Supplementary Online Appendix to "Structural Breaks in Seemingly Unrelated Regression Models"

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A Supplementary Online Appendix

This web supplement provides additional Monte Carlo results that were omitted from the paper for brevity.

In this section, we provide some additional Monte Carlo results that were omitted from the paper for brevity. Figure A1 demonstrates the results for $N = 10$ and $b_1 \in \{0.2, 0.8\}$, while Figure A2 shows the results for $N \in \{5, 10\}$ and $b_1 = 0.5$. Based on the results, as we increase the number of regressors, the gain obtained from the Stein-like shrinkage estimator increases. All simulation results confirm the results of Theorems 3 and 4 in the main text that the performance of the Stein-like shrinkage estimator and the minimal mean squared error estimator are uniformly better than the unrestricted estimator in the sense of having lower MSE, for any break points, break sizes in the coefficients, and any q.

We have also considered another data generating process which allows for serial correlation in errors. Specifically, for each i and t, the error term in (34) is $u_{i,t} = 0.25 u_{i,t-1} + 0.5 \xi_{i,t} + v_{i,t}$, in which $\xi_{i,t} \sim \mathrm{N}\big(0, \sigma^2_{(1)}\big)$, and $v_{i,t} \sim \mathrm{N}(0, \sqrt{i}\ \sigma^2_{(1)})$ for $t \leq T_1$. Also, $\xi_{i,t} \sim \mathrm{N}\big(0, \sigma^2_{(2)}\big)$, and $v_{i,t} \sim \mathrm{N}(0, \sqrt{i}\ \sigma^2_{(2)})$ for $t > T_1$. Figures A3–A4 demonstrates the results with serial correlations.
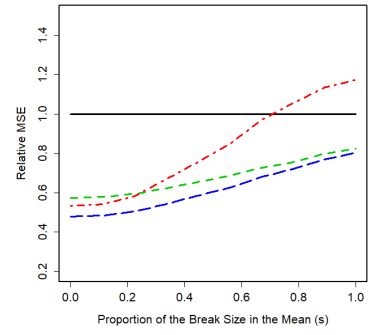

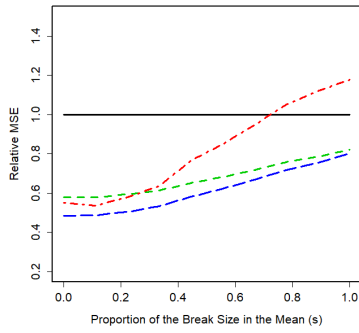[*]Address correspondence to: Shahnaz Parsaeian, sh.parsaeian@ku.edu.
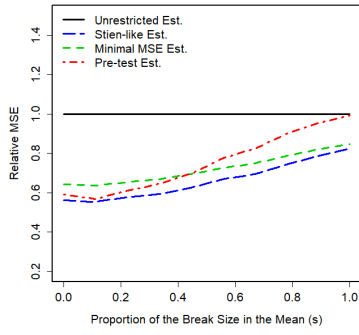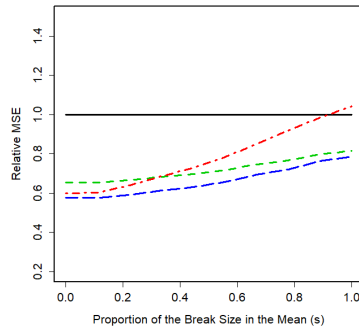
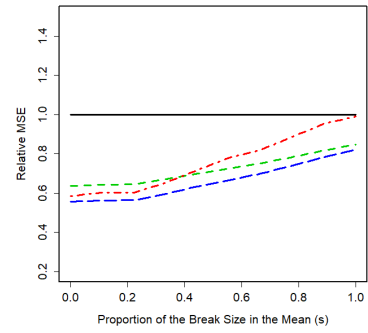(a) $T_1 = 20, q = 0.5, k = 1$
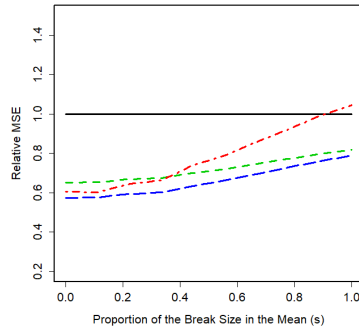
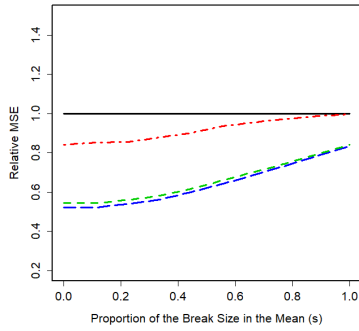(b) $T_1 = 20, q = 1, k = 1$

