Supplement to "Model averaging, asymptotic risk, and regressor groups"

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Simulation details

The simulation programs were written in R and run under Windows Vista. The programs are available on the journal website http://qeconomics.org/supp/332/code_and_data.zip.

The results are presented graphically, with MSE displayed as a function of R^2. The value of R^2 was varied on the 19-point grid $\{0.00, 0.05, 0.10, 0.15, \dots, 0.90\}$. For a fixed α and R^2, the value of c was then determined as

$$c = \sqrt{\frac{R^2}{\sum_{j=1}^{M} j^{-2\alpha}(1-R^2)}}.$$

Given c, we then set $\beta_j = cj^{-\alpha}$ and

$$y_i = \beta_0 + \sum_{j=1}^{M} \beta_j x_{ji} + e_i$$

with $\beta_0 = 0$.

We varied $\alpha \in \{0, 1, 2, 3\}$ and $n \in \{50, 150, 400, 1000\}$.

The default model (Model 1) set the errors e_i and regressors x_{ji} as i.i.d. $\mathrm{N}(0, 1)$ and set $M = 12$. The remaining models explored the deviations from these default settings.

We explored nonnormal errors, heteroskedastic errors, correlated regressors, and $M = 24$.

All models were designed so that the error is conditionally mean zero and has an unconditional variance of 1.

The results for Model 1 and Model 6 are calculated using 10,000 simulation replications. For Models 2–5, the calculations used 2000 simulation replications.

1. Model 1: Normal regression

   - $e_i \sim \mathrm{N}(0, 1)$

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- uncorrelated regressors
- $M = 12$

2. Model 2: Nonnormal error
   - $e_i \sim \frac{4}{5}\mathrm{N}(-\frac{1}{3}, \frac{5}{9}) + \frac{1}{5}\mathrm{N}(\frac{4}{3}, \frac{5}{9})$
3. Model 3: Heteroskedastic error
   - $e_i \sim \mathrm{N}(0, \frac{1}{2}(1 + x_{2i}^2))$
4. Model 4: Correlated regressors
   - $e_i \sim \mathrm{N}(0, 1)$
   - $E(x_{ji}^2) = 1$, $E(x_{ji}x_{ki}) = 0.5$ for $j \neq k$
5. Model 5: Increased number of regressors
   - $e_i \sim \mathrm{N}(0, 1)$
   - $M = 24$
6. Model 6: Autoregression

In the paper, the figures display the normalized MSE for the estimators MMA_4, MMA, Stein, Lasso, and BMA. Here, we also display the normalized MSE for the estimator SAIC and the MMA_4 estimator with the regressors ordered in reverse (from smallest to largest coefficients) and labeled as “Reversed.”

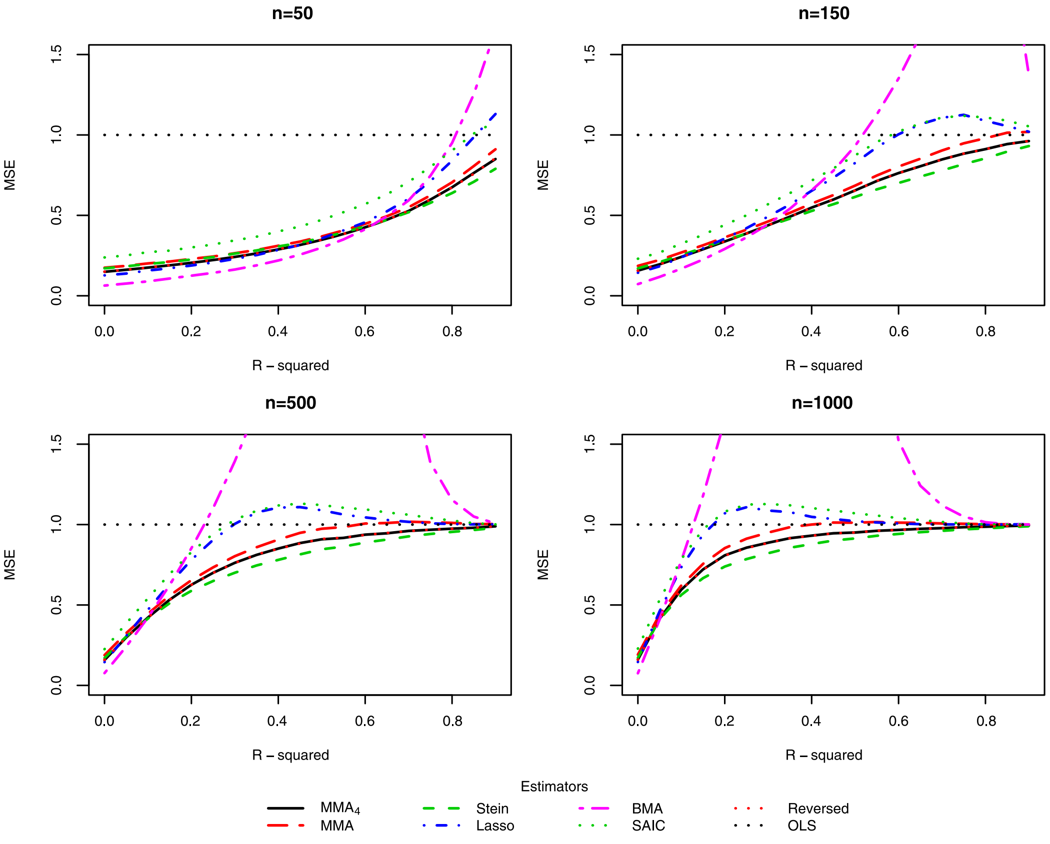

FIGURE 1. Model 1: $\alpha = 0$.

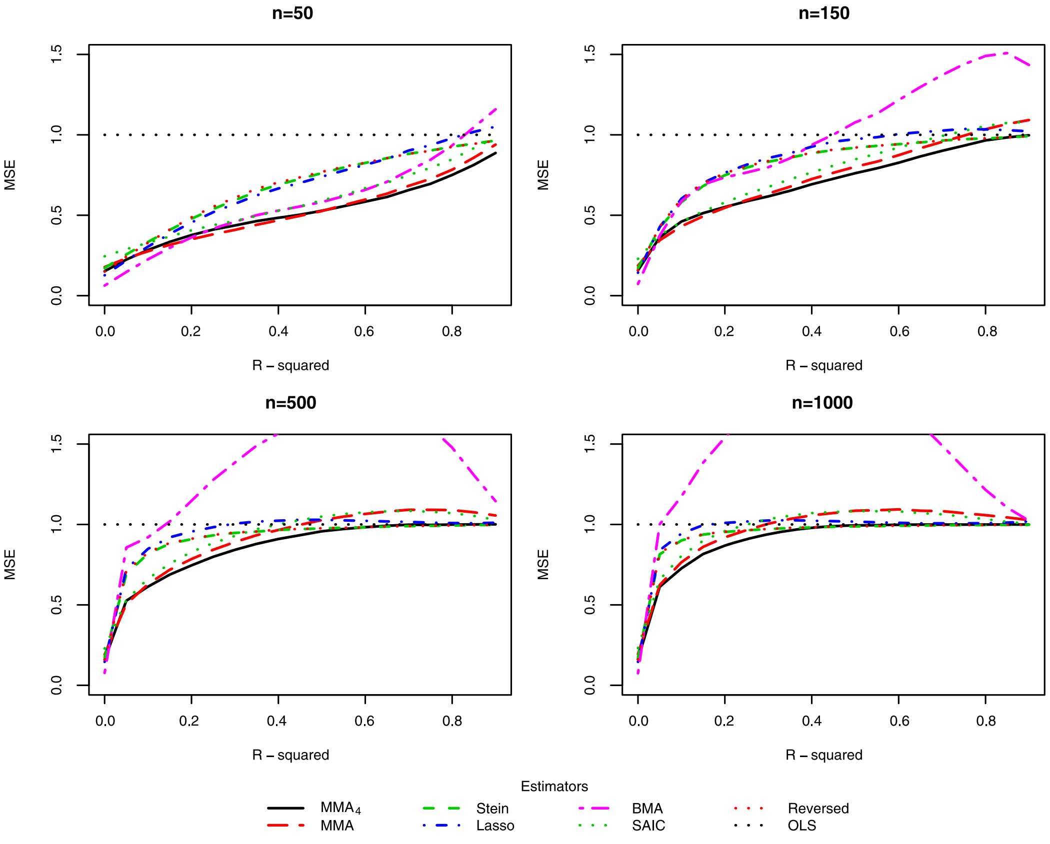

FIGURE 2. Model 1: $\alpha = 1$.

