yesterday at Strong. I have attached a brief overview of Special, our hedge fund product. The portfolio manager for Special, [REDACTED], and I would like to schedule a conference call at your convenience to further discuss the way Strong manages money in this style. We are available on Monday. I will contact your assistant to schedule a convenient time.

[REDACTED] also mentioned to me that you have some interest in cash management alternatives. I will compile that information and get it to you tomorrow or early next week. I look forward to meeting you, and please let me know how I can be of assistance.

All the best,

[REDACTED]

Strong Capital Management, Inc.

100 Heritage Reserve

Menomonee Falls, WI 53051

[REDACTED]@strong.com

[REDACTED] W | [REDACTED] F

<<Special Sep 2002.pdf>>

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Exhibit 6

Miscellaneous Documents

From: ██████████@bankone.com
Sent: Thursday, March 28, 2002 6:43 PM
To: Stern, Edward
Cc: ██████████@bankone.com
Subject: RE: One Group Purchases

Eddie
Thank you for the follow-up information. Next week seems to be the hot week for kids/parents break. I to will be out.
Is Tuesday the 9th good for you to meet with ██████████, head of our hedge fund group? She could be in you office around 11:00 and stay as long as you have time for. Please let me know and also forward us your address.
Thank you.

"Stern, Edward" <EJStern@canarycapital.com> on 03/26/2002 07:06:46 PM

To: "██████████@bankone.com" <██████████@bankone.com>
cc:

Subject: RE: One Group Purchases

██████████
Here is the list of mutual funds we would like to trade, along with some other relevant information about the trading we want to do. (Sorry it's late!)

Unfortunately, I am out of town on April 2. My kids have break from school next week. How does the following week look for your hedge fund guy?

Regards,

ES

-----Original Message-----

From: ██████████@bankone.com [mailto:██████████@bankone.com]
Sent: Thursday, March 21, 2002 3:37 PM
To: ejstern@canarycapital.com
Cc: ██████████@bankone.com
Subject: One Group Purchases

Our managers are willing to work with you on the equity funds. They would like to start with 1/2 % of the fund's net assets as the maximum position and then evaluate moving to 1 % later. Could you please send me a copy of an example of a letter of understanding you have used with other fund complexes. We will be ready to start trading once the other banking arrangements are complete. Also, the head of our hedge group will be in New York on April 2. Is it possible to meet with you or your hedge fund manager to discuss this opportunity more? I look forward to working with your group.

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ARTICLES

Who Cares About Shareholders?

Arbitrage-Proofing Mutual Funds

Eric Zitzewitz¹

Stanford Graduate School of Business

October 2002

¹Stanford Graduate School of Business, 518 Memorial Way, Stanford, CA 94305. Tel: (650) 724-1860. Fax: (650) 725-9932. Email: ericz@stanford.edu. This paper replaces an earlier draft, entitled “Daily Net Asset Value Predictability and the Associated Trading Profit Opportunity.” The author would like to thank Alexander Aganin, Peter Ciampi, Steven Cohen, Elizabeth Duggan, Ken French, Luis Garicano, Will Goetzmann, Jason Greene, Paul Joskow, Sendhil Mullainathan, Robert Pindyck, Jim Poterba, Venkat Subramaniam, an anonymous referee, and seminar participants at MIT and Tulane for helpful suggestions and comments. Thanks also to TrimTabs for sharing their daily flow data, to Jason Greene and Charles Hodges for sharing their classification of fund flow timings in the TrimTabs data, and to Cassandra Flenker for excellent research assistance. All views expressed and any errors or omissions are mine alone. The financial support of an NSF Graduate Research Fellowship is gratefully acknowledged.

Abstract

As is becoming increasingly widely known, mutual funds often calculate their net asset values using stale prices, which causes their daily returns to be predictable. By trading on this predictability, investors can earn 35-70 percent per year in international funds and 10-25 percent in asset classes such as small-cap equity and high-yield and convertible bonds. These abnormal returns come at the expense of long-term shareholders, dilution of whom has grown in international funds from 56 basis points in 1998-9 to 114 basis points in 2001. Despite these losses and pressure from the SEC, the vast majority of funds are not market-updating their prices to eliminate NAV predictability and dilution, but are instead pursuing solutions that are only partly effective. The speed and efficacy of a fund's actions to protect shareholders from dilution is negatively correlated with its expense ratios and the share of insiders on its board, suggesting that agency problems may be the root cause of the arbitrage problem.

1 Introduction

Financial markets may be efficient enough to prevent widely known arbitrages, but are financial institutions? Mutual funds currently use pricing policies that allow market timers to earn large trading profits at the expense of long-term shareholders. Despite the fact that this arbitrage opportunity has been understood by the industry for 20 years and heavily exploited since at least 1998, the fund industry was still taking only limited action to protect its long-term shareholders as of mid 2002. This paper contributes to the documentation of the arbitrage opportunity and resulting losses to long-term shareholders, discusses the shortcomings of the industry's response to date, and examines the relationship between funds' governance and their actions to protect their long-term shareholders.

The source of the arbitrage opportunity is the way in which open-end mutual funds price their shares. Whereas investors in closed-end or exchange-traded funds trade with each other on the equity exchanges, investors in open-end mutual funds trade directly with the fund itself. Transactions in open-ended funds are priced using the net asset value (NAV) per share calculated by funds at the end of the business day. Funds have traditionally calculated their NAVs by valuing their assets using their most recent transaction prices as of the close of U.S. equity markets at 4 PM Eastern Time (ET) and allowed investors to place trades up until that time.

For many asset classes, the most recent transaction price at 4PM ET does not fully reflect all available market information. The most obvious example is international equities that trade on exchanges that are located in different time zones and close 2-15 hours before U.S. markets. In addition, domestic small-cap equities and high-yield and convertible bonds often trade infrequently and have wide bid-ask spreads. This can cause the most recent transaction price to be systematically different from the price that would prevail in a liquid market at 4 PM, even for assets that trade on

exchanges that are open at that time.

Investors can take advantage of mutual funds that calculate their NAVs using stale closing prices by trading based on recent market movements. For example, if the U.S. market has risen since the close of overseas equity markets, investors can expect that overseas markets will open higher the following morning. Investors can buy a fund with a stale-price NAV for less than its current value, and they can likewise sell a fund for more than its current value on a day that the U.S. market has fallen. Analogous opportunities exist when the values of infrequently or illiquidly-traded domestic assets have recently changed.

A series of recent studies have shown that the potential returns to even a very simple trading strategy are quite high. Arbitrageurs who buy international funds on days the S&P 500 has risen and sell them on days it has declined can earn uncompounded excess returns of 35 percent per year; refinements to the trading strategy can double these returns. The arbitrage returns available in domestic small-cap and convertible and high-yield and convertible bond funds are smaller but still substantial, at 20-25 percent and 10-25 percent, respectively. These excess returns come at the expense of long-term shareholders, who are diluted by advantageously timed inflows and outflows. This paper presents evidence from a sample of funds that suggests long-term shareholders are losing about \$5 billion per year across all asset classes. Dilution is concentrated in international equity funds, where the arbitrage opportunities are largest; in 2001 it averaged 1.1 and 2.3 percent of assets per year in general and regionally-focused international funds, respectively.

Dilution of long-term shareholders has grown rapidly in the last four years, and the mutual fund industry is beginning to respond. But given the size of the problem, the industry response has been surprisingly slow, and it has almost exclusively consisted of countermeasures that have significant shortcomings. Although the SEC is

not only permitting, but actively encouraging international funds to use systematic methods to substitute market-updated (or “fair-value”) prices for stale prices when calculating their NAVs, most funds have responded to the NAV arbitrage problem solely by adding transaction fees and by monitoring trades for arbitrage activity. These solutions are only partially effective, as evidenced by the fact that dilution is still large even in funds that employ them. In addition, they can be and usually are selectively applied, potentially giving fund companies the discretion to allow certain investors the opportunity to arbitrage their funds. A very limited number of funds are regularly using fair-value prices to calculate their NAVs.

Given the magnitude of dilution of long-term shareholders, the industry’s surprisingly slow response to the arbitrage issue is suggestive of a conflict between the interests of shareholders and those of either the management company or its employees. I find that funds that have lower expense ratios and more outside directors have responded more aggressively to the arbitrage issue, implying that fund governance is an important determinant in how and whether funds respond to the arbitrage issue. Agency problems and governance quality in asset management are of interest beyond this particular issue, particularly given the debate over social security privatization and the emergence of tax-advantaged savings plans, such as state Section 529 educational savings plans, that require the use of particular asset managers in order to obtain the tax advantages.

Several academic papers have discussed NAV predictability and the associated arbitrage opportunity: Bhargava, Bose, and Dubofsky (1998), Chalmers, Edelen, and Kadlec (2001), Goetzmann, Ivkovic, and Rouwenhorst (2001), Greene and Hodges (2002), and Boudoukh, Richardson, Subrahmanyam, and Whitelaw (2002).¹ These

¹These papers draw on earlier work on the underlying financial market phenomena. On international financial market correlations see Eun and Shim (1989), Becker, Finnerty, and Gupta (1990), Engle, Ito, and Lin (1990), Becker, Finnerty, and Friedman (1993), and Lin, Engle, and Ito (1994).

papers focus on different asset classes and aspects of the problem: Bhargava, et. al. and Goetzmann, et. al. focus on international funds while Chalmers, et. al. studies small-cap U.S. equity funds as well. Goetzmann et. al. and Greene and Hodges provide estimates of dilution, while Boudoukh, et. al. examines the extent to which arbitrage trading strategies can be hedged. Relative to those papers, this paper focuses on examining the industry response to the issue and the role of fund governance, although it also extends past work on estimating arbitrage returns and dilution.

The remainder of the paper is organized as follows. The next section provides background on the NAV arbitrage and shareholder dilution issues. Sections 3 and 4 provide estimates of fund arbitrageability and shareholder dilution by asset class. These sections extend past work: 1) by providing comparable estimates of arbitrage profitability by asset class, noting for the first time that arbitrage profits are also high in high-yield bond and convertible bond funds, and 2) by providing more disaggregated and more recent calculations of shareholder dilution that highlight both its recent growth and high level in certain asset classes. Section 5 analyzes the effectiveness of solutions that are currently popular in the industry, with results that generally support the current SEC position that they are not substitutes for calculating NAVs using fair-value prices. Section 6 discusses the emerging SEC position and official industry resistance to fair valuation in more detail. Section 7 provides the evidence of a correlation between fund governance and proactiveness on the arbitrage issue that is suggestive of governance as a possible explanation for the slow response of the industry to the issue in general. A conclusion follows, summarizing what this issue teaches us about agency problems in the fund industry in general.

On predictability of indices of illiquidly traded domestic securities, see Lo and MacKinlay (1990) and Boudoukh, Richardson, and Whitelaw (1994). On the dilution of a retirement plan from an unrelated form of stale price trading, see Stanton (1999).

2 Background

The existence of NAV arbitrage has been known to industry experts for at least 20 years, but it has become more widely known since the circulation of academic studies in late 1999 and early 2000 and financial press coverage shortly thereafter. In 1981, the SEC issued a no-action letter to two Putnam funds, taking no action against the international equity fund's practice of calculating NAVs using local closing prices on all days except if "some extraordinary event were to occur after the close." The Putnam request letter had recognized that post-close information could cause local closing prices to be "no longer a reasonable estimate of such securities values as of 4:00 p.m." This suggests that both Putnam and the SEC understood the nature of the problem, as should have other funds, to whom the letters were available.

Although the no-action letter allowed Putnam and other funds to "fair value" their assets if they concluded that local closing prices did not reflect current market value, in practice funds did so extremely rarely. This practice was justified at the time by funds and the SEC as resulting from fair valuing being "too costly in light of the small risk that significant dilution would result from a failure to fair value."² One widely discussed exception occurred on October 28, 1997, when Asian markets closed down following a 9 percent prior-day drop in the S&P 500, but, after Asian markets closed, the U.S. market rallied by 10 percent from its morning lows. Most U.S.-based Asian funds priced using local closes, allowing arbitrageurs to earn one-day returns of 8-10 percent, but Fidelity determined that a significant event had occurred and fair value priced its Asian funds. The SEC investigated Fidelity following complaints from some investors (presumably arbitrageurs), but concluded that Fidelity had acted correctly. The SEC clarified its position in December 1999 and April 2001 letters to

²Then Director of the SEC's Division of Investment Management Barry Barbash, as paraphrased in Bullard (2000a).

the Investment Company Institute, stating in increasingly clear terms that funds were responsible for monitoring for “significant events,” including market volatility, that would cause local closing prices to not be considered “readily available market prices.”

NAV arbitrage is receiving increasing attention from the SEC in part because of increased awareness of it outside the industry. All but one of the academic papers listed above were circulated in late 1999 and early 2000, along with the first draft of this paper, and coverage in the financial press followed shortly thereafter (Bullard, 2000a, 2000b; Hulbert, 2000; Lucchetti, 2000). As Section 4 discusses, dilution of long-term shareholders was substantial before these reports but has increased following them.

The current NAV arbitrage problem is not the first example of arbitrageurs with knowledge of mutual fund pricing practices diluting long-term investors. Prior to the passage of the Investment Company Act of 1940, NAVs were typically calculated at 4 PM but did not become effective for transactions until 10 AM the following day. Mutual fund insiders could transact after 4 PM at the prior-day NAV with full knowledge of the current-day NAV and earn riskless arbitrage returns based the difference. Insiders were also sometimes sold mutual fund shares at a discount to the NAV, diluting the other shareholders of the fund. The 1940 Act was at least partly a response to the impression that these arbitrage opportunities were leading to fairly widespread dilution; one of the primary goals of the 1940 Act is to eliminate the opportunity for insiders to trade fund shares at prices that differ from their true value.