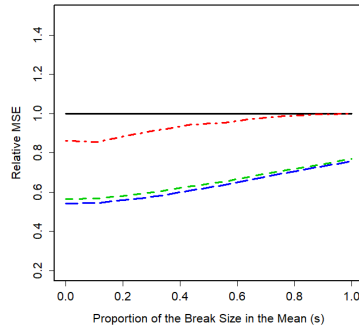(c) $T_1 = 20, q = 2, k = 1$

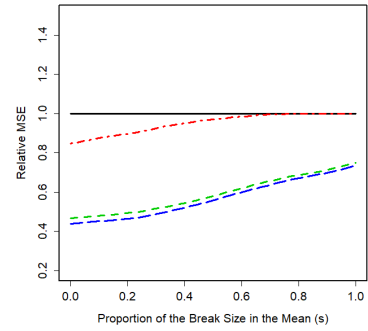(d) $T_1 = 80, q = 0.5, k = 1$

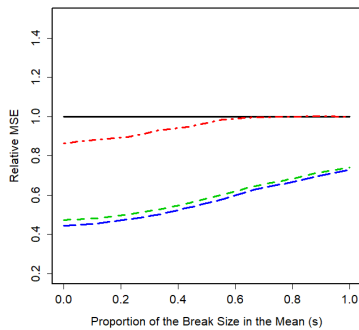(e) $T_1 = 80, q = 1, k = 1$

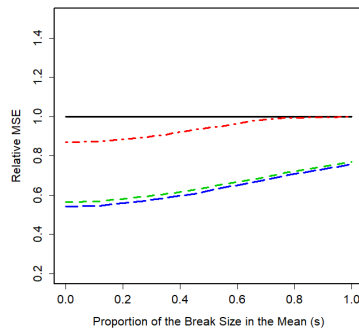(f) $T_1 = 80, q = 2, k = 1$

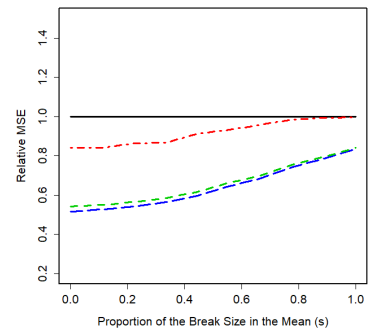(g) $T_1 = 20, q = 0.5, k = 3$

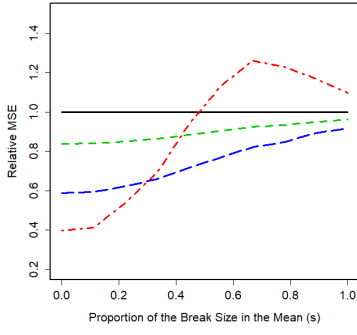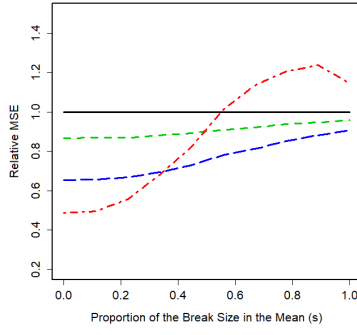(h) $T_1 = 20, q = 1, k = 3$

