



APPENDICES

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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APPENDIX A

Data

Table A-1 Prices of “ADVANC” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2010	2011	2011
Days	March	Aug	March	Aug	March	Aug	April	Aug	April	Aug	April	Aug	Nov	April	Aug
1	107	97.5	106	88	71.5	82.5	97	89	75	88	83	79.25	95.5	83.75	97.5
2	107	96	106	87	72.5	83	94.5	88	74	87.25	82	81.25	96.5	79.75	95
3	107	99	104	82.5	73.5	88	94.5	92	75	86.25	82.25	81.25	97.5	81	92.75
4	107	99	104	80.5	74	87.5	97	90	75	84.25	83	82	99	80	93
5	107	99	99	81.5	74	89.5	97.5	89.5	76	85.75	83	83	97.25	80.5	95
6	107	101	104	83.5	72.5	88	98.5	88	76	86.75	82.75	84.75	98.75	80.25	96.75
7	107	98	100	84	72	86.5	107	92	76.5	88.75	83	83.75	97.25	80	98.75
8	111	101	101	85	72	85	105	91.5	77.5	88.75	84	83.25	98.75	79	98.5
9	107	101	100	84.5	73	85	101	92	77.5	88.25	84	83	98	79.5	97.75
10	109	99.5	103	86	74	84.5	103	92.5	76	89	83.75	85	89.5	79.5	101
11	112	98.5	101	86.5	73	86.5	104	94	77	90.75	88.25	84.75	90.75	80.75	104
12	111	98	102	90	74.5	85	102	93.5	79	90.5	88.75	83.75	91.5	82.75	104.5
13	111	97.5	101	90	76	87.5	102	92.5	78	90.5	89	84.75	91.75	82.75	105
14	111	98.5	100	90	76	89	103	92.5	78	92.25	89	84	90.75	80.5	101
15	110	98	99	87	77	90.5	106	90	77.5	91	88.25	84.25	92	80	103
16	111	98	96	86.5	80	90	107	90	79.5	91	88	84.25	94	80.25	102
17	110	99	95.5	86	82	89.5	104	89.5	81	91	88.25	84.25	93.75	82	100
18	110	97.5	96	87	84.5	91	105	88.5	80.5	91.75	88.5	86.75	95	82.25	102.5
19	110	96	96	87	83	93.5	105	88.5	81.5	94	88	86.75	95	82	104
20	108	94	94	87	82.5	93	104	89.5	79	90.5	87.75	89.5	93.5	83.75	104

Table A-1 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2010	2011	2011
Days	March	Aug	March	Aug	March	Aug	April	Aug	April	Aug	April	Aug	Nov	April	Aug
21	109	96.5	94	86	82	94	101	88.5	79.5	89.75	88	88	91.75	83.75	111
22	109	96	98	83	76.5	95.5	99.5	90.5	80.5	92	88	86.75	92.25	82.75	113
23	109	96	99.5	82	77.5	95	101	88	82	93	84.25	87.5	92.25	82.25	109
24	108	98.5	101	82.5	77.5	95	99.5	86.5	83.5	91	82.25	88	92.75	82	109.5
25	106	98	97	82.5	77	96.5	97.5	85.5	81	92.75	81.25	87.5	92	81.5	110
26	106	98.5	98	85	75.5	97	99	85.5	80	93	76.75	86.5	92.75	80.75	111
27	106	96.5	97	87.5	75.5	99	100	88	81	92.5	78	86	93	79.5	111
28	108	96.5	98	85.5	75.5	98.5	97	91	80.5	89.5	77	86.75	94.5	83	114.5
29	109	97.5	97	85.5	74	103	97.5	89.5	81	90.5	77.5	87	94.25	81.75	114.5
30	110	96.5	94.5	87	73	103	100	90.5	80.5	89.5	79.25	86.25	95.5	81.75	114.5
31	112	96.5	95	87	74	102	98.5	88.5	82.5	89	81	86.75	93.5	80.75	113.5
32	115	99	97	87	74.5	98.5	98.5	86.5	84.5	89	80.5	86.5	94	80.75	113.5
33	117	98	97.5	88	74.5	98.5	96	87.5	82.5	87.75	84.75	87.75	93.5	83	117
34	120	99	97	86	74.5	98.5	97.5	88	82.5	86.75	85.75	92.25	93	83.5	116
35	117	99	95.5	89.5	73	95	99.5	87	80.5	86.5	84.75	91.25	92.75	83.75	117
36	115	101	93.5	90	73.5	97	99	86	81.5	87.25	85	91.25	92.75	84.75	117.5
37	115	99	95	91.5	73	99	100	88	83	87.75	84.75	91.25	92.25	87.75	115
38	115	104	92.5	92	72.5	98.5	100	86	83.5	91.25	85	92.5	91.5	86.5	115
39	114	105	93.5	91.5	72.5	98.5	103	86	83.25	90.75	84.5	92.5	90.25	86	115
40	111	103	95.5	91	72	100	100	87	82.75	90.5	85.75	93.5	90	85.5	115.5
41	112	104	99	92.5	72.5	97	99.5	90	81.5	90	86	94	90.5	87.25	114.5
42	109	106	98	96.5	72.5	97.5	99	89	82	88.5	85.25	93	90.75	87.25	115.5
43	110	103	94	96.5	72	97.5	98.5	90.5	80.25	88.5	85.5	91.25	92	88	119
44	110	105	94	93.5	72	97	98.5	90.5	80.25	89.5	86.25	92.5	96.75	89.75	119.5

Table A-1 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2010	2011	2011
Days	March	Aug	March	Aug	March	Aug	April	Aug	April	Aug	April	Aug	Nov	April	Aug
45	111	106	93	92.5	73	93	98.5	94	79.75	88.5	87.75	92	97	89.5	119
46	110	106	95	90	72.5	86.5	99	93.5	80	87.75	89	92.75	96.75	89.5	117.5
47	110	105	96.5	91	72.5	89	99	94	80	88.25	90	92.75	97	89	112
48	113	103	96	93	72.5	91.5	99	92.5	81.75	87.5	90	93.25	96.75	89	113.5
49	111	104	94	93	71	92	98	93.5	81.75	88.25	92	93.25	96.75	90.5	116
50	110	105	93.5	91	69.5	94	98	94.5	81.75	89	88.75	93.25	97	90	116
Sell price	114	105	94	90	70.5	94.5	98	91.5	81.75	89.75	90	93	96.75	90.75	117
XD	110	104	92.5	86.5	67	91.5	95	88	76.5	86.5	78.75	90	90.5	87	112.5

Table A-2 Prices of “CPALL” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2006	2007	2008	2009	2010	2010	2011
Days	April	April	April	April	March	May	Nov	April
1	5.7	6.1	6	9.95	12.3	24.1	37.75	35
2	5.7	6.2	5.95	10	12.3	23.7	38	37.25
3	5.8	6.1	5.95	9.85	12.3	23.6	38	37.25
4	5.8	6.15	6	9.85	12.6	23.6	38	38.75
5	5.8	6.3	5.9	10	12.5	23.8	39	38
6	5.7	6.6	5.85	10.2	11.7	23.9	39.25	38.5
7	5.7	6.8	5.75	10.2	11.8	23.6	39.75	37.75
8	5.7	6.8	5.7	10.7	11.9	23.5	39.75	39
9	5.7	6.7	5.75	10.8	11.8	23.4	39.5	39
10	5.65	6.65	5.7	11.1	11.5	23.6	39.5	39

Table A-2 (continued)

