

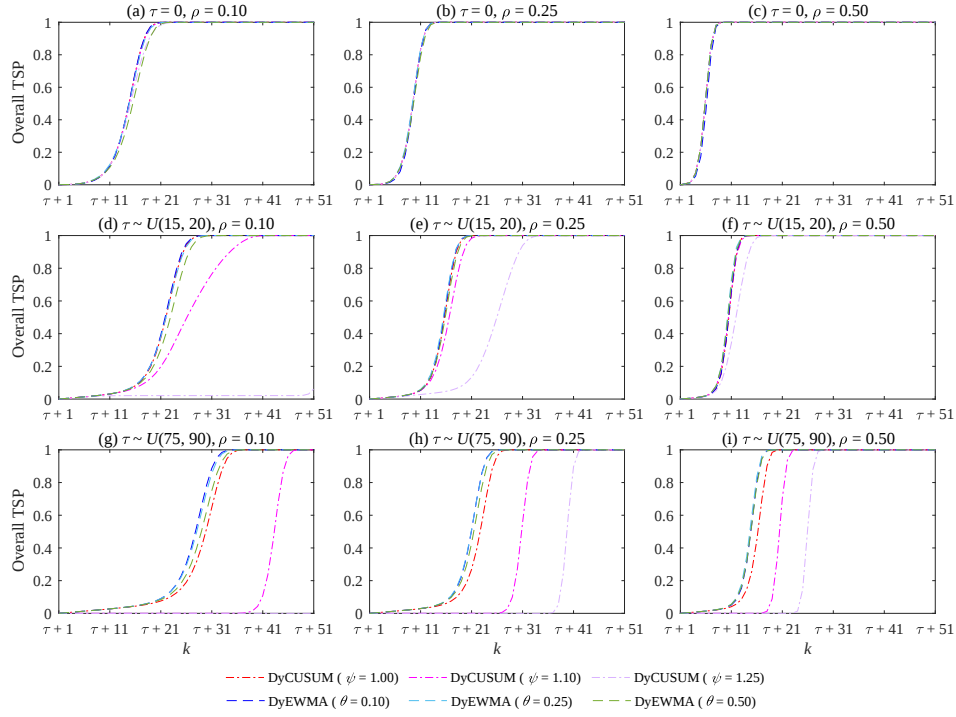
# Online Supplement to “Monitoring Aggregate Warranty Claims with Dynamically Designed CUSUM and EWMA Charts”

## A. Some results of the proposed schemes concerning variations of the two scenarios

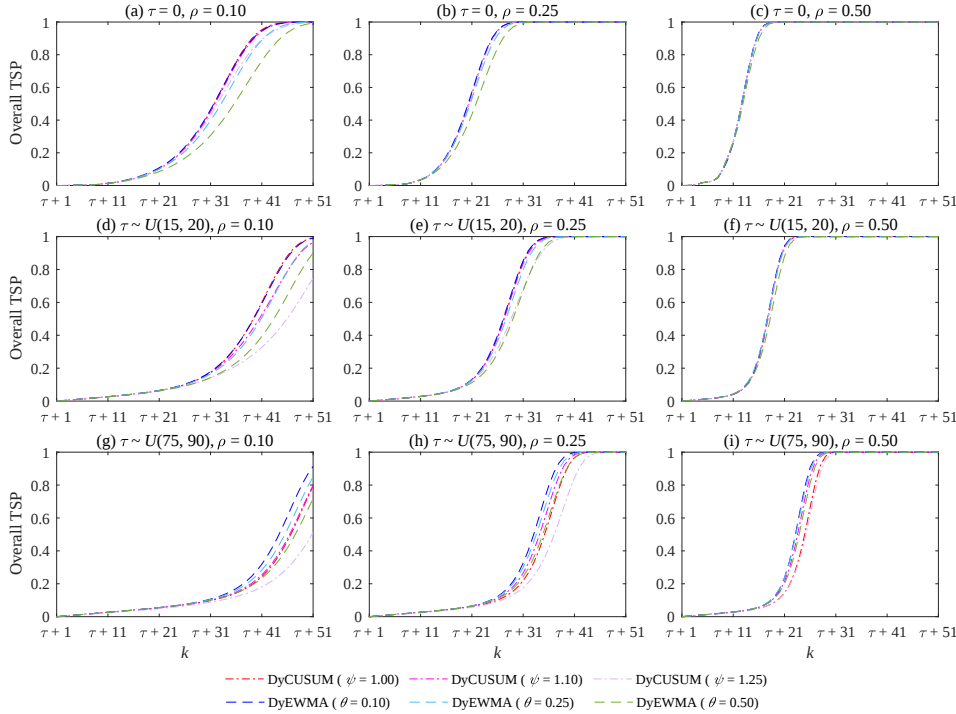
We conduct a more comprehensive simulation study, particularly concerning variations of the two scenarios illustrated in Section 4.1. The new cases developed from the two scenarios, involving changes of  $\eta_0$  (in-control scale parameter),  $\beta_0$  (in-control shape parameter),  $\bar{V}$  (baseline of initial production volume), and  $v_i$  (fluctuations of production volume), are listed as below.

