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Appendix A

Optimal and Operational Tail Risk Parameters

In this first listing, optimal and "working" tail-risk parameter settings *r**are provided for SP-100, and SP-500 DAC 2, DAC 3 for portfolio years indicated.

SP-100/500 Optimal r*					Operational Parameter Settings, r*				
SP100 Optimal		SP-500 r* by Group			SP100		SP500 , r* by group		
Year	r_tail	year	A	B	Year	r_tail	Year	A	B
1970	1.05	-	-	-	1970	1.05	-	-	-
1971	1.05	-	-	-	1971	1.05	-	-	-
1972	1.48	-	-	-	1972	1.45	-	-	-
1973	1.45	-	-	-	1973	1.45	-	-	-
1974	1.05	-	-	-	1974	1.05	-	-	-
1975	0.80	-	-	-	1975	0.80	-	-	-
1976	2.10	-	-	-	1976	2.10	-	-	-
1977	1.40	1977	0.80	0.80	1977	1.40	1977	0.80	0.80
1978	1.05	1978	0.72	0.70	1978	1.05	1978	0.70	0.70
1979	1.20	1979	0.70	0.85	1979	1.20	1979	0.70	0.85
1980	1.45	1980	1.07	1.05	1980	1.45	1980	1.05	1.05
1981	1.60	1981	1.05	1.05	1981	1.60	1981	1.05	1.05
1982	1.05	1982	0.70	0.75	1982	1.05	1982	0.70	0.75
1983	1.70	1983	0.96	1.05	1983	1.70	1983	0.95	1.05
1984	1.50	1984	0.90	0.95	1984	1.50	1984	0.90	0.95
1985	1.05	1985	0.74	0.65	1985	1.05	1985	0.70	0.65
1986	1.55	1986	0.98	0.90	1986	1.55	1986	0.95	0.90
1987	1.27	1987	0.80	0.80	1987	1.25	1987	0.80	0.80
1988	1.05	1988	0.62	0.75	1988	1.05	1988	0.60	0.75
1989	1.22	1989	0.75	0.75	1989	1.20	1989	0.75	0.75
1990	1.52	1990	0.87	0.90	1990	1.50	1990	0.85	0.90
1991	1.05	1991	0.60	0.57	1991	1.05	1991	0.60	0.55
1992	1.87	1992	1.20	1.20	1992	1.85	1992	1.20	1.20
1993	1.55	1993	0.80	1.05	1993	1.55	1993	0.80	1.05
1994	1.57	1994	0.97	0.97	1994	1.55	1994	0.95	0.95
1995	1.05	1995	0.72	0.75	1995	1.05	1995	0.70	0.75
1996	1.80	1996	0.85	0.95	1996	1.80	1996	0.85	0.95
1997	1.46	1997	0.79	0.90	1997	1.45	1997	0.75	0.90
1998	1.65	1998	0.95	0.95	1998	1.65	1998	0.95	0.95
1999	1.85	1999	0.95	0.95	1999	1.85	1999	0.95	0.95
2000	1.95	2000	1.30	2.00	2000	1.95	2000	1.30	1.75
2001	1.50	2001	0.90	0.90	2001	1.50	2001	0.90	0.90
2002	1.05	2002	0.80	1.00	2002	1.05	2002	0.80	1.00
2003	0.95	2003	0.60	0.55	2003	0.95	2003	0.60	0.55

In this second listing, operational r* for the 2-pass optimization (Re-DAC) is provided.

Operational Parameter Settings, r*

	SP-500 2-Pass (ReDAC)	
Year	Groups A-E	New Universe
1970	-	-
1971	-	-
1972	-	-
1973	-	-
1974	-	-
1975	-	-
1976	-	-
1977	1.30	1.05
1978	0.95	1.05
1979	1.10	1.15
1980	1.35	1.40
1981	1.50	1.55
1982	0.95	1.00
1983	1.40	1.40
1984	1.00	1.45
1985	0.95	1.00
1986	1.45	1.50
1987	1.15	1.20
1988	0.95	1.00
1989	1.10	1.15
1990	1.40	1.40
1991	0.95	1.00
1992	1.50	1.50
1993	1.20	1.20
1994	1.15	1.15
1995	0.95	1.00
1996	1.30	1.75
1997	1.35	1.35
1998	1.25	1.25
1999	1.25	1.25
2000	1.70	1.75
2001	1.40	1.05
2002	0.95	1.00
2003	0.85	0.90

Appendix B

Market Index Membership Matrix

Component membership for the SP-500 (SPX), SP-100 (OEX), Nasdaq 100 (NDX), and Dow 30 (DOW). Membership is denoted by a "1" in the appropriate column. Index composition as of 12/13/2003, updated for Dow additions/deletions effective 4/8/04.