Year/ Month	2005	2006	2007	2008	2009	2010	2010	2011
Days	April	April	April	April	March	May	Nov	April
11	5.65	6.7	5.8	11.3	11.4	24	40	38.75
12	5.65	6.8	5.9	11	11.3	24	42.25	39
13	5.65	6.8	5.8	10.7	11.6	24	42.75	39.5
14	5.65	6.7	5.8	10.8	11.4	24.1	43	39.75
15	5.55	6.55	5.8	11	11.6	24.3	42.25	40.25
16	5.55	6.55	5.85	10.9	11.5	24.6	41.5	40.5
17	5.6	6.55	5.85	11	11.4	24.7	42	40.25
18	5.65	6.45	5.85	10.8	11.5	25	41.75	39.75
19	5.7	6.4	5.9	10.8	11.5	26	42	39.25
20	5.85	6.45	5.95	10.8	11.5	26	42	38.25
21	5.95	6.5	5.9	10.9	11.3	26.5	41.25	38.75
22	6.1	6.35	5.85	11	11.2	26.75	41.5	38
23	6.4	6.2	5.95	11	11.2	27.25	41	37.5
24	6.4	6.3	5.85	11	11.2	27	41	38
25	6.4	6.45	5.85	10.8	11.5	27.75	40.5	37.75
26	6.45	6.4	5.85	10.7	11.7	27.5	40	38
27	6.5	6.55	5.9	10.7	11.7	28.25	40.75	38.75
28	6.4	6.4	5.85	10.6	11.8	28	40.5	39
29	6.15	6.5	5.7	10.8	11.8	28.25	40	38.75
30	6.25	6.6	5.65	11	11.9	28.25	40.25	39.25
31	6.25	6.75	5.7	11	12.1	28.25	42.25	40.25
32	6.25	6.7	5.7	11.1	11.9	27.75	42.25	40
33	6.3	6.45	5.75	11.2	12.1	28	43.25	39.75
34	6.25	6.6	5.7	11.2	12.1	27.5	42.75	40
35	6.15	6.6	5.6	11	12.3	27.5	44.25	40

Table A-2 (continued)

Year/ Month	2005	2006	2007	2008	2009	2010	2010	2011
Days	April	April	April	April	March	May	Nov	April
36	6.15	6.7	5.6	10.8	12.9	27.5	44.5	40
37	6.05	6.65	5.65	11	12.8	27.5	45	40.5
38	5.95	6.7	5.7	10.9	12.2	26	44.5	40.75
39	5.9	6.7	5.7	10.7	12.3	26.25	43.25	41
40	5.75	6.55	5.8	10.8	12.6	27.75	43	41.75
41	5.8	6.55	5.7	10.8	12.6	27.5	42.75	41.75
42	5.9	6.6	5.7	10.8	12.2	28	43	41.75
43	5.85	6.4	5.7	10.9	12.1	28.5	44.25	41.75
44	5.8	6.45	5.7	10.9	12.1	28.25	42.5	43.25
45	5.7	6.55	5.65	10.8	12.5	28.25	40.75	44
46	5.7	6.55	5.75	10.8	12.7	28	40.25	45.75
47	5.65	6.6	5.8	10.8	12.8	28	40.5	45.25
48	5.9	6.6	5.8	10.7	12.7	27.75	39.5	44.75
49	5.75	6.6	5.7	10.6	12.4	27.75	39	44
50	5.75	6.65	5.8	10.5	12.5	29.75	41	43.75
Sell price	5.7	6.7	6	10.4	12.4	29.75	41.75	45
XD	5.65	6.6	5.8	10.7	11.8	29	42.25	43.25

Table A-3 Prices of “CPAF” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2005	2005	2006	2006	2006	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	May	Aug	Nov	April	Aug	Nov	April	Mar	Aug	Mar	Aug	April	Aug	April	Aug
1	3.88	4.08	5.55	5.25	5.7	4.98	4.9	4.3	4.06	3.22	4.76	11.8	17.9	21.9	28.75
2	3.88	4.12	5.65	5.3	5.6	5	4.76	4.18	4.06	3.3	4.72	12	18.9	21.9	28.75

Table A-3 (continued)

Year/ Month	2005	2005	2005	2006	2006	2006	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	May	Aug	Nov	April	Aug	Nov	April	Mar	Aug	Mar	Aug	April	Aug	April	Aug
3	3.94	4.14	5.55	5.3	5.45	5	4.6	3.92	4.02	3.26	4.76	11.9	19.6	21.9	29.25
4	4.06	4.3	5.75	5.35	5.4	5	4.6	4.04	3.94	3.28	4.72	11.9	19.4	23	29.75
5	4.18	4.26	5.75	5.3	5.4	5	4.62	4.02	3.84	3.28	4.5	12.5	19.8	23.4	29
6	4.22	4.28	5.8	5.4	5.4	4.98	4.66	4.1	3.84	3.24	4.6	12.4	19.5	23.9	29
7	4.28	4.22	5.85	5.4	5.4	4.98	4.56	4.06	3.84	3.24	4.52	12.3	19.7	23.5	28.25
8	4.18	4.2	5.8	5.35	5.15	4.96	4.58	4.04	3.8	3.3	4.7	12.3	19.8	23.9	28.75
9	4.1	4.18	5.9	5.35	5.2	4.96	4.62	4.2	3.8	3.34	4.72	12.3	20.1	23.8	28.5
10	4.1	4.18	5.95	5.3	5.25	4.92	4.68	4.3	3.8	3.32	4.62	12.3	19.8	23.6	28.75
11	4.12	4.2	6.1	5.2	5.1	4.8	4.66	4.34	3.76	3.3	4.68	12.4	20	23.3	29
12	4.08	4.34	6.35	5.25	5.1	4.76	4.7	4.22	3.76	3.32	4.7	12.1	20.3	23.5	28.75
13	3.98	4.34	6.4	5.35	5.15	4.74	4.7	4.26	3.76	3.34	4.68	11.9	20.1	23.4	28.5
14	4.02	4.3	6.15	5.35	5.2	4.64	4.64	4.26	3.72	3.34	4.76	11.3	20.3	23.3	29.25
15	4.14	4.24	6.2	5.45	5.35	4.66	4.7	4.28	3.68	3.34	4.78	11.5	20.3	24.5	29.5
16	4.12	4.24	6.25	5.45	5.3	4.78	4.74	4.32	3.6	3.38	4.78	11.9	20.7	24.1	29.5
17	4.08	4.26	6.25	5.55	5.35	4.76	4.74	4.32	3.56	3.38	4.8	11.8	21.2	24.3	29.75
18	4.08	4.28	5.9	5.55	5.3	4.78	4.72	4.32	3.56	3.4	4.78	11.9	21.5	24.3	29.75
19	4.04	4.38	5.95	5.75	5.3	4.76	4.74	4.34	3.54	3.38	4.78	12	21.5	24.8	29.5
20	4.1	4.38	6.05	5.75	5.4	4.82	4.78	4.36	3.54	3.38	4.78	12.6	21.5	24.7	29.75
21	4.16	4.38	6	5.75	5.3	4.84	4.78	4.38	3.56	3.4	4.76	12.8	21.5	24.9	30.25
22	4.14	4.22	5.7	5.7	5.4	4.84	4.74	4.52	3.54	3.42	4.82	13	21.2	25	29.5
23	4.14	4.22	5.8	5.65	5.35	4.86	4.76	4.68	3.46	3.42	4.8	14	21	24.7	28.75
24	4.14	4.18	5.95	5.65	5.5	4.86	4.72	4.6	3.36	3.42	4.72	13.9	20.9	25	29
25	4.14	4.1	5.9	5.65	5.5	4.9	4.72	4.6	3.36	3.48	4.76	14.4	21.4	24.9	28.5
26	4.1	4.1	5.75	5.65	5.4	4.94	4.74	4.6	3.48	3.48	4.8	14.6	23.5	25.25	28.5
27	4.14	4.16	5.4	5.65	5.4	4.98	4.76	4.6	3.56	3.44	4.8	14.7	23.8	24.9	27.75

Table A-3 (continued)