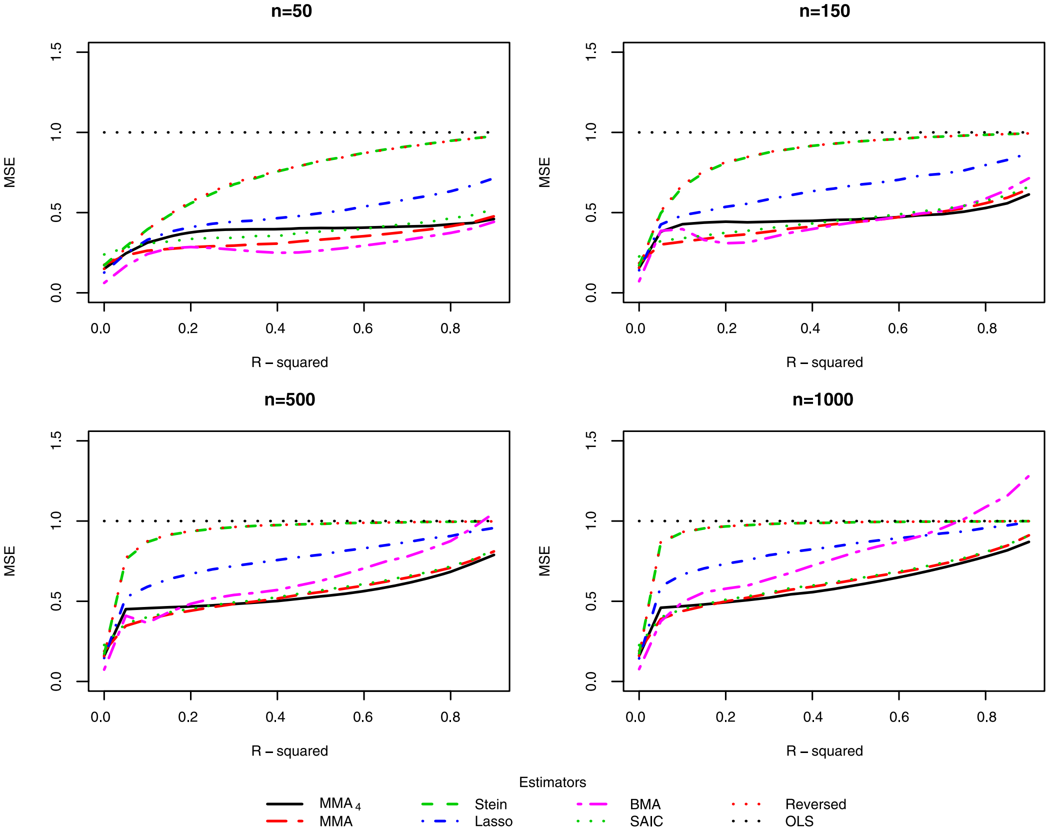

FIGURE 3. Model 1: $\alpha = 2$.

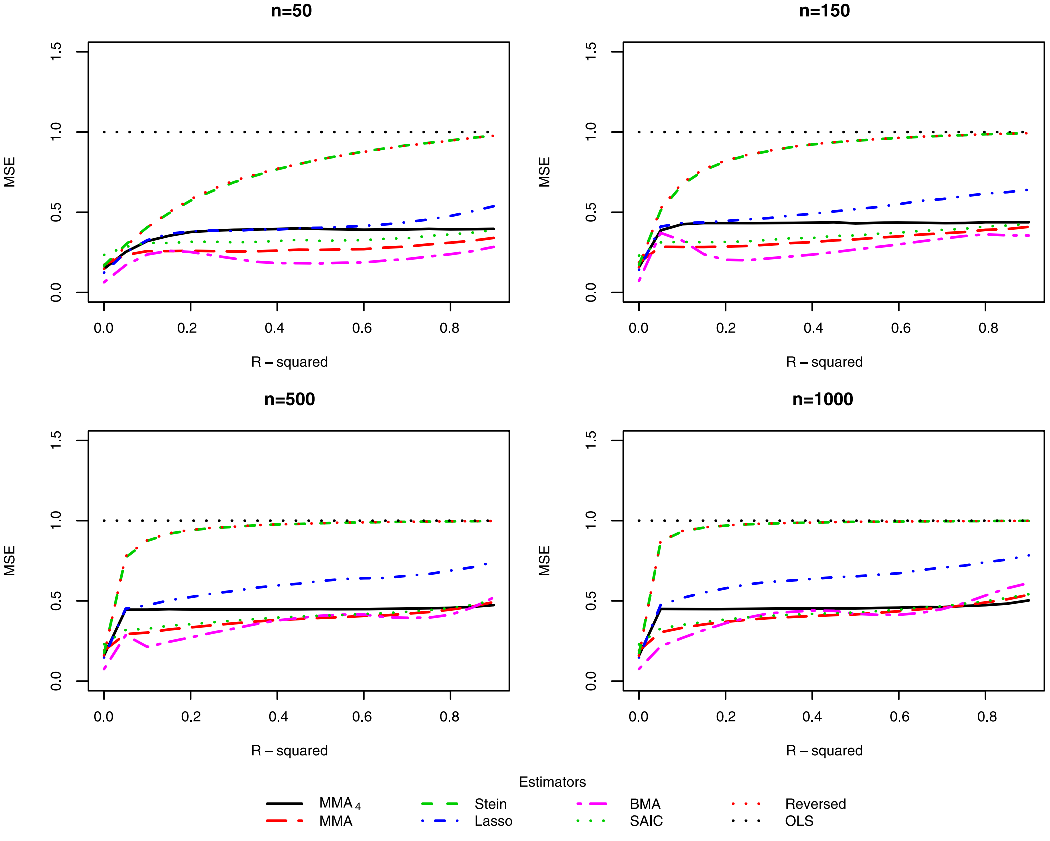

FIGURE 4. Model 1: $\alpha = 3$.