Symbol	SPX	OEX	NDX	DOW	Symbol	SPX	OEX	NDX	DOW	Symbol	SPX	OEX	NDX	DOW
AA	1	1		1	ABI	1				ASO	1			
AXP	1	1		1	ABK	1				AT	1			
BA	1	1		1	ABS	1				ATH	1			
C	1	1		1	ABT	1				AV	1			
CAT	1			1	ACE	1				AVY	1			
DD	1	1		1	ACV	1				AW	1			
DIS	1	1		1	ADBE	1		1		AWE	1			
EK	1	1			ADCT	1		1		AYE	1			
GE	1	1		1	ADI	1				AZO	1			
GM	1			1	ADM	1				BBBY	1			1
HD	1	1		1	ADP	1				BBT	1			
HON	1			1	ADSK	1				BBY	1			
HPQ	1	1		1	AEE	1				BC	1			
IBM	1			1	AET	1				BCR	1			
INTC	1	1	1	1	AFL	1				BDX	1			
IP	1	1			AGN	1				BEN	1			
JNJ	1	1		1	AHC	1				BF.B	1			
JPM	1	1		1	AIV	1				BIIB	1			1
KO	1	1		1	ALTR	1		1		BJS	1			
MCD	1	1		1	AM	1				BK	1			
MMM	1	1		1	AMAT	1		1		BLI	1			
MO	1	1		1	AMCC	1				BLL	1			
MRK	1	1		1	AMD	1				BLS	1			
MSFT	1	1	1	1	AN	1				BMC	1			
PG	1	1		1	ANDW	1				BMET	1			1
SBC	1	1		1	AOC	1				BMS	1			
T	1	1			APA	1				BOL	1			
UTX	1	1		1	APC	1				BR	1			
WMT	1	1		1	APCC	1		1		BRCM	1			1
XOM	1	1		1	APD	1				BSC	1			
A	1				APOL	1		1		BSX	1			
AAPL	1		1		ASD	1				CA	1			
ABC	1				ASH	1				CAG	1			

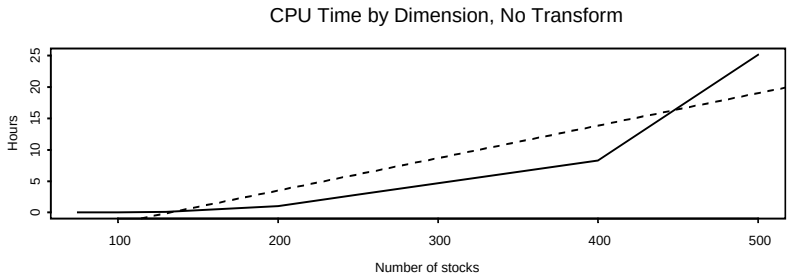
Symbol	SPX	OEX	NDX	DOW
CAH	1			
CB	1			
CBE	1			
CC	1			
CCE	1			
CCL	1			
CD	1			
CE	1			
CEG	1			
CF	1			
CFC	1			
CHIR	1		1	
CIEN	1		1	
CIN	1			
CINF	1			
CLX	1			
CMA	1			
CMCSA	1		1	
CMI	1			
CMS	1			
CMVT	1		1	
CNP	1			
COF	1			
COL	1			
COP	1			
COST	1		1	
CPN	1			
CPWR	1		1	
CR	1			
CSX	1			
CTAS	1		1	
CTB	1			
CTL	1			
CTX	1			
CTXS	1		1	
CVG	1			
CVS	1			
CVX	1			
CZN	1			
D	1			
DCN	1			
DDS	1			
DE	1			
DELL	1		1	
DG	1			
DGX	1			
DHR	1			
DJ	1			
DLX	1			
DNY	1			
DOV	1			
DPH	1			
DRI	1			
DTE	1			
DUK	1			
DVN	1			
DYN	1			
EBAY	1		1	
EC	1			
ECL	1			
ED	1			
EDS	1			
EFX	1			
EIX	1			
EMN	1			
EMR	1			
EOG	1			
EOP	1			
EQR	1			
ERTS	1		1	
ESRX	1		1	
ETN	1			
FBF	1			
FCX	1			
FD	1			
FDC	1			
FDO	1			
FDX	1			
FE	1			
FII	1			
FISV	1		1	
FITB	1			
FLR	1			
FNM	1			
FO	1			
FON	1			
FPL	1			
FRE	1			
FRX	1			
FTN	1			
GAS	1			
GCI	1			
GDT	1			
GDW	1			
GENZ	1			1
GIS	1			
GLK	1			
GLW	1			
GP	1			
GPC	1			
GPS	1			
GR	1			
GT	1			
GTW	1			
GWW	1			
HAS	1			
HBAN	1			
HCR	1			
HDI	1			
HLT	1			
HMA	1			
HOT	1			
HPC	1			
HRB	1			
HSY	1			
HUM	1			
IFF	1			
IGT	1			
INTU	1			1
IPG	1			
IR	1			
ITT	1			
ITW	1			
JBL	1			
JCI	1			
JCP	1			
JDSU	1			1
JHF	1			
JNS	1			
JNY	1			
JP	1			
JWN	1			
K	1			
KBH	1			
KEY	1			
KG	1			
KLAC	1			1
KMB	1			