Year/ Month	2005	2005	2005	2006	2006	2006	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	May	Aug	Nov	April	Aug	Nov	April	Mar	Aug	Mar	Aug	April	Aug	April	Aug
28	4.18	4.18	5.45	5.6	5.45	4.9	4.72	4.56	3.54	3.44	4.82	14.8	23.3	25	28.25
29	4.32	4.18	5.5	5.6	5.35	4.98	4.64	4.58	3.56	3.38	4.9	14.6	24.1	25.25	29.25
30	4.28	4.16	5.45	5.4	5.3	5	4.64	4.6	3.54	3.4	4.88	14.9	23.7	25.25	29
31	4.36	4.16	5.2	5.55	5.2	4.96	4.58	4.62	3.52	3.38	4.8	15	23.8	25.5	30
32	4.38	4.2	5.2	5.4	5.3	4.96	4.58	4.6	3.54	3.28	4.84	15.1	23.8	25.75	30.75
33	4.38	4.32	4.84	5.4	5.35	4.96	4.52	4.62	3.52	3.24	4.86	15.2	23.8	26.25	30.25
34	4.34	4.32	5.15	5.5	5.55	4.96	4.52	4.6	3.46	3.32	4.88	15.3	24.3	26.5	31.25
35	4.36	4.4	5.05	5.55	5.6	4.94	4.46	4.54	3.48	3.32	5.1	15.3	24.2	26.75	31.25
36	4.36	4.42	5.15	5.5	5.65	4.96	4.44	4.52	3.5	3.38	5.1	15.5	24.1	26.75	31.75
37	4.4	4.4	5.25	5.5	5.6	4.94	4.42	4.48	3.54	3.32	5.15	14.9	24.1	26.25	32.25
38	4.42	4.44	5.35	5.45	5.45	4.96	4.48	4.5	3.5	3.36	5.25	15.2	23.9	25.25	32.75
39	4.42	4.48	5.35	5.65	5.45	4.92	4.48	4.6	3.56	3.34	5.25	14.9	23.8	26.5	33
40	4.48	4.48	5.3	5.95	5.45	4.88	4.46	4.56	3.68	3.34	5.25	14.9	25.25	26.5	32.25
41	4.5	4.5	5.35	5.95	5.35	4.86	4.46	4.58	3.56	3.32	5.2	14.9	25	26.5	31
42	4.54	4.48	5.4	5.95	5.3	4.94	4.42	4.54	3.64	3.32	5.45	14.9	25.25	26.5	30.5
43	4.46	4.44	5.45	6	5.3	4.94	4.46	4.58	3.64	3.34	5.55	14.3	24.9	26.5	29.5
44	4.46	4.48	5.35	5.9	5.35	4.96	4.48	4.54	3.8	3.32	5.75	13.9	24.7	27.75	31
45	4.3	4.7	5.4	5.8	4.96	5	4.54	4.5	3.9	3.28	5.7	15	24.7	28.75	31.75
46	4.36	4.7	5.4	5.8	5	4.96	4.56	4.6	3.86	3.34	5.7	14.7	24.7	28.5	31.75
47	4.4	5.05	5.35	5.8	5.1	4.96	4.58	4.56	3.8	3.34	5.9	14.8	24.9	29	32.5
48	4.5	4.92	5.35	5.8	5.2	4.96	4.6	4.62	3.74	3.32	5.95	14.7	25	29.5	32
49	4.46	4.92	5.15	5.85	5.25	4.94	4.64	4.6	3.76	3.28	5.7	15.1	25.75	30	32.25
50	4.36	5	5.25	5.8	5.15	4.98	4.68	4.6	3.76	3.32	5.9	15.3	26.25	30	32
Sell price	4.36	5.1	5.2	5.7	5.15	4.96	4.66	4.66	3.76	3.36	5.8	15.3	26.5	30.75	31.75
XD	4.3	5.1	5.1	5.6	5.2	4.92	4.64	4.56	3.64	3.24	5.7	14.9	26.25	30	30.75

Table A-4 Prices of “KBANK” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Mar	Mar	Sep	April	Sep	April	Sep	April	Sep	April	Sep	April	Sep
1	52.5	70	59	59.5	74	79	73	45	67.75	82.25	91.75	115	115
2	55.5	73	59	60.5	76.5	83	71	45	66.25	79.5	92	113.5	116.5
3	55	74	60	62.5	82	85.5	71	43.75	66.25	78.5	90.75	111.5	120
4	56	72	58.5	63	83	86	68.5	44.5	65	79.5	90.75	108	123
5	56.5	73.5	59	63	83.5	87.5	66.5	44.5	65	79.75	90.5	103.5	123
6	56.5	75	59	63	84.5	85	67	44.75	65	79.75	90.5	104	132
7	55	76	59.5	65	86	85.5	67	45.75	65	79.75	91.5	110	130.5
8	55	75	59.5	66	87.5	86.5	66.5	45.75	63.5	77.75	91.25	114	127.5
9	56	70	60	66	85	86.5	66.5	44.75	64.5	79	92.25	117	128.5
10	56.5	70	59	65	83	90	66.5	45.25	63.5	80	93.25	118	128.5
11	58	69	56.5	66	85	91.5	68	45.25	62	80	94.25	118	128
12	57.5	68.5	55	66.5	83.5	90	66	47	64.5	79.75	93	116.5	124.5
13	57.5	66.5	56	65.5	84	88.5	63	47.25	66.25	80.5	93.25	113.5	126.5
14	57	69.5	56.5	65	83.5	88	61.5	45.5	65.25	83	92.5	112	127.5
15	55.5	68.5	57.5	66	81.5	89.5	61.5	46	67	84.75	94.25	110	127.5
16	54.5	67.5	60	66	85.5	87.5	63.5	46.75	68.75	85.75	93.75	114.5	127.5
17	56.5	67	60.5	67	85	87.5	67.5	45.75	67.75	86.5	93.75	117.5	136
18	56	68.5	61	66	87	87.5	66.5	45.5	66.5	86.5	94.75	119.5	133.5
19	55.5	68.5	60.5	65.5	86.5	88.5	69.5	45.25	68.75	88.75	96	119.5	135.5
20	55.5	68.5	61	64.5	83.5	87.5	69	45	68.5	88	98.5	120	144
21	55	67	61.5	64	82.5	87.5	66.5	45.25	69.75	87.5	98.5	120	142.5
22	56	67.5	61.5	64.5	82.5	86.5	67	44.5	72	87.75	105	120	139.5
23	55.5	68.5	62	64	82.5	88	66	41.5	70.75	87.75	102	124	141

Table A-4 (continued)

Year/ Month	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Mar	Mar	Sep	April	Sep	April	Sep	April	Sep	April	Sep	April	Sep
24	55.5	67.5	61	64	79.5	87.5	66	40.5	71.75	86.25	103.5	124	141
25	56.5	68	61.5	64	81.5	86.5	66.5	42	72.5	86.25	100	125	141
26	57.5	67.5	61.5	63.5	81	87	68	42	75.25	86.75	101.5	122	142
27	58	67	62	63	79.5	88.5	68	41.5	75	88.25	102	124	139.5
28	58	66	62.5	63	79.5	87.5	68.5	40.75	74	88.5	103.5	120	136.5
29	58	66	62.5	64	80	85	71.5	41.25	74.5	89.75	106.5	121	135.5
30	56.5	67	60.5	64	78.5	87	74.5	41.25	73.75	91.75	104.5	119.5	132.5
31	58	67	63	63.5	78	86.5	72	41.5	73	91.25	103.5	120	130
32	57.5	65	63	64.5	78	84	75.5	42.5	71	96	101.5	124.5	124.5
33	57	65	63	63.5	75	85	75.5	43.25	71	97.5	102.5	125	126
34	56	67.5	63	63.5	72	84	77.5	42.5	72.75	97.25	102.5	124	129
35	57	68	63.5	64	69.5	86	76.5	43.25	72	98.75	102.5	126.5	129
36	57	66.5	64	62.5	72	86	76.5	43.5	69.5	100	100	127	133.5
37	58	64.5	64	64	75.5	85	73	43.5	71.5	98	102	126.5	131.5
38	58	65.5	64	65	73.5	86	71	44.75	71.25	94.5	103.5	126	134
39	59	65.5	62	65.5	76	88	70	45.75	72.5	97.75	105	129.5	135.5
40	59.5	67	62	66.5	77	90	67.5	45	72.25	96.5	106.5	127	131
41	60	69.5	63	65.5	76.5	90	69	46	74.25	97.75	108	130.5	129
42	60	67	62.5	65	77	90	70	46.5	73.5	97.5	109	133	126
43	57.5	68	63	65	77.5	90.5	69	45.25	72.25	97.75	105.5	132	124.5
44	57.5	67.5	63	65	77.5	90	71	44.75	71.5	97.75	103.5	132	122
45	58	67	62.5	67	76.5	91	71.5	45.25	73	102.5	106	132.5	125
46	58.5	67.5	63	69.5	79	92.5	72	48.25	72.5	96	108.5	131	125.5
47	56.5	66	65.5	68.5	79.5	92	70.5	48.75	73.5	97.25	108.5	129.5	122.5

Table A-4 (continued)

Year/ Month	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Mar	Mar	Sep	April	Sep	April	Sep	April	Sep	April	Sep	April	Sep
48	56	64	65	68.5	78.5	91	68	48.75	73.5	92	113.5	131	127.5
49	55	65.5	64	68.5	78.5	91	67.5	50	73.5	92	114	131	128.5
50	53.5	64.5	64.5	69	77.5	91.5	69.5	49.75	72.5	92	111	131	128
Sell price	52	65.5	64.5	69	76	91.5	68.5	50	74.25	92	112.5	131	125
XD	51.5	65	64.5	68	74.5	89.5	70	50.25	76.75	84.75	110	129.5	125