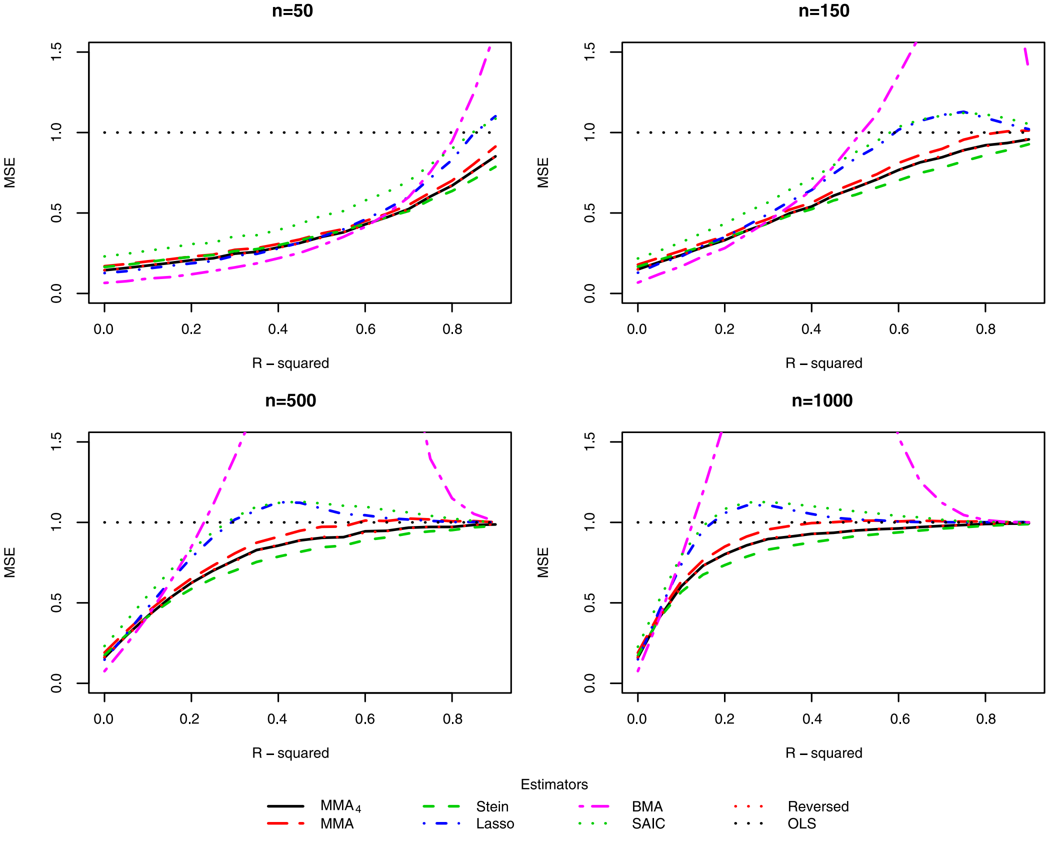

FIGURE 5. Model 2: $\alpha = 0$.

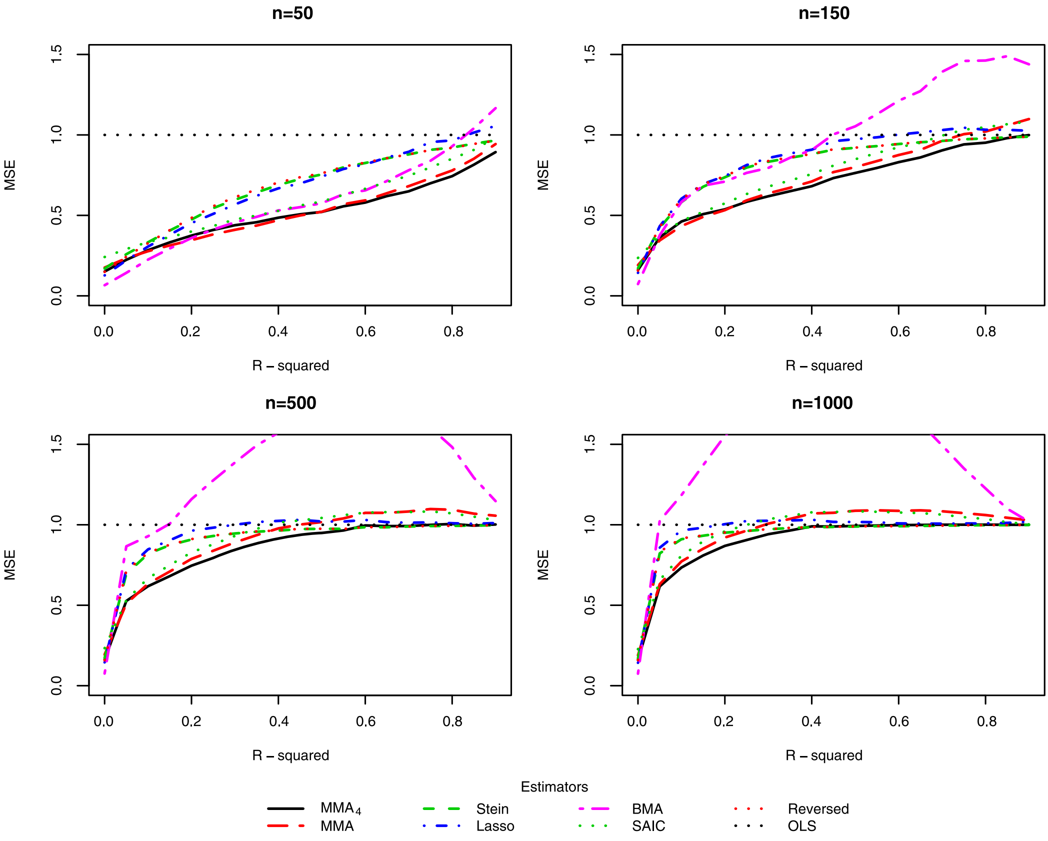

FIGURE 6. Model 2: $\alpha = 1$.

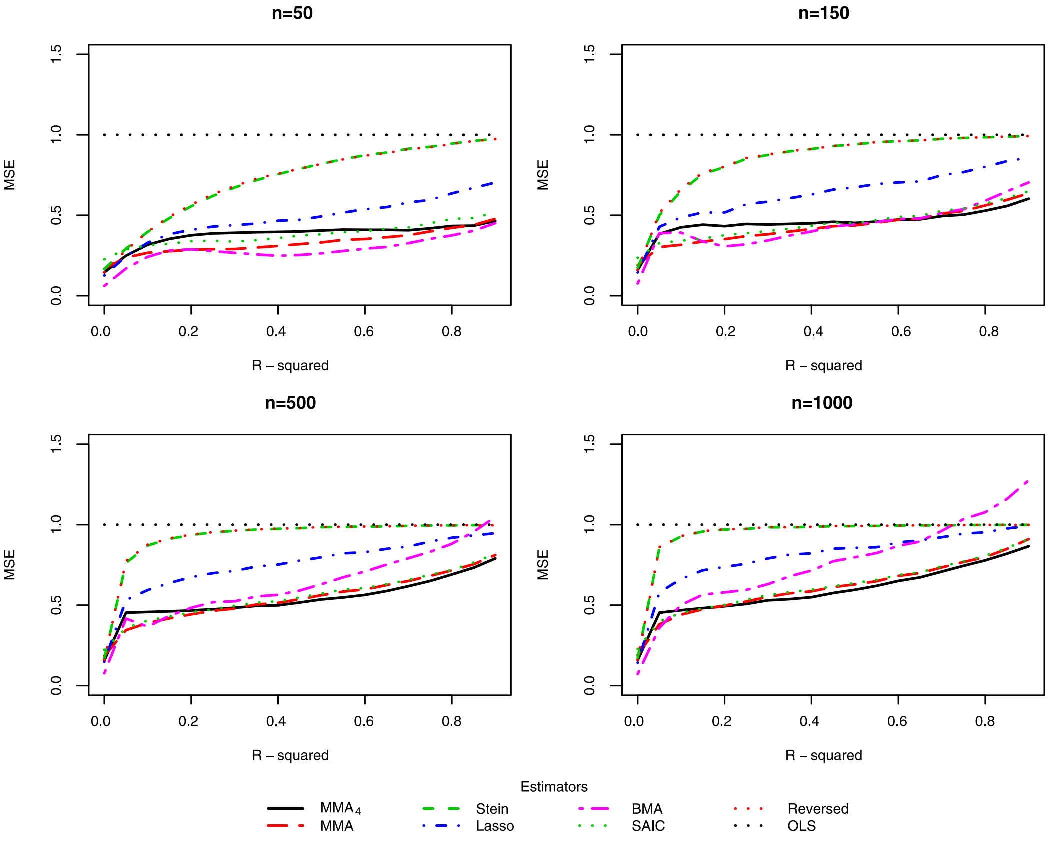

FIGURE 7. Model 2: $\alpha = 2$.