(i) $T_1 = 20, q = 2, k = 3$

(j) $T_1 = 80, q = 0.5, k = 3$

(k) $T_1 = 80, q = 1, k = 3$

(l) $T_1 = 80, q = 2, k = 3$

2

Figure A1: Monte Carlo results for $T = 100$, $N = 10$
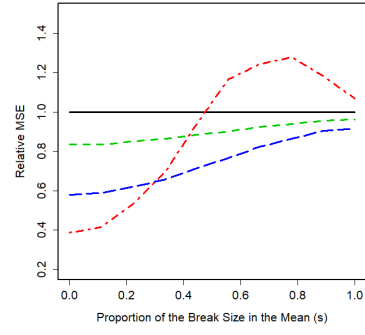
(a) $N = 5, q = 0.5, k = 1$

(b) $N = 5, q = 1, k = 1$

(c) $N = 5, q = 2, k = 1$
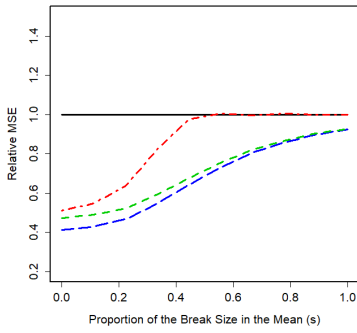
(d) $N = 5, q = 0.5, k = 3$
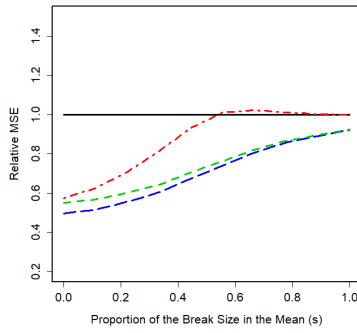
(e) $N = 5, q = 1, k = 3$
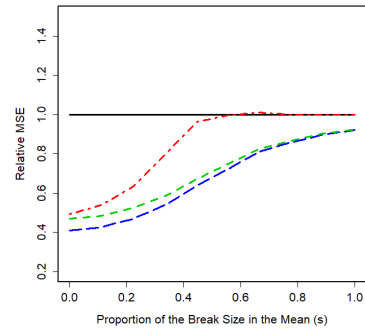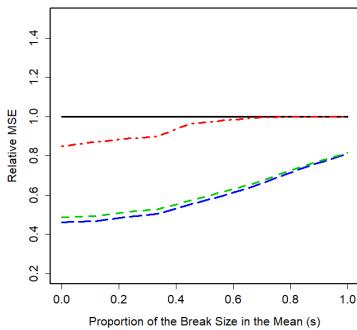