The 1940 Act eliminated the opportunities described above, but until 1968, most funds processed transactions at the most recent *prior* NAV, allowing investors to transact at prior-day NAVs on days that the market had moved significantly. The SEC eliminated this practice and adopted rule 22c-1, requiring the current practice of “forward pricing”, i.e. of processing transactions at the next calculated NAV

after orders are received. Both the pre-1940 and pre-1968 arbitrage opportunities reportedly led to substantial dilution of long-term shareholders, and in both cases, action by Congress or the SEC was required before the dilution was eliminated; the interests of long-term shareholders were not well enough represented at most funds to lead to change in the absence of government regulation.³

3 Excess Returns to NAV Arbitrage

This section provides estimates of excess returns to arbitrage strategies that exploit predictabilities in NAV changes. In particular, it analyzes an arbitrage strategy that switches between a fund and cash depending on the sign of the expected next-day fund return. Since the source of the arbitrage opportunity is that stale-price NAVs do not fully reflect recent market movements, a trading strategy would involve predicting next-day fund returns using current-day changes in the prices of related assets and then buying the fund when predicted next-day returns are positive. The analysis in this section assumes that arbitrageurs trade at maximum frequency, can make decisions up until 4 PM ET, and do not face transactions costs; this was usually the case in practice for investors trading directly with fund families in the late 1990s. Section 5 discusses the efficacy of short-term trading fees and trading frequency restrictions in reducing arbitrage and dilution.

The other papers listed above that have studied NAV arbitrage have also provided excess return estimates; the main contribution of this section is to provide them for all 48 Morningstar asset classes using a consistent methodology. Doing so highlights the breadth of NAV predictability: there are statistically and economically significant arbitrage opportunities in 44 of 48 Morningstar fund categories; the exceptions

³For more detail on pre-1968 arbitrage and dilution, see Securities and Exchange Commission (1992) and Ciccotello, Edelen, Greene, and Hodges (2002).

being the large-cap U.S. equity and Specialty-Utilities categories. It also provides useful background for the subsequent discussion of dilution and industry responses. Although arbitrage activity and the resulting losses to long-term shareholders are currently concentrated in international funds, the existence of opportunities in so many other asset classes suggests that any solution that only solves the problem in international funds will simply redirect activity to other asset classes.

3.1 Data

Standard sources of monthly mutual fund return data, such as CRSP and Morningstar, do not have daily data for funds returns or net inflows, which one needs in order to estimate dilution. Funds are required to report their inflows and outflows only on a monthly basis, but TrimTabs (TT) surveys about 12 percent of U.S.-based open-ended funds on a daily basis in an attempt to obtain more timely information. Like Chalmers, et. al. (2001), Goetzmann et. al. (2001), and Greene and Hodges (2002), this paper uses TT as its data source for daily flows, but like Goetzmann, et. al., it supplements the TT daily return data using a more comprehensive data source, in this case, data from *quote.yahoo.com*.

Supplementing the TT data is useful for two reasons. First, TT is only a 12 percent sample of funds, and thus there are inevitable questions about its representativeness of the universe of funds. Second, the coverage of asset classes such as convertible bonds, precious metals, real estate, and European Japanese, and Latin American equities is limited: each of these asset classes are represented by fewer than ten funds in TT.

I attempted to collect daily NAVs for every mutual fund in the Morningstar universe that has a ticker symbol from *quote.yahoo.com*, and succeeded for 11,556 of out 11,599 funds. The Yahoo data do not contain information on daily flows, but one

can use it to confirm that TT is roughly representative of the Morningstar universe in terms of the excess returns available to arbitrageurs. The results reported in the tables use the Yahoo data; average arbitrage returns for the TT sample, using either TT or Yahoo data, are within 1 percentage point for all asset classes.

3.2 Predicting returns

The first step in measuring excess returns to an arbitrage strategy is to predict next-day fund returns using information available at 4 PM ET. Since the source of the arbitrage opportunity is that NAVs calculated using stale prices do not fully reflect recent market movements, one would expect a positive relationship between next-day fund returns and current-day changes in the value of similar assets. I therefore regress next-day fund returns on current-day market indices, and use the resulting model to predict next-day returns out of sample.

When applying a predictive model out of sample, one usually obtains better results when one limits the number of predictive variables to limit any data-snooping bias in estimation. I limit the model to three market indices that one would expect to be predictive of future returns on *a priori* grounds. For international equity funds, I use: 1) the difference between the 4 PM price of the CME-traded Nikkei 225 future and its 2 AM ET closing value in Tokyo, 2) the change in the S&P 500 index after 11:30 AM ET, when most European markets close, and 3) the change in the S&P 500 index from 4PM the prior day until 11:30 AM.⁴ For the Japan Stock category, one might expect the Nikkei future to be the best single indicator of their value as of 4 PM ET, and thus the future-local close difference as the best predictor of the next-day return

⁴The value of the S&P 500 index at a certain time is measured using the most recent transaction price for the S&P 500 exchange-traded fund (ticker: SPY) from the NYSE TAQ data. The 4 PM Nikkei futures price is the most recent transaction price as of 4 PM from the CME Time and Sales data (which differs from the closing price since the CME closes at 4:15 PM).

in a fund that prices using local closing prices. Likewise, for a Europe Stock fund, the change in the S&P 500 index after the close of most European markets at 11:30 PM ET should be the best single predictor of next-day fund returns.

For other assets classes, I use the best available measures of recent changes in the value of similar assets. For domestic equity funds I use the 2-4 PM change in the S&P 500 along with the 24-hour change in the Russell 2000 and S&P 500. For hybrid funds and convertibles, I replace the 24-hour S&P 500 change with the change in the 10-year treasury yield, and for specialty equity funds, I replace it with an index appropriate to the equity category. For bond asset classes such as high-yield and municipal bonds, indices are less widely available in real time, so I use the current-day average NAV change as a proxy for an index that an arbitrageur might calculate on her own.⁵

Place Table 1 about here

Table 1 presents the results of these predictive regressions. The results in Table 1 are estimated using data from the 1/98 - 10/01 period; the arbitrage returns estimated below estimate the same predictive model using two years of prior data and apply the results out of sample (i.e., they assume that arbitrageurs traded in 1998 using a model estimated using 1996 and 1997 data). The index that one would expect to be most important on *a priori* grounds is listed as Index 1. For international funds, the relative importance of the predictive indices is as expected: the Nikkei future is the best predictor for Japanese and Asian funds, while the post-11:30 AM change is the best predictor for Europe. Interestingly, even the pre-11:30 AM price change has

⁵Current-day NAVs are not published until approximately 5:30 PM ET, so, strictly speaking, the average current-day NAV for a category will not be known at 4 PM. All of the prices that are used to calculate it will be, however, and so in principle an arbitrageur could estimate the average current-day NAV change using recent bond quotes reasonably well.

predictive power for European stock funds, suggesting that European equity prices do not fully respond to U.S. market movements even when their markets are still open.

3.3 Measurement of excess returns

The simplest way to measure the excess returns to an arbitrage strategy is to compare the returns to the strategy with what the investor would most likely do in the absence of an arbitrage opportunity: buying-and-holding either the fund in question or a money market, or some combination. Whereas most other studies have measured excess returns relative to 100% buy-and-hold strategy, this study measures excess returns relative to a mixture of the fund and cash that yields the same average daily exposure to the fund.

This measure of excess returns has the useful property that it is independent of the average return to a fund or asset class in the time period studied.⁶ In contrast, a comparison of the excess returns to arbitrage to 100% buy-and-hold would yield lower (higher) excess returns in periods when the fund outperforms (underperforms) cash. Having measured excess returns be independent of asset class performance is particularly helpful when making cross asset class comparisons. This definition of excess returns is also a cleaner measure of the market timing ability of a strategy, since the expected excess returns to a strategy that randomly chose which days to hold a fund would be zero in expectation, regardless of the average returns to the fund in the time period studied.⁷

⁶The wildcard option value calculated by Chalmers, et. al. (2001) also has this property.

⁷Another advantage of this definition is that any error in measuring fund returns (for example, due to omitted distributions, which is a problem in the Yahoo data) will not bias estimates of excess returns, so long as those measurement errors are not correlated with whether an arbitrageur would have held the fund (i.e., with prior-day market returns). Any definition of excess returns relative to a benchmark that involves holding mutual funds does have the disadvantage of slightly overstating

Daily excess returns as defined above can be written as:

$$\frac{\sum [R_t^{fund} \cdot Own_t + R_t^{cash} \cdot (1 - Own_t)]}{T} - \left[\frac{\sum R_t^{fund}}{T} \cdot \frac{\sum Own_t}{T} + \frac{\sum R_t^{cash}}{T} \cdot \frac{\sum 1 - Own_t}{T} \right], \quad (1)$$

where R_t^{fund} and R_t^{cash} are the returns to the fund and cash, respectively, on day t and Own_t is equal to one if the investor owns the fund and zero otherwise. Define the following notation for the returns conditional on ownership and the share of days the fund is owned:

$$\begin{aligned} \bar{R}^{fund}|Own &= \frac{\sum R_t^{fund} \cdot Own_t}{\sum Own_t} \\ s(Own) &= \frac{\sum Own_t}{T}. \end{aligned}$$

If the returns to holding cash are constant or otherwise uncorrelated with ownership of the fund, (1) can be rewritten:

$$\begin{aligned} &(\bar{R}^{fund}|Own - \bar{R}^{fund}|NotOwn) \cdot s(Own) \cdot [1 - s(Own)] \\ &= (\bar{R}^{fund}|Own - \bar{R}^{fund}) \cdot s(Own). \end{aligned} \quad (2)$$

As is clear from (2), excess returns are positive if and only if the average return on days the fund is owned is higher than average returns on days it is not owned.

3.4 Results

Table 2 reports the annualized excess returns to arbitrage trading at maximum frequency from 1/98 - 10/01. Results are presented for a single-index model that uses excess returns relative to a market model, since almost all mutual funds are not on the risk-adjusted return frontier. For example, if the fund being studied has risk-adjusted excess returns (or an alpha) of -3 percent, then the excess returns reported in this paper will be roughly 1 percent higher than the returns relative to a market model.

only the “Index 1” for a particular asset class given in Table 1 and for a model that uses all three. Excess returns are highest for international funds, but double-digit excess returns are also present for small and mid-cap U.S. equities, specialty equity funds, and high-yield, convertible, and emerging market bonds. Municipal bond funds have highly statistically significant return predictabilities, but price volatility is so low for this asset class that excess returns are as well.

Place Tables 2 and 3 about here

Table 3 reports excess returns for general international funds by year since 1986, the first year for fund return data is available from Yahoo. The arbitrage returns in a given year are a function of the volatility and the extent to which international returns are correlated in that year. To see this, note that excess returns as given in (2) can be written

$$\text{Avg}[y - \bar{y} | E(y - \bar{y} | x) > 0] \cdot s \quad (3)$$

where y is the next-day return on the fund, x is the vector of market information known at 4 PM ET, \bar{y} is the expectation of y unconditional on x , and s is the share of days when expected excess returns are positive, i.e. when $E(y - \bar{y} | x) > 0$. Given the linear predictive model, the expectation of $E(y - \bar{y} | x) = \beta(x - \bar{x})$, and one can write the expectation of (3) as:

$$\begin{aligned} E[\beta(x - \bar{x}) | (x - \bar{x}) > 0] \cdot s \\ &= \beta \cdot E[(x - \bar{x}) | (x - \bar{x}) > 0] \cdot s \\ &= \beta \cdot E(|x - \bar{x}|) \cdot s. \end{aligned} \quad (4)$$

In other words, one can multiplicatively decompose expected excess returns into the slope of the relationship between next-day NAV change and the market variables and

then average absolute deviation of the market index. From this decomposition in Table 3, one can see that arbitrage returns have more than doubled from 1992-96 to 1997-2001, and that this doubling was due mainly to increased market volatility.

3.5 Further refinements

This analysis ignores several ways in which trading strategies could be further refined. First, it assumes that arbitrageurs trade an equal-weighted portfolio of funds in a given asset class; this is equivalent to assuming that they choose the fund to arbitrage randomly. For example, international funds that hold higher beta and smaller capitalization equities and fewer ADRs or other instruments traded in the U.S. will have higher arbitrage returns. By focusing on the 10 percent of funds with the highest predicted arbitrage returns, arbitrageurs can raise their expected returns by a factor of approximately 1.2.⁸

Second, it assumes that arbitrageurs are restricted to trading in and out of a single fund, but an arbitrageur can do better by trading multiple asset classes. For example, on days when markets rise between the time when Asian and European markets close (usually 2-6 AM and 11 AM - 2 PM ET, respectively) it will be optimal to buy an Asian fund, whereas on days when markets decline during this time but rise after European markets close, it will be optimal to buy a European fund. Simulations of a three asset-class trading strategy suggest that by switching among European, Japanese, and Asian funds and cash, arbitrageurs can earn excess returns of 69 percent, compared with 38 percent by switching between a general international fund and cash.⁹

Further refinements are possible. Arbitrageurs can select funds within a region

⁸See Table 5 of the March 2002 version of this paper (available from the author). This analysis was removed for space reasons.

⁹See Table 6 of the March 2002 version. This analysis was removed for space reasons.

with holdings in sectors that have appreciated globally since local close. They can add sector funds to the multi-region strategy described above; it might be particularly useful to add gold funds, since gold stocks are inversely correlated with other equities. They can monitor for post-local close news items that affect particular foreign stocks and then buy funds with large holdings of that stock. They can condition trading on exchange rate movements, by either buying funds with holdings in stocks that would benefit from post-local close exchange rate movements or by taking advantage of the fact that most funds convert local prices to dollars using exchanges rates as of 12 PM ET, so foreign exchange appreciation after this time predicts NAV appreciation. These additional refinement opportunities are small relative to the ones analyzed in this section, but they are additional reasons to believe that the extremely high returns to maximum frequency trading documented in this section may actually be underestimates.

