

Figure S1: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0$, missing rate 20%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

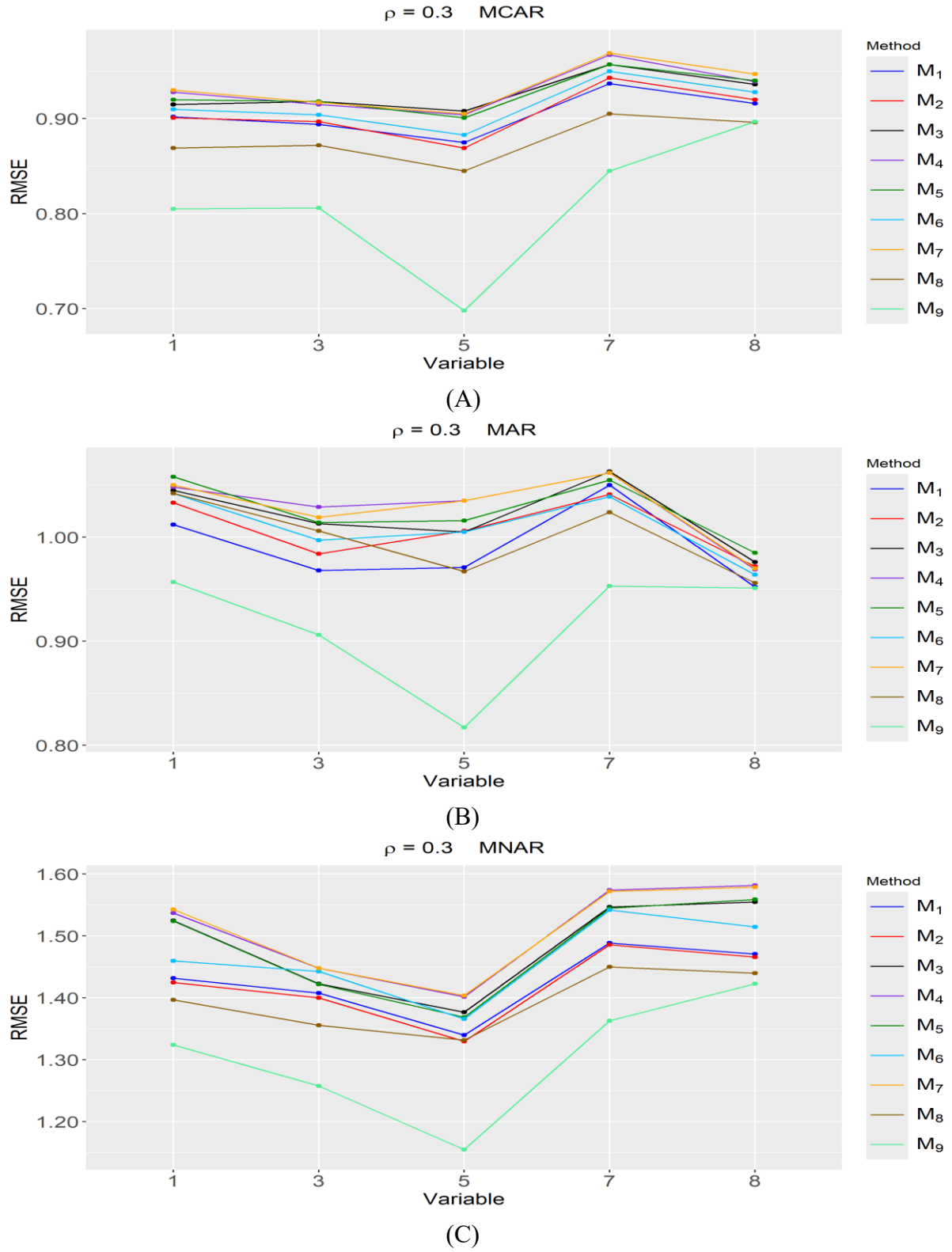


Figure S2: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0.3$, missing rate 20%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

