A Simheuristic Approach to Optimize Energy Consumption in the Single-Machine Scheduling Problem with Stochastic Processing Times

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Abstract

This paper addresses a stochastic single-machine scheduling problem with energy consumption. In this problem, job processing times are random variables, and total energy consumption depends on job scheduling, as each job has its own energy use and each period follows a Time-Of-Use tariff policy. To solve the problem, we propose a simheuristic algorithm that combines the metaheuristics Simulated Annealing and Greedy Randomized Adaptive Search Procedure to explore the solution space, along with Monte Carlo Simulation to better evaluate the solutions during the search. The solutions obtained are compared with those derived from a deterministic approach, and the results show that the simheuristic outperforms the deterministic method in terms of Average, Value at Risk, and Conditional Value at Risk, emphasizing the importance of incorporating uncertainty into the solution methods.

Keywords: Green Scheduling, Time-Of-use, Stochastic Processing Time.

1. SimSA-Expected X SimExact

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Table 1: Result of SimExact x `SimSA-Expected`

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
1	25	0.1	3.83	200.30	0.56	2.31	8.93	354	3319	-39.74%
2	25	0.1	6.48	187.00	0.63	2.48	2.36	308	3297	-61.80%
3	25	0.1	4.02	134.10	0.67	3.98	3.53	426	3847	-0.89%
4	25	0.1	3.86	374.80	0.83	3.19	2.86	437	3773	-17.35%
5	25	0.1	2.35	265.40	0.29	2.13	2.11	352	3090	-9.48%
6	25	0.1	3.97	228.40	0.27	3.01	2.23	381	3276	-24.32%
7	25	0.1	6.61	3604.91	0.12	1.89	2.04	364	3148	-71.38%
8	25	0.1	3.81	381.00	0.56	2.34	2.15	386	3246	-38.62%
9	25	0.1	3.83	346.40	0.50	2.42	2.42	349	3148	-36.83%
10	25	0.1	4.42	265.20	0.83	3.96	3.67	415	3405	-10.30%
11	25	0.1	8.75	366.60	0.26	2.28	2.92	361	3367	-73.93%
12	25	0.1	8.24	168.70	0.44	1.80	3.07	349	3074	-78.12%
13	25	0.1	3.95	285.30	0.01	2.30	1.44	348	2778	-41.68%
14	25	0.1	2.99	342.60	0.60	2.53	8.03	394	3652	-15.23%
15	25	0.1	2.75	257.20	0.15	2.41	2.05	345	2904	-12.06%
16	25	0.1	3.68	391.40	0.39	2.94	2.79	365	3275	-20.11%
17	25	0.1	8.36	243.80	0.37	2.61	1.99	311	3017	-68.76%
18	25	0.1	2.99	218.00	0.35	2.35	2.76	350	3391	-21.44%
19	25	0.1	14.16	638.00	0.24	14.02	2.13	337	3165	-0.95%
20	25	0.1	2.70	368.10	0.43	2.23	1.92	333	2995	-17.34%
21*	25	0.1	2.67	3607.43	0.45	2.39	2.12	310	2904	-10.56%
22	25	0.1	19.77	1070.50	0.07	19.44	3.03	462	4138	-1.64%
23	25	0.1	3.28	318.30	0.38	1.59	2.25	327	2887	-51.63%
24	25	0.1	7.86	194.20	0.47	1.97	1.71	284	2808	-74.89%
25	25	0.1	3.15	359.70	0.63	2.22	2.44	334	2972	-29.57%
26	25	0.5	7.28	342.30	0.44	6.00	19.31	1527	14265	-17.54%
27	25	0.5	10.78	214.00	0.76	6.76	53.66	1738	15239	-37.35%
28	25	0.5	8.85	240.50	0.31	8.42	44.55	1756	16186	-4.94%
29	25	0.5	8.44	458.20	0.75	6.90	42.91	1729	14762	-18.16%
30	25	0.5	6.61	276.10	0.30	6.44	35.27	1672	14129	-2.53%
31	25	0.5	8.26	297.40	0.39	8.11	41.09	1762	15963	-1.78%
32*	25	0.5	9.56	3617.21	0.19	5.92	34.53	1580	14319	-38.15%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
33	25	0.5	8.29	460.90	0.72	6.31	41.01	1605	15884	-23.93%
34	25	0.5	8.10	432.30	0.15	6.64	35.80	1661	14819	-17.96%
35	25	0.5	9.30	400.40	0.90	9.10	48.97	1719	15262	-2.18%
36	25	0.5	11.46	450.80	0.33	6.32	46.05	1744	14993	-44.85%
37	25	0.5	11.47	266.10	0.42	6.61	32.68	1700	14827	-42.37%
38	25	0.5	8.47	291.30	1.25	7.29	44.55	1635	15311	-13.88%
39	25	0.5	9.45	432.00	1.22	8.45	204.10	2130	19637	-10.54%
40	25	0.5	6.84	325.90	0.01	6.68	30.17	1576	14480	-2.35%
41	25	0.5	8.72	467.20	0.32	7.95	50.21	1675	16068	-8.76%
42	25	0.5	11.80	309.70	0.49	7.20	36.49	1572	14691	-38.93%
43	25	0.5	7.43	252.40	0.33	7.34	36.27	1709	15654	-1.16%
44	25	0.5	2.78	243.20	0.22	2.69	37.64	1640	15466	-3.25%
45	25	0.5	6.16	380.20	0.21	5.98	34.94	1562	14131	-2.97%
46*	25	0.5	7.02	3626.84	0.02	6.91	28.14	1559	13709	-1.55%
47	25	0.5	4.22	307.60	0.06	3.33	71.26	2265	20638	-21.21%
48	25	0.5	7.28	415.30	0.31	6.00	38.47	1624	14930	-17.54%
49	25	0.5	11.52	222.50	0.47	6.71	34.39	1693	14363	-41.78%
50	25	0.5	7.20	367.70	0.64	6.64	30.15	1605	14245	-7.75%
51	25	2.0	13.07	915.20	0.44	12.35	303.83	5326	47260	-5.52%
52	25	2.0	16.51	791.40	0.76	14.16	588.97	5890	52549	-14.23%
53	25	2.0	14.75	441.10	0.87	14.01	597.31	5749	50486	-4.98%
54	25	2.0	14.73	828.80	0.91	12.93	486.02	5303	48564	-12.22%
55	25	2.0	12.96	850.70	0.29	12.28	406.07	5402	47615	-5.30%
56	25	2.0	14.39	974.90	1.05	13.90	558.28	5418	51102	-3.45%
57*	25	2.0	14.45	3770.04	0.31	11.37	360.71	4917	44620	-21.36%
58	25	2.0	13.93	1099.90	0.90	12.84	488.31	5612	50543	-7.78%
59	25	2.0	13.30	777.40	0.26	12.36	429.53	5405	48186	-7.06%
60	25	2.0	14.92	751.20	0.86	14.23	539.26	5397	47578	-4.59%
61	25	2.0	15.48	630.90	0.35	12.28	488.30	5202	48575	-20.65%
62	25	2.0	15.50	904.60	0.60	12.80	521.06	5446	49819	-17.41%
63	25	2.0	14.26	584.70	1.52	13.37	946.72	5839	50658	-6.22%
64	25	2.0	20.16	616.70	1.22	18.16	3898.11	8269	72209	-9.92%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
65	25	2.0	14.48	640.90	1.45	13.39	578.84	5835	51753	-7.51%
66	25	2.0	16.85	607.20	0.32	16.16	611.14	6366	56216	-4.09%
67	25	2.0	16.38	710.20	0.82	13.10	425.87	5430	48372	-20.00%
68	25	2.0	14.46	813.00	0.30	14.11	523.76	5512	50979	-2.38%
69	25	2.0	7.54	359.20	0.24	7.41	458.64	5398	50068	-1.65%
70	25	2.0	12.16	879.60	0.29	11.51	358.55	4871	45564	-5.39%
71*	25	2.0	12.68	3844.08	1.82	12.07	447.32	5012	46057	-4.82%
72	25	2.0	10.59	405.10	0.07	9.72	899.41	7592	69111	-8.19%
73	25	2.0	12.72	882.40	0.38	11.80	446.76	5321	48942	-7.20%
74	25	2.0	16.52	937.60	0.46	12.90	390.05	5275	48162	-21.91%
75	25	2.0	12.38	765.90	0.64	12.23	331.00	5175	46287	-1.27%
76*	50	0.1	13.31	4289.80	0.24	12.88	3.48	340	3073	-3.24%
77*	50	0.1	2.54	3611.12	0.11	2.39	3.90	362	3210	-5.95%
78*	50	0.1	3.12	3610.67	0.02	2.33	3.31	381	3282	-25.16%
79*	50	0.1	4.75	3617.11	0.01	2.25	2.78	289	2902	-52.62%
80*	50	0.1	1.91	3636.41	0.09	1.84	3.68	363	2885	-3.40%
81*	50	0.1	4.99	3621.79	0.15	2.28	3.67	371	3218	-54.24%
82*	50	0.1	2.60	3611.40	0.02	2.30	2.83	314	3006	-11.44%
83*	50	0.1	2.43	3623.80	0.14	1.91	3.11	321	3077	-21.40%
84*	50	0.1	2.30	3623.38	0.26	2.22	3.30	355	3198	-3.50%
85*	50	0.1	3.42	3624.27	0.20	2.42	3.19	293	3111	-29.22%
86*	50	0.1	12.32	3999.92	0.17	12.19	3.01	318	2869	-1.06%
87*	50	0.1	12.41	3989.07	0.14	12.15	2.33	322	3112	-2.10%
88*	50	0.1	2.54	3623.76	0.27	2.47	4.09	356	3149	-2.42%
89*	50	0.1	5.30	3619.14	0.09	2.40	3.39	362	3152	-54.66%
90*	50	0.1	4.08	3622.31	0.05	2.33	3.40	339	3135	-42.79%
91*	50	0.1	2.87	3623.80	0.22	2.82	2.79	306	2917	-1.80%
92*	50	0.1	2.65	3623.15	0.01	2.65	3.09	323	3035	-0.19%
93*	50	0.1	2.33	3623.84	0.06	2.26	2.86	313	2902	-3.15%
94*	50	0.1	14.36	4053.18	0.12	13.64	2.77	307	2850	-5.03%
95*	50	0.1	2.05	3624.75	0.24	1.88	3.20	350	3090	-8.18%
96*	50	0.1	5.00	3617.77	0.15	2.78	3.68	370	3416	-44.41%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
97*	50	0.1	2.41	3629.96	0.19	2.07	3.13	344	2970	-13.74%
98*	50	0.1	3.18	3621.90	0.15	2.80	3.53	342	3092	-12.00%
99*	50	0.1	2.50	3616.26	0.21	1.93	3.25	323	3088	-22.98%
100*	50	0.1	4.32	3609.72	0.28	2.18	3.07	303	3152	-49.50%
101*	50	0.5	2.46	3605.90	0.13	2.43	37.22	1699	14407	-1.23%
102*	50	0.5	7.46	3621.85	0.14	7.39	45.69	1662	15390	-0.91%
103*	50	0.5	7.78	3620.20	0.11	6.87	41.93	1696	15168	-11.67%
104*	50	0.5	9.06	3627.14	0.19	7.30	45.92	1584	15245	-19.43%
105*	50	0.5	6.53	3669.47	0.12	6.05	41.04	1612	13863	-7.37%
106*	50	0.5	8.88	3642.91	0.14	6.81	43.04	1528	14901	-23.27%
107*	50	0.5	7.14	3668.60	0.04	6.81	42.92	1605	14992	-4.64%
108*	50	0.5	13.74	4052.75	0.32	13.57	49.93	1619	15235	-1.25%
109*	50	0.5	6.66	3645.66	0.30	6.51	37.78	1590	14725	-2.32%
110*	50	0.5	8.62	3650.40	0.17	7.87	47.33	1795	15831	-8.69%
111*	50	0.5	2.47	3623.50	0.17	2.41	40.73	1623	14710	-2.56%
112*	50	0.5	2.94	3619.58	0.22	2.39	42.25	1661	14322	-18.66%
113*	50	0.5	7.56	3644.29	0.14	6.81	44.76	1700	15100	-9.89%
114*	50	0.5	9.19	3643.95	0.06	6.98	36.68	1640	14675	-23.98%
115*	50	0.5	8.52	3643.58	0.05	7.43	52.08	1819	15630	-12.80%
116*	50	0.5	7.61	3648.49	0.28	6.85	41.90	1489	14732	-10.08%
117*	50	0.5	8.49	3647.74	0.17	7.00	51.41	1654	15229	-17.59%
118*	50	0.5	13.24	4029.41	0.13	12.97	36.34	1487	14757	-2.04%
119*	50	0.5	2.84	3624.77	0.04	2.18	38.20	1625	14737	-23.23%
120*	50	0.5	6.45	3644.03	0.24	6.20	41.55	1601	15021	-3.84%
121*	50	0.5	9.30	3627.63	0.23	7.12	55.87	1725	15370	-23.37%
122*	50	0.5	7.09	3646.86	0.29	6.33	41.53	1540	14317	-10.62%
123*	50	0.5	7.81	3638.27	0.21	7.63	51.80	1756	15785	-2.34%
124*	50	0.5	7.17	3626.09	0.28	6.48	42.39	1647	14537	-9.56%
125*	50	0.5	8.27	3619.02	0.51	6.71	44.86	1507	14612	-18.81%
126*	50	2.0	7.10	3660.80	0.15	6.65	438.96	5407	49006	-6.28%
127*	50	2.0	13.80	3742.81	0.11	13.58	493.45	5519	51196	-1.60%
128*	50	2.0	13.42	3720.23	0.12	12.83	429.89	5221	48831	-4.39%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
129*	50	2.0	15.08	3806.36	0.34	14.03	586.23	5529	50753	-6.93%
130*	50	2.0	12.15	4124.58	0.04	11.57	424.40	5041	46431	-4.82%
131*	50	2.0	13.96	3846.18	0.47	11.90	511.17	5226	48019	-14.76%
132*	50	2.0	13.52	3797.90	0.05	13.03	481.43	5514	49190	-3.60%
133*	50	2.0	7.08	3650.09	0.19	6.92	545.30	5684	50653	-2.28%
134*	50	2.0	11.84	4005.65	0.41	11.58	511.82	5139	47087	-2.25%
135*	50	2.0	14.95	4096.08	0.20	14.56	584.28	5794	52566	-2.60%