Table A-5 Prices of “PTT” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Mar	Mar	Sep	April	Sep	Mar	Sep	Mar	Sep	Mar	Sep	Mar	Sep
1	175	232	220	204	308	334	308	171	222	240	254	320	324
2	178	236	222	202	296	336	300	172	228	238	250	330	324
3	178	236	226	206	308	348	306	172	235	241	246	332	333
4	179	240	234	206	302	332	306	173	237	244	246	332	335
5	176	246	240	202	298	326	308	175	237	250	246	322	335
6	176	246	232	202	306	320	302	175	234	246	244	318	351
7	178	248	238	198	308	308	302	175	234	246	250	319	347
8	181	246	232	199	308	304	304	175	229	246	247	329	340
9	185	244	234	198	310	320	298	189	227	245	247	333	339
10	185	244	234	200	308	320	298	184	227	244	248	332	335
11	184	246	236	200	306	296	290	181	227	245	246	328	331
12	187	240	230	200	310	292	282	183	222	244	247	334	329

Table A-5 (continued)

Year/ Month	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Mar	Mar	Sep	April	Sep	Mar	Sep	Mar	Sep	Mar	Sep	Mar	Sep
13	184	242	230	202	328	294	286	177	227	246	246	342	332
14	184	244	228	210	328	288	290	168	216	249	246	339	334
15	185	248	228	214	332	314	298	156	215	247	246	339	334
16	186	246	228	216	322	304	286	158	222	246	247	321	338
17	187	256	232	212	322	310	270	154	223	247	246	323	340
18	186	256	236	212	314	312	250	159	221	247	245	337	346
19	184	258	232	210	306	326	250	158	222	247	242	344	349
20	186	260	234	208	302	338	238	157	237	242	247	342	352
21	188	262	234	208	302	328	260	156	233	238	247	335	350
22	190	264	236	208	292	326	264	162	226	231	255	338	348
23	190	256	236	212	292	316	264	159	232	229	256	344	351
24	190	256	236	212	304	310	266	160	233	226	256	345	351
25	191	252	236	214	294	318	262	165	236	222	254	345	347
26	192	250	242	212	290	316	254	167	238	217	257	339	350
27	194	244	246	212	290	324	244	159	235	220	258	337	348
28	190	244	244	208	278	330	236	160	240	223	259	330	343
29	191	248	246	210	274	332	250	154	239	224	261	320	340
30	193	248	250	210	270	328	246	155	248	219	259	316	330
31	196	244	248	210	272	326	246	154	250	225	256	324	322
32	199	240	244	206	288	332	236	155	248	222	251	326	311
33	199	242	248	202	276	332	240	165	256	218	250	329	317
34	196	244	248	204	288	332	264	165	251	217	250	334	315
35	197	244	248	204	288	328	256	163	251	214	250	334	315
36	197	242	254	202	290	336	266	163	250	216	255	331	327

Table A-5 (continued)

Year/ Month	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Mar	Mar	Sep	April	Sep	Mar	Sep	Mar	Sep	Mar	Sep	Mar	Sep
37	200	242	248	204	288	334	266	160	250	220	257	333	323
38	204	246	244	202	286	334	264	164	254	221	260	339	332
39	216	250	246	202	290	340	268	163	250	216	266	340	329
40	210	252	246	202	292	342	270	159	235	216	266	343	318
41	202	250	242	202	306	336	272	159	237	218	264	337	315
42	204	250	242	204	312	330	270	159	232	218	258	339	316
43	208	252	240	204	308	322	268	156	236	224	257	334	315
44	214	254	236	206	314	324	258	157	237	227	258	332	309
45	208	252	236	206	314	324	264	156	244	233	258	333	317
46	212	248	232	208	312	320	260	158	247	231	263	342	329
47	210	244	236	208	312	330	258	155	246	231	265	348	322
48	206	246	238	206	314	338	258	156	244	232	271	344	329
49	204	244	238	208	314	332	264	151	247	232	269	346	330
50	204	248	238	208	320	334	266	150	244	241	291	343	328
Sell price	206	252	238	210	324	328	262	150	243	242	302	349	324
XD	204	246	226	208	314	324	250	145	238	236	292	338	319

Table A-6 Prices of “SCC” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Apr	Aug	Mar	Aug	April	Aug	April	Aug	April	Aug	April	Aug	April	Aug
1	260	198	244	224	234	234	216	204	104	131	217	239	321	357

Table A-6 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Apr	Aug	Mar	Aug	April	Aug	April	Aug	April	Aug	April	Aug	April	Aug
2	258	232	250	222	232	236	204	204	102	136	215	245	311	360
3	258	232	246	220	232	236	208	206	102	134.5	217	241	313	355
4	258	232	244	222	232	236	202	204	105	138	218	244	316	350
5	260	232	242	220	230	238	204	204	105	145.5	218	250	316	349
6	254	232	244	220	232	238	204	202	102	154.5	215	253	312	352
7	254	236	244	220	232	242	206	202	100	158.5	217	250	311	345
8	254	234	242	216	232	256	212	202	99	159.5	217	245	314	338
9	256	238	246	214	232	252	218	204	98	161.5	215	246	314	333
10	256	234	248	206	238	248	214	208	98	160	214	250	317	338
11	258	232	244	206	240	248	212	206	98.5	159.5	211	248	317	335
12	258	230	244	206	238	246	214	202	101	154	212	257	315	337
13	264	236	242	206	236	250	216	202	101	149	214	256	312	342
14	266	238	242	195	234	248	212	202	101	146	214	259	307	335
15	264	234	238	198	234	244	214	202	101	137	212	255	298	332
16	266	238	242	206	234	248	214	200	99.5	140	212	252	308	335
17	262	234	244	206	234	250	216	202	99.5	138	213	264	304	334
18	262	234	244	200	238	256	216	202	99.5	136	212	261	309	340
19	266	228	240	200	236	252	214	200	98	141	217	261	318	345
20	266	230	240	208	238	258	216	194	99	149.5	217	259	318	345
21	264	230	242	208	236	256	214	200	100	152	220	260	317	348
22	266	230	240	206	236	256	214	197	99.5	158.5	220	266	312	343
23	262	230	240	208	232	252	216	196	99	155	223	263	312	340
24	266	228	238	208	232	252	218	196	98.5	155	223	262	306	350
25	266	228	238	208	230	254	216	195	100	148.5	223	262	310	353

Table A-6 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Apr	Aug	Mar	Aug	April	Aug	April	Aug	April	Aug	April	Aug	April	Aug
26	266	228	238	214	232	260	214	195	99.5	148.5	230	265	311	353
27	268	228	242	216	232	260	216	193	100	148.5	231	261	315	368
28	270	226	244	220	234	264	216	193	99	148.5	231	267	311	367
29	266	224	242	214	232	270	216	193	98	146.5	229	268	311	362
30	260	216	240	214	232	270	214	190	98	152	226	267	318	367
31	260	220	246	212	230	276	212	189	98	150	227	266	316	375
32	262	218	244	210	232	278	214	188	99	150	227	262	321	370
33	266	220	242	210	234	282	212	188	95.5	158	229	259	322	362
34	260	226	238	210	232	284	206	184	97	163.5	231	259	324	365
35	262	224	234	204	232	278	210	178	97	161	231	257	322	370
36	262	220	236	202	228	280	210	180	94.5	166.5	234	256	332	370
37	260	220	236	200	230	284	208	179	95.5	170	240	257	328	369
38	252	216	238	204	234	282	208	174	95.5	170.5	238	251	330	370
39	252	218	242	206	234	276	204	170	95	171	240	251	329	367
40	256	220	244	210	234	272	208	170	96	171	244	252	332	365
41	258	220	242	212	236	274	210	174	96.5	171.5	248	258	337	370
42	256	222	248	212	236	276	212	180	97	173.5	248	258	343	369
43	256	224	244	214	238	280	214	175	98.5	174	251	263	352	375
44	252	230	242	216	234	278	214	180	98	172.5	249	266	350	375
45	252	228	238	218	236	282	216	175	98	175	247	267	353	379
46	248	232	240	214	236	282	214	171	100	184	254	270	348	381
47	252	230	240	212	240	276	214	169	101	198	257	269	348	384
48	250	234	244	214	242	276	216	168	98.5	197	269	266	352	377
49	246	234	244	216	246	272	214	169	98.5	193	271	265	351	374

Table A-6 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Days	Apr	Aug	Mar	Aug	April	Aug	April	Aug	April	Aug	April	Aug	April	Aug
50	244	234	242	220	248	272	218	171	99	196	277	268	353	370
Sell price	250	236	246	220	248	272	218	171	103	194.5	277	265	358	361
XD	246	228	236	214	240	264	214	166	106.5	192	269	261	351	350

