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 ($v_R^v$ vs $v_{DR}^v$ 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 $|\beta_n|$ (y-axis) (based on 2000 different $(\alpha, \beta)$). (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 ($X_{C_2}$ misspecification). Layout and legend as per Figure 11.
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 $(\alpha, \beta)$). **Note:** Bold borders indicate where $v_{DR}^* - v_R^* < 0$. 
Figure 16: Scenario 1 ($C_1 C_2$ 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 $(\alpha, \beta)$). (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 $\Delta_R$ and $\Delta_{DR}$, 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).
Figure 17: Scenario 4 ($C_2^2$ misspecification). Layout and legend as per Figure 16.
Figure 18: Scenario 5 (XC₁ 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.