4 Estimating dilution

This section uses data from the TrimTabs (TT) sample to estimate the losses to long-term shareholders from arbitrage trading. Dilution is defined as the losses to buy-and-hold shareholders due to arbitrageurs trading at stale-price NAVs rather than fair-value NAVs. The dilution occurring on a given day is:

$$d_t = \frac{\Delta shares_t \cdot (NAV_t^{FV} - NAV_t^{ACT})}{assets_t} = \frac{flow_t}{assets_t} \cdot \frac{NAV_t^{FV} - NAV_t^{ACT}}{NAV_t^{ACT}} \quad (5)$$

where

$$\begin{aligned} \Delta shares_t &= \frac{assets_t}{NAV_t^{ACT}} - \frac{assets_{t-1}}{NAV_{t-1}^{ACT}} & (6) \\ flow_t &= assets_t - assets_{t-1} \cdot \frac{NAV_t^{ACT}}{NAV_{t-1}^{ACT}} \\ NAV_t^{FV} &= E(NAV_{t+1}^{ACT} | \Omega_t). \end{aligned}$$

The fair-value NAV_t^{FV} is defined for the purposes of this calculation as the statistical expectation of NAV_{t+1}^{ACT} given all the information known at 4 PM ET (Ω_t). NAV_t^{FV} is estimated using the same multi-index predictive model applied out of sample as in Section 3. Dilution, defined as above, is also equal to the profits of the arbitrageurs from transacting at stale-price rather than fair-value NAVs. Dilution is zero-sum, but funds may incur other costs from handling the arbitrage flow (e.g., extra transactions, extra cash holdings, administrative costs).¹⁰

Place Table 4 about here

Table 4 reports the results of this formula. Although arbitrage is possible in many asset classes, dilution is understandably concentrated in the asset classes with the highest arbitrage profits. Long-term shareholders of regionally-focused international equity funds in the TrimTabs sample lost about 1.6 percent of their assets per year to arbitrageurs from 1998-2001. Dilution was lower but still statistically significant in general international equity funds (81 basis points), specialty equity funds (33 basis points), Latin American and global equity funds (23 basis points), and small and mid-cap U.S. equity funds (12 basis points).

If one assumes that TT funds are representative of their asset classes and scales these results up to the Morningstar universe, the total annualized dilution in the first three quarters of 2001 can be estimated at \$4.9 billion per year, \$4.3 billion of which is in international equity funds. Of course, the decision to participate in the TT sample may depend on the arbitrage activity a fund is experiencing. A fund may be less likely to participate if they are experiencing heavy arbitrage and are thus more concerned

¹⁰Greene and Hodges regress buy-and-hold fund returns on market performance and the dilution for a particular and find a coefficient on dilution of 2.8. Giving this a causal interpretation would imply that the direct effect of dilution is less than half of the total negative effect on returns.

about releasing their asset data. If this is the case, then estimates of industry-wide dilution based on the TT sample will be downwardly biased. Alternatively, funds that are more aware of the arbitrage issue may both have less dilution and be less willing to cooperate with TT, leading the TT sample to be upwardly biased.

Comparing the estimated arbitrage returns in the TT and broader Yahoo samples yields only small differences, but one can obtain more direct evidence on the direction of any selection bias in the TT data by examining the 35 percent of the 167 international funds in TT that exit the sample before the data ends in September 2001. Controlling for asset class and time period fixed effects, the exiting funds have dilution that is roughly 40 basis points higher than both the non-exiting funds and the funds that replace them in the sample, suggesting that selection may be downwardly biasing estimates of dilution using the TT sample. In any case, one might argue that even the \$480 million worth of dilution that is occurring in the international TT funds themselves is a large number, regardless of what total industry-wide dilution is.

4.1 Relationship with prior estimates of dilution

Two other papers have calculated dilution using TT data. Greene and Hodges (2002) report dilution of 50 basis points from 2/98 - 6/99 for all international equity funds; this appears to be consistent with my results for that asset class and time period. The main difference between Greene and Hodges and this paper is that they substitute the actual next-day NAV_{t+1}^{ACT} for its expectation. This causes the results to be noisier in a small sample, which may explain why this paper is able to report dilution for smaller time periods and subsamples than they do. On average, however, I obtain an only slightly higher dilution figure (56 basis points vs. 50 basis points) for all international funds for the 1998-99 period.

The extra detail provided in Table 4 yields important additional conclusions: 1)

that dilution of up to 2 percent of assets is occurring in some asset classes, 2) that dilution is worse in exactly the asset classes one would expect, given the results in Table 2, and 3) that some dilution is occurring even in less profitable asset classes such as global and small-cap equity funds. This third conclusion suggests that some investors know about the arbitrage opportunity and yet are trading in channels in which they do not have access to the highest-profit asset classes; the fact that arbitrageurs are using multiple distribution channels has implications for the effectiveness of certain anti-arbitrageur measures, as discussed in the next section.

The other paper that uses TT data to measure dilution, Goetzmann, et. al. (2001), reports a much lower dilution estimate of 1.6 basis points for the same period and sample as Greene and Hodges. The source of the difference is in its treatment of the timing of the flows in the TT data. As described in Edelen and Warner (2001), TrimTabs surveys funds in the morning and collects asset data for the prior day. In principle, these assets figures should include all inflows that are priced at the prior-day NAV, i.e. be “post-flow”, in practice, however, it is not certain that funds are aware of all flows in time to include them in the asset figures. This is especially true of funds whose customers trade mainly through intermediaries, such as brokerages or 401(k) plan providers, as opposed to directly with the fund family.

Generally Accepted Accounting Principles (GAAP) require that the asset figures in annual reports be post-flow. Goetzmann, et. al. verified that TT asset data match CRSP data on the last day of the month, and concluded from this that both TT and CRSP asset figures were therefore likely to be post-flow. Greene and Hodges, however, compared TT assets with N-SAR and N-30D reports filed with the SEC and found that TT assets figures matched better for two-thirds of funds if one assumes that they are either entirely or largely pre-flow. In estimating dilution, Greene and Hodges treated the TT asset figures for these two-thirds of funds as if they were

pre-flow, and the remaining third of funds as if they were post-flow.¹¹

In doing so, they assumed that the funds whose TT assets matched their SEC reports matched because both were post-flow, i.e. that all funds followed GAAP with respect to this issue. Another possibility, however, is that the asset figures matched because both were pre-flow: that TT figures are always (or at least largely) pre-flow, and that only two-thirds of funds follow GAAP with respect to this issue.

Place Table 5 about here

Table 5 contains evidence consistent with this second possibility. In Table 5, I regress flows on current and three lagged changes in the S&P 500. If one assumes that TT asset data are pre-flow, i.e. that today's flows show up tomorrow, the coefficients estimated for international funds imply that there are inflows of 0.45% of assets on a day with a 1% S&P increase, followed by outflows of 0.34% of assets over the next two days. This is exactly what one would expect to see if funds were being arbitrated by short-term traders. On the other hand, if one assumes that TT asset data is post-flow, then Table 5 would imply that market timers do not buy on the day that it would be profitable to do so, instead they buy a day late and then sell most of what they bought over the next two days. While one might expect to see some returns chasing behavior on the day after a large inflow, the magnitudes and almost immediate outflow seem very inconsistent with behavioral returns chasing, and very consistent with arbitrage flows, reported a day late.¹²

¹¹In a recent paper co-authored by Goetzmann, Brown et. al. (2002) also adopt the Greene and Hodges approach of determining fund flow timing by matching with SEC reports.

¹²Other evidence consistent with these flows being arbitrage reported a day late includes the fact that the flows target the most arbitrageable funds (coefficients on $dS\&P(t-1)$ are 0.75, 0.48, and 0.22 for Europe/Japan/Pacific, general international funds, and global funds, respectively), and do

When I disaggregate international funds into those classified as pre-flow and post-flow by Greene and Hodges (they were kind enough to share their classification), I find that there is essentially no difference in the apparent timing of flows. The timing of flows appears similar, albeit with much smaller magnitudes, for non-international funds, with one exception that helps prove the rule. The so-called “timer funds” (i.e., the Rydex, ProFunds, and Potomac families) that cater primarily to short-term traders appear to report post-flow to TrimTabs. These funds experience a very high variance in daily inflows (their net inflow-asset ratio has a standard deviation of 8.2 percent, compared with 2.2 percent for the average fund) and track indices, and they thus need to closely monitor their inflows so that they can remain properly invested.

For the reasons discussed above, it seems highly implausible that even the funds classified as post-flow by Greene and Hodges really are, and more plausible to assume that one-third of funds simply do not follow GAAP with respect to this issue. I repeat the analysis in Table 5 for individual funds, looking for funds with current-day S&P coefficients that are statistically different from zero. I find that I can reject this null hypothesis at the 5 percent significance level for 6 percent of funds (10 out of 165), close to the rejection rate one would expect if the null were true for all funds. Rather than classify these funds as post-flow, which would induce a data-snooping bias given that I would be using the same data to classify funds as I am using to measure dilution, I choose instead to classify all funds as pre-flow.

so on the most advantageous days, targeting Europe funds when the S&P change is largely in the afternoon, Asian funds when the change is in the morning or when its accompanied by a change in the Nikkei futures, and specialty equity funds when there is a large change in the relevant sector index (see Table 11 and Appendix A in the March 2002 version of this paper).

5 Analyzing currently popular solutions

This section examines the effect of short-term trading fees, restrictions on trading frequency, and partial fair value pricing on arbitrage trading profits. These are currently the most popular solutions to the NAV arbitrage problem, but as this section discusses, they have serious shortcomings.

5.1 Short-term trading fees

Short-term trading fees are currently a popular device for limiting arbitrage flows; 30 percent of international mutual funds have adopted them as of November 2001. Dilution is lower in funds with short-term trading fees: in the first three quarters of 2001 dilution was 61 vs. 166 basis points of dilution for general international funds in the TT sample with and without fees, respectively, and 138 vs. 232 basis points for region-specific funds with and without fees. Despite their popularity, short-term trading fees have at least three shortcomings.

First, short-term fees reduce the attractiveness of mutual funds to the average investor. Zero transaction costs are not available to investors in financial markets, they are a unique feature of no-load mutual funds, and a potential competitive advantage over individual stocks or the recently introduced exchange-traded funds. So long as inflows and outflows are roughly balanced and not opportunistically timed, mutual funds can match buy and sell orders internally and provide zero-transaction-cost liquidity without significantly altering their holdings or trading themselves. Unfortunately, NAV predictability, once understood by investors, guarantees that these conditions will not be met. Funds ultimately face a choice between achieving NAV non-predictability through fair value pricing or abandoning one of the competitive advantages of their product; so far more funds have chosen the latter.

In addition to their effect on the attractiveness of funds to non-arbitrageurs, there

are also limitations to the effectiveness of short-term trading fees in preventing arbitrage. The first effectiveness issue is that short-term fees are difficult and/or costly to apply uniformly across channels. Under the terms of most existing variable annuity contracts, short-term trading fees cannot be imposed.¹³ In addition, fees are difficult to apply to 401(k) and 403(b) accounts; many funds that charge short-term trading fees in regular accounts do not charge them in 401(k)s. Since fees cannot be applied uniformly to all investors, funds that attempt to prevent NAV arbitrage through only the use of short-term trading fees are open to the criticism that they are selectively allowing certain investors to dilute their funds. Selectively allowing certain investors to dilute the fund may open a management company to criticism, particularly if the investors who benefit are disproportionately those whom a management company might otherwise have an incentive to favor (e.g., favored clients, industry insiders, management company employees, fund directors).

A second effectiveness issue is that short-term trading fees have to be fairly large and of long duration to eliminate the arbitrage opportunity. The SEC has thus far limited short-term trading fees to 2 percent.¹⁴ Although fees of this magnitude are sufficient to redirect arbitrage activity to other funds, once all funds have adopted them, they will not be sufficient to prevent arbitrage activity.

¹³While new variable annuity contracts typically either allow management companies to restrict the frequency of trading or impose transaction fees, many existing variable annuity contracts do not. Anecdotally, some investors that are grandfathered into unrestricted annuities have been aggressively taking advantage of the absence of restrictions.

¹⁴The SEC's no-action letter to Fidelity Korea on March 7, 2001 allowed Fidelity Korea to temporarily impose a 4 percent short-term redemption fee during the period of its conversion from a closed-end to an open-end fund, but it reiterated the requirement that short-term fees be limited to a reasonable estimate of the administrative and transactions cost for that asset class and an upper bound of 2 percent on that estimate. This limitation is consistent with the SEC position that funds should not use short-term fees as a substitute for accurate valuation of the fund.

Place Table 6 about here

Table 6 analyzes the profitability of arbitrage trading with various levels of short-term trading fees. As in Table 2, I estimate a predictive model using two years of prior data and then apply the model out of sample. Since predicted returns can be noisy due to imprecise coefficient estimates, I multiply them by a discount factor that is estimated from a regression of prior-year actual returns on predicted returns (i.e., actual year Y-1 returns on predicted returns from a model estimated on year Y-2 and Y-3 data). For the fund categories in Table 6, this discount factor averages 0.9. I assume that an arbitrageur trades when the absolute value of predicted next-day returns is greater than 50% of the short-term trading fee.

