Web appendix

Supplemental figures for manuscript "Impact of Outcome Model Misspecification on Regression and Doubly-robust Inverse Probability Weighting to Estimate Causal Effect" by G. Lefebvre and P. Gustafson.

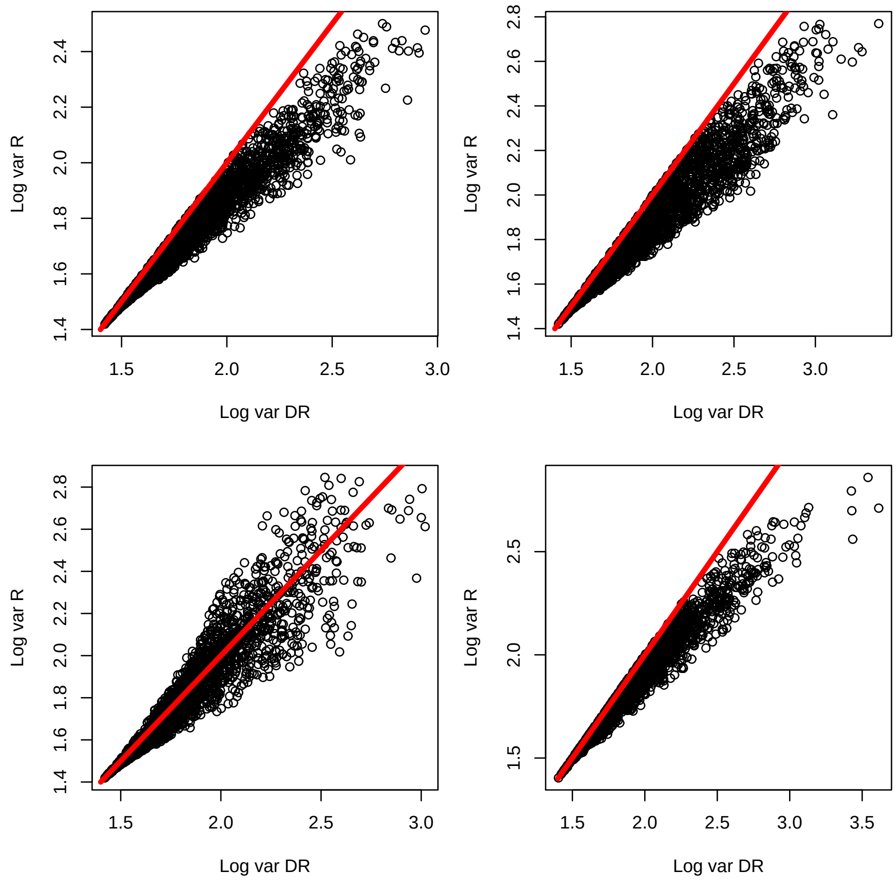


Figure 7: Variance of the regression and doubly robust estimators for Scenarios 1, 4, 5 and 7 (v_R^* vs v_{DR}^* on log scale). Display: left to right and top to bottom, respectively.

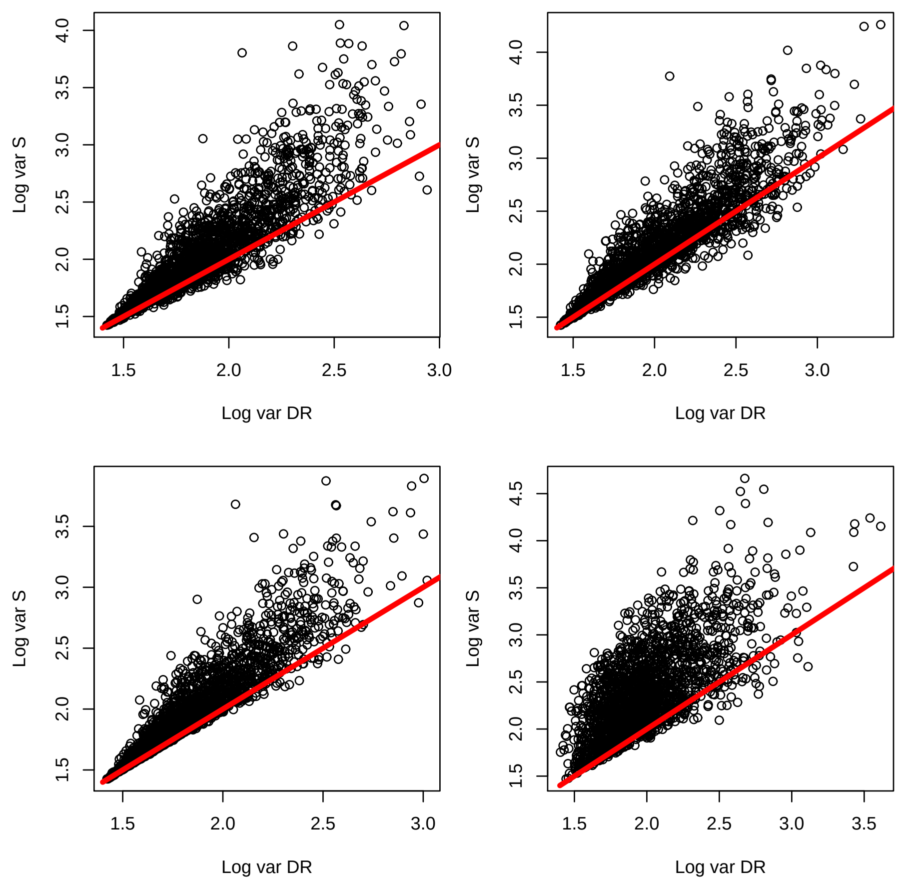


Figure 8: Variance of the stabilized and doubly robust estimators for Scenarios 1, 4, 5 and 7 (v_S vs v^*_{DR} on log scale). Display: left to right and top to bottom, respectively.