(f) $N = 5, q = 2, k = 3$
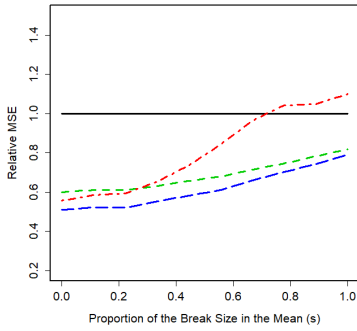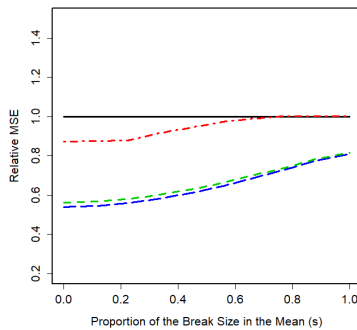
(g) $N = 10, q = 0.5, k = 1$
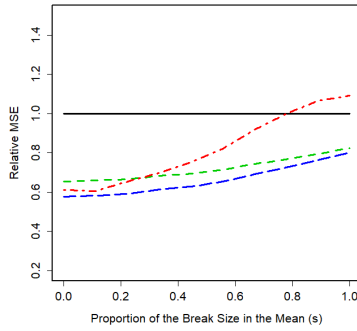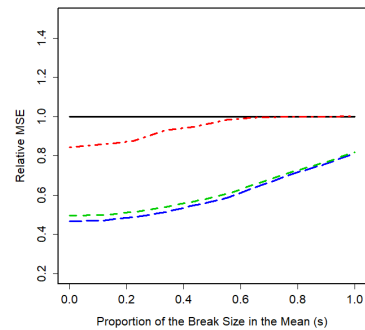
(h) $N = 10, q = 1, k = 1$
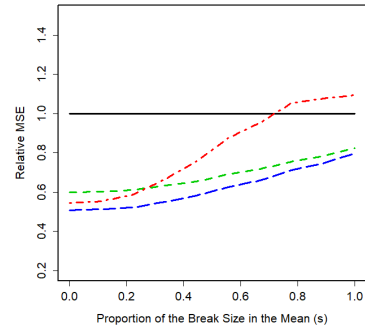
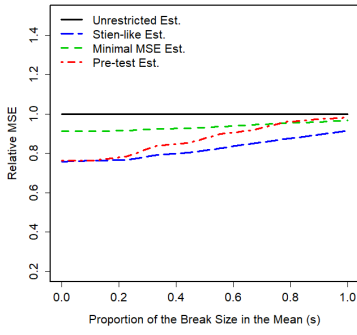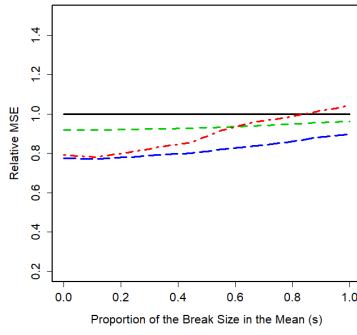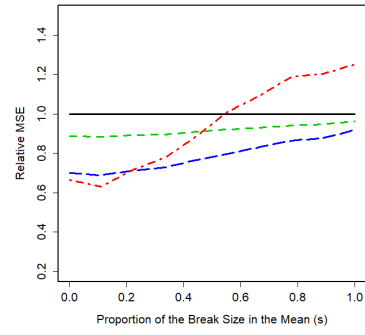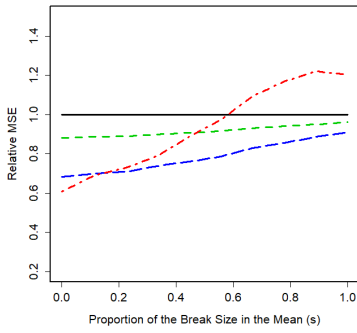(i) $N = 10, q = 2, k = 1$

