Supplemental file

In this supplemental file, we include more simulation results under various setting of different ARL_0, θ_0, τ and λ to check whether the conclusions in the manuscript would change in other cases. Figures A.1-A.3 give a parallel comparison to those of Figures 1-3 in the manuscript when the IC ARL is chosen as 800. The curves of $\gamma_t \equiv \mathrm{Pr}_{\mathrm{OC}}(T \leq t) - \mathrm{Pr}_{\mathrm{IC}}(T \leq t)$ for WEWMA, EWMAa1, EWMAa2 and WLR are presented in these three figures. Also, Tables A.1-A.14 present the SSARL values under other settings of ARL_0, θ_0, τ and λ. In all these tables, except for the parameter setting given in the caption, all the other settings would be as the same as those in the manuscript. In general, the WEWMA chart works well for other cases as well in terms of its OC ARL, and the comparison conclusion still generally holds.

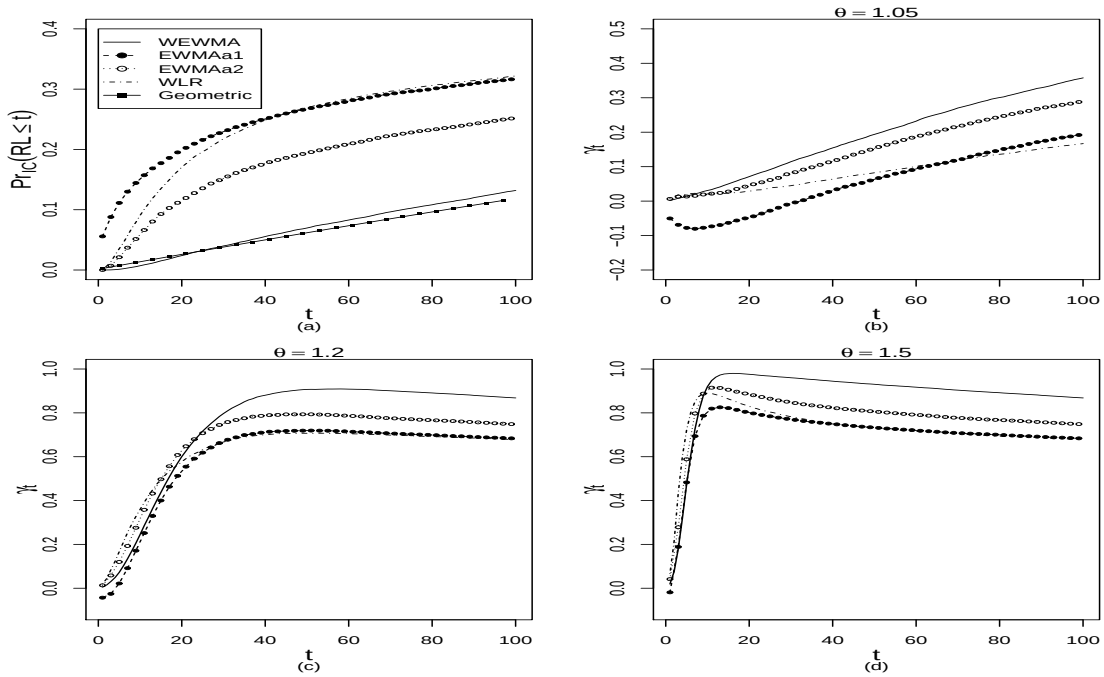

Figure A.1: Performance comparison between the WEWMA, EWMAa1, EWMAa2 and WLR under Scenario (I) with $\mathrm{ARL}_0 = 800$: (a) four in-control C.D.F curves along with Geometric distribution (with expectation 300); (b)-(d) Curves of $\gamma_t \equiv \mathrm{Pr}_{\mathrm{OC}}(T \leq t) - \mathrm{Pr}_{\mathrm{IC}}(T \leq t)$ when $\theta = 1.05$, 1.2 and 1.5, respectively.