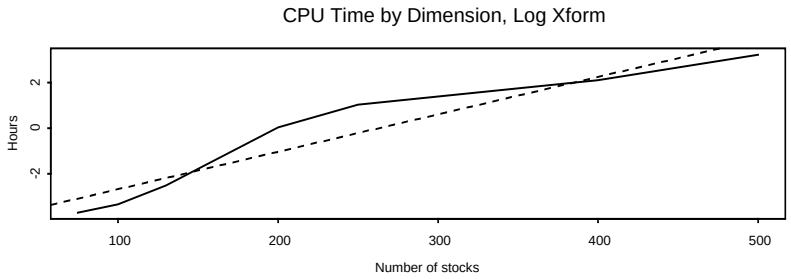
Symbol	SPX	OEX	NDX	DOW	Symbol	SPX	OEX	NDX	DOW	Symbol	SPX	OEX	NDX	DOW
KMG	1				NBR	1				PTV	1			
KMI	1				NCC	1				PVN	1			
KR	1				NCR	1				PWER	1			
KRB	1				NE	1				PX	1			
KRI	1				NEM	1				Q	1			
KSE	1				NFB	1				QCOM	1			1
KSS	1				NI	1				QLGC	1			1
LEG	1				NKE	1				R	1			
LIZ	1				NOC	1				RBK	1			
LLTC	1			1	NOVL	1				RDC	1			
LLY	1				NTAP	1			1	RF	1			
LMT	1				NTRS	1				RHI	1			
LNC	1				NUE	1				RIG	1			
LOW	1				NVDA	1			1	RJR	1			
LPX	1				NVLS	1			1	RKY	1			
LSI	1				NWL	1				ROH	1			
LTR	1				NYT	1				RX	1			
LUV	1				ODP	1				SAFC	1			
LXK	1				OMC	1				SANM	1			1
MAR	1				OXY	1				SBL	1			
MAS	1				PAYX	1			1	SBUX	1			1
MAT	1				PBG	1				SCH	1			
MBI	1				PBI	1				SDS	1			
MCK	1				PCAR	1			1	SEBL	1			1
MCO	1				PCG	1				SEE	1			
MDP	1				PCL	1				SFA	1			
MEL	1				PCS	1				SGP	1			
MERQ	1			1	PD	1				SHW	1			
MET	1				PEG	1				SIAL	1			1
MHP	1				PFG	1				SLM	1			
MHS	1				PGL	1				SLR	1			
MI	1				PGN	1				SNA	1			
MIL	1				PGR	1				SNV	1			
MKC	1				PH	1				SOTR	1			
MMC	1				PHM	1				SPC	1			
MNST	1			1	PKI	1				SPG	1			
MOLX	1			1	PLD	1				SPLS	1			1
MON	1				PLL	1				SRE	1			
MOT	1				PMCS	1				STI	1			
MRO	1				PMTC	1				STJ	1			
MTG	1				PNC	1				STT	1			
MU	1				PNW	1				SUN	1			
MWV	1				PPG	1				SUNW	1			1
MXIM	1			1	PPL	1				SVU	1			
MYG	1				PRU	1				SWK	1			
NAV	1				PSFT	1			1	SWY	1			

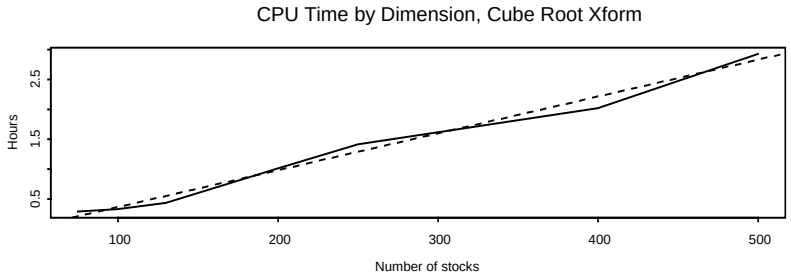
Symbol	SPX	OEX	NDX	DOW
SYK	1			
SYMC	1		1	
SYY	1			
TAP.B	1			
TE	1			
TEK	1			
TER	1			
TGT	1			
THC	1			
TIF	1			
TIN	1			
TJX	1			
TLAB	1		1	
TMK	1			
TMO	1			
TNB	1			
TRB	1			
TROW	1			
TSG	1			
TUP	1			
TXT	1			
TXU	1			
UCL	1			
UNH	1			
UNM	1			
UNP	1			
UPC	1			
UPS	1			
UST	1			
UVN	1			
VC	1			
VFC	1			
VMC	1			
VRTS	1		1	
WAG	1			
WAT	1			
WB	1			
WEN	1			
WHR	1			
WIN	1			
WLP	1			
WM	1			
WMI	1			
WOR	1			
WPI	1			
WWY	1			
WYE	1			
X	1			
XEL	1			
XL	1			
XLNX	1		1	
YHOO	1		1	
YUM	1			
ZION	1			
ZMH	1			
AEP	1	1		
AES	1	1		
AIG	1	1		1
ALL	1	1		
AMGN	1	1	1	
ATI	1	1		
AVP	1	1		
BAC	1	1		
BAX	1	1		
BCC	1	1		
BDK	1	1		
BHI	1	1		
BMY	1	1		
BNI	1	1		
BUD	1	1		
CCU	1	1		
CI	1	1		
CL	1	1		
CPB	1	1		
CSC	1	1		
CSCO	1	1	1	
DAL	1	1		
DOW	1	1		
EMC	1	1		
EP	1	1		
ETR	1	1		
EXC	1	1		
F	1	1		
G	1	1		
GD	1	1		
GS	1	1		
HAL	1	1		
HCA	1	1		
HET	1	1		
HIG	1	1		
HNZ	1	1		
LEH	1	1		
LTD	1	1		
LU	1	1		
MAY	1	1		
MDT	1	1		
MEDI	1	1	1	
MER	1	1		
MWD	1	1		
NSC	1	1		
NSM	1	1		
NXTL	1	1	1	
ONE	1	1		
ORCL	1	1	1	
PEP	1	1		
PFE	1	1		1
ROK	1	1		
RSH	1	1		
RTN	1	1		
S	1	1		
SLB	1	1		
SLE	1	1		
SO	1	1		
TOY	1	1		
TWX	1	1		
TXN	1	1		
TYC	1	1		
UIS	1	1		
USB	1	1		
VIA.B	1	1		
VZ	1	1		1
WFC	1	1		
WMB	1	1		
WY	1	1		
XRX	1	1		