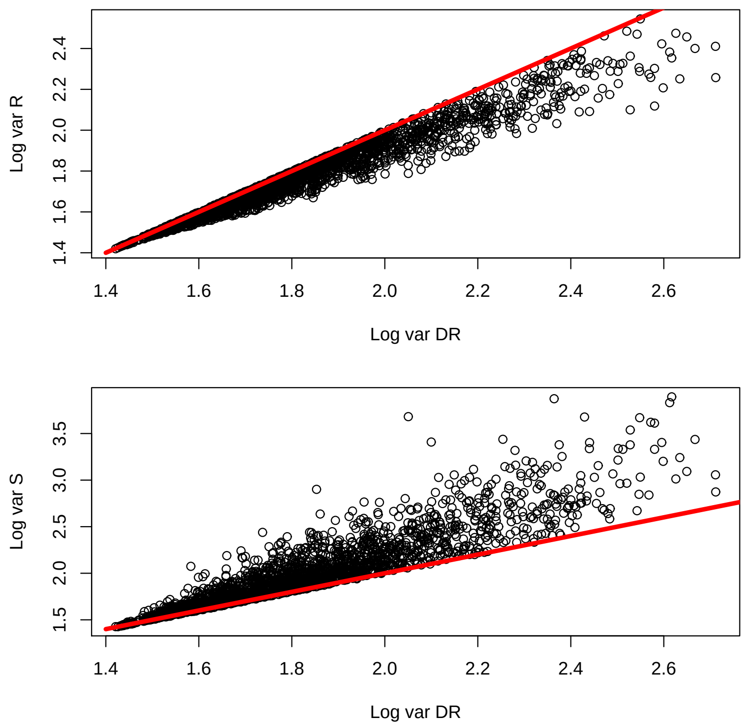


Figure 9: Scenario 5. Top: Variance of the correct regression and doubly robust estimators (v_R vs v_{DR} on log scale). Bottom: Variance of the correct stabilized and doubly robust estimators (v_S vs v_{DR} on log scale).

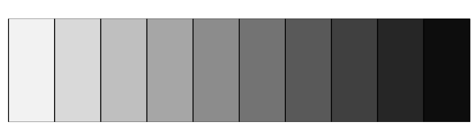


Figure 10: Grey level scale from 0.05 to 0.95 by 0.10 (0: white - 1: black).