|             |                                    |                                  |                                        |                                              |
|-------------|------------------------------------|----------------------------------|----------------------------------------|----------------------------------------------|
| Scenario 1: | $\eta_0 = 100,$                    | $\beta_0 = 3,$                   | $\bar{V}_1 = 3000,$                    | $v_{1i} \sim U(-150, 150)$                   |
| Case 1      | <b><math>\eta_0 = 50,</math></b>   | $\beta_0 = 3,$                   | $\bar{V}_1 = 3000,$                    | $v_{1i} \sim U(-150, 150)$                   |
| Case 2      | <b><math>\eta_0 = 200,</math></b>  | $\beta_0 = 3,$                   | $\bar{V}_1 = 3000,$                    | $v_{1i} \sim U(-150, 150)$                   |
| Case 3      | $\eta_0 = 100,$                    | <b><math>\beta_0 = 2,</math></b> | $\bar{V}_1 = 3000,$                    | $v_{1i} \sim U(-150, 150)$                   |
| Case 4      | $\eta_0 = 100,$                    | <b><math>\beta_0 = 5,</math></b> | $\bar{V}_1 = 3000,$                    | $v_{1i} \sim U(-150, 150)$                   |
| Case 5      | $\eta_0 = 100,$                    | $\beta_0 = 3,$                   | <b><math>\bar{V}_1 = 1000,</math></b>  | <b><math>v_{1i} \sim U(-100, 100)</math></b> |
| Case 6      | $\eta_0 = 100,$                    | $\beta_0 = 3,$                   | <b><math>\bar{V}_1 = 5000,</math></b>  | <b><math>v_{1i} \sim U(-200, 200)</math></b> |
| Scenario 2: | $\eta_0 = 1000,$                   | $\beta_0 = 1,$                   | $\bar{V}_2 = 30000,$                   | $v_{2i} \sim U(-300, 300)$                   |
| Case 7      | <b><math>\eta_0 = 500,</math></b>  | $\beta_0 = 1,$                   | $\bar{V}_2 = 30000,$                   | $v_{2i} \sim U(-300, 300)$                   |
| Case 8      | <b><math>\eta_0 = 2000,</math></b> | $\beta_0 = 1,$                   | $\bar{V}_2 = 30000,$                   | $v_{2i} \sim U(-300, 300)$                   |
| Case 9      | $\eta_0 = 1000,$                   | $\beta_0 = 1,$                   | <b><math>\bar{V}_2 = 10000,</math></b> | <b><math>v_{2i} \sim U(-100, 100)</math></b> |
| Case 10     | $\eta_0 = 1000,$                   | $\beta_0 = 1,$                   | <b><math>\bar{V}_2 = 50000,</math></b> | <b><math>v_{2i} \sim U(-500, 500)</math></b> |

Figures A1-A10 below present the overall TSPs of the DyCUSUM and DyEWMA schemes after the claim rate change in Cases 1-10, respectively.