136*	50	2.0	6.70	3645.09	0.18	6.28	397.98	4900	46795	-6.20%
137*	50	2.0	7.18	3648.72	0.24	7.06	435.43	5370	47135	-1.63%
138*	50	2.0	13.71	4044.07	0.15	13.53	555.56	5424	50299	-1.35%
139*	50	2.0	14.16	3948.95	0.23	12.82	445.08	5238	48004	-9.45%
140*	50	2.0	14.47	4036.42	0.08	13.35	549.98	5664	50458	-7.75%
141*	50	2.0	13.54	4012.63	0.79	13.29	563.07	5531	49726	-1.88%
142*	50	2.0	14.09	4056.53	0.06	13.81	487.72	5416	49483	-1.95%
143*	50	2.0	6.92	3652.33	0.33	6.85	457.84	5432	49718	-1.04%
144*	50	2.0	7.06	3645.63	0.11	6.91	528.58	5683	51919	-2.15%
145*	50	2.0	11.93	3980.05	0.24	11.60	410.90	5279	45479	-2.77%
146*	50	2.0	15.39	3784.06	0.23	13.82	515.28	5711	51348	-10.20%
147*	50	2.0	13.24	3818.03	0.27	12.81	468.59	5573	48445	-3.20%
148*	50	2.0	14.55	3947.41	0.11	14.45	548.18	5847	53777	-0.65%
149*	50	2.0	12.87	3772.46	0.35	12.75	483.47	5256	49034	-0.92%
150*	50	2.0	14.10	3707.72	0.15	11.42	434.35	5343	46459	-19.05%
151*	75	0.1	2.41	3606.90	0.07	2.27	3.61	324	2923	-5.61%
152*	75	0.1	13.76	4018.50	0.15	13.74	4.19	336	3112	-0.17%
153*	75	0.1	3.03	3606.20	0.11	2.43	4.46	332	3251	-19.96%
154*	75	0.1	3.00	3615.41	0.10	2.27	3.63	346	3014	-24.53%
155*	75	0.1	6.91	3712.40	0.15	6.90	4.25	372	3144	-0.18%
156*	75	0.1	2.55	3615.45	0.19	2.15	3.86	344	3054	-15.67%
157*	75	0.1	13.28	3732.92	0.23	13.01	4.35	337	3057	-2.06%
158*	75	0.1	2.31	3615.57	0.15	2.10	3.94	311	2886	-8.99%
159*	75	0.1	2.44	3616.11	0.23	2.33	4.34	363	3182	-4.51%
160*	75	0.1	2.73	3613.54	0.15	2.05	3.98	310	2894	-24.84%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
161*	75	0.1	2.62	3616.25	0.10	2.41	5.26	381	3012	-8.13%
162*	75	0.1	2.54	3610.60	0.08	2.28	3.82	289	2866	-10.17%
163*	75	0.1	2.20	3605.80	0.09	2.16	3.67	321	2957	-1.76%
164*	75	0.1	13.06	3978.80	0.13	12.88	3.70	321	2802	-1.35%
165*	75	0.1	13.17	3723.88	0.20	12.94	4.25	366	2979	-1.75%
166*	75	0.1	2.80	3615.68	0.04	2.40	4.03	347	3094	-14.14%
167*	75	0.1	2.65	3614.89	0.23	2.62	4.51	326	3113	-0.96%
168*	75	0.1	2.37	3615.71	0.06	1.91	4.01	326	2973	-19.41%
169*	75	0.1	13.05	3754.21	0.12	12.97	3.28	316	3056	-0.66%
170*	75	0.1	2.53	3615.36	0.17	2.50	4.50	341	3220	-1.43%
171*	75	0.1	13.51	3738.69	0.05	11.97	4.03	364	2914	-11.36%
172*	75	0.1	2.68	3615.15	0.09	2.57	3.69	317	2953	-4.26%
173*	75	0.1	2.54	3614.02	0.05	2.36	3.85	304	3178	-7.25%
174*	75	0.1	2.34	3616.30	0.12	2.28	4.55	384	3245	-2.55%
175*	75	0.1	3.05	3623.43	0.11	2.73	4.84	377	3148	-10.61%
176*	75	0.5	6.92	3665.10	0.21	6.82	50.87	1592	14775	-1.37%
177*	75	0.5	2.42	3605.70	0.14	2.15	54.72	1793	15788	-11.43%
178*	75	0.5	8.04	3670.30	0.07	7.36	49.91	1751	15692	-8.42%
179*	75	0.5	7.20	3625.83	0.11	7.08	43.44	1599	14957	-1.68%
180*	75	0.5	2.60	3607.30	0.15	2.41	53.02	1700	14613	-7.41%
181*	75	0.5	7.39	3626.65	0.16	7.17	45.02	1701	15252	-2.94%
182*	75	0.5	2.44	3614.02	0.21	2.35	49.70	1587	14798	-3.72%
183*	75	0.5	6.86	3626.84	0.14	6.56	49.40	1596	14297	-4.42%
184*	75	0.5	7.01	3626.06	0.22	6.52	49.56	1662	14730	-6.99%
185*	75	0.5	7.31	3624.66	0.11	6.97	49.24	1673	15145	-4.63%
186*	75	0.5	7.53	3626.13	0.08	7.44	52.63	1770	15526	-1.09%
187*	75	0.5	7.57	3631.30	0.03	7.19	45.03	1740	15286	-5.10%
188*	75	0.5	6.52	3620.10	0.16	6.38	52.23	1627	14820	-2.25%
189*	75	0.5	2.71	3609.70	0.13	2.54	45.43	1532	14438	-6.22%
190*	75	0.5	2.52	3615.09	0.13	2.52	47.84	1615	14965	-0.36%
191*	75	0.5	7.39	3625.98	0.15	7.05	50.27	1579	15233	-4.62%
192*	75	0.5	13.07	3729.23	0.23	13.05	57.94	1736	15594	-0.17%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
193*	75	0.5	7.35	3625.73	0.13	6.65	49.93	1656	14652	-9.47%
194*	75	0.5	2.28	3616.54	0.26	2.27	50.67	1485	15244	-0.80%
195*	75	0.5	7.56	3626.31	0.22	7.11	55.38	1661	15499	-6.01%
196*	75	0.5	2.65	3615.08	0.17	2.28	46.11	1694	14922	-14.08%
197*	75	0.5	6.99	3624.52	0.11	6.93	47.10	1788	15107	-0.97%
198*	75	0.5	7.35	3624.74	0.08	7.30	55.48	1784	15973	-0.78%
199*	75	0.5	11.91	3721.12	0.14	11.55	47.16	1621	14353	-2.99%
200*	75	0.5	8.10	3633.66	0.09	7.73	55.49	1751	15832	-4.58%
201*	75	2.0	12.74	3809.00	0.11	12.46	432.28	5375	48659	-2.16%
202*	75	2.0	7.63	3645.50	0.17	7.04	618.55	5977	53451	-7.78%
203*	75	2.0	13.87	4060.70	0.18	13.16	585.97	5715	50252	-5.12%
204*	75	2.0	13.18	3728.00	0.23	13.07	502.49	5224	48638	-0.87%
205*	75	2.0	12.65	4086.60	0.07	12.28	432.23	5135	47594	-2.88%
206*	75	2.0	13.34	3728.05	0.31	13.32	529.50	5366	50016	-0.14%
207*	75	2.0	7.05	3626.84	0.22	6.95	547.73	5465	50063	-1.37%
208*	75	2.0	12.57	3748.83	0.16	11.51	481.91	5099	47644	-8.45%
209*	75	2.0	12.63	3737.31	0.19	12.31	473.09	5417	47875	-2.54%
210*	75	2.0	13.01	3731.27	0.11	12.85	584.50	5696	50439	-1.18%
211*	75	2.0	14.07	3742.84	0.07	13.56	520.24	5486	52188	-3.62%
212*	75	2.0	13.28	4104.80	0.04	13.16	434.23	5591	50208	-0.90%
213*	75	2.0	12.01	4364.50	0.09	11.75	450.73	5628	48084	-2.16%
214*	75	2.0	7.49	3742.80	0.11	7.05	446.81	5276	47683	-5.97%
215*	75	2.0	7.38	3624.47	0.24	7.28	506.57	5308	48848	-1.42%
216*	75	2.0	13.28	3735.99	0.13	13.07	516.20	5513	48266	-1.53%
217*	75	2.0	7.52	3625.88	0.26	7.44	508.44	5289	48578	-1.00%
218*	75	2.0	12.83	3737.52	0.12	12.55	474.24	5255	48578	-2.22%
219*	75	2.0	7.19	3629.29	0.25	7.13	529.55	5464	49668	-0.92%
220*	75	2.0	13.82	3743.85	0.13	13.61	571.95	5888	50099	-1.51%
221*	75	2.0	6.79	3625.73	0.14	6.65	483.48	5255	48812	-1.96%
222*	75	2.0	13.10	3732.00	0.10	13.01	323.69	5019	49098	-0.72%
223*	75	2.0	13.56	3740.45	0.16	13.45	594.90	5687	51306	-0.77%
224*	75	2.0	6.77	3626.57	0.04	6.32	583.58	5665	50148	-6.65%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
225*	75	2.0	14.49	3783.96	0.13	14.25	572.00	5640	51106	-1.63%
226*	100	0.1	7.94	3622.20	0.08	7.50	4.72	332	3104	-5.52%
227*	100	0.1	2.68	3693.47	0.14	2.37	5.57	342	3000	-11.64%
228*	100	0.1	12.61	4177.40	0.16	12.49	4.92	356	2877	-0.97%
229*	100	0.1	2.83	3692.54	0.10	2.21	4.51	330	2917	-21.96%
230*	100	0.1	2.73	3701.43	0.02	2.23	4.98	323	2946	-18.27%
231*	100	0.1	3.14	3689.92	0.06	2.46	5.22	375	3075	-21.66%
232*	100	0.1	2.72	3693.98	0.13	2.61	5.43	340	3102	-3.99%
233*	100	0.1	12.14	4284.02	0.23	11.82	3.78	361	3195	-2.66%
234*	100	0.1	13.13	4308.74	0.10	12.93	5.12	363	3098	-1.48%
235*	100	0.1	6.95	3736.23	0.16	6.80	4.41	330	3060	-2.07%
236*	100	0.1	2.86	3605.10	0.09	2.47	5.66	393	3181	-13.64%
237*	100	0.1	6.96	3740.43	0.04	6.95	5.48	356	2933	-0.08%
238*	100	0.1	7.45	3674.20	0.14	7.40	5.50	326	3146	-0.74%
239*	100	0.1	2.62	3685.80	0.11	1.87	5.31	331	3136	-28.73%
240*	100	0.1	7.30	3676.80	0.06	6.50	7.51	349	2965	-11.03%
241*	100	0.1	14.12	4425.62	0.07	13.34	7.62	312	3010	-5.54%
242*	100	0.1	12.83	4317.80	0.13	12.75	8.17	345	3003	-0.58%
243*	100	0.1	2.68	3691.62	0.16	2.67	5.25	330	3016	-0.45%
244*	100	0.1	2.41	3608.00	0.22	2.39	5.19	335	2975	-0.64%
245*	100	0.1	2.97	3694.13	0.11	2.26	5.67	369	3088	-23.93%
246*	100	0.1	2.77	3611.20	0.08	2.71	4.38	314	2875	-2.32%
247*	100	0.1	2.48	3615.60	0.06	2.29	4.54	359	3006	-7.80%
248*	100	0.1	4.35	3608.94	0.30	2.81	5.57	367	3326	-35.50%
249*	100	0.1	2.40	3611.90	0.01	2.15	3.63	358	3124	-10.20%
250*	100	0.1	3.41	3615.60	0.07	2.43	4.88	314	3004	-28.80%
251*	100	0.5	14.15	4379.00	0.09	14.02	55.77	1770	16008	-0.96%
252*	100	0.5	6.88	3736.54	0.05	6.73	57.22	1822	14901	-2.12%
253*	100	0.5	2.61	3611.10	0.18	2.24	50.16	1627	14798	-13.97%
254*	100	0.5	6.91	3729.63	0.12	6.66	44.31	1635	14994	-3.70%
255*	100	0.5	7.17	3744.79	0.02	6.71	39.85	1713	14601	-6.50%
256*	100	0.5	7.75	3729.32	0.11	6.80	46.09	1654	14666	-12.18%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
257*	100	0.5	7.10	3732.47	0.13	6.98	61.10	1806	15422	-1.64%
258*	100	0.5	2.09	3691.56	0.23	2.08	51.24	1637	14789	-0.62%
259*	100	0.5	2.75	3689.87	0.12	2.62	49.22	1603	15254	-4.72%
260*	100	0.5	2.43	3688.63	0.03	2.30	47.23	1501	14739	-5.00%
261*	100	0.5	7.85	3722.30	0.19	7.72	63.34	1769	15723	-1.57%
262*	100	0.5	12.55	4303.91	0.02	12.43	56.05	1648	15043	-0.93%
263*	100	0.5	13.60	4234.90	0.15	12.59	61.90	1874	15414	-7.41%
264*	100	0.5	7.31	3736.39	0.10	6.93	53.19	1637	15294	-5.20%
265*	100	0.5	12.68	3868.80	0.05	12.34	74.67	1675	15257	-2.70%
266*	100	0.5	2.97	3693.67	0.08	2.78	86.12	1632	15163	-6.63%
267*	100	0.5	2.55	3611.00	0.04	2.44	42.86	1719	15463	-4.32%
268*	100	0.5	7.75	3738.43	0.08	7.25	55.62	1719	15167	-6.53%
269*	100	0.5	7.62	3725.90	0.19	7.44	52.90	1717	15111	-2.36%
270*	100	0.5	7.86	3742.27	0.06	7.22	54.98	1714	15426	-8.14%
271*	100	0.5	7.16	3646.30	0.07	7.06	50.65	1692	15050	-1.38%
272*	100	0.5	12.61	11024.40	0.21	11.97	57.43	1732	14969	-5.07%
273*	100	0.5	8.62	3637.80	0.30	7.94	56.08	1782	15831	-7.89%
274*	100	0.5	7.20	3653.90	0.01	6.77	36.63	1623	15162	-5.97%
275*	100	0.5	8.05	3660.50	0.12	7.22	59.52	1647	15230	-10.24%
276*	100	2.0	2.77	3604.00	0.06	2.70	577.68	5538	51368	-2.58%
277*	100	2.0	12.95	4350.05	0.08	12.13	531.47	5166	50034	-6.34%
278*	100	2.0	7.32	3742.40	0.03	6.72	230.40	5574	49533	-8.28%
279*	100	2.0	12.63	4314.04	0.05	12.03	216.37	5458	47347	-4.74%
280*	100	2.0	12.47	4289.95	0.07	11.98	475.01	5357	46987	-3.96%
281*	100	2.0	13.01	4312.90	0.09	12.71	549.58	5607	49435	-2.29%
282*	100	2.0	13.16	4339.81	0.17	13.11	577.45	5595	49180	-0.34%
283*	100	2.0	6.96	3736.75	0.23	6.53	613.80	5561	49080	-6.19%
284*	100	2.0	7.27	3737.38	0.06	7.26	492.16	5564	50486	-0.18%
285*	100	2.0	12.36	4302.11	0.23	12.27	537.55	5481	48952	-0.76%
286*	100	2.0	14.39	3803.20	0.17	13.43	673.41	5855	51983	-6.67%
287*	100	2.0	2.49	3689.67	0.03	2.39	552.17	5466	48276	-4.23%
288*	100	2.0	3.03	3609.40	0.15	2.65	619.57	5604	51124	-12.63%