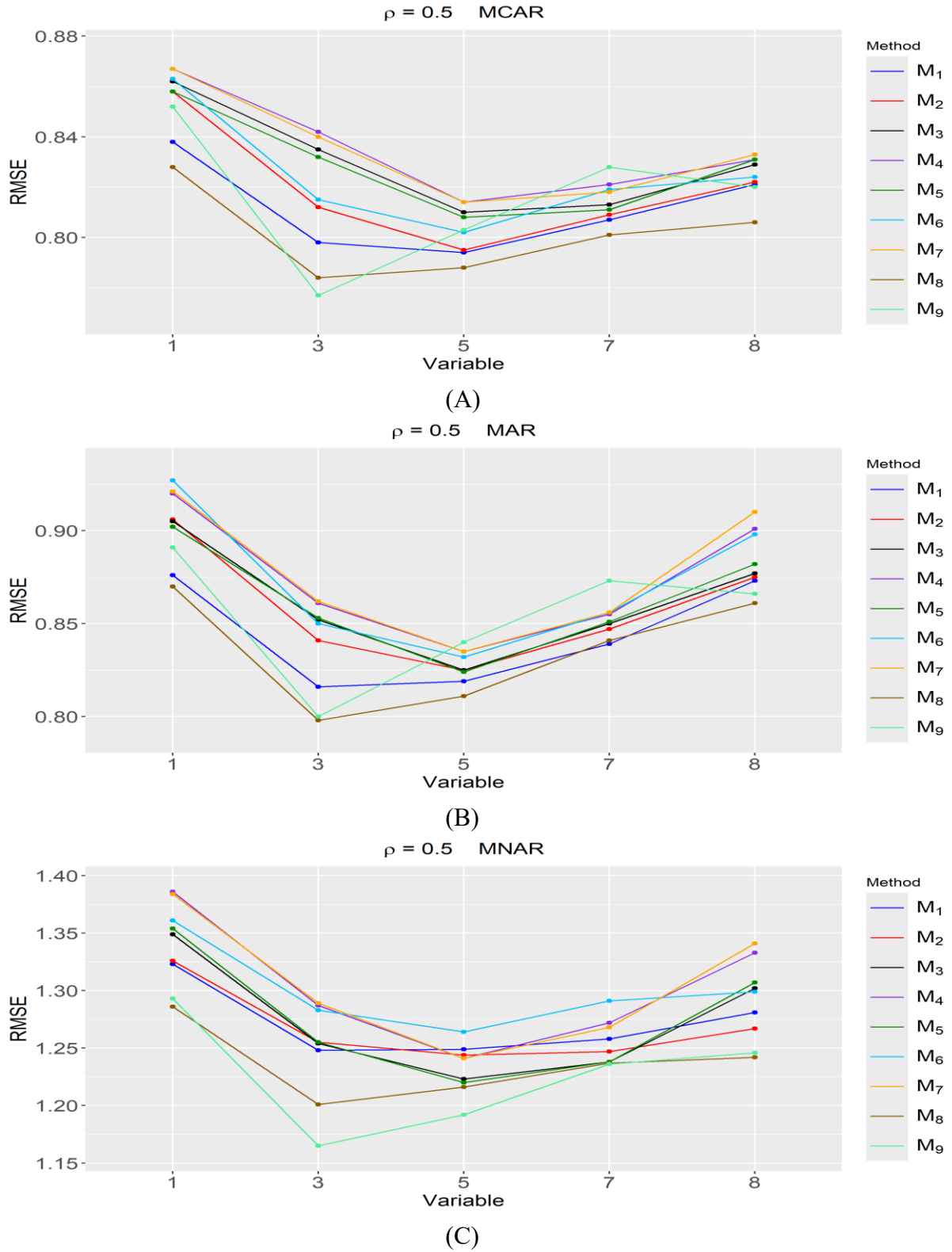


Figure S3: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0.5$, missing rate 20%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE

algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE

algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

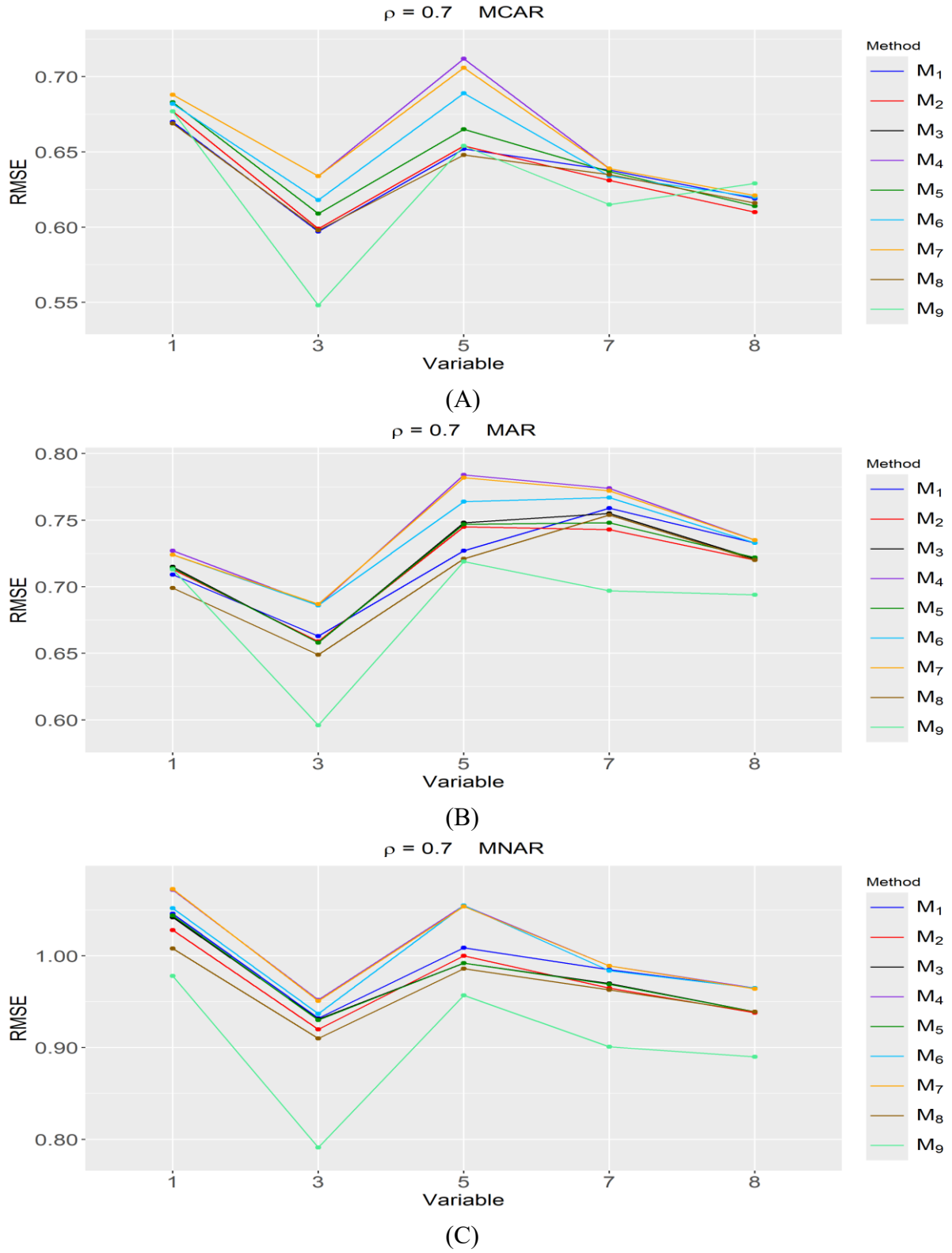


Figure S4: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0.7$, missing rate 20%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