Table A-7 Prices of “TCAP” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Month	May	Nov	May	Oct	May	Oct	May	Oct	May	Oct	April	Oct	April	Oct
1	14.6	12.5	15.4	13.2	12.5	15.9	15.5	12	8.05	13.8	20.4	30	31.75	31.25
2	14.6	12.5	14.8	13.3	12.7	15.3	15.7	11.9	7.9	14	20.3	30	32	31
3	14.5	13	14.9	13.6	12.8	15.4	15.4	11.8	7.9	13.8	20	29.75	31.25	30.5
4	14.5	13	15.2	13.8	12.8	15.7	15.1	11.5	7.85	13.6	19.8	29.25	30	30.75
5	14.6	12.9	15.1	13.9	12.2	15.6	15.1	11.5	7.85	13.8	20	29	28.5	30.5
6	14.6	12.8	15.2	13.9	12.4	15.3	15.1	11.6	7.85	13.8	20.2	29.25	29.5	30
7	14.4	13	15.1	13.5	12.3	15.3	15.1	11.6	7.9	13.7	19.8	29.75	30	30.5
8	14.4	13.2	14.6	13.3	12.4	15.2	14.9	12.2	8	14.2	19.9	31	29.75	29.5
9	14.3	13.1	14.7	13.6	12.5	14.6	14.8	11.6	8	14.2	20.1	30.25	31.5	29.25
10	14.1	13.3	14.7	13.6	12.7	14.2	14.7	12.1	8.1	14.4	19.8	30.25	31	28.25
11	14.3	13.2	14.8	13.6	12.4	14.4	14.5	12.1	8.3	14.4	19.8	30.25	31	29.25
12	14.6	13.3	15.2	13.5	12.4	15.3	14.6	12.6	8.6	14	19.7	30.25	31	30
13	14.4	13.1	15.5	13.7	12.4	14.8	14.6	12.7	8.5	14.2	19.9	30.25	30.25	30
14	14.9	13.1	15.3	14.2	12.2	15.3	14.5	12.8	8.9	14.1	20	31.75	30.25	30.5

Table A-7 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Month	May	Nov	May	Oct	May	Oct	May	Oct	May	Oct	April	Oct	April	Oct
15	14.6	13.1	15.4	14.2	12.2	15.5	14.8	12.2	9.25	14.1	20	32.75	29.5	30.25
16	14.3	13.2	15.3	14.1	11.8	15.2	14.9	12	9.45	14.1	20.1	32.5	29.75	30.5
17	14.1	13.2	15.4	14.1	11.7	15.2	15	12	9.7	14.2	20.1	32.75	29.75	30.5
18	14	13.4	15.3	13.8	11.9	15.1	15.3	11.7	10.1	14.2	20.5	32.5	30.25	30
19	13.9	13.3	15.5	14.1	12.3	15.5	15.3	11.8	9.8	14.2	20.8	32.5	30	30.75
20	13.9	13.4	15.8	14	12.7	15.1	15.3	11.7	9.65	14.6	20.7	33	30	30.5
21	14	13.3	15.8	14	12.7	15.5	15.2	11.3	9.8	14.3	20.4	33.5	30.25	29.75
22	13.6	13.1	15.9	14	12.7	15.4	15.3	11.5	9.55	14.7	20.1	34.25	31	29.25
23	13.5	13.1	15.9	14.2	14.1	15.1	15.5	11.6	9.6	14.4	20	35.25	33.5	29.5
24	14	13.1	15.8	14.8	14.7	15.2	15.5	11.8	9.65	14.8	20.7	34.5	32.75	30.25
25	13.8	13.1	16.2	14.9	14.7	15.1	15.3	11.5	9.85	15.8	21.2	35	32.75	30.25
26	13.7	12.9	16.4	14.8	14.6	15.1	15.5	11.3	9.8	15.9	21.4	35	31.5	31.5
27	13.7	12.9	17	14.7	14.4	15	15.4	11.2	9.8	16.3	21.3	34.25	32	31.5
28	13.6	12.7	17.9	14.8	14.4	14.9	15.3	11.4	9.85	16.3	21.5	33.25	30.75	31
29	13.7	12.7	17.9	14.9	14.2	15.1	15.3	11.3	9.8	16.2	22.9	34.5	31.25	30.5
30	13.6	12.8	17.4	14.6	14.3	15.2	15.3	11.7	9.85	16.2	23.8	36.25	30.75	30.5
31	13.7	12.9	17.4	14.5	14.7	15.3	15.4	11.6	10.1	16.4	24.8	35.5	30.5	31
32	13.7	12.8	17.1	14.4	14.7	15	15.4	11.4	10.1	16.2	25.5	37.5	31.75	31.25
33	13.7	12.9	16.8	14.6	14.7	14.9	15.4	11.2	10.1	16.1	25.75	38.5	31.25	31
34	13.7	12.9	16.8	15.1	14.7	14.9	15.4	11.4	10.1	16.3	25.75	39	31.75	30.25
35	13.5	12.8	16.8	15.2	14.7	15.2	15.4	11.1	10.6	16.1	25.5	38.25	32.5	29.75
36	13.5	12.5	16.5	15.1	14.8	15.3	15.9	10.7	10.6	16.2	24.5	37.5	32.5	29.25
37	13.7	12.5	16.6	15.1	14.3	15.6	16.1	10.5	10.8	16.2	24.1	37.75	32.5	30
38	13.7	12.4	16.6	15.5	14.4	15.6	16.2	10.3	10.9	16.4	25.75	37	32.25	30.25

Table A-7 (continued)

Year/ Month	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011
Month	May	Nov	May	Oct	May	Oct	May	Oct	May	Oct	April	Oct	April	Oct
39	13.5	12.3	16.8	15	14.4	15.9	18	11	10.7	17	24.8	38.25	32.75	30
40	13.4	12.3	16.2	15.1	14.4	15.7	17.7	10.5	11	17	25	38.5	32.5	30.75
41	13.2	12.4	15.8	15.1	14.4	15.7	16.7	10.6	11.1	17.1	24.9	39	33.5	30.75
42	13.2	12.5	15.9	14.9	14.4	15.6	16.5	10.9	10.9	17.1	24.8	39	33.75	29.25
43	13.3	12.5	16	15	14.4	15.6	16.9	10.9	10.7	17.2	24.8	39.25	34.25	28
44	13.2	12.5	16	14.9	14.5	15.6	16.8	10.9	11.4	17.4	25	39.5	34.25	26.75
45	13.2	12.5	16	14.9	14.5	15.7	16.8	10.5	11.2	18.1	24.5	40	34.75	28
46	13.2	12.6	16	15	14.5	15.6	16.9	10.6	11.2	17.9	24.5	41.25	34	27.75
47	13.4	12.7	15.9	15.4	14.3	15.8	16.9	10.8	11.7	18.2	23.7	41	33.5	27.25
48	13.4	13	16	15.5	14.5	15.8	17.5	11.1	11.7	18.5	23.7	39.75	34	27.25
49	13.6	13	16	15.5	14.5	16.5	17.5	10.8	13	19.1	23.7	40.25	34	26
50	13.7	13	16	15.5	14.4	17	17.6	10.3	13.3	19.9	23.7	40.5	34	25.25
Sell price	13.7	13	16.5	15.5	14.4	16.7	17.6	9.85	13.3	21.2	22.8	39.75	34	25.25
XD	13.3	12.7	16.2	15.2	13.6	16.4	16.8	8.75	12.4	21.6	21.3	38.75	33.25	26

Table A-8 Prices of “IVL” stock 50 days before selling point, selling prices and prices on XD dates

Year/ Month	2010	2011	2011
Days	May	May	Aug
1	12	40.75	46.25
2	12.3	42.5	47.25
3	12.3	41.75	46.75
4	12.3	43.5	46
5	13	42.5	45.5

Table A-8 (continued)

Year/ Month	2010	2011	2011
Days	May	May	Aug
6	13.5	43	45.25
7	14.1	44	45.5
8	14	46	46
9	13.5	49.5	45.5
10	13.8	50	46.25
11	13.6	50.75	45
12	13.8	49	46.25
13	14	50	47
14	13.8	49.25	46.5
15	14.6	49.75	46.5
16	15.3	49.25	49.5
17	15	50	49.25
18	15.9	52.5	48
19	15.4	52.75	48.75
20	16.5	54	48.75
21	17.9	54.25	47.75
22	17.6	53	46.5
23	18	51	46.75
24	17.4	51.5	46.5
25	17.2	52	46.5
26	16.3	52.5	46
27	16.9	53	45.75
28	17	53.75	45.5
29	18.3	52.75	45.5
30	18.3	52.75	46