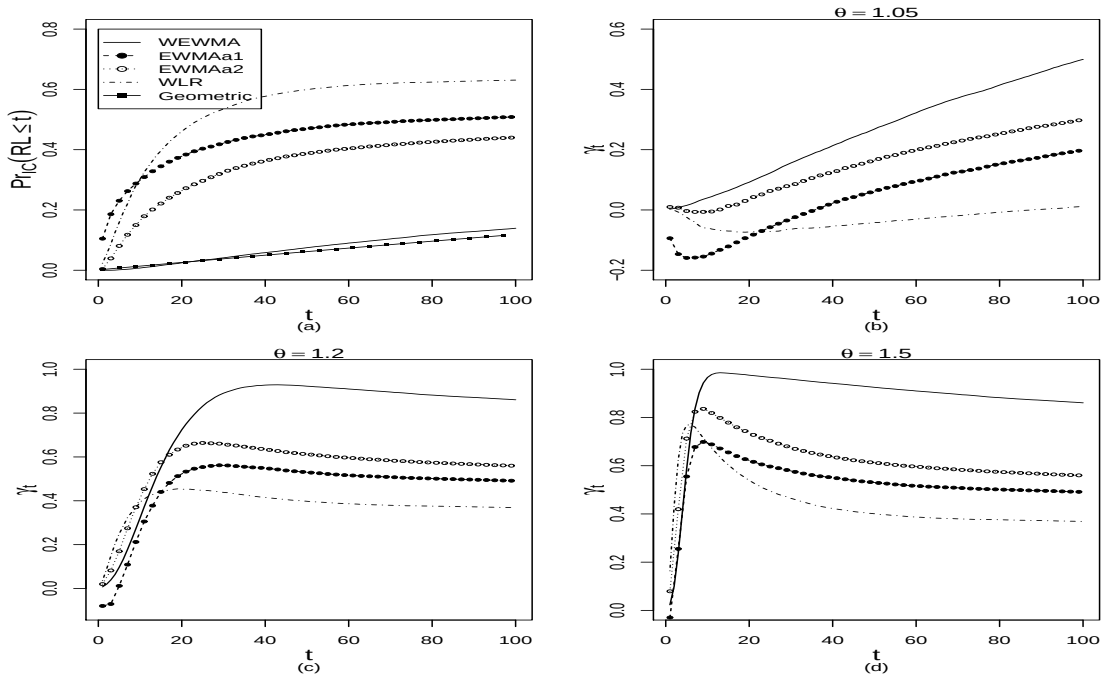

Figure A.2: Performance comparison between the WEWMA, EWMAa1, EWMAa2 and WLR under Scenario (II) with $\text{ARL}_0 = 800$: (a) four in-control C.D.F curves along with Geometric distribution (with expectation 300); (b)-(d) Curves of $\gamma_t \equiv \Pr_{\text{OC}}(T \le t) - \Pr_{\text{IC}}(T \le t)$ when $\theta = 1.05$, 1.2 and 1.5, respectively.

Table A.1: OC ARL comparison under Scenarios (I) and (II) when $\lambda = 0.2$

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.6$				$\theta_1 = 1.5$		
1.025	161 (157)	201 (195)	173 (172)	161 (159)	135 (126)	180 (190)	144 (138)	130 (124)
1.050	96.0 (89.3)	136 (130)	106 (103)	94.4 (89.4)	73.4 (62.2)	111 (109)	80.5 (70.0)	71.3 (61.1)
1.100	44.3 (37.1)	68.2 (63.1)	48.7 (42.9)	43.5 (37.2)	33.5 (24.6)	50.8 (45.4)	36.6 (27.7)	32.5 (24.5)
1.200	16.8 (12.2)	23.8 (20.1)	17.9 (13.9)	16.8 (12.2)	13.9 (9.14)	17.6 (13.7)	14.5 (9.90)	13.6 (9.12)
1.300	9.63 (6.22)	11.7 (9.08)	9.71 (6.72)	9.42 (6.14)	8.17 (4.78)	9.11 (6.37)	8.13 (5.09)	7.94 (4.86)
1.400	6.45 (3.76)	7.21 (5.04)	6.43 (4.00)	6.36 (3.72)	5.70 (3.09)	5.81 (3.67)	5.55 (3.18)	5.54 (3.05)
1.500	4.93 (2.62)	5.01 (3.16)	4.79 (2.70)	4.81 (2.64)	4.37 (2.20)	4.25 (2.40)	4.17 (2.20)	4.24 (2.16)
1.700	3.35 (1.60)	3.16 (1.65)	3.16 (1.55)	3.27 (1.57)	3.03 (1.36)	2.75 (1.33)	2.84 (1.31)	2.92 (1.33)
2.000	2.34 (0.99)	2.09 (0.91)	2.16 (0.92)	2.28 (0.98)	2.13 (0.87)	1.88 (0.80)	1.97 (0.80)	2.08 (0.85)
3.000	1.31 (0.47)	1.15 (0.36)	1.19 (0.40)	1.28 (0.47)	1.23 (0.43)	1.08 (0.27)	1.13 (0.33)	1.19 (0.40)
4.000	1.04 (0.20)	1.01 (0.09)	1.01 (0.11)	1.04 (0.19)	1.02 (0.15)	1.00 (0.04)	1.00 (0.06)	1.01 (0.12)
RMI	0.041	0.191	0.045	0.025	0.057	0.183	0.053	0.027

NOTE: Standard deviations are in parentheses.