(j) $N = 10, q = 0.5, k = 3$

(k) $N = 10, q = 1, k = 3$

(l) $N = 10, q = 2, k = 3$

3

Figure A2: Monte Carlo results for $T = 100$, $T_1 = 50$
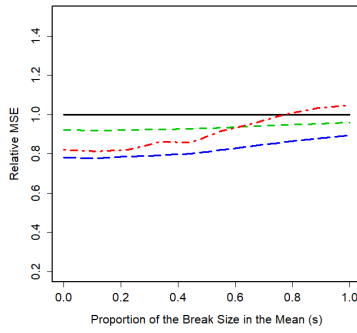
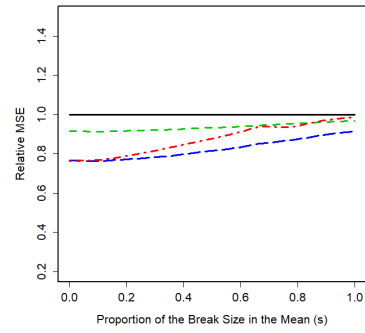(a) $T_1 = 20, q = 0.5, k = 1$

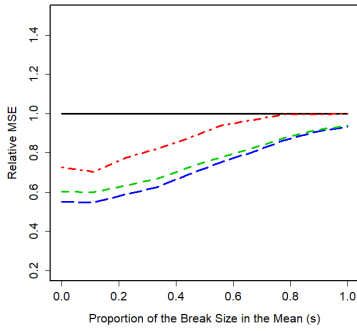(b) $T_1 = 20, q = 1, k = 1$

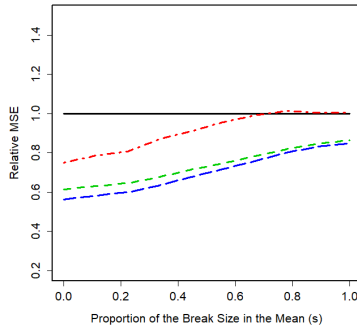(c) $T_1 = 20, q = 2, k = 1$

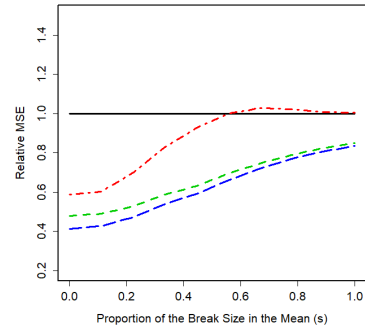(d) $T_1 = 80, q = 0.5, k = 1$

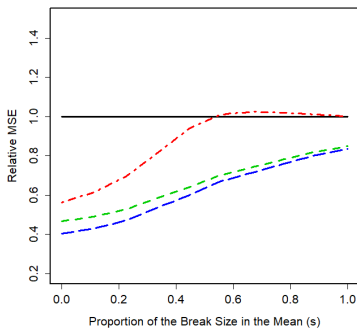(e) $T_1 = 80, q = 1, k = 1$

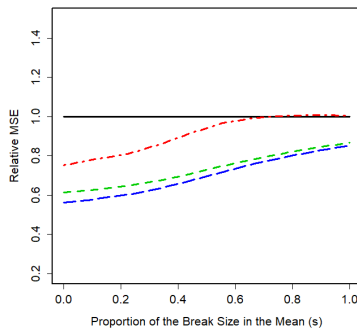(f) $T_1 = 80, q = 2, k = 1$

(g) $T_1 = 20, q = 0.5, k = 3$
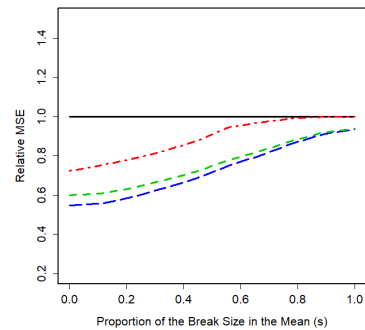
(h) $T_1 = 20, q = 1, k = 3$
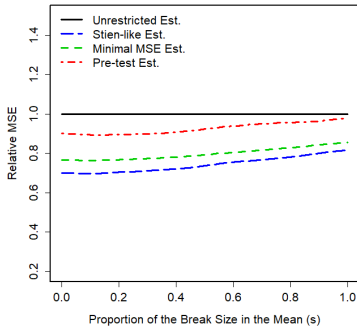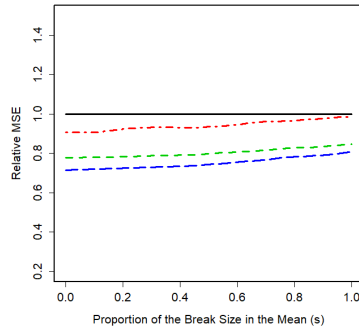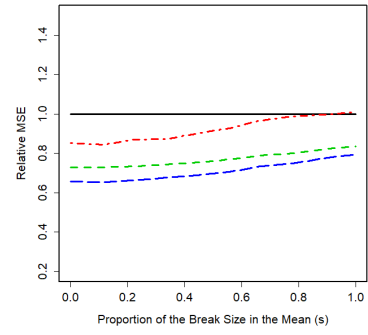
(i) $T_1 = 20, q = 2, k = 3$