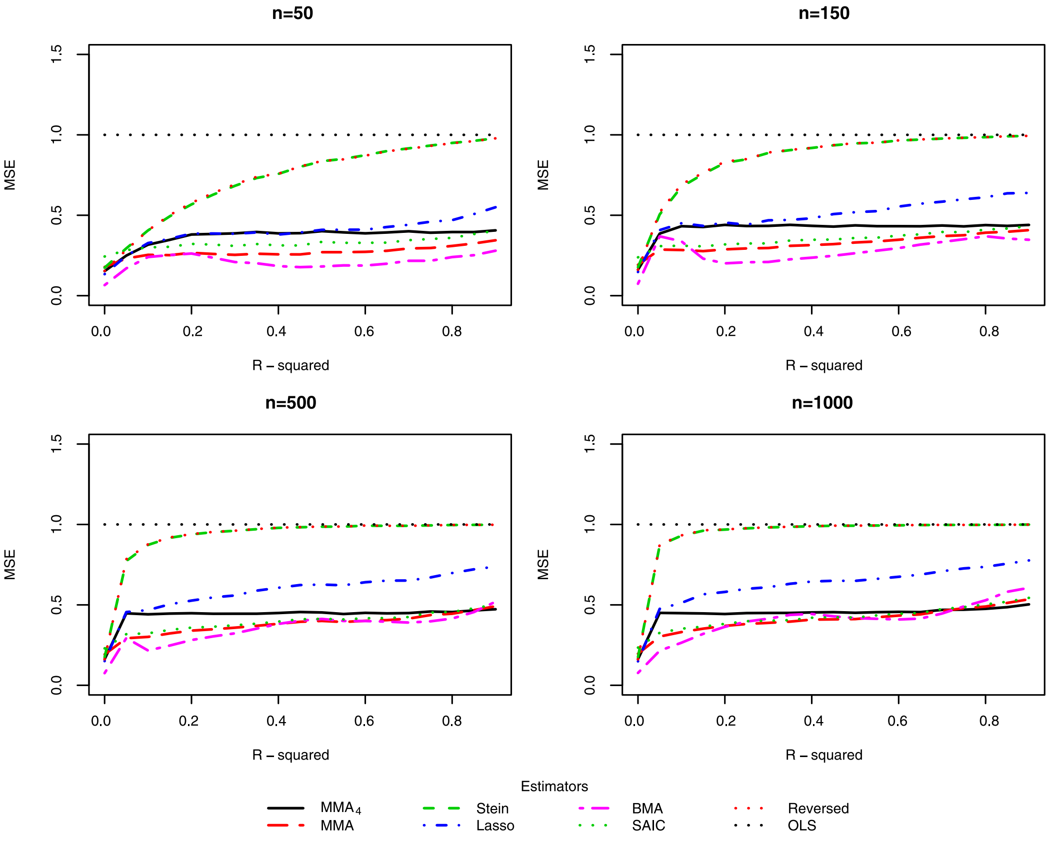

FIGURE 8. Model 2: $\alpha = 3$.

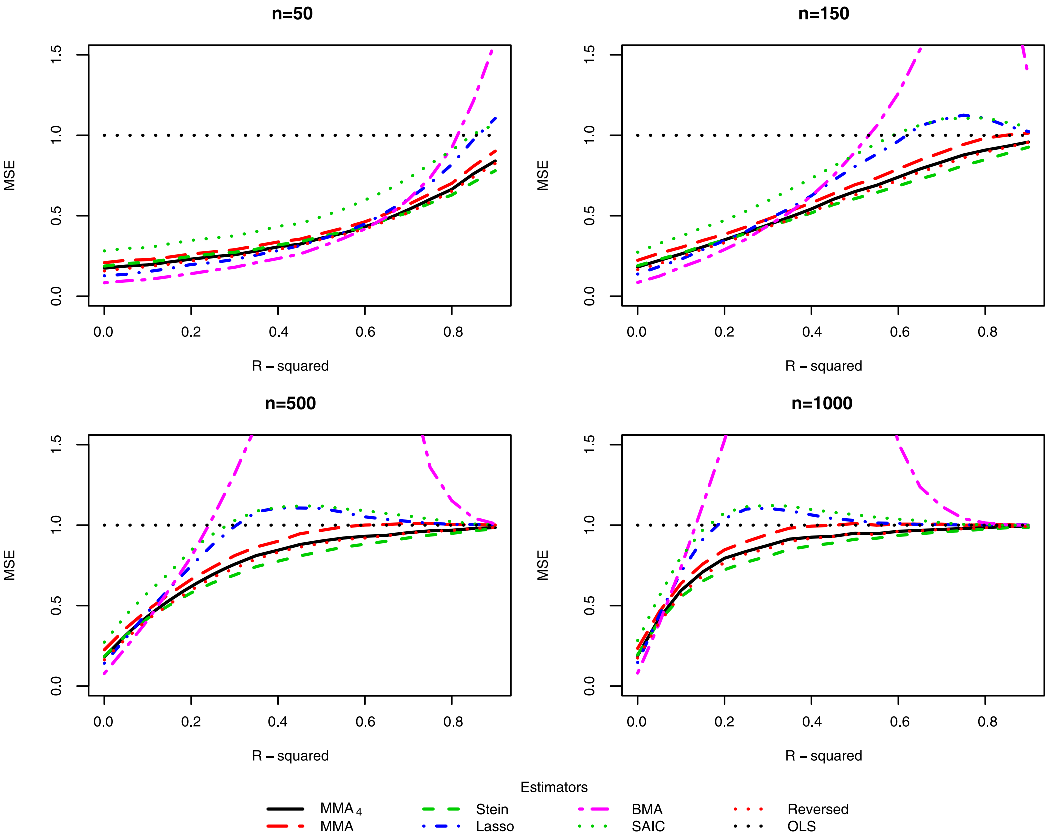

FIGURE 9. Model 3: $\alpha = 0$.

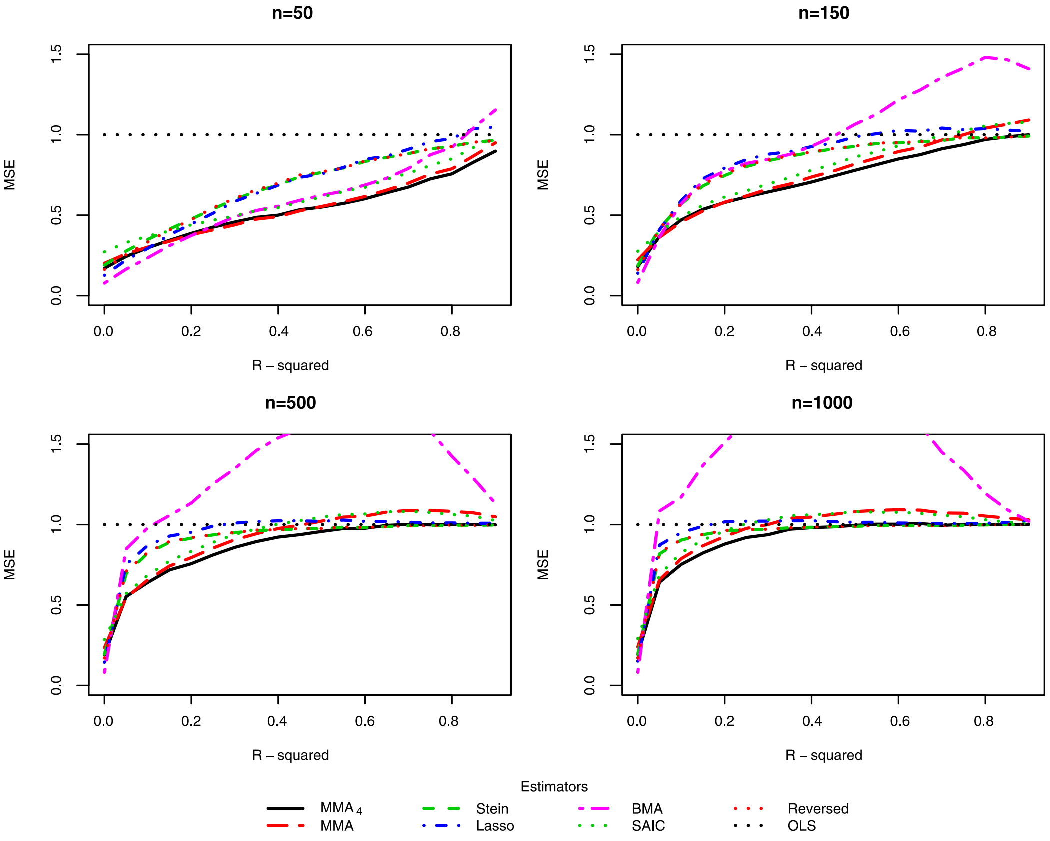

FIGURE 10. Model 3: $\alpha = 1$.