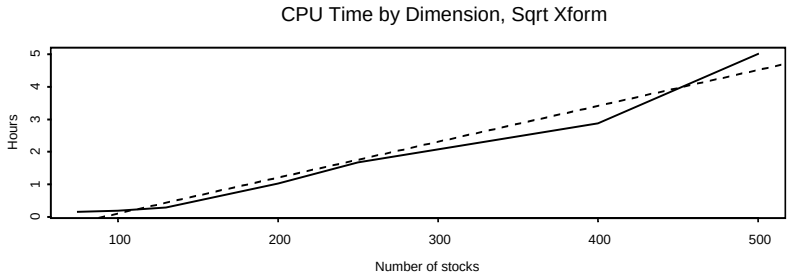
Appendix C

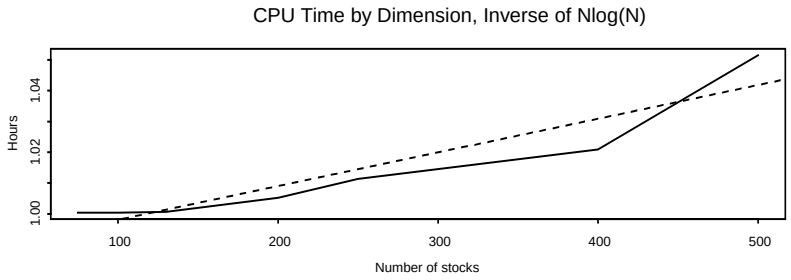
Transformation Reduction on Nelder Mead Convergence Time











Appendix D

Volatility Tables for Simugram Sample Returns

Table D.1, SP-100 Simugram Review of Returns

SP-100 Summary of Simugram Returns

	N=	105	100	100	112	124	120
N	Year	cs0	cs10	cs15	cs20	cs25	cs30
59	1970	-0.1103	-0.1216	-0.1282	-0.1510	-0.1955	-0.1974
60	1971	0.3290	0.2756	0.2607	0.2409	0.2200	0.1925
63	1972	0.4163	0.5739	0.6611	0.7175	0.7677	0.7975
64	1973	-0.0687	-0.0069	0.0849	0.0919	0.0800	0.0526
74	1974	-0.3113	-0.3248	-0.3600	-0.4021	-0.4428	-0.4875
75	1975	0.3953	0.5010	0.5324	0.4984	0.4759	0.4374
75	1976	0.3227	0.4877	0.4082	0.3573	0.3931	0.4293
75	1977	0.0008	0.0609	0.1615	0.2704	0.3628	0.4516
75	1978	0.1230	0.2366	0.3009	0.3481	0.0793	0.0368
75	1979	0.3854	0.5394	0.5642	0.5378	0.6124	0.5519
77	1980	0.6158	0.4961	0.4741	0.4243	0.3809	0.3929
77	1981	-0.1083	-0.0779	-0.0380	0.0078	0.0570	0.0528
77	1982	0.4861	0.6414	0.7217	0.7264	0.6508	0.6462
76	1983	0.3617	0.5138	0.6168	0.7701	0.8750	0.9205
78	1984	-0.0150	-0.0323	-0.0805	-0.1563	-0.1862	-0.2044
79	1985	0.3619	0.3500	0.3645	0.3691	0.3618	0.3518
80	1986	0.2933	0.3484	0.3872	0.4332	0.4874	0.5024
85	1987	0.1517	0.1616	0.1649	0.1942	0.2131	0.2211
85	1988	0.0021	-0.0206	-0.0056	0.0544	0.1023	0.0376
87	1989	0.3771	0.5186	0.5148	0.5581	0.6035	0.6393
87	1990	0.0764	-0.0067	-0.0585	-0.1688	-0.2172	-0.2504
87	1991	0.6909	0.9917	1.2672	1.3947	1.4705	1.4386
90	1992	0.3218	0.3459	0.3666	0.3703	0.4429	0.4351
92	1993	0.4944	0.8062	0.9518	1.0592	1.1074	1.2034
95	1994	0.0541	0.1293	0.2106	0.1839	0.2165	0.1951
96	1995	0.5118	0.5908	0.6475	0.6681	0.7642	0.8424
97	1996	0.3333	0.3462	0.2796	0.1393	0.1363	0.1277
97	1997	0.5146	0.5559	0.5852	0.6117	0.5911	0.5926
99	1998	0.7678	1.0410	1.4144	1.7320	2.0477	2.3857
99	1999	0.7341	1.0753	1.0837	1.0476	0.9970	0.9751
99	2000	-0.1392	-0.1956	-0.1958	-0.2223	-0.2913	-0.2632
99	2001	-0.1427	-0.1736	-0.1616	-0.1664	-0.1604	-0.1680
99	2002	-0.2499	-0.1894	-0.2210	-0.2241	-0.2371	-0.2736
Terminal $ Value		487.2	2297.4	4743.6	5165.8	5125.3	4716.4
mean %		0.242	0.316	0.357	0.373	0.387	0.396
	$\hat{\sigma}$	29.2%	37.2%	42.8%	48.0%	53.0%	57.7%
geomean % (annualized)		20.6%	26.4%	29.2%	29.6%	29.5%	29.2%