From (2), excess returns are given as:

$$(\bar{R}^{fund}|Own - \bar{R}^{fund}) \cdot s(Own). \quad (7)$$

This can also be decomposed and written:

$$\begin{aligned} & \bar{R}^{fund}|Own\&B \cdot s(Own\&B) + \bar{R}^{fund}|Own\&WB \cdot s(Own\&WB) + \\ & \bar{R}^{fund}|Own\&NotS \cdot s(Own, NotS) - \bar{R}^{fund} \cdot s(Own) \end{aligned} \quad (8)$$

where *Own&B* means that the arbitrageur bought the fund yesterday, *Own&WB* means the arbitrageur would have bought the fund if she did not already own it, and *Own&NotS* means that the arbitrageur owns the fund but would not have bought or sold it.

If the distribution of future returns in the fund beyond the next day is independent of past fund or market returns and if fund returns are distributed symmetrically, then

$$\bar{R}^{fund}|Own\&NotS = \bar{R}^{fund} \quad (9)$$

$$\bar{R}^{fund}|_{Own\&WB} - \bar{R}^{fund} = \bar{R}^{fund} - \bar{R}^{fund}|_{NotOwn\&WS} \quad (10)$$

$$s(Own\&WB) = s(NotOwn\&WS), \quad (11)$$

and (8) can be written as

$$\bar{R}^{fund}|_{Own\&B} \cdot s(Own\&B) - \bar{R}^{fund}|_{NotOwn\&S} \cdot s(NotOwn\&S), \quad (12)$$

where *NotOwn&S* means that the arbitrageur sold the fund yesterday and *NotOwn&WS* means that the arb would have sold the fund if she owned it. Note that in a large sample $s(Own\&B)$ and $s(NotOwn\&S)$ will be approximately equal and will both equal the rate at which round-trip trades are made in the fund.

The intuitive interpretation of (12) and (8) is that the excess returns to an arbitrage strategy per round-trip trade is the difference between the returns following buys and the returns following sells plus a “drift” that is zero if returns are symmetric and independent of market changes more than a day old.

Table 6 reports excess returns with and without “drift” for different levels of short-term trading fees. Since excess returns are more precisely estimated without drift, I will focus on those results. Next-day excess returns remain positive for Pacific Stock, Europe Stock, and Small Growth funds even with short-term trading fees of 3.5, 2.0, and 1.5 percent, respectively. Returns are statistically significant and above 5 percent per year even with fees of 2.0, 1.0, and 0.5 percent, respectively. Results including drift imply higher returns for Pacific Stock funds and lower returns for Europe Stock and Small Growth funds than those without drift, although in the latter case the difference is not statistically significant.

The results in Table 6 also suggest the ability of arbitrageurs to “wait out” short-term fees. In order to accommodate legitimate investor demand for liquidity and to avoid being accused of using short-term fees to “trap” money in their funds, many funds have limited fees to the sale of shares within 30 or 90 days of purchase.¹⁵ Table 6

¹⁵As of November 2001, of the funds that had imposed short-term trading fees, 42 and 92 percent

suggests that arbitrageurs can earn annualized gross excess returns of approximately 10, 6, and 4 percent in the three asset classes by making three round-trip trades per year.

To summarize, the 2 percent short-term trading fees currently allowed by the SEC are sufficient to eliminate arbitrage opportunities in asset classes other than Asian stock, so long as they are of sufficient duration to prevent arbitrageurs from waiting them out. They are also certainly large enough to reduce arbitrage profits enough to divert activity to funds without short-term fees, so long as there are some remaining.

5.2 Trading frequency restrictions and monitoring

Another popular device for controlling arbitrage is to either explicitly limit the number of round-trip trades an account may engage in or to monitor accounts for frequent trading. This approach can be effective in diverting arbitrage activity to other funds, but it has some of the same shortcomings as short-term trading fees.

First, like short-term trading fees, frequency restrictions and monitoring cannot be applied across all channels. Many existing variable annuity contracts do not allow fund companies to limit trading frequencies. Limiting trading through channels such as fund supermarkets or retirement plans is difficult, and investors can to some extent evade monitoring by moving between accounts or trading multiple funds. In addition, monitoring conducted on a case-by-case basis is even more subject to the selectivity criticism than short-term trading fees that are applied consistently according to predetermined rules. As with short-term trading fees, there is a trade-off between limiting arbitrage and the attractiveness of the fund along other dimensions. Frequency restrictions can be made more effective by restricting access to only investors who trade directly with the fund family, but this obviously has significant costs to did not charge fees when the investors had held the shares for at least 30 and 90 days, respectively.

investor convenience and the competitiveness of the fund.

Second, the evidence in Table 6 shows that frequency restrictions do not eliminate dilution opportunities, since arbitrageurs can earn excess returns of up to 10 percent by making just 3 round-trip trades per year. In addition, no amount of monitoring will prevent investors who are knowledgeable about the NAV arbitrage issue from timing their purchases and redemptions so as to earn extra returns at the expense of investors who are not knowledgeable about the issue.

5.3 Partial fair value pricing

Two types of partial fair value pricing have been proposed or adopted by fund management companies. One is using fair value pricing only on days with extreme market movements. The other is using one of a variety of partial fair valuing pricing methodologies. These partial methodologies often have some intuitive appeal, but they remove only part of the arbitrage opportunity, for reasons discussed below.

5.3.1 Fair value pricing on extreme days

The idea of using fair value pricing only on extreme movement days is appealing to fund companies. Currently most do not have a system in place for calculating fair value prices, and fair valuing involves convening a valuation subcommittee of the board of directors and calculating fair value prices in a non-automated fashion. Given the seniority of the people involved, this is, of course, extremely expensive.

Often, fair valuing only on extreme days is justified by arguing that the difference between calculated and fair-value NAVs on other days is not material. Unless the post-close change in markets is extreme, funds argue that a “significant event” has not occurred, and thus they are under no obligation to fair value price. An executive from a large fund complex recently announced in a public conference that his funds

used fair value pricing when the Japanese market was believed to be 2 percent different from its closing level or when individual Asian markets were believed to be 3 percent different.

Table 6 indirectly provides evidence about whether such a fair valuation approach is likely to prevent a significant amount of the arbitrage opportunity. Assume that the fund in question fair values much more often than the fund discussed above; assume they fair value whenever the fair-value NAV is more than 1.5 percent different from the stale-price NAV. An arbitrageur who faced a 3 percent short-term trading fee would trade precisely on the days fair-value and stale-price NAVs were more than 1.5 percent different when a fund's fair value NAV was 1.5 percent different from its actual NAV. Table 6 suggests that an arbitrageur trading a Pacific Stock fund only on such days would earn annualized gross next-day excess returns of 4.3 percent, compared with the total annualized returns of 50.6 percent that they would earn from trading every day. Likewise, if fair value pricing eliminated the excess returns on these extreme move days, a maximum frequency trader would earn excess returns of 50.6 less 4.3 percent. In this example, fair valuing only on extreme days removes less than 10 percent of the arbitrage opportunity.

Another issue with fair valuing infrequently using valuation committees is that it potentially introduces discretion into the decisions of whether and how to fair value. Zitzewitz (2002) reports evidence that discretion already enters into fair value decisions: the few funds that were occasionally fair valuing between January 2001 and July 2002 were much less likely to do so on Friday evenings, when the effort costs of fair valuation are presumably higher. Discretion could also be conceivably abused to provide dilution opportunities to those with inside knowledge of fair valuation procedures.

5.3.2 Mark-to-ADR pricing

Another partial fair value pricing methodology that has been proposed is pricing foreign assets using the prices of comparable assets that trade when the U.S. market is open. The most common version of this is mark-to-ADR pricing, where the most recent ADR price is taken to be a “readily available” market price.

The issue with mark-to-ADR pricing is foreshadowed by the high NAV predictability for U.S. small cap stock funds. Three-quarters of ADRs had lower trading volumes in 2000 than U.S. stocks in NYSE/AMEX decile 6 (most U.S. small-cap funds have holdings in deciles 6-8). As with small cap stocks, ADR prices do not instantly reflect changes in the general market, but high round-trip trading costs prevent arbitrageurs from taking advantage of this phenomenon. The last traded price for an relatively illiquid ADR, like the last traded price for a small-cap equity, will be systematically below that which would prevail in a liquid market when the U.S. market is rising, and systematically too high when the U.S. market is falling.

Place Table 7 about here

Table 7 reports regressions of the next-day change in an ADR price on the current-day change in the S&P 500. The average slope for all ADRs is 0.12. This result suggests that the predictability for a mutual fund priced entirely using ADRs is about 40 percent of that of a mutual fund priced using local closes (as suggested by the coefficient of 0.32 reported for the average international fund in Table 3). Interaction regressions suggest that the predictability coefficient is over 0.3 for the least liquid and smallest-cap ADRs and not significantly different from zero for the most liquid, largest-cap ADRs, which is consistent with illiquidity being the source of predictability of ADR prices.

Some in the industry have advocated the use of exchange-traded foreign index funds, or iShares, in fair value pricing. All but the Japanese iShare are fairly illiquid and thus, like ADRs, have predictable next-day price changes. iShares prices, like ADR prices, may be a useful input into a fair value pricing formula, especially if their liquidity improves, but a mark-to-iShares fair value pricing methodology will have the same shortcomings as a mark-to-ADRs methodology.

The evidence on ADR pricing also suggests issues with another argument sometimes made by practitioners, that fair value pricing will become moot once exchanges move to 24-hour trading. The ADR evidence suggests that unless foreign issues are liquidly traded at 4 PM ET, their next-day price changes will still be predictable. A test of whether after-hours trading in foreign markets is likely to be liquid can be conducted by examining using the German market, which extended trading until 2 PM ET (8 PM German time) in June 2000. A regression of the next-day change in the DAX index on the change in the S&P futures before 11:30 AM ET, between 11:30 AM and 2 PM, and between 2 and 4 PM yields coefficients of 0.00, 0.15, and 0.62 (with standard errors of about 0.09), suggesting that German stocks are not sufficiently liquid after regular trading hours to fully incorporate changes in the U.S. market. If German stocks are not sufficiently liquid from 6 to 8 PM German time to exhibit no price predictability, it is hard to believe that Asian stocks will be in the middle of the night Asian time.

5.4 True fair-value pricing

Given the number of partial solutions to the NAV arbitrage problem that have been adopted or at least proposed by the industry, one might expect that a full solution was impossible or prohibitively expensive. This is actually not the case. Goetzmann, et. al. (2001) outline a simple methodology that estimates a top-down correction to

a fund's NAV based on historical relationships between its NAV and market indices. Ciampi and Zitzewitz (2001) advocate a related bottom-up methodology that estimates fair-value prices at the security level. The idea behind both methodologies is that a reasonable fair value price is the statistical expectation of the price that would prevail in a liquid market, given all information reflected in market indices as of 4 PM ET.

Fair value pricing at the security level is likely to be more accurate given that the median international fund has holdings turnover of 80 percent per year, but either methodology is substantially better than the alternative solutions discussed above. Properly constructed fair value pricing should completely eliminate dilution and should substantially reduce market timing activity and the associated costs to funds. At least two third-party pricing services are currently offering to provide fair-value prices for international equities calculated using a bottom-up methodology. Out-of-sample tests of one service's prices suggest that it removes over 95 percent of NAV predictability, yet neither has been widely adopted as of mid 2002. The pricing information I have obtained from one of the services implies a cost to the median size fund complex of 5 basis points of international assets.

6 SEC guidance and industry response

The most recent formal guidance given by the SEC to funds on this issue is their letter to the Investment Company Institute of April 30, 2001. The letter states that: "with regard to a foreign security, a fund *must* evaluate whether a significant event (i.e., an event that will affect the value of a portfolio security) has occurred after the foreign exchange or market has closed, but before the fund's NAV calculation. If the fund determines that a significant event has occurred ... then the closing price for that security would not be considered a 'readily available' market quotation, and the

fund *must* value *the security* pursuant to a fair value pricing methodology.” It further states that “significant fluctuations in domestic or foreign markets *may* constitute a significant event” and that “funds should continuously monitor for events that might necessitate the use of fair value prices” and should “evaluate the appropriateness of their fair value methodology for foreign securities by reviewing next-day opening prices” (all emphasis added). The letter motivates these requirements by specifically mentioning that “the failure to determine the fair value of portfolio securities following significant events may result in dilution.”

Although the SEC’s formal guidance emphasized that fair valuing individual securities is a requirement, it leaves funds the latitude to make their own determinations in good faith as to when significant events have occurred and what constitutes an appropriate fair valuation methodology. An examination of recent NAV changes suggests that the majority of international funds have not fair valued on even a single day in the May 2001 - September 2002 period, a sustained period of high market volatility (Zitzewitz, 2002). This implies that these funds have thus far used this latitude to define a significant event such that they essentially never occur or that they are using fair value prices that are statistically indiscernible from local closing prices, even on high volatility days.¹⁶

The formal response from industry groups to the SEC guidance has tended to defend a broad interpretation of “good faith.” A March 2002 white paper by the Investment Company Institute (2002) argues that “even if *future* prices in a foreign market tend to be correlated with either a particular financial instrument or the U.S. market, this does not necessarily mean that prices in the foreign market *as of the close*

¹⁶Surveys in late 2001 by Deloitte and Touche, PriceWaterhouseCoopers, and Capital Market Risk Advisors revealed that 20-40 percent of funds did not monitor for significant events, as required by the April 2001 letter, and only 4 percent of funds made fair value adjustments to account for time zone differences (Sahoo, 2001d and 2001e; Dodds, 2001).

of the U.S. market are similarly correlated” (second emphasis added).¹⁷ A June 21, 2001 letter to the SEC from the Committee on Investment Management Regulation of the Association of the Bar of New York City states that “we are skeptical of the premise that, if one market moves after another closes, there is necessarily a change in value,” that “any fair value is but one value within a range of possible fair values” and that “this inherent uncertainty is not a basis to contest the good faith of directors in making fair value determinations.” It adds that “the dilution issues raised in the 2001 Valuation Letter are better addressed by redemption fees, limitations on exchange privileges and other trading controls.”