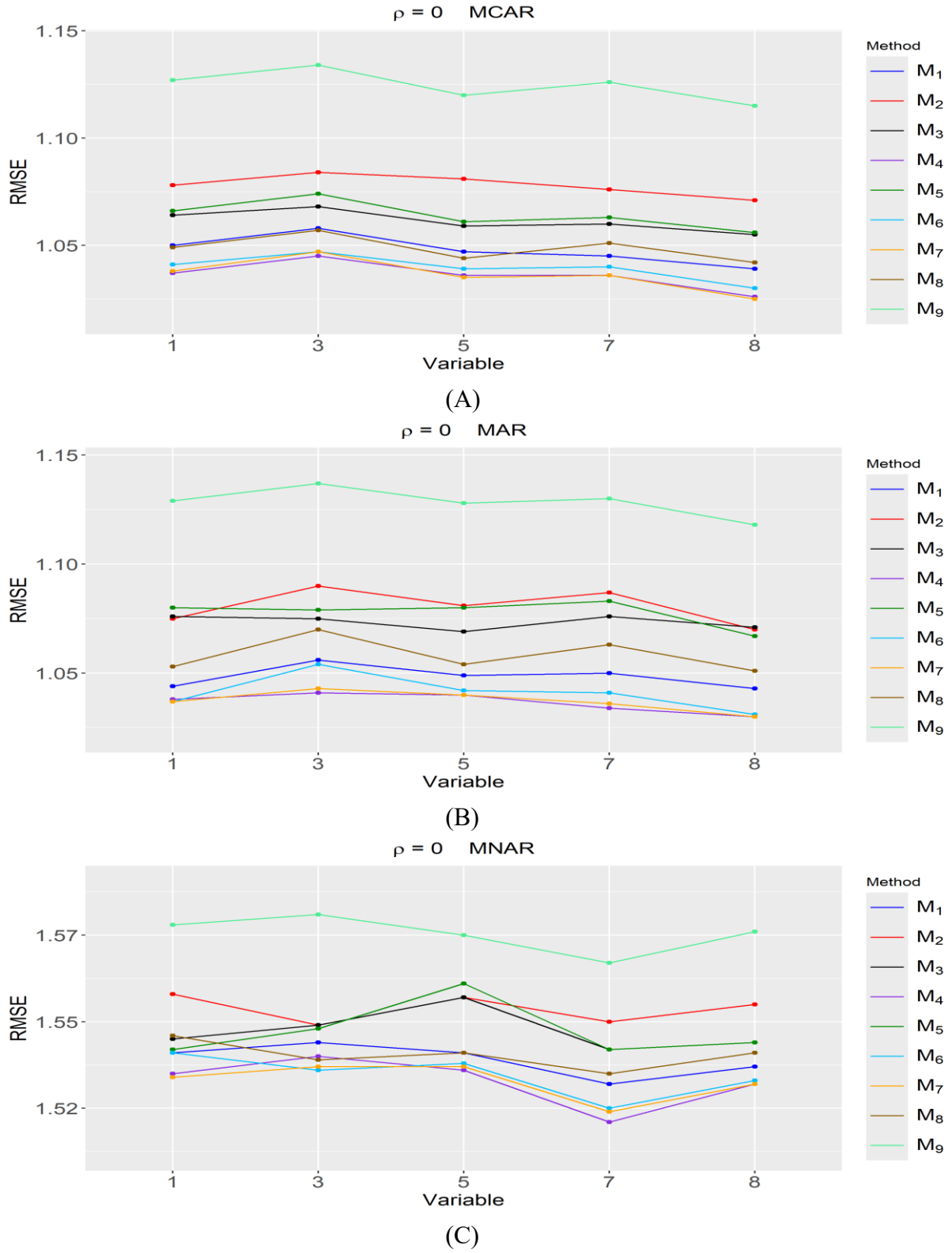


Figure S5: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0$, missing rate 30%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