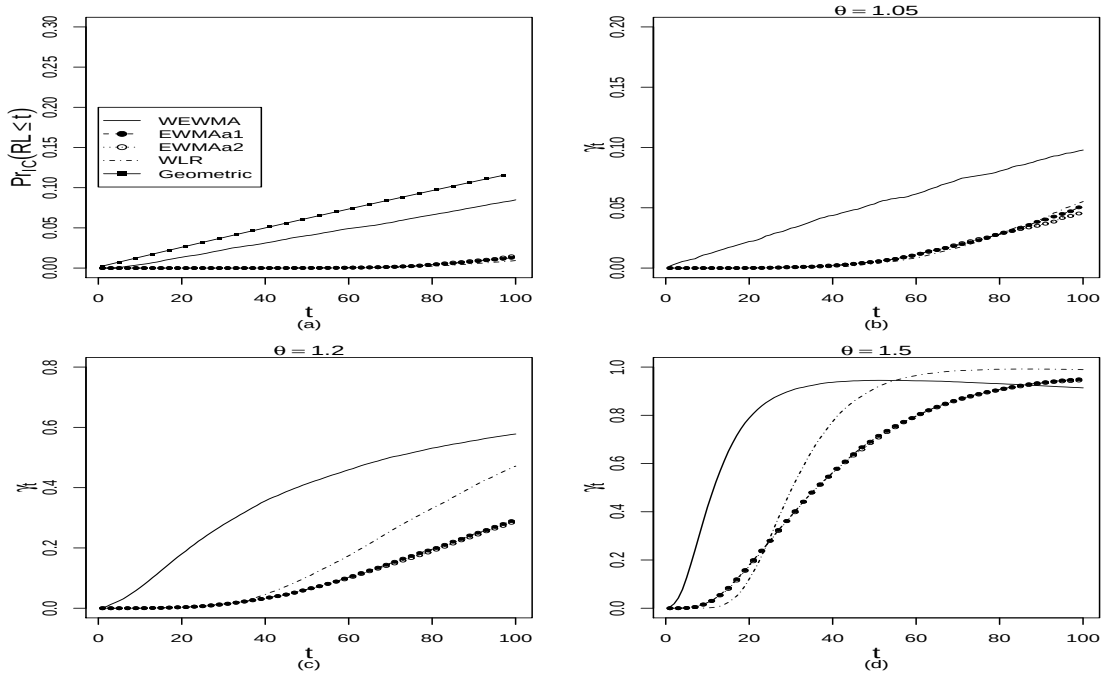

Figure A.3: Performance comparison between the WEWMA, EWMAa1, EWMAa2 and WLR under Scenario (III) with $\text{ARL}_0 = 800$: (a) four in-control C.D.F curves along with Geometric distribution (with expectation 300); (b)-(d) Curves of $\gamma_t \equiv \Pr_{\text{OC}}(T \leq t) - \Pr_{\text{IC}}(T \leq t)$ when $\theta = 1.05$, 1.2 and 1.5, respectively.

Table A.2: OC ARL comparison under Scenarios (III) and (IV) when $\lambda = 0.2$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.7$				$\theta_1 = 1.5$		
1.025	243 (238)	248 (279)	245 (236)	244 (240)	173 (171)	210 (209)	186 (186)	170 (170)
1.050	201 (199)	193 (218)	206 (202)	195 (195)	106 (102)	137 (136)	117 (114)	105 (102)
1.100	135 (137)	121 (143)	145 (149)	132 (140)	46.9 (43.9)	65.9 (64.9)	54.4 (52.2)	46.9 (43.1)
1.200	63.8 (72.6)	50.8 (63.7)	73.9 (80.6)	59.8 (68.5)	16.2 (12.8)	21.3 (19.1)	18.0 (15.5)	16.4 (13.0)
1.300	31.8 (36.1)	24.7 (29.4)	36.6 (42.5)	29.5 (33.9)	8.77 (5.88)	10.0 (7.75)	9.04 (6.57)	8.75 (5.89)
1.400	18.1 (18.5)	14.4 (14.9)	20.3 (22.5)	16.7 (17.3)	5.90 (3.45)	6.11 (4.11)	5.80 (3.68)	5.88 (3.48)
1.500	11.8 (10.6)	9.54 (8.59)	12.8 (12.4)	11.1 (9.75)	4.42 (2.37)	4.33 (2.58)	4.27 (2.40)	4.39 (2.33)
1.700	6.75 (4.59)	5.62 (4.06)	6.88 (5.05)	6.48 (4.31)	3.01 (1.40)	2.77 (1.38)	2.82 (1.35)	2.99 (1.39)
2.000	4.17 (2.32)	3.45 (2.03)	4.07 (2.37)	4.06 (2.23)	2.11 (0.87)	1.86 (0.79)	1.95 (0.81)	2.10 (0.86)
3.000	1.99 (0.85)	1.65 (0.74)	1.86 (0.81)	1.98 (0.84)	1.20 (0.40)	1.07 (0.25)	1.10 (0.30)	1.20 (0.40)
4.000	1.41 (0.55)	1.19 (0.41)	1.31 (0.50)	1.40 (0.54)	1.01 (0.12)	1.00 (0.03)	1.00 (0.05)	1.02 (0.12)
RMI	0.181	0.002	0.236	0.138	0.039	0.134	0.055	0.037

Table A.3: OC ARL comparison under Scenarios (I) and (II) when $\lambda = 0.5$

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.9$				$\theta_1 = 1.9$		
1.025	194 (194)	213 (227)	200 (203)	195 (193)	169 (167)	211 (251)	179 (178)	167 (162)
1.050	131 (127)	148 (156)	137 (138)	129 (125)	101 (92.4)	137 (165)	110 (105)	103 (94.1)
1.100	64.7 (59.9)	79.1 (81.9)	70.6 (66.8)	66.4 (61.5)	47.8 (40.0)	61.1 (72.7)	52.3 (43.9)	48.7 (39.5)
1.200	24.2 (20.5)	29.1 (27.3)	26.6 (22.9)	25.2 (20.8)	18.7 (14.2)	19.7 (19.4)	20.2 (15.6)	19.2 (14.4)
1.300	12.5 (10.0)	14.1 (12.1)	13.6 (11.2)	12.6 (10.1)	9.90 (7.26)	9.94 (8.70)	10.6 (8.09)	10.2 (7.54)
1.400	7.73 (5.81)	8.15 (6.54)	8.05 (6.25)	7.84 (5.93)	6.22 (4.34)	5.98 (4.82)	6.55 (4.75)	6.51 (4.54)
1.500	5.29 (3.72)	5.39 (4.03)	5.47 (4.02)	5.43 (3.82)	4.42 (2.89)	4.10 (3.01)	4.51 (3.06)	4.57 (2.98)
1.700	3.15 (1.93)	3.10 (1.95)	3.13 (2.01)	3.23 (1.97)	2.71 (1.54)	2.41 (1.50)	2.75 (1.63)	2.81 (1.61)
2.000	2.00 (1.02)	1.93 (0.98)	1.93 (1.04)	2.01 (1.03)	1.78 (0.84)	1.59 (0.77)	1.74 (0.84)	1.80 (0.86)
3.000	1.10 (0.30)	1.08 (0.27)	1.07 (0.25)	1.10 (0.30)	1.05 (0.22)	1.02 (0.15)	1.04 (0.20)	1.05 (0.23)
4.000	1.00 (0.07)	1.00 (0.05)	1.00 (0.04)	1.00 (0.06)	1.00 (0.03)	1.00 (0.02)	1.00 (0.02)	1.00 (0.03)
RMI	0.008	0.080	0.042	0.021	0.037	0.087	0.078	0.057