The SEC normally avoids being overly proscriptive, preferring to allow the industry the latitude develop to innovative ways of addressing the SEC’s concerns. In this case, however, many fund companies appear to be abusing that latitude to essentially not respond to the SEC’s concerns about shareholder dilution, and some have called for the SEC to become more proscriptive, particularly on the definition of a significant event and on the standards for the appropriateness of fair value prices.¹⁸ But the SEC has been subject to considerable political pressure on the issue from an industry that *opensecrets.org* ranks as the second largest political donor.¹⁹ On one

¹⁷Note that this statement is positing an extreme violation of market efficiency: that, e.g., *all* of the correlation between the 11:30 AM to 4:00 PM ET change in the U.S. market and 11:30 AM to 11:30 AM change in the price of a European security is due to post rather than pre-4 PM changes in the true value of the European security. While we do not observe the 4:00 PM values of most foreign securities, the evidence for the most liquid ADRs (Table 7) and the Nikkei future suggests that essentially all of the correlation is due to pre-4 PM changes in the value of the foreign security(ies), consistent with market efficiency.

¹⁸For example, Ciccotello, et. al. (2002) and industry sources cited in Sahoo (2001a).

¹⁹The SEC has also received other political pressure. An example is a September 13, 2001 letter from Congressman Thomas Tancredo (R-CO) expressing “alarm” at fair value pricing and at restrictions being imposed on international market timers. Tancredo specifically complained that he had had trading restrictions imposed on his personal account by a fund family. This letter and the

particular issue, the question of whether funds can substitute top-down adjustments for security-level valuation, some have interpreted Paul Roye, head of the SEC's Investment Management Division, as backing away from comments by Doug Scheidt, chief counsel of the division and author of the 2001 letter, that making only top-down adjustments is inadequate [ICI, 2002; Sahoo, 2001b and 2001c]. According to industry sources and Sahoo (2001f), the SEC has placed more emphasis on fair valuation in its recent compliance visits to mutual funds, but it is unclear whether they plan to require funds to fair value often and fully enough to substantially limit dilution or whether they will simply require funds to "monitor for significant events."

7 Who cares about shareholders?

The fact that the mutual fund industry is lobbying aggressively to avoid being forced to adopt a fairly low-cost solution to rather substantial shareholder dilution is suggestive of a conflict of interests between fund managers and their shareholders. An alternative hypothesis offered by some in the industry is that funds' resistance is motivated by legal concerns, particularly the fear of shareholder lawsuits based on the ex-post difference between fair value and future prices. There are reasons to doubt the legal explanation, particularly the fact that the SEC's position provides some cover for funds and that, arguably, continued dilution provides even greater grounds for shareholder action, but further light can be shed on these competing hypotheses by examining the relationship between fund governance and aggressiveness on the arbitrage issue.

Although the industry response to the arbitrage problem has been slow in aggregate, there are some exceptions. About 30 percent of international funds have short-term trading fees, mostly adopted in the last two years. As discussed above, Bar Association letter were obtained from the SEC via a Freedom of Information Act request.

short-term trading fees have limitations in their effectiveness in preventing arbitrage, but having them offers more protection to shareholders than not having them. In addition, a very limited number of funds have started either full or partial fair value pricing.

This section examines the determinants of funds' taking action to protect shareholders from arbitrage. While I will only be able to report factors that are correlated with protecting shareholders and will not be able to demonstrate that these factors are causal, the analysis of correlations is potentially informative.²⁰ I find that funds with lower expense ratios and fewer insiders on the board are more likely to have adopted short-term trading fees. Both of these results are consistent with earlier adoption by funds with governance that places higher priority on shareholder welfare.

I collected information on short-term trading fees and on board composition from prospectuses and Statements of Additional Information for as many international funds as possible. Table 8 reports probit regressions predicting fee adoption using expense ratio, board composition, and control variables. Funds with lower expense ratios and fewer insiders on the board are more likely to adopt short-term trading fees.

Place Table 8 about here

The magnitudes of these relationships are large: a standard-deviation reduction in expense ratio increases the likelihood of a short-term trading fee by 6 percentage points, while a standard-deviation reduction in the insider share of board seats increases it by 16 percentage points. The estimated signs of the control variables are

²⁰This analysis is in the spirit of Tufano and Sevick (1997), who find that mutual funds with fewer board insiders had lower expense ratios.

logical: fees are more common at Asian funds, small-cap funds, no-load funds, and funds with wider and non-size limited distribution. Interestingly, controlling for the asset holdings and other characteristics of the fund, more arbitrageable funds are less likely to adopt fees. One potential explanation of that result is that some funds may be less arbitrageable than their holdings would predict since they are using partial fair value pricing, and these funds might be more aware of the arbitrage issue and thus more likely to also have fees.

A small number of funds appear to have adopted full fair-value pricing. The largest is the Vanguard Pacific Stock Index fund; the coefficient from regressing next-day fund returns on the change in the S&P 500 fell from 0.32 from 1998-2000 to 0.00 (standard error 0.07) in 2001. The fact that Vanguard has both low expense ratios and more board outsiders is consistent with the results for short-term fees. Funds that cater to high frequency traders, such as the Rydex and Profunds Japan and Europe funds, have also adopted fair value pricing.²¹

8 Conclusion

This paper makes several points. First, NAV arbitrage is a widespread problem, and the resulting dilution of long-term shareholders has roughly doubled since 1998-9 to over \$4 billion per year. Second, the solutions adopted and advocated to date by the fund management industry have serious shortcomings, and most funds appear willing to defy regulators to avoid adopting fairly low cost full solutions. Third, while the industry has been surprising slow in moving to close the NAV arbitrage loophole, funds that appear to be better governed seem to be moving faster.

²¹Rydex and ProFunds Japan both index the Nikkei 225 index, so they can “fair value price” using the 4 PM ET Nikkei future price from the CME. Profunds Europe “fair values” by limiting itself to holding 35 very liquid ADRs and using mark-to-ADR pricing.

This set of facts is consistent with fairly severe agency problems in delegated fund management. The fact that funds are unwilling to spend 5 basis points per year to eliminate annual dilution of over 100 basis points suggests that they care less than 5 cents on the dollar about shareholder welfare.²²

A similar estimate can be made using the fact that Daly (2001) reports that at least three fund families that discourage market timing at daily frequencies are willing to allow it at monthly or quarterly frequencies in order to increase the size of their funds. From Table 6, one can infer that 12 and 4 well-timed roundtrips per year yield excess returns of 15-25 and 8-12 percent in international and small-cap funds without fees. The size-weighted average expense ratio of international funds is 115 basis points, and most asset management costs are fixed, so for simplicity assume that marginal fund-company profit from additional assets is 100 basis points. By allowing an additional \$1 of market timing, average annual assets increase by 50 cents and fund-company profits by 0.5 cents, but shareholders lose 8 - 25 cents. This suggests that funds companies that consciously allow monthly or quarterly market timing to increase their asset base care less than 2-6 cents on the dollar about shareholder assets.

But a simple back-of-the-envelope calculation suggests that fund management companies actually have greater incentives to prevent dilution than these calculations imply. Recent research on the slope of the inflow-performance relationship (e.g., Chevalier and Ellison, 1997) suggests that a \$1 of dilution reduces future inflows by roughly another \$1, thus reducing the future size of the fund by \$2. If one again assumes that margin profit from additional assets is 100 basis points, then \$1 of

²²This assumes that none of the 5 basis points could be passed onto shareholders in the form of higher expense ratios. It also ignores any additional costs of implementing fair value pricing other than fees paid to the data provider, but since fair valuing would eliminate the need for the monitoring that many funds were engaged in as of 2001, net of this saving, the additional cost may be minimal.

dilution costs a fund company 2 cents in flow profit per year. Applying a net discount rate of 10 percent (cost of capital less average future fund growth rate) in perpetuity suggests that \$1 of dilution costs the fund management 20 cents in reduced NPV of flow profits. Although these exact assumptions may be debatable, reasonable alternatives are unlikely to change the conclusion that fund management companies have a substantial interest in reducing dilution.

Taken together, these calculations imply that there is another layer of agency problems inside the management companies. One might expect that fund managers would have high-powered incentives based on the performance of their funds and thus have a strong interest in eliminating dilution, but in many management companies, decisions about fair value pricing are not made by fund managers, but rather by functional experts who could conceivably face strong incentives to maintain the status quo. Even if this is the case, one would need to explain why functional experts incentives are determinant in this case.

Two other possibilities exist. One is the legal risk argument mentioned above, although as discussed it is far from clear that funds minimize their legal risk by allowing dilution, especially given the SEC position. Another possibility, that one would hesitate to even suggest until all others are exhausted, is that fund management company employees directly benefit from allowing arbitrage. This might also explain why short-term trading fees and monitoring have been the dominant responses thus far, since these can be applied (or not applied) selectively. Even if this is not, in fact, the explanation, one might expect that the perception that it could be will be sufficient to spur action in the future, as NAV arbitrage becomes more widely understood.

References

- Becker, Kent G., Joseph Finnerty, and Joseph Friedman. 1993. "Economic News And Equity Market Linkages Between The U.S. And UK," 19 Journal of Banking and Finance 1191-1210.
- _____. _____ and Manoj Gupta. 1990. "The Intertemporal Relation Between The U.S. And Japanese Stock Markets," 45 Journal of Finance 1297-1306.
- Bhargava, Rahul and David A. Dubofsky. 2001. "A Note On Fair Value Pricing Of Mutual Funds," 25 Journal of Banking and Finance 339-354.
- _____. Ann Bose, and David A. Dubofsky. 1998. Exploiting International Stock Market Correlations With Open-End International Mutual Funds," 25 Journal of Business, Finance, and Accounting 765-773.
- Bouroukh, Jacob, Matthew P. Richardson, and Robert F. Whitelaw. 1994. "A Tale of Three Schools: Insights on Autocorrelations of Short-horizon Returns," 7 Review of Financial Studies 539-573.
- Bouroukh, Jacob, Matthew P. Richardson, Marti Subrahmanyam, and Robert F. Whitelaw. 2002. "Stale Prices and Strategies for Trading Mutual Funds," 58 Financial Analysts Journal 53-71.
- Brown, Stephen J., William H. Goetzmann, Takato Hiraki, Noriyoshi Shiraishi, and Masahiro Wantanabe. 2002. "Investor Sentiment in Japanese and U.S. Daily Mutual Fund Flows," NYU mimeo.
- Bullard, Mercer. 2000a. "Your International Fund May Have the 'Arbs Welcome' Sign Out," TheStreet.Com (June 10).
- _____. 2000b. "International Funds Still Sitting Ducks for Arbs," TheStreet.Com (July 1).

- Chalmers, John, Roger Edelen, and Gregory Kadlec. 2001. "On the Perils of Security Pricing by Financial Intermediaries: The Wildcard Option in Transacting Mutual-fund Shares," 56 Journal of Finance 2209-2236.
- Chevalier, Judith A. and Glenn D. Ellison. 1997. "Rick Taking by Mutual Funds as a Response to Incentives," 105 Journal of Political Economy 1167-1200.
- Ciampi, Peter and Eric Zitzewitz. 2001. "Fair Value Pricing to Solve the NAV Predictability Problem," FT Interactive Data White Paper.
- Ciccotello, Conrad, Roger Edelen, Jason Greene, and Craig Hodges. 2002. "Who's Minding the Mutual Fund Store: Addressing the Expropriation of Buy-and-Hold Investors' Wealth by Stale Price Trades," Georgia State mimeo.
- Daly, Gavin. 2002. "In Lean Times, Firms Reconsider Market Timers," Ignites.com, (April 19).
- Dodds, Colin. 2001. "Study: Inconsistent Valuation Practices Plague Industry," Ignites.com, (July 23).
- Edelen, Roger M. and Jerold B. Warner. 2001. "Aggregate Price Effects of Institutional Trading: A Study of Mutual Fund Flow and Market Returns," 59 Journal of Financial Economics 195-220.
- Engle, Robert, Takatoshi Ito and Wen-Ling Lin. 1990. "Meteor Showers or Heat Waves? Heteroskedastic Intra-daily Volatility in the Foreign Exchange," 58 Econometrica 525-542.
- Eun, Cheol and Sangdal Shim. 1989. "International Transmission of Stock Market Movements," 24 Journal of Financial and Quantitative Analysis 241-256.
- Froot, Kenneth A. and Emil M. Dabora. 1999. "How Are Stock Prices Affected by the Location of Trade," 53 Journal of Financial Economics 189-216.

- Goetzmann, William N., Massimo Massa, and K. Geert Rouwenhorst. 1999. "Behavioral Factors in Mutual Fund Flows," Yale mimeo.
- _____. Zoran Ivkovic, and K. Geert Rouwenhorst. 2001. "Day Trading International Mutual Funds: Evidence and Policy Solutions," 36 Journal of Financial and Quantitative Analysis 287-309.
- Greene, Jason T. and Charles W. Hodges. 2002. "The Dilution Impact of Daily Fund Flows on Open-end Mutual Funds," 65 Journal of Financial Economics 131-158.
- Hulbert, Mark. 2000. "Monitoring Trades for the Good of the Fund," New York Times, (April 9).
- Investment Company Institute. 2002. "Valuation and Liquidity Issues for Mutual Funds: 2002 Supplement." ICI White Paper.
- Lin, Wen-Ling, Robert Engle, and Takatoshi Ito. 1994. "Do Bulls and Bears Move Across Borders? International Transmission of Stock Returns and Volatility as the World Turns," 7 Review of Financial Studies 507-538.
- Lo, Andrew and Craig MacKinlay. 1990. "An Econometric Analysis of Nonsynchronous Trading," 45 Journal of Econometrics 181-211.
- Lucchetti, Aaron. 2000. "Frequent Trading Worries Fund Firms," Wall Street Journal, (September 22), C1.
- Sahoo, Alison. 2001a. "SEC Letter on Valuation Leave Questions Unanswered," Ignites.com, (May 22).
- _____. 2001b. "SEC's Roye Ties to Clear up Valuation Quagmire," Ignites.com, (August 31).
- _____. 2001c. "SEC on Valuation: It's How You Get There," Ignites.com, (September 5).
- _____. 2001d. "Fund Firms Lagging When it Comes to Valuation," Ignites.com, (October 18).