Table A-8 (continued)

Year/ Month	2010	2011	2011
Days	May	May	Aug
31	17.9	55	45.75
32	17	54	45
33	17.5	52.5	44.5
34	17.3	53.75	43.75
35	17.3	53.75	43.75
36	17.3	53.75	44
37	17.3	53.75	46.5
38	15.7	53.75	46.5
39	14.4	54	45.75
40	16.6	54.75	43.25
41	15.8	56	41
42	16.2	56	38.5
43	16.1	55.5	40.5
44	16.3	55	40.25
45	16.1	53.5	40.25
46	15.8	53.75	41
47	16	53.25	39.75
48	16.3	53.25	41.25
49	16.3	52.75	41.25
50	17.8	53	40.25
Sell price	17.8	53	40
XD	18.1	51	39

APPENDIX B

Matlab source codes

Appendix B-1 Genetic algorithm for detection of regime switching

```
%Genetic Algorithm For Sine XD
%(c)Komsan Suriya and Tatcha Sudtasan
%Chiang Mai School of Economics, Thailand
%April 2012

clear

load TatchaXD advanc30 advanc40 advanc50 ptt30 ptt40 ptt50 tcap30
tcap40 tcap50 scc30 scc40 scc50 kbank30 kbank40 kbank50 cpf30 cpf40
cpf50 cpall30 cpall40 cpall50 ivl30 ivl40 ivl50

%Choose data, days and column of year.

data=advanc30; %select the file in use.
days=30; %please insert the number of days of the data set.
column=1; %select the XD rounds in use.

%-----

%Settings
%define the model's parameters

mutation_prob=0.3; % define the probability of mutation
amountchildren=4; % define the number of children
iteration=1000; %set repeat rounds for a pair of parents.

%-----

price=data(1:days,column);
sellprice=data(days+1,column);

%Step 1 Initialize parents

%Generate parents
father = ones(1,days);
mother = zeros(1,days);

%Step 2
%Crossover

%Technical notes:
```

```

%Single point crossover beginning after the cutpoint

%Please insert number of offsprings
offspring= ones (amountchildren,days);

for sister=1:1:amountchildren
randcross=rand;

cutpoint=round(randcross*days);

if cutpoint>0 %then crossover
if cutpoint<days
offspring(sister, 1:cutpoint)=father(1:cutpoint);
offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
else %cutpoint==days
offspring(sister, 1:days)=father;
end
else %if cutpoint =0, children are alike parents.
offspring(sister, 1:days)=mother;
end
end

offspring ;

%Step3 Mutation
mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
for k=1:1:mutation
position=round(rand*days);
for times=1:10
if position==0
position=round(rand*days);
end
end
offspring(sister,position)=abs(offspring(sister,position)-
1);
end
end

offspring;

%Step4 Objective function

sellprice=ones (amountchildren,1)*sellprice;
price=ones (amountchildren,1)*price';

buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones (days,1);

```

```

averageprice=buyprice*ones(days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice; %profit matrix
of all children.

```

```

%Step 5 Selection of the best offsprings

```

```

bestprofit=max(profit);

```

```

for child=1:amountchildren
    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end

```

```

%Step 6 The second best child

```

```

%distance from the maxprofit
secondbestprofit=abs(profit-(ones(amountchildren,1)*bestprofit));

```

```

s_profit=ones(amountchildren,1);

```

```

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    else
        s_profit(sister,1)=99.9999;
    end
end
minsecond=min(s_profit);

```

```

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end

```

```

%Step 7 Collection of bestchild

```

```

collection=[bestchild];
collectprofit=[bestprofit];

```

```

%-----
%Repeat rounds*****
%-----

```

```

for repeat=2:1:iteration

```

```

    father=bestchild;
    mother=secondchild;
    price=price(1,1:days);

```

```

price=price';

%Step 2
%Crossover

%Please insert number of offsprings
offspring= ones(amountchildren,days);

for sister=1:1:amountchildren
randcross=rand;

cutpoint=round(randcross*days);
if cutpoint>0 %then crossover
    if cutpoint<days
        offspring(sister, 1:cutpoint)=father(1:cutpoint);
        offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
    else %cutpoint==days
        offspring(sister, 1:days)=father;
    end
else %if cutpoint =0, children are alike parents.

        offspring(sister, 1:days)=mother;

end
end

offspring ;

%Step3 Mutation

mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
    for k=1:1:mutation
        position=round(rand*days);
        for times=1:10
            if position==0
                position=round(rand*days);
            end
        end
        offspring(sister,position)=abs(offspring(sister,position)-
1);
    end
end
offspring;

%Step4 Objective function

%Please insert the price of the day before XD
%sellprice=100;

sellprice;

```



```

price=ones (amountchildren,1)*price';

buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones (days,1);
averageprice=buyprice*ones (days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice ;%profit matrix
of all children.

%Step 5 Selection of the best offsprings

bestprofit=max(profit);

for child=1:amountchildren
    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end

%Step 6 The second best child

%distance from the maxprofit
secondbestprofit=abs(profit-(ones (amountchildren,1)*bestprofit));

s_profit=ones (amountchildren,1);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    else
        s_profit(sister,1)=99.9999;
    end
end
end
minsecond=min(s_profit);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end
end
disp('You are using Genetic Algorithm. Family 1. Good Luck. ')
%Step 7 Collection of bestchild

collection=[collection; bestchild];
collectprofit=[collectprofit ; bestprofit];

```

```

end

%Summarize
disp ('-----')
disp ('Summary of the best offspring')
disp ('-----')

repeat % Test of completeness of iteration
maxbestprofit=max(collectprofit)

for id=1:1:iteration
    if collectprofit(id,1)==maxbestprofit
        bestofbestchild1=collection(id,1:days);
        id;
    end
end

bestofbestchild1

Bestparents=[1 maxbestprofit ];

%-----
%Family 2: Random father and random mother
%-----

father=round(rand(1,days));
mother=round(rand(1,days));

price=price(1,1:days);
price=price';

collection2=collection;
collectprofit2=collectprofit;

%Step 2
%Crossover

%Please insert number of offsprings
offspring=ones(amountchildren,days);

for sister=1:1:amountchildren
    randcross=rand;
    cutpoint=round(randcross*days);

    if cutpoint>0 %then crossover
        if cutpoint<days
            offspring(sister, 1:cutpoint)=father(1:cutpoint);

```

```

        offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
    else %cutpoint==days
        offspring(sister, 1:days)=father;
    end
else %if cutpoint =0, children are alike parents.
        offspring(sister, 1:days)=mother;
end
end

offspring ;

%Step3 Mutation
mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
    for k=1:1:mutation
        position=round(rand*days);
        for times=1:10
            if position==0
                position=round(rand*days);
            end
        end
        offspring(sister,position)=abs(offspring(sister,position)-
1);
    end
end

offspring;

%Step4 Objective function
price=ones(amountchildren,1)*price';

buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones(days,1);
averageprice=buyprice*ones(days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice; %profit matrix
of all children.

%Step 5 Selection of the best offsprings

bestprofit=max(profit);
for child=1:amountchildren
    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end
end

```

```

%Step 6 The second best child

%distance from the maxprofit
secondbestprofit=abs(profit-(ones(amountchildren,1)*bestprofit));

s_profit=ones(amountchildren,1);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    else
        s_profit(sister,1)=99.9999;
    end
end
minsecond=min(s_profit);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end

%Step 7 Collection of bestchild

collection2=[collection2; bestchild];
collectprofit2=[collectprofit2 ; bestprofit];

%-----
%Repeat rounds*****
%-----

for repeat=2:1:iteration

    father=bestchild;
    mother=secondchild;
    price=price(1,1:days);
    price=price';

%Step 2
%Crossover

%Please insert number of offsprings
offspring= ones(amountchildren,days);

for sister=1:1:amountchildren
    randcross=rand;

    cutpoint=round(randcross*days);

    if cutpoint>0 %then crossover