Table A.4: OC ARL comparison under Scenarios (III) and (IV) when $\lambda = 0.5$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 2.3$				$\theta_1 = 1.9$		
1.025	255 (235)	254 (261)	258 (210)	259 (259)	203 (201)	260 (259)	219 (216)	198 (198)
1.050	221 (209)	211 (220)	231 (193)	221 (225)	143 (140)	192 (194)	156 (155)	140 (140)
1.100	169 (160)	147 (158)	185 (162)	165 (170)	73.8 (72.1)	104 (103)	82.8 (81.6)	72.8 (70.4)
1.200	101 (103)	74.7 (84.5)	115 (113)	91.5 (105)	25.3 (24.0)	36.3 (35.3)	28.7 (27.5)	25.3 (23.7)
1.300	59.6 (64.5)	39.2 (45.7)	70.2 (76.3)	50.6 (60.9)	12.1 (10.5)	15.8 (14.7)	13.2 (11.7)	12.0 (10.5)
1.400	34.8 (39.5)	22.8 (26.2)	41.4 (46.9)	29.0 (36.4)	7.06 (5.54)	8.50 (7.17)	7.45 (6.13)	7.00 (5.59)
1.500	21.8 (25.1)	14.1 (14.8)	25.8 (30.3)	17.5 (21.1)	4.68 (3.33)	5.33 (4.07)	4.92 (3.59)	4.70 (3.37)
1.700	10.0 (10.1)	7.18 (6.44)	11.4 (12.2)	8.24 (8.23)	2.78 (1.62)	2.93 (1.86)	2.83 (1.75)	2.79 (1.64)
2.000	4.78 (3.76)	3.83 (2.74)	5.02 (4.17)	4.24 (3.22)	1.79 (0.85)	1.77 (0.89)	1.75 (0.86)	1.78 (0.86)
3.000	1.77 (0.89)	1.57 (0.77)	1.74 (0.91)	1.67 (0.82)	1.05 (0.21)	1.03 (0.18)	1.04 (0.19)	1.05 (0.21)
4.000	1.23 (0.45)	1.13 (0.35)	1.19 (0.43)	1.19 (0.42)	1.00 (0.03)	1.00 (0.02)	1.00 (0.02)	1.00 (0.03)
RMI	0.273	0.000	0.400	0.145	0.010	0.208	0.066	0.004

Table A.5: OC ARL comparison under Scenarios (I) and (II) when $ARL_0 = 500$

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.4$				$\theta_1 = 1.3$		
1.025	219 (211)	281 (276)	241 (238)	210 (205)	169 (152)	235 (223)	188 (173)	159 (153)
1.050	114 (103)	166 (161)	128 (119)	107 (100)	81.5 (63.1)	126 (114)	91.8 (75.8)	74.7 (61.9)
1.100	46.3 (35.2)	71.0 (63.9)	51.6 (42.0)	43.8 (34.1)	35.4 (22.7)	49.2 (38.1)	38.0 (25.8)	32.6 (22.2)
1.200	18.2 (11.1)	22.3 (17.1)	18.6 (12.2)	17.1 (10.9)	15.4 (8.39)	17.2 (10.9)	15.3 (8.93)	14.0 (8.13)
1.300	10.9 (5.86)	11.4 (7.52)	10.6 (6.10)	10.2 (5.73)	9.55 (4.75)	9.60 (5.23)	9.12 (4.81)	8.62 (4.51)
1.400	7.75 (3.82)	7.36 (4.23)	7.31 (3.79)	7.24 (3.71)	6.92 (3.19)	6.68 (3.21)	6.45 (3.12)	6.22 (3.05)
1.500	6.02 (2.78)	5.50 (2.83)	5.56 (2.67)	5.60 (2.69)	5.47 (2.42)	5.09 (2.25)	5.00 (2.25)	4.91 (2.26)
1.700	4.22 (1.80)	3.61 (1.59)	3.86 (1.64)	3.93 (1.71)	3.84 (1.59)	3.54 (1.39)	3.48 (1.40)	3.49 (1.48)
2.000	2.98 (1.18)	2.48 (0.97)	2.67 (1.01)	2.77 (1.11)	2.76 (1.04)	2.48 (0.85)	2.47 (0.90)	2.50 (0.98)
3.000	1.66 (0.59)	1.31 (0.47)	1.49 (0.53)	1.55 (0.57)	1.57 (0.56)	1.38 (0.49)	1.38 (0.50)	1.42 (0.52)
4.000	1.22 (0.42)	1.03 (0.16)	1.10 (0.30)	1.16 (0.37)	1.16 (0.37)	1.04 (0.18)	1.04 (0.21)	1.09 (0.28)
RMI	0.117	0.178	0.093	0.048	0.105	0.196	0.071	0.008