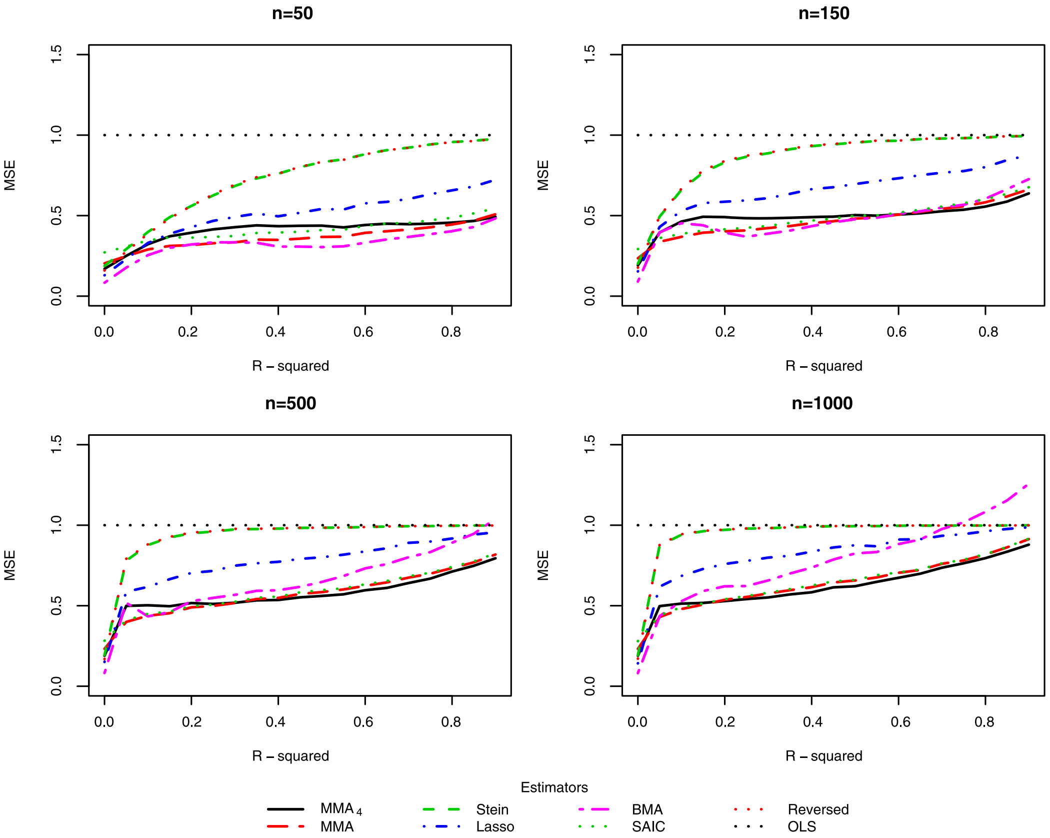

FIGURE 11. Model 3: $\alpha = 2$.

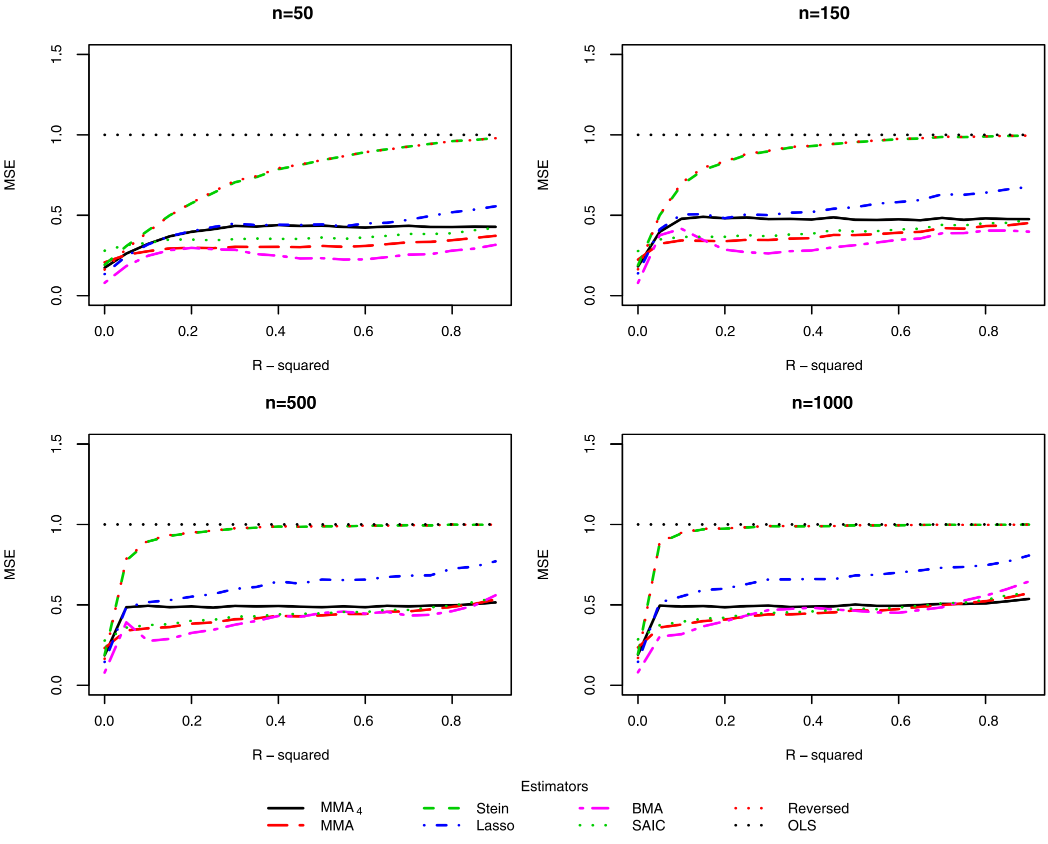

FIGURE 12. Model 3: $\alpha = 3$.

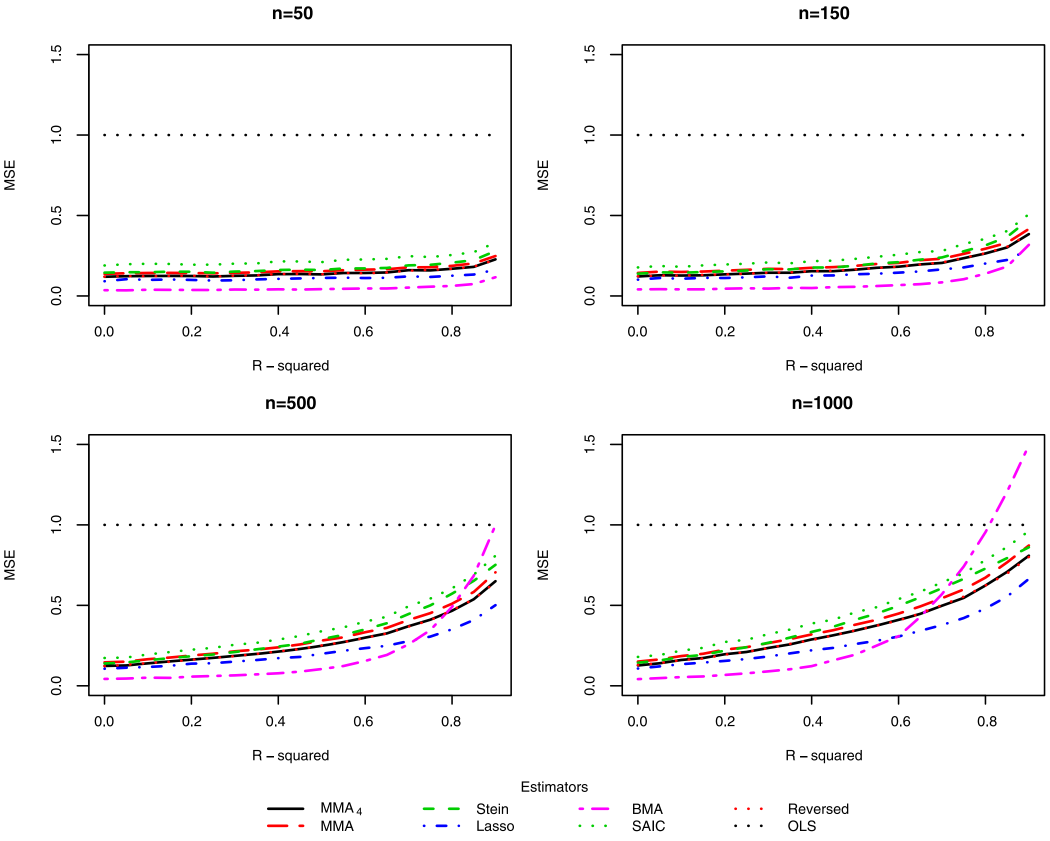

FIGURE 13. Model 4: $\alpha = 0$.