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Table 1: Result of SimExact X SimSA-Expected (Continued)

Inst	n	δ	**SimExact**		**SimSA-Expected**					**GAP$_{a,b}$(%)**
			E-RPD[(a)]	T(s)	D-RPD	E-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
289*	100	2.0	12.66	4323.21	0.06	12.59	488.05	5263	47983	-0.61%
290*	100	2.0	2.59	3609.30	0.11	2.34	712.85	5473	48406	-9.46%
291*	100	2.0	7.84	3738.96	0.12	7.33	799.12	5708	51804	-6.45%
292*	100	2.0	7.25	3668.60	0.11	7.08	510.01	5153	49437	-2.37%
293*	100	2.0	13.03	4351.22	0.09	12.97	477.87	5456	48364	-0.43%
294*	100	2.0	13.29	3835.40	0.03	13.11	229.74	5687	49507	-1.39%
295*	100	2.0	13.57	4349.52	0.05	12.89	525.43	5532	49791	-4.99%
296*	100	2.0	13.34	4244.40	0.06	13.18	523.26	5600	50335	-1.22%
297*	100	2.0	6.90	3632.40	0.12	6.88	457.71	5239	47942	-0.31%
298*	100	2.0	14.90	4134.42	0.30	13.61	558.75	5560	52383	-8.65%
299*	100	2.0	12.49	11021.80	0.17	12.43	465.35	5264	48393	-0.55%
300*	100	2.0	13.13	4045.80	0.10	12.53	536.40	5602	49935	-4.57%

Note: Instances marked with * correspond to cases in which the MILP did not reach the optimal solution when solved using the `SimExact` approach.

