Table 1: Model 1

Estimator	IMSE	IMSE $\mid Y<q_{.25}$	IMSE $\mid q_{.25}<Y<q_{.5}$	IMSE $\mid q_{.5}<Y<q_{.75}$	IMSE $\mid q_{.75}<Y$
$\hat{f}_{\hat{\mu},\text{nonpar}}$	0.104 (1)	0.0771 (1)	0.00537 (1)	0.00819 (1)	0.0135 (1)
$\hat{f}_{\mu,\xi}$	0.0915 (0.878)	0.0789 (1.02)	0.00373 (0.455)	0.00398 (0.294)	0.00491 (0.913)
$\hat{f}_{\mu,\hat{\xi}}$	0.09 (0.864)	0.0787 (1.02)	0.00303 (0.224)	0.00345 (0.642)	0.00489 (0.597)
$\hat{f}_{\hat{\mu},\text{par(rough)}}$	6.78 (65.1)	0.0635 (0.824)	0.00379 (0.281)	0.00354 (0.433)	6.71 (1250)
$\hat{f}_{\hat{\mu},\text{par}}$	0.128 (1.23)	0.058 (4.29)	0.0298 (0.386)	0.019 (3.54)	0.0211 (2.57)
$\tilde{f}_{\hat{\mu},\text{nonpar}}$	0.547 (5.25)	0.225 (41.8)	0.243 (3.15)	0.0704 (5.2)	0.00868 (1.06)
$\tilde{f}_{\mu,\xi}$	0.0895 (0.859)	0.0785 (1.02)	0.00279 (0.206)	0.00348 (0.647)	0.00477 (0.583)
$\tilde{f}_{\mu,\hat{\xi}}$	0.0901 (0.865)	0.0787 (5.82)	0.00305 (0.567)	0.00347 (0.424)	0.00489 (0.0635)
$\tilde{f}_{\hat{\mu},\text{par(rough)}}$	6.78 (65.1)	0.0635 (7.76)	0.00379 (0.0492)	0.00354 (0.262)	6.71 (1250)
$\tilde{f}_{\hat{\mu},\text{par}}$	0.0993 (0.953)	0.0823 (15.3)	0.00342 (0.418)	0.00343 (0.0445)	0.0101 (0.748)
$f^{\dagger}_{\hat{\mu},\text{nonpar}}$	0.0969 (0.93)	0.0551 (0.715)	0.0233 (2.85)	0.00743 (0.549)	0.011 (2.04)
$f^{\dagger}_{\mu,\xi}$	0.0872 (0.837)	0.0763 (0.989)	0.00272 (0.201)	0.00342 (0.637)	0.00476 (0.581)
$f^{\dagger}_{\mu,\hat{\xi}}$	0.0878 (0.843)	0.0765 (5.66)	0.00303 (0.0393)	0.00343 (0.639)	0.00488 (0.596)
$f^{\dagger}_{\hat{\mu},\text{par(rough)}}$	27.7 (265)	1.77 (22.9)	1.45 (107)	0.644 (120)	23.8 (2910)
$f^{\dagger}_{\hat{\mu},\text{par}}$	0.116 (1.11)	0.0948 (1.23)	0.00735 (0.544)	0.00492 (0.601)	0.00886 (1.65)
$f^{\dagger}_{\hat{\omega},\text{nonpar}}$	0.273 (2.62)	0.148 (11)	0.056 (10.4)	0.0437 (0.567)	0.0245 (2.99)
$f^{\dagger}_{\hat{\omega},\text{par}}$	0.116 (1.12)	0.0956 (17.8)	0.00719 (0.0932)	0.00472 (0.349)	0.00882 (1.08)
p	0.0705 (0.677)	0.0506 (0.656)	0.0108 (0.799)	0.00379 (0.705)	0.00534 (0.652)
$\hat{f}_{\hat{\omega},\text{nonpar}}$	1.83 (17.6)	0.869 (11.3)	0.581 (42.9)	0.304 (56.6)	0.0758 (9.26)
$\hat{f}_{\hat{\omega},\text{par}}$	0.138 (1.33)	0.0588 (4.35)	0.0344 (6.41)	0.0223 (0.289)	0.0229 (2.79)
$\tilde{f}_{\hat{\omega},\text{nonpar}}$	2.22 (21.3)	1.43 (18.5)	0.649 (48)	0.11 (20.5)	0.0326 (3.98)
$\tilde{f}_{\hat{\omega},\text{par}}$	0.101 (0.965)	0.0835 (1.08)	0.00345 (0.643)	0.00344 (0.421)	0.0101 (0.751)