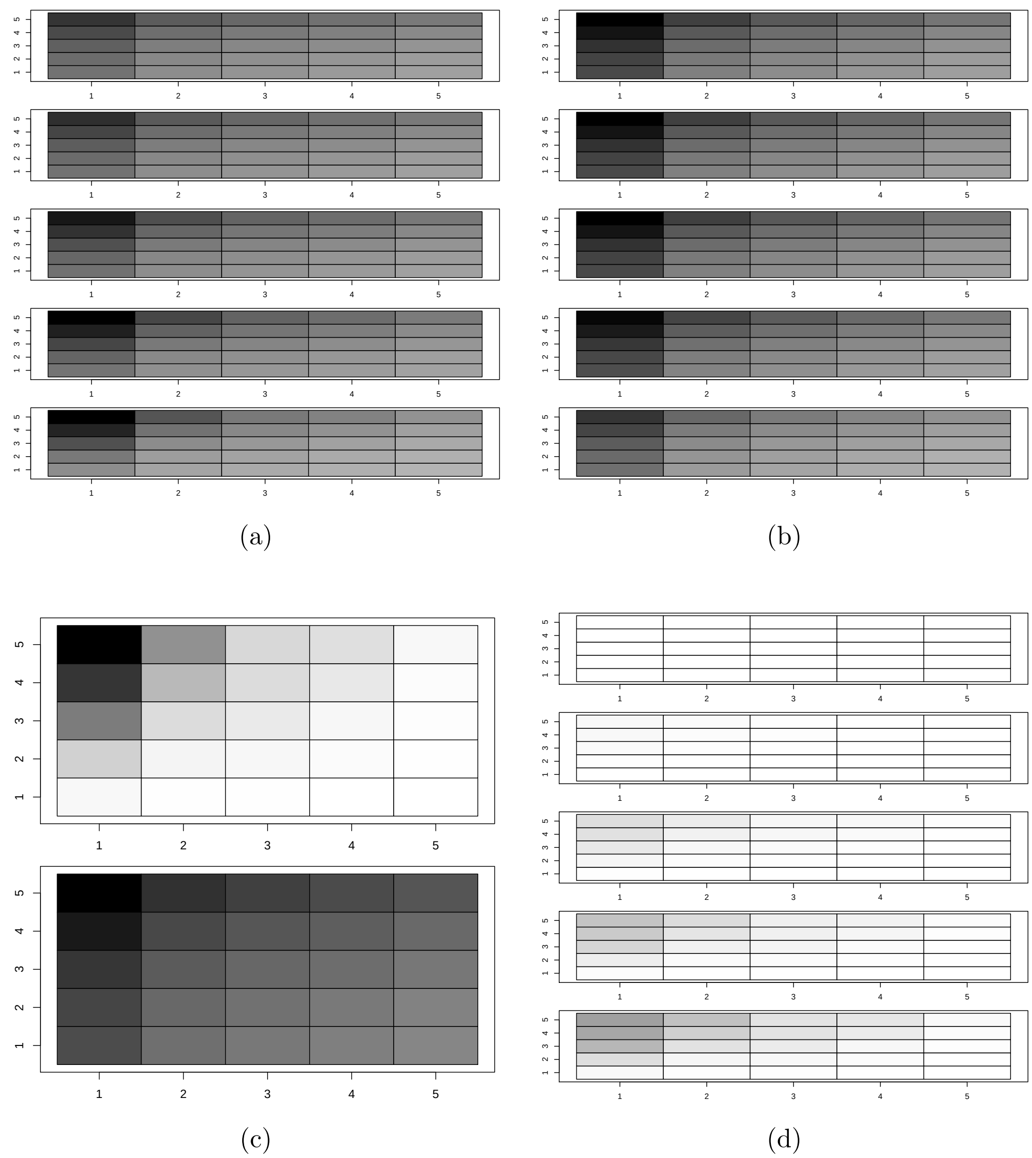


Figure 11: Scenario 1 (C_1C_2 misspecification): Intensity plots as a function of 0-20, 20-40, 40-60, 60-80, and 80-100th percentiles of $E[e(C)(1-e(C))]$ (x-axis) and of $|\beta_m|$ (y-axis) (based on 2000 different (α, β)). (a) Top to bottom: Average $MSE^*_R(n)$, $n = 1, 100, 500, 1000, 2000$ (b) Top to bottom: Average $MSE^*_{DR}(n)$, $n = 1, 100, 500, 1000, 2000$ (c) Top to bottom: Average b^2_R, v^*_R. (d) Top to bottom: Average $b^2_R/MSE^*_R(n)$, $n = 1, 100, 500, 1000, 2000$. **Notes**: for better comparisons between $\hat{\Delta}_R$ and $\hat{\Delta}_{DR}$, the grey levels of plots appearing in subfigures (a) and (b) are normalized using a common scale (for each sample size separately). Plots in (c) are drawn on their own individual scale. Plots in (d) are left unnormalized since $b^2_R/MSE^*_R(n) \in [0, 1]$. See Figure 10 for grey level scale.