2. SimSA-VaR X SimExact

Table 2: Result of SimExact x `SimSA-VaR`

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
1	25	0.1	19.10	200.30	0.44	18.09	8.06	356	3307	-5.29%
2	25	0.1	21.31	187.00	1.04	18.03	2.60	337	3014	-15.42%
3	25	0.1	22.17	134.10	0.20	20.62	2.45	411	3699	-6.98%
4	25	0.1	21.27	374.80	0.60	20.32	1.92	346	3245	-4.46%
5	25	0.1	18.90	265.40	0.64	18.56	2.30	363	3038	-1.83%
6	25	0.1	20.96	228.40	0.50	19.55	2.26	354	3304	-6.73%
7	25	0.1	21.85	3604.91	0.23	16.53	1.75	314	2905	-24.37%
8	25	0.1	20.94	381.00	0.29	18.74	1.81	292	3041	-10.52%
9	25	0.1	19.47	346.40	0.35	17.92	2.13	379	3034	-7.97%
10	25	0.1	21.68	265.20	0.54	20.36	2.39	372	3268	-6.09%
11	25	0.1	22.92	366.60	0.44	18.26	2.24	345	3139	-20.32%
12	25	0.1	22.92	168.70	0.36	17.29	1.84	342	2969	-24.55%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
13	25	0.1	19.68	285.30	0.94	16.99	1.62	286	2683	-13.64%
14	25	0.1	20.79	342.60	0.34	19.88	2.93	357	3261	-4.35%
15	25	0.1	17.96	257.20	0.81	17.81	1.93	332	2935	-0.85%
16	25	0.1	22.03	391.40	0.37	18.26	2.57	348	2874	-17.10%
17	25	0.1	23.30	243.80	0.47	18.14	1.71	341	2968	-22.14%
18	25	0.1	19.57	218.00	0.36	18.07	3.20	411	3425	-7.64%
19	25	0.1	46.89	638.00	0.17	18.06	2.23	374	3106	-61.49%
20	25	0.1	18.74	368.10	0.32	17.88	2.68	338	2980	-4.60%
21*	25	0.1	18.03	3607.43	0.59	17.37	2.41	332	2945	-3.67%
22	25	0.1	53.88	1070.50	0.36	21.32	3.26	394	3513	-60.43%
23	25	0.1	19.78	318.30	0.59	16.43	2.45	311	2940	-16.96%
24	25	0.1	21.06	194.20	0.47	17.69	1.99	300	2928	-16.00%
25	25	0.1	19.30	359.70	0.81	17.23	2.46	347	2880	-10.74%
26	25	0.5	44.11	342.30	1.07	42.51	27.81	1576	13729	-3.63%
27	25	0.5	50.24	214.00	0.78	45.76	40.74	1739	15419	-8.91%
28	25	0.5	48.03	240.50	0.19	47.73	38.86	1805	16295	-0.63%
29	25	0.5	47.70	458.20	0.60	44.40	36.91	1693	14606	-6.90%
30	25	0.5	43.25	276.10	0.41	42.99	32.88	1519	14310	-0.60%
31	25	0.5	46.31	297.40	0.30	46.25	36.45	1747	15078	-0.13%
32*	25	0.5	43.80	3617.21	0.17	41.04	27.67	1531	13618	-6.30%
33	25	0.5	48.01	460.90	1.20	44.86	40.77	1755	15768	-6.55%
34	25	0.5	45.77	432.30	0.73	42.41	39.75	1595	14212	-7.35%
35	25	0.5	49.53	400.40	1.02	46.38	42.55	1586	14919	-6.35%
36	25	0.5	45.54	450.80	0.47	43.93	40.23	1719	14973	-3.54%
37	25	0.5	47.01	266.10	0.47	44.66	17.29	1632	14992	-5.00%
38	25	0.5	45.63	291.30	0.65	44.75	33.20	1694	14730	-1.93%
39	25	0.5	53.83	432.00	1.26	52.67	76.09	2160	19321	-2.16%
40	25	0.5	45.28	325.90	0.00	43.42	32.65	1632	14822	-4.09%
41	25	0.5	49.58	467.20	0.24	49.48	46.62	1891	16830	-0.20%
42	25	0.5	48.01	309.70	0.93	44.91	39.77	1613	14430	-6.47%
43	25	0.5	46.57	252.40	0.29	45.79	41.26	1792	15340	-1.67%
44	25	0.5	90.73	243.20	0.25	45.24	39.49	1669	15602	-50.13%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
45	25	0.5	42.22	380.20	0.47	41.49	37.17	1614	14052	-1.74%
46*	25	0.5	44.07	3626.84	0.79	43.06	32.03	1625	13784	-2.30%
47	25	0.5	115.70	307.60	0.80	53.88	71.51	1954	18099	-53.43%
48	25	0.5	44.56	415.30	0.17	43.35	41.04	1605	14600	-2.72%
49	25	0.5	47.67	222.50	1.03	42.77	43.07	1508	14084	-10.27%
50	25	0.5	44.37	367.70	1.03	44.21	41.99	1596	14034	-0.34%
51	25	2.0	86.96	915.20	0.27	85.52	362.27	5081	46399	-1.66%
52	25	2.0	92.69	791.40	0.88	91.74	486.80	5711	51099	-1.03%
53	25	2.0	91.23	441.10	0.63	88.21	451.42	5411	49240	-3.31%
54	25	2.0	90.63	828.80	0.61	86.19	377.38	5332	46863	-4.89%
55	25	2.0	87.91	850.70	0.38	85.54	445.75	5234	46282	-2.70%
56	25	2.0	90.33	974.90	0.71	89.76	454.33	5385	49253	-0.63%
57*	25	2.0	84.74	3770.04	0.44	82.22	413.85	5047	45284	-2.97%
58	25	2.0	89.88	1099.90	1.65	88.21	491.79	5572	49611	-1.85%
59	25	2.0	85.94	777.40	0.43	85.88	409.47	5454	47773	-0.07%
60	25	2.0	89.82	751.20	0.89	89.38	405.55	5314	48055	-0.49%
61	25	2.0	88.05	630.90	0.35	86.31	420.67	5301	48334	-1.98%
62	25	2.0	89.08	904.60	0.90	87.77	459.10	5337	48127	-1.47%
63	25	2.0	89.73	584.70	1.08	89.12	389.23	5143	47567	-0.68%
64	25	2.0	116.19	616.70	1.03	111.71	1053.66	7789	68871	-3.86%
65	25	2.0	92.45	640.90	1.25	92.05	580.14	6042	52756	-0.44%
66	25	2.0	101.54	607.20	0.22	101.14	588.01	6359	58268	-0.39%
67	25	2.0	89.11	710.20	0.42	86.53	368.91	5390	47189	-2.89%
68	25	2.0	93.35	813.00	0.22	93.31	497.16	5637	51253	-0.04%
69	25	2.0	91.06	359.20	0.27	90.26	476.84	5436	49283	-0.87%
70	25	2.0	83.23	879.60	0.16	81.95	321.88	5087	45608	-1.54%
71*	25	2.0	84.00	3844.08	0.64	82.06	288.66	4632	44784	-2.31%
72	25	2.0	115.91	405.10	0.14	114.59	965.39	7332	69347	-1.14%
73	25	2.0	87.78	882.40	0.39	85.99	488.24	5476	48375	-2.05%
74	25	2.0	88.16	937.60	0.63	87.10	463.23	5292	47667	-1.20%
75	25	2.0	84.55	765.90	0.56	84.49	426.70	5079	45848	-0.07%
76*	50	0.1	44.53	4289.80	0.24	17.61	3.71	374	3035	-60.47%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD$^{(a)}$	T(s)	D-RPD	V-RPD$^{(b)}$	T(s)	$\#\rho_S$	$\#\rho_L$	
77*	50	0.1	19.28	3611.12	0.11	19.07	3.71	353	3371	-1.08%
78*	50	0.1	19.71	3610.67	0.09	18.74	3.56	321	3381	-4.93%
79*	50	0.1	20.50	3617.11	0.12	17.90	3.55	347	2965	-12.73%
80*	50	0.1	17.69	3636.41	0.04	16.98	3.61	337	3056	-4.03%
81*	50	0.1	19.86	3621.79	0.15	16.92	3.92	379	3023	-14.80%
82*	50	0.1	18.19	3611.40	0.25	17.74	3.39	319	3121	-2.46%
83*	50	0.1	18.29	3623.80	0.29	18.19	3.58	320	3184	-0.56%
84*	50	0.1	18.18	3623.38	0.38	17.60	3.84	350	3083	-3.20%
85*	50	0.1	20.39	3624.27	0.17	17.87	3.76	320	2939	-12.32%
86*	50	0.1	43.27	3999.92	0.19	17.23	3.29	376	2881	-60.17%
87*	50	0.1	43.43	3989.07	0.21	18.16	2.59	333	3065	-58.17%
88*	50	0.1	18.08	3623.76	0.12	17.95	3.12	340	3210	-0.73%
89*	50	0.1	20.40	3619.14	0.05	17.67	2.98	331	2960	-13.40%
90*	50	0.1	20.42	3622.31	0.78	17.86	2.93	303	3046	-12.53%
91*	50	0.1	19.03	3623.80	0.34	18.19	3.12	351	2957	-4.42%
92*	50	0.1	18.65	3623.15	0.82	18.55	3.12	359	3172	-0.52%
93*	50	0.1	18.55	3623.84	0.16	17.49	2.66	284	2813	-5.67%
94*	50	0.1	45.44	4053.18	0.11	17.55	2.68	341	2762	-61.37%
95*	50	0.1	17.85	3624.75	0.60	17.42	2.92	256	3078	-2.40%
96*	50	0.1	20.26	3617.77	0.12	19.87	3.26	366	3458	-1.93%
97*	50	0.1	18.27	3629.96	0.39	17.79	2.88	273	2901	-2.65%
98*	50	0.1	19.68	3621.90	0.15	17.77	2.98	338	2938	-9.70%
99*	50	0.1	18.36	3616.26	0.32	18.24	3.23	300	3159	-0.67%
100*	50	0.1	18.50	3609.72	0.39	18.45	3.54	353	3153	-0.28%
101*	50	0.5	86.74	3605.90	0.16	43.23	42.85	1669	14604	-50.17%
102*	50	0.5	47.64	3621.85	0.11	46.81	48.62	1734	15285	-1.73%
103*	50	0.5	45.88	3620.20	0.79	44.65	50.93	1658	15391	-2.69%
104*	50	0.5	46.64	3627.14	0.19	45.52	51.05	1685	14733	-2.39%
105*	50	0.5	43.32	3669.47	0.08	42.53	43.14	1554	14308	-1.84%
106*	50	0.5	45.20	3642.91	0.23	43.38	49.40	1659	14426	-4.02%
107*	50	0.5	45.70	3668.60	0.14	44.98	46.40	1571	15283	-1.57%
108*	50	0.5	90.17	4052.75	0.30	44.63	49.04	1613	15192	-50.51%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
109*	50	0.5	44.40	3645.66	0.32	44.13	48.50	1593	14548	-0.60%
110*	50	0.5	47.42	3650.40	0.23	45.99	50.39	1562	15334	-3.01%
111*	50	0.5	84.82	3623.50	0.19	43.27	40.26	1552	14281	-48.98%
112*	50	0.5	85.78	3619.58	0.19	43.43	39.09	1494	14417	-49.37%
113*	50	0.5	45.01	3644.29	0.20	44.62	51.34	1682	15301	-0.87%
114*	50	0.5	45.57	3643.95	0.10	44.30	45.08	1469	14465	-2.78%
115*	50	0.5	45.56	3643.58	0.81	45.46	49.48	1617	15460	-0.23%
116*	50	0.5	45.79	3648.49	0.28	45.45	42.72	1577	14911	-0.75%
117*	50	0.5	47.67	3647.74	0.31	45.94	55.58	1726	15442	-3.62%
118*	50	0.5	88.20	4029.41	0.07	44.83	31.14	1646	15151	-49.17%
119*	50	0.5	91.36	3624.77	0.14	43.88	44.80	1680	14991	-51.97%
120*	50	0.5	42.78	3644.03	0.49	42.74	33.05	1499	14315	-0.09%
121*	50	0.5	47.21	3627.63	0.18	46.11	50.81	1692	15526	-2.33%
122*	50	0.5	44.76	3646.86	0.24	43.43	48.50	1662	14858	-2.97%
123*	50	0.5	46.88	3638.27	0.25	46.27	48.93	1747	15616	-1.31%
124*	50	0.5	44.99	3626.09	0.23	44.14	41.50	1600	14673	-1.88%
125*	50	0.5	45.32	3619.02	0.33	43.25	45.06	1583	14459	-4.57%
126*	50	2.0	87.01	3660.80	0.29	86.74	467.25	5297	48444	-0.31%
127*	50	2.0	91.65	3742.81	0.08	91.03	529.30	5427	50727	-0.67%
128*	50	2.0	87.17	3720.23	0.59	86.87	509.46	5365	48351	-0.35%
129*	50	2.0	91.65	3806.36	0.26	90.24	594.20	5696	50038	-1.54%
130*	50	2.0	83.80	4124.58	0.12	83.27	511.49	5084	46301	-0.63%
131*	50	2.0	86.06	3846.18	0.16	84.55	520.72	5485	47993	-1.76%
132*	50	2.0	88.91	3797.90	0.24	87.98	513.15	5471	49469	-1.05%
133*	50	2.0	90.59	3650.09	0.19	90.17	524.14	5580	50026	-0.46%
134*	50	2.0	85.03	4005.65	0.45	83.23	445.01	5138	45303	-2.11%
135*	50	2.0	95.12	4096.08	0.06	94.21	537.40	5846	52312	-0.96%
136*	50	2.0	85.27	3645.09	0.39	84.82	442.56	5183	46294	-0.53%
137*	50	2.0	84.52	3648.72	0.22	83.79	503.76	5558	47304	-0.86%
138*	50	2.0	91.58	4044.07	0.20	89.42	630.55	5716	50405	-2.36%
139*	50	2.0	87.06	3948.95	0.03	86.39	474.36	5454	48125	-0.77%
140*	50	2.0	90.40	4036.42	0.91	89.53	384.71	5358	49856	-0.96%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
141*	50	2.0	89.46	4012.63	0.31	87.53	471.20	6497	51278	-2.16%
142*	50	2.0	89.92	4056.53	0.01	89.14	489.28	5439	49613	-0.87%
143*	50	2.0	88.56	3652.33	0.15	87.89	462.27	5050	48560	-0.76%
144*	50	2.0	92.10	3645.63	0.14	91.13	578.47	5806	51126	-1.05%
145*	50	2.0	83.56	3980.05	0.51	83.24	430.14	5078	46211	-0.38%
146*	50	2.0	92.39	3784.06	0.28	92.02	576.61	5781	52166	-0.40%
147*	50	2.0	88.73	3818.03	0.40	87.20	556.91	5575	48379	-1.73%
148*	50	2.0	94.38	3947.41	0.22	93.87	624.30	5734	52547	-0.54%
149*	50	2.0	88.13	3772.46	0.32	88.05	514.46	5370	48483	-0.10%
150*	50	2.0	85.12	3707.72	0.46	85.07	538.39	5207	47582	-0.07%
151*	75	0.1	17.45	3606.90	0.20	17.04	4.25	294	2794	-2.35%