- _____. 2001e. "Funds Still Not up to Snuff on Valuation, Survey Says," Ignites.com, (November 19).
- _____. 2001f. "SEC Outlines Enforcement Agenda for New Year," Ignites.com, (December 18).
- Security and Exchange Commission. 1992. Protecting Investors: A Half Century of Investment Company Regulation. Washington D.C.: U.S. Government Printing Office.
- Stanton, Richard. 1999. "From Cradle to Grave: How to Loot a 401(k) Plan," 56 Journal of Financial Economics 195-220.
- Tufano, Peter and Matthew Sevick. 1997. "Board structure and fee-setting in the U.S. mutual fund industry," 46 Journal of Financial Economics 321-355.
- Zitzewitz, Eric. 2002. "Another Kind of 'Weekend Effect' in Financial Markets," Stanford University mimeo.

Table 1. Regressions predicting next-day fund returns, 1/98 - 10/01

Each row reports a regression that predicts the (equal-weighted) average next-day return for a given Morningstar asset class using current day changes in three predictive indices. Current-day changes are close (t-1) to close (t), except for the Nikkei future, which is the 4pm CME futures price less the spot close in Tokyo, and the SPY (S&P 500 exchange-traded fund) changes, which are intraday. "10-year T-bond" refers to the yield on the 10-year treasury bond. "Own NAV" is the current-day return for that fund category. For space reasons, funds classified as "Mid and Small-cap equity", "Municipal bonds", "Large-cap equity", and "Investment-grade bonds" are aggregated into super-categories.

Morningstar category	Regression predicting next-day NAV change using 3 indices						Predictive indices used for asset class		
	Index 1		Index 2		Index 3		Index 1	Index 2	Index 3
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.			
International equity	0.31*	0.04	0.16*	0.05	0.17*	0.05	SPY 11:30-4	SPY pre-11:30	Nikkei future
Diversified Emerging Mkts	0.33*	0.06	0.21*	0.06	0.19*	0.06	SPY 11:30-4	SPY pre-11:30	Nikkei future
Europe Stock	0.43*	0.05	0.11*	0.05	0.07	0.06	SPY 11:30-4	SPY pre-11:30	Nikkei future
Foreign Stock	0.34*	0.04	0.14*	0.05	0.16*	0.06	SPY 11:30-4	SPY pre-11:30	Nikkei future
Latin America Stock	0.25*	0.10	0.14	0.11	0.06	0.12	SPY 11:30-4	SPY pre-11:30	Nikkei future
World Stock	0.27*	0.05	0.12*	0.05	0.09*	0.05	SPY 11:30-4	SPY pre-11:30	Nikkei future
Diversified Pacific/Asia	0.43*	0.06	0.17*	0.06	0.25*	0.06	Nikkei future	SPY pre-11:30	SPY 11:30-4
Japan Stock	0.46*	0.08	0.03	0.08	0.20*	0.07	Nikkei future	SPY pre-11:30	SPY 11:30-4
Pacific/Asia ex-Japan	0.37*	0.08	0.30*	0.07	0.26*	0.07	Nikkei future	SPY pre-11:30	SPY 11:30-4
Mid and small-cap equity	0.29*	0.10	0.14*	0.06	-0.07	0.07	SPY 2-4	Russell 2000	S&P 500
Equity-debt hybrids	0.06*	0.01	0.07*	0.01	-0.01*	0.01			
Convertibles	0.27*	0.06	0.12*	0.03	-0.05	0.03	SPY 2-4	Russell 2000	10-year T-bond
Domestic Hybrid	0.06	0.04	0.03	0.02	-0.04	0.02	SPY 2-4	Russell 2000	10-year T-bond
High Yield Bond	0.56*	0.06	0.03*	0.005	-0.01	0.01	Own NAV	Russell 2000	10-year T-bond
Multisector Bond	0.01	0.01	0.04*	0.01	-0.02	0.01	Own NAV	Russell 2000	10-year T-bond
International bonds	0.12*	0.07	0.01*	0.02	-0.03*	0.02			
Emerg Mkts Bond	0.23*	0.09	0.03	0.02	-0.01	0.02	Own NAV	Russell 2000	10-year T-bond
International Bond	0.07*	0.03	0.11	0.007	-0.05*	0.01	Own NAV	Russell 2000	10-year T-bond
International Hybrid	0.09*	0.04	0.10*	0.01	-0.03*	0.01	Own NAV	Russell 2000	10-year T-bond
Municipal bonds	0.38*	0.05	0.003	0.003	-0.002	0.01	Own NAV	Russell 2000	10-year T-bond
Specialty equity	0.14*	0.09	0.10*	0.06	-0.04*	0.06			
Specialty-Communication	0.04*	0.13	0.09*	0.02	-0.14*	0.07	SPY 2-4	Phil Semi (SOXX)	10-year bond
Specialty-Financial	0.22*	0.10	0.04	0.04	-0.07	0.05	SPY 2-4	NYSE Financial	10-year bond
Specialty-Health	0.29*	0.10	0.07	0.04	-0.05	0.05	SPY 2-4	Russell 2000	10-year bond
Specialty-Natural Res	0.11*	0.03	0.08*	0.04	-0.01	0.07	Oil Index (XOI)	Russell 2000	SPY 2-4
Specialty-Precious Metals	0.11*	0.02	0.10*	0.05	-0.17	0.10	Gold Index (XAU)	Russell 2000	SPY 2-4
Specialty-Real Estate	0.30*	0.05	-0.02	0.02	0.14	0.04	MS REIT (RMS)	Russell 2000	SPY 2-4
Specialty-Technology	0.17*	0.05	-0.14	0.09	0.10	0.18	Phil Semi (SOXX)	Russell 2000	SPY 2-4
Specialty-Utilities	0.05	0.03	0.04	0.03	0.02	0.06	DJ Utilities	Russell 2000	SPY 2-4
Large-cap equity	0.10	0.09	0.03	0.06	-0.01	0.06	SPY 2-4	Russell 2000	S&P 500
Vanguard 500 Index	0.04	0.10	0.01	0.06	-0.02	0.07	SPY 2-4	Russell 2000	S&P 500
Investment-grade bonds	0.39*	0.12	0.005	0.005	0.05*	0.02	Own NAV	Russell 2000	10-year T-bond

Notes:

1. Asterisks indicate significance at the 5% level.

Table 2. Estimates of maximum-frequency trading strategy excess returns, 1/98 - 10/01

The annualized excess returns to a simulated trading strategy are reported for the (equal-weighted) average fund in each Morningstar category. For each year, 1998-2001, the predictive model in Table 1 is estimated using two years of prior data and applied out-of-sample. The single-index model uses only the "Index 1" given in Table 1 for the category; the multi-index model uses all three. Arbitrageurs are assumed to hold the asset class when predicted returns are greater than zero. Excess returns are defined as in equation (2) in the text: they are the returns to the arbitrage strategy less a proportionate mix of the fund and cash that has the same average exposure to the asset class.

Morningstar category	Annualized excess returns estimates			
	Single-index model		Multi-index model	
	Est.	S.E.	Est.	S.E.
International equity	32.8*	3.8	40.2*	3.7
Diversified Emerging Mkts	36.5*	4.8	44.5*	4.8
Diversified Pacific/Asia Stock	59.5*	4.6	53.5*	4.7
Europe Stock	39.1*	4.5	36.2*	4.5
Foreign Stock	34.1*	3.8	37.8*	3.8
Japan Stock	58.0*	5.6	43.2*	5.7
Latin America Stock	24.6*	7.7	31.1*	7.7
Pacific/Asia ex-Japan Stock	54.1*	5.5	51.1*	5.6
World Stock	26.1*	3.8	29.9*	3.8
Mid and small-cap equity	20.1*	5.5	26.2*	5.5
Equity-debt hybrids	7.7*	1.1	11.6*	1.1
Convertibles	22.7*	3.7	28.6*	3.8
Domestic Hybrid	5.6*	2.5	7.1*	2.5
High Yield Bond	12.3*	0.7	12.8*	0.8
Multisector Bond	3.2*	0.7	4.9*	0.7
International bonds	9.9*	1.8	7.4*	1.8
Emerg Mkts Bond	20.2*	3.7	16.7*	3.5
International Bond	5.7*	1.0	6.5*	1.0
International Hybrid	13.3*	1.4	16.4*	1.4
Municipal bonds	5.7*	0.5	3.6*	0.5
Specialty equity	12.5*	5.2	18.3*	5.3
Specialty-Communication	18.9*	7.7	28.5*	7.6
Specialty-Financial	12.5*	5.6	19.8*	5.7
Specialty-Health	23.3*	6.2	25.1*	6.3
Specialty-Natural Res	20.6*	5.2	16.5*	5.3
Specialty-Precious Metals	20.6*	7.0	22.5*	7.0
Specialty-Real Estate	25.6*	2.7	23.4*	2.7
Specialty-Technology	30.0*	11.1	38.6*	11.0
Specialty-Utilities	3.0	3.6	3.0	3.3
Large-cap equity	7.4	5.0	12.7*	5.2
Vanguard 500 Index	1.7	5.3	-1.7	5.2
Investment-grade bonds	3.0*	0.8	2.5*	0.8

Notes:

1. Asterisks indicate significance at the 5% level.

Table 3. Annualized excess returns by year -- international equity funds

As discussed in Section 3.4 of the text and summarized in equation (4), expected excess returns from a single-index model are proportional to the product of the NAV predictability coefficient and the average absolute deviation in the predictive variable. This table reports expected returns for a single-index model by year for international equity funds. In addition, it provides predictability coefficients and average absolute change data by year, so that, for example, the increase in arbitrage profitability from 1992-1996 to 1997-2001 can be decomposed into changes in market comovement and volatility.

Year	S&P coeff	Average absolute S&P change	Annualized excess returns Single-index model
1986	0.22	0.67	18.9
1987	0.22	1.13	31.8
1988	0.18	0.74	17.0
1989	0.25	0.58	18.4
1990	0.34	0.77	33.3
1991	0.28	0.67	23.6
1992	0.30	0.46	17.4
1993	0.21	0.40	10.6
1994	0.37	0.46	21.8
1995	0.42	0.37	19.7
1996	0.28	0.56	19.5
1997	0.36	0.85	38.5
1998	0.29	0.92	33.9
1999	0.32	0.90	36.6
2000	0.36	1.06	48.1
2001 (Jan.-Oct.)	0.25	1.08	34.3
1986 - 1991	0.25	0.76	23.8
1992 - 1996	0.31	0.45	17.6
1997 - 2001	0.32	0.96	38.8

Table 4. Annualized dilution of mutual funds in the TrimTabs sample

Daily dilution is calculated as the percentage difference between today's actual NAV and what today's NAV would have been if yesterday's inflows had been priced at the expected (fair value) rather than the actual stale price NAV: $\text{dilution}(t) = [A(t)/NAV(t) - A(t-1)/NAV(t-1)] / [NAV_FV(t-1) - NAV(t-1)] / A(t)$. Fair value NAVs are estimated exactly as predicted returns are estimated in Tables 1 and 2. Standard errors of the point estimates of dilution for the entire period are all less than one basis point for all categories except international equity, for international equity they are less than 10 basis points (SEs are heteroskedasticity-robust and adjusted for clustering within days). The last two columns report the total assets of all funds in the category according to Morningstar as of June 2001 and an estimate of total dilution, assuming that TrimTabs funds are representative. Given that TrimTabs funds may not be representative, this estimate should be treated with some caution.

	TrimTabs sample					Morningstar universe		
	Funds in sample	2/98 - 12/98	1999	2000	1/01 - 9/01	Average	Assets 6/01 (\$billions)	Annualized dilution at 2001 rate (\$billions)
International equity	165	0.66	0.46	0.63	1.14	0.69	416.7	4.34
Regionally focused funds (European, Japan, Pacific)	25	2.00	1.05	1.35	2.28	1.60	32.2	0.73
Global, Latin, and Diversified Emerging Market	74	0.32	0.20	0.18	0.25	0.23	187.5	0.41
General International Funds	66	0.59	0.51	0.81	1.47	0.81	217.0	3.20
Small and mid-cap equity	170	0.17	0.14	0.10	0.08	0.12	470.9	0.37
Equity-debt hybrids	134	0.01	0.01	0.01	0.01	0.01	402.2	0.05
International bonds	40	0.01	0.01	0.04	0.00	0.01	37.7	0.00
Municipal bonds	135	0.00	0.00	0.00	0.00	0.00	280.6	0.00
Specialty equity	67	0.42	0.36	0.36	0.14	0.33	214.3	0.29
Precious Metals	8	1.57	1.25	1.28	0.26	1.17	1.8	0.00
Large-cap equity	335	0.04	0.02	0.02	-0.01	0.02	2,089.8	-0.15
Investment-grade bonds	119	0.00	0.00	0.01	0.00	0.00	368.2	0.00
Total	1,165	0.16	0.11	0.13	0.17	0.14	4,698.9	4.90

Table 5. Timing of inflows in Trim Tabs data
 Dependent variable: change in log of shares outstanding (assets/NAV)

Each line is a regression of the change in the log of shares outstanding in a fund (a measure of the inflow-to-assets ratio) on current and lagged changes in the S&P 500 for a subset of the funds covered by Trim Tabs. The coefficients for international equity funds imply that large inflows are reported to Trim Tabs the day after an increase in the S&P 500, and that these inflows are followed by outflows the next two days. The dependent variable is log change in the number of shares outstanding, calculated as the end-of-day assets reported to Trim Tabs divided by that day's NAV. As we argue in the text, the evidence in this table is consistent with TT assets not reflecting current day flows, except for the market-timer funds.