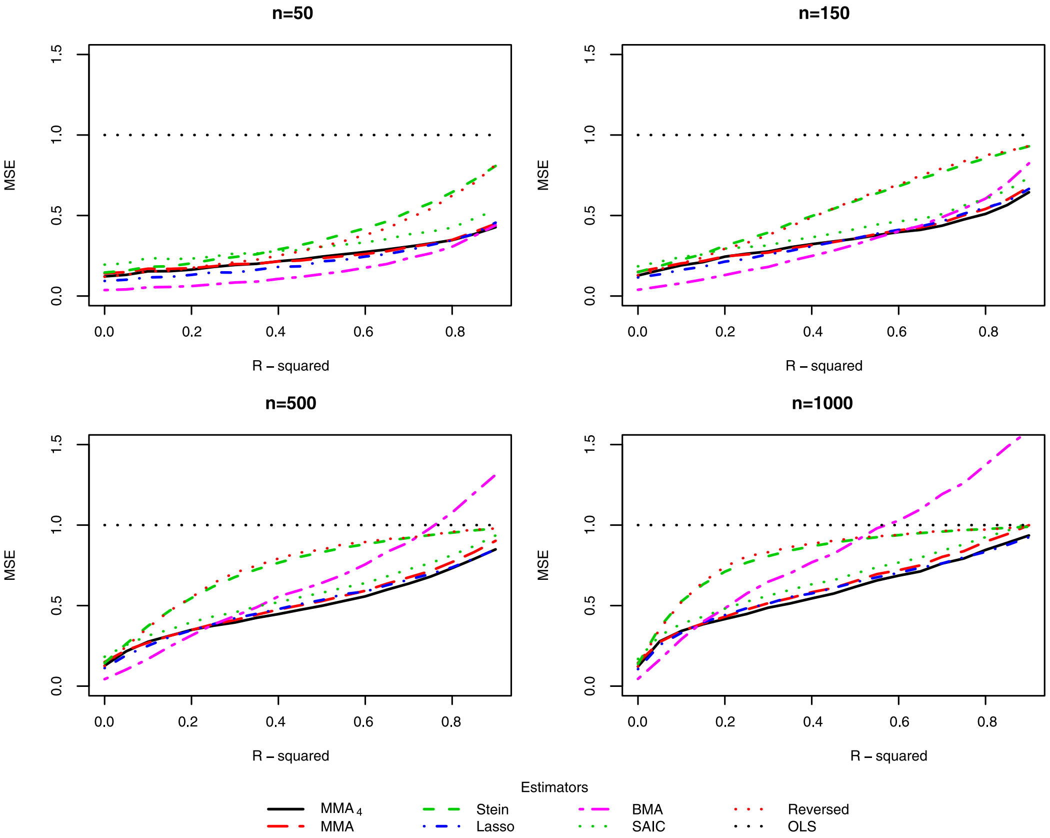

FIGURE 14. Model 4: $\alpha = 1$.

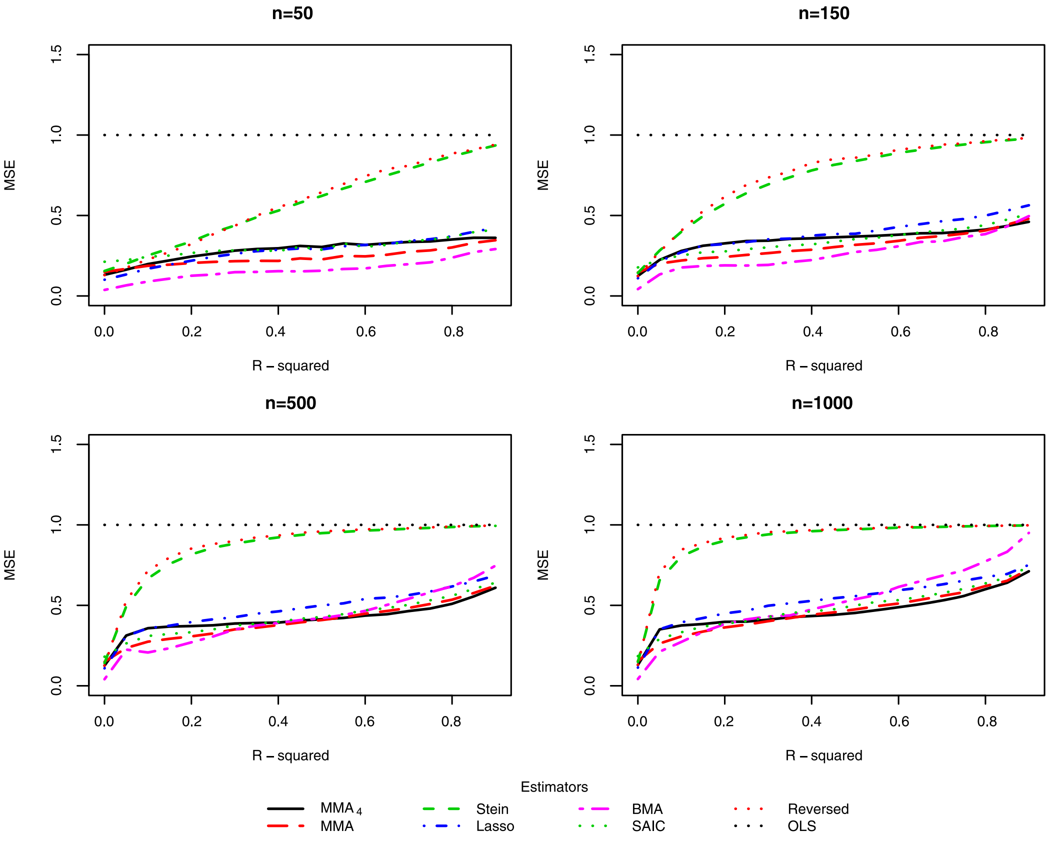

FIGURE 15. Model 4: $\alpha = 2$.