**Figure A1.** Overall TSPs of the proposed schemes after the claim rate change in Case 1.



**Figure A2.** Overall TSPs of the proposed schemes after the claim rate change in Case 2.

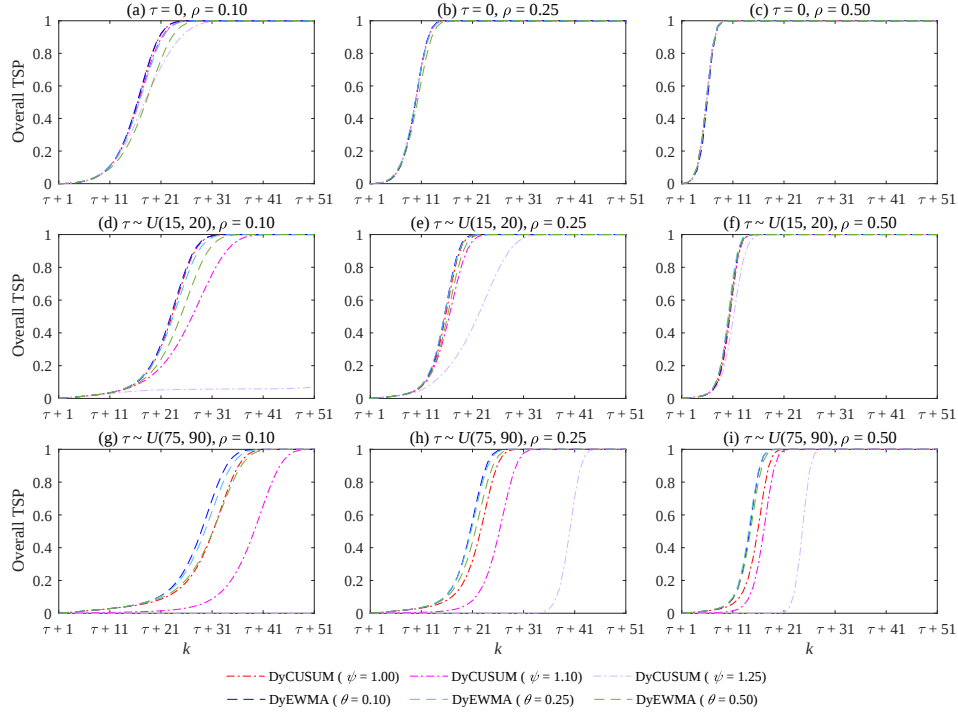


Figure A3. Overall TSPs of the proposed schemes after the claim rate change in Case 3.