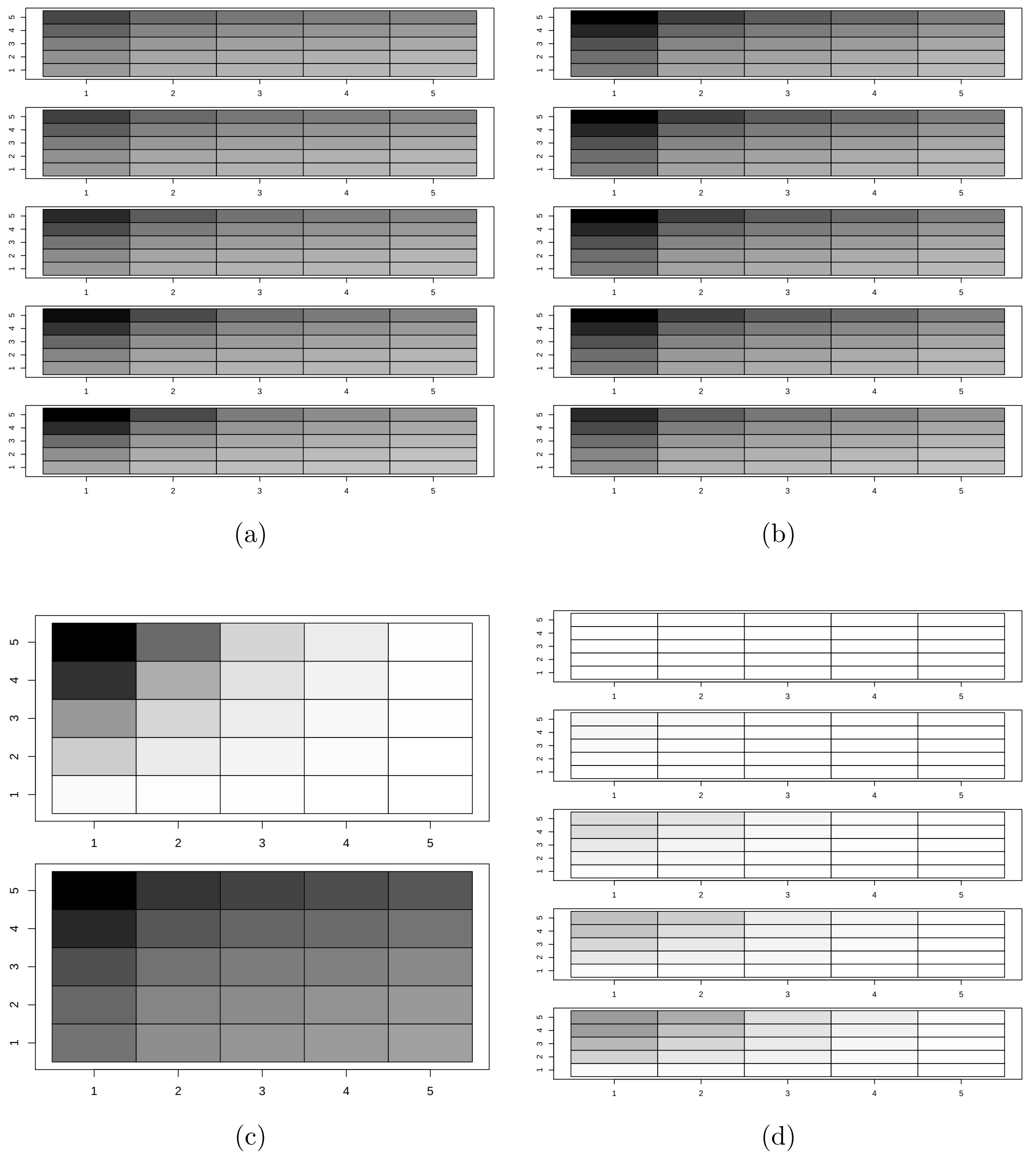


Figure 12: Scenario 4 (C_2^2 misspecification). Layout and legend as per Figure 11.

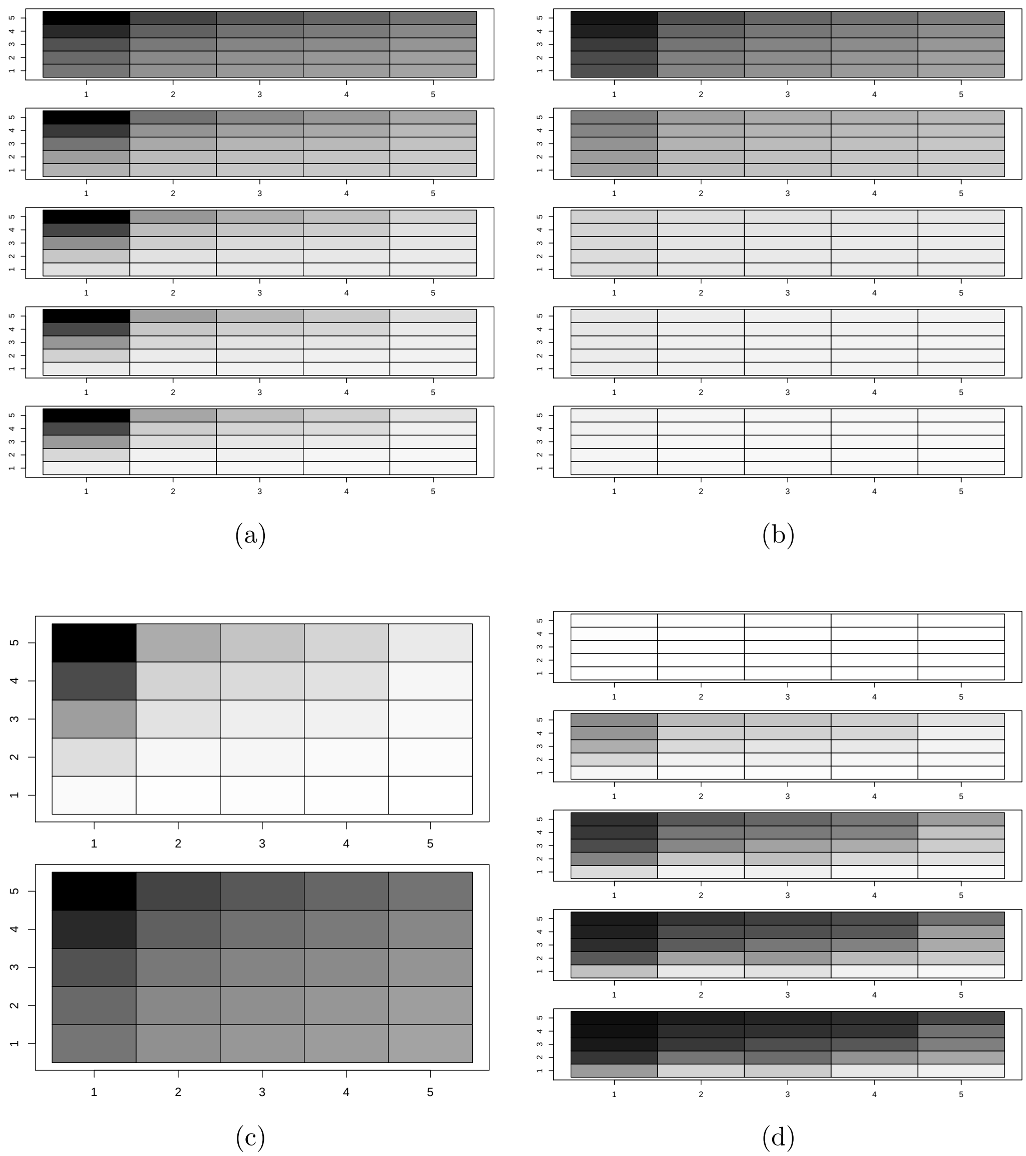


Figure 13: Scenario 5 (XC_1 misspecification). Layout and legend as per Figure 11.

