

Target MOTAD

\$100,000 Investment Capital

	<u>Investment Options</u>		
	Futures	Stocks	Savings
year 1	0.250	0.060	0.034
year 2	-0.120	0.070	0.031
year 3	0.100	0.090	0.038
year 4	0.150	-0.010	0.040
year 5	0.080	0.090	0.036
year 6	-0.250	0.050	0.034
year 7	-0.030	0.050	0.041
year 8	0.130	-0.020	0.038
year 9	0.200	0.050	0.045
year 10	0.150	0.070	0.037
mean	0.066	0.050	0.037
std. dev.	0.147	0.035	0.004
C.V.	222%	71%	10%

Target MOTAD

Investment Portfolio Problem

Target MOTAD Formulation

$$\begin{aligned} \text{Max } E(z) = & 0.066 x_{FT} + 0.050 x_{ST} + 0.037 x_{SV} \\ \text{s.t.} & \\ & x_{FT} + x_{ST} + x_{SV} \leq 100,000 \\ & 0.250x_{FT} + 0.060x_{ST} + 0.034x_{SV} + y_1 \geq 5000 \\ & -0.120x_{FT} + 0.070x_{ST} + 0.031x_{SV} + y_2 \geq 5000 \\ & 0.100x_{FT} + 0.090x_{ST} + 0.038x_{SV} + y_3 \geq 5000 \\ & 0.150x_{FT} - 0.010x_{ST} + 0.040x_{SV} + y_4 \geq 5000 \\ & 0.080x_{FT} + 0.090x_{ST} + 0.036x_{SV} + y_5 \geq 5000 \\ & -0.250x_{FT} + 0.050x_{ST} + 0.034x_{SV} + y_6 \geq 5000 \\ & -0.030x_{FT} + 0.050x_{ST} + 0.041x_{SV} + y_7 \geq 5000 \\ & 0.130x_{FT} - 0.020x_{ST} + 0.038x_{SV} + y_8 \geq 5000 \\ & 0.200x_{FT} + 0.050x_{ST} + 0.045x_{SV} + y_9 \geq 5000 \\ & 0.150x_{FT} + 0.070x_{ST} + 0.037x_{SV} + y_{10} \geq 5000 \\ & 0.1y_1 + 0.1y_2 + 0.1y_3 + 0.1y_4 + 0.1y_5 + 0.1y_6 \\ & \quad + 0.1y_7 + 0.1y_8 + 0.1y_9 + 0.1y_{10} \leq L \end{aligned}$$

Target MOTAD Solution - \$100,000 Investment Capital - \$4,000 Income Target

Optimal Obj.	3,835	4,000	4,675	5,253	5,500	5,640	6,600
Risk (M)	498	585	1,331	2,021	2,825	3,560	10,400
Futures	2,091	0	8,511	15,789	31,250	40,000	100,000
Savings	92,205	76,923	35,461	0	0	0	0
Stocks	5,704	23,077	56,028	84,211	68,750	60,000	0

Target MOTAD Solution - \$100,000 Investment Capital - \$5,000 Income Target

Optimal Obj.	4,178	4,366	4,417	4,450	5,168	5,600	5,747	6,600
Risk (M)	1,794	1,842	1,864	1,890	2,748	4,150	4,920	11,000
Futures	2,198	1,695	1,053	1,470	10,526	37,500	46,667	100,000
Savings	65,934	50,847	46,154	44,118	0	0	0	0
Stocks	31,868	47,458	52,793	54,412	89,474	62,500	53,333	0

Target MOTAD Solution - \$100,000 Investment Capital - \$6,000 Income Target

Optimal Obj.	4,414	4,510	4,837	5,084	5,107	5,700	5,853	6,600
Risk (M)	3,180	3,183	3,326	3,516	3,547	5,475	6,280	11,600
Futures	7,414	6,205	2,105	5,263	6,667	43,750	53,333	100,000
Savings	54,183	45,346	15,385	0	0	0	0	0
Stocks	38,403	48,449	82,510	94,737	93,333	56,250	46,667	0

MOTAD Solution - \$100,000 Investment Capital

Optimal Obj.	3,732	3,762	3,815	4,000	4,287	5,155	5,667	5,836	6,600
Risk (M)	234	248	313	585	1,103	2,860	5,033	6,056	11,960
Futures	0	0	1,169	0	2,410	9,709	41,667	52,239	100,000
Savings	97,561	95,238	92,567	76,923	57,830	0	0	0	0
Stocks	2,439	4,762	6,264	23,077	39,759	90,291	58,333	47,761	0

Target MOTAD Solution - \$100,000 Investment Capital - \$5,000 Income Target

Optimal Obj.	4,178	4,366	4,417	4,450	5,168	5,600	5,747	6,600
Risk (M)	1,794	1,842	1,864	1,890	2,748	4,150	4,920	11,000
Futures	2,198	1,695	1,053	1,470	10,526	37,500	46,667	100,000
Savings	65,934	50,847	46,154	44,118	0	0	0	0
Stocks	31,868	47,458	52,793	54,412	89,474	62,500	53,333	0