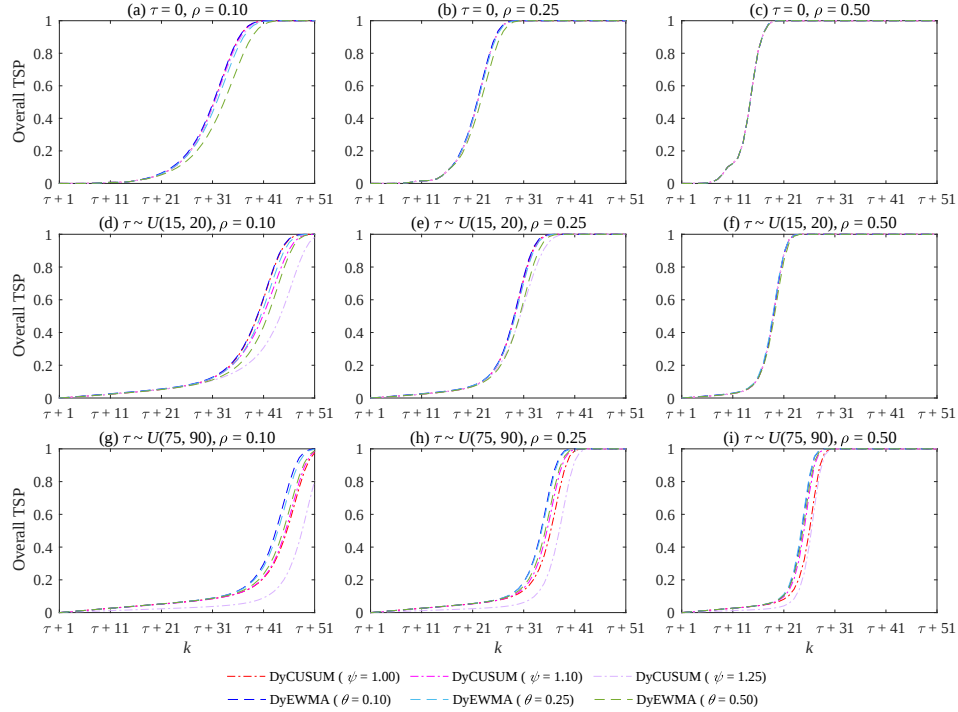
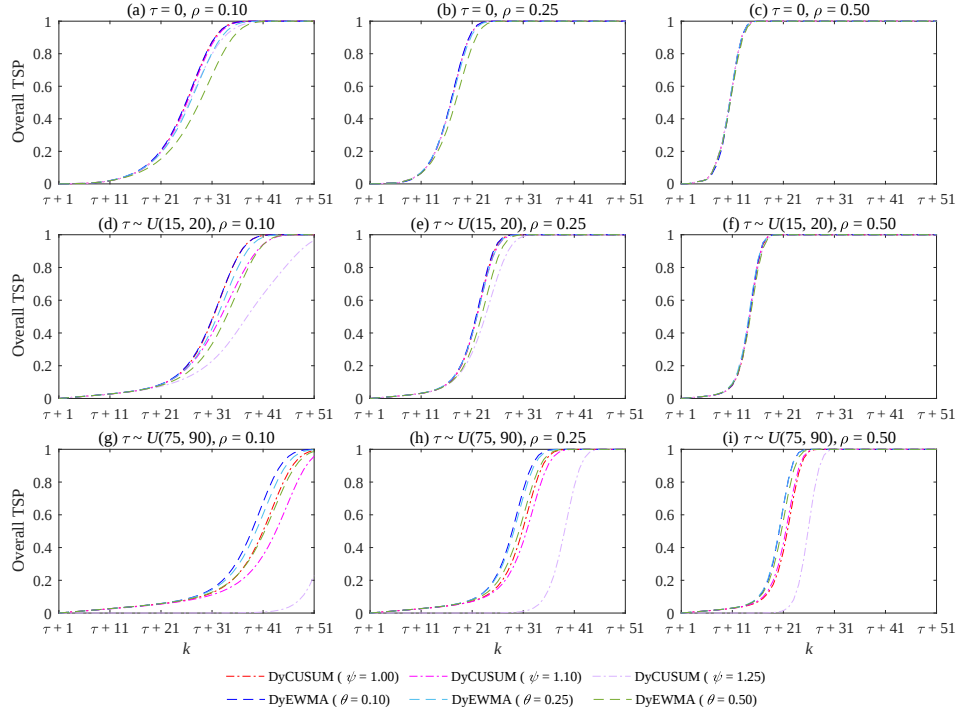
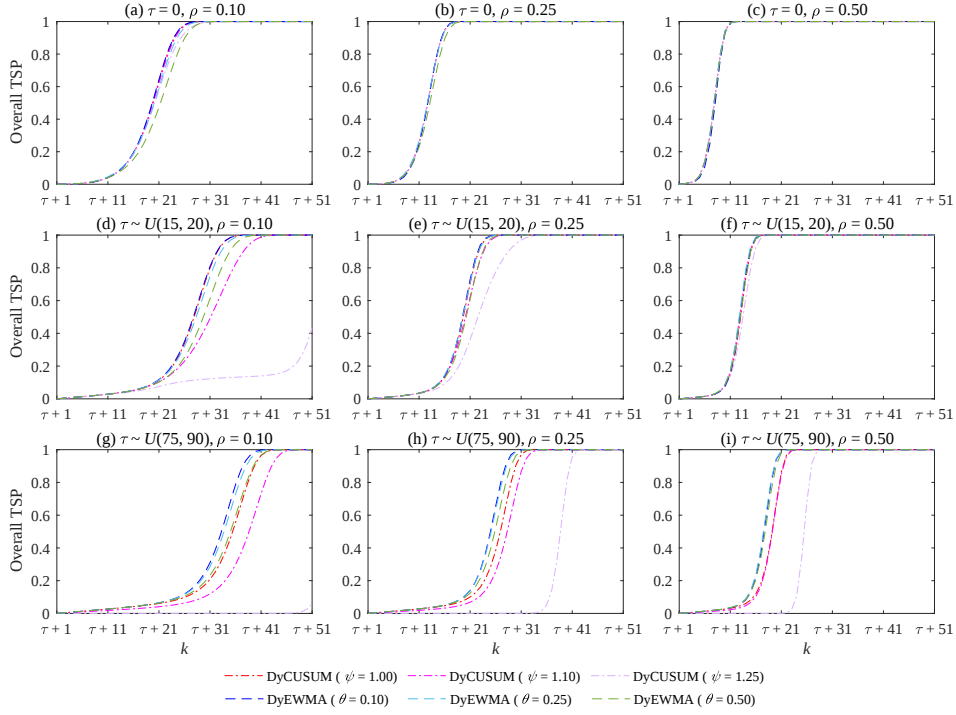