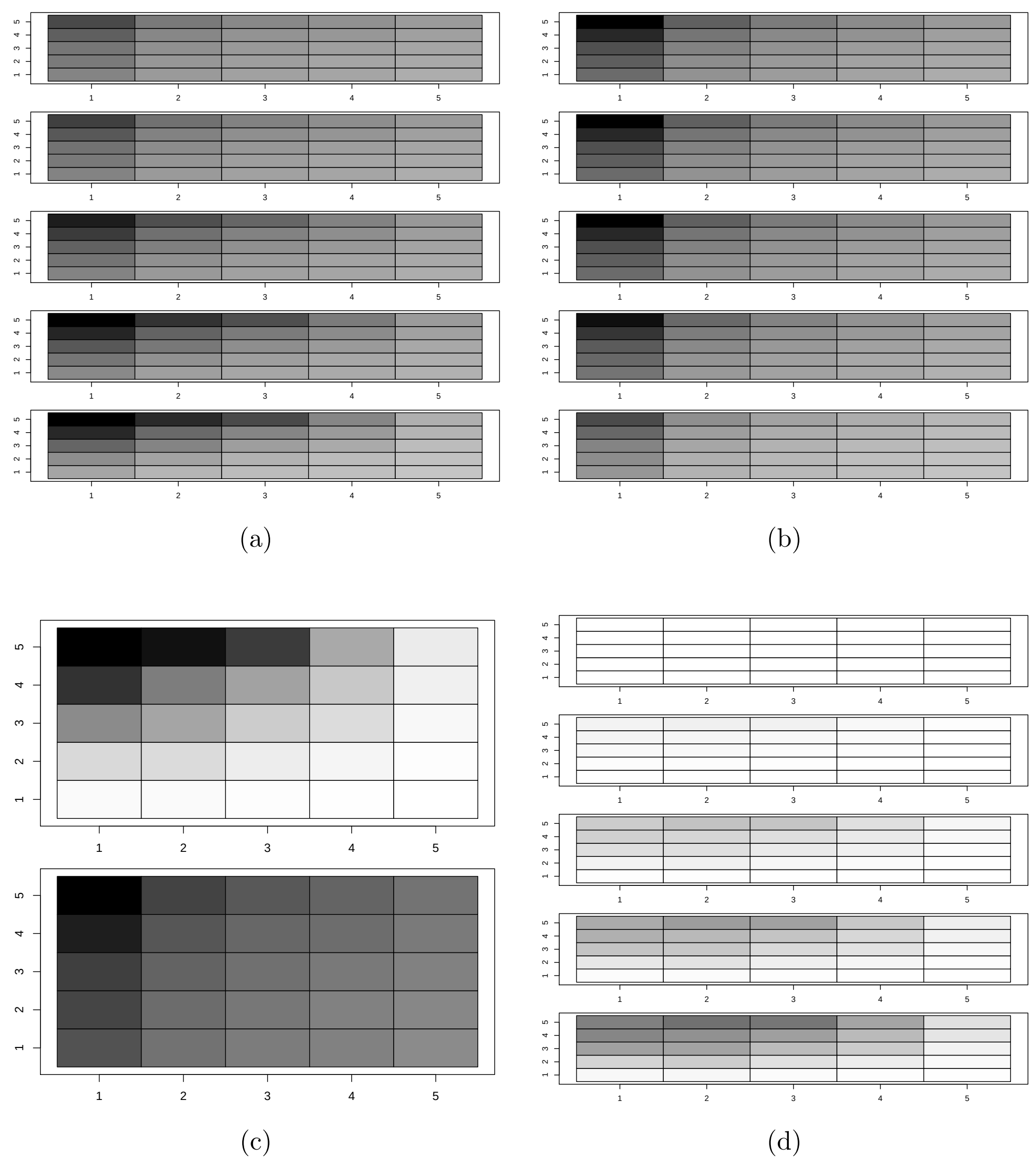
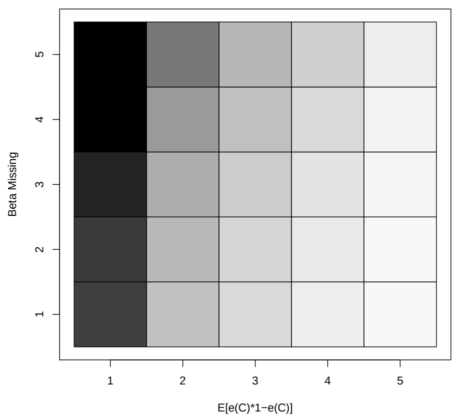
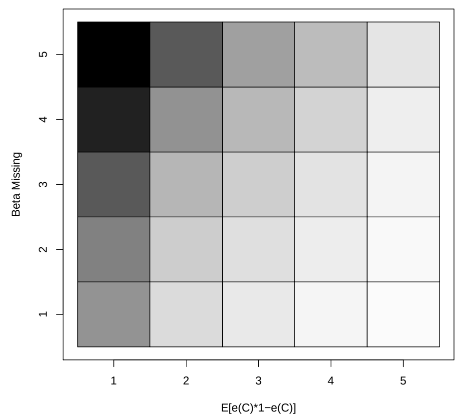


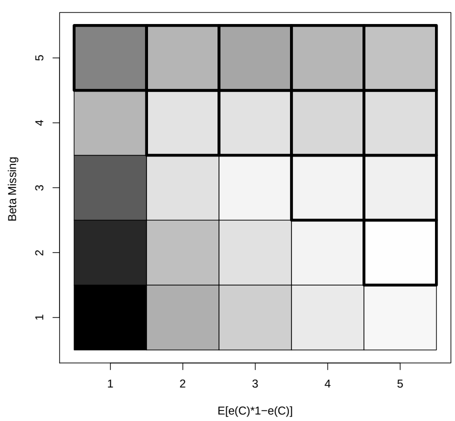
Figure 14: Scenario 7 (XC_2^2 misspecification). Layout and legend as per Figure 11.