```

```

if cutpoint<days
    offspring(sister, 1:cutpoint)=father(1:cutpoint);
    offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
else %cutpoint==days
    offspring(sister, 1:days)=father;
end
else %if cutpoint =0, children are alike parents.
    offspring(sister, 1:days)=mother;
end
end

offspring ;

%Step3 Mutation

mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
    for k=1:1:mutation
        position=round(rand*days);
        for times=1:10
            if position==0
                position=round(rand*days);
            end
            end
            offspring(sister,position)=abs(offspring(sister,position) -
1);
        end
    end
end

offspring;

%Step4 Objective function

sellprice;

price=ones(amountchildren,1)*price';

buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones(days,1);
averageprice=buyprice*ones(days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice;%profit matrix
of all children.

%Step 5 Selection of the best offsprings

bestprofit=max(profit);

for child=1:amountchildren

```

```

    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end

%Step 6 The second best child

%distance from the maxprofit
secondbestprofit=abs(profit-(ones(amountchildren,1)*bestprofit));
s_profit=ones(amountchildren,1);
for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    else
        s_profit(sister,1)=99.9999;
    end
end
minsecond=min(s_profit);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end

disp('You are using Genetic Algorithm. Family 2. Good Luck. ')

%Step 7 Collection of bestchild

collection2=[collection2; bestchild];
collectprofit2=[collectprofit2 ; bestprofit];

end

%Summarize
disp ('-----')
disp ('Summary of the best offspring')
disp ('-----')

repeat % Test of completeness of iteration
maxbestprofit=max(collectprofit2);

for id=1:1:(2*iteration)
    if collectprofit2(id,1)==maxbestprofit
        bestofbestchild2=collection2(id,1:days);
    end
end

```

```

end

bestofbestchild2

Bestparents=[Bestparents ; 2 maxbestprofit ];

%-----
%Family 3: Father with all "1" and random mother
%-----

father=ones(1,days);
mother=round(rand(1,days));

price=price(1,1:days);
price=price';

collection3=collection2;
collectprofit3=collectprofit2;

%Step 2
%Crossover

%Please insert number of offsprings
offspring=ones(amountchildren,days);

for sister=1:1:amountchildren
    randcross=rand;

    cutpoint=round(randcross*days);

    if cutpoint>0 %then crossover
        if cutpoint<days
            offspring(sister, 1:cutpoint)=father(1:cutpoint);
            offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
        else %cutpoint==days
            offspring(sister, 1:days)=father;
        end
    else %if cutpoint =0, children are alike parents.

        offspring(sister, 1:days)=mother;
    end
end

offspring ;

%Step3 Mutation

mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
    for k=1:1:mutation

```

```

position=round(rand*days);
for times=1:10
if position==0
    position=round(rand*days);
end
end
    offspring(sister,position)=abs(offspring(sister,position)-
1);
    end
end
offspring;

%Step4 Objective function

price=ones(amountchildren,1)*price';

buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones(days,1);
averageprice=buyprice*ones(days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice; %profit matrix
of all children.

%Step 5 Selection of the best offsprings

bestprofit=max(profit);

for child=1:amountchildren
    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end

%Step 6 The second best child

%distance from the maxprofit
secondbestprofit=abs(profit-(ones(amountchildren,1)*bestprofit));

s_profit=ones(amountchildren,1);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    else
        s_profit(sister,1)=99.9999;
    end
end
minsecond=min(s_profit);

```



```

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end

%Step 7 Collection of bestchild
collection3=[collection3; bestchild];
collectprofit3=[collectprofit3 ; bestprofit];

%-----
%Repeat rounds*****
%-----

for repeat=2:1:iteration
    father=bestchild;
    mother=secondchild;
    price=price(1,1:days);
    price=price';

    %Step 2
    %Crossover

    %Please insert number of offsprings
    offspring= ones(amountchildren,days);

    for sister=1:1:amountchildren
        randcross=rand;

        cutpoint=round(randcross*days);

        if cutpoint>0 %then crossover
            if cutpoint<days
                offspring(sister, 1:cutpoint)=father(1:cutpoint);
                offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
            else %cutpoint==days
                offspring(sister, 1:days)=father;
            end
        else %if cutpoint =0, children are alike parents.
            offspring(sister, 1:days)=mother;
        end
    end

    offspring ;

    %Step3 Mutation

    mutation=round(mutation_prob*days);

```

```

for sister=1:1:amountchildren
    for k=1:1:mutation
        position=round(rand*days);
        for times=1:10
            if position==0
                position=round(rand*days);
            end
        end
        offspring(sister,position)=abs(offspring(sister,position)-
1);
    end
end
offspring;

%Step4 Objective function
sellprice;
price=ones(amountchildren,1)*price';

buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones(days,1);
averageprice=buyprice*ones(days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice ;%profit matrix
of all children.

%Step 5 Selection of the best offsprings
bestprofit=max(profit);

for child=1:amountchildren
    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end

%Step 6 The second best child
%distance from the maxprofit
secondbestprofit=abs(profit-(ones(amountchildren,1)*bestprofit));
s_profit=ones(amountchildren,1);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    end
end

```

```

else
    s_profit(sister,1)=99.9999;
end
end
minsecond=min(s_profit);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end

disp('You are using Genetic Algorithm. Family 3. Good Luck. ')

%Step 7 Collection of bestchild

collection3=[collection3; bestchild];
collectprofit3=[collectprofit3 ; bestprofit];

end

%Summarize
disp ('-----')
disp ('Summary of the best offspring')
disp ('-----')

repeat % Test of completeness of iteration
maxbestprofit=max(collectprofit3);

for id=1:1:(3*iteration)

    if collectprofit3(id,1)==maxbestprofit
        bestofbestchild3=collection3(id,1:days);
    end

end

end

bestofbestchild3

Bestparents=[Bestparents ; 3 maxbestprofit ];

%-----
%Family 4: Random father and mother with all "0"
%-----

father=round(rand(1,days));
mother=zeros(1,days);

price=price(1,1:days);
price=price';

```

```

collection4=collection3;
collectprofit4=collectprofit3;

%Step 2
%Crossover

%Please insert number of offsprings
offspring= ones(amountchildren,days);

for sister=1:1:amountchildren
randcross=rand;

cutpoint=round(randcross*days);

if cutpoint>0 %then crossover
    if cutpoint<days
        offspring(sister, 1:cutpoint)=father(1:cutpoint);
        offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
    else %cutpoint==days
        offspring(sister, 1:days)=father;
    end
else %if cutpoint =0, children are alike parents.

        offspring(sister, 1:days)=mother;

end
end

offspring ;

%Step3 Mutation

mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
    for k=1:1:mutation
        position=round(rand*days);
        for times=1:10
            if position==0
                position=round(rand*days);
            end
            end
            offspring(sister,position)=abs(offspring(sister,position)-
1);
        end
    end

offspring;

%Step4 Objective function

price=ones(amountchildren,1)*price';

buyprice=price;

```

```

buyprice=buyprice.*offspring;
buytimes=offspring*ones(days,1);
averageprice=buyprice*ones(days,1)./buytimes;
profit=((sellprice-averageprice)*100)./averageprice; %profit matrix
of all children.

```

```

%Step 5 Selection of the best offsprings

```

```

bestprofit=max(profit);

for child=1:amountchildren
    if profit(child,1)>=bestprofit
        bestchild=offspring(child,1:days);
        child;
    end
end

```

```

%Step 6 The second best child

```

```

%distance from the maxprofit
secondbestprofit=abs(profit-(ones(amountchildren,1)*bestprofit));

s_profit=ones(amountchildren,1);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit(sister,1)=secondbestprofit(sister,1) ;
    else
        s_profit(sister,1)=99.9999;
    end
end
end
minsecond=min(s_profit);

for sister=1:1:amountchildren
    if secondbestprofit(sister,1)==minsecond
        secondprofit=profit(sister,1);
        secondchild=offspring(sister,1:days);
    end
end
end

```

```

%Step 7 Collection of bestchild

```

```

collection4=[collection4; bestchild];
collectprofit4=[collectprofit4 ; bestprofit];
%-----
%Repeat rounds*****
%-----

for repeat=2:1:iteration

```

```

father=bestchild;
mother=secondchild;
price=price(1,1:days);
price=price';

%Step 2
%Crossover

%Please insert number of offsprings
offspring= ones(amountchildren,days);

for sister=1:1:amountchildren
randcross=rand;

cutpoint=round(randcross*days);

if cutpoint>0 %then crossover
    if cutpoint<days
        offspring(sister, 1:cutpoint)=father(1:cutpoint);
        offspring(sister, cutpoint+1:days)=mother(cutpoint+1:days);
    else %cutpoint==days
        offspring(sister, 1:days)=father;
    end
else %if cutpoint =0, children are alike parents.

        offspring(sister, 1:days)=mother;

end
end

offspring ;

%Step3 Mutation

mutation=round(mutation_prob*days);

for sister=1:1:amountchildren
    for k=1:1:mutation
        position=round(rand*days);
        for times=1:10
            if position==0
                position=round(rand*days);
            end
            end
            offspring(sister,position)=abs(offspring(sister,position)-
1);
        end
    end
end
offspring;

%Step4 Objective function

sellprice;