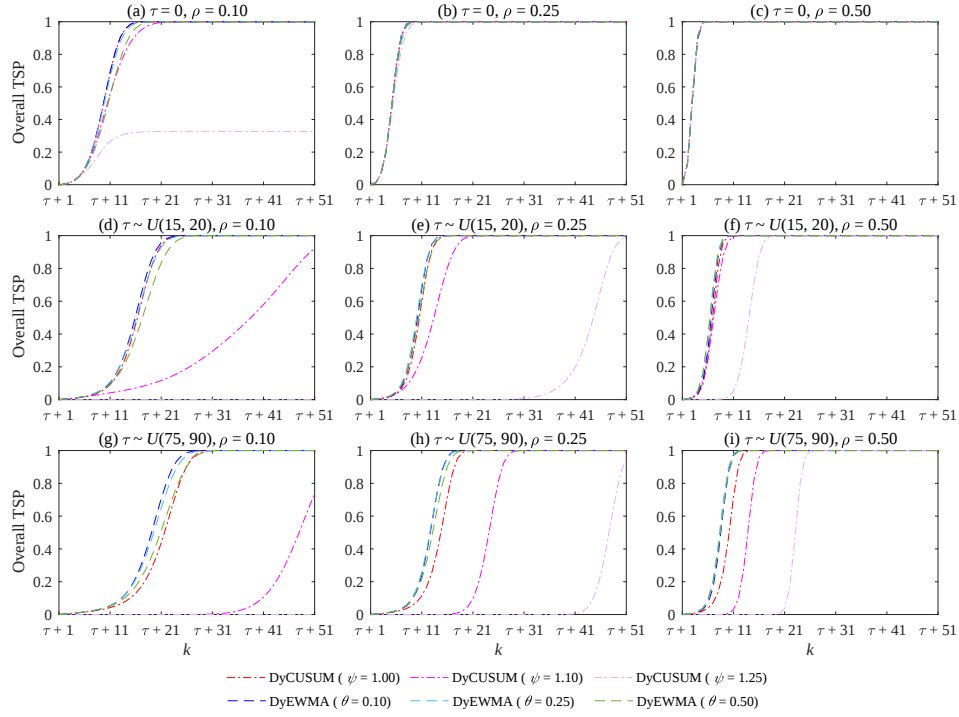
Figure A4. Overall TSPs of the proposed schemes after the claim rate change in Case 4.



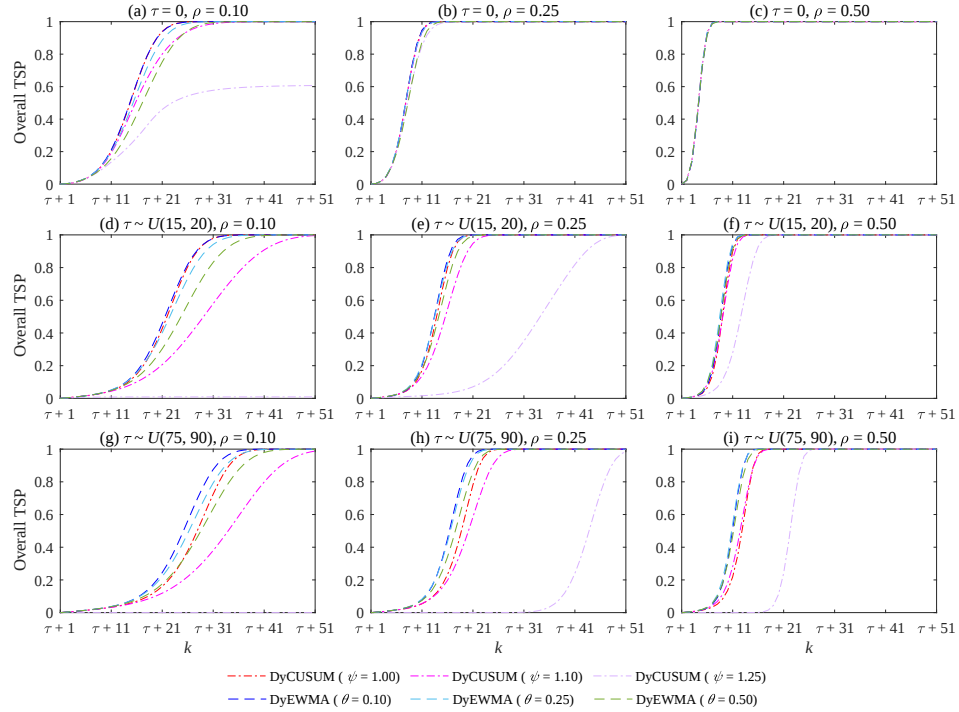
**Figure A5.** Overall TSPs of the proposed schemes after the claim rate change in Case 5.



