

Reply to Ed's comments on version 8

Here are some comments on some of your suggestions. The remaining ones were incorporated in the text.

1) Additional empirical predictor for the RP model (page 17). We did not receive the spreadsheet, but it seems that with both estimators we should obtain the same results. To see this, replace

$$\hat{k}^* = \max\left(-\frac{m}{M-m}, \frac{MSB-MSE}{MSB}\right) \text{ and } \hat{k}_r^* = \max\left(0, \frac{MSB-\sigma_r^2}{MSB}\right)$$

in the expression for $\hat{T}_i = f[\bar{Y} + k_r^*(\bar{Y}_i - \bar{Y})] + (1-f)[\bar{Y} + k^*(\bar{Y}_i - \bar{Y})]$, to obtain

$$\begin{aligned} \hat{T}_i &= f\left[\bar{Y} + \frac{MSB-\sigma_r^2}{MSB}(\bar{Y}_i - \bar{Y})\right] + (1-f)\left[\bar{Y} + \frac{MSB-MSE}{MSB}(\bar{Y}_i - \bar{Y})\right] \\ &= \bar{Y} + f(\bar{Y}_i - \bar{Y})\left(\frac{MSB-\sigma_r^2}{MSB}\right) + (1-f)(\bar{Y}_i - \bar{Y})\left(\frac{MSB-MSE}{MSB}\right) \\ &= \bar{Y} + (\bar{Y}_i - \bar{Y})\left[\frac{MSB-MSE}{MSB} + f\left(\frac{MSB-\sigma_r^2}{MSB} - \frac{MSB-MSE}{MSB}\right)\right] \\ &= \bar{Y} + (\bar{Y}_i - \bar{Y})\left[\frac{MSB-MSE}{MSB} + f\left(\frac{MSE-\sigma_r^2}{MSB}\right)\right] \end{aligned}$$

which agrees with the expression for $\hat{T}_i = \bar{Y} + [k^* + f(k_r^* - k^*)](\bar{Y}_i - \bar{Y})$ when using

$$\hat{k}^* = \max\left(-\frac{m}{M-m}, \frac{MSB-MSE}{MSB}\right) \text{ and } \hat{k}_r^* - \hat{k}^* = \max\left(0, \frac{MSE-\sigma_r^2}{MSB}\right).$$

2) Empirical predictor for ME and SS models when within cluster variances are equal (page 19), the minimum of $\hat{k}_i = \max\left(0, \frac{MSB-MSE}{MSB}\right)$ can be less than zero when $MSE > MSB$.

3) On page 20, the maximum for $m\hat{b}_1^2 = \max\left(0, \frac{nm(\bar{Y}_i - \bar{Y})^2}{n-1} - S_i^2\right)$ is only between 0 and

$\frac{nm(\bar{Y}_i - \bar{Y})^2}{n-1} - S_i^2$ to guarantee that the last expression is not negative, but not over $i=1, \dots, n$.

4) Page 30, "It appears that when rho(s)=.8, you also get this result". Although there is also a poor behavior for ME predictors for rho(s)=0.5, we base the poor performance on the criteria on that $RPI > 50\%$ (cited on page 28).

5) On page 30, about using different symbols in Figure 5. Julio also suggested this, but although I tried, I couldn't modify the symbols (Silvina).

6) On page 32, about how much larger the variance of the empirical predictor will be relative to the theoretical one, there is no unique value. They depend on the population, sampling fraction and model. This point is considered in section 4)1)b) and Table 3 when we compute the RPI of EMSE relative to TMSE. For example, a maximum RPI of 200% means that the EMSE is twice the TMSE. Although we don't incorporate the mean of the RPI in the Table, they come up to 32%.

7) On page 33, meaning of "small" is clarified later in the same paragraph.

8) On page 36, the conclusion about the shape of the distribution is limited to those used in the simulations (normal, uniform, Beta(10,1), Beta(.5,.5), Gamma(.5) and Gamma(2)), but which cover different "types" of distributions (symmetric and asymmetric, U shaped, etc.). We included a comment about further simulations which are under investigation.

Some general comments:

About Tables and Figures: We incorporate two sentences in the text indicating that figures provide more detailed information (including sampling fractions and intra-class correlations), while the tables try to summarize a general behavior (considering all sampling fractions together).

It would be better to place macros, figures and tables at the cluster project site and to modify the references to it in the article accordingly.

In the Conclusions, we also included a general paragraph indicating the limitations of the simulation study.