	Obs.	Funds	dS&P(t)		dS&P(t-1)		dS&P(t-2)		dS&P(t-3)	
			Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
International equity funds	102,891	165	0.000	0.013	0.453*	0.018	-0.217*	0.014	-0.125*	0.013
Pre-flow, per Greene and Hodges	71,108	90	-0.002	0.013	0.409*	0.016	-0.188*	0.014	-0.103*	0.013
Post-flow, per Greene and Hodges	23,889	32	-0.003	0.026	0.558*	0.027	-0.279*	0.020	-0.165*	0.022
Not classified by GH	7,048	43	0.029	0.040	0.538*	0.061	-0.295*	0.051	-0.206*	0.061
Market timer funds (non-international)	2,730	3	1.332*	0.115	-0.175	0.127	-0.373*	0.115	-0.046	0.123
All other funds	660,652	997	0.001	0.003	0.028*	0.003	-0.012*	0.003	-0.002	0.003

Notes:

1. Asterisks indicate significance at the 5% level.
- 2.

While the purpose of this analysis is to determine whether Trim Tabs assets data include current day flows, it is fairly clear from the data that current-day NAV changes are consistently reflected in current-day asset figures. So assets(t)/NAV(t) as reported in Trim Tabs is shares outstanding either before or after day t inflows.

Table 6. Annualized excess returns with short-term trading fees, 1/98 - 10/01

This table examines the effect of short-term trading fees on arbitrage excess returns. The multi-index predictive model from Table 1 is estimated for each asset class and applied out-of-sample. Arbitrageurs are assumed to trade when expected excess returns are greater than 50 percent of the short-term trading fee. Expected excess returns are adjusted for the fact that out-of-sample actual return tend to be slightly less than predicted returns, as described in the text. The table first reports an estimate of the excess returns on the day following trading signals. The next set of columns uses this estimate to construct an estimate of annual excess returns, assuming that returns are symmetrically distributed and that excess returns on days when there is no trading signal are zero. The final set of columns report excess returns from the simulated trading strategy that does not make this assumption.

Category and Short-term fee	Roundtrips per year	Excess return per RT		Day-after-signal returns only		Annualized excess return estimates		Simulation results	
		Coeff	S.E.	Gross	Net	Gross	Net	Gross	Net
Pacific/Asia ex-Japan Stock									
0	56.2	0.97*	0.10	54.7*	54.7*	54.1*	54.1*	54.1*	54.1*
0.25	51.3	1.04*	0.10	53.5*	40.7*	53.4*	40.6*	40.6*	40.6*
0.5	38.8	1.28*	0.12	49.8*	30.4*	50.4*	31.0*	31.0*	31.0*
0.75	28.6	1.56*	0.14	44.6*	23.2*	47.0*	25.6*	25.6*	25.6*
1	19.5	1.79*	0.16	34.9*	15.4*	44.5*	25.0*	25.0*	25.0*
1.5	10.3	2.23*	0.22	23.0*	7.5*	29.2*	13.8*	13.8*	13.8*
2	5.8	2.74*	0.33	15.7*	4.2*	13.2*	1.7	1.7	1.7
2.5	3.7	2.98*	0.48	11.0*	1.8	0.3	-9.0	-9.0	-9.0
3	1.9	4.03*	0.73	7.5*	1.9	13.9*	8.3	8.3	8.3
3.5	1.0	4.59*	0.93	4.7*	1.1	-3.7	-7.2	-7.2	-7.2
Europe Stock									
0	54.2	0.75*	0.08	40.8*	40.8*	40.6*	40.6*	40.6*	40.6*
0.25	46.7	0.90*	0.08	42.1*	30.4*	41.4*	29.7*	29.7*	29.7*
0.5	31.1	1.11*	0.10	34.5*	18.9*	37.0*	21.4*	21.4*	21.4*
0.75	19.6	1.30*	0.13	25.5*	10.8*	29.3*	14.6*	14.6*	14.6*
1	12.1	1.41*	0.17	17.1*	5.0*	19.2*	7.2	7.2	7.2
1.5	4.4	1.92*	0.30	8.4*	1.8	8.6*	2.0	2.0	2.0
2	1.4	2.32*	0.46	3.2*	0.4	-3.8	-6.6	-6.6	-6.6
Small Growth									
0	50.8	0.73*	0.13	36.8*	36.8*	36.5*	36.5*	36.5*	36.5*
0.25	42.9	0.83*	0.13	35.5*	24.8*	34.9*	24.1*	24.1*	24.1*
0.5	25.0	1.04*	0.19	26.1*	13.6*	37.9*	25.4*	25.4*	25.4*
0.75	14.4	1.22*	0.28	17.6*	6.8	19.5*	8.7	8.7	8.7
1	8.5	1.65*	0.35	14.0*	5.5	10.9	2.4	2.4	2.4
1.5	2.6	2.03*	0.60	5.2*	1.4	11.3	7.5	7.5	7.5

Notes:

1. Asterisks indicate significance at the 5% level.

Table 7. Predictability of next-day ADR returns, 1995-2000

Dependent variable: log returns(t+1)

The predictability of next-day returns using current-day change in the S&P 500 is examined for securities identified as ADRs in the CRSP dataset. Interaction regressions suggest less predictability for large-cap and more heavily traded ADRs. Tests for non-linearities in the interaction terms do not reveal statistically significant quadratic or cubic effects (not reported). Average predictability is not significantly different in different years (not reported). Standard errors are adjusted for clustering within trading days.

ADRs	666	666	666
Observations	579,116	579,116	579,116
dS&P(t)	0.12*	0.34*	0.38*
	(0.03)	(0.07)	(0.07)
dS&P(t)*Ln(Market Cap)		-0.018*	
		(0.005)	
dS&P(t)*Ln[Daily volume in \$]			-0.020*
			(0.006)
Ln(Market Cap)/100		0.010*	
		(0.005)	
Ln(Daily volume in \$)/100			-0.007
			(0.005)
Quartiles for interaction variables		Ln(Market cap)	Ln(Volume)
0		0.6	1.8
25		10.7	11.3
50		11.9	13.1
75		13.3	14.8
100		18.6	22.1
Predictability slope at quartiles			
0		0.33	0.35
25		0.14	0.16
50		0.12	0.12
75		0.09	0.09
100		-0.01	-0.06

Table 8. Determinants short-term trading fee introduction by international equity mutual funds

Dependent variable: = 1 if fund has short-term trading fee by end of 2001

Probit regressions examine the econometric determinants of the introduction of short-term trading fees by the end of 2001. Each fund is one observation. Data on board of director composition is available from SAI for a subsample of the funds. Coefficients reported are marginal effects.

Specification	Probit regression		Probit regression		Summary statistics of RHS variables
	ST fee dummy	S.E.	ST fee dummy	S.E.	
Mean of dependent variable	0.31		0.33		Mean
Observations	982		674		S.D.
Pseudo R ²	0.09		0.13		
	Coeff.	S.E.	Coeff.	S.E.	
Expense ratio (in percent)	-0.09*	0.04	-0.07*	0.04	1.9
Percent of board that are "interested parties"			-0.81*	0.16	0.2
Daily excess return to maximum frequency arbitrage in 2000	-0.31*	0.08	-0.59*	0.21	0.6
Ln(Median Market Cap of Holdings)	-0.06*	0.02	-0.09*	0.02	9.2
Ln(Fund Assets)	0.01	0.01	0.02	0.01	3.4
Load fund dummy	-0.12*	0.04	-0.01	0.05	0.6
Ln(Brokerage networks distributed through)	0.18*	0.03	0.08	0.05	2.8
Dummy: minimum investment >= \$100k	-0.13*	0.06	-0.11	0.07	0.1
Fund category effects (World Stock category omitted)					0.3
Diversified Emerging Mkts	0.10	0.13	0.06	0.07	0.12
Diversified Pacific/Asia Stock	0.16	0.15	0.05	0.11	0.04
Europe Stock	0.07	0.13	0.00	0.08	0.12
Foreign Stock	0.04	0.11	0.00	0.05	0.45
Japan Stock	0.18	0.15	0.01	0.12	0.03
Latin America Stock	0.15	0.16	0.13	0.14	0.03
Pacific/Asia ex-Japan Stock	0.24	0.14	0.18	0.09	0.06

Notes:

1. Asterisks indicate significance at the 5% level.



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Personal Finance : Mutual Funds

International Funds Still Sitting Ducks For Arbs

By [Mercer Bullard](#)
 Special to TheStreet.com
 7/1/00 10:08 AM ET

A few weeks ago, I took foreign funds to task for hanging out an "Arbs Welcome" sign. These funds use stale prices to value their portfolios, thereby allowing arbitragers to make easy profits (at other shareholders' expense) by buying shares they know will rise with U.S. markets the next day.

I showed that shareholders in a dozen of these funds could have lost up to 2.5% of their assets overnight during a volatile two-day period in October 1997.

Since '97, some of these funds have removed the "Arbs Welcome" sign by improving portfolio valuation procedures, restricting frequent trading in fund shares and imposing redemption fees. But anecdotal and empirical evidence suggests that some of these efforts are half-hearted or ineffective and that the only solution to this problem may be regulatory action.

The most effective antidote to arbs is fair-value pricing. When closing market prices become stale because of events occurring after foreign exchanges have closed, portfolio managers should update the price, or net asset value, of their funds by using their own best estimates of fair market value. But critics of fair-value pricing say its subjective nature can give rise to a new set of abuses.

This debate is not simply academic. You need look back only to April to find a prime example of how an arbitrage opportunity can hurt shareholders. On Friday, April 14, the S&P 500 index fell 5.78% in U.S. trading. Asian markets followed suit the following Monday. Later that day, long after Asian markets closed, the S&P 500 rallied for a 3.25% gain. By 4 p.m. ET, when almost all funds price their portfolios, it was clear that Asian markets would rally on Tuesday.

How did some Asia-Pacific funds respond to these market events? They lighted up their "Arbs Welcome" signs in neon, using the lower,

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now-stale closing prices on Asian exchanges to value their portfolios.

Arb Bait

These funds appeared to be ripe targets on April 17 for arbitrageurs, who knew a decline in Asian markets would be reversed by a 3.25% rise in U.S. markets that day.

Fund	Change in NAV, April 14-17	Est. 1-Day Loss, April 17-18*	1-Day Loss as % of Fund Assets
<u>ABN AMRO Asian Tigers</u>	\$9.87 - \$9.15	\$322,200	0.81%
Chase Vista Japan	9.87 - 9.27	4,700	0.73
<u>Invesco Pacific Basin</u>	10.43 - 9.44	695,300	0.72
<u>Merrill Lynch Dragon</u>	11.40 - 10.47	160,300	0.67
Delaware New Pacific	7.58 - 7.08	6,700	0.56
Flag Investors Japanese Equity	26.75 - 24.74	36,700	0.48
<u>GAM Japan Capital</u>	12.71 - 12.02	7,500	0.41
<u>Capstone Japan</u>	7.16 - 7.01	17,848	0.31
Barr Rosenberg Japan Select	7.49 - 6.96	300	0.30
<u>GAM Pacific Basin</u>	11.48 - 10.79	2,400	0.22

Source: Morningstar. *Assumes arbitrageurs purchased 25% of fund's shares on April 14.

Not all of the funds mentioned above are equally vulnerable to arbs, however. Class B shares for the Chase Vista Japan and Flag Investors Japanese Equity funds carry stiff 5% deferred commissions payable upon redemption – enough to preclude arbitrageurs from profiting in just about any arbitrage scenario. Similarly, Invesco Pacific Basin charges a 2% fee on shares redeemed within three months of purchase, and class C shares for the Delaware New Pacific, GAM Pacific Basin and Merrill Lynch Dragon funds carry a 1% sales charge payable on redemption. Many funds also track frequent trading in order to identify arbitrageurs and deny them purchasing privileges.

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But none of these deterrents solves the problem of the daily dilution of fund assets caused by transactions occurring at inaccurate prices. Every time a shareholder buys fund shares at a stale price, other shareholders eat the difference. As money flows into and out of funds over time, the affect on shareholders as a group is negligible. But that's little solace to individual shareholders who, unknowingly, were on the short end of the bargain.

Some Funds Fair Value

If you want to invest in Asian markets and protect yourself against arbitrage-friendly funds, there is hope. There are at least 15 Japan and Asia-Pacific funds that state in their prospecti that they may fair value their portfolio securities if market prices become stale because of intervening events.

But whether funds that reserve the right to fair value actually do it is another question. For example, the Ivy China Region fund, which has one of the best fair-value statements, shot up 0.87% from April 17 to April 18; the U.S. Global China Region Opportunities fund rose 1.89%. If these funds were fair valuing, the price rise should have shown up a day earlier. In fact, funds that claim to use fair-value pricing gained an average of 0.70% from April 17 to April 18, a full 18 basis points more than for the non-fair-value funds listed in the table above. Fair-value funds may not have an "Arbs Welcome" sign out, but arbs may be more than welcome once inside.

The Guinness Flight China & Hong Kong fund has taken a different approach to the problem of arbitrage. It values its portfolio at 9:30 a.m. ET, which slices the 13-hour time lag between the close of the Hong Kong and New York exchanges to seven hours. Jim Atkinson, a director at Investec Guinness Flight, believes this fresh pricing approach is superior to the admittedly subjective process of fair-value pricing.