Table A.6: OC ARL comparison under Scenarios (III) and (IV) when $ARL_0 = 500$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.4$				$\theta_1 = 1.2$		
1.025	392 (389)	373 (413)	389 (384)	377 (367)	242 237	244 (239)	264 (259)	229 (225)
1.050	299 (301)	269 (302)	313 (316)	294 (286)	127 121	132 (127)	147 (144)	124 (119)
1.100	183 (190)	149 (174)	200 (208)	180 (181)	50.6 43.6	51.3 (44.6)	57.8 (52.2)	49.2 (42.2)
1.200	71.3 (79.5)	51.4 (64.0)	83.9 (95.5)	70.4 (76.3)	17.6 12.1	17.4 (11.7)	18.0 (13.2)	17.4 (11.8)
1.300	33.0 (35.1)	23.6 (26.0)	37.5 (44.2)	33.6 (36.1)	9.91 5.61	9.87 (5.40)	9.65 (5.94)	9.94 (5.60)
1.400	18.7 (17.1)	13.7 (12.1)	20.2 (20.8)	18.6 (16.7)	6.94 3.50	6.95 (3.29)	6.58 (3.49)	6.91 (3.51)
1.500	12.5 (9.34)	9.72 (7.18)	12.8 (10.7)	12.6 (9.16)	5.36 2.52	5.35 (2.31)	5.00 (2.41)	5.32 (2.50)
1.700	7.62 (4.40)	6.08 (3.68)	7.39 (4.57)	7.78 (4.47)	3.71 1.57	3.76 (1.45)	3.40 (1.44)	3.72 (1.58)
2.000	4.93 (2.43)	3.95 (2.01)	4.61 (2.33)	5.05 (2.47)	2.64 1.02	2.66 (0.91)	2.39 (0.89)	2.63 (1.02)
3.000	2.44 (0.98)	1.99 (0.78)	2.22 (0.87)	2.51 (1.00)	1.49 0.54	1.50 (0.51)	1.33 (0.48)	1.49 (0.54)
4.000	1.73 (0.65)	1.42 (0.54)	1.57 (0.58)	1.78 (0.66)	1.11 0.32	1.07 (0.26)	1.03 (0.17)	1.11 (0.32)
RMI	0.252	0.000	0.288	0.258	0.060	0.063	0.049	0.049

Table A.7: OC ARL comparison under Scenarios (I) and (II) when $\text{ARL}_0 = 800$.

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.4$				$\theta_1 = 1.3$		
1.025	321 (307)	429 (423)	353 (345)	314 (312)	239 (221)	349 (340)	265 (253)	224 (217)
1.050	155 (142)	245 (239)	175 (162)	149 (139)	103 (81.8)	173 (156)	118 (98.5)	96.2 (81.9)
1.100	57.1 (43.8)	92.1 (82.6)	63.7 (52.2)	54.4 (43.9)	41.1 (26.1)	59.1 (46.0)	44.4 (29.9)	37.9 (25.5)
1.200	20.7 (12.5)	25.4 (19.0)	21.1 (13.9)	19.6 (12.3)	16.9 (9.04)	19.1 (11.5)	16.9 (9.69)	15.6 (8.90)
1.300	11.9 (6.34)	12.7 (8.06)	11.7 (6.62)	11.3 (6.21)	10.4 (4.99)	10.7 (5.49)	9.95 (5.06)	9.50 (4.87)
1.400	8.41 (4.06)	8.24 (4.58)	7.97 (4.05)	7.87 (3.94)	7.44 (3.35)	7.26 (3.33)	6.97 (3.30)	6.69 (3.20)
1.500	6.48 (2.92)	5.99 (2.91)	6.06 (2.85)	6.04 (2.83)	5.85 (2.50)	5.58 (2.35)	5.37 (2.38)	5.28 (2.35)
1.700	4.49 (1.85)	3.98 (1.69)	4.12 (1.71)	4.20 (1.80)	4.13 (1.64)	3.84 (1.43)	3.72 (1.47)	3.69 (1.52)
2.000	3.14 (1.20)	2.74 (1.02)	2.86 (1.06)	2.95 (1.15)	2.93 (1.08)	2.71 (0.90)	2.61 (0.94)	2.64 (1.01)
3.000	1.74 (0.60)	1.46 (0.52)	1.57 (0.54)	1.64 (0.58)	1.64 (0.57)	1.51 (0.51)	1.46 (0.51)	1.50 (0.54)
4.000	1.27 (0.45)	1.06 (0.23)	1.13 (0.33)	1.20 (0.40)	1.21 (0.41)	1.07 (0.25)	1.07 (0.25)	1.11 (0.32)
RMI	0.094	0.197	0.075	0.036	0.101	0.228	0.071	0.007