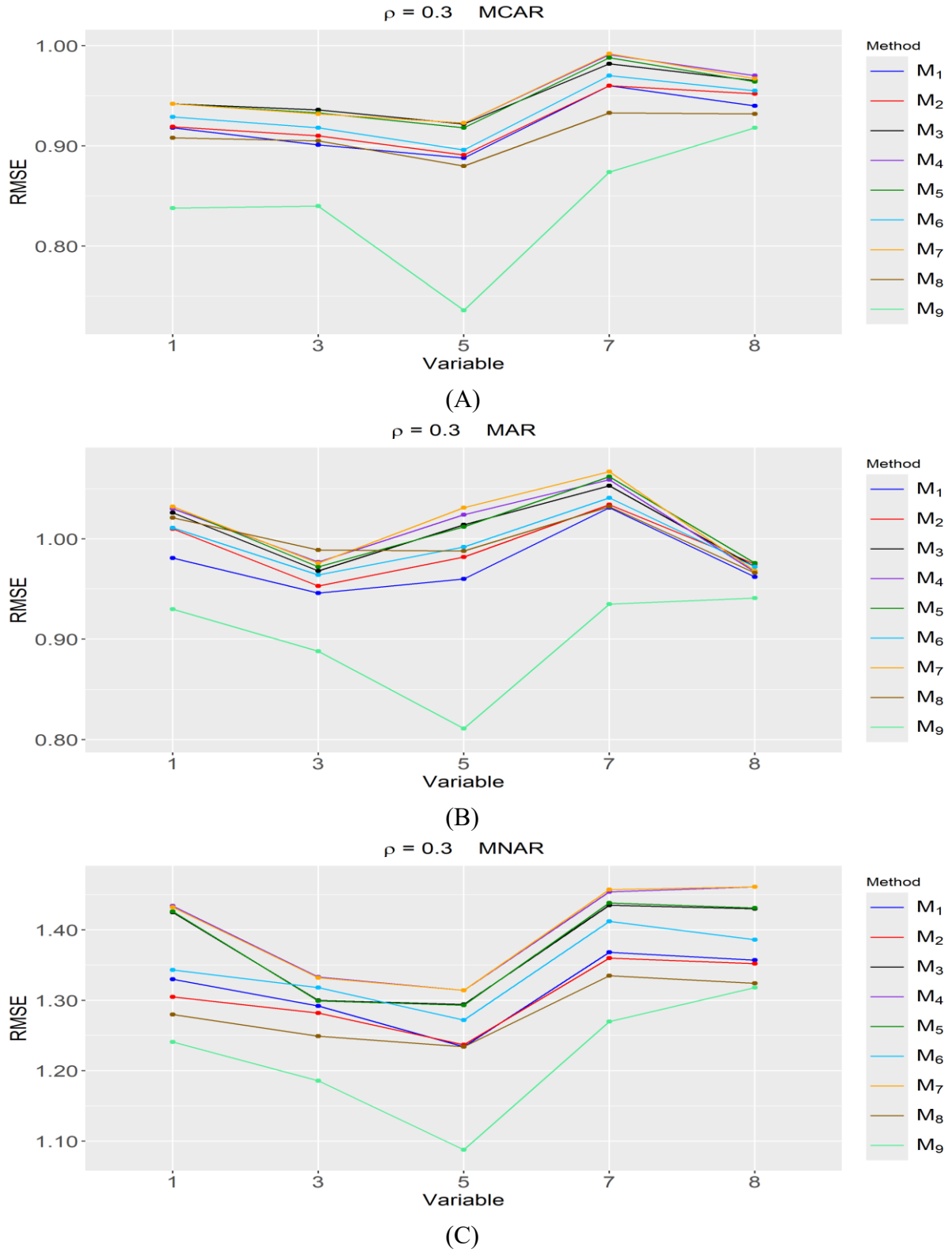


Figure S6: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0.3$, missing rate 30%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