```

```

price=ones (amountchildren,1)*price';
buyprice=price;

buyprice=buyprice.*offspring;
buytimes=offspring*ones (days,1);
averageprice=buyprice*ones (days,1) ./buytimes;
profit=((sellprice-averageprice)*100) ./averageprice ;%profit matrix
of all children.

%Step 5 Selection of the best offsprings
bestprofit=max(profit);

for child=1:amountchildren
    if profit (child,1)>=bestprofit
        bestchild=offspring (child,1:days);
        child;
    end
end

%Step 6 The second best child

%distance from the maxprofit
secondbestprofit=abs (profit- (ones (amountchildren,1) *bestprofit));
s_profit=ones (amountchildren,1);

for sister=1:1:amountchildren
    if secondbestprofit (sister,1)>min(secondbestprofit) %second best
profit is min of this distance but not zero
        s_profit (sister,1)=secondbestprofit (sister,1) ;
    else
        s_profit (sister,1)=99.9999;
    end
end
end
minsecond=min(s_profit);

for sister=1:1:amountchildren
    if secondbestprofit (sister,1)==minsecond
        secondprofit=profit (sister,1);
        secondchild=offspring (sister,1:days);
    end
end

disp('You are using Genetic Algorithm. Family 4. Good Luck. ')
%Step 7 Collection of bestchild

collection4=[collection4; bestchild];
collectprofit4=[collectprofit4 ; bestprofit];

end

```

```

%Summarize
disp ('-----')
disp ('Summary of the best offspring')
disp ('-----')

repeat % Test of completeness of iteration
maxbestprofit=max(collectprofit4);

for id=1:1:(4*iteration)
    if collectprofit4(id,1)==maxbestprofit
        Bestofbestchild4=collection4(id,1:days);
        best_id=id
    end
end

Bestofbestchild4 % From all 4 families
maxbestprofit %From all 4 families
best_id

%-----
%Final summary
%-----

Bestparents=[Bestparents ; 4 maxbestprofit ]

maxreturn=max(Bestparents(:,2))

disp('The best parents are as follows:')
if Bestparents(1,2)==maxreturn
    disp ('Fixed unity father and fixed null mother are the best
parents.')
    disp ('Family 1')
elseif Bestparents(2,2)==maxreturn
    disp ('Random father and random mother are the best parents.')
    disp ('Family 2')
elseif Bestparents(3,2)==maxreturn
    disp ('Fixed unity father and random mother are the best
parents.')
    disp ('Family 3')
else
    disp ('Random father and fixed null mother are the best
parents.')
    disp ('Family 4')
end
end

```



```

disp ('-----')
disp ('Finish the Genetic Algorithm')
disp ('Thank you for choosing KSTS Software.')
disp ('(C) Komsan Suriya and Tatcha Sudtasan 2012')
disp ('-----')

```

Appendix B-2: Out-of-sample test

```

%Out-of-sample tests for GA XD
%(c)Komsan Suriya and Tatcha Sudtasan
%Chiang Mai School of Economics, Thailand
%April 2012

clear

load TatchaXD advanc30 advanc40 advanc50 ptt30 ptt40 ptt50 tcap30
tcap40 tcap50 scc30 scc40 scc50 kbank30 kbank40 kbank50 cpf30 cpf40
cpf50 cpall30 cpall40 cpall50 ivl30 ivl40 ivl50

load BestXD bestadvanc30 bestadvanc40 bestadvanc50 bestptt30
bestptt40 bestptt50 besttcap30 besttcap40 besttcap50 bestscc30
bestscc40 bestscc50 bestkbank30 bestkbank40 bestkbank50 bestcpf30
bestcpf40 bestcpf50 bestcpall30 bestcpall40 bestcpall50 bestivl30
bestivl40 bestivl50

%Set periods of XD

first=[ 1, 3, 5, 7, 9, 11, 14 ]
length(first)
second=[ 2, 4, 6, 8, 10, 12, 13]

data=advanc50
best=bestadvanc50
days=50

%-----\
disp ('I am performing self-check of in-sample profit')
%For the first XD rounds such as April

firstprofit=99.9999
for k=1:length(first)
data(1:days,first(:,k))
best(1:days,first(:,k))
sumprice=data(1:days,first(:,k))*best(1:days,first(:,k))
sumtimes=sum(best(1:days,first(:,k)))
averageprice=sumprice/sumtimes

```

```

sellprice=data(days+1,first(:,k))
profit=(sellprice-averageprice)*100/averageprice
firstprofit=[firstprofit ; profit]
k
end

firstprofit=firstprofit(2:end,:)

%For the second XD rounds such as August

secondprofit=99.9999

for k=1:1:length(second)
data(1:days,second(:,k))
best(1:days,second(:,k))
sumprice=data(1:days,second(:,k))*best(1:days,second(:,k))
sumtimes=sum(best(1:days,second(:,k)))
averageprice=sumprice/sumtimes
sellprice=data(days+1,second(:,k))
profit=(sellprice-averageprice)*100/averageprice
secondprofit=[secondprofit ; profit]
k
end

secondprofit=secondprofit(2:end,:)

disp('End of in-sample profit test.')
%-----

disp('Next, I am performing out-of-sample test for April XD.')

% First round
% Idea is that we calculate all the profits but when it is the same
year,
% we don't show the calculation in the result matrix.

out_sample_profit=99.9999

for m=1:1:length(first)

    out_sample_profit=[out_sample_profit; 99.9999]
    for k=1:1:length(first)

        if m<k | m>k
            data(1:days,first(:,k))
            best(1:days,first(:,m))
            sumprice=data(1:days,first(:,k))*best(1:days,first(:,m))
            sumtimes=sum(best(1:days,first(:,m)))
            averageprice=sumprice/sumtimes
            sellprice=data(days+1,first(:,k))
            profit=(sellprice-averageprice)*100/averageprice
            out_sample_profit=[out_sample_profit ; profit]
        end
    end
end

```

```

k
m
end

end
end

%Second round
disp (' I am running out-sample-test for August XD')
second_out_sample_profit=99.9999
for m=1:1:length(second)
    second_out_sample_profit=[second_out_sample_profit; 99.9999]
    for k=1:1:length(second)
        if m<k | m>k
            data(1:days,second(:,k))
            best(1:days,second(:,m))
            sumprice=data(1:days,second(:,k))*best(1:days,second(:,m))
            sumtimes=sum(best(1:days,second(:,m)))
            averageprice=sumprice/sumtimes
            sellprice=data(days+1,second(:,k))
            profit=(sellprice-averageprice)*100/averageprice
            second_out_sample_profit=[second_out_sample_profit ; profit]
        k
        m
        end

    end
end

if length(out_sample_profit)==length(second_out_sample_profit)
Final=[ out_sample_profit second_out_sample_profit ]
else
    OSP1=out_sample_profit
    OSP2=second_out_sample_profit
end

disp ('Congratulations! You have finished the out-of-sample_test.')

disp ('-----')
disp ('Thank you for choosing KSTS Software.')
disp ('(c)2012 by Komsan Suriya and Tatcha Sudtasan')
disp ('-----')

```

Curriculum Vitae

Name	Miss Tatcha Sudtasan
Date of Birth	14 November 1983
Educational Background	
2007-2009	Research student in the Faculty of Education, Shiga University, Japan
2005-2006	Graduate diploma student in Faculty of Education, Teaching Profession, Chiang Mai University
2001-2004	Bachelor of Science (Mathematics), Faculty of Science, Department of Mathematics, Chiang Mai University
1998-2000	Grade 10-12, Nakhonsawan School
Award	
2007	Awarded the Japanese Government Scholarship (MEXT), MONBUKAGAKUSHO as a research student in the Faculty of Education, Shiga University, Japan
2001	Awarded the Institute for the Promotion of Teaching Science and Technology Scholarship, a Thai Government-Funded Scholarship to further study an undergraduate program at the Faculty of Science and a diploma of education at the Faculty of Education , Chiang Mai University, Thailand (2001-2005)