Table A.8: OC ARL comparison under Scenarios (III) and (IV) when $ARL_0 = 800$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.4$				$\theta_1 = 1.2$		
1.025	600 (588)	577 (612)	614 (606)	600 (580)	358 (352)	353 (347)	393 (392)	349 (346)
1.050	456 (463)	409 (448)	481 (472)	452 (440)	180 (173)	177 (169)	205 (201)	177 (170)
1.100	267 (278)	210 (242)	303 (309)	274 (277)	63.7 (56.1)	61.9 (53.4)	73.9 (67.3)	63.3 (55.8)
1.200	100 (113)	67.5 (83.0)	121 (137)	103 (115)	20.3 (13.9)	19.6 (12.8)	20.7 (15.3)	20.3 (13.9)
1.300	42.6 (48.3)	28.3 (31.6)	50.8 (61.7)	43.5 (49.0)	11.1 (6.28)	11.1 (5.84)	10.8 (6.48)	11.0 (6.22)
1.400	22.7 (22.3)	15.8 (14.0)	24.8 (27.1)	22.8 (22.0)	7.57 (3.75)	7.70 (3.53)	7.18 (3.73)	7.55 (3.73)
1.500	14.4 (11.0)	11.0 (8.03)	15.1 (13.4)	14.8 (11.2)	5.81 (2.64)	5.93 (2.48)	5.40 (2.54)	5.77 (2.65)
1.700	8.44 (4.90)	6.80 (3.94)	8.29 (5.12)	8.65 (4.96)	4.01 (1.64)	4.10 (1.52)	3.65 (1.48)	4.01 (1.65)
2.000	5.36 (2.58)	4.41 (2.11)	5.02 (2.50)	5.51 (2.63)	2.81 (1.07)	2.89 (0.96)	2.55 (0.92)	2.80 (1.06)
3.000	2.59 (1.01)	2.25 (0.82)	2.39 (0.90)	2.67 (1.04)	1.57 (0.55)	1.63 (0.51)	1.40 (0.50)	1.56 (0.56)
4.000	1.83 (0.67)	1.60 (0.58)	1.68 (0.60)	1.89 (0.68)	1.15 (0.35)	1.12 (0.33)	1.04 (0.20)	1.15 (0.36)
RMI	0.265	0.000	0.335	0.290	0.063	0.064	0.049	0.056

Table A.9: OC ARL comparison under Scenarios (I) and (II) when $\theta_0 = 1.2$

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.5$				$\theta_1 = 1.5$		
1.225	153 (145)	170 (162)	165 (160)	147 (145)	125 (111)	157 (149)	138 (127)	118 (113)
1.250	89.0 (79.0)	108 (99.8)	99.4 (91.8)	84.0 (77.3)	68.8 (54.1)	93.1 (82.1)	76.1 (62.5)	63.2 (52.7)
1.300	41.6 (32.3)	51.0 (43.5)	45.5 (37.5)	38.9 (31.1)	32.8 (21.4)	42.9 (32.9)	34.7 (24.6)	30.2 (21.4)
1.400	17.6 (11.2)	19.2 (13.5)	18.1 (12.5)	16.6 (11.0)	15.1 (8.58)	16.8 (10.8)	15.0 (9.19)	13.8 (8.42)
1.500	10.7 (6.01)	11.0 (6.69)	10.5 (6.28)	10.0 (5.86)	9.49 (4.94)	9.69 (5.52)	9.15 (5.05)	8.55 (4.76)
1.700	6.02 (2.95)	5.73 (2.82)	5.58 (2.83)	5.59 (2.79)	5.43 (2.51)	5.19 (2.44)	4.99 (2.38)	4.95 (2.39)
2.000	3.70 (1.60)	3.44 (1.41)	3.34 (1.44)	3.47 (1.54)	3.41 (1.42)	3.12 (1.24)	3.06 (1.24)	3.10 (1.32)
3.000	1.81 (0.67)	1.65 (0.57)	1.63 (0.58)	1.69 (0.63)	1.71 (0.62)	1.53 (0.53)	1.52 (0.54)	1.57 (0.58)
4.000	1.30 (0.47)	1.14 (0.34)	1.15 (0.35)	1.23 (0.42)	1.23 (0.43)	1.07 (0.26)	1.09 (0.28)	1.14 (0.35)
RMI	0.082	0.120	0.069	0.017	0.103	0.184	0.079	0.012

Table A.10: OC ARL comparison under Scenarios (III) and (IV) when $\theta_0 = 1.2$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.6$				$\theta_1 = 1.5$		
1.225	239 (239)	237 (270)	247 (245)	235 (224)	167 (165)	181 (180)	177 (175)	159 (155)
1.250	189 (192)	182 (212)	202 (203)	189 (182)	97.2 (92.5)	114 (111)	109 (105)	94.8 (89.3)
1.300	123 (130)	108 (132)	137 (143)	123 (124)	44.2 (38.3)	51.5 (48.1)	48.8 (45.2)	43.2 (37.0)
1.400	54.5 (60.0)	43.7 (54.7)	64.3 (73.1)	55.8 (60.5)	17.0 (12.0)	18.3 (14.5)	17.4 (13.4)	16.8 (11.9)
1.500	27.8 (28.2)	21.8 (24.3)	32.0 (36.1)	28.2 (28.6)	9.98 (5.93)	9.67 (6.39)	9.66 (6.23)	9.76 (5.80)
1.700	11.8 (8.62)	9.43 (7.26)	12.3 (10.4)	12.2 (9.18)	5.40 (2.66)	4.91 (2.53)	5.02 (2.56)	5.33 (2.65)
2.000	6.30 (3.55)	5.08 (2.98)	6.06 (3.61)	6.45 (3.60)	3.30 (1.41)	2.88 (1.20)	2.98 (1.25)	3.26 (1.40)
3.000	2.66 (1.14)	2.21 (0.92)	2.44 (1.03)	2.74 (1.17)	1.64 (0.59)	1.38 (0.50)	1.45 (0.52)	1.62 (0.60)
4.000	1.81 (0.70)	1.53 (0.58)	1.65 (0.62)	1.88 (0.73)	1.18 (0.39)	1.03 (0.17)	1.06 (0.23)	1.18 (0.38)
RMI	0.177	0.001	0.228	0.198	0.080	0.069	0.063	0.061