152*	75	0.1	45.69	4018.50	0.18	17.41	5.56	335	3049	-61.90%
153*	75	0.1	19.72	3606.20	0.19	18.74	6.36	380	3088	-4.99%
154*	75	0.1	19.56	3615.41	0.19	18.35	5.46	397	3116	-6.20%
155*	75	0.1	44.14	3712.40	0.08	17.67	4.91	374	2985	-59.96%
156*	75	0.1	18.37	3615.45	0.47	17.60	4.52	331	3011	-4.22%
157*	75	0.1	45.66	3732.92	0.23	17.57	4.47	306	2998	-61.52%
158*	75	0.1	17.44	3615.57	0.14	17.35	4.22	294	2877	-0.53%
159*	75	0.1	17.88	3616.11	0.23	17.85	5.68	311	2960	-0.18%
160*	75	0.1	19.33	3613.54	0.18	18.49	5.30	353	3132	-4.34%
161*	75	0.1	19.23	3616.25	0.07	18.71	4.81	375	3158	-2.73%
162*	75	0.1	17.99	3610.60	0.08	17.74	4.76	355	2976	-1.41%
163*	75	0.1	17.61	3605.80	0.47	17.41	4.17	336	2884	-1.16%
164*	75	0.1	44.57	3978.80	0.25	18.26	5.15	323	3047	-59.03%
165*	75	0.1	43.72	3723.88	0.20	18.58	4.82	341	3154	-57.49%
166*	75	0.1	19.11	3615.68	0.13	18.24	4.64	311	3139	-4.58%
167*	75	0.1	18.95	3614.89	0.25	18.62	5.42	373	3201	-1.73%
168*	75	0.1	17.76	3615.71	0.17	17.48	4.23	271	2819	-1.58%
169*	75	0.1	45.85	3754.21	0.22	18.10	5.00	406	3297	-60.51%
170*	75	0.1	18.61	3615.36	0.17	18.13	4.45	334	3152	-2.58%
171*	75	0.1	45.02	3738.69	0.27	18.05	4.51	307	3110	-59.89%
172*	75	0.1	18.47	3615.15	0.23	18.28	4.41	334	3048	-1.00%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
173*	75	0.1	19.01	3614.02	0.09	17.19	4.48	354	2923	-9.57%
174*	75	0.1	17.64	3616.30	0.13	16.16	4.59	316	2704	-8.38%
175*	75	0.1	19.72	3623.43	0.11	18.91	5.14	371	3167	-4.12%
176*	75	0.5	44.83	3665.10	0.19	44.75	54.99	1627	14736	-0.18%
177*	75	0.5	92.00	3605.70	0.17	45.69	62.44	1577	15288	-50.34%
178*	75	0.5	46.82	3670.30	0.19	46.37	68.38	1776	15481	-0.95%
179*	75	0.5	44.93	3625.83	0.18	44.58	61.73	1656	14746	-0.79%
180*	75	0.5	44.80	3607.30	0.18	44.09	57.76	1666	14869	-1.58%
181*	75	0.5	46.41	3626.65	0.34	45.21	61.31	1567	15200	-2.58%
182*	75	0.5	89.22	3614.02	0.22	45.65	58.86	1652	15037	-48.84%
183*	75	0.5	44.47	3626.84	0.18	43.54	57.13	1615	14205	-2.09%
184*	75	0.5	44.67	3626.06	0.18	44.58	54.03	1634	15094	-0.21%
185*	75	0.5	46.08	3624.66	0.03	44.32	48.95	1679	14916	-3.82%
186*	75	0.5	46.81	3626.13	0.12	45.64	58.39	1635	15487	-2.49%
187*	75	0.5	45.90	3631.30	0.09	45.22	44.34	1716	14954	-1.49%
188*	75	0.5	43.65	3620.10	0.26	43.31	53.88	1552	14755	-0.77%
189*	75	0.5	88.24	3609.70	0.23	44.57	63.34	1683	14772	-49.49%
190*	75	0.5	87.26	3615.09	0.20	43.72	46.02	1691	14710	-49.90%
191*	75	0.5	45.75	3625.98	0.16	45.14	51.72	1606	15116	-1.33%
192*	75	0.5	89.09	3729.23	0.17	45.86	52.47	1615	15348	-48.52%
193*	75	0.5	44.46	3625.73	0.16	44.32	53.39	1643	14640	-0.32%
194*	75	0.5	89.36	3616.54	0.23	45.85	66.99	1812	15773	-48.70%
195*	75	0.5	45.49	3626.31	0.14	45.29	57.18	1605	15048	-0.44%
196*	75	0.5	88.76	3615.08	0.88	45.02	46.54	1526	14854	-49.28%
197*	75	0.5	44.53	3624.52	0.15	44.29	40.32	1643	14621	-0.52%
198*	75	0.5	46.75	3624.74	0.08	45.83	53.43	1758	15295	-1.97%
199*	75	0.5	84.86	3721.12	0.07	43.45	47.45	1520	14662	-48.80%
200*	75	0.5	47.34	3633.66	0.10	46.90	64.89	1717	15806	-0.92%
201*	75	2.0	87.45	3809.00	0.35	86.82	493.50	5275	47741	-0.72%
202*	75	2.0	92.65	3645.50	0.17	91.84	641.25	5427	52552	-0.88%
203*	75	2.0	90.81	4060.70	0.16	90.20	684.60	5702	50871	-0.67%
204*	75	2.0	87.51	3728.00	0.19	86.91	537.13	5315	47441	-0.68%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
205*	75	2.0	87.92	4086.60	0.13	87.44	583.15	5642	49670	-0.54%
206*	75	2.0	88.70	3728.05	0.19	88.19	563.32	5686	49278	-0.57%
207*	75	2.0	88.70	3626.84	0.20	87.97	539.24	5293	50037	-0.83%
208*	75	2.0	86.34	3748.83	0.14	84.95	593.23	5228	47321	-1.61%
209*	75	2.0	86.80	3737.31	0.32	85.22	600.64	5107	48074	-1.82%
210*	75	2.0	88.66	3731.27	0.18	87.59	636.23	5337	49343	-1.21%
211*	75	2.0	91.79	3742.84	0.09	91.17	690.30	5732	52049	-0.67%
212*	75	2.0	90.28	4104.80	0.27	89.15	745.33	6322	50721	-1.26%
213*	75	2.0	86.92	4364.50	0.25	85.50	568.64	5113	48856	-1.63%
214*	75	2.0	86.89	3742.80	0.07	86.13	557.31	5721	49494	-0.88%
215*	75	2.0	87.42	3624.47	0.15	87.26	602.41	5501	49551	-0.18%
216*	75	2.0	88.08	3735.99	0.18	87.96	564.57	5321	48373	-0.14%
217*	75	2.0	89.27	3625.88	0.34	88.39	664.75	5652	48873	-0.98%
218*	75	2.0	88.59	3737.52	0.33	86.43	607.93	5350	48388	-2.43%
219*	75	2.0	89.95	3629.29	0.13	89.36	267.64	5639	50191	-0.65%
220*	75	2.0	91.06	3743.85	0.16	89.23	637.18	5433	49317	-2.01%
221*	75	2.0	86.96	3625.73	0.16	86.04	552.72	5360	49796	-1.05%
222*	75	2.0	87.73	3732.00	0.24	86.35	586.00	5441	48935	-1.57%
223*	75	2.0	91.55	3740.45	0.10	90.16	594.08	5788	50870	-1.52%
224*	75	2.0	83.79	3626.57	0.17	82.98	558.92	5171	47061	-0.97%
225*	75	2.0	93.15	3783.96	0.21	92.25	777.65	5700	51659	-0.97%
226*	100	0.1	90.65	3622.20	0.10	18.48	6.32	350	3127	-79.62%
227*	100	0.1	18.69	3693.47	0.10	17.20	5.67	323	2900	-7.96%
228*	100	0.1	44.94	4177.40	0.11	18.19	5.18	339	3050	-59.52%
229*	100	0.1	19.35	3692.54	0.15	17.23	5.26	333	2878	-10.95%
230*	100	0.1	18.88	3701.43	0.12	16.87	5.69	331	2963	-10.64%
231*	100	0.1	18.82	3689.92	0.04	17.97	5.34	322	2941	-4.53%
232*	100	0.1	18.32	3693.98	0.76	17.69	5.86	345	3025	-3.41%
233*	100	0.1	44.33	4284.02	0.54	17.31	5.84	357	3021	-60.96%
234*	100	0.1	45.60	4308.74	0.12	18.43	5.30	336	3010	-59.58%
235*	100	0.1	44.88	3736.23	0.31	18.11	5.49	388	3234	-59.65%
236*	100	0.1	19.05	3605.10	0.15	17.84	5.14	319	3001	-6.38%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
237*	100	0.1	86.94	3740.43	0.09	17.34	5.83	291	2869	-80.05%
238*	100	0.1	90.94	3674.20	0.18	19.29	6.13	391	3295	-78.79%
239*	100	0.1	18.93	3685.80	0.09	18.35	5.44	375	3182	-3.06%
240*	100	0.1	88.22	3676.80	0.10	17.96	5.15	295	2971	-79.64%
241*	100	0.1	46.09	4425.62	0.06	17.93	5.12	311	3056	-61.10%
242*	100	0.1	45.50	4317.80	0.16	18.60	5.67	362	3168	-59.12%
243*	100	0.1	19.10	3691.62	0.16	18.12	5.12	259	2880	-5.08%
244*	100	0.1	18.47	3608.00	0.13	18.00	5.55	354	3068	-2.57%
245*	100	0.1	20.51	3694.13	0.05	17.59	5.10	257	3022	-14.22%
246*	100	0.1	18.60	3611.20	0.05	18.04	4.93	332	2937	-3.01%
247*	100	0.1	18.34	3615.60	0.09	17.09	5.39	332	2944	-6.82%
248*	100	0.1	19.88	3608.94	0.62	17.83	5.77	303	3041	-10.31%
249*	100	0.1	17.88	3611.90	0.70	16.83	4.88	340	2923	-5.91%
250*	100	0.1	19.12	3615.60	0.16	17.93	5.56	333	3087	-6.20%
251*	100	0.5	47.23	4379.00	0.09	46.39	58.58	1765	15681	-1.78%
252*	100	0.5	45.52	3736.54	0.07	44.50	59.18	1763	14886	-2.25%
253*	100	0.5	88.27	3611.10	0.15	44.94	53.09	1608	14893	-49.09%
254*	100	0.5	44.83	3729.63	0.08	44.56	52.29	1735	15014	-0.59%
255*	100	0.5	44.85	3744.79	0.08	44.71	55.18	1670	14804	-0.30%
256*	100	0.5	45.28	3729.32	0.08	45.21	54.01	1623	14869	-0.16%
257*	100	0.5	46.39	3732.47	0.66	45.47	60.09	1758	15342	-1.98%
258*	100	0.5	86.08	3691.56	0.60	44.33	58.59	1720	15018	-48.51%
259*	100	0.5	88.88	3689.87	0.23	45.60	61.45	1772	15068	-48.70%
260*	100	0.5	45.01	3688.63	0.23	44.37	58.52	1733	14892	-1.43%
261*	100	0.5	47.58	3722.30	0.17	47.43	78.49	1874	16123	-0.30%
262*	100	0.5	44.80	4303.91	0.77	44.23	56.92	1570	14549	-1.29%
263*	100	0.5	46.50	4234.90	0.15	46.13	65.98	1658	15541	-0.80%
264*	100	0.5	45.97	3736.39	0.11	45.52	58.72	1778	15356	-0.98%
265*	100	0.5	44.55	3868.80	0.04	44.54	52.73	1635	14971	-0.03%
266*	100	0.5	91.96	3693.67	0.09	46.09	68.99	1757	15372	-49.88%
267*	100	0.5	87.60	3611.00	0.10	45.38	65.52	1639	15211	-48.19%
268*	100	0.5	46.56	3738.43	0.11	46.25	57.99	1765	15484	-0.68%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD$^{(a)}$	T(s)	D-RPD	V-RPD$^{(b)}$	T(s)	$\#\rho_S$	$\#\rho_L$	
269*	100	0.5	46.05	3725.90	0.28	45.40	60.09	1635	15331	-1.43%
270*	100	0.5	46.69	3742.27	0.15	46.47	67.73	1618	15520	-0.46%
271*	100	0.5	46.32	3646.30	0.12	46.05	61.03	1660	15143	-0.58%
272*	100	0.5	86.65	11024.40	0.11	44.71	53.53	1735	15087	-48.40%
273*	100	0.5	47.34	3637.80	0.54	46.35	64.97	1684	15502	-2.10%
274*	100	0.5	44.80	3653.90	0.34	44.72	61.16	1573	14788	-0.20%
275*	100	0.5	45.38	3660.50	0.06	45.10	57.20	1679	15074	-0.62%
276*	100	2.0	90.73	3604.00	0.06	90.65	615.36	5613	50446	-0.09%
277*	100	2.0	87.83	4350.05	0.18	86.81	582.74	5302	48753	-1.17%
278*	100	2.0	86.85	3742.40	0.16	85.99	551.26	5563	48764	-0.99%
279*	100	2.0	87.62	4314.04	0.25	87.60	569.99	5507	49812	-0.02%
280*	100	2.0	85.71	4289.95	0.00	84.66	508.94	5391	48027	-1.23%
281*	100	2.0	87.40	4312.90	0.21	86.99	622.38	5357	48299	-0.46%
282*	100	2.0	88.23	4339.81	0.60	88.10	625.62	5433	49473	-0.15%
283*	100	2.0	86.37	3736.75	0.71	86.08	606.90	5612	48571	-0.33%
284*	100	2.0	88.60	3737.38	0.17	87.78	593.95	5317	49467	-0.92%
285*	100	2.0	86.99	4302.11	0.24	85.63	501.07	5438	47315	-1.56%
286*	100	2.0	94.17	3803.20	0.17	93.96	766.93	6009	53910	-0.23%
287*	100	2.0	87.72	3689.67	0.70	86.85	596.05	5192	48768	-1.00%
288*	100	2.0	88.85	3609.40	0.12	87.97	656.32	5496	51275	-0.98%
289*	100	2.0	86.22	4323.21	0.03	86.17	637.78	5330	50215	-0.06%
290*	100	2.0	87.37	3609.30	0.16	86.67	550.98	5675	49571	-0.80%
291*	100	2.0	90.88	3738.96	0.06	89.91	663.24	5725	51255	-1.07%
292*	100	2.0	88.41	3668.60	0.09	87.51	550.66	5392	48894	-1.02%
293*	100	2.0	88.36	4351.22	0.01	88.14	637.28	5710	49713	-0.25%
294*	100	2.0	89.09	3835.40	0.23	88.81	549.72	5808	49672	-0.30%
295*	100	2.0	89.51	4349.52	0.15	89.03	623.46	5672	50799	-0.53%
296*	100	2.0	90.64	4244.40	0.13	88.68	609.56	5563	50656	-2.17%
297*	100	2.0	85.81	3632.40	0.28	85.04	485.82	5460	48133	-0.91%
298*	100	2.0	91.67	4134.42	0.72	89.29	573.78	5923	51503	-2.59%
299*	100	2.0	86.44	11021.80	0.30	85.24	507.14	5303	48295	-1.39%
300*	100	2.0	85.14	4045.80	0.66	84.85	580.48	5430	47682	-0.34%