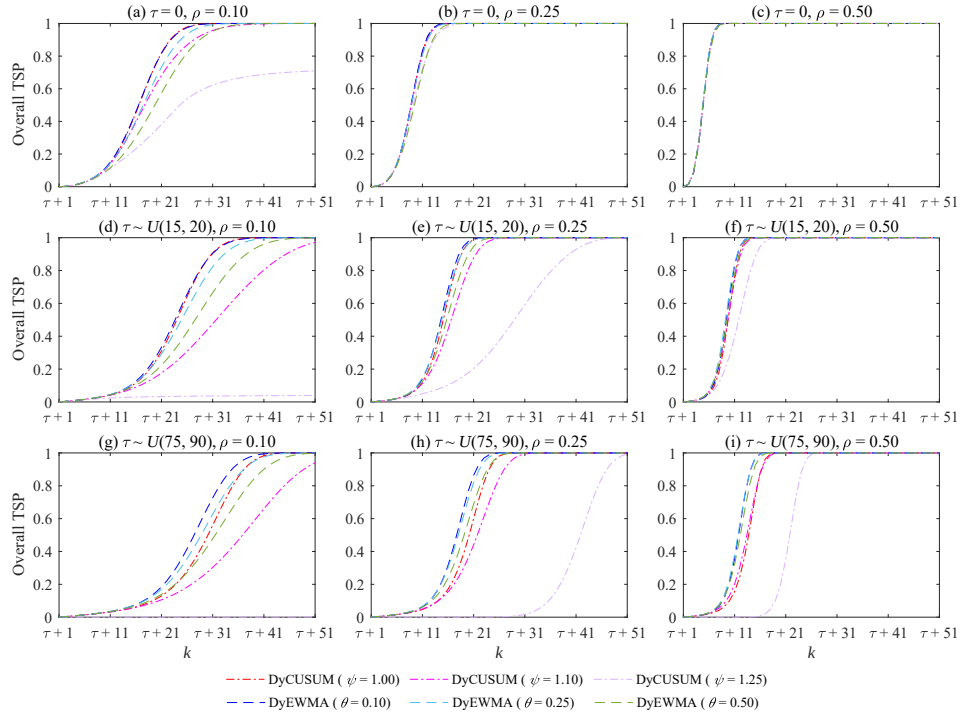
**Figure A6.** Overall TSPs of the proposed schemes after the claim rate change in Case 6.



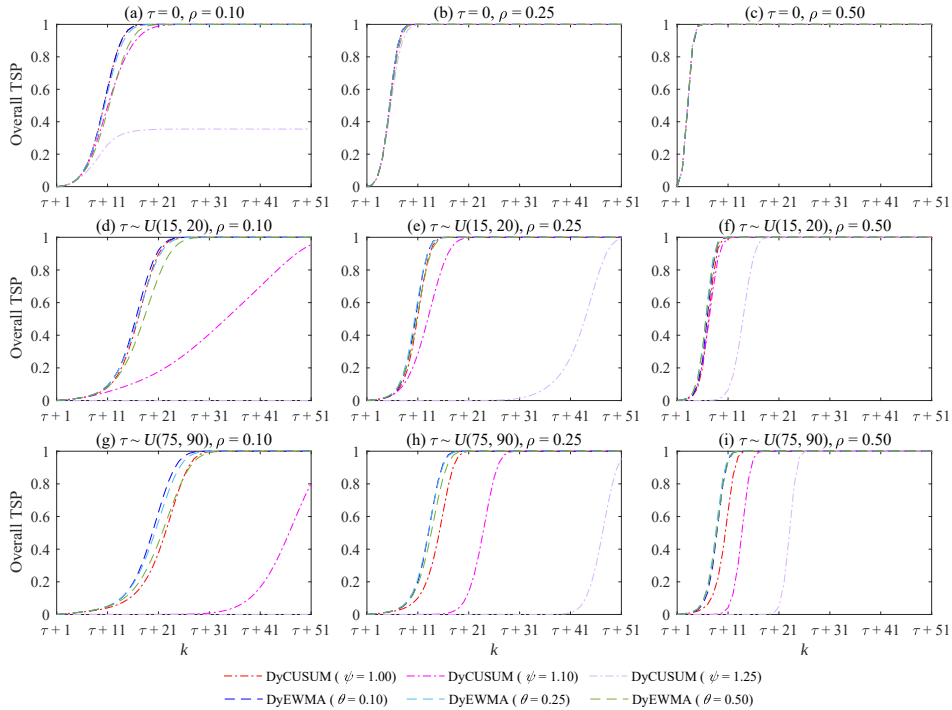
**Figure A7.** Overall TSPs of the proposed schemes after the claim rate change in Case 7.