Table 2: Model 2

Estimator	IMSE	IMSE $\mid Y<q_{.25}$	IMSE $\mid q_{.25}<Y<q_{.5}$	IMSE $\mid q_{.5}<Y<q_{.75}$	IMSE $\mid q_{.75}<Y$
$\hat{f}_{\hat{\mu},\text{nonpar}}$	0.00234 (1)	0.00188 (1)	0.000235 (1)	7.38e-05 (1)	0.00015 (1)
$\hat{f}_{\mu,\xi}$	0.00369 (1.58)	0.00343 (1.82)	0.000111 (1.5)	7.1e-05 (0.473)	8.3e-05 (0.354)
$\hat{f}_{\mu,\hat{\xi}}$	0.0124 (5.29)	0.00945 (5.03)	0.00218 (14.5)	0.000169 (0.719)	0.000572 (7.75)
$\hat{f}_{\hat{\mu},\text{par(rough)}}$	0.00391 (1.67)	0.00313 (1.67)	0.000431 (2.87)	0.000118 (1.59)	0.000224 (0.953)
$\hat{f}_{\hat{\mu},\text{par}}$	0.00764 (3.27)	0.00328 (21.9)	0.00101 (0.536)	0.00261 (11.1)	0.000741 (10)
$\tilde{f}_{\hat{\mu},\text{nonpar}}$	0.183 (78.1)	0.0272 (116)	0.00663 (3.53)	0.0158 (106)	0.133 (1800)
$\tilde{f}_{\mu,\xi}$	0.00361 (1.54)	0.00335 (1.78)	0.00011 (0.736)	7.17e-05 (0.306)	7.99e-05 (1.08)
$\tilde{f}_{\mu,\hat{\xi}}$	0.012 (5.14)	0.00922 (61.4)	0.00203 (8.65)	0.000159 (2.15)	0.000622 (0.331)
$\tilde{f}_{\hat{\mu},\text{par(rough)}}$	0.00391 (1.67)	0.00313 (42.4)	0.000431 (0.229)	0.000118 (0.784)	0.000224 (0.953)
$\tilde{f}_{\hat{\mu},\text{par}}$	0.00653 (2.79)	0.00436 (18.6)	0.000423 (5.73)	0.00136 (0.723)	0.000385 (2.57)
$f^{\dagger}_{\hat{\mu},\text{nonpar}}$	0.0926 (39.6)	0.0429 (22.8)	0.0257 (348)	0.0037 (24.6)	0.0204 (86.9)
$f^{\dagger}_{\mu,\xi}$	0.000876 (0.375)	0.000475 (0.253)	0.00021 (1.4)	0.000135 (0.575)	5.62e-05 (0.762)
$f^{\dagger}_{\mu,\hat{\xi}}$	0.0116 (4.97)	0.0088 (58.6)	0.00107 (0.568)	0.000451 (1.92)	0.00131 (17.7)
$f^{\dagger}_{\hat{\mu},\text{par(rough)}}$	0.00524 (2.24)	0.00433 (2.3)	0.000287 (1.91)	0.00026 (1.11)	0.000367 (4.97)
$f^{\dagger}_{\hat{\mu},\text{par}}$	0.00779 (3.33)	0.00601 (3.19)	0.000349 (2.32)	0.0011 (14.9)	0.000342 (1.46)
$f^{\dagger}_{\hat{\omega},\text{nonpar}}$	0.0996 (42.6)	0.0456 (304)	0.0279 (119)	0.00403 (2.14)	0.022 (298)
$f^{\dagger}_{\hat{\omega},\text{par}}$	0.00905 (3.87)	0.00652 (27.8)	0.000422 (0.224)	0.00158 (10.5)	0.000531 (7.2)
p	0.0407 (17.4)	0.0242 (12.9)	0.00814 (54.2)	0.000784 (3.34)	0.00749 (101)
$\hat{f}_{\hat{\omega},\text{nonpar}}$	0.153 (65.4)	0.0544 (28.9)	0.0526 (351)	0.0346 (148)	0.0113 (153)
$\hat{f}_{\hat{\omega},\text{par}}$	0.0102 (4.35)	0.0035 (23.4)	0.00146 (6.23)	0.00402 (2.14)	0.00119 (16.1)
$\tilde{f}_{\hat{\omega},\text{nonpar}}$	0.378 (161)	0.0372 (19.8)	0.00889 (59.3)	0.0445 (190)	0.287 (3890)
$\tilde{f}_{\hat{\omega},\text{par}}$	0.0134 (5.72)	0.00285 (1.52)	0.00275 (11.7)	0.00601 (81.4)	0.00177 (11.8)