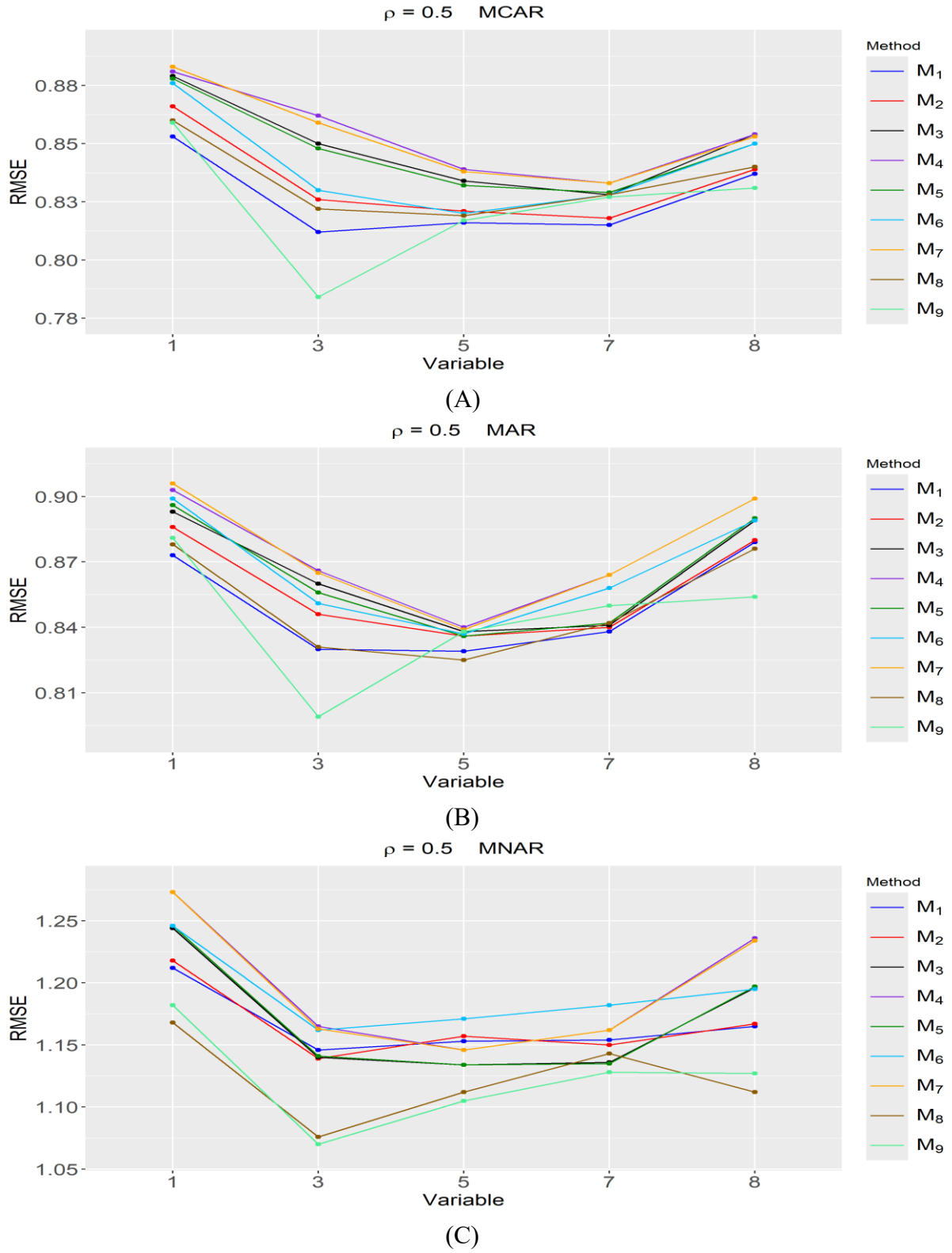


Figure S7: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0.5$, missing rate 30%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE

algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE

algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.