**Figure A8.** Overall TSPs of the proposed schemes after the claim rate change in Case 8.



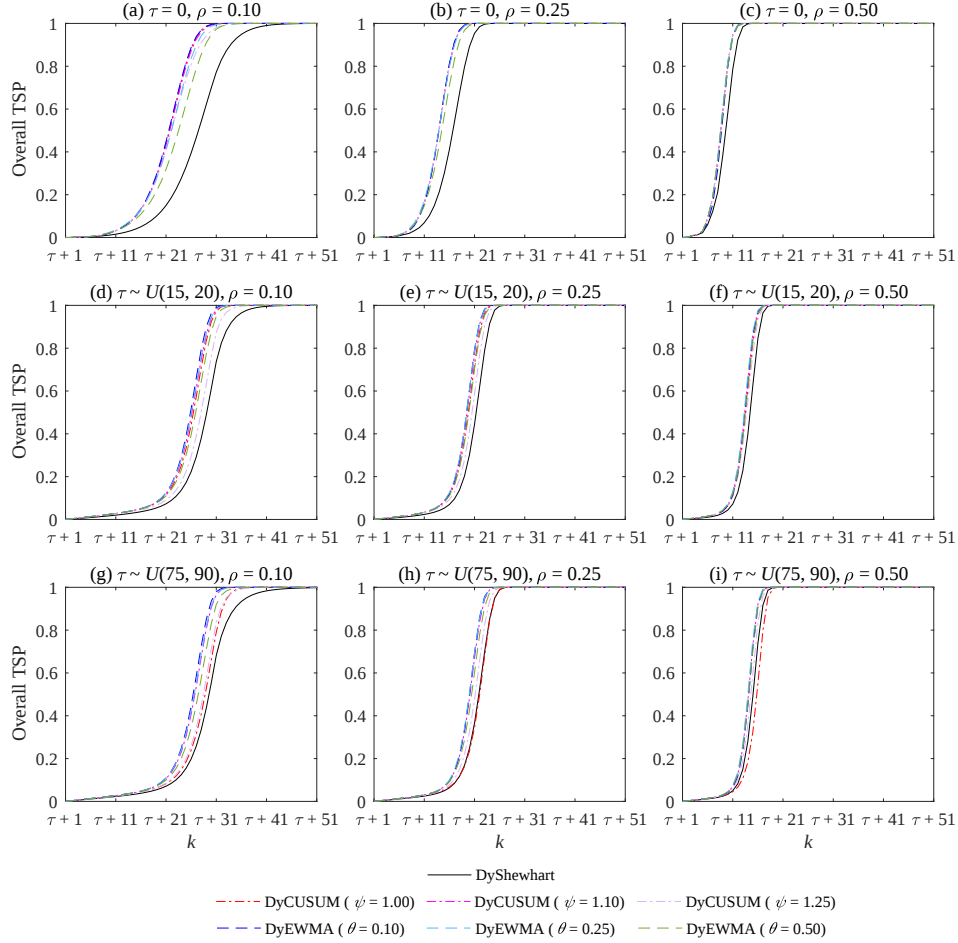
**Figure A9.** Overall TSPs of the proposed schemes after the claim rate change in Case 9.



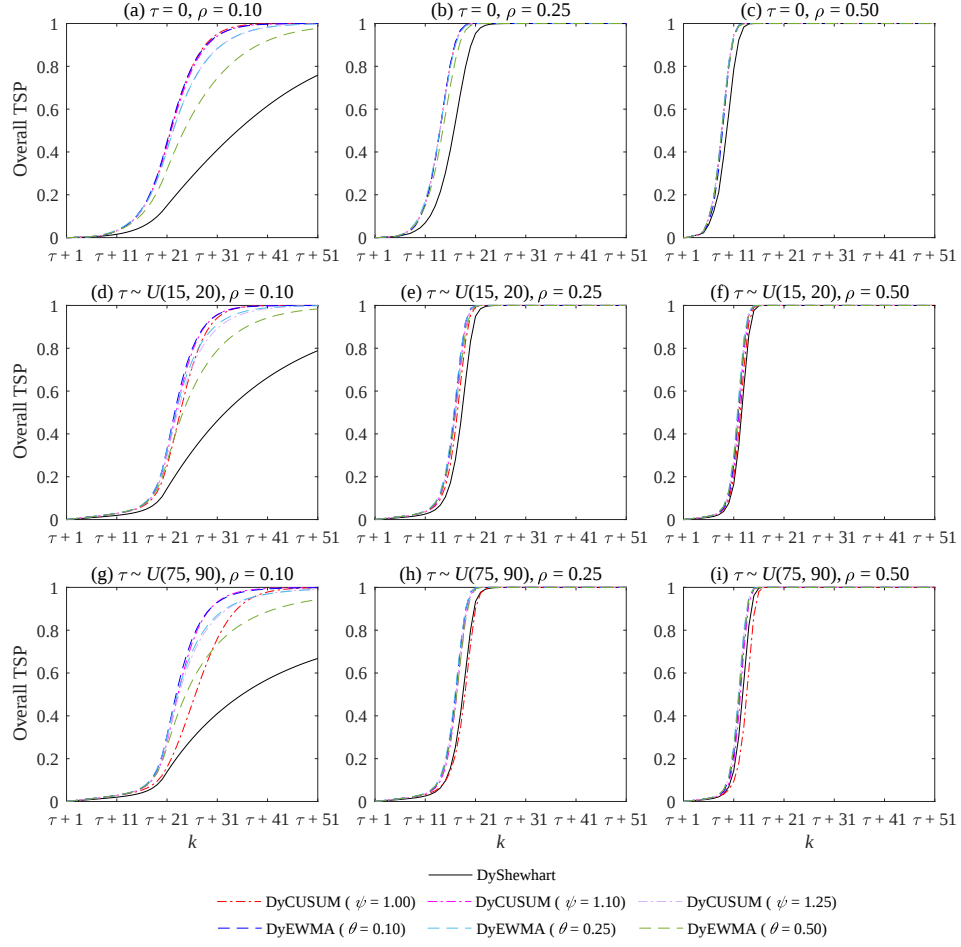
**Figure A10.** Overall TSPs of the proposed schemes after the claim rate change in Case 10.