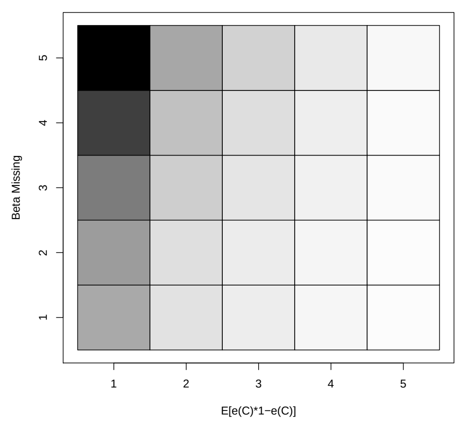
(a) Scenario 1



(b) Scenario 4

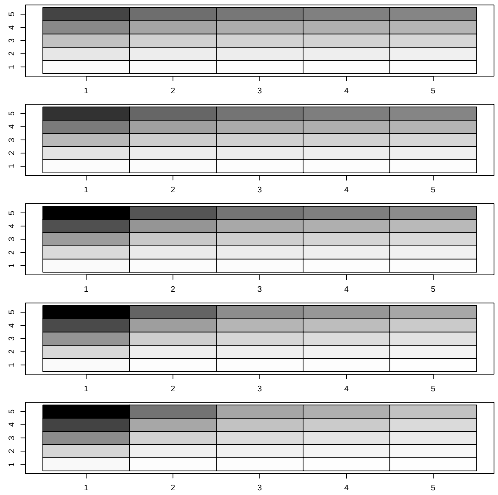


(c) Scenario 5

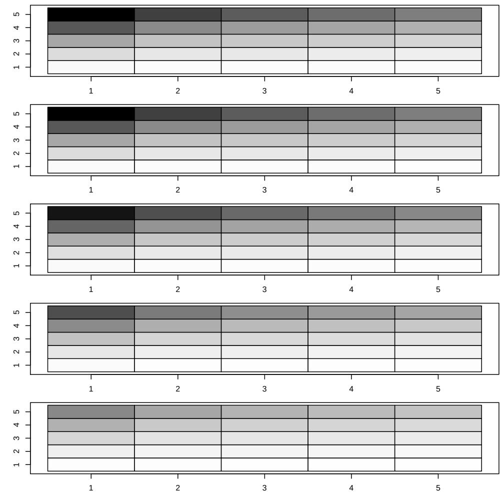


(d) Scenario 7

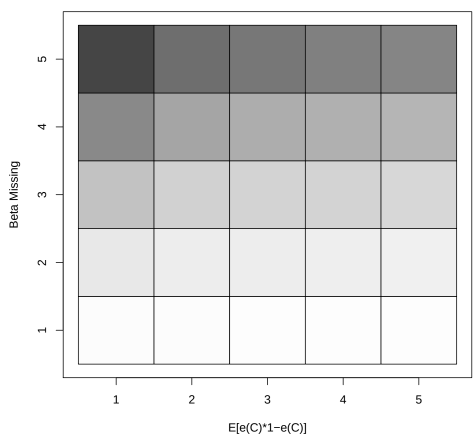
Figure 15: Intensity plots for the difference in variance between the doubly robust and regression estimators ($v^*_{DR} - v^*_R$) for Scenarios 1, 4, 5 and 7 as a function of 0-20, 20-40, 40-60, 60-80, and 80-100th percentiles of $E[e(C)(1 - e(C))]$ (x-axis) and of $|\beta_m|$ (y-axis) (based on 2000 different (α, β)). **Note**: Bold borders indicate where $v^*_{DR} - v^*_R < 0$.



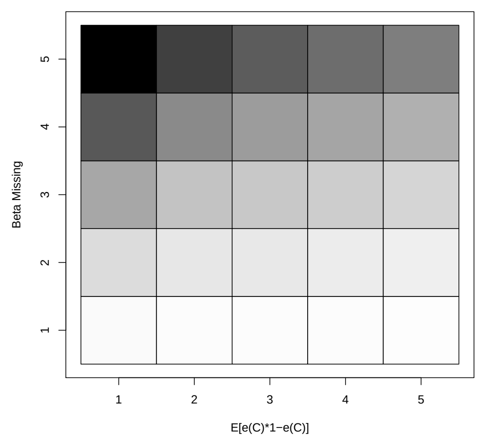
(a)



(b)

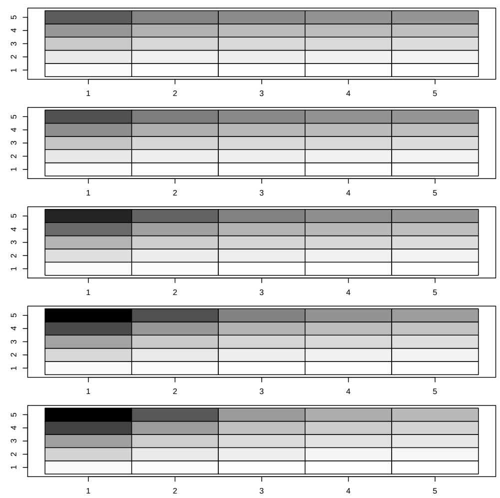


(c)