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Table 2: Result of SimExact X SimSA-VaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-VaR**					**GAP$_{a,b}$(%)**
			V-RPD[(a)]	T(s)	D-RPD	V-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	

Note: Instances marked with * correspond to cases in which the MILP did not reach the optimal solution when solved using the `SimExact` approach.

3. SimSA-CVaR X SimExact

Table 3: Result of SimExact x `SimSA-CVaR`

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
1	25	0.1	19.10	200.30	0.44	18.09	8.06	356	3307	-5.29%
2	25	0.1	21.31	187.00	1.04	18.03	2.60	337	3014	-15.42%
3	25	0.1	22.17	134.10	0.20	20.62	2.45	411	3699	-6.98%
4	25	0.1	21.27	374.80	0.60	20.32	1.92	346	3245	-4.46%
5	25	0.1	18.90	265.40	0.64	18.56	2.30	363	3038	-1.83%
6	25	0.1	20.96	228.40	0.50	19.55	2.26	354	3304	-6.73%
7	25	0.1	21.85	3604.91	0.23	16.53	1.75	314	2905	-24.37%
8	25	0.1	20.94	381.00	0.29	18.74	1.81	292	3041	-10.52%
9	25	0.1	19.47	346.40	0.35	17.92	2.13	379	3034	-7.97%
10	25	0.1	21.68	265.20	0.54	20.36	2.39	372	3268	-6.09%
11	25	0.1	22.92	366.60	0.44	18.26	2.24	345	3139	-20.32%
12	25	0.1	22.92	168.70	0.36	17.29	1.84	342	2969	-24.55%
13	25	0.1	19.68	285.30	0.94	16.99	1.62	286	2683	-13.64%
14	25	0.1	20.79	342.60	0.34	19.88	2.93	357	3261	-4.35%
15	25	0.1	17.96	257.20	0.81	17.81	1.93	332	2935	-0.85%
16	25	0.1	22.03	391.40	0.37	18.26	2.57	348	2874	-17.10%
17	25	0.1	23.30	243.80	0.47	18.14	1.71	341	2968	-22.14%
18	25	0.1	19.57	218.00	0.36	18.07	3.20	411	3425	-7.64%
19	25	0.1	46.89	638.00	0.17	18.06	2.23	374	3106	-61.49%
20	25	0.1	18.74	368.10	0.32	17.88	2.68	338	2980	-4.60%
21*	25	0.1	18.03	3607.43	0.59	17.37	2.41	332	2945	-3.67%
22	25	0.1	53.88	1070.50	0.36	21.32	3.26	394	3513	-60.43%
23	25	0.1	19.78	318.30	0.59	16.43	2.45	311	2940	-16.96%
24	25	0.1	21.06	194.20	0.47	17.69	1.99	300	2928	-16.00%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
25	25	0.1	19.30	359.70	0.81	17.23	2.46	347	2880	-10.74%
26	25	0.5	44.11	342.30	1.07	42.51	27.81	1576	13729	-3.63%
27	25	0.5	50.24	214.00	0.78	45.76	40.74	1739	15419	-8.91%
28	25	0.5	48.03	240.50	0.19	47.73	38.86	1805	16295	-0.63%
29	25	0.5	47.70	458.20	0.60	44.40	36.91	1693	14606	-6.90%
30	25	0.5	43.25	276.10	0.41	42.99	32.88	1519	14310	-0.60%
31	25	0.5	46.31	297.40	0.30	46.25	36.45	1747	15078	-0.13%
32*	25	0.5	43.80	3617.21	0.17	41.04	27.67	1531	13618	-6.30%
33	25	0.5	48.01	460.90	1.20	44.86	40.77	1755	15768	-6.55%
34	25	0.5	45.77	432.30	0.73	42.41	39.75	1595	14212	-7.35%
35	25	0.5	49.53	400.40	1.02	46.38	42.55	1586	14919	-6.35%
36	25	0.5	45.54	450.80	0.47	43.93	40.23	1719	14973	-3.54%
37	25	0.5	47.01	266.10	0.47	44.66	17.29	1632	14992	-5.00%
38	25	0.5	45.63	291.30	0.65	44.75	33.20	1694	14730	-1.93%
39	25	0.5	53.83	432.00	1.26	52.67	76.09	2160	19321	-2.16%
40	25	0.5	45.28	325.90	0.00	43.42	32.65	1632	14822	-4.09%
41	25	0.5	49.58	467.20	0.24	49.48	46.62	1891	16830	-0.20%
42	25	0.5	48.01	309.70	0.93	44.91	39.77	1613	14430	-6.47%
43	25	0.5	46.57	252.40	0.29	45.79	41.26	1792	15340	-1.67%
44	25	0.5	90.73	243.20	0.25	45.24	39.49	1669	15602	-50.13%
45	25	0.5	42.22	380.20	0.47	41.49	37.17	1614	14052	-1.74%
46*	25	0.5	44.07	3626.84	0.79	43.06	32.03	1625	13784	-2.30%
47	25	0.5	115.70	307.60	0.80	53.88	71.51	1954	18099	-53.43%
48	25	0.5	44.56	415.30	0.17	43.35	41.04	1605	14600	-2.72%
49	25	0.5	47.67	222.50	1.03	42.77	43.07	1508	14084	-10.27%
50	25	0.5	44.37	367.70	1.03	44.21	41.99	1596	14034	-0.34%
51	25	2.0	86.96	915.20	0.27	85.52	362.27	5081	46399	-1.66%
52	25	2.0	92.69	791.40	0.88	91.74	486.80	5711	51099	-1.03%
53	25	2.0	91.23	441.10	0.63	88.21	451.42	5411	49240	-3.31%
54	25	2.0	90.63	828.80	0.61	86.19	377.38	5332	46863	-4.89%
55	25	2.0	87.91	850.70	0.38	85.54	445.75	5234	46282	-2.70%
56	25	2.0	90.33	974.90	0.71	89.76	454.33	5385	49253	-0.63%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					$\mathbf{GAP_{a,b}(\%)}$
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
57*	25	2.0	84.74	3770.04	0.44	82.22	413.85	5047	45284	-2.97%
58	25	2.0	89.88	1099.90	1.65	88.21	491.79	5572	49611	-1.85%
59	25	2.0	85.94	777.40	0.43	85.88	409.47	5454	47773	-0.07%
60	25	2.0	89.82	751.20	0.89	89.38	405.55	5314	48055	-0.49%
61	25	2.0	88.05	630.90	0.35	86.31	420.67	5301	48334	-1.98%
62	25	2.0	89.08	904.60	0.90	87.77	459.10	5337	48127	-1.47%
63	25	2.0	89.73	584.70	1.08	89.12	389.23	5143	47567	-0.68%
64	25	2.0	116.19	616.70	1.03	111.71	1053.66	7789	68871	-3.86%
65	25	2.0	92.45	640.90	1.25	92.05	580.14	6042	52756	-0.44%
66	25	2.0	101.54	607.20	0.22	101.14	588.01	6359	58268	-0.39%
67	25	2.0	89.11	710.20	0.42	86.53	368.91	5390	47189	-2.89%
68	25	2.0	93.35	813.00	0.22	93.31	497.16	5637	51253	-0.04%
69	25	2.0	91.06	359.20	0.27	90.26	476.84	5436	49283	-0.87%
70	25	2.0	83.23	879.60	0.16	81.95	321.88	5087	45608	-1.54%
71*	25	2.0	84.00	3844.08	0.64	82.06	288.66	4632	44784	-2.31%
72	25	2.0	115.91	405.10	0.14	114.59	965.39	7332	69347	-1.14%
73	25	2.0	87.78	882.40	0.39	85.99	488.24	5476	48375	-2.05%
74	25	2.0	88.16	937.60	0.63	87.10	463.23	5292	47667	-1.20%
75	25	2.0	84.55	765.90	0.56	84.49	426.70	5079	45848	-0.07%
76*	50	0.1	44.53	4289.80	0.24	17.61	3.71	374	3035	-60.47%
77*	50	0.1	19.28	3611.12	0.11	19.07	3.71	353	3371	-1.08%
78*	50	0.1	19.71	3610.67	0.09	18.74	3.56	321	3381	-4.93%
79*	50	0.1	20.50	3617.11	0.12	17.90	3.55	347	2965	-12.73%
80*	50	0.1	17.69	3636.41	0.04	16.98	3.61	337	3056	-4.03%
81*	50	0.1	19.86	3621.79	0.15	16.92	3.92	379	3023	-14.80%
82*	50	0.1	18.19	3611.40	0.25	17.74	3.39	319	3121	-2.46%
83*	50	0.1	18.29	3623.80	0.29	18.19	3.58	320	3184	-0.56%
84*	50	0.1	18.18	3623.38	0.38	17.60	3.84	350	3083	-3.20%
85*	50	0.1	20.39	3624.27	0.17	17.87	3.76	320	2939	-12.32%
86*	50	0.1	43.27	3999.92	0.19	17.23	3.29	376	2881	-60.17%
87*	50	0.1	43.43	3989.07	0.21	18.16	2.59	333	3065	-58.17%
88*	50	0.1	18.08	3623.76	0.12	17.95	3.12	340	3210	-0.73%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD$^{(a)}$	T(s)	D-RPD	C-RPD$^{(b)}$	T(s)	$\#\rho_S$	$\#\rho_L$	
89*	50	0.1	20.40	3619.14	0.05	17.67	2.98	331	2960	-13.40%
90*	50	0.1	20.42	3622.31	0.78	17.86	2.93	303	3046	-12.53%
91*	50	0.1	19.03	3623.80	0.34	18.19	3.12	351	2957	-4.42%
92*	50	0.1	18.65	3623.15	0.82	18.55	3.12	359	3172	-0.52%
93*	50	0.1	18.55	3623.84	0.16	17.49	2.66	284	2813	-5.67%
94*	50	0.1	45.44	4053.18	0.11	17.55	2.68	341	2762	-61.37%
95*	50	0.1	17.85	3624.75	0.60	17.42	2.92	256	3078	-2.40%
96*	50	0.1	20.26	3617.77	0.12	19.87	3.26	366	3458	-1.93%
97*	50	0.1	18.27	3629.96	0.39	17.79	2.88	273	2901	-2.65%
98*	50	0.1	19.68	3621.90	0.15	17.77	2.98	338	2938	-9.70%
99*	50	0.1	18.36	3616.26	0.32	18.24	3.23	300	3159	-0.67%
100*	50	0.1	18.50	3609.72	0.39	18.45	3.54	353	3153	-0.28%
101*	50	0.5	86.74	3605.90	0.16	43.23	42.85	1669	14604	-50.17%
102*	50	0.5	47.64	3621.85	0.11	46.81	48.62	1734	15285	-1.73%
103*	50	0.5	45.88	3620.20	0.79	44.65	50.93	1658	15391	-2.69%
104*	50	0.5	46.64	3627.14	0.19	45.52	51.05	1685	14733	-2.39%
105*	50	0.5	43.32	3669.47	0.08	42.53	43.14	1554	14308	-1.84%
106*	50	0.5	45.20	3642.91	0.23	43.38	49.40	1659	14426	-4.02%
107*	50	0.5	45.70	3668.60	0.14	44.98	46.40	1571	15283	-1.57%
108*	50	0.5	90.17	4052.75	0.30	44.63	49.04	1613	15192	-50.51%
109*	50	0.5	44.40	3645.66	0.32	44.13	48.50	1593	14548	-0.60%
110*	50	0.5	47.42	3650.40	0.23	45.99	50.39	1562	15334	-3.01%
111*	50	0.5	84.82	3623.50	0.19	43.27	40.26	1552	14281	-48.98%
112*	50	0.5	85.78	3619.58	0.19	43.43	39.09	1494	14417	-49.37%
113*	50	0.5	45.01	3644.29	0.20	44.62	51.34	1682	15301	-0.87%
114*	50	0.5	45.57	3643.95	0.10	44.30	45.08	1469	14465	-2.78%
115*	50	0.5	45.56	3643.58	0.81	45.46	49.48	1617	15460	-0.23%
116*	50	0.5	45.79	3648.49	0.28	45.45	42.72	1577	14911	-0.75%
117*	50	0.5	47.67	3647.74	0.31	45.94	55.58	1726	15442	-3.62%
118*	50	0.5	88.20	4029.41	0.07	44.83	31.14	1646	15151	-49.17%
119*	50	0.5	91.36	3624.77	0.14	43.88	44.80	1680	14991	-51.97%
120*	50	0.5	42.78	3644.03	0.49	42.74	33.05	1499	14315	-0.09%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
121*	50	0.5	47.21	3627.63	0.18	46.11	50.81	1692	15526	-2.33%