Table 3: Model 3

Estimator	IMSE	IMSE $\mid Y<q_{.25}$	IMSE $\mid q_{.25}<Y<q_{.5}$	IMSE $\mid q_{.5}<Y<q_{.75}$	IMSE $\mid q_{.75}<Y$
$\hat{f}_{\hat{\mu},\text{nonpar}}$	0.00213 (1)	0.000524 (1)	0.000738 (1)	0.000653 (1)	0.000219 (1)
$\hat{f}_{\mu,\xi}$	0.12 (56.4)	0.0213 (40.6)	0.0408 (62.5)	0.0393 (180)	0.019 (25.8)
$\hat{f}_{\mu,\hat{\xi}}$	0.12 (56.4)	0.0213 (40.6)	0.0408 (186)	0.0393 (53.3)	0.019 (29.1)
$\hat{f}_{\hat{\mu},\text{par(rough)}}$	113 (52900)	113 (215000)	0.0243 (111)	0.0165 (25.3)	0.00301 (4.08)
$\hat{f}_{\hat{\mu},\text{par}}$	0.0291 (13.6)	0.00376 (17.1)	0.0165 (31.5)	0.00763 (10.3)	0.00125 (1.91)
$\tilde{f}_{\hat{\mu},\text{nonpar}}$	1.09 (509)	0.018 (24.4)	0.0314 (60)	0.235 (1070)	0.802 (1230)
$\tilde{f}_{\mu,\xi}$	0.0591 (27.7)	0.016 (30.6)	0.0292 (133)	0.0127 (17.1)	0.00124 (1.89)
$\tilde{f}_{\mu,\hat{\xi}}$	0.0591 (27.7)	0.016 (73.1)	0.0292 (39.5)	0.0127 (19.4)	0.00124 (2.36)
$\tilde{f}_{\hat{\mu},\text{par(rough)}}$	113 (52900)	113 (173000)	0.0243 (46.4)	0.0165 (75.4)	0.00301 (4.08)
$\tilde{f}_{\hat{\mu},\text{par}}$	0.0429 (20.1)	0.0065 (8.8)	0.0215 (33)	0.0122 (23.2)	0.00274 (12.5)
$f^{\dagger}_{\hat{\mu},\text{nonpar}}$	0.187 (87.8)	0.0198 (37.8)	0.0373 (57.2)	0.0226 (103)	0.108 (146)
$f^{\dagger}_{\mu,\xi}$	1210000 (5.69e+08)	10600 (20200000)	27200 (1.24e+08)	372000 (5.03e+08)	805000 (1.23e+09
$f^{\dagger}_{\mu,\hat{\xi}}$	1210000 (5.69e+08)	10600 (48300000)	27200 (51900000)	372000 (5.03e+08)	805000 (1.23e+09
$f^{\dagger}_{\hat{\mu},\text{par(rough)}}$	161 (75200)	139 (266000)	2.68 (12200)	8.28 (11200)	10.1 (15400)
$f^{\dagger}_{\hat{\mu},\text{par}}$	0.0227 (10.6)	0.00146 (2.79)	0.00727 (33.2)	0.00674 (10.3)	0.00721 (9.77)
$f^{\dagger}_{\hat{\omega},\text{nonpar}}$	0.211 (98.9)	0.0193 (88.1)	0.0364 (49.3)	0.0206 (39.3)	0.135 (206)
$f^{\dagger}_{\hat{\omega},\text{par}}$	0.0236 (11)	0.00129 (1.75)	0.00721 (13.8)	0.00712 (32.5)	0.00795 (12.2)
p	0.0591 (27.7)	0.016 (30.6)	0.0292 (133)	0.0127 (17.1)	0.00124 (1.89)
$\hat{f}_{\hat{\omega},\text{nonpar}}$	0.126 (58.9)	0.0216 (41.2)	0.0415 (189)	0.0414 (56.1)	0.0213 (32.6)
$\hat{f}_{\hat{\omega},\text{par}}$	0.0285 (13.4)	0.00381 (17.4)	0.0162 (21.9)	0.00727 (13.9)	0.00126 (1.93)
$\tilde{f}_{\hat{\omega},\text{nonpar}}$	0.772 (362)	0.0174 (33.2)	0.0322 (147)	0.0207 (28.1)	0.702 (1070)
$\tilde{f}_{\hat{\omega},\text{par}}$	0.0429 (20.1)	0.00676 (12.9)	0.0216 (29.2)	0.0119 (18.3)	0.00265 (12.1)