(j) $T_1 = 80, q = 0.5, k = 3$

(k) $T_1 = 80, q = 1, k = 3$

(l) $T_1 = 80, q = 2, k = 3$

4

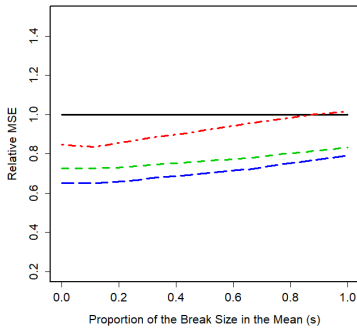Figure A3: Monte Carlo results for $T = 100$, $N = 5$
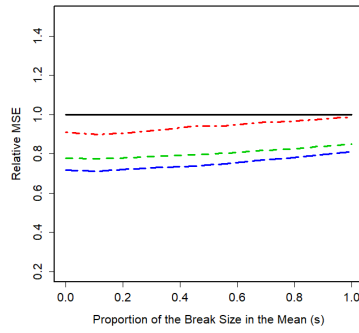
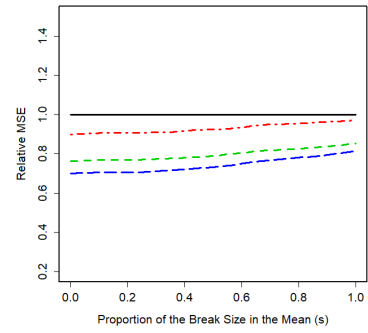(a) $T_1 = 20, q = 0.5, k = 1$

(b) $T_1 = 20, q = 1, k = 1$
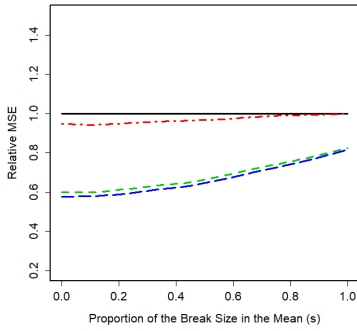
(c) $T_1 = 20, q = 2, k = 1$
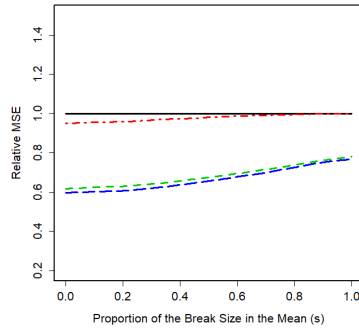
(d) $T_1 = 80, q = 0.5, k = 1$
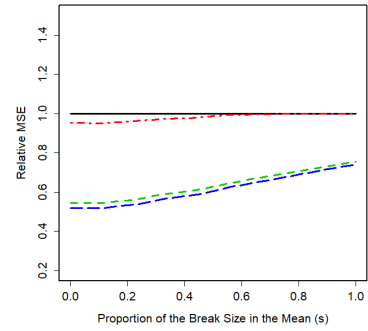
(e) $T_1 = 80, q = 1, k = 1$
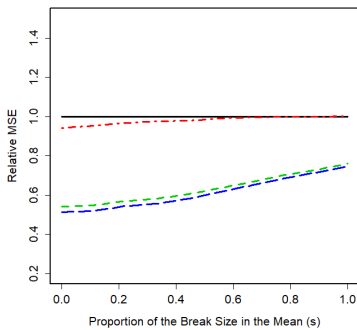
(f) $T_1 = 80, q = 2, k = 1$
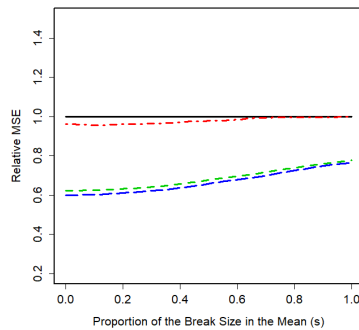
(g) $T_1 = 20, q = 0.5, k = 3$
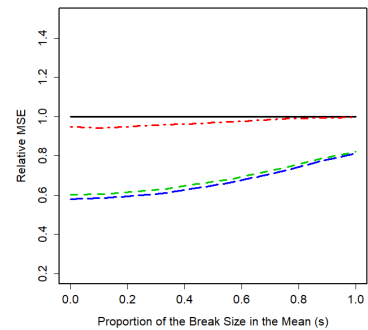
(h) $T_1 = 20, q = 1, k = 3$

(i) $T_1 = 20, q = 2, k = 3$

(j) $T_1 = 80, q = 0.5, k = 3$

(k) $T_1 = 80, q = 1, k = 3$

(l) $T_1 = 80, q = 2, k = 3$

Figure A4: Monte Carlo results for $T = 100$, $N = 10$