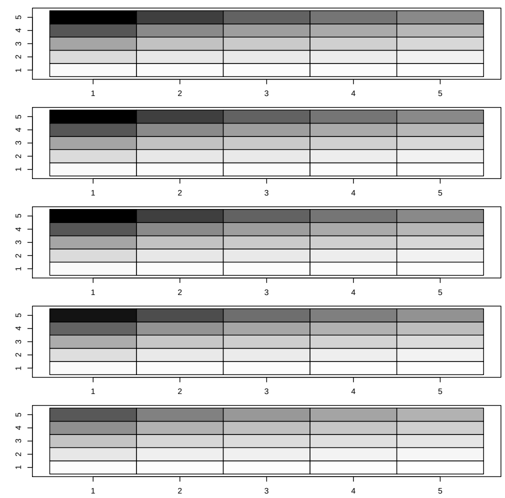


(d)

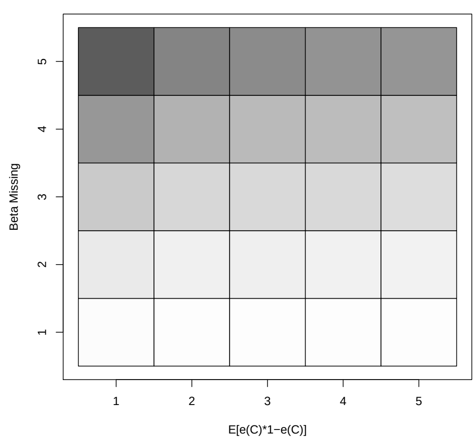
Figure 16: Scenario 1 (C_1C_2 misspecification): Intensity plots as a function of 0-20, 20-40, 40-60, 60-80, and 80-100th percentiles of $E[e(C)(1-e(C))]$ (x-axis) and of $|\beta_m|$ (y-axis) (based on 2000 different (α, β)). (a) Top to bottom: Average $MSE_R^*(n) - MSE_R(n)$, $n = 1, 100, 500, 1000, 2000$ (b) Top to bottom: Average $MSE_{DR}^*(n) - MSE_{DR}(n)$, $n = 1, 100, 500, 1000, 2000$ (c) Average $v_R^* - v_R$ (d) Average $v_{DR}^* - v_{DR}$. **Note**: for better comparisons between $\hat{\Delta}_R$ and $\hat{\Delta}_{DR}$, the grey levels of plots appearing within subfigure pairs (a,b) and (c,d) are normalized using a common scale (for each sample size separately when applicable).



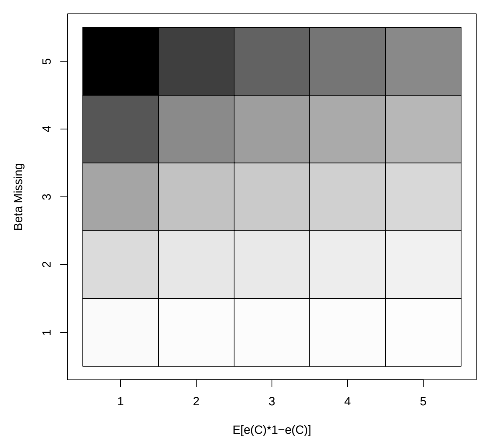
(a)



(b)