But K. Geert Rouwenhorst, a Yale School of Management finance professor who co-authored a study on the topic, disagrees. "Our analysis showed that using prices that were as little as seven hours old would still allow an arbitrage to make a killing. Arbitrage could simply use information gleaned from European markets, which would already have been open for five or six hours at 9:30 am ET, to game the system," he says.

The April example provides some support for Rouwenhorst's analysis. At 9 a.m. ET April 17, electronically traded S&P 500 futures contracts were up 1.2%, thus portending a positive day for trading on the S&P 500. In theory, an arb could have invested in the Guinness fund at 9:30 and

enjoyed a tidy 1.09% one-day profit.

Still, early-morning S&P 500 futures are weak indicators of the U.S. markets' performance that day. Guinness' fresh pricing approach, coupled with its 2% redemption fee, is likely to be far more effective at keeping arbs away than the efforts of funds whose fair-value policies are merely cardboard sheriffs.

Rouwenhorst argues that funds should fair value every day. He and his Yale colleagues, William Goetzmann and Zoran Ivkovic, found that one could trade foreign stock funds based solely on whether the S&P 500 had climbed or fallen during the day, and do more than twice as well, taking half the risk, as the funds' long-term shareholders.

Rouwenhorst says, "If we all agree that using NAVs based on stale prices is not a good idea, then the industry should develop fair value practices. There are approaches to fair-value pricing that would require very few computations and are based on a fairly simple model that captures most of the fair value adjustment." In fact, Rouwenhorst and his colleagues have developed such a model, which is described in his paper.

Fair Value Faulted

Meanwhile, Atkinson argues that fair-value pricing is inferior to his approach, in part because such a subjective determination of a fund's net asset value creates the potential for abuse. For example, a fund might misprice its portfolio under cover of a fair-value policy to reduce the volatility of its share price. Or it could use fair-value pricing on Dec. 31 to get an end-of-year boost in its performance. Atkinson is correct, but there's no escaping the fact that Guinness is still using stale prices.

It may be that the only effective solution to the problem of stale prices is to prohibit them. The SEC's current position is that a fund may — but is not required to — fair value portfolio securities when events that materially affect the value of the securities occur after the closing of the foreign exchange on which they trade. Last December, the SEC issued its first guidance on fund pricing in 30 years, but failed to prohibit the use of stale prices. Let's hope that the SEC doesn't wait another 30 years to fix the problem.

Mercer Bullard, a former assistant chief counsel at the Securities and Exchange Commission, is the founder and CEO of Fund Democracy, a mutual fund shareholders advocacy group in Chevy Chase, Md.

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Personal Finance : Mutual Funds

Your International Fund May Have the 'Arbs Welcome' Sign Out

By Mercer Bullard
 Special to TheStreet.com
 6/10/00 9:59 AM ET

Would you invest in a fund with a sign out front that said: "Arbitraders welcome." I hope not. Arbitraders prey on pricing discrepancies. When those pricing discrepancies involve mutual fund shares, shareholders are their victims.

Surprisingly, a number of funds have standing invitations to arbitraders to line their pockets at the expense of shareholders. These funds sometimes use stale prices to calculate their net asset value or NAV, thereby giving arbitraders an opportunity to buy shares at prices that they know will rise the next day. You might call this unfair. But it can and does happen in the heavily regulated world of mutual funds, where it goes by the civilized name of "dilution."

A fund's board of directors is responsible for preventing dilution. The directors are charged with ensuring that the fund's NAVs rise or fall to reflect changes in the value of the securities in its portfolio. Accordingly, funds usually base their NAVs on current market prices.

Some funds, however, use stale market prices. For example, funds whose portfolio securities trade on the **Hong Kong Stock Exchange**, which stops trading at 3 a.m. ET, typically value their portfolios at 4 p.m. ET. This is harmless as long as the value of funds' portfolio securities does not change between 3 a.m. and 4 p.m. But in this age of global markets and frictionless communication, 13 hours is an eternity. If these funds do not adjust their NAVs to reflect intervening events, shareholders may suffer dilution, or in plain English -- big losses.

Asian Crisis an Arb Opportunity

This is more than a theoretical possibility. On Oct. 28, 1997, on the heels of a 10% decline in the U.S. stock market, Asian markets dropped precipitously. By 4 p.m. ET, however, the U.S. markets had recovered. To anyone following the

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Asian markets, it was clear that those markets would follow suit when they opened for trading.

Unfortunately, this was not so clear to some mutual funds that invest in securities traded in Asian markets. These funds calculated their NAVs at the lower, 13 hours' stale closing prices on the exchange. Many arbitragers, knowing the funds' next-day NAV would rise, stood ready to exploit this pricing discrepancy.

Barry Barbash, then the director of the **Securities and Exchange Commission's** Division of Investment Management, reported that "large numbers" of arbitragers made a risk-free killing at the expense of other shareholders. They poured money into Asia/Pacific funds and sold them the next day, pocketing a one-day profit of around 10%. This profit came directly out of the pockets of the remaining shareholders.

How much did shareholders in Asia-Pacific funds lose because the funds used stale prices to value their portfolios? Not surprisingly, the funds aren't talking. But based on methodology suggested by the SEC, shareholders in many of these funds would have seen their accounts drop up to 2.5% overnight. Estimates of losses suffered by some funds are provided below.

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Table 1: Estimated Losses to Shareholders of Asia-Pacific Funds Due to Arbitrage

Asia-Pacific Fund	Change in NAV (%)	Estimated Losses (\$)	% of Fund Assets
<u>Guinness Flight China & Hong Kong</u>	\$13.76 - \$12.20	\$6.4 million	2.56
<u>Liberty-Newport Tiger</u>	\$9.14 - \$8.14	\$9.1 million	2.46
<u>AIM New Pacific Growth</u>	\$7.79 - \$6.76	\$3.5 million	2.39
<u>Matthews Pacific Tiger</u>	\$8.75 - \$7.86	\$80,000	2.26
<u>Merrill Lynch Dragon</u>	\$10.83 - \$9.81	\$9.7 million	2.08
<u>Eaton Vance Greater China Growth</u>	\$10.64 - \$9.65	\$3.7 million	2.05
<u>T. Rowe Price New Asia</u>	\$5.97 - \$5.45	\$16.7 million	1.91
<u>Van Kampen Asian Growth</u>	\$9.29 - \$8.52	\$1.4 million	1.81
<u>Templeton</u>	\$11.08 -	\$700,000	1.68

<u>Pacific Growth</u>	\$10.22	\$100,000	1.00
<u>MSDW Pacific Growth</u>	\$12.99 - \$11.99	\$10,000	1.67
<u>Kemper Asian Growth</u>	\$6.80 - \$6.34	\$50,000	1.45
<u>Scudder Pacific Opportunities</u>	\$11.44 - \$10.75	\$1.8 million	1.28

Source: Morningstar. * Assumes arbitragers purchased 25% of fund's shares on Oct. 28.

Notwithstanding these losses, Barbash insisted that using stale prices was consistent with SEC rules, even though the rules require that funds price securities at fair value if market quotations are not readily available, as was the case for Asian securities on Oct. 28, 1997. According to Barbash, funds that used stale prices argued that fair-value pricing involved "complicated judgment calls" and was too costly in light of the small risk that significant dilution would result from a failure to fair value.

In some cases, these arguments might hold water. But when the difference between old closing prices on a foreign exchange and current market values exceeds 10%, the judgment call is simple, and the potential for significant dilution is self-evident. Barbash promised a "comprehensive review of pricing issues" by the SEC in 1998.

Two years later, the SEC has finally reconsidered its position. In a letter to the fund industry issued last December (for which I was a contributor as a member of the SEC staff), the staff stated that under certain circumstances, funds were required to fair-value their portfolio securities. For example, the staff said that after an earthquake closed the **Taiwan Stock Exchange** for a number of days in September 1999, mutual funds were required to fair-value securities in their portfolios that traded on the exchange.

Arb Events On the Rise

The volatility that rocked October 1997 prices of Asian securities is not an isolated occurrence. Potential arbitrage events include unexpected occurrences, such as trading restrictions imposed in Malaysia in January 1999, an earthquake in Turkey last August, and the unscheduled closing of the Philippine stock exchange in March, as well as expected events, such as scheduled holidays in foreign countries on days when U.S. funds price their portfolios.

A recent study suggests that it doesn't take a major arbitrage event to cause substantial losses to shareholders. Two **Yale School of Management** finance professors, William Goetzmann and K. Geert Rouwenhorst, and a Yale graduate student, Zoran Ivkovic, considered the

effects of mispricing on 116 international mutual funds during the 17 months ending in June 1998. They estimate that trading on stale prices cost shareholders about \$1.5 billion during this period, or 0.44% of the funds' assets.

The increasing globalization of financial markets, coupled with faster access to market information, will increase the frequency of arbitrage events and the awareness of the opportunities presented by mispricing practices. This will lead to more opportunities for arbitragers, and mounting losses to long-term shareholders. In this light, it is difficult to understand why the SEC has not clarified that fair-value pricing in certain situations is not optional – it's legally required.

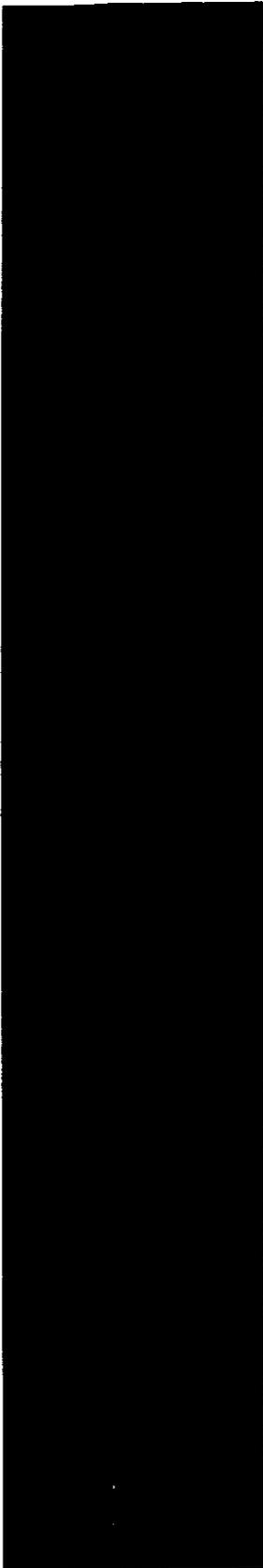
Will the SEC expressly require fair-value pricing any time soon? Paul Royce, the current director of the Division of Investment Management, says that "it's an issue that we recognize is out there, and we will be thinking about it as we continue to evaluate our policies on pricing and the need for further guidance in this area."

Steps Investors Can Take

Until the SEC sets funds straight, what can you do to protect yourself? It is not hard to spot funds with an "arbitragers welcome" sign out front. Look for funds that invest primarily in foreign markets in distant time zones, and that price their portfolios long after the exchanges in those markets close (usually at 4 p.m. ET).

Time Lag for Foreign Markets	
Foreign Exchange	Ahead of E.P. By
London Stock Exchange	5 hours
Bourse de Paris	6 hours
Istanbul Stock Exchange	7 hours
Moscow Stock Exchange	8 hours
Taiwan Stock Exchange	13 hours
Kuala Lumpur Exchange	13 hours
Philippine Stock Exchange	13 hours
Hong Kong Stock Exchange	13 hours
Tokyo Stock Exchange	14 hours

Next, check the funds' prospectuses. Stay away from the ones that do not clearly state that they may use fair-value prices instead of closing exchange prices if events occurring after the close of the markets have affected the value of the fund's portfolio securities. Of the Asia/Pacific funds listed above, only the **T. Rowe Price** and **AIM** funds have learned their lessons and adopted this policy. Of course, reserving this option does no good unless the funds' directors ensure that the



funds take advantage of it.

In contrast, the registration statement for the Merrill Lynch Dragon fund not only fails to reserve the fair-value option, it goes out of its way to confess that "events affecting the values" of its securities may occur between the closing of the exchange and the time they are priced, and these events "may not be reflected in the computation of the fund's net asset value." Now there's an invitation that no true arbitrageur could pass up.

If you are already invested in a haven for arbitrageurs, don't panic. There is a simple solution.

First, write to the fund's directors. Ask them to consider basing the fund's NAV on the next closing prices on the relevant exchange after the close of U.S. markets. Or ask them to change the fund's pricing policy to permit it to update its NAV when market prices are stale. The fund should prominently feature this policy in its prospectus. This will help deter arbitrageurs, whose trading can be costly to a fund even if its NAV is accurate.

If your directors opt for fair-value pricing, ask them to develop contingency pricing procedures to deal with extreme volatility, exchange closures, earthquakes and other potential market-shaking events. The directors may complain that this will increase the fund's compliance costs. Don't buy it.

First, this is what management fees are for -- saving you money. Second, these plans need not be perfect, nor should they try to be. They need only ensure that, following a major event, the fund's NAV is not so out of line as to risk significant dilution.

And while you're at it, if you were a shareholder of a fund invested in the Asian markets in October 1997, you might ask its directors whether the fund fair-valued its Asian securities on Oct. 28. If the answer is no, ask them how much of the fund's assets walked out the door in the pockets of arbitrageurs. And don't forget to ask them how they plan to make you whole.

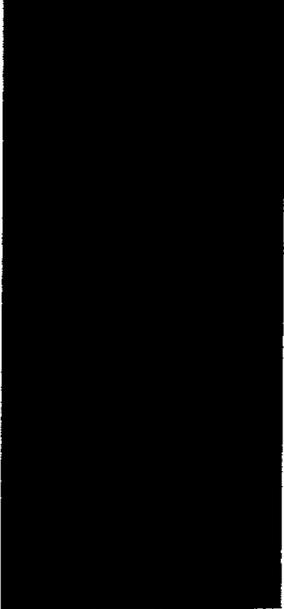
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