## B. Some results on the performance comparison of the monitoring schemes for particular choices of $B$

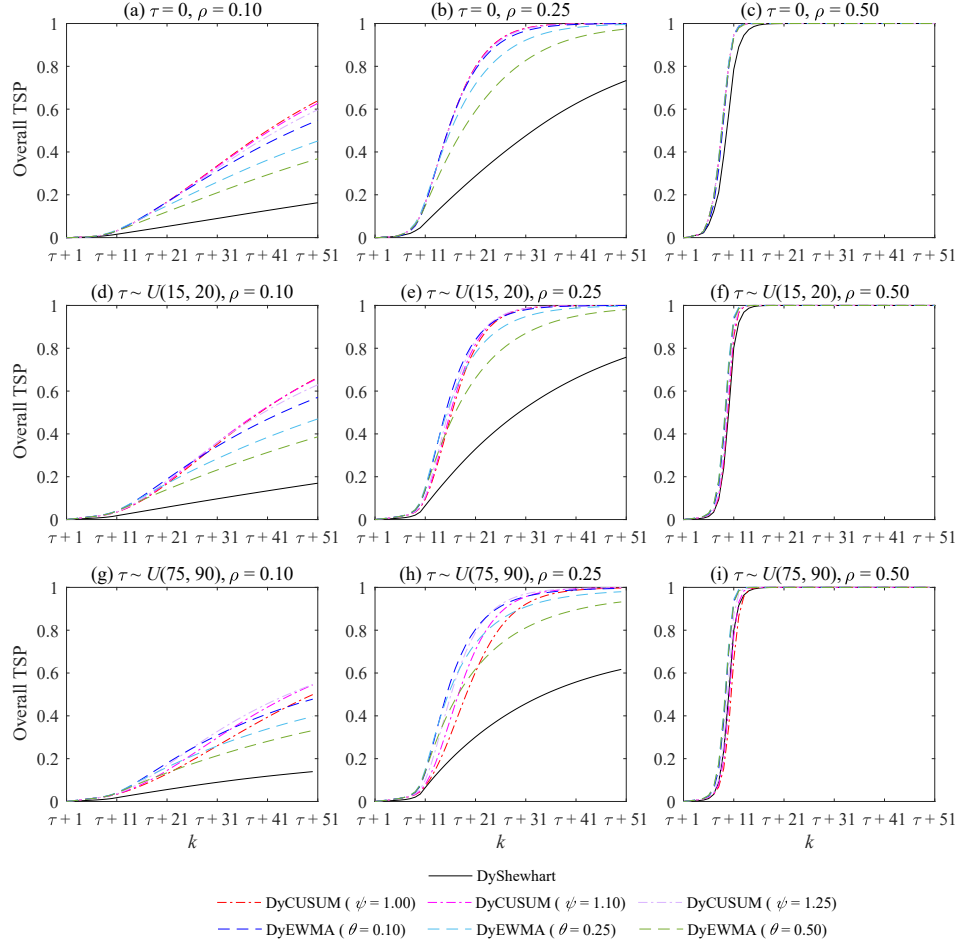
We compare the performance of various monitoring schemes by taking into account the moving window. Figures B1-B3 below present the results on the performance comparison of the schemes for particular choices of  $B$  (including  $B = 10, 20$ , and  $30$ ) under scenario 1. Note that all relevant results under scenario 2 are consistent with those under scenario 1 and thus omitted.



**Figure B1.** Overall TSPs of various monitoring schemes after the claim rate change under scenario 1, when  $B = 30$ .



**Figure B2.** Overall TSPs of various monitoring schemes after the claim rate change under scenario 1, when  $B = 20$ .



**Figure B3.** Overall TSPs of various monitoring schemes after the claim rate change under scenario 1, when  $B = 10$ .