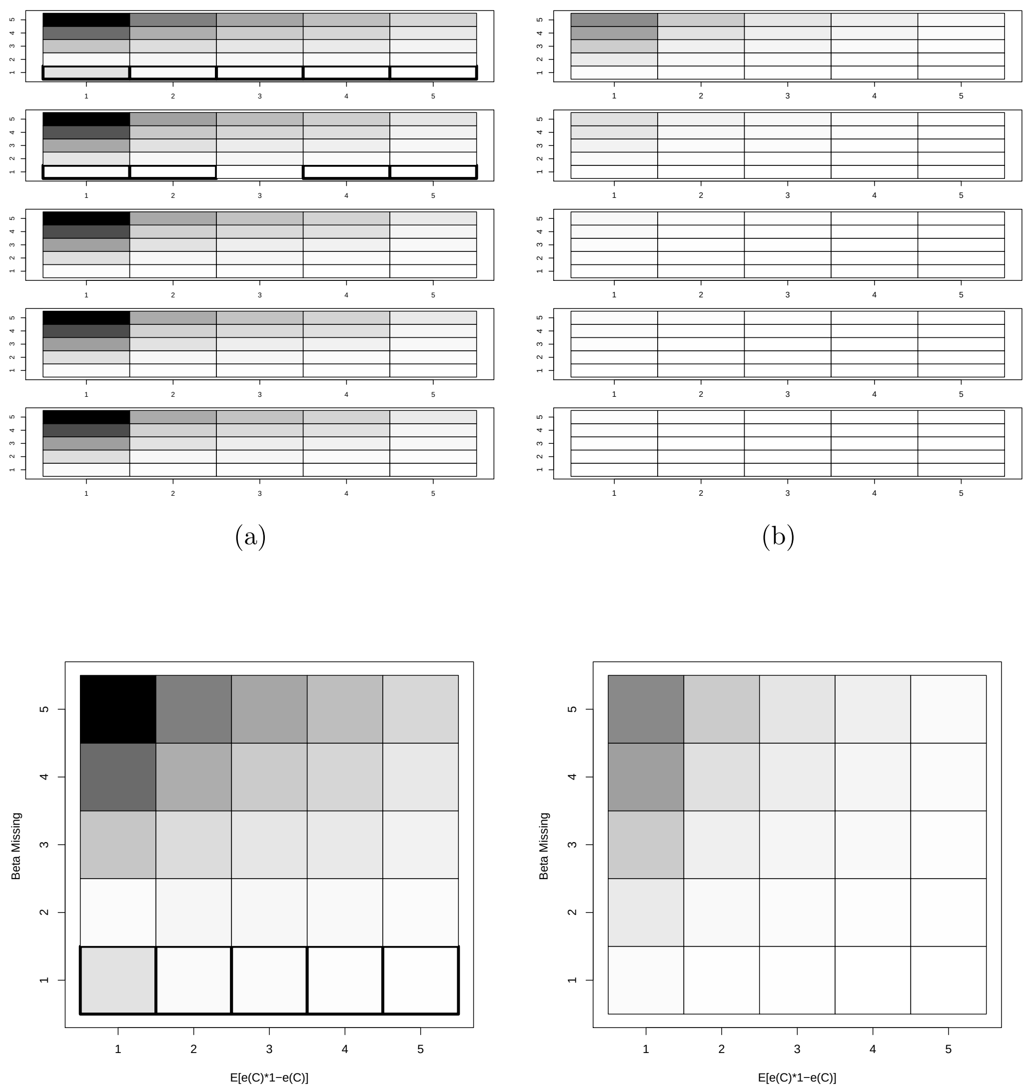


(c)



(d)

Figure 17: Scenario 4 (C_2^2 misspecification). Layout and legend as per Figure 16.



(a) (b) (c) (d)

Figure 18: Scenario 5 (XC_1 misspecification): Layout and legend as per Figure 16. Bold borders indicate negative value for the quantity of interest.

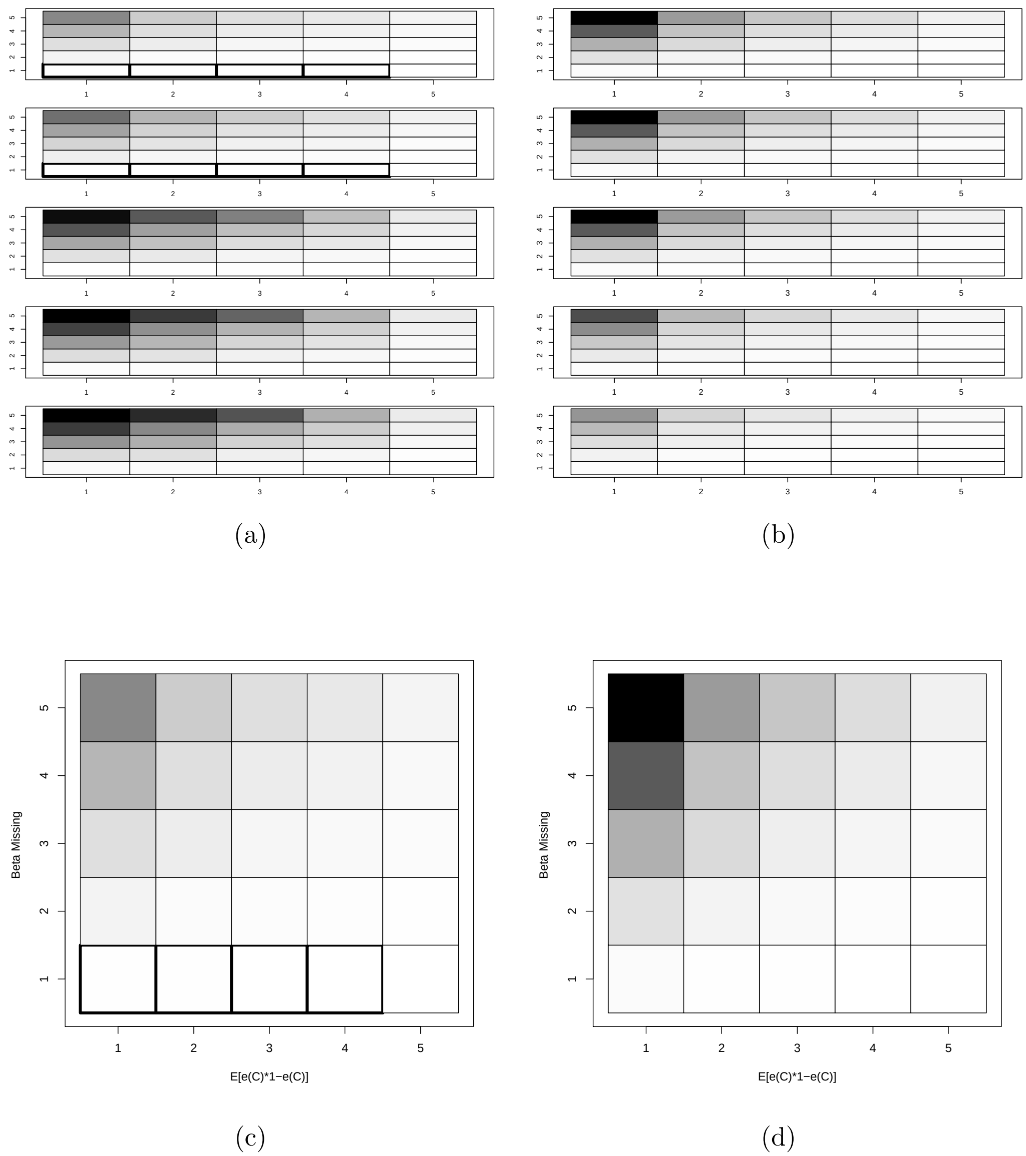


Figure 19: Scenario 7 (XC_2^2 misspecification). Layout and legend as per Figure 18.