Table 4: Model 4

Estimator	IMSE	IMSE | $Y<q_{.25}$	IMSE | $q_{.25}<Y<q_{.5}$	IMSE | $q_{.5}<Y<q_{.75}$	IMSE | $q_{.7}$
(12) $\hat{f}_{\hat{\mu},\text{nonpar}}$	0.0028 (1)	0.00046 (1)	0.00057 (1)	0.00058 (1)	0.0012 (
(13) $\hat{f}_{\mu,\xi}$	8.5e+45 (3e+48)	9.4e+44 (2e+48)	2.6e+45 (4.6e+48)	2.9e+45 (5e+48)	2.1e+45 (1.7
(14) $\hat{f}_{\mu,\hat{\xi}}$	3.1e+46 (1.1e+49)	2.7e+45 (5.8e+48)	8.8e+45 (1.5e+49)	1.1e+46 (1.8e+49)	8.9e+45 (7.4
(15) $\hat{f}_{\hat{\mu},\text{par}}$	0.0032 (1.2)	0.00049 (1.1)	0.00068 (1.2)	0.00053 (0.91)	0.0016 (1
(20) $f^{\dagger}_{\hat{\mu},\text{nonpar}}$	0.003 (1.1)	0.00068 (1.5)	0.00052 (0.92)	0.00067 (1.2)	0.0011 (0.
(21) $f^{\dagger}_{\mu,\xi}$	0.0026 (0.94)	0.00043 (0.93)	0.00054 (0.94)	0.00055 (0.95)	0.0011 (0.
(22) $f^{\dagger}_{\mu,\hat{\xi}}$	0.0027 (0.96)	0.00046 (1)	0.00054 (0.95)	0.00056 (0.96)	0.0012 (0.
(23) $f^{\dagger}_{\hat{\mu},\text{par}}$	0.0027 (0.96)	0.00046 (1)	0.00054 (0.95)	0.00056 (0.97)	0.0012 (0.
(25) $f^{\dagger}_{\hat{\omega},\text{nonpar}}$	0.003 (1.1)	7e-04 (1.5)	0.00051 (0.89)	0.00065 (1.1)	0.0011 (0.
(26) $f^{\dagger}_{\hat{\omega},\text{par}}$	0.0027 (0.96)	0.00046 (1)	0.00054 (0.95)	0.00056 (0.96)	0.0012 (0.
(4) p	0.016 (5.8)	0.008 (17)	0.00077 (1.4)	0.0035 (6.2)	0.004 (3.
f	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
(hat25) $\hat{f}_{\hat{\omega},\text{nonpar}}$	0.0027 (0.96)	0.00047 (1)	0.00054 (0.94)	0.00054 (0.95)	0.0012 (0.
(hat26) $\hat{f}_{\hat{\omega},\text{par}}$	0.0032 (1.1)	0.00048 (1)	0.00067 (1.2)	0.00052 (0.91)	0.0015 (1
$\hat{\mu}$, nonpar	0.00043 (0.15)	0.00041 (0.89)	2.1e-06 (0.0037)	2e-06 (0.0035)	9.8e-06 (0.0
μ, ξ	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
$\mu, \hat{\xi}$	0.0012 (0.43)	0.0012 (2.5)	3e-05 (0.053)	1.4e-05 (0.024)	1.1e-05 (0.0
$\hat{\mu}$, par	0.00017 (0.06)	0.00017 (0.36)	7.4e-07 (0.0013)	3.1e-07 (0.00054)	3.1e-07 (0.0
$\hat{\omega}$, nonpar	0.0012 (0.42)	0.0012 (2.5)	4e-06 (0.007)	8.1e-07 (0.0014)	6.3e-06 (0.0
$\hat{\omega}$, par	0.00016 (0.056)	0.00016 (0.34)	7.7e-07 (0.0013)	3.2e-07 (0.00055)	3.1e-07 (0.0