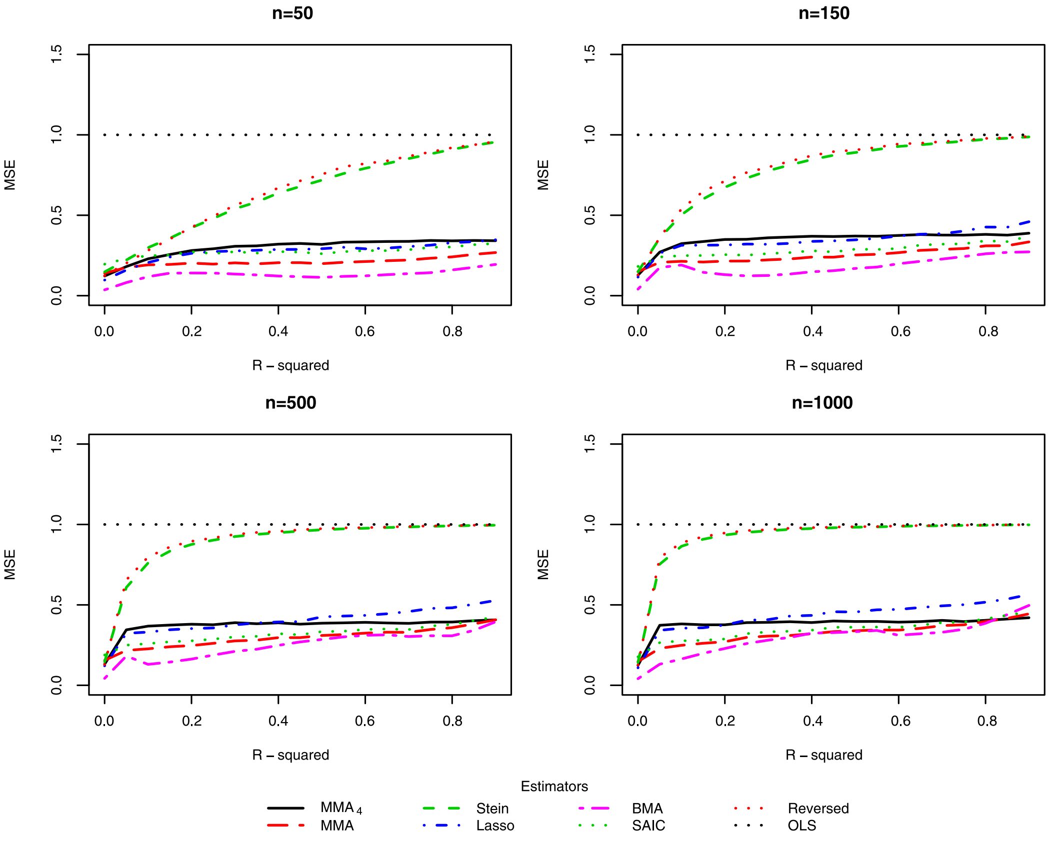

FIGURE 16. Model 4: $\alpha = 3$.

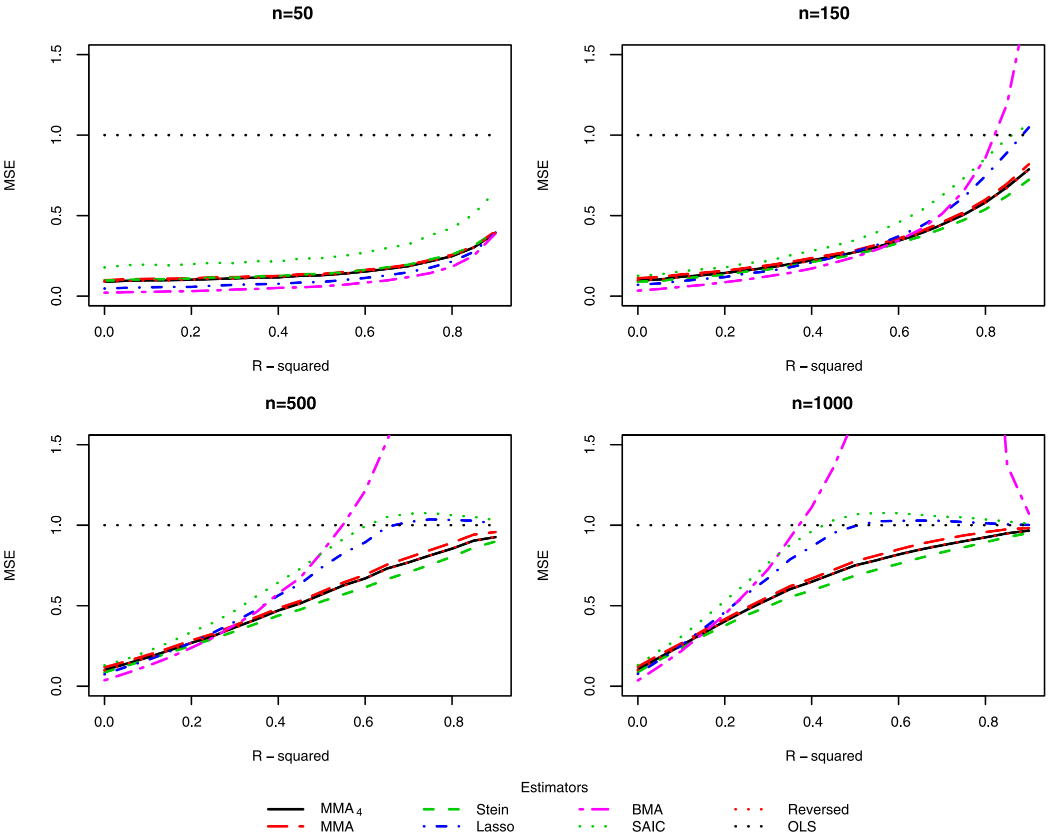

FIGURE 17. Model 5: $\alpha = 0$.

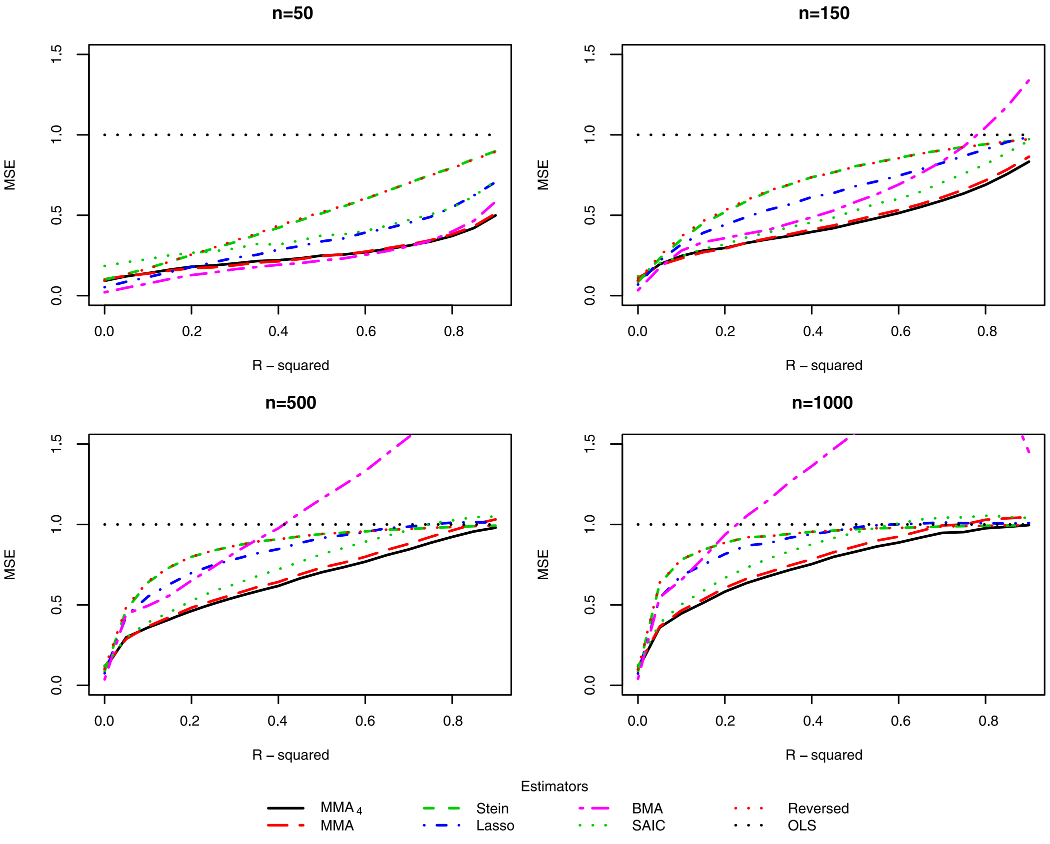

FIGURE 18. Model 5: $\alpha = 1$.