Table A.11: OC ARL comparison under Scenarios (I) and (II) when $\theta_0 = 1.5$

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.8$				$\theta_1 = 1.9$		
1.525	166 (157)	180 (170)	177 (171)	156 (156)	138 (125)	177 (170)	148 (137)	130 (125)
1.550	100 (90.7)	115 (106)	111 (103)	93.1 (87.1)	77.1 (62.1)	113 (103)	85.9 (72.2)	71.9 (61.7)
1.600	47.6 (38.0)	56.9 (47.8)	52.3 (43.8)	44.5 (36.6)	37.2 (25.1)	53.6 (44.1)	40.0 (29.0)	34.4 (24.8)
1.700	20.2 (13.3)	22.2 (15.6)	20.8 (14.7)	18.8 (12.8)	17.0 (9.88)	20.5 (14.7)	17.2 (10.8)	15.6 (9.68)
1.800	12.3 (7.23)	12.7 (7.67)	12.1 (7.51)	11.4 (6.91)	10.8 (5.78)	11.3 (7.18)	10.5 (5.94)	9.83 (5.56)
1.900	8.77 (4.68)	8.76 (4.76)	8.32 (4.72)	8.15 (4.51)	7.85 (3.90)	7.60 (4.35)	7.32 (3.86)	7.08 (3.74)
2.000	6.72 (3.35)	6.67 (3.31)	6.32 (3.29)	6.25 (3.23)	6.15 (2.87)	5.62 (2.91)	5.67 (2.78)	5.56 (2.72)
2.200	4.72 (2.15)	4.56 (2.00)	4.32 (1.99)	4.40 (2.09)	4.33 (1.89)	3.81 (1.71)	3.91 (1.70)	3.89 (1.77)
2.500	3.31 (1.38)	3.16 (1.19)	2.98 (1.21)	3.07 (1.31)	3.08 (1.25)	2.59 (1.01)	2.75 (1.06)	2.78 (1.15)
3.000	2.30 (0.89)	2.19 (0.73)	2.05 (0.74)	2.14 (0.83)	2.15 (0.80)	1.80 (0.62)	1.91 (0.67)	1.96 (0.74)
4.000	1.54 (0.56)	1.43 (0.51)	1.35 (0.48)	1.44 (0.53)	1.45 (0.52)	1.17 (0.38)	1.27 (0.45)	1.33 (0.48)
RMI	0.089	0.123	0.065	0.014	0.125	0.185	0.086	0.029

Table A.12: OC ARL comparison under Scenarios (III) and (IV) when $\theta_0 = 1.5$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 2.0$				$\theta_1 = 1.8$		
1.525	244 (245)	250 (282)	252 (248)	244 (232)	172 (168)	185 (183)	184 (182)	170 (167)
1.550	201 (204)	196 (226)	211 (215)	199 (195)	107 (103)	120 (117)	120 (117)	106 (102)
1.600	134 (141)	125 (151)	149 (155)	136 (135)	50.4 (44.2)	58.5 (54.4)	57.2 (53.5)	49.6 (43.3)
1.700	63.2 (69.2)	54.7 (68.9)	75.5 (83.6)	65.9 (71.4)	19.7 (14.6)	20.9 (16.7)	20.5 (16.2)	19.3 (13.9)
1.800	33.4 (35.3)	27.2 (32.1)	39.5 (45.7)	34.3 (36.2)	11.4 (6.97)	11.4 (7.64)	11.2 (7.52)	11.2 (6.91)
1.900	20.5 (19.6)	16.3 (16.5)	22.7 (24.0)	20.9 (19.5)	7.95 (4.40)	7.57 (4.44)	7.53 (4.44)	7.79 (4.30)
2.000	14.1 (11.5)	11.2 (9.56)	14.8 (13.6)	14.3 (11.5)	6.01 (3.06)	5.64 (2.92)	5.63 (2.97)	6.03 (3.06)
2.200	8.60 (5.47)	6.86 (4.68)	8.44 (5.82)	8.73 (5.50)	4.23 (1.91)	3.84 (1.71)	3.86 (1.77)	4.14 (1.89)
2.500	5.47 (2.91)	4.39 (2.44)	5.19 (2.83)	5.64 (2.96)	2.94 (1.20)	2.65 (1.03)	2.64 (1.07)	2.92 (1.21)
3.000	3.51 (1.61)	2.80 (1.31)	3.24 (1.48)	3.62 (1.66)	2.05 (0.78)	1.85 (0.63)	1.84 (0.65)	2.05 (0.77)
4.000	2.17 (0.87)	1.76 (0.67)	1.97 (0.77)	2.25 (0.90)	1.38 (0.50)	1.20 (0.40)	1.21 (0.41)	1.37 (0.50)
RMI	0.180	0.002	0.231	0.205	0.062	0.047	0.041	0.050