Table D.2, SP-100 Simugram Volatility of Returns

SP-100 Volatility of Simugram Returns							
	N=	105	100	100	112	124	120
N	Year	cs0	cs10	cs15	cs20	cs25	cs30
59	1970	1.04%	2.12%	1.96%	1.12%	0.69%	2.49%
60	1971	3.48%	2.81%	4.31%	5.08%	4.68%	2.58%
63	1972	0.98%	2.78%	3.87%	2.69%	3.72%	1.55%
64	1973	0.88%	1.65%	1.62%	10.86%	11.60%	6.97%
74	1974	0.63%	0.47%	1.33%	1.42%	1.45%	0.70%
75	1975	3.47%	5.06%	5.03%	7.60%	7.98%	4.94%
75	1976	1.65%	2.91%	7.19%	0.88%	0.37%	0.25%
75	1977	1.59%	0.83%	1.59%	3.47%	6.78%	4.72%
75	1978	0.98%	2.38%	3.06%	0.92%	7.66%	5.78%
75	1979	1.59%	3.55%	3.69%	0.31%	5.04%	5.12%
77	1980	1.73%	2.71%	3.35%	3.95%	1.06%	2.86%
77	1981	2.07%	3.32%	3.97%	6.23%	6.51%	4.47%
77	1982	0.61%	6.32%	14.08%	12.18%	13.24%	9.97%
76	1983	1.23%	4.50%	3.33%	1.10%	0.63%	0.92%
78	1984	1.44%	0.61%	1.24%	0.37%	0.24%	2.58%
79	1985	1.97%	2.87%	2.99%	2.11%	0.53%	0.57%
80	1986	1.53%	1.82%	2.24%	1.68%	4.50%	1.72%
85	1987	0.94%	2.56%	4.74%	3.26%	1.05%	1.67%
85	1988	1.22%	1.61%	3.58%	5.71%	8.37%	5.28%
87	1989	1.71%	5.48%	2.14%	2.57%	3.64%	4.02%
87	1990	2.58%	4.67%	4.13%	2.81%	1.25%	1.39%
87	1991	2.98%	3.04%	3.07%	2.89%	0.49%	0.78%
90	1992	4.63%	4.05%	4.86%	6.37%	0.75%	0.99%
92	1993	1.13%	1.29%	6.73%	5.69%	1.70%	6.89%
95	1994	0.81%	1.74%	1.09%	3.64%	12.93%	6.60%
96	1995	2.34%	2.19%	3.50%	8.42%	4.84%	4.37%
97	1996	1.73%	1.82%	3.70%	4.26%	4.11%	2.25%
97	1997	1.62%	1.90%	4.10%	9.25%	3.27%	2.46%
99	1998	4.96%	5.35%	4.59%	11.99%	13.74%	6.93%
99	1999	2.40%	9.54%	7.28%	9.05%	26.37%	18.55%
99	2000	2.02%	1.86%	2.48%	2.84%	0.28%	2.98%
99	2001	1.22%	1.90%	1.14%	2.61%	3.34%	3.22%
99	2002	1.73%	2.03%	3.24%	4.42%	3.20%	3.65%
	$\mu(\sigma)$	1.85%	2.96%	3.79%	4.48%	5.03%	3.95%
	$\sigma(\sigma)$	0.011	0.019	0.024	0.034	0.055	0.035

Table D.3, SP-500 Simugram Volatility of Returns

SP-500 Volatility of Returns

		cs0	cs0	cs0	cs0	cs0	cs0	cs25	cs25
	N=	105	2.5	3.3	5.65	12.5	16.5	2.92	5.73
N	Year	SP-100	DAC2-S2	DAC2-S1	DAC3-S1	DAC5-S5	reDAC5-S1	DAC5-S5	reDAC5-S1
397	1977	1.6%	0.9%	2.1%	2.3%	6.6%	4.1%	8.1%	0.3%
396	1978	1.0%	2.0%	0.7%	4.0%	31.5%	4.5%	26.0%	0.2%
396	1979	1.6%	6.3%	2.9%	1.5%	68.5%	6.1%	4.1%	5.5%
395	1980	1.7%	4.4%	4.3%	2.3%	76.6%	16.9%	8.4%	24.1%
392	1981	2.1%	2.7%	0.5%	3.6%	12.2%	3.9%	3.6%	0.2%
394	1982	0.6%	2.7%	2.7%	3.7%	84.9%	12.7%	6.2%	3.3%
395	1983	1.2%	2.4%	1.5%	1.9%	26.3%	6.9%	3.9%	1.1%
396	1984	1.4%	3.1%	--	1.7%	7.5%	2.8%	10.8%	6.1%
395	1985	2.0%	0.8%	3.6%	1.8%	68.3%	8.0%	14.9%	0.6%
387	1986	1.5%	1.7%	1.4%	1.6%	44.7%	6.6%	1.9%	3.3%
396	1987	0.9%	3.1%	1.6%	0.9%	12.2%	2.9%	4.0%	1.1%
396	1988	1.2%	3.5%	---	2.4%	7.7%	3.5%	9.7%	1.6%
388	1989	1.7%	0.5%	3.0%	1.7%	38.7%	9.1%	17.0%	1.7%
386	1990	2.6%	1.4%	1.8%	1.3%	11.6%	4.0%	3.3%	0.4%
383	1991	3.0%	1.1%	7.6%	3.2%	80.9%	14.7%	8.2%	15.3%
382	1992	4.6%	1.2%	3.9%	2.2%	17.3%	4.6%	10.6%	1.8%
383	1993	1.1%	0.1%	2.9%	1.7%	31.8%	11.0%	4.0%	14.6%
380	1994	0.8%	4.7%	4.3%	1.1%	3.3%	2.4%	8.9%	4.5%
496	1995	2.3%	3.7%	---	2.0%	53.7%	6.1%	15.5%	12.6%
494	1996	1.7%	1.7%	2.0%	1.2%	28.9%	5.1%	8.0%	2.2%
494	1997	1.6%	7.2%	---	1.8%	33.2%	6.3%	24.5%	0.3%
498	1998	5.0%	5.9%	4.3%	1.7%	38.9%	9.3%	14.7%	0.4%
494	1999	2.4%	n/s	8.9%	--	33.6%	16.2%	23.1%	12.9%
498	2000	2.0%	0.7%	1.5%	7.7%	23.0%	7.4%	7.8%	9.3%
495	2001	1.2%	4.2%	1.3%	1.9%	22.2%	4.4%	---	0.3%
496	2002	1.7%	1.8%	2.1%	2.1%	22.7%	5.8%	---	0.7%
	$\mu(\sigma)$	0.019	0.027	0.029	0.023	0.341	0.071	0.103	0.048
	$\sigma(\sigma)$	0.010	0.019	0.021	0.014	0.244	0.041	0.069	0.062