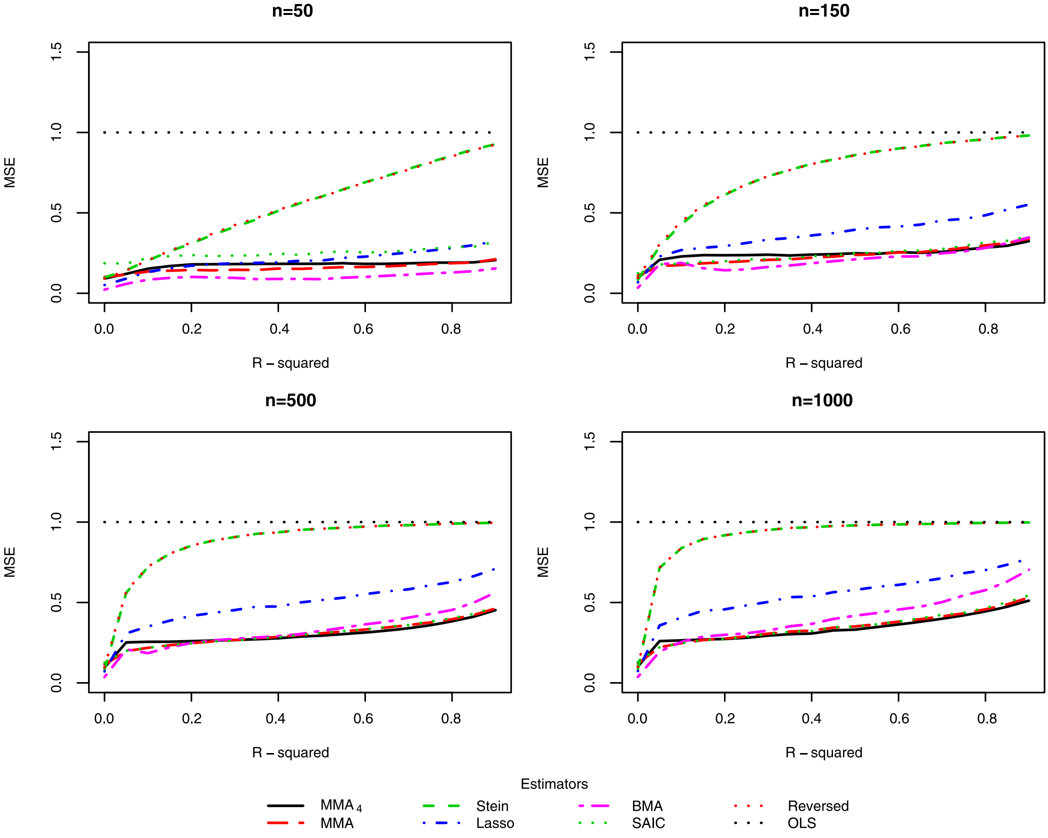

FIGURE 19. Model 5: $\alpha = 2$.

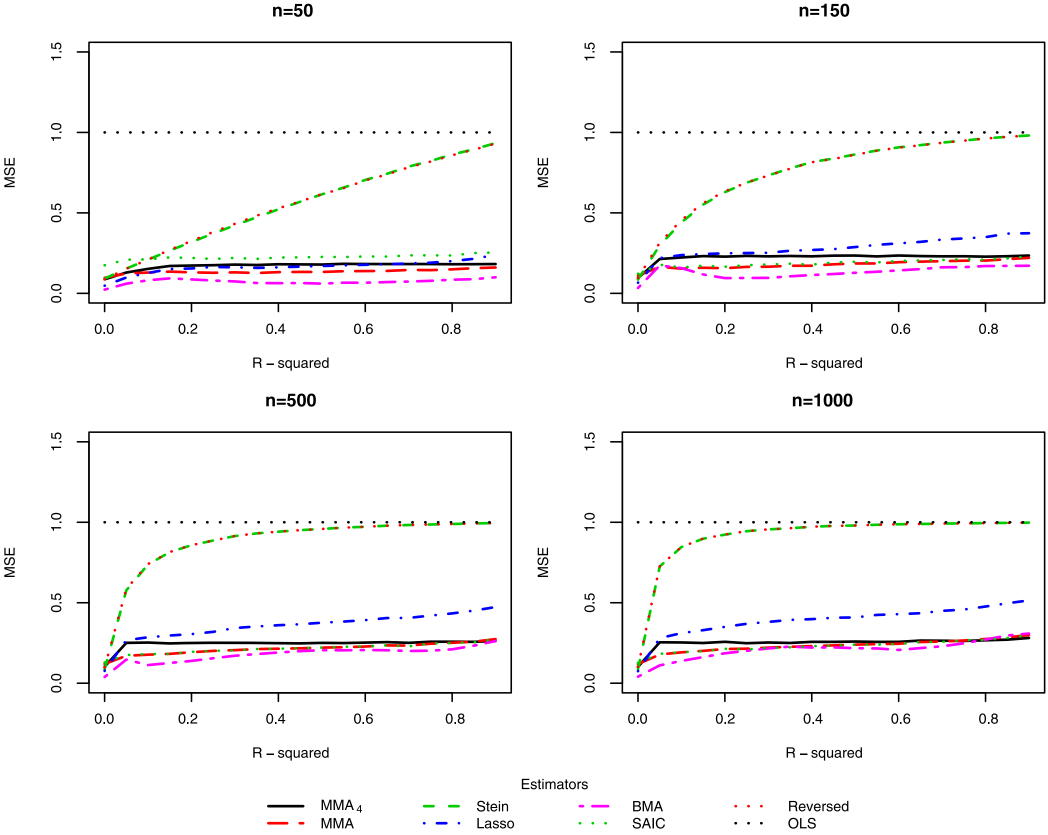

FIGURE 20. Model 5: $\alpha = 3$.

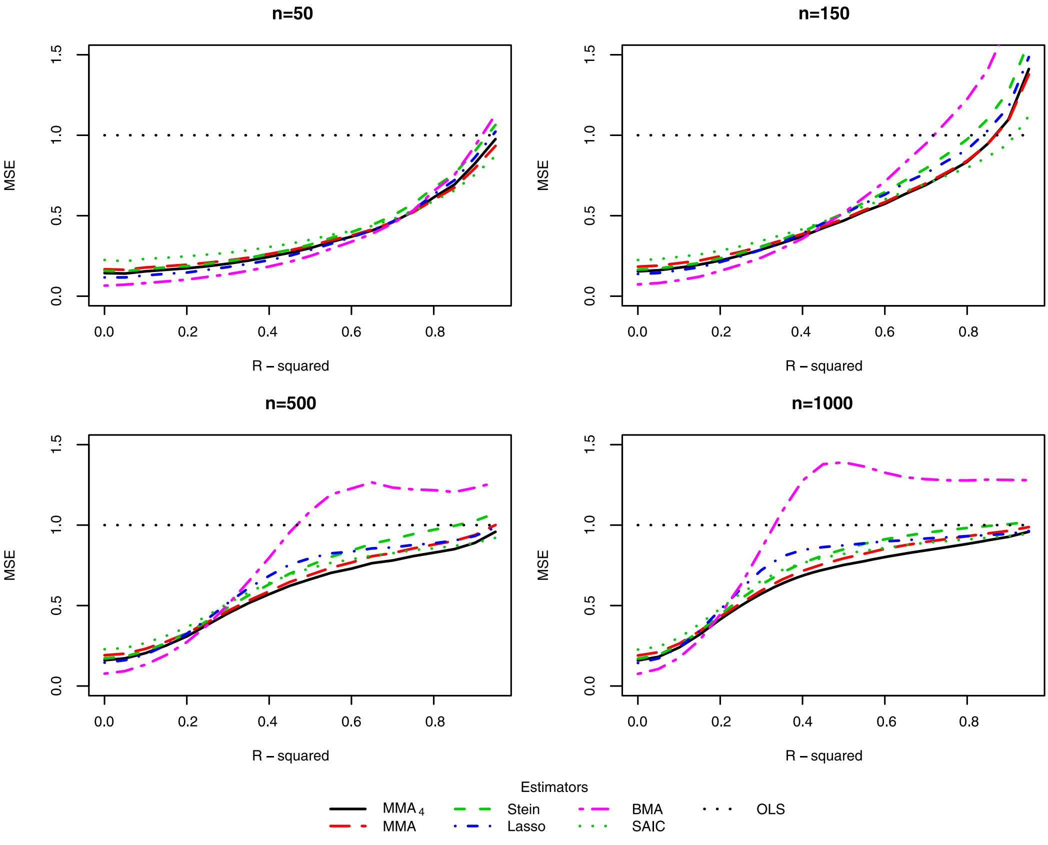

FIGURE 21. Model 6: Autoregression.

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