Table A.13: OC ARL comparison under Scenarios (I) and (II) when $\tau = 50$

	Scenario (I)				Scenario (II)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.4$				$\theta_1 = 1.3$		
1.025	143 (136)	177 (175)	154 (151)	138 (137)	112 (103)	149 (145)	125 (118)	109 (104)
1.050	76.7 (69.8)	112 (110)	87.2 (82.6)	76.2 (70.8)	55.7 (45.5)	83.2 (78.6)	60.4 (52.8)	53.5 (45.4)
1.100	33.8 (26.8)	49.3 (46.2)	37.0 (31.2)	32.7 (26.4)	23.7 (16.3)	32.9 (28.4)	24.8 (18.3)	22.4 (15.8)
1.200	13.4 (8.32)	16.1 (13.1)	13.5 (9.08)	13.0 (8.27)	10.0 (5.54)	10.6 (7.55)	9.70 (5.71)	9.46 (5.39)
1.300	8.20 (4.42)	8.09 (5.61)	7.76 (4.47)	7.88 (4.38)	6.26 (3.07)	5.71 (3.33)	5.80 (2.95)	5.90 (2.98)
1.400	5.88 (2.90)	5.25 (3.19)	5.43 (2.77)	5.64 (2.81)	4.61 (2.08)	3.90 (1.98)	4.19 (1.89)	4.32 (1.98)
1.500	4.60 (2.11)	3.87 (2.06)	4.23 (1.96)	4.43 (2.08)	3.70 (1.57)	2.96 (1.35)	3.30 (1.39)	3.45 (1.48)
1.700	3.28 (1.39)	2.59 (1.18)	2.95 (1.22)	3.17 (1.36)	2.69 (1.04)	2.08 (0.83)	2.38 (0.90)	2.51 (1.01)
2.000	2.38 (0.92)	1.80 (0.71)	2.10 (0.79)	2.28 (0.91)	2.00 (0.73)	1.47 (0.55)	1.76 (0.62)	1.87 (0.69)
3.000	1.37 (0.50)	1.06 (0.23)	1.20 (0.40)	1.33 (0.48)	1.18 (0.38)	1.00 (0.06)	1.04 (0.20)	1.12 (0.33)
4.000	1.06 (0.24)	1.00 (0.02)	1.01 (0.09)	1.05 (0.22)	1.01 (0.10)	1.00 (0.00)	1.00 (0.02)	1.00 (0.07)
RMI	0.128	0.140	0.091	0.090	0.142	0.138	0.090	0.082

Table A.14: OC ARL comparison under Scenarios (III) and (IV) when $\tau = 50$

	Scenario (III)				Scenario (IV)			
θ	EWMAe	CUSUM	EWMAM	WEWMA	EWMAe	CUSUM	EWMAM	WEWMA
		$\theta_1 = 1.4$				$\theta_1 = 1.3$		
1.025	236 (238)	258 (274)	242 (242)	227 (218)	156 (151)	160 (158)	167 (166)	150 (149)
1.050	190 (188)	193 (205)	195 (196)	184 (176)	90.0 (84.3)	92.8 (87.9)	99.4 (95.2)	85.8 (80.0)
1.100	124 (125)	122 (131)	133 (136)	121 (117)	38.5 (32.2)	40.3 (35.6)	42.9 (38.6)	38.3 (32.2)
1.200	59.1 (60.0)	53.9 (58.3)	66.5 (69.2)	59.4 (57.2)	15.1 (10.2)	14.8 (10.2)	15.4 (11.4)	14.8 (10.0)
1.300	33.2 (32.0)	29.1 (28.6)	37.1 (37.9)	34.2 (32.0)	8.93 (5.15)	8.60 (4.92)	8.56 (5.19)	8.78 (5.09)
1.400	21.0 (18.8)	18.8 (17.1)	22.8 (21.8)	21.8 (18.8)	6.29 (3.26)	6.10 (3.06)	5.88 (3.16)	6.25 (3.24)
1.500	15.0 (11.9)	13.6 (10.9)	15.5 (13.5)	15.5 (12.1)	4.92 (2.32)	4.71 (2.17)	4.51 (2.23)	4.88 (2.31)
1.700	9.34 (6.23)	8.42 (5.57)	9.21 (6.67)	9.77 (6.40)	3.49 (1.53)	3.30 (1.35)	3.14 (1.38)	3.43 (1.50)
2.000	5.98 (3.39)	5.44 (3.04)	5.66 (3.40)	6.24 (3.43)	2.46 (0.98)	2.36 (0.85)	2.21 (0.84)	2.47 (0.99)
3.000	2.87 (1.30)	2.66 (1.17)	2.62 (1.19)	3.03 (1.36)	1.42 (0.52)	1.33 (0.48)	1.26 (0.44)	1.41 (0.52)
4.000	2.00 (0.83)	1.88 (0.72)	1.83 (0.74)	2.10 (0.86)	1.09 (0.28)	1.02 (0.15)	1.02 (0.14)	1.08 (0.28)
RMI	0.086	0.021	0.111	0.108	0.067	0.042	0.039	0.051