Appendix E

Graphical Summary of Returns

Table E.1 Graphical Return Summary, SP-100 Simugram Returns, CS0

SP-100 Simugram Returns - CS0

σ	[-.40, -.30)	[-.30, -.20)	[-.20 -.10)	[-.10, +.10)	[.10, .20)	[.20, .30)	[.30, .40)	[.40, .50)	[.50, .60)	[.60, .70)	[.70, .80)
1.0%			-0.110	1970							
3.5%				1971			0.329				
1.0%				1972				0.416			
0.9%				1973							
0.6%	-0.311			1974							
3.5%				1975				0.395			
1.6%				1976			0.323				
1.6%				1977							
1.0%				1978	0.123						
1.6%				1979			0.385				
1.7%				1980						0.616	
2.1%			-0.108	1981							
0.6%				1982				0.486			
1.2%				1983			0.362				
1.4%				1984							
2.0%				1985			0.362				
1.5%				1986		0.293					
0.9%				1987	0.152						
1.2%				1988							
1.7%				1989			0.377				
2.6%				1990							
3.0%				1991						0.691	
4.6%				1992			0.322				
1.1%				1993				0.494			
0.8%				1994							
2.3%				1995					0.512		
1.7%				1996			0.333				
1.6%				1997					0.515		
5.0%				1998							0.768
2.4%				1999							0.734
2.0%			-0.139	2000							
1.2%			-0.143	2001							
1.7%		-0.250		2002							

Table E.2 Graphic Return Summary, SP-500 Simugram Returns, CS0

NOTE: The SP-500 data is from DAC-3, Σ(w)=1

SP-500 Simugram Returns - DAC-3 Sum 1: CS0

σ	[-.40, -.30)	[-.30, -.20)	[-.20 -.10)	[-.10, +.10)	[.10, .20)	[.20, .30)	[.30, .40)	[.40, .50)	[.50, .60)	[.60, .70)
2.3%				1977						
4.0%				1978	0.179					
1.5%				1979		0.210				
2.3%				1980						
3.6%			-0.171	1981						
3.7%				1982		0.281				
1.9%				1983			0.328			
1.7%				1984						
1.8%				1985			0.379			
1.6%				1986		0.266				
0.9%				1987						
2.4%				1988						
1.7%				1989		0.294				
1.3%				1990						
3.2%				1991					0.571	
2.2%				1992	0.119					
1.7%				1993				0.450		
1.1%				1994						
2.0%				1995			0.296			
1.2%				1996			0.316			
1.8%				1997			0.386			
1.7%				1998				0.454		
n/a				1999						0.601
7.7%		-0.251		2000						
1.9%			-0.130	2001						
2.1%		-0.222		2002						

Appendix F
Epilogue: DAC-4 and 2003 Results

DAC-4 tests were coded and completed prior to the oral defense; at least 5 trials were obtained for each CS. The DAC-4 results did not continue the improvements seen in DAC-3, either for sum k or sum 1. The higher allocation in DAC-4 did a little better, and exceeded the SP-100 equal weight, but did not come close to the SP-100, nor to the SP-100 higher allocation results, and the drawdowns were typical for the higher allocation results. These are presented in tables F1, F2 and F3. The DAC4 CS0 results show slightly better variance that the DAC-2 or DAC-3, but the sample size is small and therefore this is most likely insignificant.

Table F.1 Summary results, SP-500 vs. SP-100 simugram vs. market, including DAC-4 Years 1977 –2002

Portfolio	Description	k	Σ(w)	TV	r_bar	sigma	r_geo
sp100	Simugram equal-wt	1	1	39.3	0.165	17.9%	0.152
sp100	Simugram mktcap	1	1	11.3	0.111	17.6%	0.098
Wilshire	Market Index Returns	1	1	10.4	10.8%	17.4%	9.4%
Dow 30	Market Index Returns	1	1	8.2	9.6%	15.8%	8.4%
Geomarket	Market Index Returns	1	1	8.4	9.6%	15.1%	8.5%
sp500	Market Index Returns	1	1	8.3	9.5%	14.8%	8.5%
sp100	**Mean Baseline, cs0**	**1**	**1**	**246**	**0.269**	**29.1%**	**0.236**
sp500	Baseline, 1-group	1	1	39.0	0.185	28.2%	0.151
sp500	DAC4 sum1, cs0	4	1	39.4	0.183	26.9%	0.152
sp500	DAC2 sum1, cs0	2	1	44.4	0.187	26.6%	0.157
sp500	DAC3 sum1, cs0	3	1	54.8	0.195	26.2%	0.166
sp500	ReDAC, cs0	5	1	36.9	0.176	25.2%	0.149
sp500	DAC2 sum2, cs0	2	2	43.5	0.181	23.9%	0.156
sp500	DAC5 sum5, cs0	5	5	21.0	0.136	16.2%	0.124
sp100	**Mean Baseline, cs25**	**1**	**1**	**5,125**	**0.387**	**53.0%**	**0.295**
sp500	DAC2 sum1, cs25	2	1	82.7	0.254	41.1%	0.185
sp500	DAC4 sum1, cs25	4	1	108.0	0.264	40.5%	0.197
sp500	ReDAC, cs25	5	1	50.6	0.229	39.8%	0.163
sp500	DAC3 sum1, cs25	3	1	113.4	0.252	36.2%	0.200
sp500	DAC2 sum2, cs25	2	2	40.1	0.201	34.8%	0.152
sp500	DAC5 sum5, cs25	5	5	35.9	0.177	26.5%	0.148