122*	50	0.5	44.76	3646.86	0.24	43.43	48.50	1662	14858	-2.97%
123*	50	0.5	46.88	3638.27	0.25	46.27	48.93	1747	15616	-1.31%
124*	50	0.5	44.99	3626.09	0.23	44.14	41.50	1600	14673	-1.88%
125*	50	0.5	45.32	3619.02	0.33	43.25	45.06	1583	14459	-4.57%
126*	50	2.0	87.01	3660.80	0.29	86.74	467.25	5297	48444	-0.31%
127*	50	2.0	91.65	3742.81	0.08	91.03	529.30	5427	50727	-0.67%
128*	50	2.0	87.17	3720.23	0.59	86.87	509.46	5365	48351	-0.35%
129*	50	2.0	91.65	3806.36	0.26	90.24	594.20	5696	50038	-1.54%
130*	50	2.0	83.80	4124.58	0.12	83.27	511.49	5084	46301	-0.63%
131*	50	2.0	86.06	3846.18	0.16	84.55	520.72	5485	47993	-1.76%
132*	50	2.0	88.91	3797.90	0.24	87.98	513.15	5471	49469	-1.05%
133*	50	2.0	90.59	3650.09	0.19	90.17	524.14	5580	50026	-0.46%
134*	50	2.0	85.03	4005.65	0.45	83.23	445.01	5138	45303	-2.11%
135*	50	2.0	95.12	4096.08	0.06	94.21	537.40	5846	52312	-0.96%
136*	50	2.0	85.27	3645.09	0.39	84.82	442.56	5183	46294	-0.53%
137*	50	2.0	84.52	3648.72	0.22	83.79	503.76	5558	47304	-0.86%
138*	50	2.0	91.58	4044.07	0.20	89.42	630.55	5716	50405	-2.36%
139*	50	2.0	87.06	3948.95	0.03	86.39	474.36	5454	48125	-0.77%
140*	50	2.0	90.40	4036.42	0.91	89.53	384.71	5358	49856	-0.96%
141*	50	2.0	89.46	4012.63	0.31	87.53	471.20	6497	51278	-2.16%
142*	50	2.0	89.92	4056.53	0.01	89.14	489.28	5439	49613	-0.87%
143*	50	2.0	88.56	3652.33	0.15	87.89	462.27	5050	48560	-0.76%
144*	50	2.0	92.10	3645.63	0.14	91.13	578.47	5806	51126	-1.05%
145*	50	2.0	83.56	3980.05	0.51	83.24	430.14	5078	46211	-0.38%
146*	50	2.0	92.39	3784.06	0.28	92.02	576.61	5781	52166	-0.40%
147*	50	2.0	88.73	3818.03	0.40	87.20	556.91	5575	48379	-1.73%
148*	50	2.0	94.38	3947.41	0.22	93.87	624.30	5734	52547	-0.54%
149*	50	2.0	88.13	3772.46	0.32	88.05	514.46	5370	48483	-0.10%
150*	50	2.0	85.12	3707.72	0.46	85.07	538.39	5207	47582	-0.07%
151*	75	0.1	17.45	3606.90	0.20	17.04	4.25	294	2794	-2.35%
152*	75	0.1	45.69	4018.50	0.18	17.41	5.56	335	3049	-61.90%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
153*	75	0.1	19.72	3606.20	0.19	18.74	6.36	380	3088	-4.99%
154*	75	0.1	19.56	3615.41	0.19	18.35	5.46	397	3116	-6.20%
155*	75	0.1	44.14	3712.40	0.08	17.67	4.91	374	2985	-59.96%
156*	75	0.1	18.37	3615.45	0.47	17.60	4.52	331	3011	-4.22%
157*	75	0.1	45.66	3732.92	0.23	17.57	4.47	306	2998	-61.52%
158*	75	0.1	17.44	3615.57	0.14	17.35	4.22	294	2877	-0.53%
159*	75	0.1	17.88	3616.11	0.23	17.85	5.68	311	2960	-0.18%
160*	75	0.1	19.33	3613.54	0.18	18.49	5.30	353	3132	-4.34%
161*	75	0.1	19.23	3616.25	0.07	18.71	4.81	375	3158	-2.73%
162*	75	0.1	17.99	3610.60	0.08	17.74	4.76	355	2976	-1.41%
163*	75	0.1	17.61	3605.80	0.47	17.41	4.17	336	2884	-1.16%
164*	75	0.1	44.57	3978.80	0.25	18.26	5.15	323	3047	-59.03%
165*	75	0.1	43.72	3723.88	0.20	18.58	4.82	341	3154	-57.49%
166*	75	0.1	19.11	3615.68	0.13	18.24	4.64	311	3139	-4.58%
167*	75	0.1	18.95	3614.89	0.25	18.62	5.42	373	3201	-1.73%
168*	75	0.1	17.76	3615.71	0.17	17.48	4.23	271	2819	-1.58%
169*	75	0.1	45.85	3754.21	0.22	18.10	5.00	406	3297	-60.51%
170*	75	0.1	18.61	3615.36	0.17	18.13	4.45	334	3152	-2.58%
171*	75	0.1	45.02	3738.69	0.27	18.05	4.51	307	3110	-59.89%
172*	75	0.1	18.47	3615.15	0.23	18.28	4.41	334	3048	-1.00%
173*	75	0.1	19.01	3614.02	0.09	17.19	4.48	354	2923	-9.57%
174*	75	0.1	17.64	3616.30	0.13	16.16	4.59	316	2704	-8.38%
175*	75	0.1	19.72	3623.43	0.11	18.91	5.14	371	3167	-4.12%
176*	75	0.5	44.83	3665.10	0.19	44.75	54.99	1627	14736	-0.18%
177*	75	0.5	92.00	3605.70	0.17	45.69	62.44	1577	15288	-50.34%
178*	75	0.5	46.82	3670.30	0.19	46.37	68.38	1776	15481	-0.95%
179*	75	0.5	44.93	3625.83	0.18	44.58	61.73	1656	14746	-0.79%
180*	75	0.5	44.80	3607.30	0.18	44.09	57.76	1666	14869	-1.58%
181*	75	0.5	46.41	3626.65	0.34	45.21	61.31	1567	15200	-2.58%
182*	75	0.5	89.22	3614.02	0.22	45.65	58.86	1652	15037	-48.84%
183*	75	0.5	44.47	3626.84	0.18	43.54	57.13	1615	14205	-2.09%
184*	75	0.5	44.67	3626.06	0.18	44.58	54.03	1634	15094	-0.21%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD$^{(a)}$	T(s)	D-RPD	C-RPD$^{(b)}$	T(s)	$\#\rho_S$	$\#\rho_L$	
185*	75	0.5	46.08	3624.66	0.03	44.32	48.95	1679	14916	-3.82%
186*	75	0.5	46.81	3626.13	0.12	45.64	58.39	1635	15487	-2.49%
187*	75	0.5	45.90	3631.30	0.09	45.22	44.34	1716	14954	-1.49%
188*	75	0.5	43.65	3620.10	0.26	43.31	53.88	1552	14755	-0.77%
189*	75	0.5	88.24	3609.70	0.23	44.57	63.34	1683	14772	-49.49%
190*	75	0.5	87.26	3615.09	0.20	43.72	46.02	1691	14710	-49.90%
191*	75	0.5	45.75	3625.98	0.16	45.14	51.72	1606	15116	-1.33%
192*	75	0.5	89.09	3729.23	0.17	45.86	52.47	1615	15348	-48.52%
193*	75	0.5	44.46	3625.73	0.16	44.32	53.39	1643	14640	-0.32%
194*	75	0.5	89.36	3616.54	0.23	45.85	66.99	1812	15773	-48.70%
195*	75	0.5	45.49	3626.31	0.14	45.29	57.18	1605	15048	-0.44%
196*	75	0.5	88.76	3615.08	0.88	45.02	46.54	1526	14854	-49.28%
197*	75	0.5	44.53	3624.52	0.15	44.29	40.32	1643	14621	-0.52%
198*	75	0.5	46.75	3624.74	0.08	45.83	53.43	1758	15295	-1.97%
199*	75	0.5	84.86	3721.12	0.07	43.45	47.45	1520	14662	-48.80%
200*	75	0.5	47.34	3633.66	0.10	46.90	64.89	1717	15806	-0.92%
201*	75	2.0	87.45	3809.00	0.35	86.82	493.50	5275	47741	-0.72%
202*	75	2.0	92.65	3645.50	0.17	91.84	641.25	5427	52552	-0.88%
203*	75	2.0	90.81	4060.70	0.16	90.20	684.60	5702	50871	-0.67%
204*	75	2.0	87.51	3728.00	0.19	86.91	537.13	5315	47441	-0.68%
205*	75	2.0	87.92	4086.60	0.13	87.44	583.15	5642	49670	-0.54%
206*	75	2.0	88.70	3728.05	0.19	88.19	563.32	5686	49278	-0.57%
207*	75	2.0	88.70	3626.84	0.20	87.97	539.24	5293	50037	-0.83%
208*	75	2.0	86.34	3748.83	0.14	84.95	593.23	5228	47321	-1.61%
209*	75	2.0	86.80	3737.31	0.32	85.22	600.64	5107	48074	-1.82%
210*	75	2.0	88.66	3731.27	0.18	87.59	636.23	5337	49343	-1.21%
211*	75	2.0	91.79	3742.84	0.09	91.17	690.30	5732	52049	-0.67%
212*	75	2.0	90.28	4104.80	0.27	89.15	745.33	6322	50721	-1.26%
213*	75	2.0	86.92	4364.50	0.25	85.50	568.64	5113	48856	-1.63%
214*	75	2.0	86.89	3742.80	0.07	86.13	557.31	5721	49494	-0.88%
215*	75	2.0	87.42	3624.47	0.15	87.26	602.41	5501	49551	-0.18%
216*	75	2.0	88.08	3735.99	0.18	87.96	564.57	5321	48373	-0.14%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
217*	75	2.0	89.27	3625.88	0.34	88.39	664.75	5652	48873	-0.98%
218*	75	2.0	88.59	3737.52	0.33	86.43	607.93	5350	48388	-2.43%
219*	75	2.0	89.95	3629.29	0.13	89.36	267.64	5639	50191	-0.65%
220*	75	2.0	91.06	3743.85	0.16	89.23	637.18	5433	49317	-2.01%
221*	75	2.0	86.96	3625.73	0.16	86.04	552.72	5360	49796	-1.05%
222*	75	2.0	87.73	3732.00	0.24	86.35	586.00	5441	48935	-1.57%
223*	75	2.0	91.55	3740.45	0.10	90.16	594.08	5788	50870	-1.52%
224*	75	2.0	83.79	3626.57	0.17	82.98	558.92	5171	47061	-0.97%
225*	75	2.0	93.15	3783.96	0.21	92.25	777.65	5700	51659	-0.97%
226*	100	0.1	90.65	3622.20	0.10	18.48	6.32	350	3127	-79.62%
227*	100	0.1	18.69	3693.47	0.10	17.20	5.67	323	2900	-7.96%
228*	100	0.1	44.94	4177.40	0.11	18.19	5.18	339	3050	-59.52%
229*	100	0.1	19.35	3692.54	0.15	17.23	5.26	333	2878	-10.95%
230*	100	0.1	18.88	3701.43	0.12	16.87	5.69	331	2963	-10.64%
231*	100	0.1	18.82	3689.92	0.04	17.97	5.34	322	2941	-4.53%
232*	100	0.1	18.32	3693.98	0.76	17.69	5.86	345	3025	-3.41%
233*	100	0.1	44.33	4284.02	0.54	17.31	5.84	357	3021	-60.96%
234*	100	0.1	45.60	4308.74	0.12	18.43	5.30	336	3010	-59.58%
235*	100	0.1	44.88	3736.23	0.31	18.11	5.49	388	3234	-59.65%
236*	100	0.1	19.05	3605.10	0.15	17.84	5.14	319	3001	-6.38%
237*	100	0.1	86.94	3740.43	0.09	17.34	5.83	291	2869	-80.05%
238*	100	0.1	90.94	3674.20	0.18	19.29	6.13	391	3295	-78.79%
239*	100	0.1	18.93	3685.80	0.09	18.35	5.44	375	3182	-3.06%
240*	100	0.1	88.22	3676.80	0.10	17.96	5.15	295	2971	-79.64%
241*	100	0.1	46.09	4425.62	0.06	17.93	5.12	311	3056	-61.10%
242*	100	0.1	45.50	4317.80	0.16	18.60	5.67	362	3168	-59.12%
243*	100	0.1	19.10	3691.62	0.16	18.12	5.12	259	2880	-5.08%
244*	100	0.1	18.47	3608.00	0.13	18.00	5.55	354	3068	-2.57%
245*	100	0.1	20.51	3694.13	0.05	17.59	5.10	257	3022	-14.22%
246*	100	0.1	18.60	3611.20	0.05	18.04	4.93	332	2937	-3.01%
247*	100	0.1	18.34	3615.60	0.09	17.09	5.39	332	2944	-6.82%
248*	100	0.1	19.88	3608.94	0.62	17.83	5.77	303	3041	-10.31%