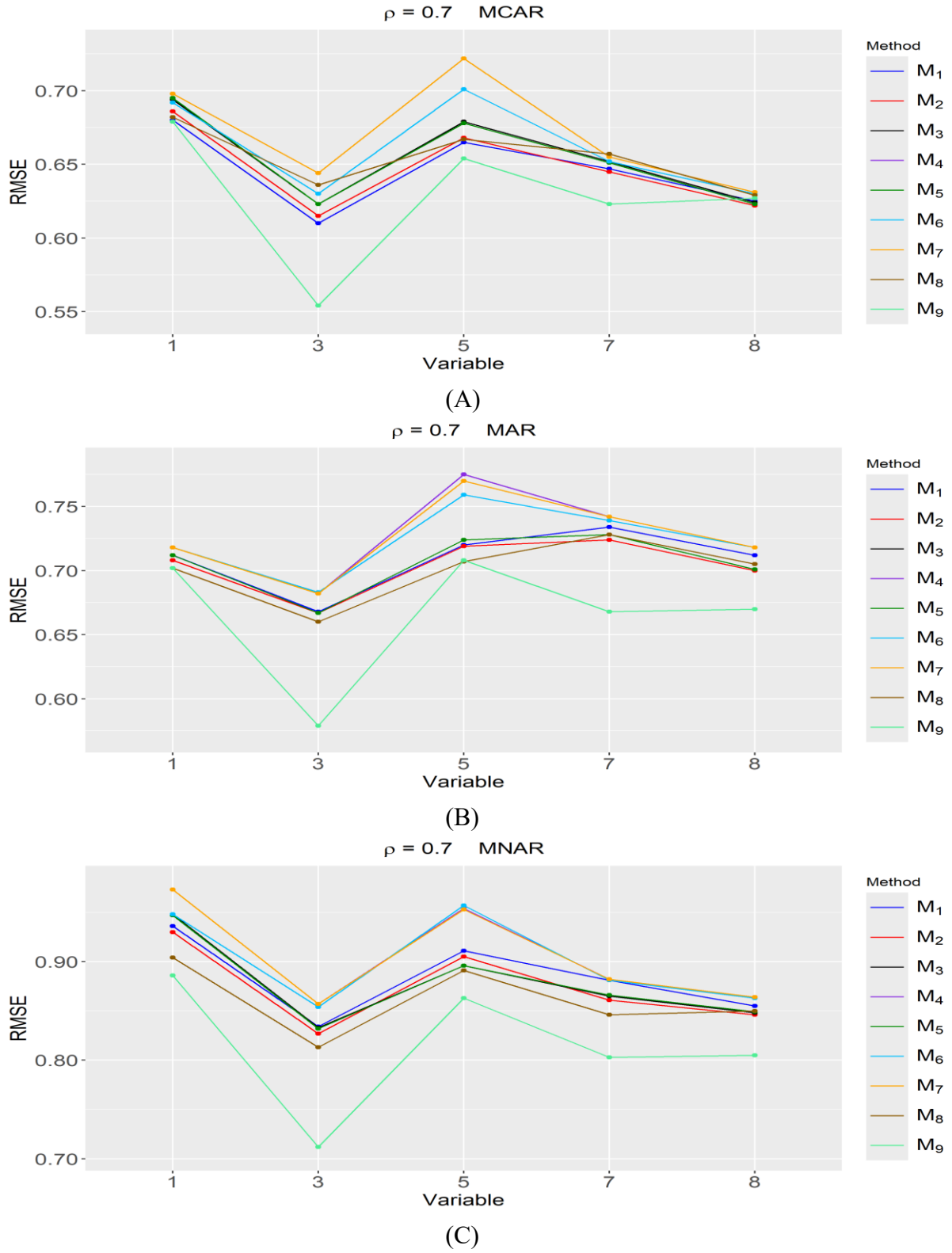


Figure S8: The imputation performances for quantitative variables 1, 3, 5, 7, and 8 under the condition $\rho = 0.7$, missing rate 30%, $N = 500$, and (A) MCAR, (B) MAR, (C) MNAR. The $RMSE_p$ under Methods M_1 to M_8 are plotted respectively for each of the

variables. Imputation methods: M_1 : *rpart* with surrogate variables;

M_2 : GI (RSS) + majority rule; M_3 : GI (RSS) + RE algorithm; M_4 : GI (RSS) + H-RE

algorithm; M_5 : CHI + majority rule; M_6 : CHI + RE algorithm; M_7 : CHI + H-RE

algorithm; M_8 : iterative imputation; M_9 : *mice* with cart option.