Table F.2 Epilogue comparative results for DAC-k, Sum 1

SP-500 Using Divide and Conquer - Epilogue

			DAC-k, Σ(w)=1, CS0				DAC-k Σ(w)=1 CS25	
N	Year	Geomkt	DAC1	DAC2	DAC3	DAC4	DAC3	DAC4
397	1977	-0.120	0.090	0.0898	0.0718	0.1108	0.067	0.1006
396	1978	0.006	0.117	0.1232	0.1793	0.1022	0.293	0.2912
396	1979	0.118	0.251	0.2288	0.2097	0.2478	0.124	0.2697
395	1980	0.226	0.663	0.7549	0.7028	0.7422	0.659	0.9382
392	1981	-0.091	-0.186	-0.1906	-0.1712	-0.1482	-0.114	-0.1449
394	1982	0.157	0.390	0.4200	0.2810	0.3043	0.219	0.2746
395	1983	0.188	0.311	0.3176	0.3279	0.3179	0.468	0.4216
396	1984	-0.012	-0.085	-0.0665	-0.1012	-0.0667	0.036	-0.1342
395	1985	0.271	0.304	0.3260	0.3792	0.3558	0.633	0.6060
387	1986	0.165	0.277	0.2864	0.2661	0.2695	0.477	0.3848
396	1987	0.012	0.090	0.0391	0.1027	0.0615	-0.007	0.0454
396	1988	0.125	-0.001	-0.0133	-0.0051	-0.0095	0.019	-0.0041
388	1989	0.264	0.299	0.3309	0.2939	0.3455	0.349	0.3462
386	1990	-0.068	-0.137	-0.1017	-0.0985	-0.1061	-0.120	-0.1866
383	1991	0.256	0.607	0.5199	0.5708	0.5125	0.789	0.6377
382	1992	0.049	0.055	0.0912	0.1187	0.0926	-0.091	-0.0010
383	1993	0.097	0.418	0.4661	0.4497	0.4950	0.896	1.0825
380	1994	-0.007	-0.009	0.0104	0.0447	-0.0140	-0.062	-0.0997
496	1995	0.336	0.270	0.2837	0.2964	0.2918	0.249	0.4129
494	1996	0.217	0.262	0.2510	0.3159	0.2622	0.385	0.4968
494	1997	0.276	0.314	0.3702	0.3863	0.3545	0.733	0.6637
498	1998	0.214	0.454	0.4125	0.4541	0.3478	0.616	0.8473
494	1999	0.222	0.772	0.5600	0.6011	0.6206	0.724	0.6073
498	2000	-0.094	-0.310	-0.2967	-0.2515	-0.3174	-0.259	-0.3665
495	2001	-0.108	-0.196	-0.1562	-0.1297	-0.2018	-0.114	-0.1894
496	2002	-0.208	-0.221	-0.1948	-0.2219	-0.2226	-0.417	-0.4481
Terminal $ Value		8.4	39.0	44	55	39	113	108
mean %		9.6%	18.5%	18.7%	19.5%	18.3%	25.2%	26.4%
	$\hat{\sigma}$	15%	28%	27%	26%	27%	36%	41%
Geomean % (annualized)		8.5%	15.1%	15.7%	16.6%	15.2%	20.0%	19.7%