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Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD[(a)]	T(s)	D-RPD	C-RPD[(b)]	T(s)	$\#\rho_S$	$\#\rho_L$	
249*	100	0.1	17.88	3611.90	0.70	16.83	4.88	340	2923	-5.91%
250*	100	0.1	19.12	3615.60	0.16	17.93	5.56	333	3087	-6.20%
251*	100	0.5	47.23	4379.00	0.09	46.39	58.58	1765	15681	-1.78%
252*	100	0.5	45.52	3736.54	0.07	44.50	59.18	1763	14886	-2.25%
253*	100	0.5	88.27	3611.10	0.15	44.94	53.09	1608	14893	-49.09%
254*	100	0.5	44.83	3729.63	0.08	44.56	52.29	1735	15014	-0.59%
255*	100	0.5	44.85	3744.79	0.08	44.71	55.18	1670	14804	-0.30%
256*	100	0.5	45.28	3729.32	0.08	45.21	54.01	1623	14869	-0.16%
257*	100	0.5	46.39	3732.47	0.66	45.47	60.09	1758	15342	-1.98%
258*	100	0.5	86.08	3691.56	0.60	44.33	58.59	1720	15018	-48.51%
259*	100	0.5	88.88	3689.87	0.23	45.60	61.45	1772	15068	-48.70%
260*	100	0.5	45.01	3688.63	0.23	44.37	58.52	1733	14892	-1.43%
261*	100	0.5	47.58	3722.30	0.17	47.43	78.49	1874	16123	-0.30%
262*	100	0.5	44.80	4303.91	0.77	44.23	56.92	1570	14549	-1.29%
263*	100	0.5	46.50	4234.90	0.15	46.13	65.98	1658	15541	-0.80%
264*	100	0.5	45.97	3736.39	0.11	45.52	58.72	1778	15356	-0.98%
265*	100	0.5	44.55	3868.80	0.04	44.54	52.73	1635	14971	-0.03%
266*	100	0.5	91.96	3693.67	0.09	46.09	68.99	1757	15372	-49.88%
267*	100	0.5	87.60	3611.00	0.10	45.38	65.52	1639	15211	-48.19%
268*	100	0.5	46.56	3738.43	0.11	46.25	57.99	1765	15484	-0.68%
269*	100	0.5	46.05	3725.90	0.28	45.40	60.09	1635	15331	-1.43%
270*	100	0.5	46.69	3742.27	0.15	46.47	67.73	1618	15520	-0.46%
271*	100	0.5	46.32	3646.30	0.12	46.05	61.03	1660	15143	-0.58%
272*	100	0.5	86.65	11024.40	0.11	44.71	53.53	1735	15087	-48.40%
273*	100	0.5	47.34	3637.80	0.54	46.35	64.97	1684	15502	-2.10%
274*	100	0.5	44.80	3653.90	0.34	44.72	61.16	1573	14788	-0.20%
275*	100	0.5	45.38	3660.50	0.06	45.10	57.20	1679	15074	-0.62%
276*	100	2.0	90.73	3604.00	0.06	90.65	615.36	5613	50446	-0.09%
277*	100	2.0	87.83	4350.05	0.18	86.81	582.74	5302	48753	-1.17%
278*	100	2.0	86.85	3742.40	0.16	85.99	551.26	5563	48764	-0.99%
279*	100	2.0	87.62	4314.04	0.25	87.60	569.99	5507	49812	-0.02%
280*	100	2.0	85.71	4289.95	0.00	84.66	508.94	5391	48027	-1.23%

Continued on the next page

Table 3: Result of SimExact X SimSA-CVaR (Continued)

Inst	n	δ	**SimExact**		**SimSA-CVaR**					**GAP$_{a,b}$(%)**
			C-RPD$^{(a)}$	T(s)	D-RPD	C-RPD$^{(b)}$	T(s)	$\#\rho_S$	$\#\rho_L$	
281*	100	2.0	87.40	4312.90	0.21	86.99	622.38	5357	48299	-0.46%
282*	100	2.0	88.23	4339.81	0.60	88.10	625.62	5433	49473	-0.15%
283*	100	2.0	86.37	3736.75	0.71	86.08	606.90	5612	48571	-0.33%
284*	100	2.0	88.60	3737.38	0.17	87.78	593.95	5317	49467	-0.92%
285*	100	2.0	86.99	4302.11	0.24	85.63	501.07	5438	47315	-1.56%
286*	100	2.0	94.17	3803.20	0.17	93.96	766.93	6009	53910	-0.23%
287*	100	2.0	87.72	3689.67	0.70	86.85	596.05	5192	48768	-1.00%
288*	100	2.0	88.85	3609.40	0.12	87.97	656.32	5496	51275	-0.98%
289*	100	2.0	86.22	4323.21	0.03	86.17	637.78	5330	50215	-0.06%
290*	100	2.0	87.37	3609.30	0.16	86.67	550.98	5675	49571	-0.80%
291*	100	2.0	90.88	3738.96	0.06	89.91	663.24	5725	51255	-1.07%
292*	100	2.0	88.41	3668.60	0.09	87.51	550.66	5392	48894	-1.02%
293*	100	2.0	88.36	4351.22	0.01	88.14	637.28	5710	49713	-0.25%
294*	100	2.0	89.09	3835.40	0.23	88.81	549.72	5808	49672	-0.30%
295*	100	2.0	89.51	4349.52	0.15	89.03	623.46	5672	50799	-0.53%
296*	100	2.0	90.64	4244.40	0.13	88.68	609.56	5563	50656	-2.17%
297*	100	2.0	85.81	3632.40	0.28	85.04	485.82	5460	48133	-0.91%
298*	100	2.0	91.67	4134.42	0.72	89.29	573.78	5923	51503	-2.59%
299*	100	2.0	86.44	11021.80	0.30	85.24	507.14	5303	48295	-1.39%
300*	100	2.0	85.14	4045.80	0.66	84.85	580.48	5430	47682	-0.34%

Note: Instances marked with * correspond to cases in which the MILP did not reach the optimal solution when solved using the `SimExact` approach.