Table 5: Model 5

Estimator	IMSE	IMSE | $Y<q_{.25}$	IMSE | $q_{.25}<Y<q_{.5}$	IMSE | $q_{.5}<Y<q_{.75}$	IMSE | $q_{.75}<Y$
(12) $\hat{f}_{\hat{\mu},\text{nonpar}}$	0.0011 (1)	0.00012 (1)	2e-04 (1)	0.00023 (1)	0.00052 (1)
(13) $\hat{f}_{\mu,\xi}$	0.0016 (1.5)	0.00015 (1.2)	0.00027 (1.3)	9.1e-05 (0.39)	0.0011 (2.1)
(14) $\hat{f}_{\mu,\hat{\xi}}$	0.0018 (1.7)	0.00019 (1.6)	0.00029 (1.4)	9.7e-05 (0.42)	0.0012 (2.3)
(15) $\hat{f}_{\hat{\mu},\text{par}}$	0.0017 (1.6)	0.00023 (1.9)	4e-04 (1.9)	0.00014 (0.59)	0.00098 (1.9)
(20) $f^{\dagger}_{\hat{\mu},\text{nonpar}}$	0.0015 (1.4)	0.00043 (3.5)	0.00015 (0.73)	0.00041 (1.8)	0.00051 (0.99)
(21) $f^{\dagger}_{\mu,\xi}$	0.00094 (0.87)	9.8e-05 (0.81)	0.00018 (0.86)	0.00021 (0.9)	0.00045 (0.87)
(22) $f^{\dagger}_{\mu,\hat{\xi}}$	0.001 (0.96)	0.00012 (0.99)	0.00019 (0.94)	0.00021 (0.91)	0.00051 (0.98)
(23) $f^{\dagger}_{\hat{\mu},\text{par}}$	0.001 (0.94)	0.00013 (1)	0.00019 (0.91)	0.00022 (0.95)	0.00048 (0.93)
(25) $f^{\dagger}_{\hat{\omega},\text{nonpar}}$	0.0015 (1.4)	0.00046 (3.8)	0.00014 (0.69)	4e-04 (1.7)	5e-04 (0.97)
(26) $f^{\dagger}_{\hat{\omega},\text{par}}$	0.001 (0.93)	0.00012 (1)	0.00018 (0.89)	0.00022 (0.94)	0.00048 (0.92)
(4) p	0.015 (14)	0.0072 (59)	0.00052 (2.6)	0.0033 (14)	0.0037 (7.1)
f	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
(hat25) $\hat{f}_{\hat{\omega},\text{nonpar}}$	0.001 (0.96)	0.00014 (1.2)	0.00019 (0.94)	0.00022 (0.97)	0.00048 (0.92)
(hat26) $\hat{f}_{\hat{\omega},\text{par}}$	0.0017 (1.6)	0.00023 (1.9)	0.00039 (1.9)	0.00013 (0.57)	0.00097 (1.9)
$\hat{\mu}$, nonpar	0.00041 (0.38)	0.00039 (3.2)	2.7e-06 (0.013)	2.8e-06 (0.012)	1e-05 (0.02)
μ, ξ	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
$\mu, \hat{\xi}$	0.00089 (0.83)	0.00086 (7)	2.1e-05 (0.1)	9.2e-06 (0.04)	7.1e-06 (0.014)
$\hat{\mu}$, par	0.00016 (0.15)	0.00016 (1.3)	7.7e-07 (0.0038)	3.3e-07 (0.0014)	3.2e-07 (0.00061)
$\hat{\omega}$, nonpar	0.0014 (1.3)	0.0014 (12)	4.5e-06 (0.022)	8.1e-07 (0.0035)	5.4e-06 (0.01)
$\hat{\omega}$, par	0.00015 (0.14)	0.00015 (1.2)	8e-07 (0.0039)	3.3e-07 (0.0014)	3.1e-07 (6e-04)