Table F.3 Epilogue comparative results for DAC-k Sum 4, and ReDAC

SP-500 Using Divide and Conquer - Epilogue

		DAC-5, Σ(w)=5				ReDAC-5			
N	Year	cs0	cs20	cs25	cs30	cs0	cs20	cs25	cs30
397	1977	-0.0043	0.0889	0.0614	0.0848	0.0884	0.1215	0.0916	0.0658
396	1978	0.1098	0.1500	0.1226	0.1268	0.1319	0.3792	0.4632	0.4474
396	1979	0.2431	0.2987	0.2175	0.2243	0.2073	-0.0900	0.0164	0.0129
395	1980	0.4524	0.6880	0.7030	0.7567	0.7196	0.6977	0.5456	0.6371
392	1981	-0.0656	-0.1623	-0.1951	-0.1992	-0.1878	-0.1532	-0.1150	-0.0818
394	1982	0.3035	0.4270	0.3720	0.3405	0.4033	0.1772	0.2606	0.3808
395	1983	0.2170	0.2855	0.2782	0.2955	0.3296	0.1807	0.2577	0.3029
396	1984	-0.0353	-0.0901	-0.1173	-0.1187	-0.0843	-0.2735	-0.2788	-0.3012
395	1985	0.2739	0.3407	0.3478	0.3378	0.3260	0.7186	0.7487	0.7387
387	1986	0.1747	0.2472	0.2705	0.3076	0.2522	0.4442	0.4881	0.4940
396	1987	0.0470	0.1021	0.0451	0.0668	0.0910	0.0267	-0.1242	-0.1454
396	1988	0.0324	0.0714	0.0675	0.0984	0.0099	0.1520	0.1273	0.1357
388	1989	0.1757	0.2519	0.2963	0.2284	0.3265	0.2862	0.3403	0.3766
386	1990	-0.0503	-0.0877	-0.0733	-0.0681	-0.1160	-0.0776	-0.1018	-0.1103
383	1991	0.3195	0.5275	0.5184	0.5573	0.5837	0.5409	0.5627	0.5646
382	1992	0.1163	0.0503	0.0345	0.0125	0.0884	-0.1702	-0.1118	-0.1089
383	1993	0.2178	0.3942	0.4088	0.4598	0.4311	0.9200	0.9360	1.0605
380	1994	-0.0030	0.0447	-0.0247	-0.0208	0.0068	-0.1098	-0.0994	-0.0952
496	1995	0.2838	0.2576	0.2443	0.2680	0.2805	0.2107	0.2882	0.2949
494	1996	0.2260	0.2535	0.2780	0.2811	0.2536	0.5262	0.5103	0.4275
494	1997	0.2921	0.2576	0.2456	0.3034	0.3356	0.6331	0.8055	0.9540
498	1998	0.3001	0.4097	0.4115	0.4126	0.4585	0.5375	0.6260	0.7316
494	1999	0.2495	0.6628	0.7122	0.7261	0.6698	0.7449	0.7705	0.7269
498	2000	-0.1309	-0.2639	-0.2394	-0.3076	-0.2781	-0.3831	-0.3865	-0.5110
495	2001	-0.0911	-0.1476	-0.1828	-0.1622	-0.1463	-0.3106	-0.2666	-0.2446
496	2002	-0.1258	-0.1762	-0.2088	-0.2357	-0.2086	-0.3855	-0.4154	-0.4515
Terminal $ Value		21	49	36	39	48	33	51	52
mean %		13.6%	18.8%	17.7%	18.4%	19.1%	20.6%	22.8%	24.2%
	$\hat{\sigma}$	16%	25%	27%	28%	27%	38%	40%	43%
Geomean % (annualized)		12.4%	16.1%	14.8%	15.1%	16.1%	14.4%	16.3%	16.4%

Simugram returns for the out-of-sample data for the 2003 returns have been completed. Both SP-100 and SP-500 CS0 returns were calculated and appear in table F4.

Table F.4 Simugram Comparative results for 2003, CS0

2003 Out-of-Sample Results			
Wilshire 5000	**Geomarket**	**DJIA**	**SP-500**
0.294	0.270	0.253	0.264

Simugram	Maximum Allocation		
Portfolio	0.05	0.2	0.25
SP-100	0.238	0.390	0.338
SP-500 DAC-2	0.360		
SP-500 DAC-3	0.390		

Finally, comparative results for the combined period of 1977-2003 are retabulated and appear below in table F4. In it we can see the cumulative terminal value including the gains (finally!) in 2003. As can be seen in both tables F4 and F5 below, the SP-500 simugram portfolio outperformed the SP-100 portfolio in 2003, indicating the need for multi-period comparison. The multi-period comparisons in table F5 do show the SP-500 DAC-2 and DAC-3 simugram volatilities are about 10% lower than that of the SP-100 over the same period.

Table F.5 Epilogue Comparative results, 1977-2003, CS0

N	Year	Wilshire 5000	Market Geoindex	SP-100	SP-500 DAC Σ(w) = 1 DAC-2	DAC-3
75 / 397	1977	-0.070	-0.120	0.001	0.090	0.072
75 / 396	1978	0.040	0.006	0.123	0.123	0.179
75 / 396	1979	0.193	0.118	0.385	0.229	0.210
77 / 395	1980	0.522	0.226	0.616	0.755	0.703
77 / 392	1981	-0.084	-0.091	-0.108	-0.191	-0.171
77 / 394	1982	0.129	0.157	0.486	0.420	0.281
76 / 395	1983	0.187	0.188	0.362	0.318	0.328
78 / 396	1984	-0.013	-0.012	-0.015	-0.067	-0.101
79 / 395	1985	0.272	0.271	0.362	0.326	0.379
80 / 387	1986	0.125	0.165	0.293	0.286	0.266
85 / 396	1987	-0.007	0.012	0.152	0.039	0.103
85 / 396	1988	0.133	0.125	0.002	-0.013	-0.005
87 / 388	1989	0.249	0.264	0.377	0.331	0.294
87 / 386	1990	-0.093	-0.068	0.076	-0.102	-0.098
87 / 383	1991	0.303	0.256	0.691	0.520	0.571
90 / 382	1992	0.062	0.049	0.322	0.091	0.119
92 / 383	1993	0.086	0.097	0.494	0.466	0.450
95 / 380	1994	-0.025	-0.007	0.054	0.010	0.045
96 / 496	1995	0.334	0.336	0.512	0.284	0.296
97 / 494	1996	0.188	0.217	0.333	0.251	0.316
97 / 494	1997	0.292	0.276	0.515	0.370	0.386
99 / 498	1998	0.217	0.214	0.768	0.413	0.454
99 / 494	1999	0.220	0.222	0.734	0.560	0.601
99 / 498	2000	-0.118	-0.094	-0.139	-0.297	-0.251
99 / 495	2001	-0.121	-0.108	-0.143	-0.156	-0.130
99 / 496	2002	-0.221	-0.208	-0.250	-0.195	-0.222
99 / 482	**2003**	**0.294**	**0.270**	**0.238**	**0.360**	**0.390**
Terminal $ **Value**		13.5	10.7	304.3	60.4	76.1
mean %		11.5%	10.2%	26.8%	19.3%	20.2%
		17%	15%	29%	26%	26%
geomean % (annualized)		10.1%	9.2%	23.6%	16.4%	17.4%